Materials Testing & Consulting, Inc.

Geotechnical Engineering & Consulting ● Special Inspection ● Materials Testing ● Environmental Consulting

October 8, 2013

Ms. Maggie Buckley, LEED AP
David Evans and Associates, Inc.
415 118th Avenue SE
Bellevue, WA 98005
via email: Mmbr@deainc.com

Subject: **Cursory Geotechnical Evaluation Report**
Skagit County Jail – Alf Christianson Site
Skagit County Tax Parcel Numbers: P121047, P26886, P26788, P53373, P53374, P53375, P53376, P53377, P53378, P53379, P54112, P54113, P54114, P54115, P54116, P54117, P54118, P54119, P54120, P54122, and P103224
Mt. Vernon, WA 98273

MTC Project Number: 13B093-01

Dear Ms. Buckley:

In accordance with your request Materials Testing & Consulting, Inc. (MTC) has conducted a cursory geotechnical evaluation of the above mentioned site to assess geotechnical feasibility for construction of a new jail and courtroom. Our field investigation activities were conducted on September 4, 5, and 12, 2013, in accordance with the scope of services presented in our Revised Proposal for Geotechnical Engineering Services, dated June 26, 2013.

We appreciate the opportunity to provide geotechnical engineering services to you for this project. If you have any questions regarding this report, or if we can provide assistance with other aspects of the project, please contact me at (360) 647-9295.

Respectfully Submitted,
MATERIALS TESTING & CONSULTING, INC.

Lance Levine, P.E.
Project Geotechnical Engineer

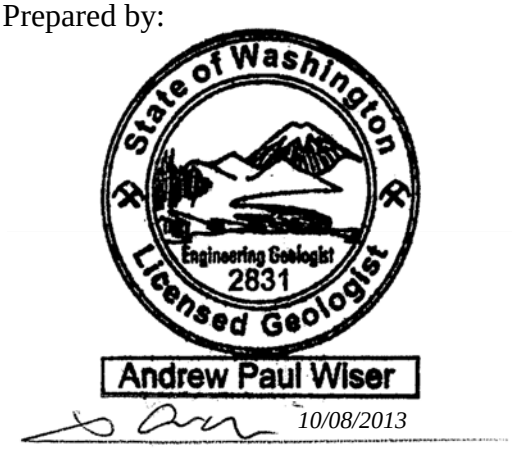
Attachment: Cursory Geotechnical Evaluation Report

Prepared for:

Ms. Maggie Buckley, LEED AP
David Evans and Associates, Inc.
415 118th Avenue SE
Bellevue, Washington 98005

Cursory Geotechnical Evaluation Report
Skagit County Jail – Alf Christianson Site
Skagit County Tax Parcel Numbers: P121047, P26886, P26788, P53373, P53374, P53375, P53376, P53377, P53378, P53379, P54112, P54113, P54114, P54115, P54116, P54117, P54118, P54119, P54120, P54122, and P103224
Mt. Vernon, WA 98273

Prepared by:



Andy Wiser, L.E.G.
Project Engineering Geologist

Lance Levine, P.E.
Project Geotechnical Engineer

MATERIALS TESTING & CONSULTING, INC. (MTC)
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Phone: (360) 755-1990
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October 8, 2013
MTC Project Number: 13B093-01

Table of Contents

1.0 INTRODUCTION

1.1 GENERAL

This report presents the findings and recommendations of Materials Testing & Consulting, Inc.'s (MTC), cursory geotechnical evaluation study for the prospective project. The prospective project site consists of twenty one (21) Skagit County parcels located south of West Kincaid Street, between Interstate 5, Union Street, and the Burlington Northern Santa Fe Railway in Mount Vernon, Washington. The parcel numbers include P121047, P26886, P26788, P53373, P53374, P53375, P53376, P53377, P53378, P53379, P54112, P54113, P54114, P54115, P54116, P54117, P54118, P54119, P54120, P54122, and P103224. The location of the project site is shown in Figure 5 of Appendix A.

1.2 PROJECT DESCRIPTION

It is our understanding that Skagit County is considering two sites for construction of a new jail facility and courtroom. This report details a cursory geotechnical evaluation for the prospective Alf Christianson site. A separate evaluation is also being conducted for the other prospective site, and Phase I Environmental Site Assessments are being conducted for both sites. The Alf Christianson site is composed of developed commercial-industrial property and undeveloped land formerly utilized as single-family residential lots. Primary access to the new facility would be from West Kincaid Street to the north and Railroad Avenue and South 6th Street from the south. The exact building materials and loads have not been specified at the time of report production, but according to the project documentation provided by David Evans and Associates, Inc., the complex will be primarily one-story with portions of multi-story, will house up to 400 beds, and encompass approximately 90,000 square feet of building footprint. In addition, future development plans include expansion of the complex to house up to 800 beds and encompass 165,000 square feet.

1.3 PURPOSE AND SCOPE OF SERVICES

The purpose of MTC's study was to characterize the subsurface soil and groundwater conditions based on data collected during the advancement of borings and excavation of archeological trenches. Cursory-level geotechnical recommendations for site development are needed to aid in the determination of which prospective site is most suitable for the proposed development.

Our scope of services was consistent with that presented in our Proposal for Geotechnical Engineering Services, dated June 26, 2013, and supplemental scopes to provide private utility locates, advancement of additional boring footage, and to observe archeological trench excavations.

2.0 SITE EXPLORATION AND LABORATORY TESTING

2.1 SITE EXPLORATION

MTC's site exploration activities were performed on September 4, 5, and 12, 2013. Our site exploration involved logging the advancement of five borings and excavation of two archeological trenches. Two borings were advanced to 51.5 feet below present grade (BPG), two borings were advanced to 56.5 feet BPG, and a fifth boring was advanced to 86.5 feet BPG. Both archeological trenches were excavated to approximately 8 feet BPG. Boring locations were selected by the project structural engineer to encompass the proposed development and target proposed building footprints. Archeological trenching locations were selected by the project Archeologist based on site accessibility and requirements of the site archeological evaluation. During advancement of borings and excavation of archeological trenches, a MTC Engineering Geologist logged soil conditions as encountered in accordance with the Unified Soil Classification System (USCS) and made note of soil texture, color, consistency or density, and other geotechnical or geologically defining characteristics. Representative soil samples were collected, sealed in plastic bags, and transported to our laboratory for additional classification and analysis.

Exploration locations are shown on the attached site plan included in Appendix A, Figure 6. Additional information on the site exploration program is provided with our Exploration Logs included in Appendix B of this report.

Figure 1. Exploration Activities at Test Pit 2

Figure 2. Test Pit 1

2.2 LABORATORY TESTING

Laboratory tests were performed on select soil samples in accordance with ASTM standards to determine index and engineering properties of on-site soils. Tests included supplementary soil classification, grain-size distribution, plasticity index, and determination of natural moisture content. Laboratory test results are presented on test reports included in Appendix C.

3.0 EXISTING SITE CONDITIONS

3.1 SURFACE DESCRIPTION

The prospective project site is located in a mixed commercial and residential neighborhood in the downtown area of Mount Vernon. The property is generally flat and level and is located in the Skagit River Valley. MTC anticipates somewhat significant fill activities (approximately 5 feet) will be required to bring the site to design grade. Retaining structures are not anticipated for the scope of potential development.

The 8.2-acre prospective project site includes twenty-one (21) Skagit County parcels and is bordered by commercial property to the north, Interstate 5 to the east, and residential properties to the to the south and west. Burlington Northern Santa Fe Railway also borders the western property line. The site is primarily accessed from the north via East Kincaid Street and south via South 6th Street and Railroad Avenue.

Much of the property is currently developed with existing improvements including buildings, asphalt paving, and other associated improvements. Some of the smaller eastern parcels historically utilized as single-family residential parcels are presently undeveloped and vegetated with field grass, sparse brush, and trees.

Figure 3. Typical Surface Conditions, North Half of Prospective Site (Google Image)

Figure 4. One of the Existing Structures, South End of Prospective Site (Google Image)

3.2 AREA GEOLOGY

The site soils are mapped by the Soil Survey of Skagit County primarily as Mt. Vernon-Field complex, 0 to 3 percent slopes (152). The soil in the particular area of the site is largely inferred in the Soil Survey of Skagit County due to being mostly covered by buildings, roads, and parking areas. Mt. Vernon-Field complex is described as being very deep and moderately well drained. The seasonal high water table

depth is generally shallow (24 to 48 inches below the surface). The results of our field and laboratory investigations indicate that site conditions are consistent with the published geology.

According to the *Geologic Map of Washington – Northwest Quadrant*, the geology of the site consists of alluvium (Qa). The Holocene age material consists of sorted combinations of silt, sand, and gravel deposited in streambeds and alluvial fans. The surface is relatively undissected.

According to the *Geologic Map of Mount Vernon, Skagit County Washington*, United States Department of the Interior Geological Survey (Dethier and Whetten, 1981), site geology is composed of alluvium (Qal). The Holocene age alluvium was deposited by the Skagit River and is composed predominantly of heterogeneous deposits of silt, sand, and gravel.

Soil conditions encountered during our field exploration generally agree with local geologic sources.

3.3 SOIL CONDITIONS

A general characterization of the on-site soil units encountered during our exploration is presented in this section. The Exploration Logs in Appendix B present details of the soils encountered at each exploration location.

The on-site soils are generally characterized as follows:

Topsoil; Silt (ML/OL): Brown sandy silt with trace gravel was encountered BH-5 and TP-1, and is interpreted as occurring across all areas of the project presently surfaced by sod and unkempt landscaping. Topsoil was generally 0.5 to 0.8 feet thick where observed directly, and was soft to stiff, and moist. Some roots and minor organic material was observed in this layer. It should also be noted that established trees were observed at the project site and that topsoil and subsurface root penetration will be significantly greater at these locations.

Uncontrolled Fill (UCF): Observed directly at TP-2 was uncontrolled fill extending to 2.7 feet BPG. This material is composed of a silt-clay matrix with sand and gravel that was soft to medium dense and dry. Garbage refuse of brick, glass, and plastic also comprised the uncontrolled fill.

Historic Fill (Milled Wood): A wood deposit that may be related to historic site use was encountered between 7 to 11 feet BPG at BH-2. This material was capped by organic silt underlying silty sand and sand with gravel, all of which would be interpreted as past site fill in the event that the wood deposit is in fact milled wood.

Fill; Asphalt, road base, and general site fill (GP / SP): Brown sand with gravel and gravel with sand was encountered on the surface (below asphalt or grass) at all exploration locations except Archeological Trenches 1 and 2 and Borehole 5 in the mostly undeveloped areas (uncontrolled fill was generally still found at these locations). This fill layer was generally 2.0 to 4.0 feet thick, medium dense, and moist.

Upper Alluvium; Sand with varying Silt content (SM, SP, SP-SM, some ML): Gray or brown sand with varying silt content was generally encountered immediately below the surface fill material. This layer was typically 25 feet to 30 feet thick. The material was generally loose to medium dense and moist to saturated. The shallow sections of this stratum exhibited mottling near the water table. Boring BH-2 differed from other exploration locations significantly. The soft, fine grained stratum described immediately below (middle subsoil) extended to near the ground surface fill at BH-2.

Middle Alluvium; Inter-bedded Sand, Silt, Clay, Peat, and Organics (SM, ML-OL, CL, PT): A thick layer of inter-bedded sand, silt, clay, peat, and organics was encountered at approximately 23.5 feet to 31.0 feet BPG at all exploration locations, with the exception of BH-2 and TP-1 where it was encountered immediately below surface fill material. This layer ranged from 15.0 feet to 30.0 feet thick, was highly interbedded and laterally discontinuous, and was primarily very loose/very soft with isolated horizons of medium dense/firm consistency. Soils appear to be below the regional groundwater surface and were therefore saturated. The soil ranged in color including grays, browns, and reds and the fine grained soils were generally non-cohesive to moderately cohesive. Field tests suggested that some fine-grained soils exhibit plastic behavior and may be compressible. Organic silt and peat deposits ranged from 50 to 100 percent organic material and may comprise between 3 to 10 feet of the entire bored length between the ground surface and approximately 50 feet BPG.

Lower Alluvium; Sand with varying silt and gravel content (SM, SP): Sand with varying silt and gravel content extended from the base of the compressible interbedded Middle Alluvium to the depth explored. The average depth of this layer could not be determined. However, the base of this stratum extended to approximately 86.5 feet BPG at BH-1 where medium dense gravel was encountered. The material was generally gray, loose to medium dense, wet to saturated, and contained interbedded silt lenses observed from split-spoon samples to be as great as 12 inches thick.

3.4 GROUNDWATER CONDITIONS

Groundwater was encountered at depths ranging from 5 feet to 10 feet BPG during our field exploration. Evidence of top-down mottling was observed in near-surface soils as was mottling indicative of a seasonal high groundwater surface approaching 24 to 36 inches below the existing ground surface.

It should be noted that MTC's investigation did not constitute a comprehensive hydrogeologic investigation. As a result, MTC's interpretation of groundwater conditions is solely based on soil conditions encountered at the time of investigation. Season climatic variations can occur, along with temporal variations of groundwater surface or character. As such, MTC's investigation is not designed to be relied upon for construction design. A more comprehensive investigation is recommended after final site selection and prior to construction.

4.0 DISCUSSION AND CURSORY RECOMMENDATIONS

MTC has prepared the following discussion and cursory-level recommendations for consideration by the project design team during evaluation of site feasibility for the proposed development. The recommendations presented are based on MTC's current understanding of general project scope. Additional work including site exploration, geotechnical engineering, and winter season groundwater monitoring may be required to properly address geotechnical site conditions as subsequent phases of project scoping are completed. MTC shall be allowed to review and comment as project plans develop and, as necessary, provide additional consultation and engineering services as deemed appropriate for an evolving project scope.

4.1 DESIGN OF STORM WATER DISPOSAL SYSTEMS

Near-surface soil conditions consist of sand with interbedded silt lenses displaying both lateral and vertical heterogeneity. Finer grained silty sand and silt soils will exhibit a very low capacity to transmit water, whereas coarser silty sand and sand deposits may exhibit long-term infiltration rates as great as 0.50 inches per hour. As an additional constraint to storm water infiltration design, relatively shallow groundwater (6 to 8 feet BPG) was encountered during our field explorations as was visual evidence of a seasonal high groundwater surface (mottling) within a few feet of present ground.

For these reasons, it is MTC's opinion that infiltration may be considered for storm water disposal at the project site but that a site specific evaluation will need to be performed to determine the appropriate type and location of the proposed facility. Preliminary consideration suggests that permeable pavement, bio-infiltration swales, infiltration chambers, or a combination thereof, may be suitable. It may also be necessary to perform a groundwater mounding analysis based on the scale of the proposed impervious improvements and potential shallow depth to the seasonal groundwater surface. In addition, installation of groundwater monitoring wells and quarterly or instrumented groundwater elevation readings will reduce uncertainty associated with the selection of the appropriate storm water infiltration disposal system.

4.2 CURSORY FOUNDATION RECOMMENDATIONS

MTC recommends that a deep foundation system is suitable for use at this prospective project site. The thick compressible layer encountered at the site could result in significant long term settlement if the foundation system does not extend through the layer. As an additional complication, problematic soils were found to be laterally discontinuous, which poses the potential for differential settlement across the site. Furthermore, organic silt and peat deposits pose an additional long-term settlement hazard, as will historic site fills consisting of milled wood.

Preliminary evaluation indicates that deep foundations extending to depths of 40 to 50 feet BPG or deeper should be considered to avoid long term ultimate and differential settlement issues. Other potential considerations may include rammed aggregate piers, mat foundations, deep structural fill mat sections, long term pre-loading, or other items that can be discussed further if requested.

Present site development requirements should also be considered when evaluating potential foundation options. MTC understands that approximately 3 to 4 feet of fill will be required to bring the site above base flood elevation. The fill should be treated as structural fill, and may potentially be utilized as a structural fill mat with incorporation of a structural woven-geotextile, or inclusion of a reinforced structural mat slab, to increase minimize the risk of differential settlement of site fills.

The proposed fill section could also be utilized as a portion of a pre-load to induce consolidation settlement and minimize long-term settlement. The required thickness of the pre-load would need to be determined based on additional site explorations as well as in consideration of final site improvements. For the Alf Christensen site, consolidation settlement can be expected to exhibit a component of long-term time-rate consolidation due to the presence of the compressible soils observed primarily between 30 to 50 feet BPG, but also observed extending to near the present ground surface.

To limit post construction settlement and alleviate differential settlement concerns associated with heterogeneous soil conditions, MTC's preliminary evaluation suggests that a program of fill placement oversight and associated surface settlement monitoring be conducted. Additionally, MTC recommends that supplemental exploration and engineering include estimates of potential settlement magnitudes to be used to design the pre-load fill section and develop a settlement monitoring schedule. In practice, surface settlement shall be allowed to proceed until no further appreciable settlement is observed. Given that observed site conditions appear to be susceptible to extended time-dependent settlement concerns, a fill settlement monitoring period of up to 6 months should be expected, but will need to be refined based on additional exploration and engineering.

4.3 STRIPPING, CLEARING, GRUBBING, AND RE-USE OF ONSITE SOILS

Site preparation on the prospective project site will need to consist of removing existing structures, foundations, asphalt paving, and other items associated with previous development. Any vegetation, topsoil, and soft/yielding soils extending 0.5 to 0.8 feet BPG will need to be stripped from beneath proposed improvements. Stabilization of uncontrolled fill extending to depths of 4.0 feet BPG will need to be considered at undeveloped locations and may simply require excavation and replacement. Deeper historic site fills will need to be delineated and addressed, either by excavation and replacement or by spanning with deep-foundation elements. Some fill sections on the site may need to be extended to as deep as 15.0 feet BPG as witnessed by fragments of milled wood scraps and charcoaled wood at depth. Surface soils will need to be stabilized at these areas (potentially use geo-fabric and structural fill sections). The sub base material under asphalt may remain in place and pulverizing/crushing the

existing asphalt to be re-used as fill can be considered for potential cost savings if the site grade is to be elevated.

Due to proposed grade increases across the project site, MTC does not anticipate re-use of native soils as structural fill. Fine-grained site soils consisting of silt and silty sand with silt concentrations greater than 10 percent are not suitable for re-use as structural fill material. However, this material may be considered for general backfill purposes. If required, some separation of excavated coarse-grained soils may be feasible for re-use as structural fill for limited purposes. However, all structural fill placed beneath structural foundations shall be imported to the project site.

4.4 GEOLOGIC HAZARDS

MTC's review of local geologic resources indicates that the nearest active fault trace is inferred to trend east-southeast by west-northwest approximately 2 miles northeast of the subject property. Based on MTC's research and site observations it does not appear that the proposed improvements are subject to a seismic hazard resulting from ground rupture during a seismic event. However, it should be noted that mapped fault traces transecting Mount Vernon are inferred, meaning that the plotted locations are based on a combination of geophysical techniques, regional fault trace observations and seismograph data. As a result the location of actual ground rupture produced by a seismic event may vary from mapped location of inferred fault traces. In spite of these uncertainties, it is still MTC's opinion that the best available science suggests that ground rupture at the project site is unlikely.

An additional seismic hazard to be considered at the project site is seismic shaking, which could be significant during a major seismic event. As a result, the improvements should be designed according to building standards presented by the 2012 International Building Code, assuming a Seismic Site Class of D to E as reported for the project site by the *Site Class Map of Skagit County, Washington* (Palmer et al., 2004). Soft silt, clay and organic soils and saturated fine to medium grained sand soils encountered at the project site are considered susceptible to seismically-induced settlement, liquefaction and amplification of seismic ground motion. For this reason, MTC recommends that Site Class E be used for the project site unless supplemental shear-wave velocity data analysis obtained from CPT explorations indicates otherwise.

In addition to ground shaking hazards is the resulting site-susceptibility for seismically-induced soil liquefaction. According to the *Liquefaction Susceptibility Map of Skagit County, Washington* (Palmer et al., 2004), the site is identified as having a moderate to high liquefaction susceptibility. The results of MTC's subsurface investigation indicate the site is underlain, in part, by loose to medium dense silty sand that would generally considered to be susceptible to liquefaction. In addition, some thick layers of loose to medium dense saturated sand containing relatively few fine-grained particles were also

encountered. These soils are highly prone to liquefaction and confirm the mapped regional interpretation of potentially high liquefaction susceptibility at the project site. If the project site is selected, further investigations (such as CPT advancement and additional engineering) should be performed to better characterize the site liquefaction susceptibility.

4.5 PRELIMINARY SEISMIC ACCELERATION COEFFICIENTS

Seismic acceleration values were derived from the USGS Java Ground Motion Parameter Calculator - Version 5.1.0 for the project latitude and longitude based on MTC's cursory-level investigation and mapped seismic site class. MTC has elected to determine coefficients according to Site Class E based on encountered subsurface soil conditions. Supplemental site characterization may indicate that Site Class D is appropriate, resulting in less conservative recommended acceleration coefficients. All structures should be designed incorporating the following seismic acceleration coefficients unless subsequent investigations suggest otherwise.

Site Class	E
Mapped Peak Spectral Acceleration @ 0.2 sec (SM_s)	0.976
Mapped Peak Spectral Acceleration @ 1.0 sec (SM_1)	0.933
Design Peak Spectral Acceleration @ 0.2 sec (SD_s)	0.651
Design Peak Spectral Acceleration @ 1.0 sec (SD_1)	0.622
F_a	0.90
F_v	2.518

5.0 LIMITATIONS

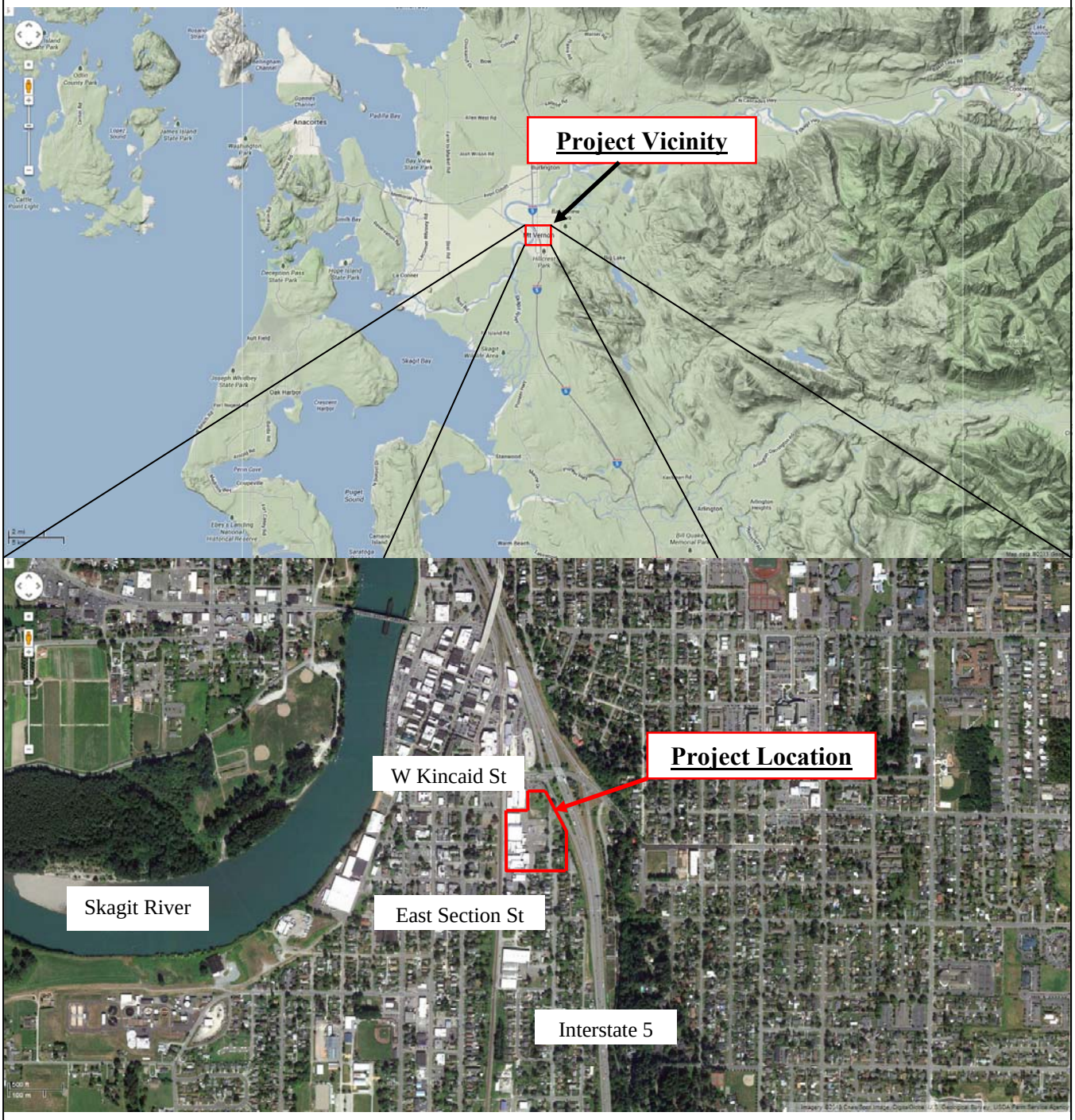
Recommendations contained in this report are based on our understanding of the prospective development and construction activities, our field observations and exploration, and our laboratory test results. It is possible that soil and groundwater conditions could vary and differ between or beyond the points explored. If soil or groundwater conditions are encountered during construction that vary or differ from those described herein, we should be notified immediately in order that a review may be made and supplemental recommendations provided. If the scope of the proposed construction, including the proposed loads or structural locations, changes from that described in this report, our recommendations should also be reviewed.

We have prepared this report in substantial accordance with the generally accepted geotechnical engineering practice as it exists in the site area at the time of our study. No warranty, express or implied, is made. The recommendations provided in this report are based on the assumption that an adequate program of tests and observations will be conducted by MTC during the construction phase in order to evaluate compliance with our recommendations. Other standards or documents referenced in any given standard cited in this report, or otherwise relied upon by the author of this report, are only mentioned in the given standard; they are not incorporated into it or "included by referenced", as that latter term is used relative to contracts or other matters of law.

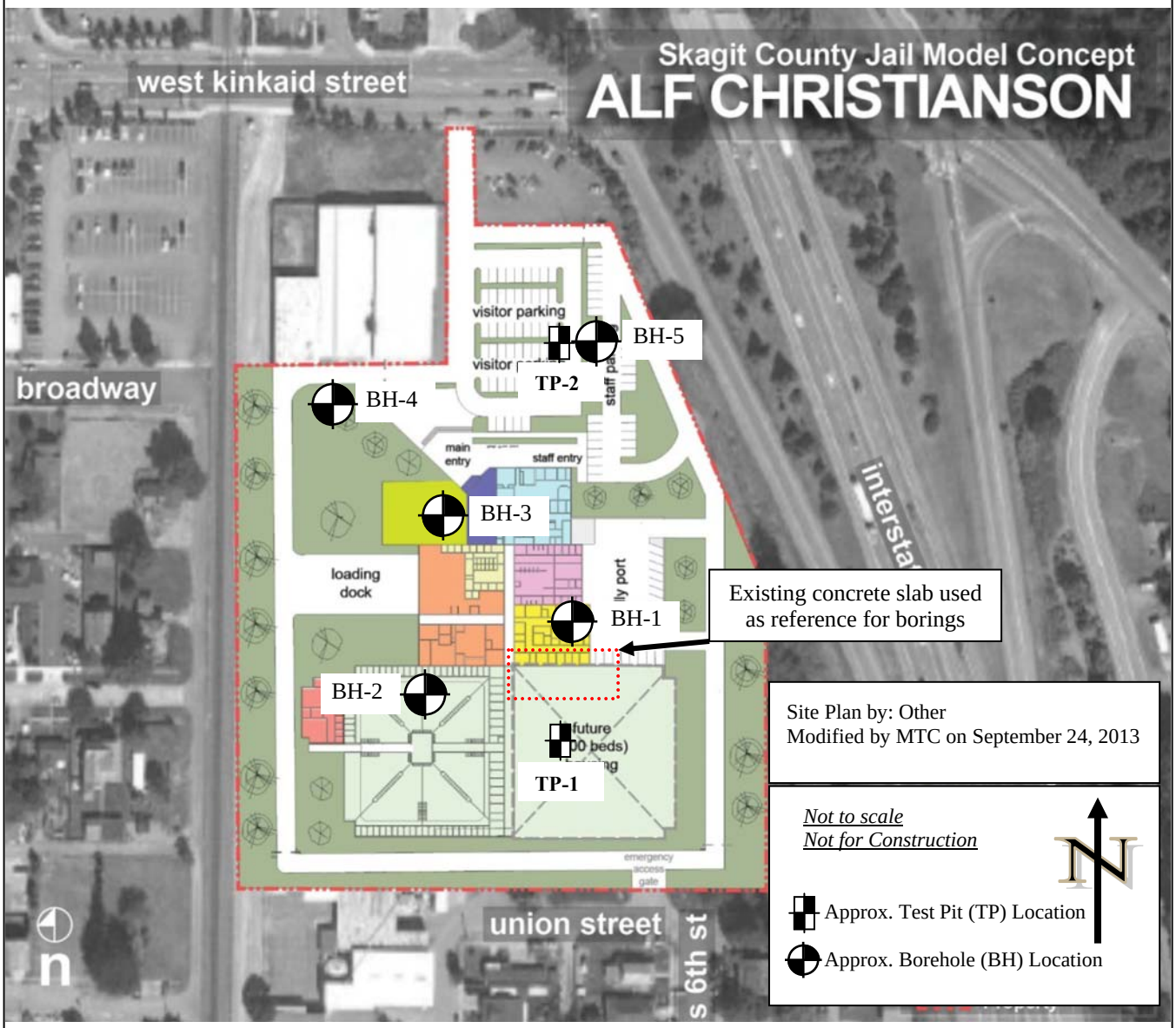
This report may be used only by David Evans and Associates, Inc., and their design consultants and only for the purposes stated within a reasonable time from its issuance, but in no event later than 18 months from the date of the report. This report is intended for preliminary consideration of a site for prospective development and does not constitute a project geotechnical engineering report. If the site is chosen for development, a project geotechnical engineering report will be required and should account for design grade, construction materials, structure loading, and other considerations not known at this time.

Land or facility use, on- and off-site conditions, regulations, or other factors may change over time, and additional work may be required with the passage of time. Based on the intended use of the report, MTC recommends that additional work be performed and that an updated report be issued of the site is selected for development. Non-compliance with any of these requirements by David Evans and Associates, Inc., or anyone else will release MTC from any liability resulting from the use of this report by any unauthorized party and David Evans and Associates, Inc., agrees to defend, indemnify, and hold harmless MTC from any claim or liability associated with such unauthorized use or non-compliance. We recommend that MTC be given the opportunity to review project plans and specifications to evaluate if our recommendations have been properly interpreted. We assume no responsibility for misinterpretation of our recommendations.

APPENDIX A. SITE PLANS



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Regional Site Vicinity** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 5



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Site Map** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 6

APPENDIX B. EXPLORATION LOGS

Representative soil samples were collected from each location by our field geologist during exploration activities. Soil samples collected during the field exploration were classified in accordance with ASTM D2487. All samples were placed in plastic bags to limit moisture loss, labeled, and returned to our laboratory for further examination and testing.

Exploration activities were monitored by our field geologist who examined and classified the materials encountered in accordance with the Unified Soil Classification System (USCS), obtained representative soil samples, and recorded pertinent information including soil sample depths, stratigraphy, soil engineering characteristics, and groundwater occurrence.

The stratification lines shown on the individual logs represent the approximate boundaries between soil types; actual transitions may be either more gradual or more severe. The conditions depicted are for the date and location indicated only, and it should not necessarily be expected that they are representative of conditions at other locations and times.

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Unified Soil Classification System Chart

Major Divisions			Graph	USCS	Typical Description
Coarse Grained Soils More Than 50% Retained On No. 200 Sieve	**Gravel** More Than 50% of Coarse Fraction Retained On No. 4 Sieve	Clean Gravels		GW	Well-graded Gravels, Gravel-Sand Mixtures
				GP	Poorly-Graded Gravels, Gravel-Sand Mixtures
		Gravels With Fines		GM	Silty Gravels, Gravel-Sand-Silt Mixtures
				GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	Sand More Than 50% of Coarse Fraction Passing No. 4 Sieve	Clean Sands		SW	Well-graded Sands, Gravelly Sands
				SP	Poorly-Graded Sands, Gravelly Sands
		Sands With Fines		SM	Silty Sands, Sand-Silt Mixtures
				SC	Clayey Sands, Clay Mixtures
Fine Grained Soils More Than 50% Passing The No. 200 Sieve	**Silts & Clays**	Liquid Limit Less Than 50		ML	Inorganic Silts, rock Flour, Clayey Silts With Low Plasticity
				CL	Inorganic Clays of Low To Medium Plasticity
				OL	Organic Silts and Organic Silty Clays of Low Plasticity
	Silts & Clays	Liquid Limit Greater Than 50		MH	Inorganic Silts of Moderate Plasticity
				CH	Inorganic Clays of High Plasticity
				OH	Organic Clays And Silts of Medium to High Plasticity
Highly Organic Soils				PT	Peat, Humus, Soils with Predominantly Organic Content

Sampler Symbol Description

- Standard Penetration Test (SPT)
- Shelby Tube
- Grab or Bulk
- California (3.0" O.D.)
- Modified California (2.5" O.D.)

Stratigraphic Contact

- Distinct Stratigraphic Contact Between Soil Strata
- Gradual Change Between Soil Strata
- Approximate location of stratagraphic change

- Groundwater observed at time of exploration
- Measured groundwater level in exploration, well, or piezometer
- Perched water observed at time of exploration

Modifiers

Description	%
Trace	>5
Some	5-12
With	>12

Soil Consistency

Granular Soils		Fine-grained Soils	
Density	***SPT Blowcount***	***Consistency***	***SPT Blowcount***
Very Loose	0-4	Very Soft	0-2
Loose	4-10	Soft	2-4
Medium Dense	10-30	Firm	4-8
Dense	30-50	Stiff	8-15
Very Dense	> 50	Very Stiff	15-30
		Hard	> 30

Grain Size

DESCRIPTION		SIEVE SIZE	GRAIN SIZE	APPROXIMATE SIZE
Boulders		> 12"	> 12"	Larger than a basketball
Cobbles		3 - 12"	3 - 12"	Fist to basketball
Gravel	Coarse	3/4 - 3"	3/4 - 3"	Thumb to fist
	Fine	#4 - 3/4"	0.19 - 0.75"	Pea to thumb
Sand	Coarse	#10 - #4	0.079 - 0.19"	Rock salt to pea
	Medium	#40 - #10	0.017 - 0.079"	Sugar to rock salt
	Fine	#200 - #40	0.0029 - 0.017"	Flour to Sugar
Fines		Passing #200	< 0.0029"	Flour and smaller

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Boring Log Key** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 7

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

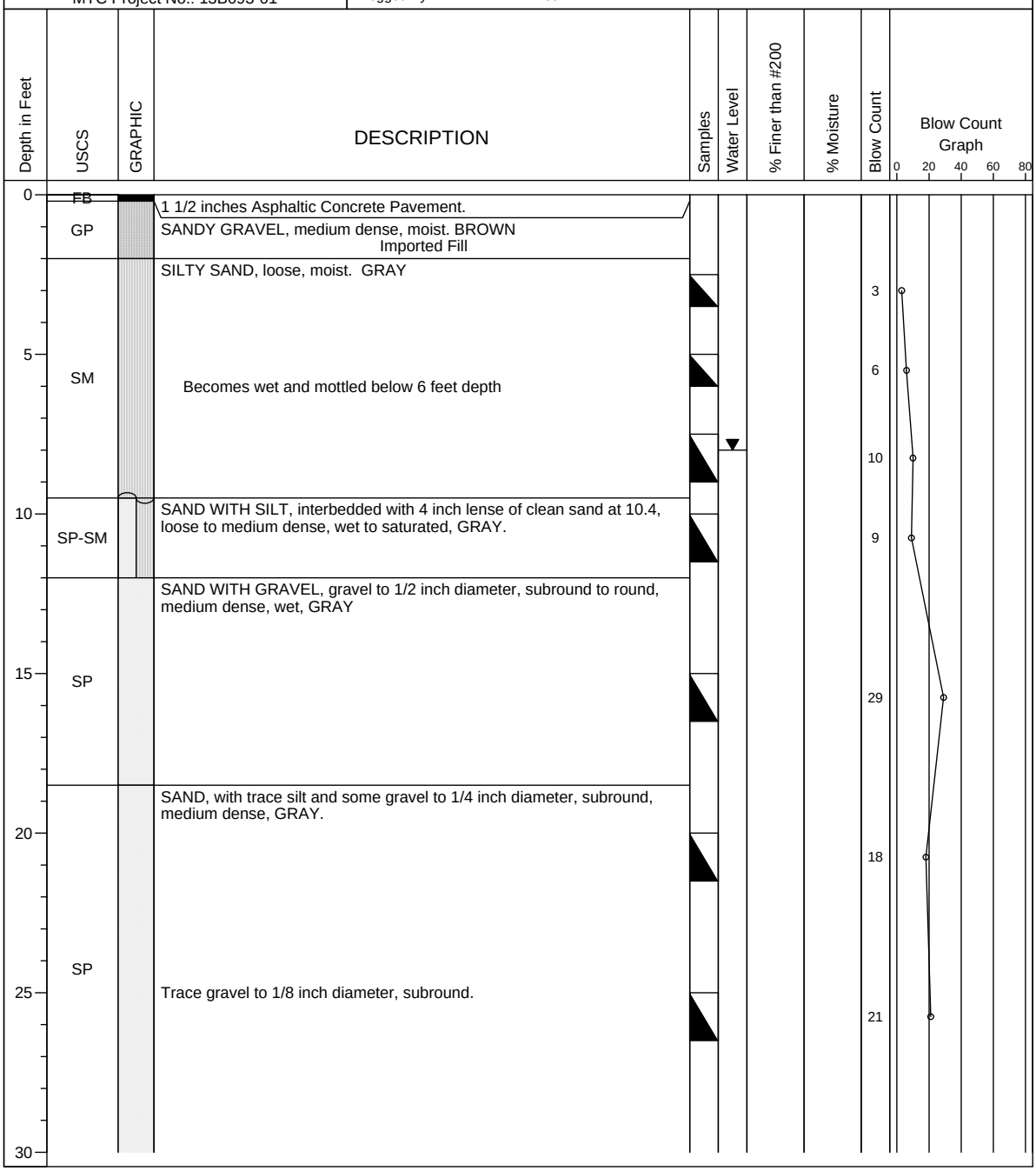
Log of Boring BH-1

(Page 1 of 3)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started	: 9/4/13
Date Completed	: 9/4/13
Sampling Method	: Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location	: 50' E., 8' N. of NW Corner of Concrete Slab.
Logged By	: A. Wiser



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 8

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

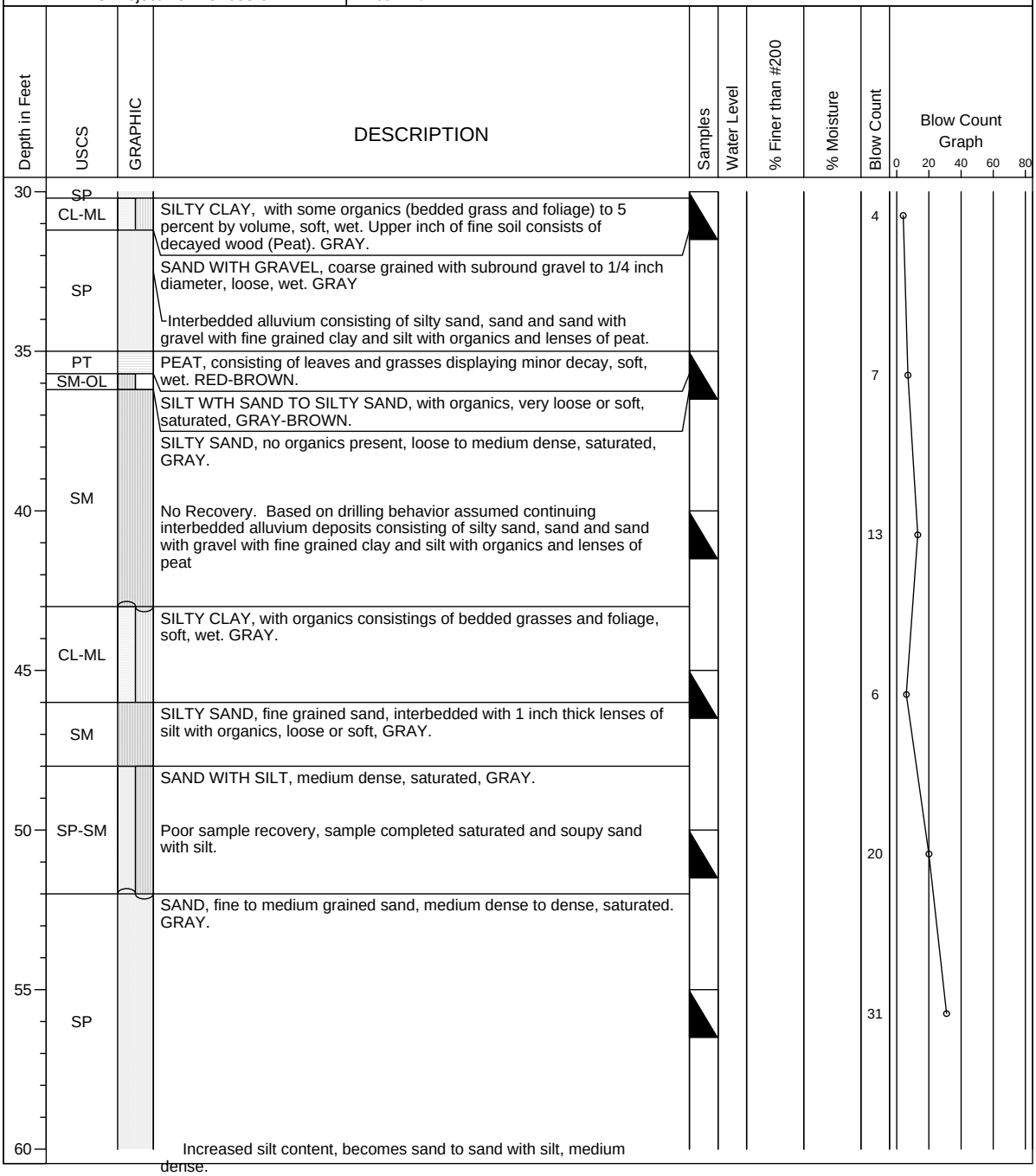
Log of Boring BH-1

(Page 2 of 3)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started	: 9/4/13
Date Completed	: 9/4/13
Sampling Method	: Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location	: 50' E., 8' N. of NW Corner of Concrete Slab.
Logged By	: A. Wiser



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 9

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

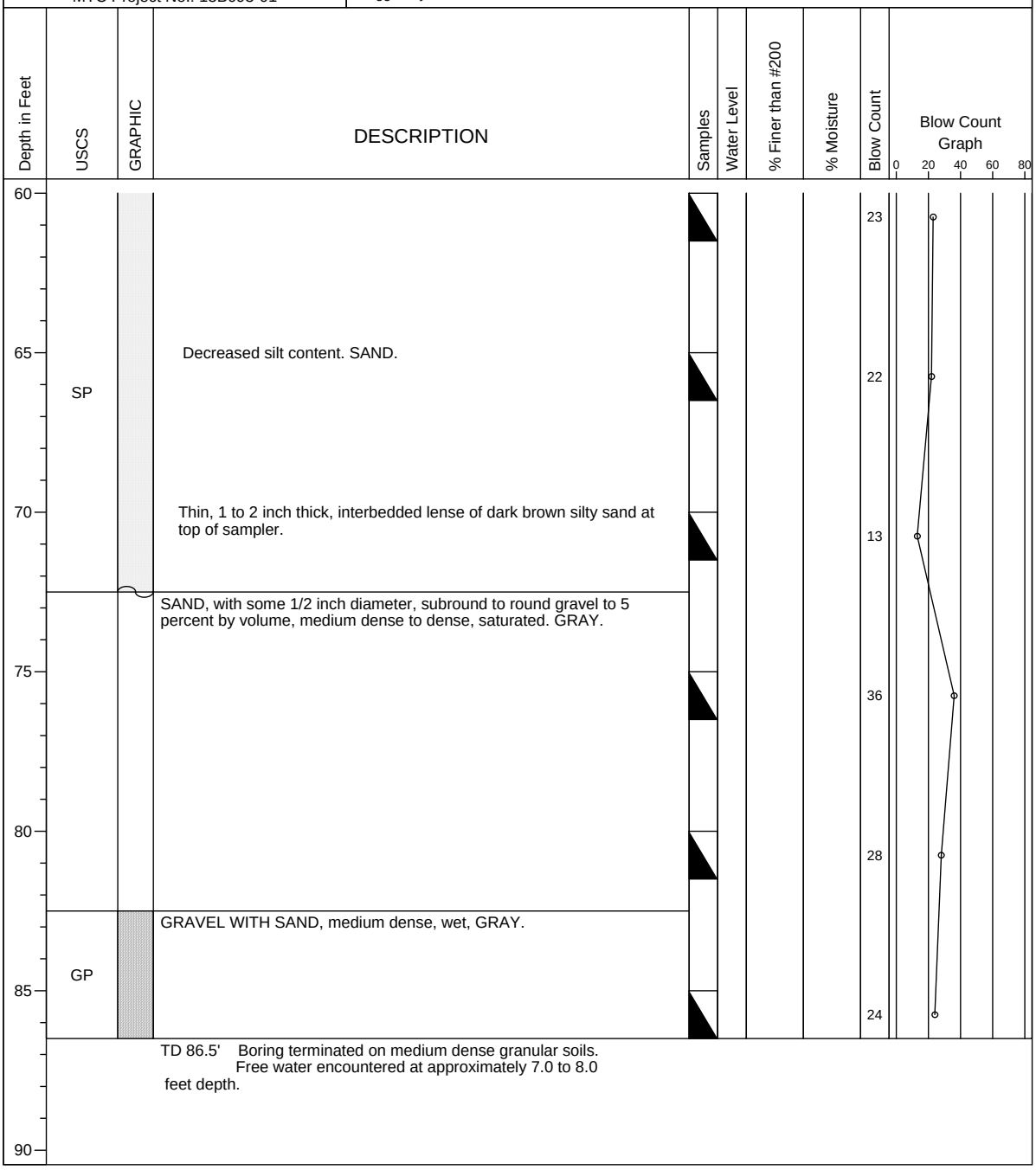
Log of Boring BH-1

(Page 3 of 3)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started	: 9/4/13
Date Completed	: 9/4/13
Sampling Method	: Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location	: 50' E., 8' N. of NW Corner of Concrete Slab.
Logged By	: A. Wiser



TD 86.5' Boring terminated on medium dense granular soils. Free water encountered at approximately 7.0 to 8.0 feet depth.

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 10

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

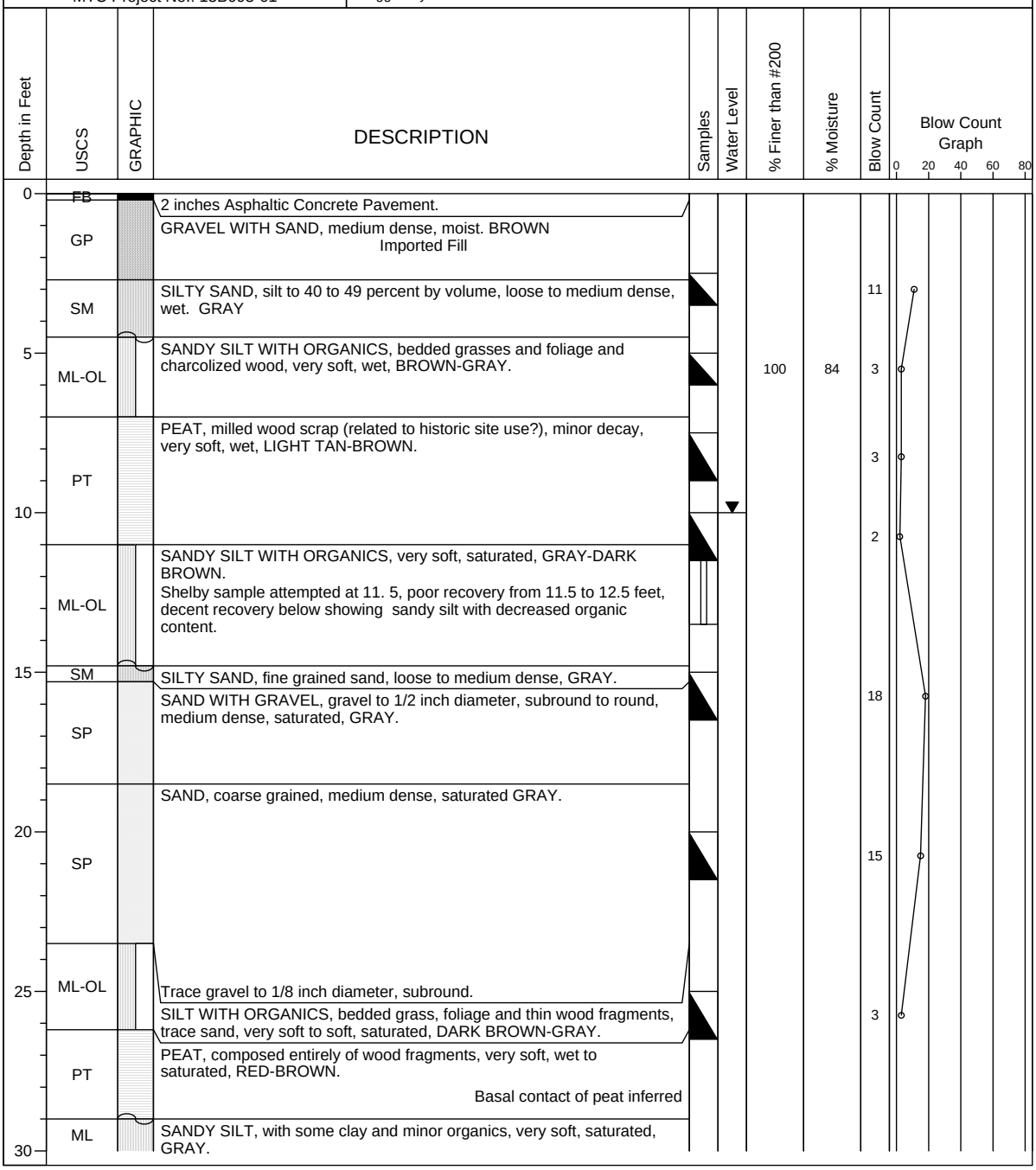
Log of Boring BH-2

(Page 1 of 2)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started	: 9/4/13
Date Completed	: 9/4/13
Sampling Method	: Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location	: 67' W., 98' S. of NW Corner of Concrete Slab
Logged By	: A. Wiser



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 11

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

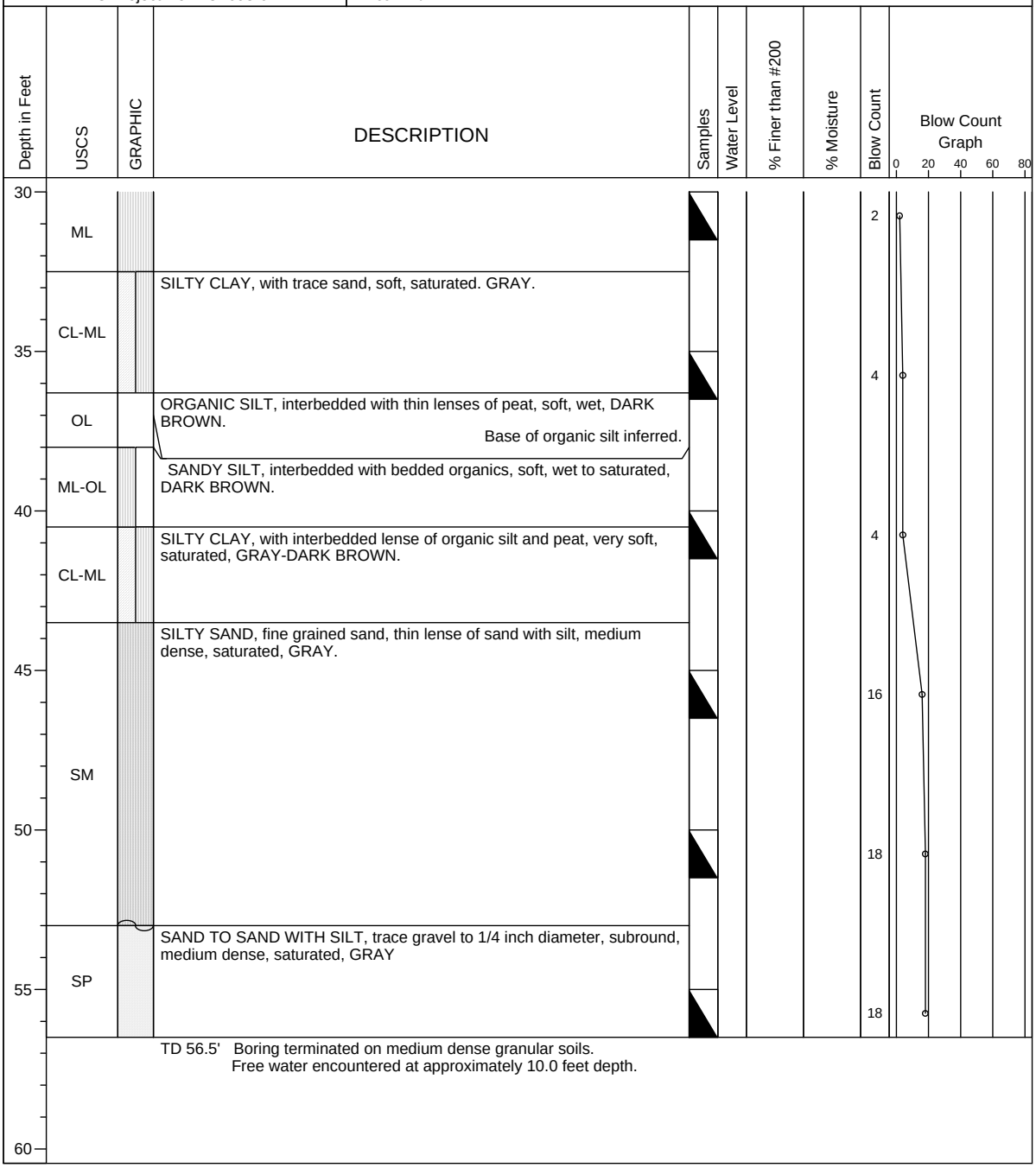
Log of Boring BH-2

(Page 2 of 2)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started	: 9/4/13
Date Completed	: 9/4/13
Sampling Method	: Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location	: 67' W., 98' S. of NW Corner of Concrete Slab
Logged By	: A. Wiser



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 12

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

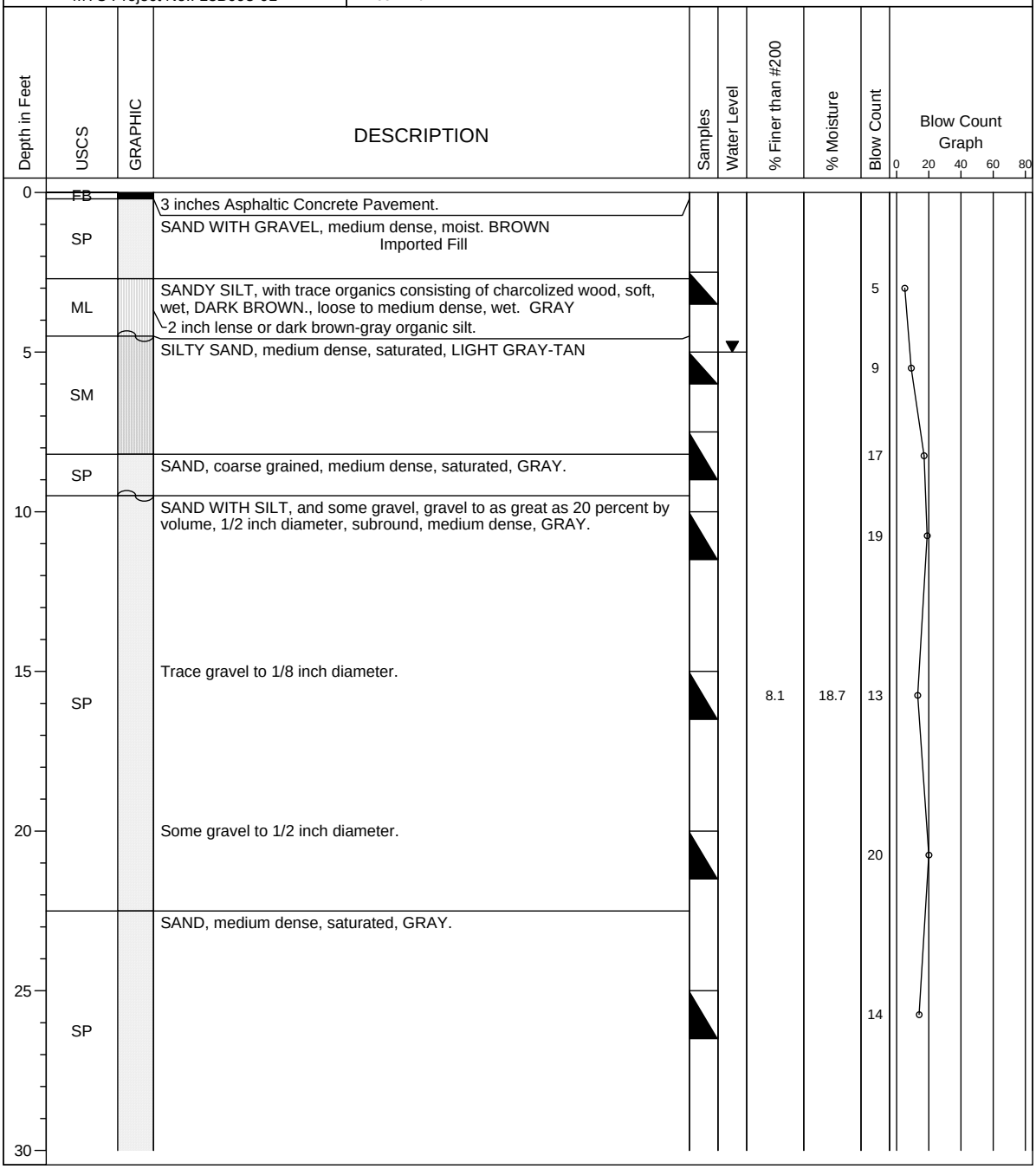
Log of Boring BH-3

(Page 1 of 2)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started	: 9/4/13
Date Completed	: 9/4/13
Sampling Method	: Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location	: 65' W., 130' N. of NW Corner of Concrete Slab
Logged By	: A. Wiser



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 13

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

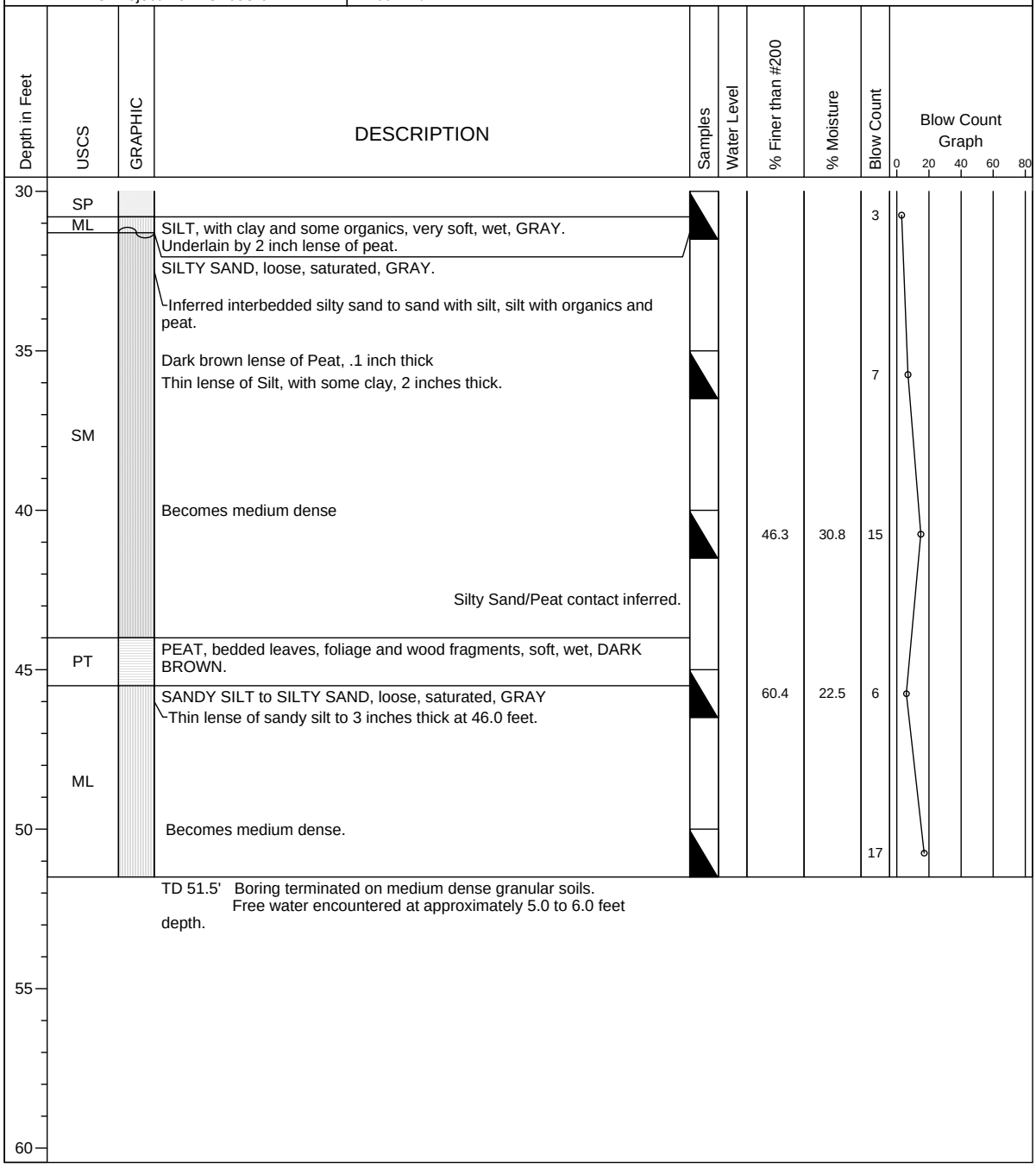
Log of Boring BH-3

(Page 2 of 2)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started	: 9/4/13
Date Completed	: 9/4/13
Sampling Method	: Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location	: 65' W., 130' N. of NW Corner of Concrete Slab
Logged By	: A. Wiser



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 14

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

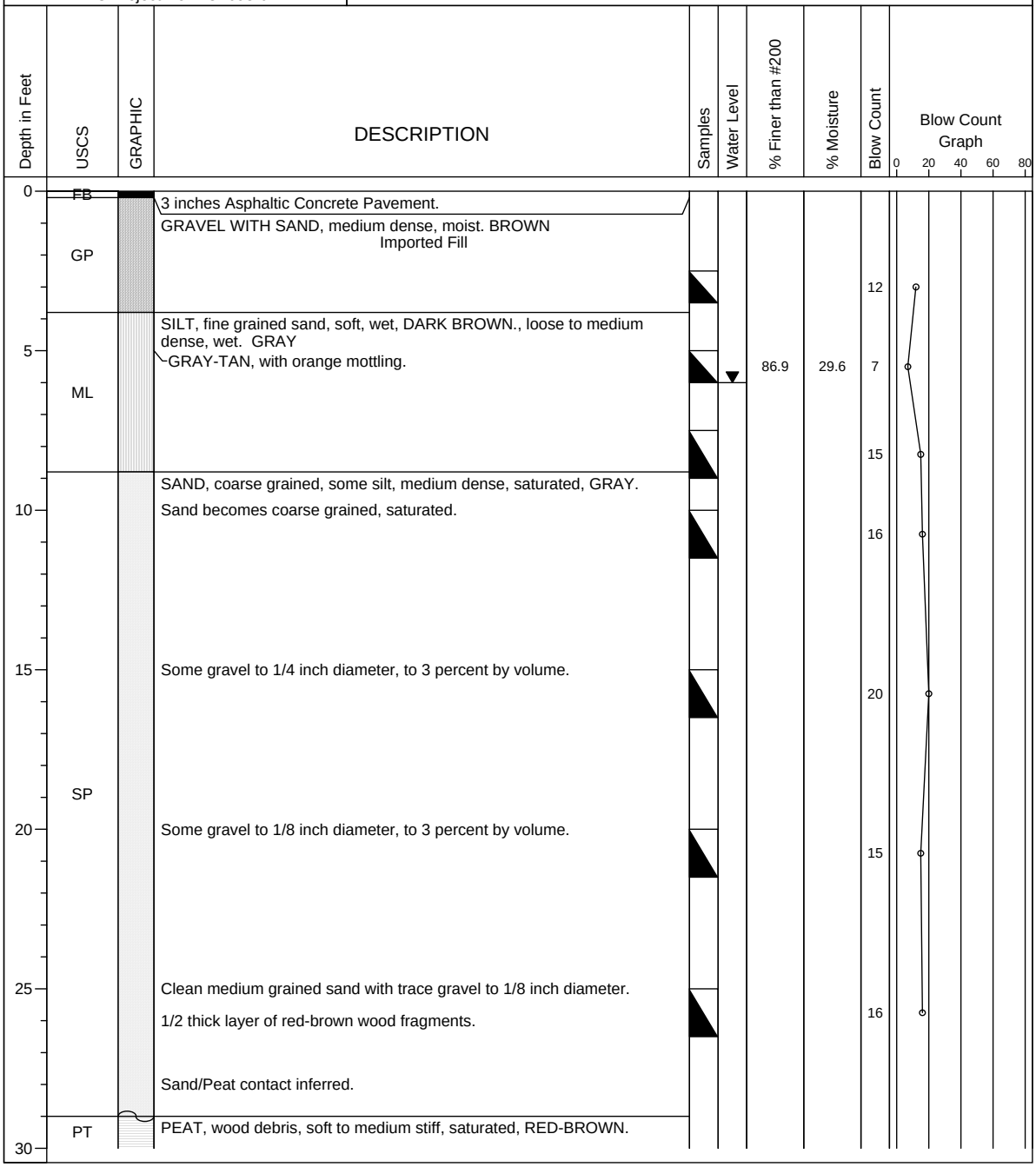
Log of Boring BH-4

(Page 1 of 2)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started	: 9/5/13
Date Completed	: 9/5/13
Sampling Method	: Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location	: 190' W., 280' N. of NW Corner of Concrete Slab
Logged By	: A. Wiser



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 15

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

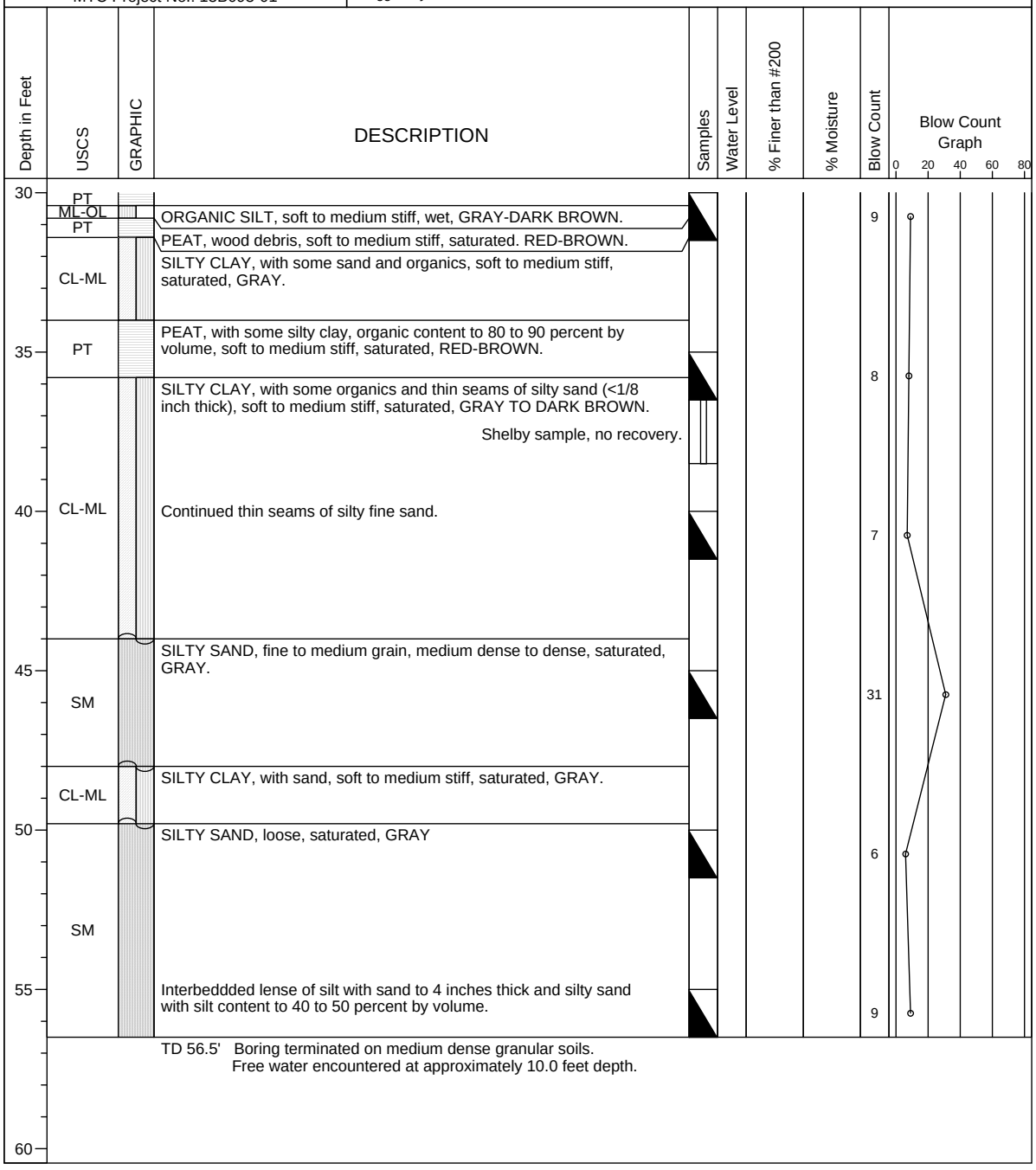
Log of Boring BH-4

(Page 2 of 2)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started	: 9/5/13
Date Completed	: 9/5/13
Sampling Method	: Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location	: 190' W., 280' N. of NW Corner of Concrete Slab
Logged By	: A. Wiser



TD 56.5' Boring terminated on medium dense granular soils.
Free water encountered at approximately 10.0 feet depth.

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 16

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

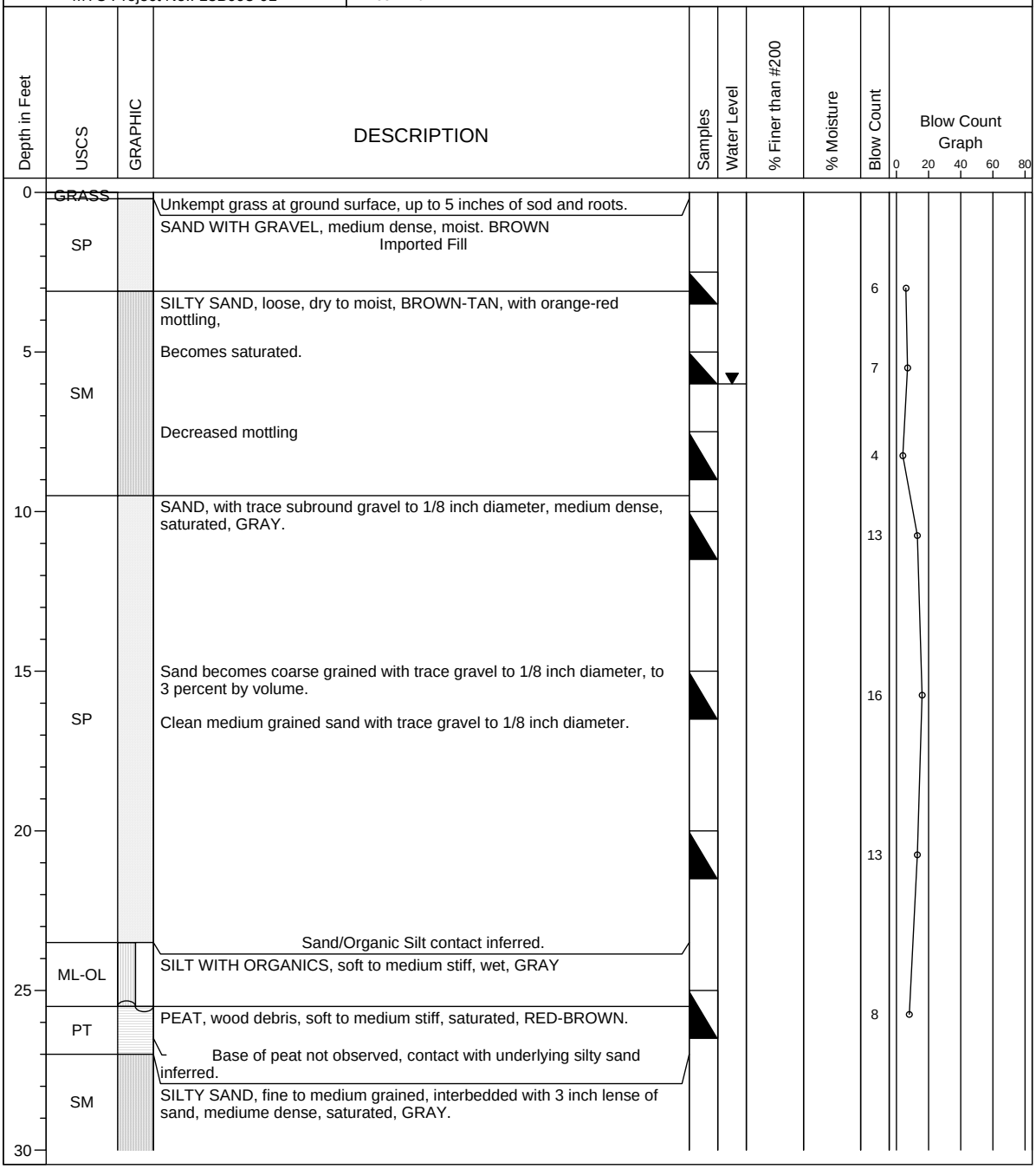
Log of Boring BH-5

(Page 1 of 2)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started : 9/5/13
Date Completed : 9/5/13
Sampling Method : Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location : 80' E., 330' N. of NW Corner of Concrete Slab
Logged By : A. Wiser



Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 17

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

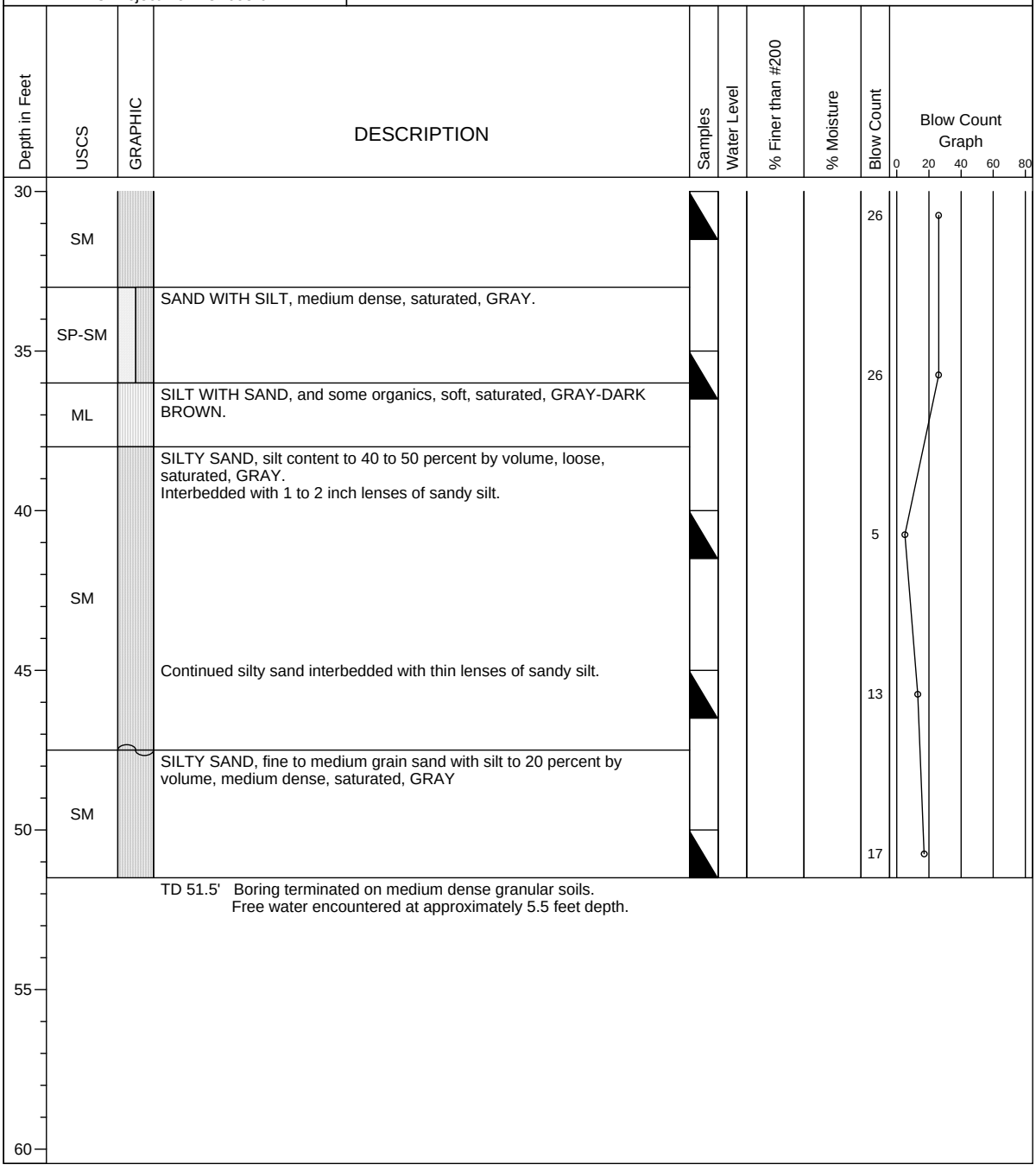
Log of Boring BH-5

(Page 2 of 2)

Skagit County Jail Geotechnical Exploration
Alf Christensen Seed Site
101 E. Section Street
Mt. Vernon, WA

MTC Project No.: 13B093-01

Date Started : 9/5/13
Date Completed : 9/5/13
Sampling Method : Split Spoon 2.5-ft sample interval to 10 ft, 5-ft. below.
Location : 80' E., 330' N. of NW Corner of Concrete Slab
Logged By : A. Wiser



TD 51.5' Boring terminated on medium dense granular soils.
Free water encountered at approximately 5.5 feet depth.

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 18

Materials Testing and Consulting 805 Dupont Street, Suite 5 Bellingham, WA	Log of Test Pit TP-1 (Page 1 of 1)
Skagit County Jail Geotechnical Exploration Alf Christianson Site, E. Section & Kincaid St. Mt. Vernon, WA MTC Project No. 13B093-01	Date Started : 9/12/13 Date Completed : 9/12/13 Sampling Method : Grab Sample Location : Approximately 50' E of S Gate, in grass Logged By : JG

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Samples	Water Level	Percent Moisture	% Finer #200 Sieve
0	OL		TOPSOIL - SANDY SILT, loose, grass roots, dry. Dark BROWN.				
1	SM		SILTY SAND, fine to medium grained, loose to medium dense, damp. Medium BROWN to BROWN-GRAY. Mottling begins.				
2							
3	ML		SANDY SILT, damp to moist, medium stiff, cohesive, variable coarse content. BROWN-GRAY with mottling. Upper contact has local band of dark brown silt 1-3" thick, contains charred wood remnants.				
4							
5							
6	SP-SM		SILTY SAND to SAND WITH SILT, medium dense to loose, moist. Medium GRAY with mottling. Becomes medium GRAY, no visible mottling.				
7			Becomes saturated, seepage observed. Encountered large wood remnant, nondecomposed.		▼		
8			Termination Depth: 7.8' Pit walls caving at end depth.				
9							
10							

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 19

Materials Testing and Consulting
805 Dupont Street, Suite 5
Bellingham, WA

Log of Test Pit TP-2

(Page 1 of 1)

Skagit County Jail Geotechnical Exploration
Alf Christianson Site, E. Section & Kincaid St.
Mt. Vernon, WA

MTC Project No. 13B093-01

Date Started : 9/12/13
Date Completed : 9/12/13
Sampling Method : Grab Sample
Location : Approximately 40' W of N end of east access road, in grass
Logged By : JG

Depth in Feet	USCS	GRAPHIC	DESCRIPTION	Samples	Water Level	Percent Moisture	% Finer #200 Sieve
0	UCF		UNCONTROLLED FILL - SILT-CLAY with SAND and GRAVEL, variable content, dry, soft/loose to medium stiff/medium dense. Color locally variable BROWN to GRAY.				
			Refuse observed throughout: brick, glass, plastic, etc.				
1							
2			Contact is uneven.				
3	SM		SILTY SAND, fine to medium grained, loose to medium dense with depth, damp, fines estimated 20-30%. Medium GRAY with mottling.				
4							
			Becomes moderately cohesive, increased fines content locally. Thin silty bedding on 6" to 1' intervals.				
5							
6							
7			Becomes saturated, seepage observed.		▼		
8			Termination Depth: 8.0'				
			Pit walls caving at end depth.				
9							
10							

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Exploration Log** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 20

APPENDIX C. LABORATORY RESULTS

Laboratory tests were conducted on several representative soil samples to better identify the soil classification of the units encountered and to evaluate the material's general physical properties and engineering characteristics. A brief description of the tests performed for this study is provided below. The results of laboratory tests performed on specific samples are provided at the appropriate sample depths on the individual boring and test pit logs. However, it is important to note that these test results may not accurately represent in situ soil conditions. All of our recommendations are based on our interpretation of these test results and their use in guiding our engineering judgment. MTC cannot be responsible for the interpretation of these data by others.

Soil samples for this project will be retained for a period of 3 months following completion of this report, unless we are otherwise directed in writing.

SOIL CLASSIFICATION

Soil samples were visually examined in the field by our representative at the time they were obtained. They were subsequently packaged and returned to our laboratory where they were reexamined and the original description checked and verified or modified. With the help of information obtained from the other classification tests, described below, the samples were described in general accordance with ASTM Standard D2487. The resulting descriptions are provided at the appropriate locations on the individual exploration logs, located in Appendix B, and are qualitative only.

GRAIN-SIZE DISTRIBUTION

Grain-size distribution analyses were conducted in general accordance with ASTM Standard D422 on representative soil samples to determine the grain-size distribution of the on-site soil. The information gained from these analyses allows us to provide a description and classification of the in-place materials. In turn, this information helps us to understand how the in-place materials will react to conditions such as heavy seepage, traffic action, loading, potential liquefaction, and so forth. The results are presented in this Appendix.

ATTERBERG LIMITS (Plasticity Index)

The plasticity index (PI) was attempted to be determined in general accordance with ASTM Standard D4318. The plasticity index is a measure of the plasticity of a soil. The plasticity index is also the size of the range of water contents where the soil exhibits plastic properties or, in other words, defines the complete range of plastic state. Because the material was determined to be non-plastic, further testing could not be performed.

ASTM D4318 - Liquid Limit, Plastic Limit and Plasticity Index of Soils

Project: Skagit County Jail - ASC
Project #: 13B093-01
Client: David Evans and Assoc.
Source: B2 @ 5'
Sample #: B13-623

Date Received: 5-Sep-13
Sampled By: AW
Date Tested: 18-Sep-13
Tested By: CM

Unified Soils Classification System, ASTM D-2487
ML, Silt
Sample Color
Dark brown

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:						
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						
Number of Blows:	30	25	20			

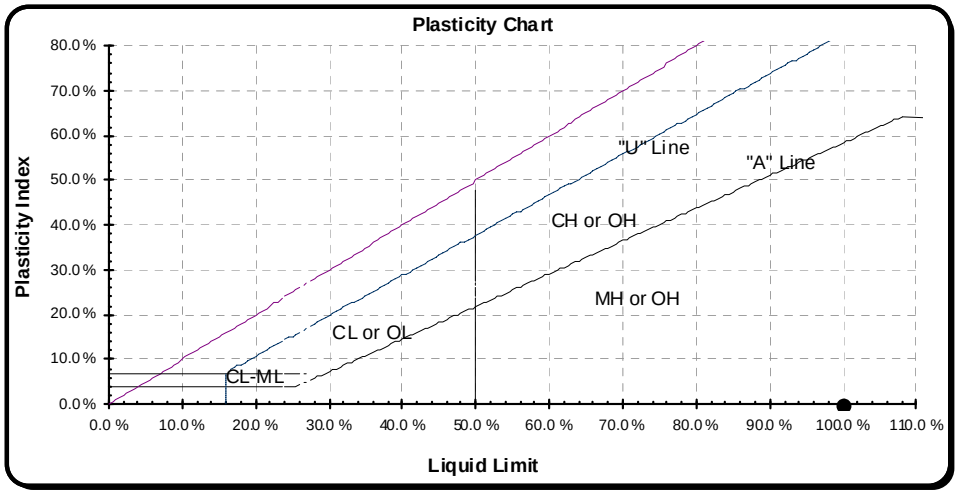
Plastic Limit Determination

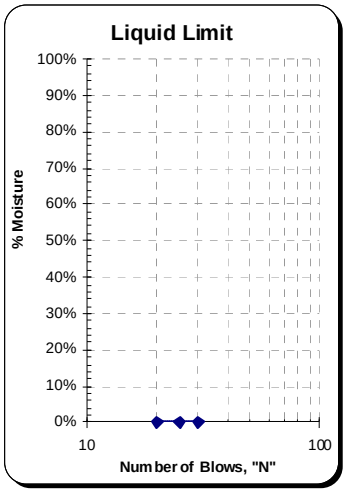
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:						
Weight of Dry Soils + Pan:						
Weight of Pan:						
Weight of Dry Soils:						
Weight of Moisture:						
% Moisture:						

Moisture %, as sampled = 84.0%

Liquid Limit @ 25 Blows: N/A
Plastic Limit: N/A
Plasticity Index, I_p: N/A

ACCREDITED
Certificate #: 1366.01, 1366.02





Comments: Sample was determined to be Non-Plastic, in accordance with ASTM D-4318.

Reviewed by:

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Laboratory Test Results** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 21

Sieve Report

Project: Skagit County Jail - ASC
Project #: 13B093-01
Client: David Evans and Associates
Source: B3 @ 15'
Sample#: B13-624

Date Received: 5-Sep-13
Sampled By: AW
Date Tested: 18-Sep-13
Tested By: CM

ASTM D-2487 Unified Soils Classification System
SP-SM, Sand with Silt
Sample Color:
Dark brown

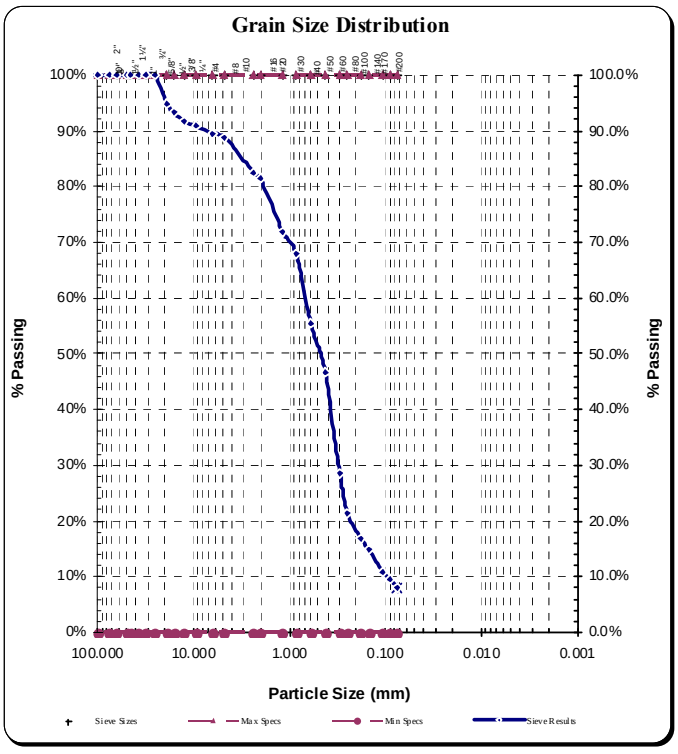
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs?

$D_{(5)}$ = 0.046	mm	% Gravel = 11.2%		Coeff. of Curvature, C_C = 1.45	
$D_{(10)}$ = 0.096	mm	% Sand = 80.7%		Coeff. of Uniformity, C_U = 7.21	
$D_{(30)}$ = 0.309	mm	% Silt & Clay = 8.1%		Fineness Modulus = 2.72	
$D_{(50)}$ = 0.492	mm	Fracture % = n/a		Liquid Limit = n/a	
$D_{(60)}$ = 0.691	mm	Moisture %, as sampled = 18.7%		Plastic Limit = n/a	
$D_{(90)}$ = 7.540	mm	Sand Equivalent= n/a		Plasticity Index = n/a	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	95%	95%	100.0%	0.0%
5/8"	16.00		93%	100.0%	0.0%
1/2"	12.50	92%	92%	100.0%	0.0%
3/8"	9.50	91%	91%	100.0%	0.0%
1/4"	6.30		89%	100.0%	0.0%
#4	4.75	89%	89%	100.0%	0.0%
#8	2.36		82%	100.0%	0.0%
#10	2.00	81%	81%	100.0%	0.0%
#16	1.18		72%	100.0%	0.0%
#20	0.850	68%	68%	100.0%	0.0%
#30	0.600		55%	100.0%	0.0%
#40	0.425	47%	47%	100.0%	0.0%
#50	0.300		29%	100.0%	0.0%
#60	0.250	21%	21%	100.0%	0.0%
#80	0.180		17%	100.0%	0.0%
#100	0.150	15%	15%	100.0%	0.0%
#140	0.106		11%	100.0%	0.0%
#170	0.090		9%	100.0%	0.0%
#200	0.075	8.1%	8.1%	100.0%	0.0%



Comments:

Reviewed by:

Materials Testing & Consulting, Inc.
777 Chrysler Drive
Burlington, WA 98233

Laboratory Test Results
Skagit County Jail–Alf Christianson
Mt Vernon, Washington

FIGURE
22

Sieve Report

Project: Skagit County Jail - ASC
Project #: 13B093-01
Client: David Evans and Associates
Source: B3 @ 40'
Sample#: B13-625

Date Received: 5-Sep-13
Sampled By: AW
Date Tested: 18-Sep-13
Tested By: CM

ASTM D-2487 Unified Soils Classification System
SM, Silty Sand
Sample Color:
Dark brown

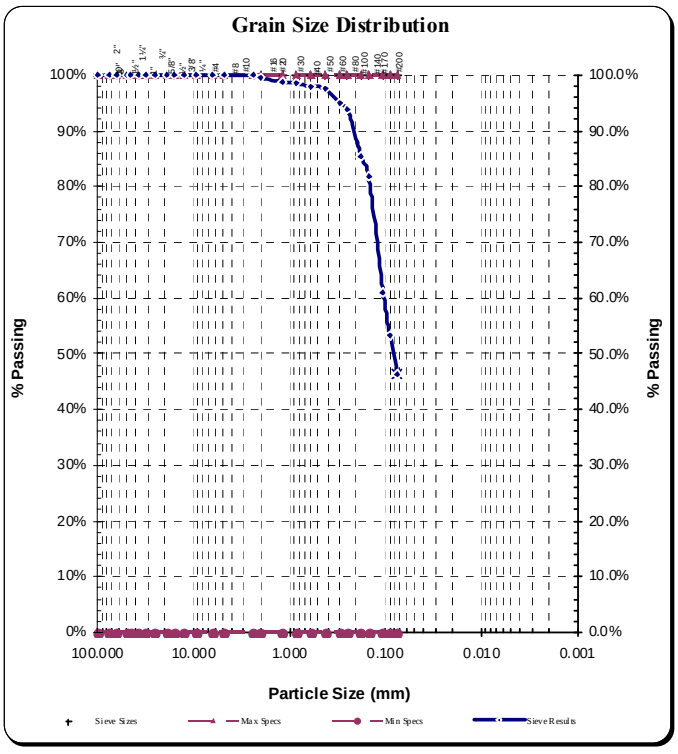
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs?

$D_{(5)}$ = 0.008	mm	% Gravel = 0.0%		Coeff. of Curvature, C_C = 1.40	
$D_{(10)}$ = 0.016	mm	% Sand = 53.7%		Coeff. of Uniformity, C_U = 6.42	
$D_{(30)}$ = 0.049	mm	% Silt & Clay = 46.3%		Fineness Modulus = 0.26	
$D_{(50)}$ = 0.083	mm	Fracture % = n/a		Liquid Limit = n/a	
$D_{(60)}$ = 0.104	mm	Moisture %, as sampled = 30.8%		Plastic Limit = n/a	
$D_{(90)}$ = 0.218	mm	Sand Equivalent= n/a		Plasticity Index = n/a	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50		100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75		100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850	99%	99%	100.0%	0.0%
#30	0.600		98%	100.0%	0.0%
#40	0.425	98%	98%	100.0%	0.0%
#50	0.300		95%	100.0%	0.0%
#60	0.250	94%	94%	100.0%	0.0%
#80	0.180		85%	100.0%	0.0%
#100	0.150	82%	82%	100.0%	0.0%
#140	0.106		61%	100.0%	0.0%
#170	0.090		53%	100.0%	0.0%
#200	0.075	46.3%	46.3%	100.0%	0.0%



Comments:

Reviewed by:

Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Laboratory Test Results** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 23

Sieve Report

Project: Skagit County Jail - ASC
Project #: 13B093-01
Client: David Evans and Associates
Source: B3 @ 45' B
Sample#: B13-626

Date Received: 5-Sep-13
Sampled By: AW
Date Tested: 18-Sep-13
Tested By: CM

ASTM D-2487 Unified Soils Classification System
ML, Sandy Silt
Sample Color:
Dark brown

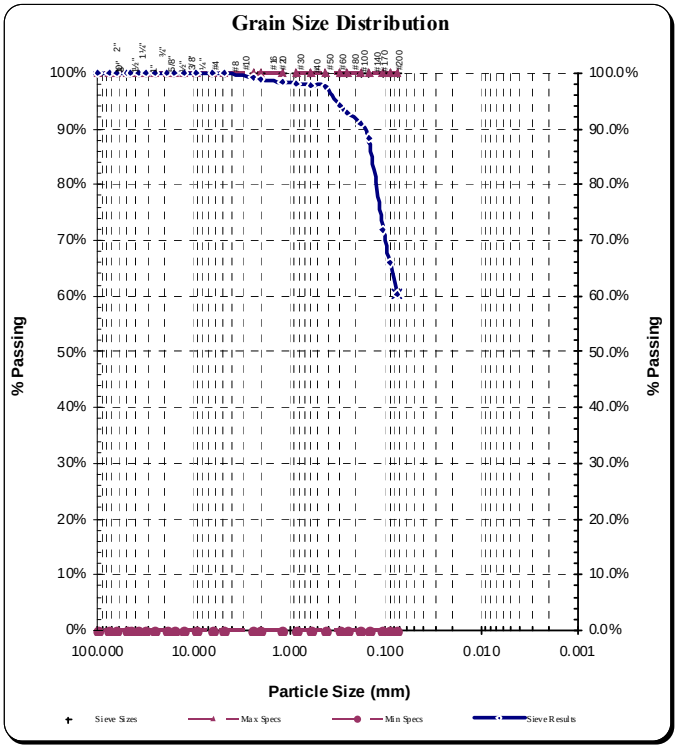
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs?

$D_{(5)}$ = 0.006	mm	% Gravel = 0.0%		Coeff. of Curvature, C_C = 1.50	
$D_{(10)}$ = 0.012	mm	% Sand = 39.6%		Coeff. of Uniformity, C_U = 6.00	
$D_{(30)}$ = 0.037	mm	% Silt & Clay = 60.4%		Fineness Modulus = 0.22	
$D_{(50)}$ = 0.062	mm	Fracture % = n/a		Liquid Limit = 0.0%	
$D_{(60)}$ = 0.075	mm	Moisture %, as sampled = 22.5%		Plastic Limit = 0.0%	
$D_{(90)}$ = 0.169	mm	Sand Equivalent= n/a		Plasticity Index = 0.0%	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50		100%	100.0%	0.0%
3/8"	9.50		100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36	99%	99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		98%	100.0%	0.0%
#20	0.850	98%	98%	100.0%	0.0%
#30	0.600		98%	100.0%	0.0%
#40	0.425	98%	98%	100.0%	0.0%
#50	0.300		94%	100.0%	0.0%
#60	0.250		93%	100.0%	0.0%
#80	0.180	91%	91%	100.0%	0.0%
#100	0.150	88%	88%	100.0%	0.0%
#140	0.106		72%	100.0%	0.0%
#170	0.090		66%	100.0%	0.0%
#200	0.075	60.4%	60.4%	100.0%	0.0%



Comments:

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Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Laboratory Test Results** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 24

Sieve Report

Project: Skagit County Jail - ASC
Project #: 13B093-01
Client: David Evans and Associates
Source: B4 @ 5'
Sample#: B13-627

Date Received: 5-Sep-13
Sampled By: AW
Date Tested: 18-Sep-13
Tested By: CM

ASTM D-2487 Unified Soils Classification System
ML, Silt
Sample Color:
Dark olive

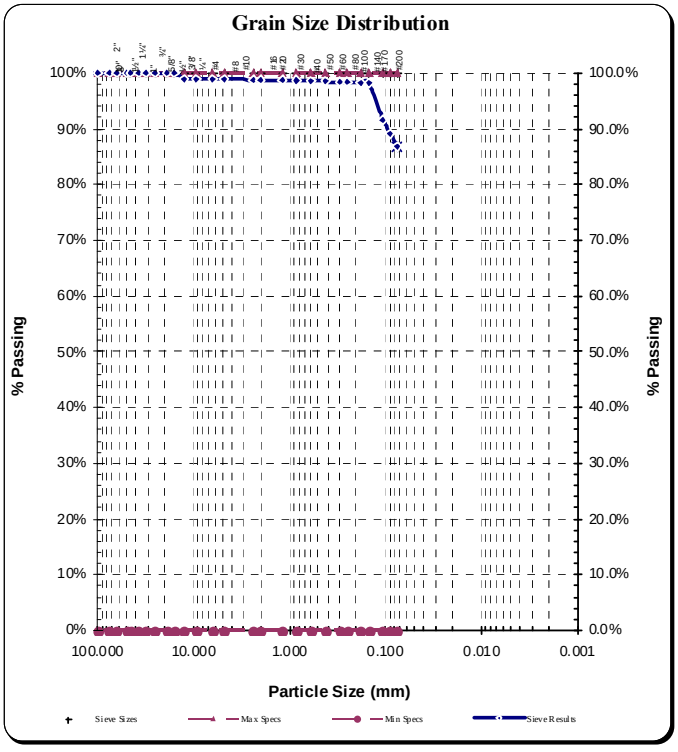
ASTM D-2216, ASTM D-2419, ASTM D-4318, ASTM D-5821

Specifications
No Specs
Sample Meets Specs?

$D_{(5)}$ = 0.004	mm	% Gravel = 1.2%		Coeff. of Curvature, C_C = 1.50	
$D_{(10)}$ = 0.009	mm	% Sand = 11.9%		Coeff. of Uniformity, C_U = 6.00	
$D_{(30)}$ = 0.026	mm	% Silt & Clay = 86.9%		Fineness Modulus = 0.10	
$D_{(50)}$ = 0.043	mm	Fracture % = n/a		Liquid Limit = 0.0%	
$D_{(60)}$ = 0.052	mm	Moisture %, as sampled = 29.6%		Plastic Limit = 0.0%	
$D_{(90)}$ =	mm	Sand Equivalent= n/a		Plasticity Index = 0.0%	

ASTM C-136, ASTM D-6913

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00		100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00		100%	100.0%	0.0%
3/4"	19.00		100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	99%	99%	100.0%	0.0%
3/8"	9.50		99%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75		99%	100.0%	0.0%
#8	2.36	99%	99%	100.0%	0.0%
#10	2.00	99%	99%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850	99%	99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	98%	98%	100.0%	0.0%
#50	0.300		98%	100.0%	0.0%
#60	0.250		98%	100.0%	0.0%
#80	0.180	98%	98%	100.0%	0.0%
#100	0.150	98%	98%	100.0%	0.0%
#140	0.106		92%	100.0%	0.0%
#170	0.090		89%	100.0%	0.0%
#200	0.075	86.9%	86.9%	100.0%	0.0%



Comments:

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Materials Testing & Consulting, Inc. 777 Chrysler Drive Burlington, WA 98233	**Laboratory Test Results** Skagit County Jail–Alf Christianson Mt Vernon, Washington	**FIGURE** 25