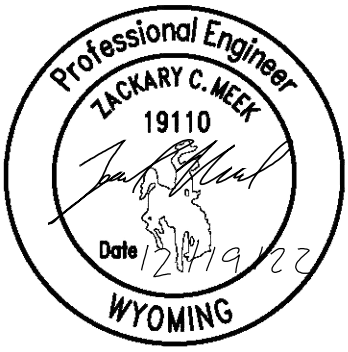
WESTERN ENGINEERS & GEOLOGISTS

GEOTECHNICAL INVESTIGATION REPORT

Wyoming National Guard Facility
Wheatland, WY 82201



1329 Ninth Street
Rock Springs, WY 82901
(307) 362-5180
western@westernegi.com

Table of Contents

EXECUTIVE SUMMARY

A. Pleasant Construction commissioned Western-EGI to complete a geotechnical investigation and report for the Wyoming Army National Guard facility located at 1257 Cole St., Wheatland, WY 82201. The purpose of the investigation and report is to determine and document the subsurface conditions found at the site, determine whether the subgrade material is adequate for bearing, and offer recommendations for rehabilitation and proper maintenance of the parking area.

To perform the geotechnical investigation, a Simco 2800 H/S truck mounted drilling rig was used to bore three holes at the site. Before sampling took place, asphalt and the base coarse layer were measured in each hole to determine an average thickness for the site. Sampling began at 1.5’ below ground surface (bgs) then continuously down to a depth of 6.0’ bgs. Samples were also taken at 10.0’ bgs and a sample was taken at 15.0’ bgs in Borehole 1. Bedrock was not encountered in any of the boreholes, and overburden soils consisted of a light brown sand with varying amounts of silt and clay. Groundwater was not encountered in any of the boreholes during drilling. Samples taken during drilling were retained and transported to Western-EGI’s geotechnical lab for further testing.

Testing and analysis revealed that the existing soil conditions are “Excellent to Good” as a general subgrade rating. However, water is allowed to infiltrate into the subgrade through large cracks in the asphalt and gaps between the asphalt and the gutters, allowing for softening and loss of bearing capacity underneath the structure. In order to repair and maintain the current parking area, proper mitigation efforts must be made in order to prevent water from infiltrating into the subgrade below the parking area.

This executive summary is only an overview of the following report. The report should be used in its entirety for design and construction of the project. Special attention should be given to the analysis, recommendations, and limitations sections of the report.

I. INTRODUCTION

A. Project Scope

A. Pleasant Construction commissioned Western-EGI to complete a geotechnical investigation and report for the Wyoming Army National Guard facility located at 1257 Cole St., Wheatland, WY 82201. The purpose of the investigation and report is to determine and document the subsurface conditions found at the site, determine whether the subgrade material is adequate for bearing, and offer recommendations for rehabilitation and proper maintenance of the parking area.

B. Investigation and Report Scope

The purpose of the investigation was to determine the physical and engineering properties of the subsurface soils to define and mitigate any subsurface conditions that are potentially hazardous to the parking area, as well as determine the asphalt and base thicknesses across the site. In order to gather samples and analyze the subsurface soils, three holes were drilled at the site. Borehole 1 was drilled in the southeast corner of the parking area, Borehole 2 was drilled centrally near the large crack running north to south, and Borehole 3 was drilled in the northwest corner of the parking area.

Samples were collected with a nominal 2" outside diameter Standard Split-Spoon Sampler. The sampler was driven by a 140-pound safety hammer operated by a rope-and-pulley system. Blow counts were recorded while the sampler was driven. Samples were collected from each borehole and retained for laboratory testing and classification.

The intent of the report is to convey the data gathered and analysis of the results obtained from the subsurface investigation and laboratory testing and offer recommendations for maintaining and repairing the parking area.

This report contains results of the investigation and laboratory testing, and suitability of the soils on site for the parking area.

II. SITE SETTING AND BASE GEOLOGY

A. Site Description

The site is located at 1257 Cole Street, Wheatland, WY 82201. The site is accessed from the north via an existing access on Cole Street. The site has long been developed as a Wyoming Army National Guard facility. The vicinity map of the area is in Appendix A.

B. Drainage

Drainage in the parking area sheet flows from the southeast to the northwest. However, due to the extensive cracking in the parking area and the gaps between the gutters and the asphalt, water is allowed to infiltrate into the subgrade underneath the parking area, and does not allow for the gutter system to work as intended.

C. General Geology

Geology of the site belongs to the Dune Sand and Loess formation. This formation is described as including active and dormant sand dunes. In northwestern Wyoming the formation is chiefly loess (age 12,000-19,000 years).

III. EXPLORATION AND INVESTIGATION

A. Subsurface Investigation

The subsurface investigation was completed with a Simco 2800 H/S drilling rig mounted on a truck carrier. Borehole 1 was drilled with a 4 ½" solid-stem flight auger down to a depth of 10', but then switched to a 6" hollow stem auger after the material sloughed to a depth of 5' bgs. The borehole was redrilled down to a depth of 10' bgs before continuing sampling. The remaining boreholes were drilled using the 6" hollow stem to prevent sloughing of the material inside the hole. All sampling was conducted with a Standard Split Spoon Sampler starting at 1.5' below ground surface (bgs) and continuously down to a depth of 6' bgs. In Borehole 1 samples were taken at 10' and 15' bgs, while sampling in Boreholes 2 and 3 ended at 10' bgs. An additional sample was taken at 7' in Borehole 3 as drilling was not advancing at that depth due to cobbles, however once the sampling was conducted, it moved the cobbles to where the auger was able to advance down to 10'. Bedrock was not encountered in any of the boreholes.

Blow counts and soil types were recorded as sampling was completed. Sampling was conducted with a nominal 2" O.D. Standard Split-Spoon sampler and a 140-pound rope-and-pulley safety hammer with a 30" free fall stroke. The drilling and split-spoon sampling was done in general accordance with ASTM D1452 – 09 *Standard Practice for Soil Exploration and Sampling by Auger Boring,* and ASTM D1586 – 11 *Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*.

During the sampling process, overburden soils consisted of a light brown sand with varying amounts of silt and clay, with a layer of cobbles around 7' – 10' bgs, and transitioned back to the light brown sand.

Notes were recorded during drilling and used to compile drill logs for each hole. The logs contain information such as soil types and descriptions, raw and corrected blow counts, elevations, general moisture content and any other information pertinent to the physical properties of the soils found. The logs are located in Appendix B of this report.

B. Laboratory Testing

Samples collected during the investigation were transported to Western-EGI's soils lab for further testing and evaluation. To verify the material type, and to provide enough material, samples from a depth of 1.5' – 4.5' from each borehole were combined for a total of three testing samples. The combined samples were subjected to testing for liquid and plastic limits, plasticity index, particle size distribution, and classification by the Unified Soil Classification System (USCS) and American Association of State Highway and Transportation Officials (AASHTO). These testing results are located in Appendix C of this report. A summary of the lab results is presented below:

SAMPLE ID	LL (%)	PL (%)	PI	NATURAL MOISTURE (%)	USCS SYMBOL	AASHTO SYMBOL
1A & 1B	NP	NP	NP	4.7 & 2.3	SM	A-2-4
2A & 2B	NP	NP	NP	5.4 & 2.8	SW-SM	A-2-4
3A & 3B	22	17	5	11.1 & 7.6	SC-SM	A-2-4

Samples 1A and 1B classified as silty-sand with gravel, 2A and 2B classified as well graded sand with silt, while samples 3A and 3B classified as a silty, clayey-sand with gravel. AASHTO classifies A-2-4 materials as "Excellent to Good" as a general rating as subgrade.

IV. SUBSURFACE CONDITIONS

A. Soils

The soils profile was consistent throughout the property. The overburden soils consist of light brown sand with varying amounts of silt and clay, with a layer of cobbles around 7' – 10' bgs, and transitioning back to light brown sand. Standard Penetration Testing (SPT) indicated that the soils in Borehole 3 are relatively soft near the surface with corrected blow count (N_{60}) values ranging from 6 - 7 blows/foot in the first 4.5' and then stiffened from 4.5' to 10' with blow counts ranging from 13 - 24 blows/foot. Soils in Boreholes 1 and 2 were relatively stiff throughout with corrected blow counts ranging from 14 – 32 blows/foot.

B. Groundwater

There was not an indication of a free groundwater table during drilling. Soils were dry to moist in-situ, with higher moisture contents closer to the surface indicating that water is infiltrating into the subgrade through cracks and gaps in the asphalt.

V. ANALYSIS AND RECOMMENDATIONS

A. Analysis

After the field and laboratory testing, the data was analyzed to determine the suitability of the subsurface conditions for bearing and offer recommendations for rehabilitation and proper maintenance of the parking area. The Standard Penetration Tests (SPT) taken during the field investigation were corrected for energy losses, rod length variations, and sampler disturbance affects. These corrected blow counts were used to determine density and compactness of the subgrade soils. Laboratory testing was used to determine the physical and engineering properties of the soils encountered.

Sampling, testing and analysis of the soils indicated that mitigation efforts must be taken in order to prevent water infiltration into the subgrade in order to maintain the integrity of the parking area throughout its lifespan. Recommendations are based on conditions observed during exploration and testing and should be revised if conditions are found to be different during construction.

B. Asphalt Maintenance Recommendations

Lab testing and analysis showed that the subgrade material was "Excellent to Good" as a general subgrade material. During the geotechnical investigation, asphalt and base material thicknesses were measured prior to sampling. It was found that there was an even layer of ~4" – 6" base material, however, the asphalt thicknesses varied between 2.5" – 3.75". The varied thickness of asphalt causes the asphalt have a varied performance in terms of section strength, causing the asphalt to fail and crack. Once this asphalt failed it allowed water to infiltrate into the subgrade materials, causing further loss of bearing capacity underneath the asphalt, causing additional cracking. Additionally, this parking area is older and has lost its flexibility. Exposure to the elements has caused additional damages in the parking area, along with shrinkage that the asphalt cannot rebound from and has caused gaps in between the asphalt and the gutter system.

In order to maintain and prevent further degradation of the parking area, water must be prevented from infiltrating into the subgrade materials and transported off via the gutter system. This can be accomplished by sealing the minor cracks in the pavement and along the edges where the asphalt meets the curb and gutter system. Cracks greater than 1" wide that do not allow for sealing, along with areas that are experiencing "alligator" cracking should be removed and patched. An additional valley pan would also help catch the water midway in the parking area, helping transport the water into the gutter system and off the parking area.

When performing patch work or installing new valley pans, the base material should be properly compacted. Western-EGI recommends scarifying and moisture conditioning the top 8" of the base material. The base material should be compacted to 95% of the Standard Proctor as defined by ASTM D698-12e2 *Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12 400 ft-lbf/ft3 (600 kN-m/m3))*. Compaction should be done with equipment that is large enough to densify the entire thickness of the lift. Asphalt patches should also have a minimum thickness of 3", compacted to a minimum of 94% with an average of 96% of the Marshall Test in accordance with ASTM D2726 *Standard Test Method for Bulk Specific Gravity and Density of Non-Absorptive Compacted Asphalt Mixtures.*

Once the cracks have been sealed or repaired and any patch work or installation of valley pans have occurred, Western-EGI recommends that the entire surface of the asphalt be seal coated, to help ensure the preservation of the asphalt.

VI. CONCLUSIONS AND LIMITATIONS

A. Conclusions

A. Pleasant Construction commissioned Western-EGI to complete a geotechnical investigation and report for the Wyoming Army National Guard facility located at 1257 Cole St., Wheatland, WY 82201 (Appendix A). The report includes an overview and discussion of our analysis of the existing conditions and recommendations for the rehabilitation and proper maintenance of the current parking area. It is the opinion of Western-EGI that the project can be successfully completed. It is our opinion that a geotechnical engineer be retained to assess conditions as construction of the project proceeds. Recommendations given in this report assume that adequate field testing and inspection of the construction efforts will be made during installation.

If subsurface conditions are found during construction that differ from those described in this report and attached drill logs, Western-EGI should be notified so that additional recommendations can be given as necessary.

B. Limitations

Our professional services were performed, our findings obtained, and our recommendations prepared in accordance with generally accepted engineering principles and practices, and in accordance with the standards and codes sited.

This geotechnical report was prepared for the use of our Client in the design of the subject property and should be made available to potential contractors and/or the Contractor for information on factual data only. This report should not be used for contractual purposes as a warranty of interpreted subsurface conditions such as those indicated by the interpretive boring and test pit logs, cross-sections, or discussion of subsurface conditions contained herein.

The analyses, conclusions and recommendations contained in the report are based on site conditions as they presently exist and assume that the exploratory borings, test pits, and/or probes are representative of the subsurface conditions of the site. If, during construction, subsurface conditions are found which are significantly different from those observed in the exploratory borings and test pits, or assumed to exist in the excavations, we should be advised at once so that we can review these conditions and reconsider our recommendations where necessary. If there is a substantial lapse of time between the submission of this report and the start of work at the site, or if conditions have changed due to natural causes or construction operations at, or adjacent to, the site, this report should be reviewed to determine the applicability of the conclusions and recommendations considering the changed conditions and time lapse.

The Summary Boring Logs are our opinion of the subsurface conditions revealed by periodic sampling of the ground as the borings progressed. The soil descriptions and interfaces between strata are interpretive and actual changes may be gradual.

The drilling logs and related information depict subsurface conditions only at these specific locations and at the particular time designated on the logs. Soil conditions at other locations may differ from conditions occurring at these boring locations.

Also, the passage of time may result in a change in the soil conditions at these boring locations. Groundwater levels often vary seasonally. Groundwater levels reported on the drilling logs or in the body of the report are factual data only for the dates shown.

Unanticipated soil conditions are commonly encountered on construction sites and cannot be fully anticipated by merely taking soil samples, borings, or test pits. Such unexpected conditions frequently require that additional expenditures be made to attain a properly constructed project. It is recommended that the Owner consider providing a contingency fund to accommodate such potential extra costs.

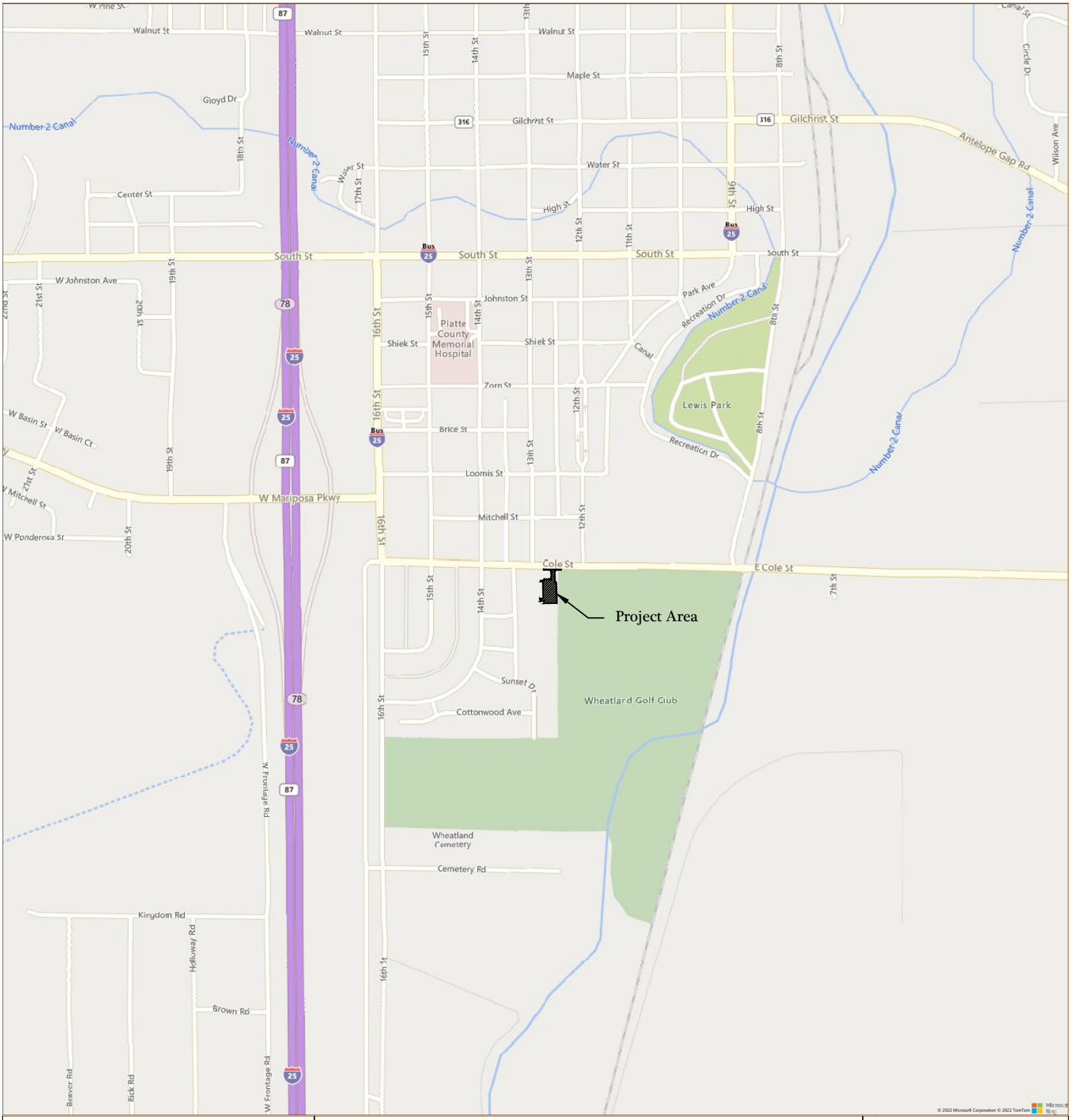
Western-EGI will not be responsible for any deviation from the intent of this report including, but not restricted to, any changes to the scheduled time of construction, the nature of the project or the specific construction methods or means indicated in this report; nor can

our firm be responsible for any construction activity on sites other than the specific site referred to in this report.

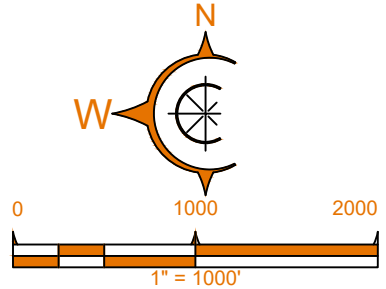
We appreciate this opportunity to help successfully complete this project. If you have any questions about the information contained in this report, please contact us at your convenience.

APPENDIX A

VICINITY MAP



VICINITY MAP



Layout: VICINITY MAP Plot Date: 12/19/2022 9:48 AM Plotted By: Zack
Path:Q:\Projects\2022 Projects\22-1044 WYNG Pavement Maintenance\Wheatland\Vicinity Map\Wheatland Vicinity Map and Borehole Locations.dwg

Job No.:	22-1044
Date:	12/1/2022
Drawn By:	ZCM
Checked By:	BDL

WESTERN ENGINEERS & GEOLOGISTS
1329 NINTH STREET
ROCK SPRINGS, WY 82901
307-362-5180
WESTERN@WESTERNEGI.COM
WWW.WESTERNEGI.COM

APP. A

APPENDIX B

BOREHOLE LOCATIONS

BOREHOLE LOCATIONS

N
W
0 30 60
1" = 60'

Layout: BH LOCATIONS Plot Date: 12/19/2022 9:48 AM Plotted By: Zack
Path: Q:\Projects\2022 Projects\22-1044 WYNG Pavement Maintenance\Wheatland\Vicinity Map\Wheatland Vicinity Map and Borehole Locations.dwg

Job No.:	22-1044
Date:	12/1/2022
Drawn By:	ZCM
Checked By:	BDL

WESTERN ENGINEERS & GEOLOGISTS
1329 NINTH STREET
ROCK SPRINGS, WY 82901
307-362-5180
WESTERN@WESTERNEGI.COM
WWW.WESTERNEGI.COM

APP. B

APPENDIX C

DRILL LOGS

GROUP SYMBOLS AND NAMES

Graphic / Symbol	Group Names
GW	Well-graded GRAVEL Well-graded GRAVEL with SAND
GP	Poorly-graded GRAVEL Poorly-graded GRAVEL with SAND
GW-GM	Well-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GW-GC	Well-graded GRAVEL with CLAY or (SILTY CLAY) Well-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GP-GM	Poorly-graded GRAVEL with SILT Well-graded GRAVEL with SILT and SAND
GP-GC	Poorly-graded GRAVEL with CLAY (or SILTY CLAY) Poorly-graded GRAVEL with CLAY and SAND (or SILTY CLAY and SAND)
GM	SILTY GRAVEL SILTY GRAVEL with SAND
GC	CLAYEY GRAVEL CLAYEY GAVEL with SAND
GC-GM	SILTY, CLAYEY GRAVEL SILTY, CLAYEY GRAVEL with SAND
SW	Well-graded SAND Well-graded SAND with GRAVEL
SP	Poorly graded SAND Poorly graded SAND with GRAVEL
SW-SM	Well-graded SAND with SILT Well-graded SAND with SILT and GRAVEL
SW-SC	Well-graded SAND with CLAY (or SILTY CLAY) Well-graded SAND with CLAY and Gravel (or SILTY CLAY and GRAVEL)
SP-SM	Poorly graded SAND with SILT Poorly graded SAND with SILT and GRAVEL
SP-SC	Poorly graded SAND with CLAY (or SILTY CLAY) Poorly graded SAND with CLAY and GRAVEL (or SILTY CLAY AND GRAVEL
SM	SILTY SAND SILTY SAND WITH GRAVEL
SC	CLAYEY SAND CLAYEY SAND With GRAVEL
SC-SM	SILTY, CLAYEY SAND SILTY, CLAYEY SAND with GRAVEL
PT	PEAT
	COBBLES COBBLES AND BOULDERS BOULDERS

Graphic / Symbol	Group Names
CL	Lean CLAY Lean CLAY with SAND Lean CLAY with GRAVEL SANDY lean CLAY SANDY Lean CLAY with GRAVEL GRAVELLY lean CLAY GRAVELLY lean CLAY with SAND
CL-ML	SILTY CLAY SILTY CLAY with SAND SILTY CLAY with GRAVEL SANDY SILTY CLAY SANDY SILTY CLAY with GRAVEL GRAVELLY SILTY CLAY GRAVELLY SILTY CLAY with SAND
ML	SILT SILT with SAND SILT with GRAVEL SANDY SILT SANDY SILT with GRAVEL GRAVELLY SILT GRAVELLY SILT with SAND
OL	ORGANIC lean CLAY ORGANIC lean CLAY with SAND ORGANIC lean CLAY with GRAVEL SANDY ORGANIC lean CLAY SANDY ORGANIC lean CLAY with GRAVEL GRAVELLY ORGANIC lean CLAY GRAVELLY ORGANIC lean CLAY with SAND
OL	ORGANIC SILT ORGANIC SILT with SAND ORGANIC SILT with GRAVEL SANDY ORGANIC SILT SANDY ORGANIC SILT with GRAVEL GRAVELLY ORGANIC SILT GRAVELLY ORGANIC SILT with SAND
CH	Fat CLAY Fat CLAY with SAND Fat CLAY with GRAVEL SANDY Fat CLAY SANDY Fat CLAY with GRAVEL GRAVELLY Fat CLAY GRAVELLY Fat CLAY with SAND
MH	Elastic SILT Elastic SILT with SAND Elastic SILT with GRAVEL SANDY Elastic SILT SANDY Elastic SILT with GRAVEL GRAVELLY Elastic SILT GRAVELLY Elastic SILT with SAND
OH	ORGANIC Fat CLAY ORGANIC Fat CLAY with SAND ORGANIC Fat CLAY with GRAVEL SANDY ORGANIC Fat CLAY SANDY ORGANIC Fat CLAY with GRAVEL GRAVELLY ORGANIC Fat CLAY GRAVELLY ORGANIC Fat CLAY with SAND
OH	ORGANIC elastic SILT ORGANIC elastic SILT with SAND ORGANIC elastic SILT with GRAVEL SANDY ORGANIC ELASTIC SILT SANDY ORGANIC elastic SILT with GRAVEL GRAVELLY ORGANIC elastic SILT GRAVELLY ORGANIC elastic SILT with SAND
OL/OH	ORGANIC Soil ORGANIC Soil with SAND ORGANIC Soil with GRAVEL SANDY ORGANIC Soil SANDY ORGANIC Soil with GRAVEL GRAVELLY ORGANIC Soil GRAVELLY ORGANIC Soil with SAND

FIELD AND LABORATORY TESTS

C	Consolidation (ASTM D 2435-04)
CL	Collapse Potential (ASTM D 5333-03)
CP	Compaction Curve (CTM 216-06)
CR	Corrosion, Sulfates, Chlorides (ASTM 643-99; CTM 417-06; CTM 422-06)
CU	Consolidated Undrained Triaxial (ASTM D 4767-02)
DS	Direct Shear (ASTM D 3080-04)
EI	Expansion Index (ASTM D 4829-03)
M	Moisture Content (ASTM D 2216-05)
OC	Organic Content (ASTM D 2974-07)
P	Permeability (CTM 220-05)
PA	Particle Size Analysis (ASTM D 422-02)
PI	Liquid Limit, Plastic Limit, Plasticity Index (AASHTO T 89-02, AASHTO T 90-00)
PL	Point Load Index (ASTM D 5731-05)
PM	Pressure Meter
PP	Pocket Penetrometer
R	R-Value (CTM 301-00)
SE	Sand Equivalent (CTM 217-99)
SG	Specific Gravity (AASHTO T 100-06)
SL	Shrinkage Limit (ASTM D 427-04)
SW	Swell Potential (ASTM D 4546-03)
TV	Pocket Torvane
UC	Unconfined Compression - Soil (ASTM D 2166-06) Unconfined Compression - Rock (ASTM D 2938-95)
UU	Unconsolidated Undrained Triaxial (ASTM D 2850-03)
UW	Unit Weight (ASTM D 4767-04)
VS	Vane Shear (AASHTO T 223-96

SAMPLER GRAPHIC SYMBOLS

- Standard Penetration Test (SPT)
- Standard California Sampler
- Modified California Sampler
- Shelby Tube
- Piston Sampler
- NX Rock Core
- HQ Rock Core
- Bulk Sample
- Other (see remarks)

GROUP SYMBOLS AND NAMES

- Auger Drilling
- Rotary Drilling
- Dynamic Cone or Hand Driven
- Diamond Core

WATER LEVEL SYMBOLS

- First Water Level Reading (During Drilling)
- Static Water Level Reading (short-term)
- Static Water Level Reading (long-term))

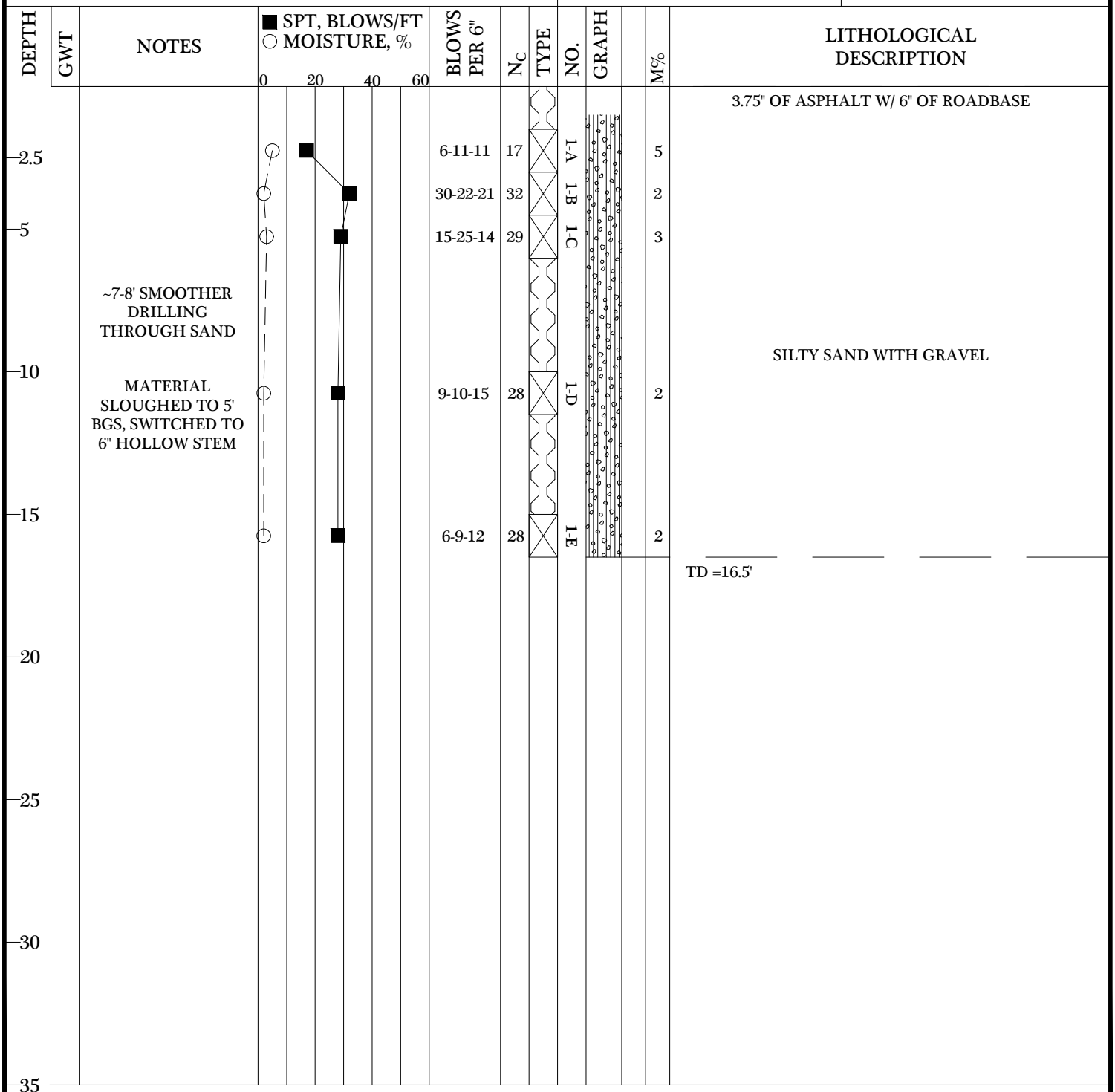
WESTERN ENGINEERS & GEOLOGISTS

Western Engineers & Geologists
1329 9th St. Rock Springs,
Wyoming 82901
www.westernegi.com

DRILL LOG LEGEND
SHEET 1 OF 1

WESTERN ENGINEERS & GEOLOGISTS

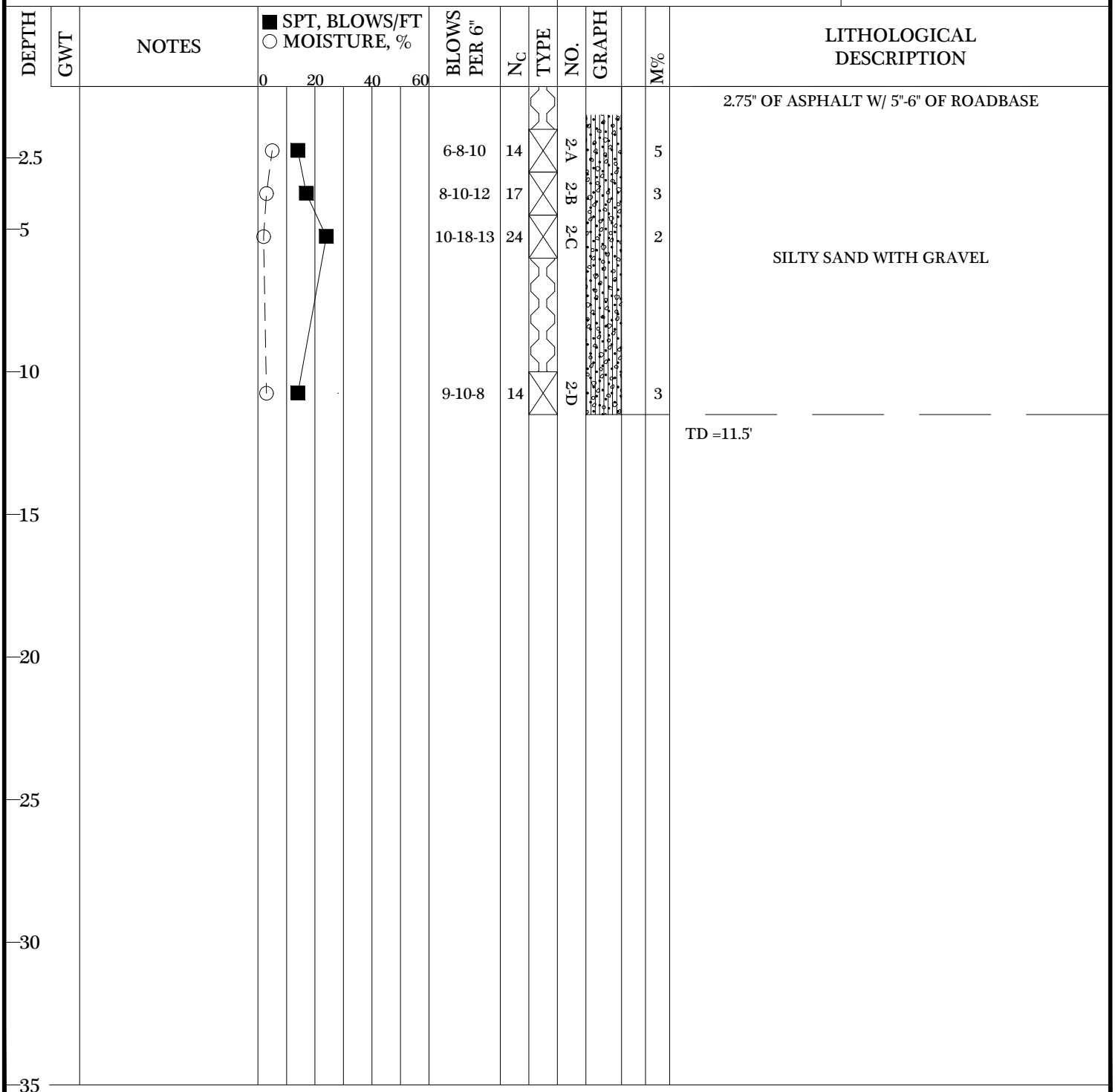
DRILL LOG NO.: BH-1			CLIENT: A. PLEASANT CONST.
PROJECT: WYNG PAVEMENT MAINTANENCE			
LOC.: WHEATLAND WYNG FACILITY			PROJ. NO.: 22-1044
AUGER: 4" Solid Stem Flight O.D.			GND EL (FT): 4824.36'
HAMMER: ROPE & PULLEY SAFETY	DROP: 30 in.	WEIGHT: 140 lb	TD (FT): 16.5'
SAMPLER: SOLID STEM, 4" O.D. AND 6" O.D.		GWT W.D.: N/A	LOGGED BY: ZCM
WEATHER: SUNNY/WINDY		DATE: 10/19/2022	DRAWN BY: JBD



COMMENTS: HOLE DRILLED WITH SIMCO 2800 H/S.

WESTERN ENGINEERS & GEOLOGISTS

DRILL LOG NO.: BH-2			CLIENT: A. PLEASANT CONST.
PROJECT: WYNG PAVEMENT MAINTANENCE			
LOC.: WHEATLAND WYNG FACILITY			PROJ. NO.: 22-1044
AUGER: 4" Solid Stem Flight O.D.			GND EL (FT): 4823.84'
HAMMER: ROPE & PULLEY SAFETY	DROP: 30 in.	WEIGHT: 140 lb	TD (FT): 11.5'
SAMPLER: HOLLOW STEM, 6" O.D.		GWT W.D.: N/A	LOGGED BY: ZCM
WEATHER: SUNNY/WINDY		DATE: 10/19/2022	DRAWN BY: JBD



COMMENTS: HOLE DRILLED WITH SIMCO 2800 H/S.

WESTERN ENGINEERS & GEOLOGISTS

DRILL LOG NO.: BH-3	CLIENT: A. PLEASANT CONST.	
PROJECT: WYNG PAVEMENT MAINTANENCE		
LOC.: WHEATLAND WYNG FACILITY		PROJ. NO.: 22-1044
AUGER: 4" Solid Stem Flight O.D.		GND EL (FT): 4823.31'
HAMMER: ROPE & PULLEY SAFETY	DROP: 30 in.	WEIGHT: 140 lb	TD (FT): 11.5'
SAMPLER: HOLLOW STEM, 6" O.D.		GWT W.D.: N/A	LOGGED BY: ZCM
WEATHER: SUNNY/WINDY		DATE: 10/19/2022	DRAWN BY: JBD

DEPTH	GWT	NOTES	SPT, BLOWS/FT ■ / MOISTURE, % ○ (0 20 40 60)	BLOWS PER 6"	N_C	TYPE	NO.	GRAPH	M%	LITHOLOGICAL DESCRIPTION
										3" OF ASPHALT W/ 4" OF ROADBASE
2.5				2-4-3	6		3-A		11	BROWN SILTY CLAYEY SAND
				4-5-4	7		3-B		8	
5				12-18-14	24		3-C		3	
		HARD DRILLING DOWN TO 6-7'. HAD TO STOP DRILLING AT 7', UNABLE TO ADVANCE BIT THROUGH COBBLES. CONDUCTED SPT SAMPLE, AND WAS ABLE TO GET THROUGH LAYER.		22-13-13	20		3-D		2	SILTY SAND WITH GRAVEL
10				11-9-8	13		3-E		2	
										TD =11.5'
15										
20										
25										
30										
35										

COMMENTS: HOLE DRILLED WITH SIMCO 2800 H/S.

APPENDIX D

TESTING RESULTS

1329 Ninth Street
Rock Springs, Wy 82901
307-362-5180
www.westernegi.com

WESTERN ENGINEERS & GEOLOGISTS

SPT Corrections N_{60}	
CLIENT:	A. Pleasant Const.
JOB NUMBER:	22-1044
PROJECT:	Wheatland WYNG
SAMPLE DATE:	10/19/2022

Borehole	DEPTH (FT)	N (BLOWS/FT)	ROD LENGTH (FT)	HOLE DIA. (IN)	ηH	ηB	ηS	ηR	N_C, BLOWS/FT	N_C, BLOWS/FT
BH-1	3	22	1	4.5	60	1	1	0.75	16.50	17
	4.5	43	2.5	4.5	60	1	1	0.75	32.25	32
	6	39	4	4.5	60	1	1	0.75	29.25	29
	11.5	35	9.5	6	60	1.05	1	0.75	27.56	28
	16.5	31	14.5	6	60	1.05	1	0.85	27.67	28
BH-2	3	18	1	6	60	1.05	1	0.75	14.18	14
	4.5	22	2.5	6	60	1.05	1	0.75	17.33	17
	6	31	4	6	60	1.05	1	0.75	24.41	24
	11.5	18	9.5	6	60	1.05	1	0.75	14.18	14
BH-3	3	7	1	6	60	1.05	1	0.75	5.51	6
	4.5	9	2.5	6	60	1.05	1	0.75	7.09	7
	6	30	4	6	60	1.05	1	0.75	23.63	24
	8.5	26	6.5	6	60	1.05	1	0.75	20.48	20
	11.5	17	9.5	6	60	1.05	1	0.75	13.39	13

1329 Ninth Street
Rock Springs, Wy 82901
307-362-5180
www.westernegi.com

WESTERN ENGINEERS & GEOLOGISTS

Natural Moisture Percentages	
CLIENT:	A. Pleasant Const.
JOB NUMBER:	22-1044
PROJECT:	Wheatland Armory
SAMPLE DATE:	10/19/2022

BH	Depth	Tin	Mass of Tin	Tin + Wet	Tin + Dry	Moisture %
1A	1.5 - 3.0	16	20.84	67.91	65.81	4.7%
1B	3.0 - 4.5	35	20.86	70.35	69.24	2.3%
1C	4.5 - 6.0	21	20.66	70.06	68.67	2.9%
1D	10.0 -11.5	3	20.8	82.64	81.2	2.4%
1A	15.0 - 16.5	27	20.76	75.97	74.67	2.4%
2A	1.5 - 3.0	ML	20.65	84.03	80.77	5.4%
2B	3.0 - 4.5	8	21.03	73.59	72.16	2.8%
2C	4.5 - 6.0	14	20.84	80.21	79.07	2.0%
2D	10.0 - 11.5	31	20.8	72.07	70.75	2.6%
3A	1.5 - 3.0	13	20.79	61.72	57.64	11.1%
3B	3.0 - 4.5	XS	20.72	54.3	51.94	7.6%
3C	4.5 - 6.0	24	20.58	69.52	68.33	2.5%
3D	7.0 - 8.5	33	20.91	68.84	67.98	1.8%
3E	10.0 - 11.5	GG	20.73	69.53	68.45	2.3%

1329 Ninth Street
Rock Springs, Wy 82901
307-362-5180
www.westernegi.com

WESTERN ENGINEERS & GEOLOGISTS

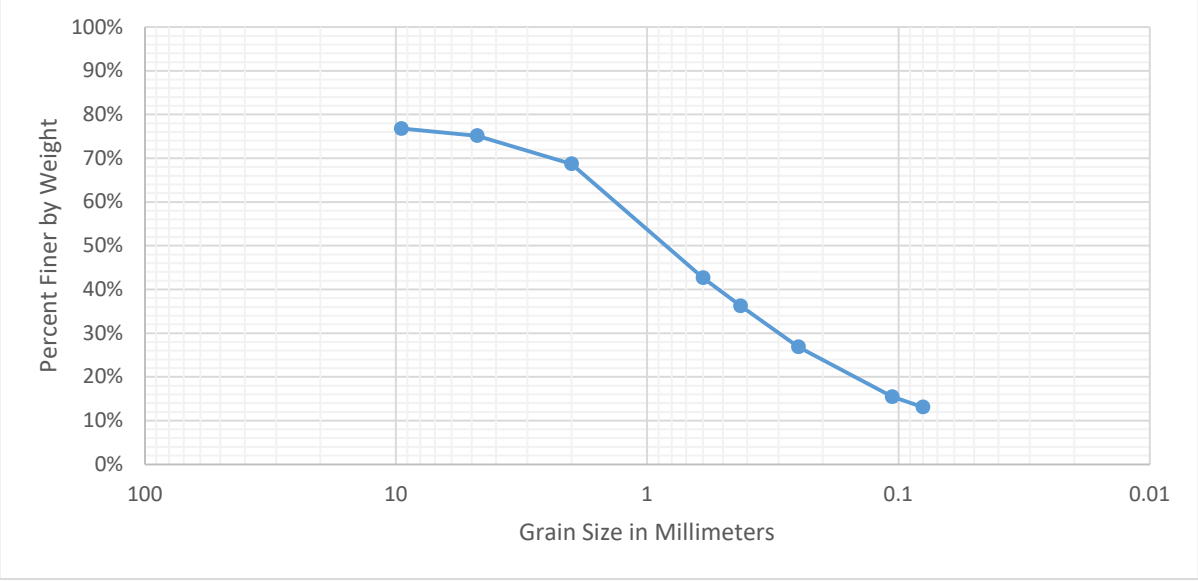
CLIENT:	A. Pleasant Const.	TECHNICIAN:	ZCM
JOB NUMBER:	22 - 1044	TEST METHOD:	ASTM C117 & C136
PROJECT:	Wheatland Armory	SAMPLE NUMBER:	1A & 1B
SAMPLE DATE:	10/19/2022	SAMPLED BY:	ZCM
TEST DATE:	11/2/2022	SOURCE	BH 1 1.5' - 4.5'
SAMPLE DESCRIPTION:	Silty Sand with Gravel - **SM**		

Pan = 674.4

Sieve Number	Sieve Size (mm)	Weight Retained + Pan (gm)	Weight Retained (gm)	Percent Retained	Percent Finer
0.375	9.53	881.4	207.0	23%	77%
4	4.75	689.0	14.6	25%	75%
10	2	731.9	57.5	31%	69%
30	0.6	906.9	232.5	57%	43%
40	0.425	731.5	57.1	64%	36%
60	0.25	758.3	83.9	73%	27%
140	0.106	776.2	101.8	85%	15%
200	0.08	695.5	21.1	87%	13%
Pan		680.9	116.7	100%	0%
		Total	892.2		

Uniformity Coefficient, Percent Moisture, and Mass Lost			
Initial Mass:	892.2	% Moisture:	#DIV/0!
Final Mass:	892.2	D10:	0.07
% Mass Lost:	0.0%	D30:	0.30
Tin:		D60:	1.50
Tin + M_D:		C_C:	0.9
Tin + M_W:		C_U:	21

Washing	
Initial Mass	892.2
Mass of Pan + Soil (B)	1271.32
Mass of Pan + Soil (A)	1162.14
Mass Passing 200	109.2



Reviewed by: Zack Meek Date: 12/19/2022

1329 Ninth Street
Rock Springs, Wy 82901
307-362-5180
www.westernegi.com

WESTERN ENGINEERS & GEOLOGISTS

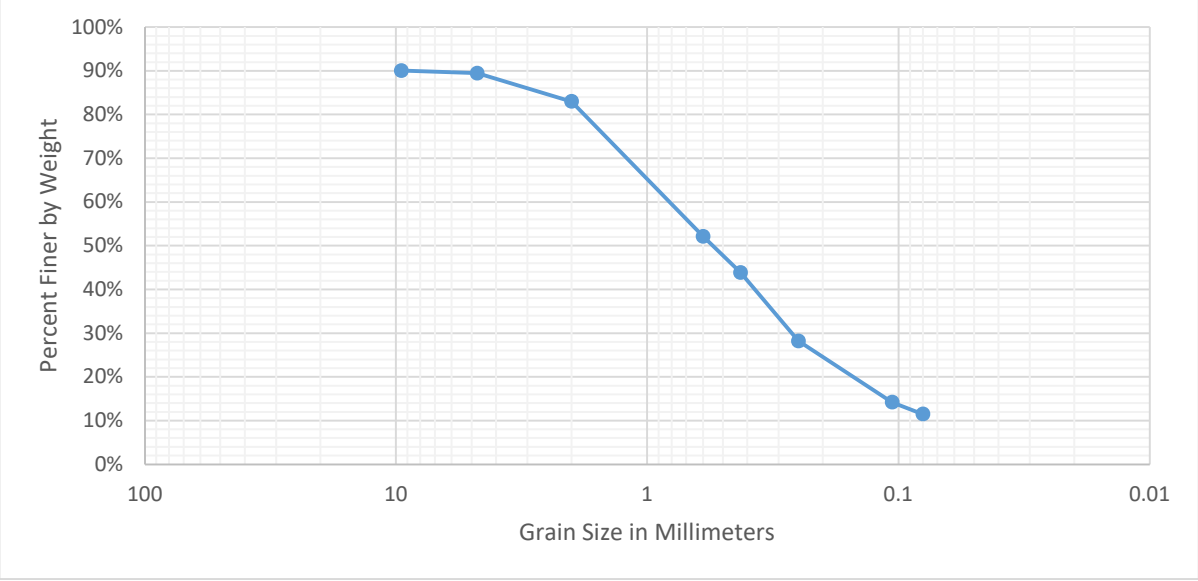
CLIENT:	A. Pleasant Const.	TECHNICIAN:	ZCM
JOB NUMBER:	22 - 1044	TEST METHOD:	ASTM C117 & C136
PROJECT:	Wheatland Armory	SAMPLE NUMBER:	2A & 2B
SAMPLE DATE:	10/19/2022	SAMPLED BY:	ZCM
TEST DATE:	11/2/2022	SOURCE	BH 2 1.5' - 4.5'
SAMPLE DESCRIPTION:	Well Graded Sand with Silt **SW-SM**		

Pan = 674.4

Sieve Number	Sieve Size (mm)	Weight Retained + Pan (gm)	Weight Retained (gm)	Percent Retained	Percent Finer
0.375	9.53	756.0	81.6	10%	90%
4	4.75	679.3	4.9	11%	89%
10	2	727.7	53.3	17%	83%
30	0.6	927.5	253.1	48%	52%
40	0.425	742.5	68.1	56%	44%
60	0.25	802.8	128.4	72%	28%
140	0.106	789.4	115.0	86%	14%
200	0.08	696.7	22.3	89%	11%
Pan		682.7	94.2	100%	0%
		Total	820.7		

Uniformity Coefficient, Percent Moisture, and Mass Lost			
Initial Mass:	820.7	% Moisture:	#DIV/0!
Final Mass:	820.7	D10:	0.08
% Mass Lost:	0.0%	D30:	0.28
Tin:		D60:	0.80
Tin + M_D:		C_C:	1
Tin + M_W:		C_U:	10

Washing	
Initial Mass	820.7
Mass of Pan + Soil (B)	1255.75
Mass of Pan + Soil (A)	1170.45
Mass Passing 200	85.3



Reviewed by: Zack Meek Date: 12/19/2022

1329 Ninth Street
Rock Springs, WY 82901
307-362-5180
www.westernegi.com

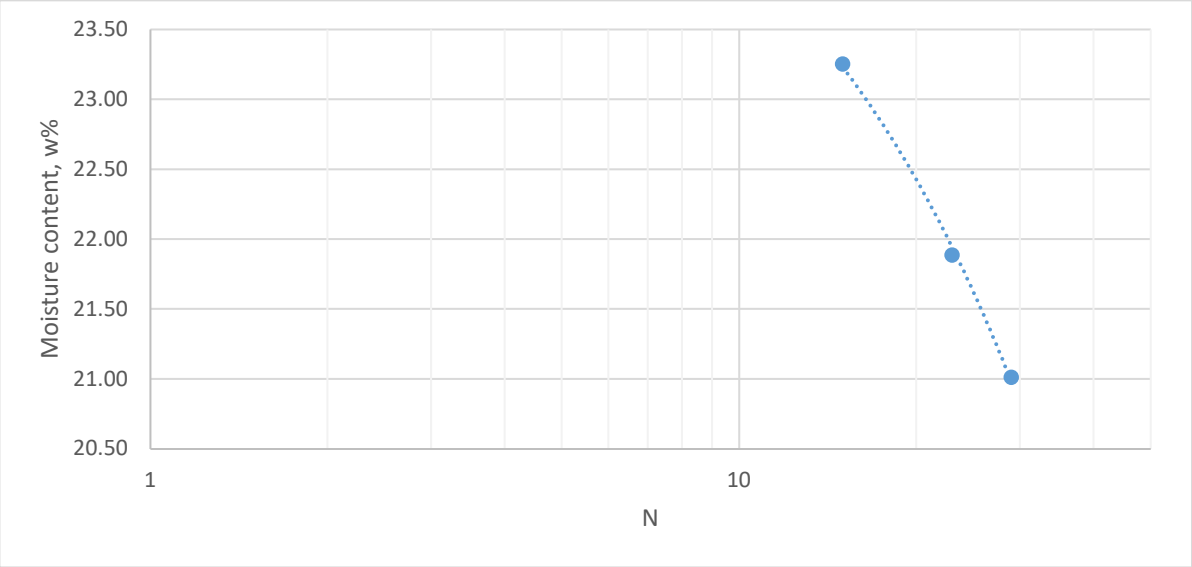
WESTERN ENGINEERS & GEOLOGISTS

CLIENT:	A. Pleasant Const.	TECHNICIAN:	ZCM
JOB NUMBER:	22 - 1044	TEST METHOD:	ASTM D4318-10
PROJECT:	Wheatland Armory	SAMPLE NUMBER:	3A & 3B
SAMPLE DATE:	10/19/2022	SAMPLED BY:	ZCM
TEST DATE:	11/2/2022	SOURCE:	BH 3 1.5' - 4.5'
SAMPLE DESCRIPTION:	Brown Silty Clayey Sand		

	Liquid Limit			Plastic Limit	
Can No.	11	18	26	A	E
Mass of can	20.89	20.76	20.68	20.88	20.71
Can + wet	41.45	41.81	40.98	35.06	33.98
Can + dry	37.88	38.03	37.15	32.93	32.03
%M	21.01	21.89	23.25	17.68	17.23
Blows N	29	23	15		
Blows Required	25-35	20-30	15-25		

LL =	22
PI =	5

Classification	**CL-ML**



1329 Ninth Street
Rock Springs, Wy 82901
307-362-5180
www.westernegi.com

WESTERN ENGINEERS & GEOLOGISTS

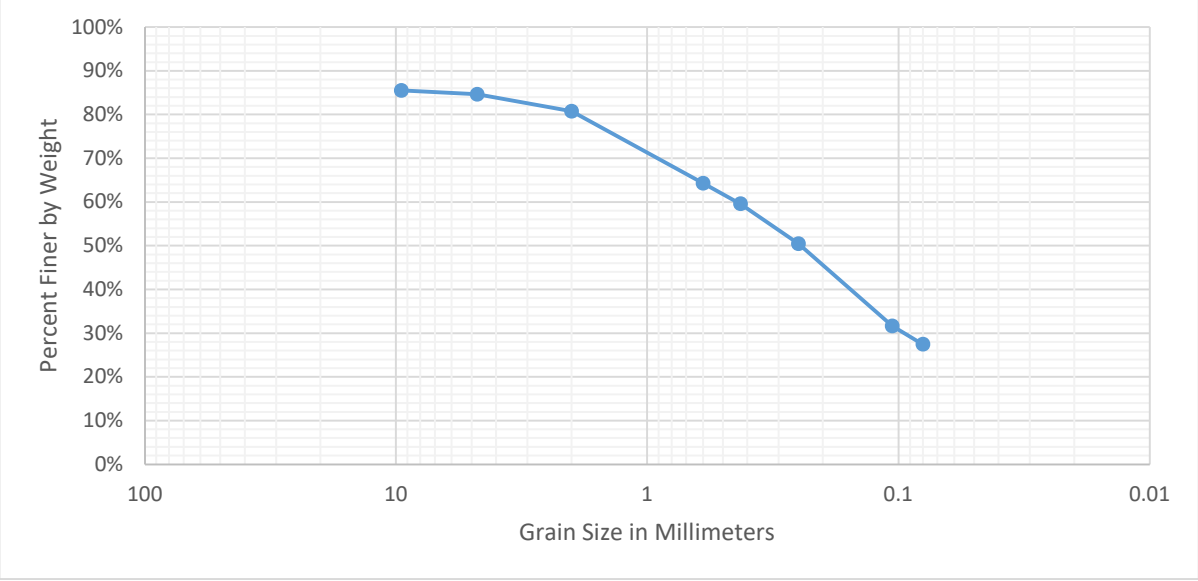
CLIENT:	A. Pleasant Const.	TECHNICIAN:	ZCM
JOB NUMBER:	22 - 1044	TEST METHOD:	ASTM C117 & C136
PROJECT:	Wheatland Armory	SAMPLE NUMBER:	3A & 3B
SAMPLE DATE:	10/19/2022	SAMPLED BY:	ZCM
TEST DATE:	11/2/2022	SOURCE	BH 3 1.5' - 4.5'
SAMPLE DESCRIPTION:	Silty, Clayey Sand with Gravel		

Pan = 674.4

Sieve Number	Sieve Size (mm)	Weight Retained + Pan (gm)	Weight Retained (gm)	Percent Retained	Percent Finer
0.375	9.53	742.4	68.0	14%	86%
4	4.75	678.4	4.0	15%	85%
10	2	692.7	18.3	19%	81%
30	0.6	751.5	77.1	36%	64%
40	0.425	696.6	22.2	40%	60%
60	0.25	717.1	42.7	50%	50%
140	0.106	762.7	88.3	68%	32%
200	0.08	694.0	19.6	73%	27%
Pan		680.5	128.8	100%	0%
		Total	469.0		

Uniformity Coefficient, Percent Moisture, and Mass Lost			
Initial Mass:	469.0	% Moisture:	#DIV/0!
Final Mass:	469.0	D10:	
% Mass Lost:	0.0%	D30:	
Tin:		D60:	
Tin + M_D:		C_C:	#DIV/0!
Tin + M_W:		C_U:	#DIV/0!

Washing	
Initial Mass	469.0
Mass of Pan + Soil (B)	888.65
Mass of Pan + Soil (A)	767.02
Mass Passing 200	121.6



Reviewed by: Zack Meek Date: 12/19/2022