November 17, 2021

Providence Development, LLC
529 E Main Street
Bozeman, MO 59715

Attention: Mr. Parker Lange

RE: DRAFT Geotechnical Evaluation
Ponderay Hotel Development
Parcel # RPP00000037302A
Ponderay, Idaho
ALLWEST Project No. 121-360G

Mr. Lange,

ALLWEST has completed the authorized DRAFT Geotechnical Evaluation for the hotel development located at Parcel # RPP00000037302A in Ponderay, Idaho. The purpose of this evaluation was to characterize the soil and geologic conditions on the property and prepare the attached report with the results of the field evaluation and our geotechnical recommendations to assist with design and construction of the proposed project. Based on our evaluation, the site is suitable for the planned development.

We appreciate the opportunity to work with you on this project. If you have any questions or need additional information, please call us at 208.762.4721.

Sincerely,
ALLWEST

Adam Richter, G.I.T.
Project Geologist

Samuel P. Sommers, P.E.
Engineering Services Manager

DRAFT GEOTECHNICAL EVALUATION
PONDERAY HOTEL DEVELOPMENT
PARCEL # RPP00000037302A
PONDERAY, IDAHO
ALLWEST PROJECT NO. 121-360G

November 17, 2021

Prepared for:
PROVIDENCE DEVELOPMENT, LLC
529 E MAIN STREET
BOZEMAN, MO 59715

Prepared by:
ALLWEST
690 W. CAPSTONE CT.,
HAYDEN, ID 83835

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EXECUTIVE SUMMARY

ALLWEST has completed the authorized geotechnical evaluation for the Ponderay Hotel Development project located at Parcel # RPP00000037302A in Ponderay, Idaho. The purpose of this evaluation was to assess the subsurface conditions on the project site with respect to the planned development. This report details the results of the field evaluation and laboratory testing and presents our geotechnical recommendations to assist the design and construction of the planned development. The following geotechnical considerations were identified:

- The anticipated building loads would induce unacceptable level of settlement with a conventional foundation system. Therefore, it is our recommendation that the building be supported on either a deep foundation system or on conventional foundation system after a rammed aggregate pier (RAP) ground improvement system has been installed.
- To support anticipated construction traffic, we recommend the site be stabilized with 2 feet of structural fill overlying a geosynthetic fabric and geogrid. Prior to stabilization, ALLWEST should consult with the foundation / RAP contractor to ensure recommendations work for the proposed equipment.
- The on-site soils are unsuitable for re-use as structural fill.
- The near surface site soils are not suitable for stormwater infiltration.

Our services were provided in accordance with our proposal No. 121-360G dated September 16, 2021. Close monitoring of the construction operations discussed herein will be critical in achieving the design subgrade support. If we are not retained to provide required construction observation and materials testing services, we cannot be responsible for soil engineering related construction errors or omissions. This summary should be used in conjunction with the entire report for design purposes. It should be recognized that details were not included or fully developed in this section, and the report must be read in its entirety for a comprehensive understanding of the items contained herein. Section *8.0 EVALUATION LIMITATIONS* should be read for an understanding of the report limitations.

DRAFT GEOTECHNICAL EVALUATION
PONDERAY HOTEL DEVELOPMENT
PARCEL # RPP00000037302A
PONDERAY, IDAHO

1.0 PROJECT DOCUMENTS

The following documents were provided to and reviewed by ALLWEST to help develop our understanding of the planned development:

- [1] Parcel Survey Map, provided by Providence Development, LLC on September 9, 2021.
- [2] Conceptual Site Plan for the Marriott Springhill Suites Hotel, prepared by The Richardson Design Partnership, dated August 31, 2021.

2.0 PROJECT DESCRIPTION

We understand the planned development will consist of constructing a new 3-story hotel structure and associated asphalt parking lot and landscaping. We anticipate the buildings will be constructed with light, wood, or metal framing, supported by conventional spread footings and concrete slab-on-grade floors. If the proposed design or loads vary from those stated, we should be notified to review our recommendations and provide additional or revised information, as necessary.

3.0 EVALUATION PROCEDURES

To complete this evaluation, we reviewed soil and geologic literature for the project site and surrounding area. We evaluated the subsurface conditions at the site by advancing five geotechnical borings beneath the building footprint. We supplemented the borings by excavating six test pits throughout the project site. Information obtained from the field evaluation, laboratory testing, and geotechnical analyses was utilized to develop the recommendations presented in this report.

4.0 SITE CONDITIONS

The project site is comprised of a partially developed parcel, approximately 3 acres in total size. Topographically, the proposed development area is relatively flat. The property is bordered by U.S. Highway 95 to the west, Sand Creek to the east, a developed residential property to the north, and a partially developed light industrial property to the south. The ground coverage consists of mostly grass, small trees and shrubs, and gravel driveway. The property has been previously developed with a residential structure and shop.

4.1 Subsurface Conditions

4.1.1 Published Geologic Information

The geologic conditions in the site vicinity are mapped on the Geologic Map of the Sandpoint Quadrangle, Bonner County, Idaho, by S. Lewis, F. Burmester, M. Breckenridge, E. Box, and D. McFadden, 2006. The project site is mapped as glaciolacustrine deposits (Pleistocene to Holocene), which is described as massive to finely laminated clay, silt, and sand glacial lake deposits.

The USDA Natural Resources Conservation Service (NRCS) has mapped the soils on and around the property predominately as the Mission Silt Loam. The Mission silt loam is described as volcanic ash and loess over silty glaciolacustrine deposits. The soil profile is described as silt, silty clay and very fine sandy loam. The permeability is slow and run-off is slow. A seasonal high water table is reported at a depth of 12 inches from February through May. The soil conditions encountered in the test pits was generally consistent with the mapped soil conditions.

4.1.2 Subsurface Exploration Program

We observed the excavation of 6 test pits at the site on September 27, 2021 utilizing a Bobcat E50 with a 24-inch toothed excavation bucket. We followed these excavations with the advancement of 5 geotechnical borings beneath the proposed building footprint. The approximate locations of the test pits and borings are shown on Figure A-1, Exploration Location Plan in Appendix A. The soil conditions observed in the test pits were visually described and classified in general accordance with ASTM D 2488 and we logged the subsurface profiles.

Detailed descriptions of the soil observed within the borings and test pits are presented on individual boring and test pit logs in Appendix B of this report. The descriptive soil terms used on the boring and test pit logs, and in this report, can be referenced by the *Unified Soil Classification System (USCS)*. A summary of the USCS is included in Appendix B. The subsurface conditions may vary between exploration locations; such changes in subsurface conditions may not be apparent until construction.

The near surface geologic profile appears to consist of topsoil and undocumented fill overlying silt and interbedded clay and fine sands. Undocumented fill was present at the site encountered in some areas overlying native gravel. General descriptions of the observed soil units follow:

Topsoil – Topsoil was encountered in some of our explorations. The topsoil layer was observed to be 6 inches thick, and may vary between test hole and boring locations.

Undocumented Fill – Undocumented fill was encountered in most test pits and borings. The undocumented fill was encountered at shallow depths up to 18 inches in the graded drivable areas of the site and consisted of gravel soils with variable amounts of silt.

Uncontrolled Fill - Uncontrolled fill was also encountered in most test pits and borings and was primarily encountered along the western edge of the proposed building area, at the top of the existing slope bordering the site. A localized area of uncontrolled fill was also encountered in test pit TP-5. The uncontrolled fill varied in soil type but tended to consist of silty soils with moderate amounts of organic debris, trash, brick and concrete debris, and other deleterious material. It ranged in depth from 3 to 7 feet .

Silt - Silt was generally encountered underlying the topsoil and fill soils. It appeared moist and medium stiff and extended to a depth up to 11 feet.

Lean Clay – Lean clay was encountered underlying the silt soils. It generally ranged in depth from 10 to 20 feet below ground surface and appeared moist and soft to medium stiff.

Poorly-graded Sand – Poorly-graded sand soils were encountered underlying the silt and clay soils and extended beyond the bottom of our explorations of 31 ½ feet.

4.2 Groundwater Conditions

We encountered groundwater within our borings between 26 and 29 feet below ground surface. We did not observe surface water on the property during our evaluation. Changes in precipitation, irrigation, construction, or other factors may impact depth to groundwater and the surface water flow on the property and therefore, conditions may be different during construction.

5.0 LABORATORY TESTING

We performed laboratory testing to supplement field classifications and to assess some of the soil engineering properties and parameters. The laboratory testing included particle size distribution/gradation (ASTM D 6913), liquid and plastic limits (ASTM D 4318), moisture content (ASTM D 2216), fines content (ASTM D 1140), direct shear (AASHTO T-236), and one-dimensional consolidation (ASTM D 2435) tests. The laboratory test results are included in Appendix C of this report, and some results are also summarized on the test pit logs in Appendix B.

6.0 CONCLUSIONS AND RECOMMENDATIONS

The previous sections of this report presented our understanding of the proposed project and surface and subsurface site conditions. The following conclusions and recommendations are based on this understanding. If the proposed development changes or if unforeseen conditions are encountered, we must be given the opportunity to review the new information and, if necessary, update our recommendations. Additionally, if the geotechnical parameters presented in this report are utilized for the design of structures or retaining walls, we need to be given the opportunity to review the plans and specifications to determine whether the recommendations presented in this report were properly incorporated.

6.1 Site Preparation

Clearing and Stripping: Once temporary erosion and sediment control (TESC) measures are installed, we expect site preparation to continue with clearing and grubbing brush and stripping of organic-rich topsoil. Based on our explorations, the stripping depth for topsoil removal is estimated to be approximately 6 inches. Clearing and stripping debris should be wasted off-site or used for topsoil within non-structural/landscape areas.

Over-Excavation: Once clearing and stripping is complete, we expect site preparation to continue with over-excavation of the undocumented and uncontrolled fill. If the building and slab-on-grade are to be supported on pile foundations, this material may be left in place. If Rammed Aggregate Piers (RAPs) are used or if the slab is not pile supported, this undocumented and uncontrolled fill should be removed and replaced with structural fill.

Building Pad: The structure footings should be supported on either deep foundations or RAPs As described above, the slab-on-grade may be supported by either piles or RAPs or through the over-excavation and replacement of the undocumented / uncontrolled fill. Site preparation associated with construction traffic is addressed in the subgrade stabilization section of this report.

Pavement Areas: Undocumented and uncontrolled fill should be over-excavated from all pavement areas for a standard pavement design to be completed. If this is cost prohibitive, we may discuss cost vs. risk with the owner and provide recommendations for an alternative solution that may have a shorter lifetime and/or higher maintenance costs but saves money during construction. The pavement design provided in this report assumed all undocumented and uncontrolled fill has been removed from underneath pavement areas.

6.2 Subgrade Stabilization

To support the anticipated construction traffic, we recommend stabilizing the subgrade by placing a minimum of 2 feet of structural fill over a filter fabric geosynthetic. Depending on the equipment used for either the deep foundations or RAP, we may need to adjust these recommendations based on the installer's feedback.

A 4-ounce, non-woven filter fabric should be placed on the properly prepared subgrade. The filter fabric should be unrolled in the primary direction of fill placement and should be over-lapped at least 3 feet.

Construction equipment should not be operated directly on the filter fabric materials. Fill should be placed from outside the excavation to create a pad to operate equipment on. We recommend a minimum of 12 inches of structural fill be placed over the filter fabric before operating construction equipment on the fill. Low pressure, track-mounted equipment should be used to place fill over the filter fabric.

6.3 Excavation
Based on the conditions observed within our explorations, we anticipate excavation of the on-site soil can be achieved with typical excavation equipment. Temporary excavation slope stability is a function of many factors, including:

- The presence and abundance of groundwater;
- The type and density of the various soil strata;
- The depth of cut;
- Surcharge loadings adjacent to the excavation; and
- The length of time the excavation remains open.

It is exceedingly difficult under the variable circumstances to pre-establish a safe and "maintenance-free" temporary cut slope angle. Therefore, it is the responsibility of the contractor to maintain safe temporary slope configurations since the contractor is continuously at the job site, able to observe the nature and condition of the cut slopes, and able to monitor the subsurface materials and groundwater conditions encountered. Unsupported vertical slopes or cuts deeper than 4 feet are not recommended if worker access is necessary. The cuts should be adequately sloped, shored, or supported to prevent injury to personnel from local sloughing and spalling. The excavation should conform to applicable federal, state, and local regulations. Regarding trench wall support, the site soil is considered Type A soil according to OSHA guidelines and therefore should not exceed a ¾ H : 1 V (horizontal to vertical) temporary slope.

We recommend that all permanent cut or fill slopes constructed in native soils be designed at a 2H:1V inclination or flatter. All permanent cut and fill slopes should be adequately protected from erosion both temporarily and permanently. Prior to construction ALLWEST should be provided a copy of the final grading plan to determine whether the proposed site grading will affect the recommendations provided in this report.

6.4 Materials
The on-site soils are not suitable for use as structural fill. Structural fill will need to be imported to the site.

Import materials should consist of granular soil, free of organics, debris, and other deleterious material and meet the following criteria. Import materials should be approved by the Geotechnical Engineer prior to delivery to the site. *Table 1* below presents our recommended requirements for structural fill and utility trench backfill materials.

Fill Type	Criteria
Structural Fill	Maximum size ≤ 3 inches; Retained on ¾-inch sieve <30% Passing No. 200 Sieve ≤ 10%; Non-plastic
Utility-Trench Backfill	Maximum size ≤ 2 inches; Passing No. 200 Sieve ≤ 15%; Non-plastic

Table 1 - Structural fill / utility trench backfill requirements.

6.5 Fill Placement and Compaction

Fill should be placed in lift thicknesses which are appropriate for the compaction equipment used. Typically, eight-inch loose lifts are appropriate for typical rubber tire and steel drum compaction equipment. Lift thicknesses should be reduced to four inches for hand operated compaction equipment. Fill should be moisture conditioned to within two percentage points of the optimum moisture content prior to placement to facilitate compaction. Structural fill and utility trench backfill should be compacted to a minimum of 95 percent of the maximum dry density established by ASTM D1557 (modified Proctor).

6.6 Wet Weather Construction

Due to the climatic effects in this region during late fall, winter, and spring (generally wet conditions), we recommend construction (especially site grading) take place during the summer and early fall season, if possible. If construction occurs during or immediately after excessive precipitation, it may be necessary to over-excavate and replace wet subgrade soil which might otherwise be suitable.

We recommend earthwork for this site be scheduled for the drier seasons of the year. If construction is undertaken in wet periods of the year, it will be important to slope the ground surface to provide drainage away from construction.

6.7 Cold Weather Construction

Foundations should be embedded adequately to protect against frost action as recommended in section *6.8 Foundation Recommendations* of this report. We recommend removal of frost susceptible soils (soil with fines contents greater than 10 percent) within the frost-depth zone below concrete flatwork (sidewalks, patios, etc.) to reduce the potential detrimental effects of frost heave.

If site grading and construction are anticipated during cold weather, we recommend good winter construction practices be observed. Snow and ice should be removed from excavated and fill areas prior to additional earthwork or construction. Footings, floor slabs or structural portions of the construction should not be placed on frozen ground; nor should the supporting soils for buildings be permitted to freeze during or after construction. Frozen soils should not be used as backfill or fill.

6.8 Foundation Recommendations

As previously stated, the existing undocumented fill and native soils are not suitable to support the anticipated building loads. Removal of these soils is not practical or cost effective due to the depth observed in the borings. We recommend either the building be supported on a deep foundation system or on conventional shallow foundations after RAP ground improvement has been completed.

Rammed Aggregate Piers (RAP): The proposed building may be supported on conventional spread footings supported on RAP. Design of RAP system is proprietary and is performed by a specialty contractor. This alternative is likely to be the most cost-effective method to support foundations. RAP typically consist of a 24-inch diameter cavity drilled to the design depth. Aggregate is then placed in lifts and compacted. The use of suspended structural floors in lieu of slab-on-grade floors will reduce the number of rammed aggregate piers required to support the structures.

Footings should be embedded a minimum of 30 inches below the lowest adjacent grade for frost protection. A coefficient of friction of 0.40 may be used for footings bearing on RAP prepared subbase. The ground surface adjacent to the foundations should be sloped to a minimum of 5 feet in the first 10 feet and 2 percent for ground surfaces which are covered with relatively impermeable surfaces such as concrete or asphalt.

Alternative Foundations: Alternative pile foundations may be considered for this site. Auger cast piles, driven steel H-beam or pipe piles may be considered for support of the proposed building. For estimation purposes, an anticipated pile length of approximately 25 feet would be appropriate but will vary based on building loads. **We can provide pile capacities vs. depth once the most cost effective solution is determined as the capacities vary based on the pile type and size. If additional deep foundation recommendations are needed, ALLWEST should be notified with specific pile types and loading to provide in our FINAL geotechnical report.**

6.9 Concrete Slabs-on-Grade

Concrete slabs-on-grade should be underlain by at least 6 inches of crushed base course. The crushed base course below the slabs should be compacted to at least 95 percent of the maximum dry density established by modified Proctor (ASTM D 1557). The slab subgrade should be prepared as previously recommended which includes over-excavation of the topsoil and undocumented / uncontrolled fill or supported on pile foundations.

From a geotechnical perspective, a vapor barrier is not considered necessary beneath the slab-on-grade floor unless moisture sensitive floor coverings and/or adhesives are used. If a vapor barrier is used, we recommend using a 15-mil, puncture-resistant proprietary product such as Stego Wrap, or an approved equivalent that is classified as a Class A vapor barrier in accordance with ASTM E 1745. Overlap lengths and the appropriate tape used to seal the laps should be in accordance with the vapor retarder manufacturer's recommendations. To avoid puncturing of the vapor barrier, we recommend a thin sand layer be placed over the crushed gravel. When conditions warrant the use of a vapor retarder, the slab designer and slab contractor should refer to ACI 302 and ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder/barrier.

6.10 Lateral Earth Pressures

Below-grade building walls should be designed to resist lateral earth pressures. *Table 2* below presents the equivalent fluid pressures for structural fill for calculation of lateral earth pressures. For recommendations for site retaining wall design, refer to the section *6.11 Retaining Walls* of this report.

Condition	Equivalent Fluid Pressure Structural Fill (pcf)
At-rest	45
Active	25
Passive	300

Table 2 - Lateral earth pressures for structural fill.

The above values are for level backfill only and do not account for hydrostatic forces. Walls should be provided with adequate drainage so hydrostatic forces do not adversely affect the walls. We recommend placement of gravel behind walls and/or weep holes to assist with drainage and reduce the potential for the buildup of hydrostatic pressures. Walls that are braced in a manner that does not allow any rotational movement (rigid) (e.g. basement walls) should be designed using the given "at-rest" equivalent fluid pressure. The active and at-rest pressures should be increased by an equivalent fluid weight of 10 pounds per cubic foot (pcf) and the passive pressure should be reduced by 10 pcf for seismic design. The dynamic component of the active pressure acts at a height of approximately 0.6 times the height of the wall.

6.11 Retaining Walls

At the time this report was prepared we have no knowledge of planned retaining walls for this project. If retaining walls are to be implemented as part of this project ALLWEST should be provided the opportunity to review the plans to determine if further geotechnical evaluation is required. We may need to develop wall specific lateral earth pressures depending on location and height of proposed retaining walls. Our scope of services did not include segmental block design, boulder faced slope design, or global stability analyses; we can provide these services for an additional fee, if requested.

6.12 Seismicity

We anticipate the *2018 International Building Code* (IBC) will be used as the basis for design of the proposed structures. The soil at the site can be characterized as Site Class D for seismic design.

Table 3 below contains seismic parameters that were calculated using USGS U.S. Seismic Design Maps for use with the 2018 IBC. The latitude and longitude for the site were used to specify the location of the subject property.

Latitude (degrees)	Longitude (degrees)	Spectral Accelerations		Site Coefficients	
		Ss	S1	Fa	Fv
48.3153	-116.5471	0.331g	0.112g	1.535	2.376

Table 3 - Seismic design parameters.

6.13 Flexible (Hot Mix Asphalt) Pavement

SUBGRADE

We recommend that the moisture content and density of the top 12 inches of the subgrade be evaluated and that the pavement subgrades be proof-rolled within two days prior to commencement of actual paving operations. Areas not in compliance with the required ranges of moisture or density should be moisture conditioned and recompacted. Particular attention should be paid to high traffic areas that were rutted and disturbed and to areas where backfilled trenches are located. Areas where unsuitable conditions are located by a representative of the geotechnical engineer of record should be repaired by removing and replacing the materials with properly compacted structural fills. If a significant precipitation event occurs after the evaluation or if the surface becomes disturbed, the subgrade should be reviewed by a representative of the geotechnical engineer of record immediately prior to paving. The subgrade should be in its finished form at the time of the final review.

DESIGN PARAMETERS

Table 4 below presents some of the key design parameters used in the development of this pavement design. These values were either measured, estimated, or assumed. It is critical that these values are reviewed and accepted by the design team.

Design Parameter	Value
Estimated: Subgrade California Bearing Ratio (CBR)	5%
Estimated: Equivalent Single-Axle Loads (ESALs) Light / Heavy Duty	30,000 / 75,000
Assumed: Pavement Reliability	85%
Assumed: Pavement Design Life	20-year
Assumed: Initial Serviceability	4.2
Assumed: Terminal Serviceability	2.0

Table 4 - Pavement design parameters.

PAVEMENT SECTION

Tables 5 and 6 below present our designed pavement sections based on the parameters presented in *Table 4*.

Minimum Light-Duty Pavement Section (passenger cars only)	
Layer	**Thickness (inches)**
Asphalt Surface	2.5
Crushed Aggregate Base	4.0
Structural Fill	12.0
Total Pavement Section	18.5

Table 5 - Light-duty pavement section layers.

Minimum Heavy-Duty Pavement Section	
Layer	**Thickness (inches)**
Asphalt Surface	3.0
Crushed Aggregate Base	6.0
Structural Fill	12.0
Total Pavement Section	21.0

Table 6 - Heavy-duty pavement section layers.

We also recommend a concrete apron in areas where you expect frequent truck loading, unloading, turning, starting, and stopping such as around loading docks and dumpster pads. Concrete aprons should be underlain by a minimum of 6 inches of crushed aggregate base. If a rigid (concrete) pavement design is needed, ALLWEST can provide additional recommendation in an addendum to this report. Steel reinforcement for rigid pavement should be designed by the structural engineer using a modulus of subgrade reaction of 85 pounds per cubic inch (pci).

MATERIALS

We recommend specifying crushed aggregate base meeting the requirements of the Idaho Standards for Public Works Construction (ISPWC) Section 802, Type I for crushed aggregate for base gradations. We recommend the asphalt concrete pavement meet the requirements of ITD Standard Specification 405 for plant mix asphalt concrete pavements.

We recommend the crushed aggregate base be compacted to a minimum of 95 percent of the maximum dry density established by ASTM D 1557 (modified Proctor). We recommend the asphaltic concrete surface be compacted to minimum of 92 percent of the Rice density.

DRAINAGE

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the crushed aggregate base section.

We recommend drainage be included at the bottom of the crushed aggregate base layer at the storm structures within the pavement to aid in removing water that may enter this layer. Drainage could consist of small diameter weep holes drilled around the perimeter of the storm structures. The weep holes should be drilled at the elevation of the crushed aggregate base and soil interface. The weep holes should be covered with crushed aggregate which is encompassed in Mirafi 140NL or approved equivalent which will aid in reducing fines from entering the storm system.

MAINTENANCE

The pavement sections provided in this report represent minimum recommended thicknesses. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Preventive maintenance activities are intended to slow the rate of pavement deterioration, and to preserve the pavement investment. Preventive maintenance consists of both localized maintenance (e.g., crack, and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the first priority when implementing a planned pavement maintenance program and provides the highest return on investment for pavements. Prior to implementing any maintenance, additional engineering observation is recommended to determine the type and extent of preventive maintenance. Even with periodic maintenance, some movements and related cracking may still occur, and repairs may be required.

6.14 Stormwater and Drainage

We recommend a permanent foundation drainage system be designed and constructed around the perimeter of the structure. The drainage system should consist of a four-inch diameter, Schedule 40 or ADS, perforated pipe surrounded with a free draining aggregate. The pipe should be located at the lowest elevation of the footing trench excavation such that gravity drainage may be achieved. Water collected in the drains should be discharged down-gradient of the structure.

We recommend the grading plan include slopes such that storm water run-off is directed away from the building and pavement areas to a storm water management system. We recommend ground surface adjacent to foundations be sloped a minimum of five percent within ten feet of the building. If the adjoining ground surface consists of hardscapes it may be sloped a minimum of two percent in the first ten feet. Water should not be allowed to infiltrate or pond adjacent to the foundations.

Drywells are not suitable for stormwater disposal at the site.

7.0 ADDITIONAL RECOMMENDED SERVICES

We recommend ALLWEST be retained to provide construction materials testing and observation to verify the soil and geologic conditions and the report recommendations are incorporated into the actual construction. The design engineer of record should determine applicable testing and special inspection requirements in accordance with the governing code documents. If we are not retained to provide required construction observation and materials testing services, we cannot be responsible for soil engineering related construction errors or omissions.

8.0 EVALUATION LIMITATIONS

This report has been prepared to assist the planning and design for the Ponderay Hotel Development project located at Parcel # RPP00000037302A in Ponderay, Idaho. Reliance by any other party is prohibited without the written authorization of ALLWEST. Our services consist of professional opinions and conclusions made in accordance with generally accepted geotechnical engineering principles and practices in the local area at the time this report was prepared. This acknowledgement is in lieu of all warranties, express or implied.

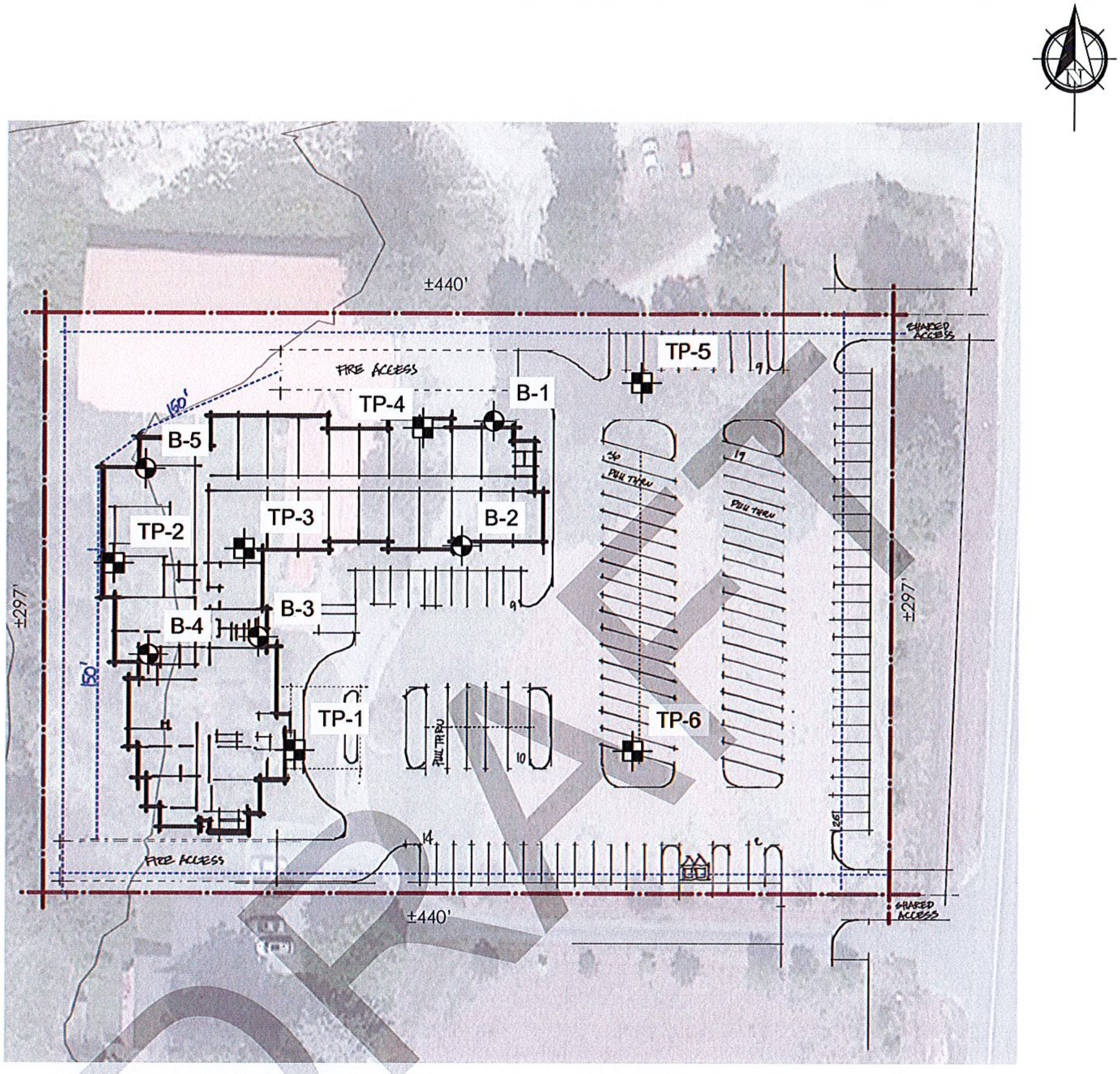
The following appendices complete this report:

Appendix A – Exploration Location Plan
Appendix B – Test Pit Logs, Boring Logs, Unified Soil Classification System
Appendix C – Laboratory Test Results
Appendix D – Settlement Analyses, Slope Stability Analyses

Appendix A

Exploration Location Plan

ALLWEST



SCALE IN FEET

80 0 40 80

LEGEND:

TP-1 — TEST PIT NUMBER AND APPROXIMATE LOCATION

B-1 — BORING NUMBER AND APPROXIMATE LOCATION

BASEMAP SOURCE: CONCEPTUAL SITE PLAN PREPARED BY THE RICHARDSON DESIGN PARTNERSHIP, DATED AUGUST 31, 2021.

ALLWEST
690 W Capstone Court
Hayden, Idaho 83835
(208) 762-4721
www.allwesttesting.com

FIGURE A-1: EXPLORATION LOCATION PLAN

PROJECT:	121-360G PONDERAY HOTEL DEVELOPMENT		
LOCATION:	PARCEL# RPP00000037302A, PONDERAY, IDAHO		
CLIENT NAME:	PROVIDENCE DEVELOPMENT, LLC		
DATE:	OCTOBER, 2021	SCALE:	AS SHOWN

Appendix B

Test Pit Logs
Boring Logs
Unified Soil Classification System

ALLWEST
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 9/27/2021
DATE FINISHED: 9/27/2021
OPERATOR: Rick Marcus
COMPANY: R&K, LLC
LOGGER: Adam Richter
WEATHER: Overcast

TEST PIT TP-1

EXCAVATOR: Bobcat E50
EXCAVATION METHOD: 24-inch Toothed Excavation Bucket

PROJECT: 121-360G Ponderay Hotel

NOTES:

TOTAL DEPTH: 8'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	NOTES
0	TOPSOIL	SILT, dark brown, damp. Contained plant debris and roots. (Topsoil)		
0.5	ML	SILT, tan, damp, medium stiff to stiff.		
5	ML	Sandy SILT, tan, moist, medium stiff. Sand was very fine grained.		
8		Test pit TP-1 terminated at 8 feet. No groundwater encountered. No caving observed.		

Depth scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

WATER LEVELS
- ∇ WHILE EXCAVATING
- ∇ AT COMPLETION
- ▼ AFTER EXCAVATING

ALLWEST HAYDEN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG	DATE STARTED: 9/27/2021 DATE FINISHED: 9/27/2021 OPERATOR: Rick Marcus COMPANY: R&K, LLC LOGGER: Adam Richter WEATHER: Overcast	TEST PIT TP-2 EXCAVATOR: Bobcat E50 EXCAVATION METHOD: 24-inch Toothed Excavation Bucket
PROJECT: 121-360G Ponderay Hotel	NOTES:	

DEPTH (ft)	USCS	TOTAL DEPTH: 11' DESCRIPTION	GRAPHIC LOG	NOTES
0	FILL	Sandy SILT with gravel, brown, damp, dense. (Undocumented Fill)		
1.5	FILL	SILT, brown to dark brown, damp, soft to medium stiff. Contained abundant wood debris and sawdust. Contained minor amounts of trash and other deleterious material. (Uncontrolled Fill)		
7	ML	SILT, tan, damp, medium stiff to stiff.		
11		Test pit TP-2 terminated at 11 feet. No groundwater encountered. No caving observed.		

WATER LEVELS
- ∇ WHILE EXCAVATING
- ∇ AT COMPLETION
- ▼ AFTER EXCAVATING

ALLWEST
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 9/27/2021
DATE FINISHED: 9/27/2021
OPERATOR: Rick Marcus
COMPANY: R&K, LLC
LOGGER: Adam Richter
WEATHER: Overcast

TEST PIT TP-3

EXCAVATOR: Bobcat E50
EXCAVATION METHOD: 24-inch Toothed Excavation Bucket

PROJECT: 121-360G Ponderay Hotel

NOTES:

TOTAL DEPTH: 10'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	NOTES
0 – 1	FILL	Silty GRAVEL with sand, brown, damp, dense. (Undocumented Fill)		
1 – 7	ML	SILT, tan, damp, medium stiff to stiff.		
7 – 10	ML	Sandy SILT, tan, moist, medium stiff. Sand was very fine grained.		
10		Test pit TP-3 terminated at 10 feet. No groundwater encountered. No caving observed.		

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 9/27/2021
DATE FINISHED: 9/27/2021
OPERATOR: Rick Marcus
COMPANY: R&K, LLC
LOGGER: Adam Richter
WEATHER: Overcast

TEST PIT TP-4

EXCAVATOR: Bobcat E50
EXCAVATION METHOD: 24-inch Toothed Excavation Bucket

PROJECT: 121-360G Ponderay Hotel

NOTES:

TOTAL DEPTH: 10'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	NOTES
0	FILL	Silty GRAVEL with sand, brown, damp, dense. (Undocumented Fill)		
1	ML	SILT, tan, damp, medium stiff to stiff.		
7	ML	Sandy SILT, tan, moist, medium stiff. Sand was very fine grained.		
10		Test pit TP-4 terminated at 10 feet. No groundwater encountered. No caving observed.		

Depth scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

WATER LEVELS
- ∇ WHILE EXCAVATING
- ▼ AT COMPLETION
- ▼ AFTER EXCAVATING

ALLWEST HAYDEN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG	DATE STARTED: 9/27/2021 DATE FINISHED: 9/27/2021 OPERATOR: Rick Marcus COMPANY: R&K, LLC LOGGER: Adam Richter WEATHER: Overcast	TEST PIT TP-5 EXCAVATOR: Bobcat E50 EXCAVATION METHOD: 24-inch Toothed Excavation Bucket
PROJECT: 121-360G Ponderay Hotel	NOTES:	

TOTAL DEPTH: 8'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	NOTES
0	FILL	SILT with sand and gravel, brown, damp, medium stiff. Contained abundant brick, cinder block, and ceramic debris. (Uncontrolled Fill)		
~3.5	ML	SILT, tan, damp, medium stiff to stiff. Trace roots in upper 2 feet.		
8		Test pit TP-5 terminated at 8 feet. No groundwater encountered. No caving observed.		

Depth scale: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

WATER LEVELS
- ▽ WHILE EXCAVATING
- ▼ AT COMPLETION
- ▼ AFTER EXCAVATING

ALLWEST HAYDEN, IDAHO GEOTECHNICAL SECTION TEST PIT LOG	DATE STARTED: 9/27/2021 DATE FINISHED: 9/27/2021 OPERATOR: Rick Marcus COMPANY: R&K, LLC LOGGER: Adam Richter WEATHER: Overcast	TEST PIT TP-6 EXCAVATOR: Bobcat E50 EXCAVATION METHOD: 24-inch Toothed Excavation Bucket
PROJECT: 121-360G Ponderay Hotel	NOTES:	

TOTAL DEPTH: 8'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	NOTES
0	TOPSOIL	SILT, dark brown, damp. Contained plant debris and roots. (Topsoil)		
1–7	ML	SILT, tan, damp, medium stiff to stiff.		
7	ML	Sandy SILT, tan, moist, medium stiff. Sand was very fine grained.		
8		Test pit TP-6 terminated at 8 feet. No groundwater encountered. No caving observed.		
9				
10				
11				
12				

WATER LEVELS
- ▽ WHILE EXCAVATING
- ▼ AT COMPLETION
- ▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild

BORING B-1

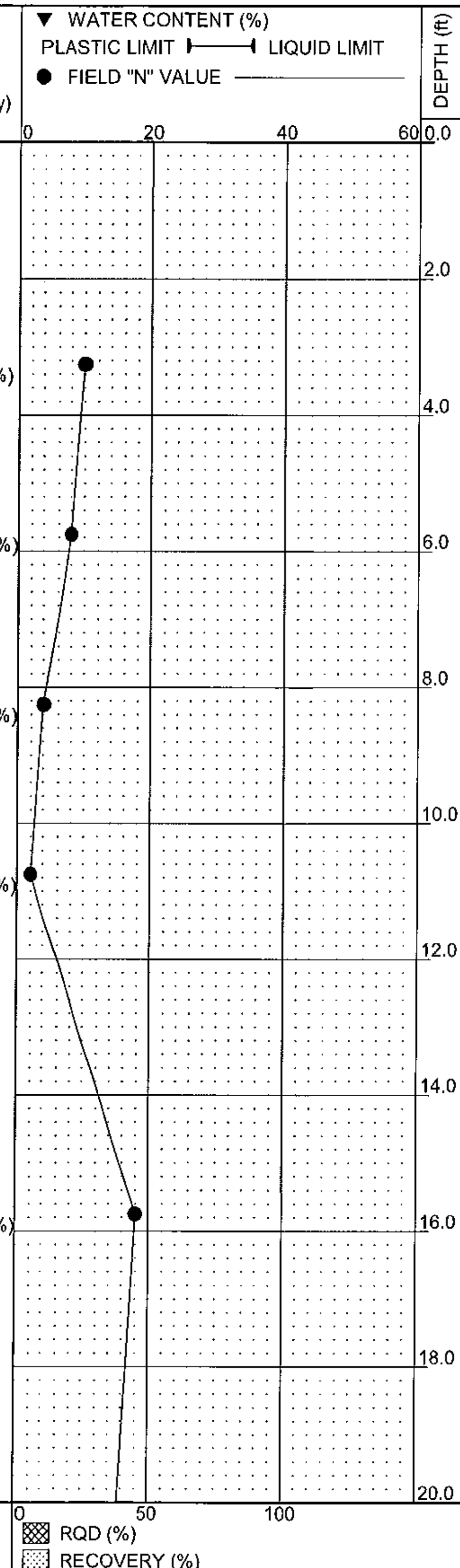
DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

PROJECT: 121-360G Ponderay Hotel

NOTES:

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery)
0–1	Poorly-graded GRAVEL with silt and sand, gray to brown, moist, dense. (Undocumented Fill)		
1–5.5	SILT, tan, moist, stiff. Pocket Penetrometer Values = 1.5-2.0	S-1	4-4-6 (16" = 89%)
5.5–7.5	SILT with sand, tan-gray, moist, medium stiff. Pocket Penetrometer Values = 0.5-1.5	S-2	3-4-4 (18" = 100%)
7.5–8	Lean CLAY, light brown, moist, stiff. Pocket Penetrometer Value = 1.75		
8–10	Poorly-graded SAND with silt, light brown, moist, loose. Sand was very fine-grained.	S-3	2-2-2 (18" = 100%)
10–16	Lean CLAY, tan, moist, soft to medium stiff. Pocket Penetrometer Values = 0.25-0.75 Lab Testing at 10 feet. Liquid Limit = 30 Plastic Limit = 21 Plastiity Index = 9 Moisture Content = 32% Sand = 1% Silt / Clay = 99% Pocket Penetrometer Values = 0.5-0.75	S-4	1-1-2 (18" = 100%)
		S-5	2-5-13 (18" = 100%)
16–20	Poorly-graded SAND, light tan-gray, damp, medium dense. Fine to medium-grained sand.		



WATER LEVELS
29' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

PROJECT: 121-360G Ponderay Hotel

DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild

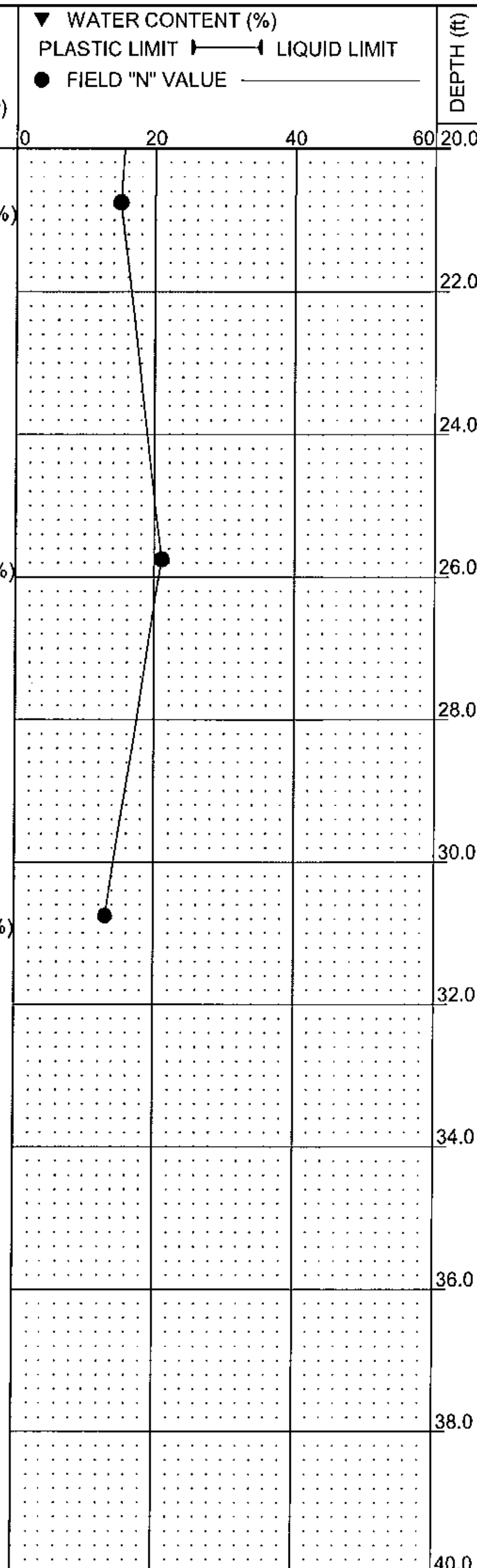
NOTES:

BORING B-1

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery)
20–26.5	Poorly-graded SAND, light tan-gray, damp, medium dense. Fine to medium-grained sand. Particle-Size Distribution Test at 20 feet. Sand = 96% Silt / Clay = 4%	S-6	5-7-8 (18" = 100%)
		S-7	4-10-11 (18" = 100%)
26.5–30	Sandy SILT, mottled gray-brown, moist, very stiff. Pocket Penetrometer Value = 2.0		
29 ▽			
30–31.5	Lean CLAY, gray, moist to wet, stiff to very stiff. Pocket Penetrometer Values = 1.75-2.25	S-8	6-7-6 (18" = 100%)
31.5	Boring B-1 terminated at 31.5 feet. Groundwater encountered while drilling at 29 feet.		



0 50 100
RQD (%)
RECOVERY (%)

WATER LEVELS
29' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

PROJECT: 121-360G Ponderay Hotel

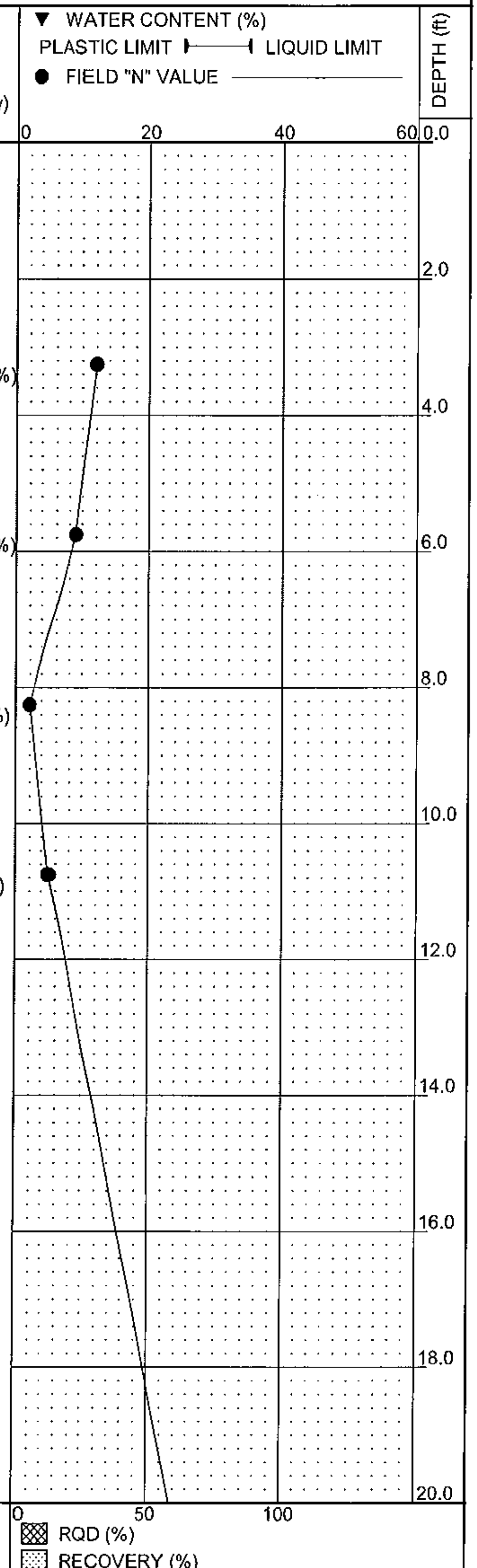
DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild
NOTES:

BORING B-2

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery)
0	Silty SAND, dark brown, moist. (Topsoil)		
1	SILT, tan, moist, very stiff.		
2.5	Pocket Penetrometer Values = 2.0-2.5	S-1	4-7-5 (18" = 100%)
5	Pocket Penetrometer Values = 1.5-2.0	S-2	4-4-5 (18" = 100%)
6.5	Sandy SILT, tan, moist, soft. Pocket Penetrometer Values = <0.5		
8	Lean CLAY, brown, moist, medium stiff. Pocket Penetrometer Values = 0.5-0.75	S-3	2-1-1 (16" = 89%)
9	Poorly-graded SAND with silt, light brown, damp, loose. Sand was very fine grained.		
10	Lean CLAY, gray-brown, moist, medium stiff. Pocket Penetrometer Values = 0.5-0.75	S-4	1-3-2 (6" = 33%)
15	Lab Testing at 15 feet. Liquid Limit = 30 Plastic Limit = 22 Plasticity Index = 8 Silt / Clay = 99.9%	S-5	



WATER LEVELS	
27' ▽ WHILE DRILLING	Hollow Stem Auger
▼ AT COMPLETION	3" Shelby Tube
▼ AFTER DRILLING	2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

PROJECT: 121-360G Ponderay Hotel

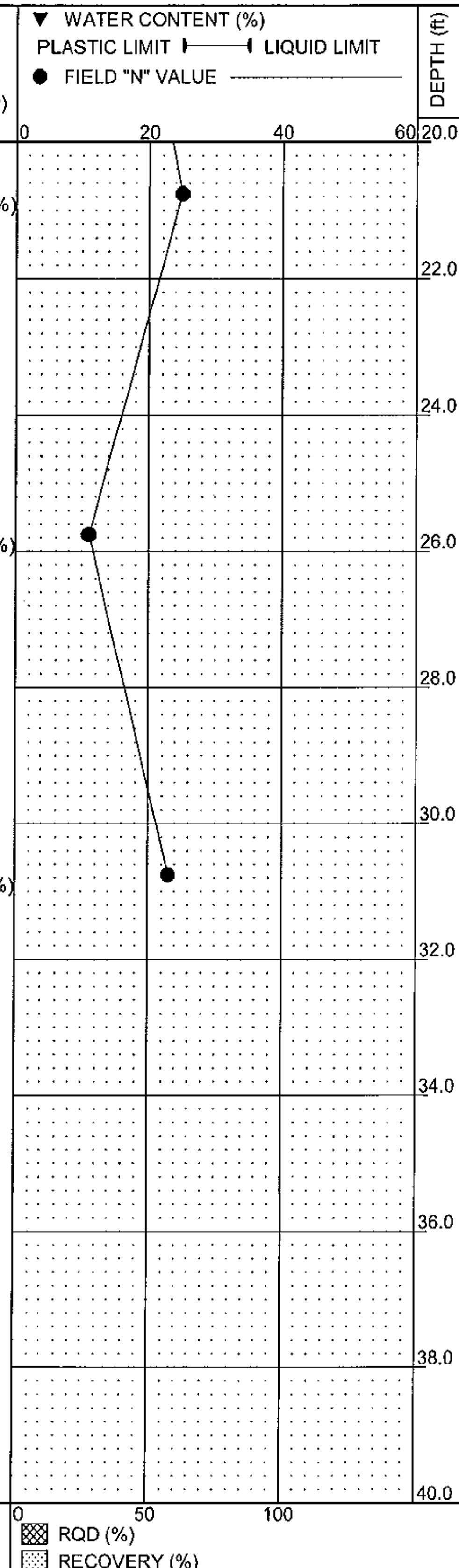
DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild
NOTES:

BORING B-2

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery)
20–31	Poorly-graded SAND with silt, light tan-gray to dark gray, moist to wet, medium dense. Particle-Size Distribution Test at 20 feet. Sand = 94% Silt / Clay = 6%	S-6	11-11-14 (18" = 100%)
		S-7	2-4-7 (18" = 100%)
31	Lean CLAY. gray, moist to wet, very stiff. Pocket Penetrometer Values = 2.0-3.0	S-8	6-10-13 (18" = 100%)
31.5	Boring B-2 terminated at 31.5 feet. Groundwater encountered while drilling at 26 feet.		



WATER LEVELS
27' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
3" Shelby Tube
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

PROJECT: 121-360G Ponderay Hotel

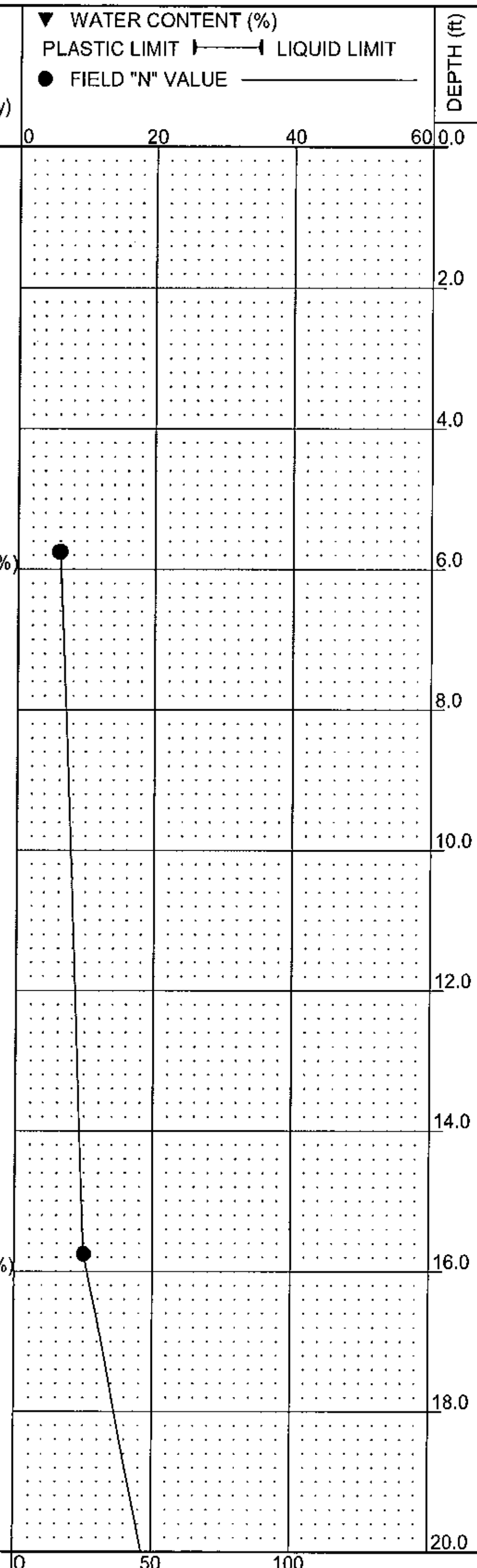
DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild
NOTES:

BORING B-3

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery)
0–1.5	Poorly-graded GRAVEL with silt and sand, gray, moist, dense. Brick fragements observed in augur cuttings.		
1.5–10	SILT, tan, moist, stiff. Pocket Penetrometer Values = 1.0-1.5	S-1	2-2-4 (18" = 100%)
10–15	SILT, gray-brown, moist, medium stiff to stiff. Pocket Penetrometer Values = 0.75-2.0 Lab Testing at 10 feet. Non-Plastic Sand = 0.9% Silt / Clay = 99.1%	S-2	
15–20	Lean CLAY, gray-brown, moist, medium stiff to stiff. Pocket Penetrometer Values = 0.75-2.0 Lab Testing at 15 feet. Liquid Limit = 29 Plastic Limit = 21 Plasticity Index = 8 Moisture Content = 23.6% Silt / Clay = 100%	S-3	2-4-6 (18" = 100%)



WATER LEVELS
27' WHILE DRILLING
AT COMPLETION
AFTER DRILLING

Hollow Stem Auger
3" Shelby Tube
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

PROJECT: 121-360G Ponderay Hotel

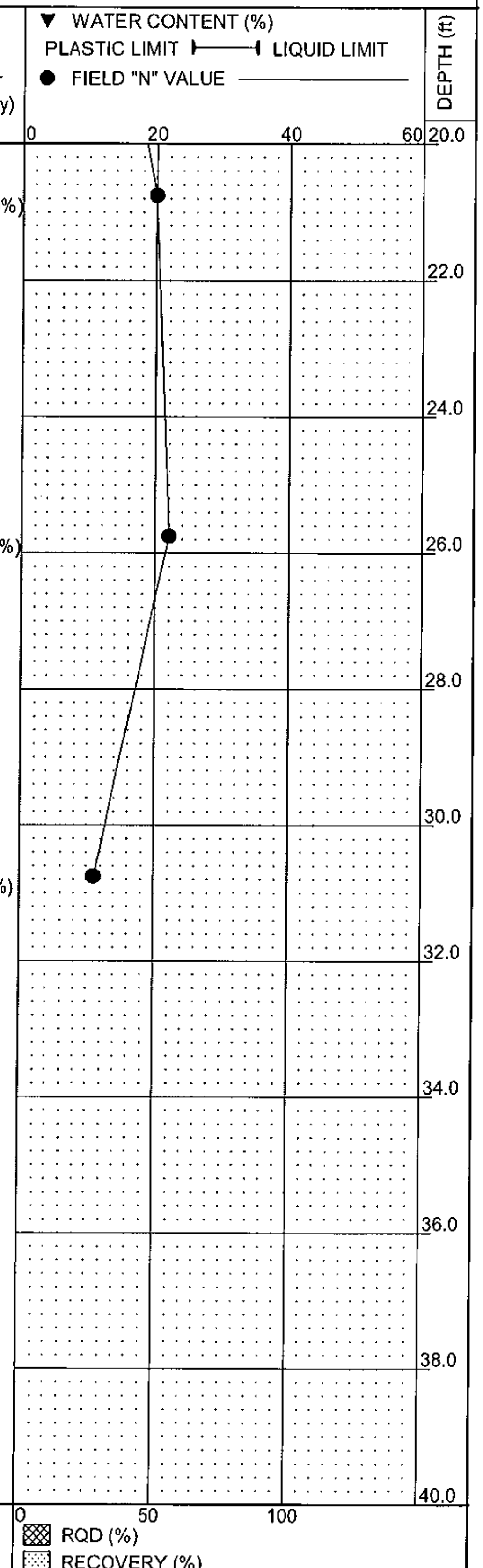
DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild
NOTES:

BORING B-3

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery)
20	Poorly-graded SAND with silt, light gray, moist, medium dense. Fine to medium grained sand.		
21		S-4	6-9-11 (18" = 100%)
26		S-5	6-10-12 (18" = 100%)
27 ∇			
30	SILT with sand, gray, wet, stiff. Pocket Penetrometer Values = 1.0-1.5		
31		S-6	4-6-5 (12" = 67%)
31.5	Boring B-3 terminated at 31.5 feet. Groundwater encountered while drilling at 26 feet.		



WATER LEVELS	
27' ∇ WHILE DRILLING	Hollow Stem Auger
AT COMPLETION	3" Shelby Tube
AFTER DRILLING	2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

PROJECT: 121-360G Ponderay Hotel

DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild
NOTES:

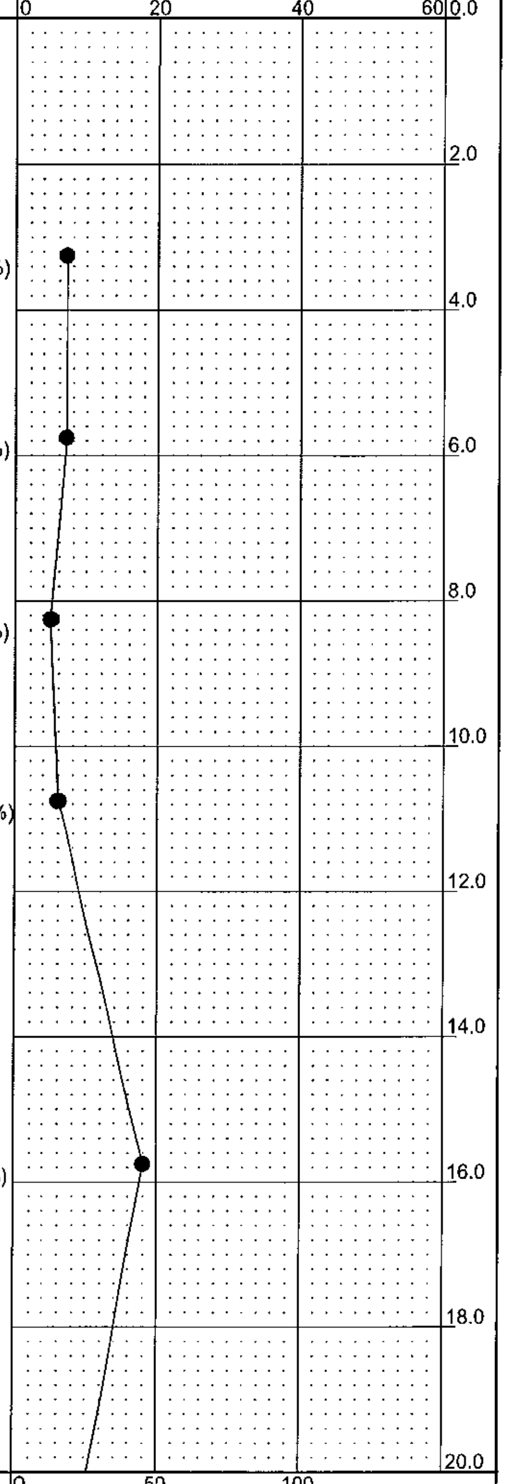
BORING B-4

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery)
0	Poorly-graded GRAVEL with silt and sand, gray, moist, dense. (Undocumented Fill)		
1	SILT with sand, mottled gray-black-brown, moist, medium stiff. Contains organics. (Uncontrolled Fill)		
3.5		S-1	2-3-4 (14" = 78%)
6		S-2	3-4-3 (16" = 89%)
6	Sandy SILT, gray-brown, moist, medium stiff. Pocket Penetrometer Values = 0.5-0.75		
8	Poorly-graded SAND with silt, gray, moist, loose. Sand was very fine-grained.	S-3	2-2-3 (16" = 89%)
10	Lean CLAY, mottled gray-brown to light brown, moist, stiff to very stiff. Pocket Penetrometer Values = 0.75-2.0	S-4	4-2-4 (18" = 100%)
15	Pocket Penetrometer Values = 2.25-2.5	S-5	4-7-11 (16" = 89%)
16	Poorly-graded SAND with silt, light tan-gray to dark gray, moist to wet, medium dense.		

▼ WATER CONTENT (%)
PLASTIC LIMIT ├──┤ LIQUID LIMIT
● FIELD "N" VALUE



WATER LEVELS
26' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

RQD (%)
RECOVERY (%)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

PROJECT: 121-360G Ponderay Hotel

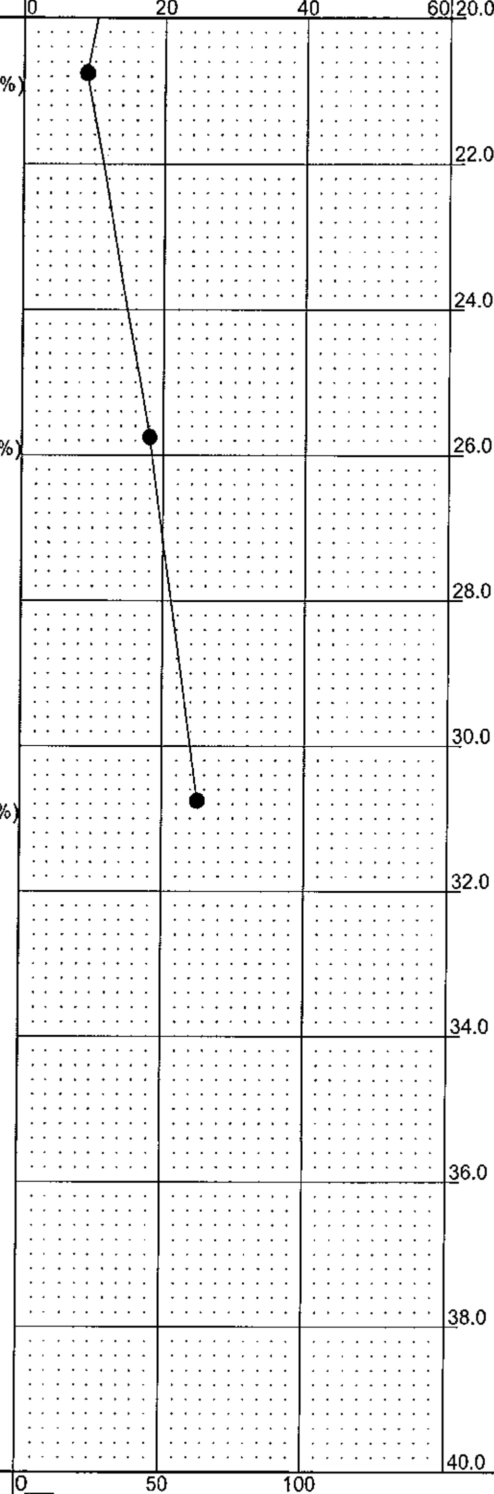
DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild
NOTES:

BORING B-4

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	SAMPLER	FIELD BLOW COUNT (Recovery)
20–31.5	Poorly-graded SAND with silt, light tan-gray to dark gray, moist to wet, medium dense.			
21		S-6	2" OD Split Spoon (SPT)	4-5-4 (18" = 100%)
26 ▽		S-7	2" OD Split Spoon (SPT)	6-8-10 (18" = 100%)
31		S-8	2" OD Split Spoon (SPT)	6-11-14 (18" = 100%)
31.5	Boring B-4 terminated at 31.5 feet. Groundwater encountered while drilling at 27 feet while drilling.			



WATER LEVELS
26' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

PROJECT: 121-360G Ponderay Hotel

DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild
NOTES:

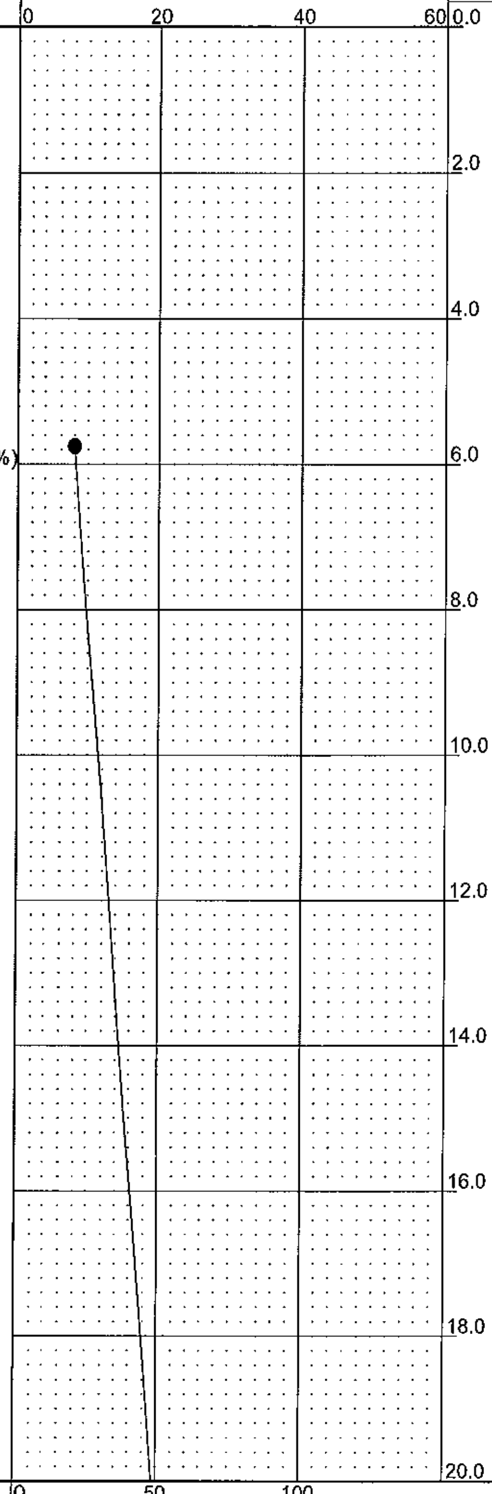
BORING B-5

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	SAMPLER	FIELD BLOW COUNT (Recovery)
0–5.5	SILT with sand, mottled gray-black-brown, moist, medium stiff. Contains organics. (Uncontrolled Fill)		Hollow Stem Auger	
5.5–10	SILT, tan, moist, stiff.	S-1	2" OD Split Spoon (SPT)	1-3-5 (18" = 100%)
10–15	Lean CLAY, mottled gray-brown, moist, medium stiff.	S-2	3" Shelby Tube	
15–20	Poorly-graded SAND with silt, tan-gray to dark gray, moist, medium dense. Sand was fine to medium-grained.	S-3	3" Shelby Tube	

▼ WATER CONTENT (%)
PLASTIC LIMIT ├──┤ LIQUID LIMIT
● FIELD "N" VALUE ────



WATER LEVELS
26' ▽ WHILE DRILLING
▼ AT COMPLETION
▼ AFTER DRILLING

Hollow Stem Auger
3" Shelby Tube
2" OD Split Spoon (SPT)

RQD (%)
RECOVERY (%)

ALLWEST TESTING & ENGINEERING
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG (US Customary Units)

PROJECT: 121-360G Ponderay Hotel

DATE STARTED: 10/1/2021
DATE FINISHED: 10/1/2021
DRILLER: Andy
COMPANY: Geologic Drill
LOGGER: Adam Richter
WEATHER: Mild

NOTES:

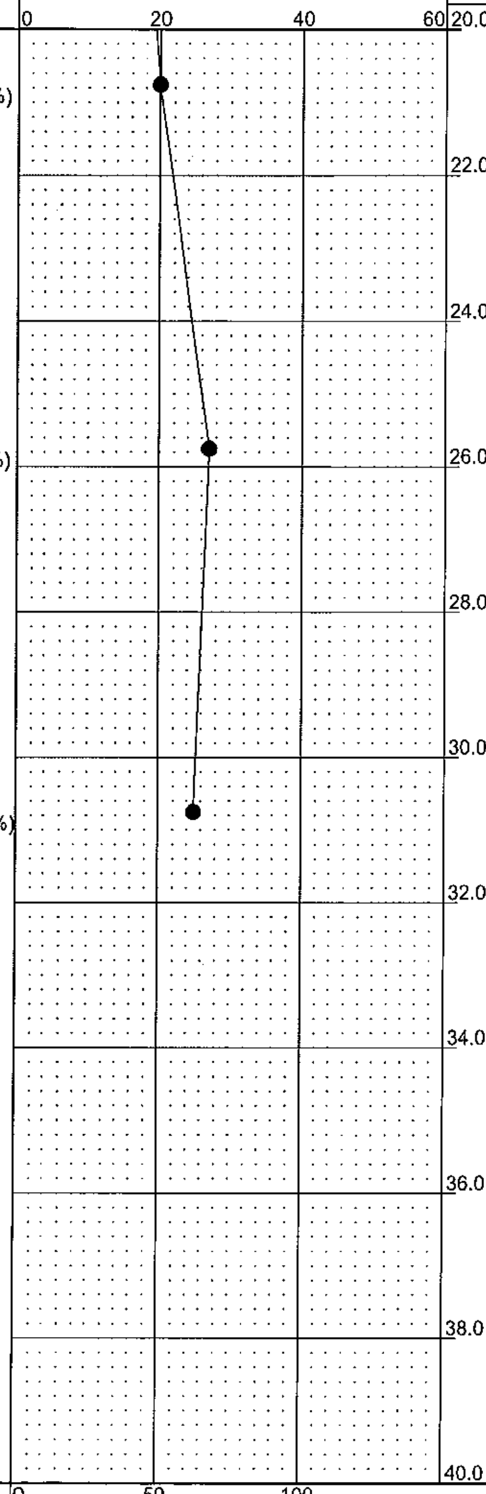
BORING B-5

DRILL: Trailer Drill
HAMMER: Manual
DRILLING METHODS: 6" Hollow Stem Augur

TOTAL DEPTH: 31.5'

DEPTH (ft)	DESCRIPTION	SAMPLE #	SAMPLER	FIELD BLOW COUNT (Recovery)
20–26	Poorly-graded SAND with silt, tan-gray to dark gray, moist, medium dense. Sand was fine to medium-grained.	S-4	2" OD Split Spoon (SPT)	7-9-11 (14" = 78%)
			Hollow Stem Auger	
		S-5	2" OD Split Spoon (SPT)	8-11-16 (14" = 78%)
26–30	Silty SAND, gray, moist to wet, medium dense. Sand was very fine-grained.		Hollow Stem Auger	
30–31.5	SILT, gray, moist, stiff to very stiff. Pocket Penetrometer Values = 1.75-2.25	S-6	2" OD Split Spoon (SPT)	9-11-14 (18" = 100%)
31.5	Boring B-5 terminated at 31.5 feet. Groundwater encountered at 27 feet while drilling.			

▼ WATER CONTENT (%)
PLASTIC LIMIT ├──┤ LIQUID LIMIT
● FIELD "N" VALUE



WATER LEVELS
26' ∇ WHILE DRILLING
AT COMPLETION
AFTER DRILLING

Hollow Stem Auger
3" Shelby Tube
2" OD Split Spoon (SPT)

RQD (%)
RECOVERY (%)

Unified Soil Classification System

MAJOR DIVISIONS			SYMBOL	TYPICAL NAMES
COARSE GRAINED SOILS	GRAVELS	CLEAN GRAVELS	GW	Well-Graded Gravel, Gravel-Sand Mixtures.
			GP	Poorly-Graded Gravel, Gravel-Sand Mixtures.
		GRAVELS WITH FINES	GM	Silty Gravel, Gravel-Sand-Silt Mixtures.
			GC	Clayey Gravel, Gravel-Sand-Clay Mixtures.
	SANDS	CLEAN SANDS	SW	Well-Graded Sand, Gravelly Sand.
			SP	Poorly-Graded Sand, Gravelly Sand.
		SANDS WITH FINES	SM	Silty Sand, Sand-Silt Mixtures.
			SC	Clayey Sand, Sand-Clay Mixtures.
FINE GRAINED SOILS	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50%		ML	Inorganic Silt, Silty or Clayey Fine Sand.
			CL	Inorganic Clay of Low to Medium Plasticity, Sandy or Silty Clay.
			OL	Organic Silt and Clay of Low Plasticity.
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%		MH	Inorganic Silt, Elastic Silt, Micaceous Silt, Fine Sand or Silt.
			CH	Inorganic Clay of High Plasticity, Fat Clay.
			OH	Organic Clay of Medium to High Plasticity.
Highly Organic Soils			PT	Peat, Muck and Other Highly Organic Soils.

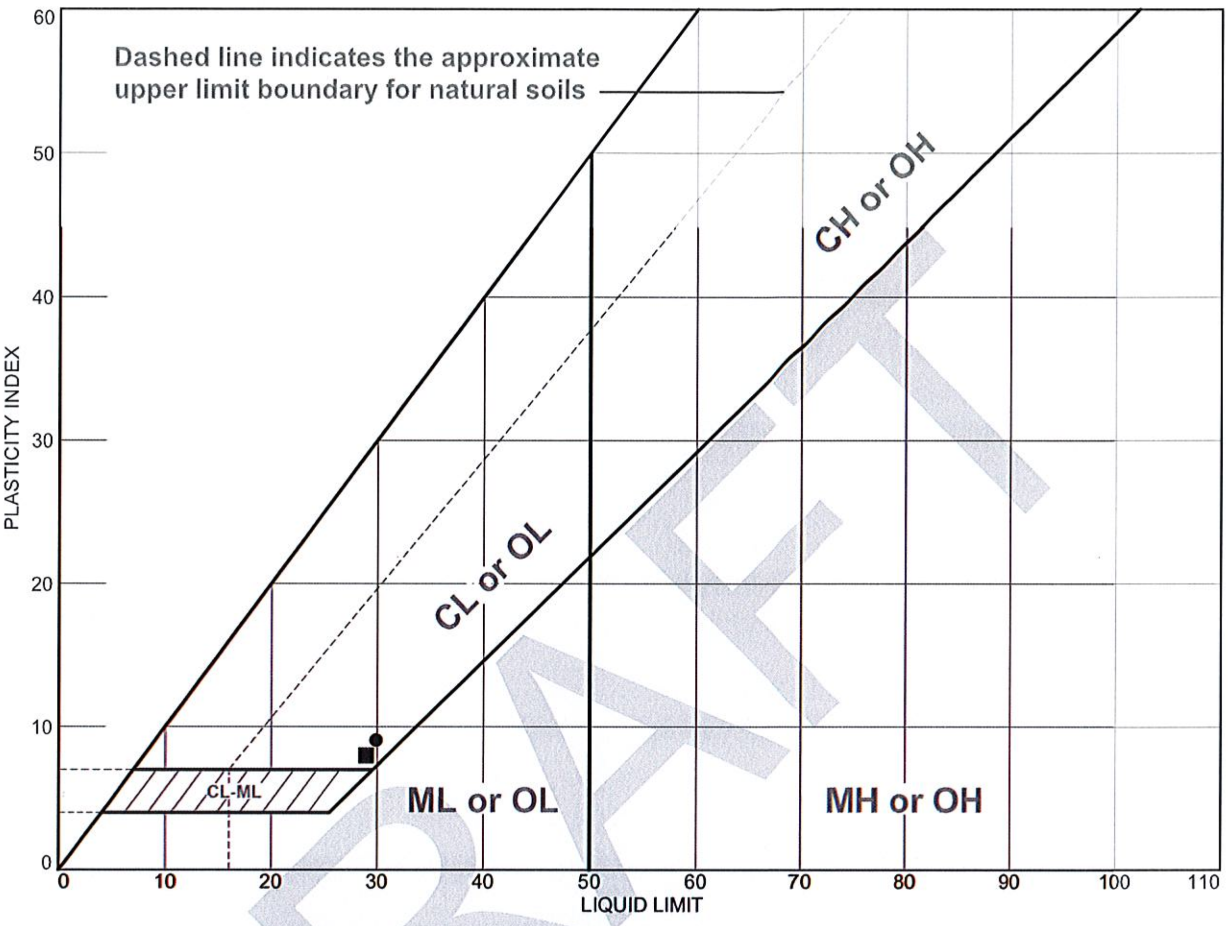
ALLWEST

Appendix C

Laboratory Test Results

ALLWEST

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean CLAY	30	21	9		99	CL
■	Lean CLAY	29	21	8		100	CL

Project No. 121-360G **Client:** Providence Development, LLC

Project: Ponderay Hotel Development

●**Location:** B-1 **Depth:** -10' **Sample Number:** S121-1125

■**Location:** B-3 **Depth:** -15' **Sample Number:** S121-1128

Remarks:

●Sampled By: A.Richter
Sample Date: 10/1/21
As Recieved Moisture Content: 32.0%

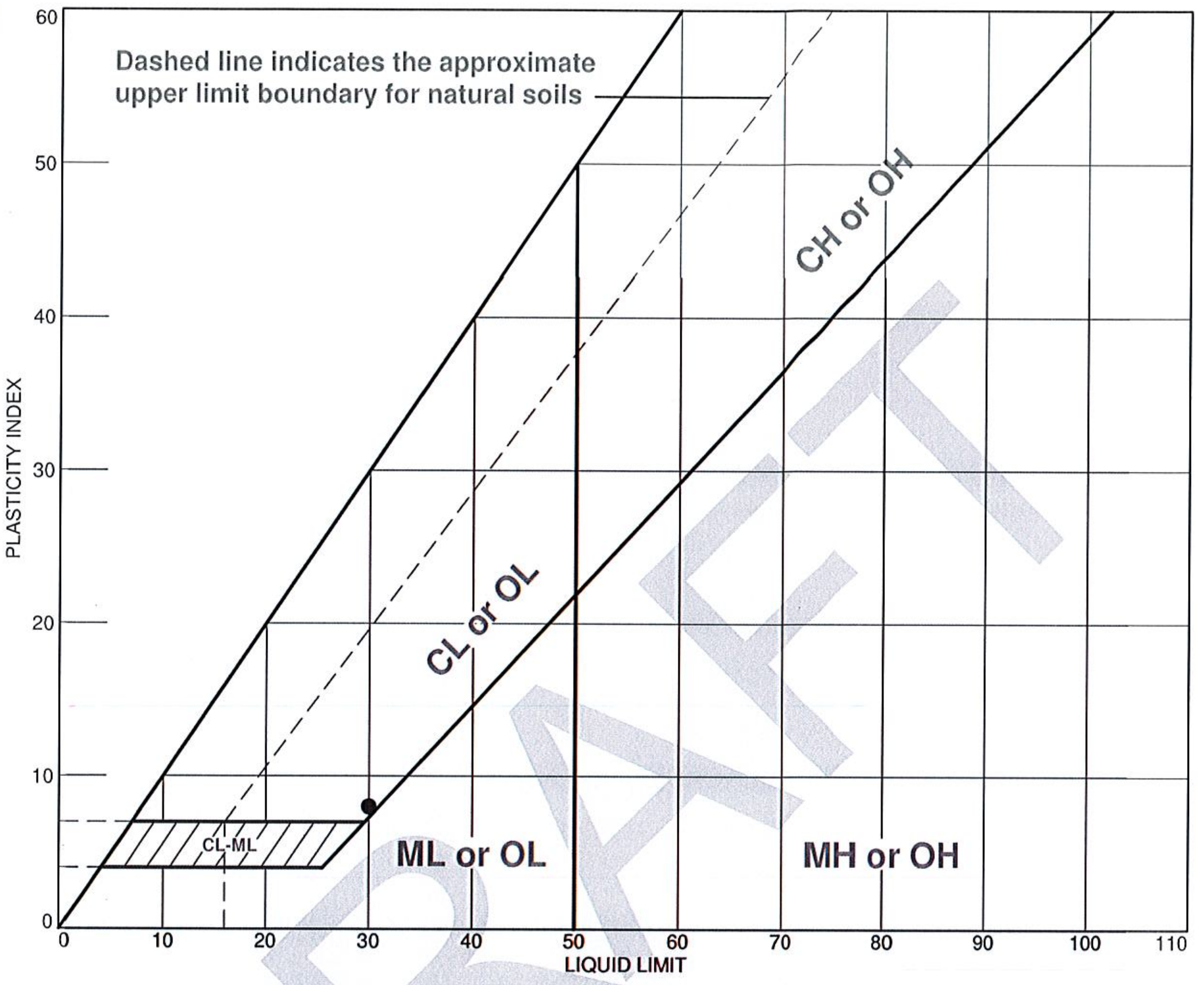
■Sampled By: A.Richter
Sample Date: 10/1/21
As Recieved Moisture Content: 23.6%

ALLWEST

Figure C-1

Tested By: Noah White **Checked By:** Chris McKissen

LIQUID AND PLASTIC LIMITS TEST REPORT



	MATERIAL DESCRIPTION	LL	PL	PI	%<#40	%<#200	USCS
●	Lean CLAY	30	22	8	99.9	99.9	CL
■	SILT	NP	NP	NP	99.4	99.1	ML

Project No. 121-360G **Client:** Providence Development, LLC

Project: Ponderay Hotel Development

● **Location:** B-2 **Depth:** @ 15.0' **Sample Number:** S121-1080

■ **Location:** B-3 **Depth:** @ 10.0' **Sample Number:** S221-1081

Remarks:

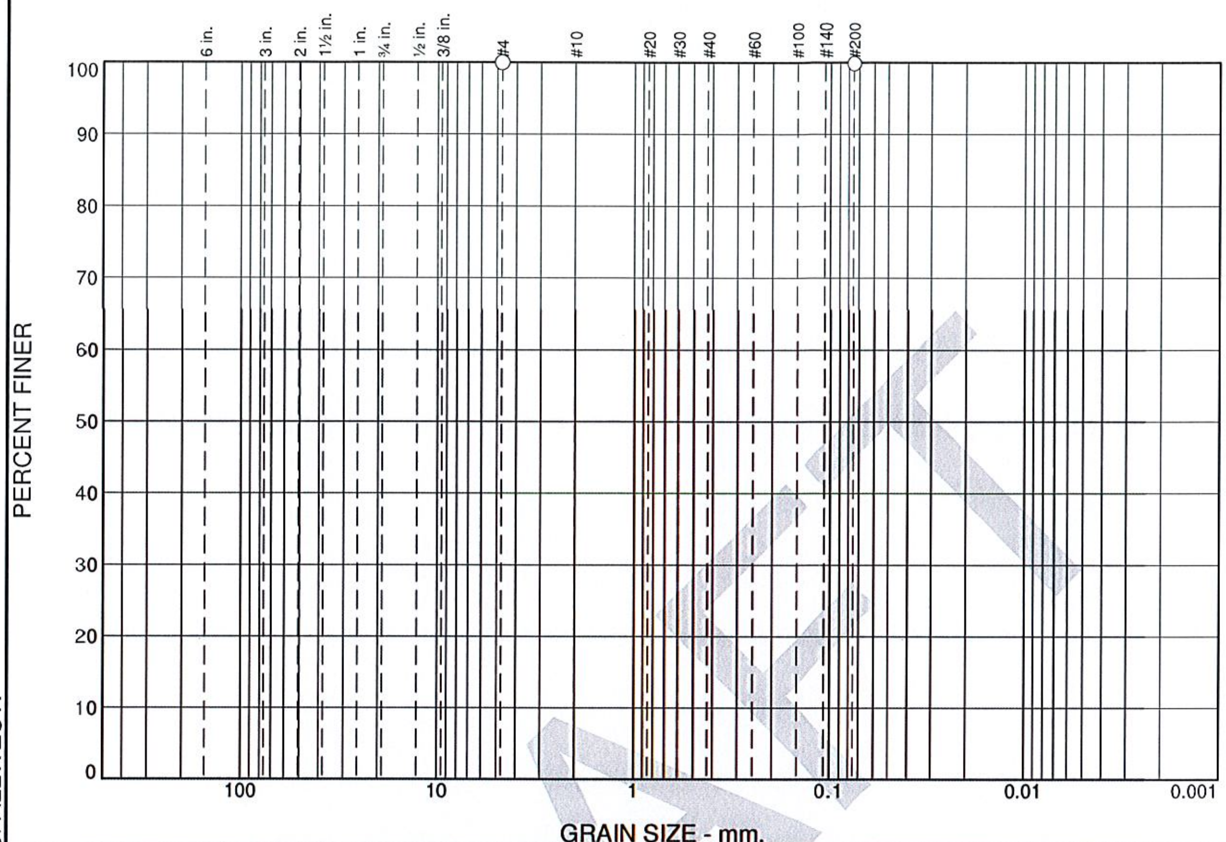
● A.Richter sampled 10/1/21

ALLWEST

Figure C-2

Tested By: K.Semanko **Checked By:** D.Schmitz

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.1	0.0	99.9	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#200	99.9		

* (no specification provided)

Soil Description

Lean CLAY

Atterberg Limits

PL= 22 LL= 30 PI= 8

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= CL AASHTO= A-4(8)

Remarks

Moisture content: 22.6%
A.Richter sampled 10/1/21

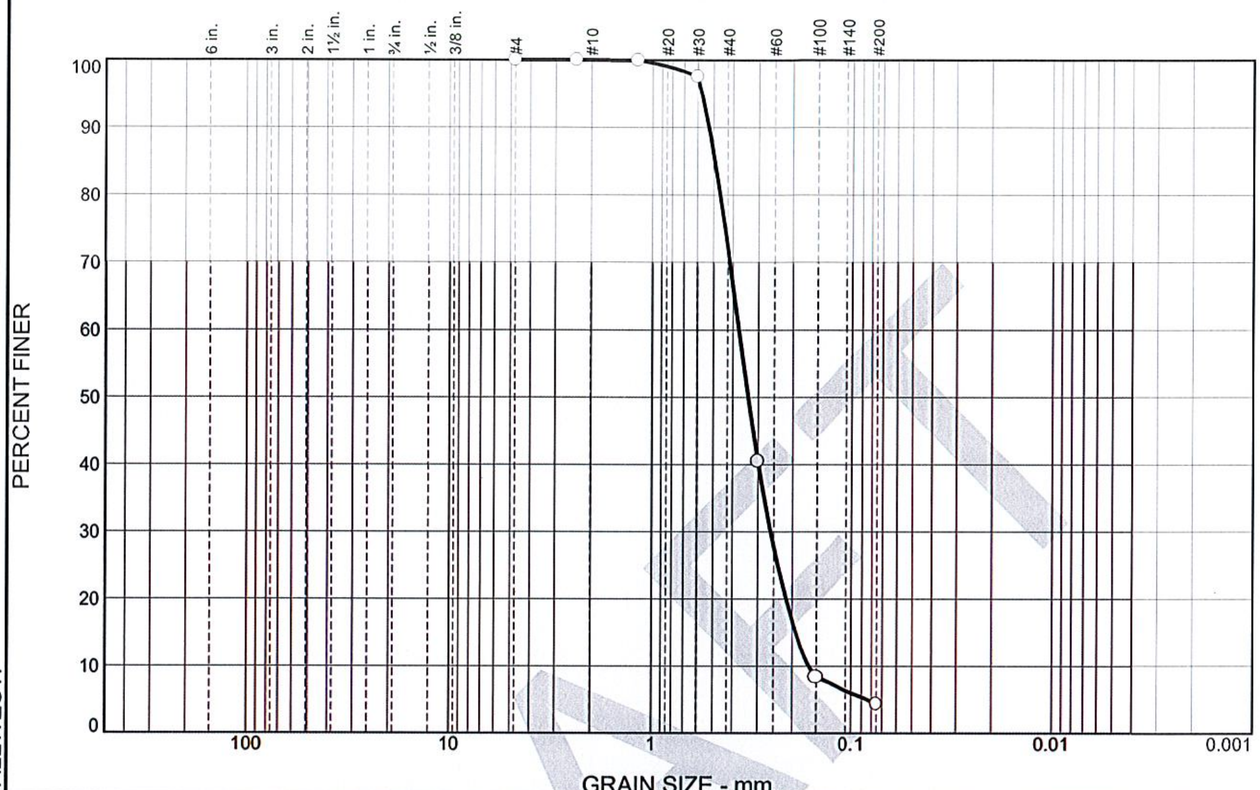
Location: B-2
Sample Number: S121-1080 **Depth:** @ 15.0' **Date:** 10/20/21

ALLWEST

Client: Providence Development, LLC
Project: Ponderay Hotel Development
Project No: 121-360G **Figure C-3**

Tested By: K.Semanko **Checked By:** D.Schmitz

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	28	68	4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#8	100		
#16	100		
#30	98		
#50	40		
#100	8		
#200	4.3		

* (no specification provided)

Material Description

Poorly-graded SAND

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5279 D_{85}= 0.4937 D_{60}= 0.3735
D_{50}= 0.3353 D_{30}= 0.2592 D_{15}= 0.1913
D_{10}= 0.1619 C_u= 2.31 C_c= 1.11

Classification

USCS= SP AASHTO=

Remarks

Sampled By: A.Richter
Sample Date: 10/1/21

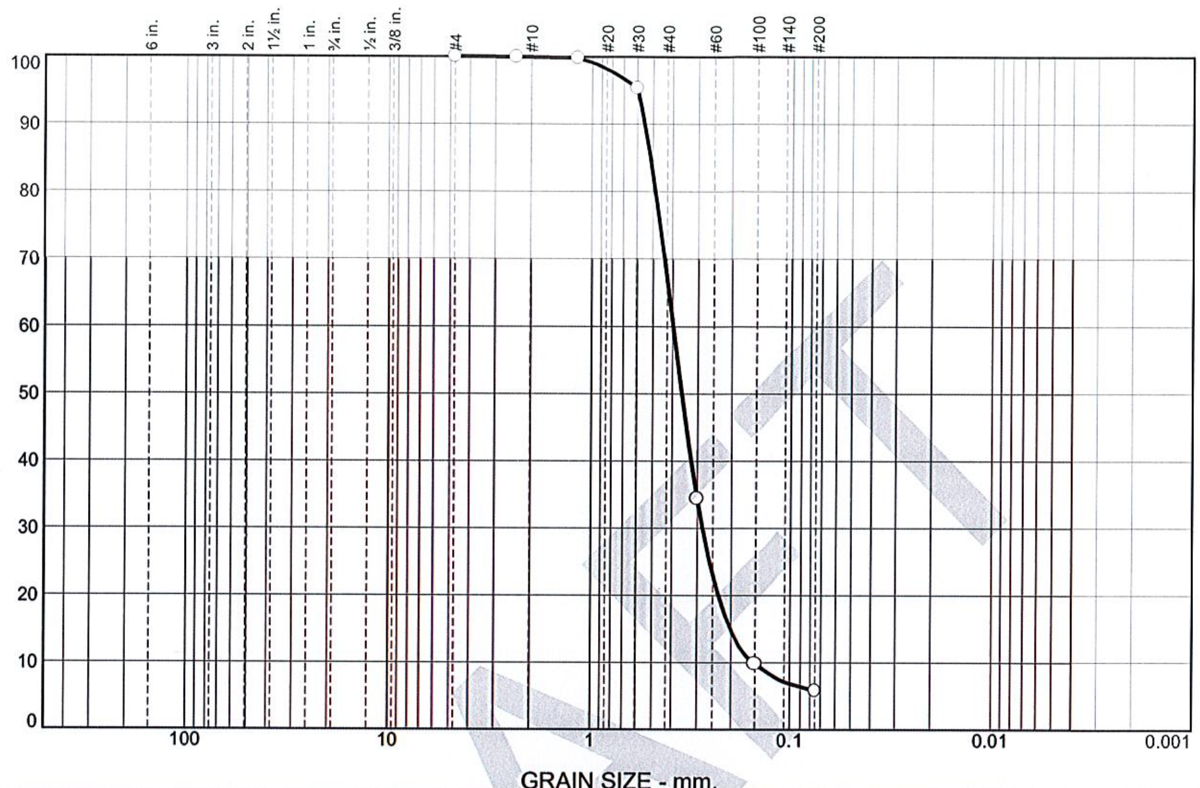
Location: B-1
Sample Number: S121-1126 **Depth:** -20' **Date:** 10/21/21

ALLWEST

Client: Providence Development, LLC
Project: Ponderay Hotel Development
Project No: 121-360G **Figure C-4**

Tested By: Noah White **Checked By:** Chris McKissen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	0	0	0	33	61	6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100		
#8	100		
#16	100		
#30	95		
#50	34		
#100	10		
#200	5.8		

* (no specification provided)

Material Description

Poorly-graded SAND with Silt

Atterberg Limits

PL= LL= PI=

Coefficients

D_{90}= 0.5511 D_{85}= 0.5163 D_{60}= 0.3962
D_{50}= 0.3581 D_{30}= 0.2820 D_{15}= 0.2019
D_{10}= 0.1527 C_u= 2.60 C_c= 1.32

Classification

USCS= SP-SM AASHTO=

Remarks

Sampled By: A.Richter
Sample Date: 10/21/21

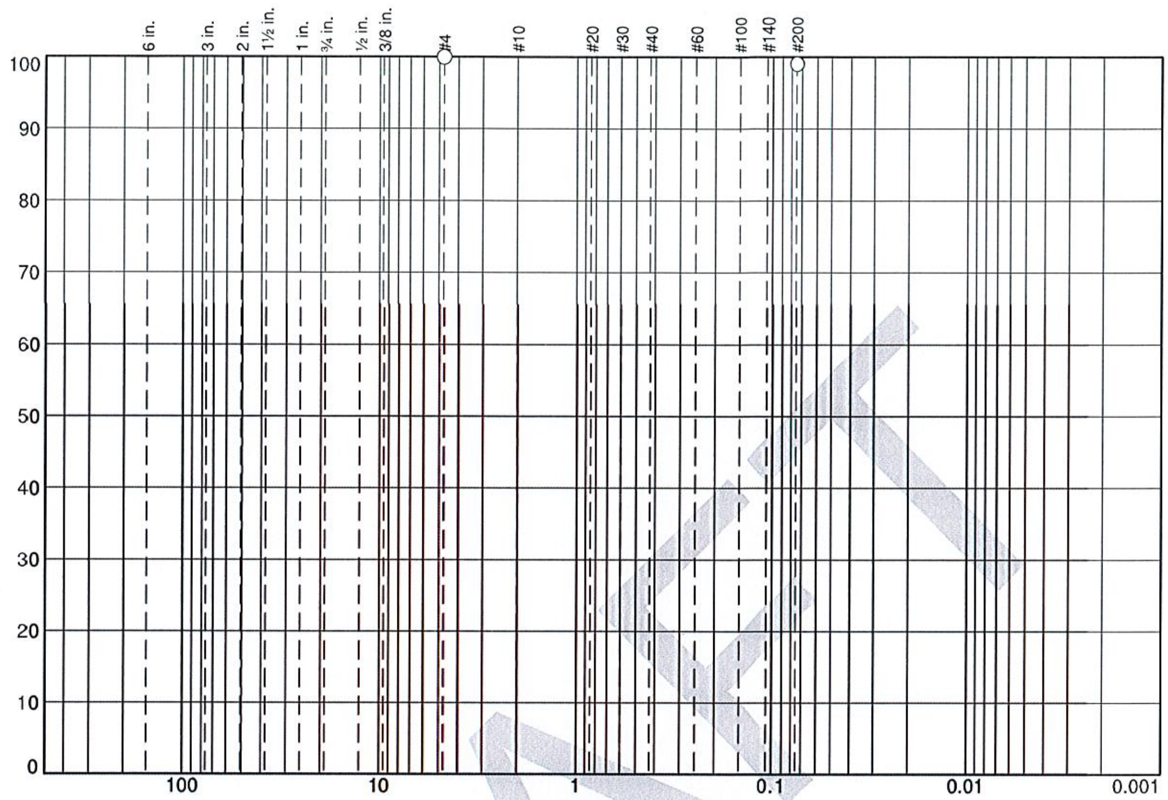
Location: B-2
Sample Number: S121-1127 **Depth:** -20' **Date:** 10/21/21

ALLWEST

Client: Providence Development, LLC
Project: Ponderay Hotel Development
Project No: 121-360G **Figure C-5**

Tested By: Noah White **Checked By:** Chris McKissen

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.2	0.4	0.3	99.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
#4	100.0		
#200	99.1		

* (no specification provided)

Soil Description

SILT

Atterberg Limits

PL= NP LL= NP PI= NP

Coefficients

D_{90}= D_{85}= D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

Moisture content: 28.0%
A.Richter sampled 10/1/21

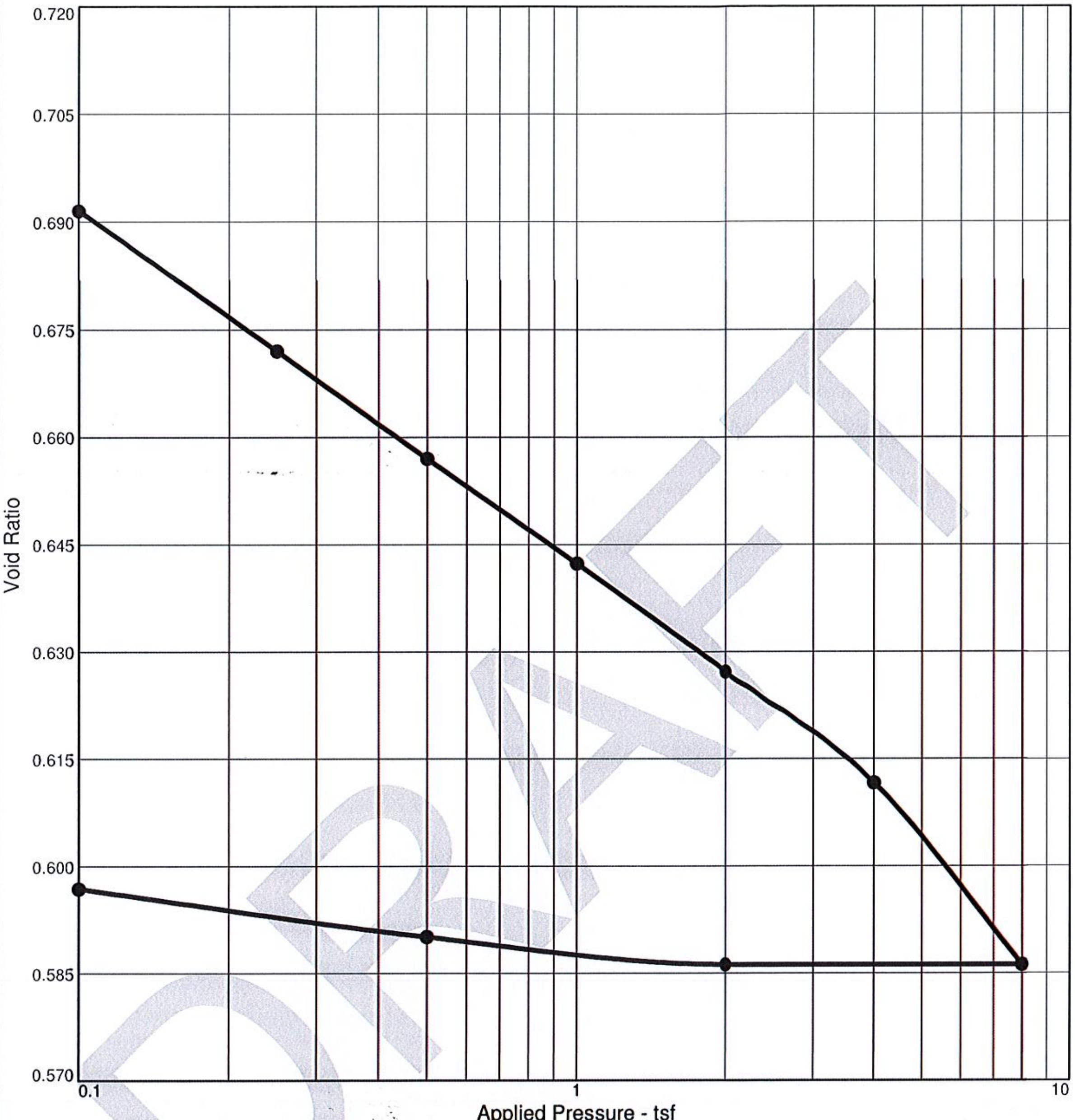
Location: B-3
Sample Number: S221-1081 **Depth:** @ 10.0' **Date:** 10/20/21

ALLWEST

Client: Providence Development, LLC
Project: Ponderay Hotel Development
Project No: 121-360G **Figure C-6**

Tested By: K.Semanko **Checked By:** D.Schmitz

CONSOLIDATION TEST REPORT



Natural		Dry Dens. (pcf)	LL	PI	Sp. Gr.	Overburden (tsf)	P_c (tsf)	C_c	C_r	Swell Press. (tsf)	Swell %	e_o
Sat.	Moist.											
102.5 %	26.5 %	101.5	NP	NP	2.65	-	4.1	0.09	0.01			0.685

MATERIAL DESCRIPTION	USCS	AASHTO
SILT	ML	A-4(0)

Project No. 121-360G **Client:** Providence Development, LLC

Project: Ponderay Hotel Development

Location: B-3 **Depth:** @ 10.0' **Sample Number:** S221-1081

ALLWEST

Remarks:
A.Richter sampled 10/1/21

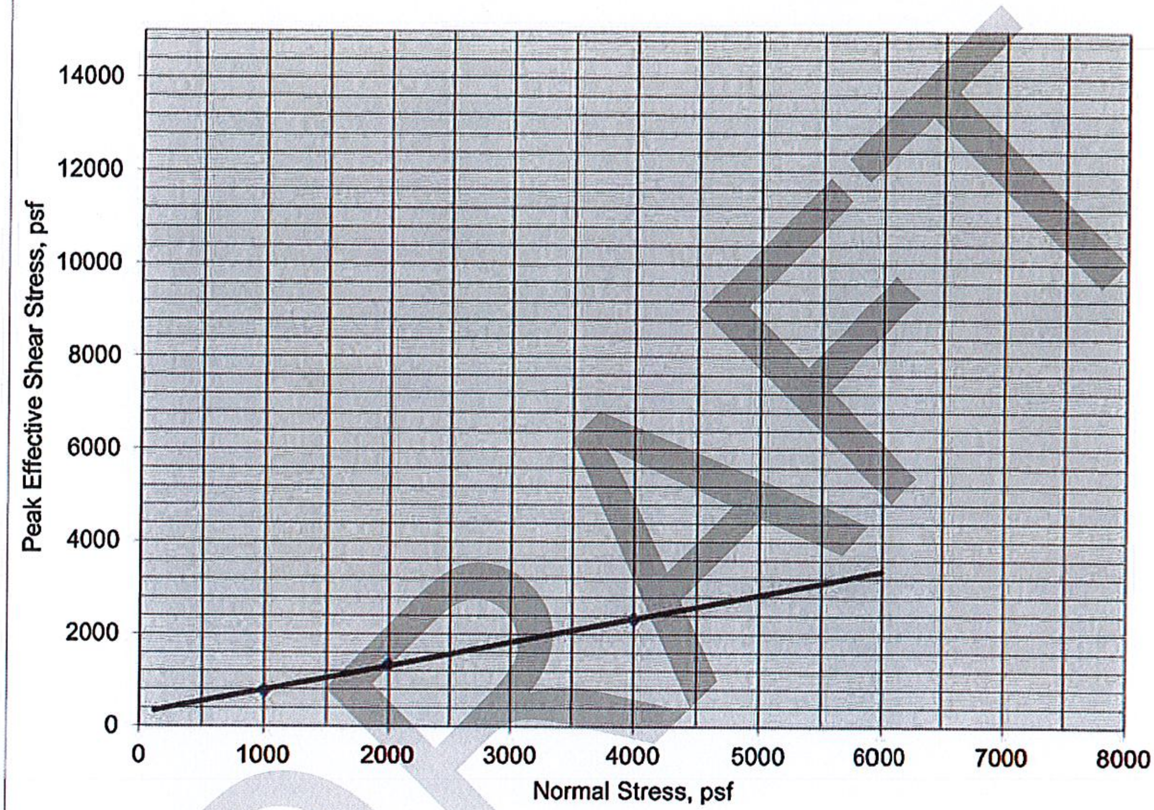
Figure C-7

Tested By: D.Schmitz **Checked By:** S.Sommers

Direct Shear
AASHTO T236

Project: Ponderay Hotel
Client: Providence Development, LLC
Date Tested: 10/19/21 and 10/20/21
Tested By: D. Schmitz

Project No.: 121-360G
Sample No.: S121-1080
Sample Location: B-2 @ 15.0'
Classification: Lean clay



Angle of Internal Friction (ø'):	27
Cohesion Intercept (psf):	276
Dry Unit Weight (pcf):	105.9
Water Content (%):	22.8
Shear Box Diameter (inches):	2.4

Reviewed by: ____________________

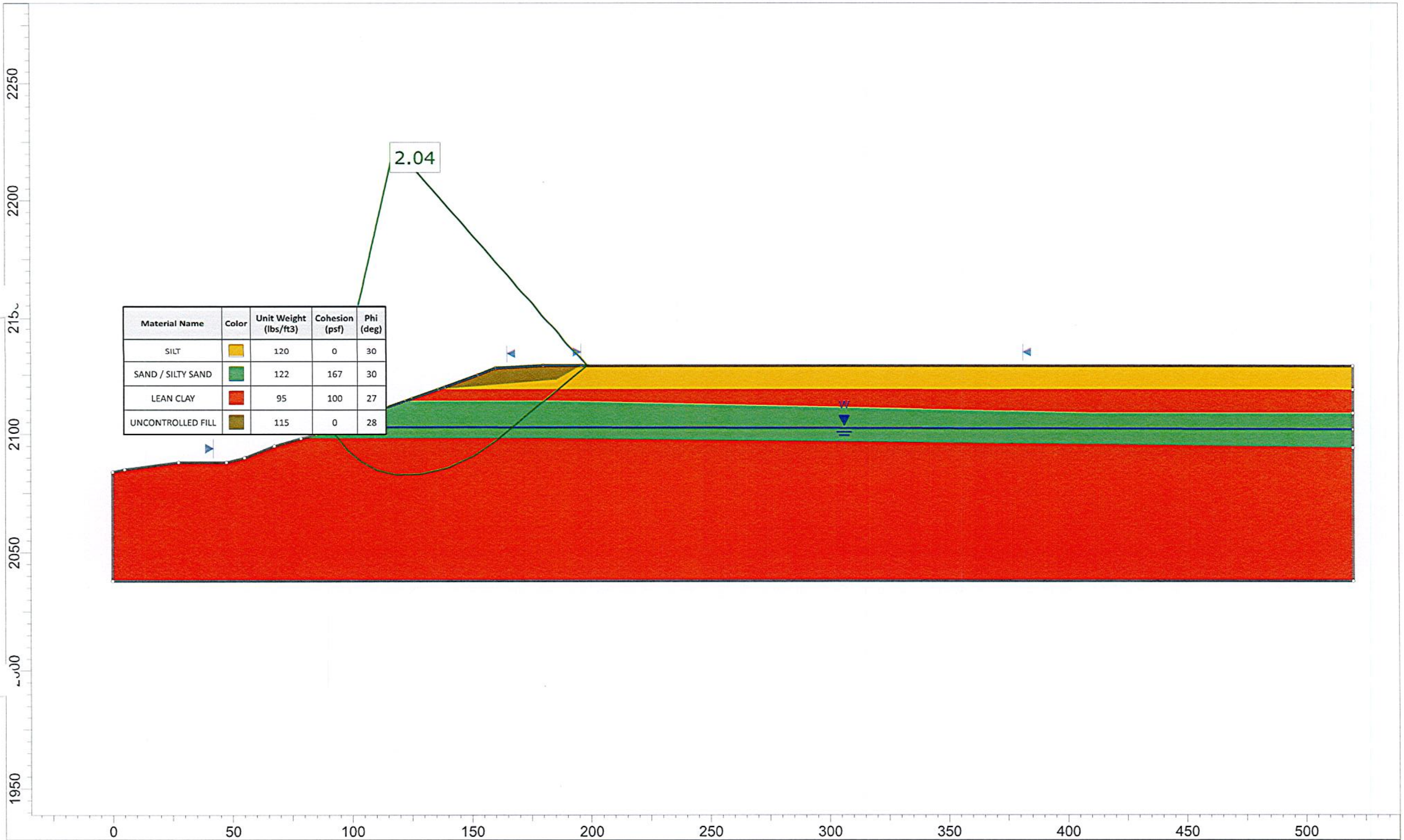
Figure C-8

ALLWEST
690 W. Capstone Ct. • Hayden, Id. 83835 • (208) 762-4721 • Fax (208) 762-0942
www.allwesttesting.com

Appendix D

Settlement Analyses
Slope Stability Analyses

ALLWEST

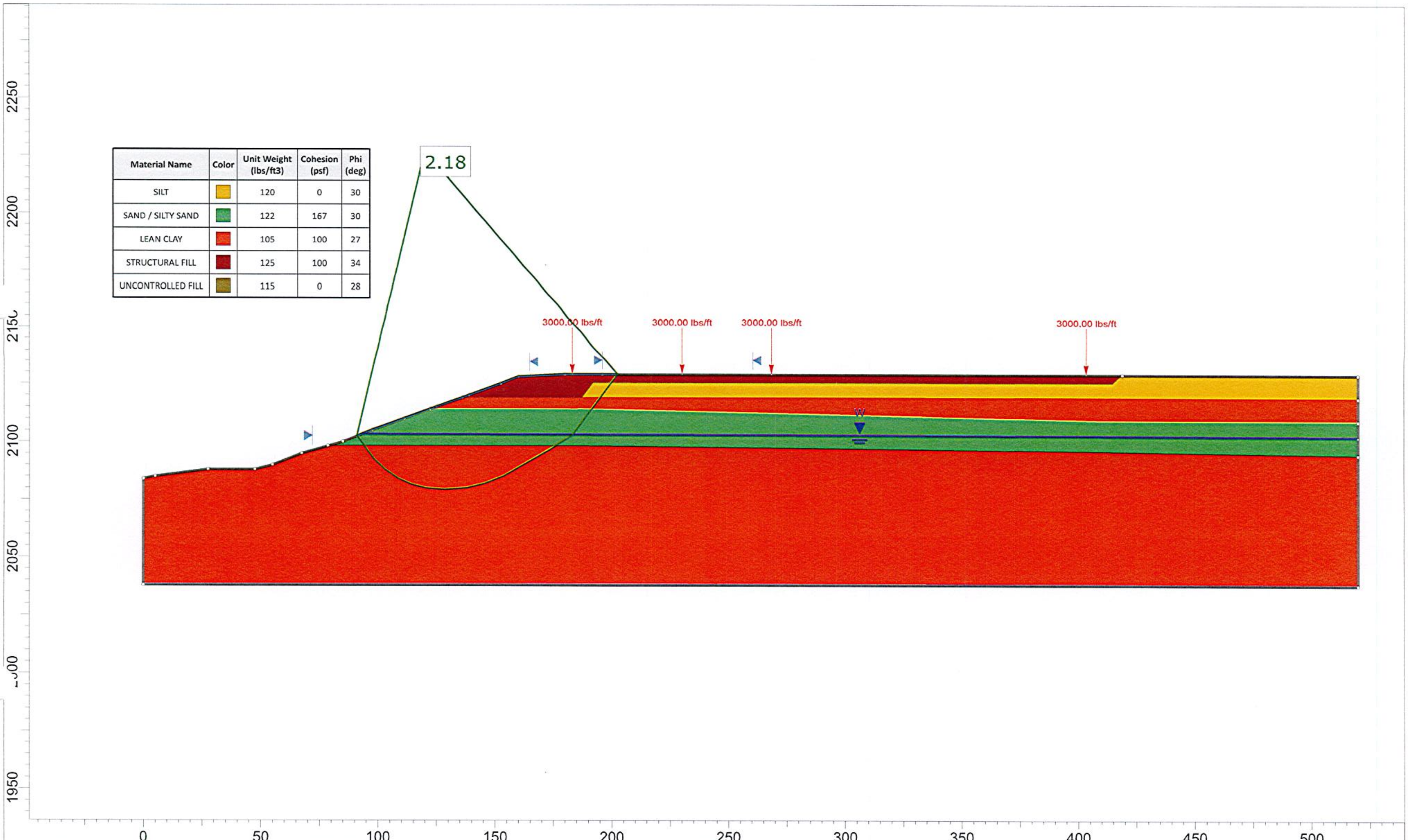


Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
SILT		120	0	30
SAND / SILTY SAND		122	167	30
LEAN CLAY		95	100	27
UNCONTROLLED FILL		115	0	28

Project	Ponderay Hotel		
Analysis Description	A-A' Existing Conditions		
Drawn By	AKR	Scale	1:668
Company	ALLWEST		
Date		File Name	A-A' Existing.slim

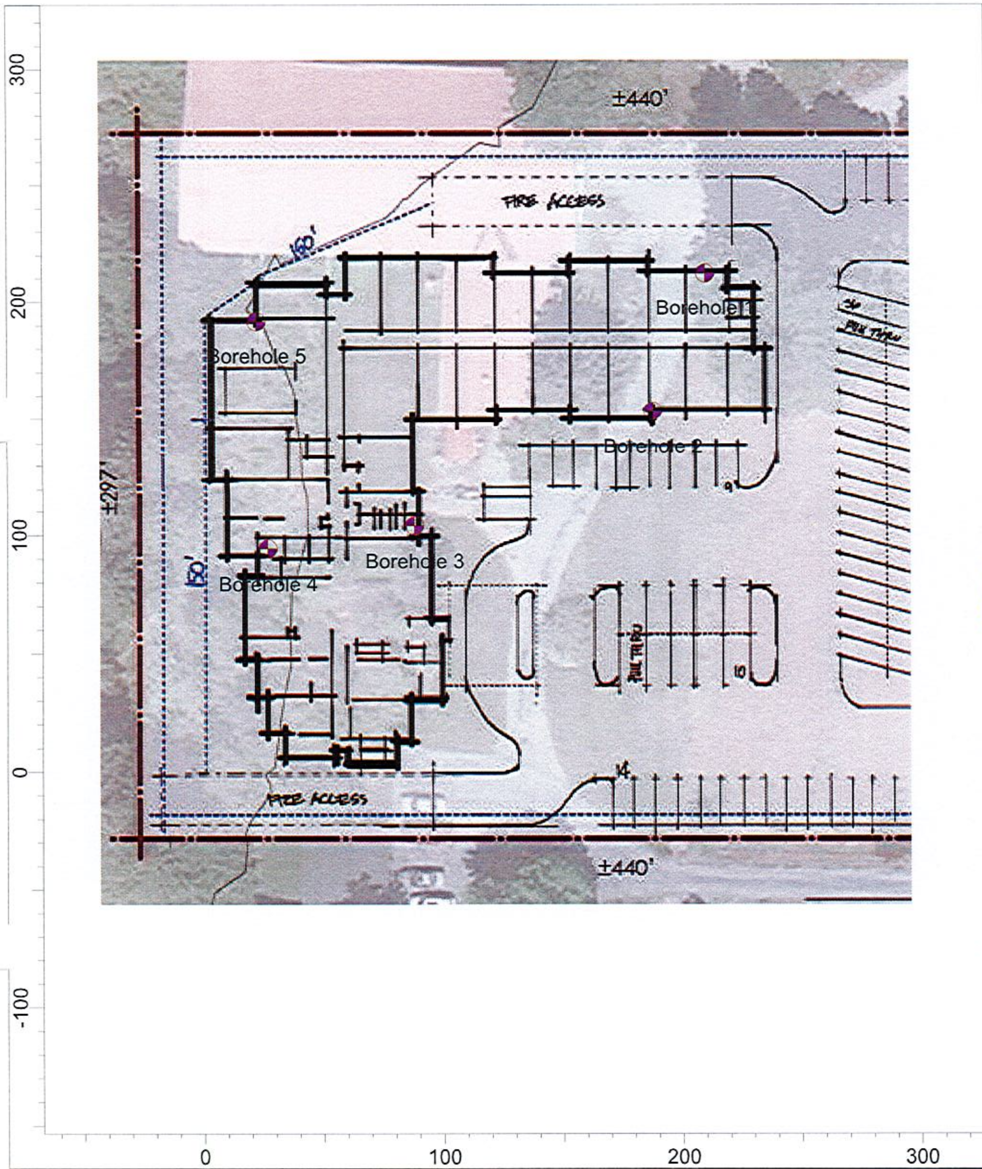
SLIDEINTERPRET 7.018

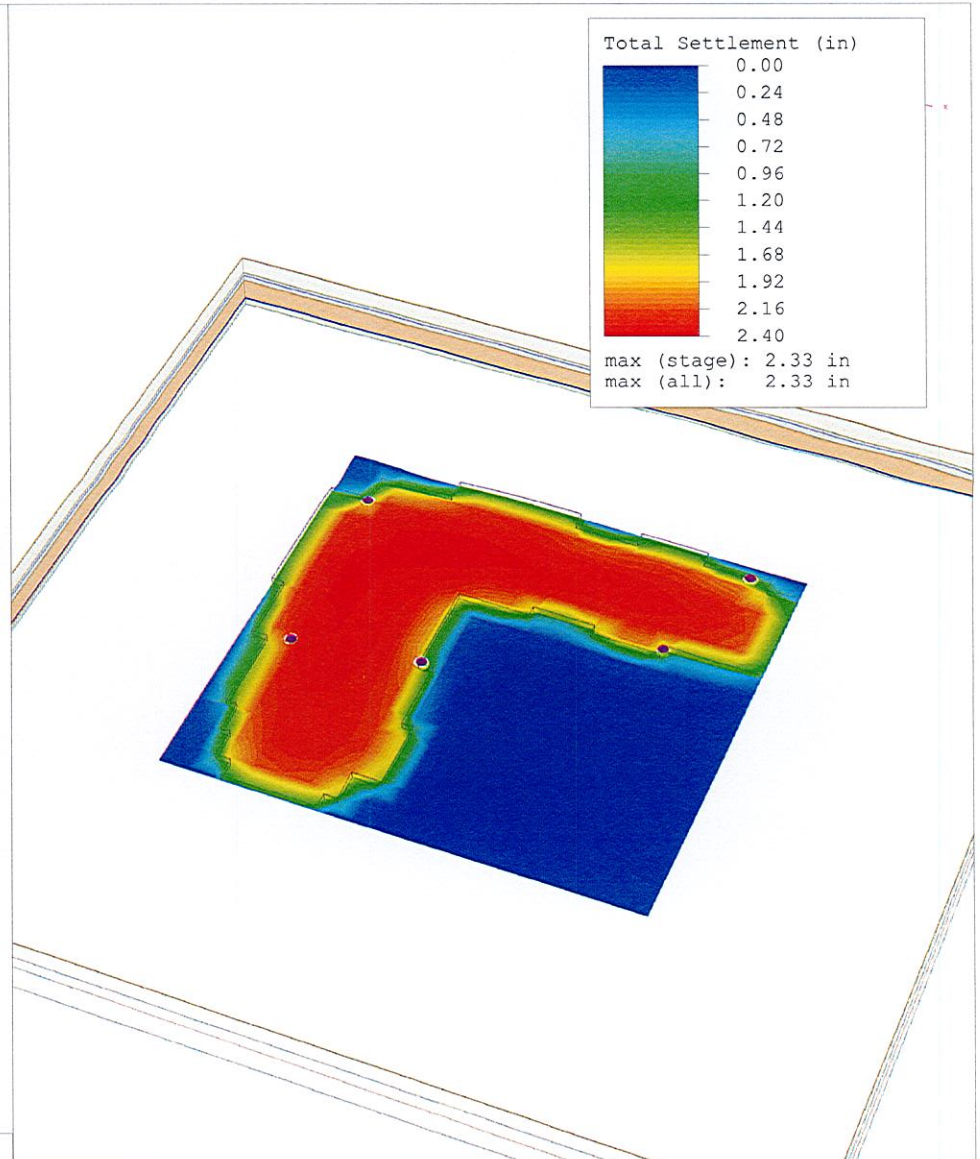
Material Name	Color	Unit Weight (lbs/ft3)	Cohesion (psf)	Phi (deg)
SILT		120	0	30
SAND / SILTY SAND		122	167	30
LEAN CLAY		105	100	27
STRUCTURAL FILL		125	100	34
UNCONTROLLED FILL		115	0	28



SLIDEINTERPRET 7.018

Project	Ponderay Hotel		
Analysis Description	A-A' Existing Conditions		
Drawn By	AKR	Scale	1:685
Company	ALLWEST		
Date		File Name	A-A' Proposed.slim





rocscience	Project	Ponderay Hotel	
	Analysis Description	Settlement	
	Drawn By	AKR	Company: ALLWEST
SETTLE3D 4.023	Date		File Name: Ponderay Hotel.s3z

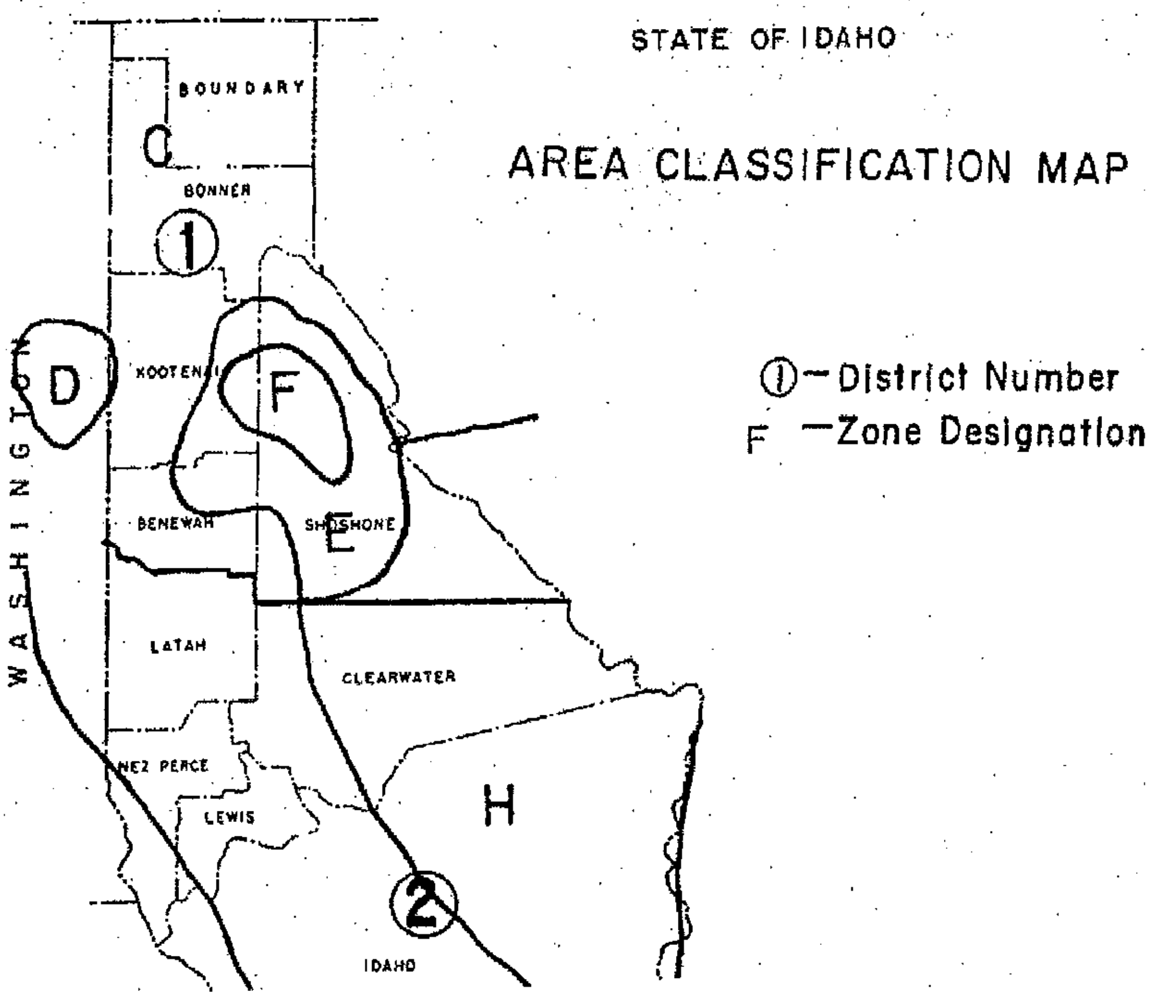


FIGURE 6-3 AREA CLASSIFICATION MAP FOR IDF CURVES - IDAHO (IDAHO TRANSPORTATION DEPARTMENT)

FIGURE 6-4 ZONE C, INTENSITY-DURATION-FREQUENCY CURVE
(IDAHO TRANSPORTATION DEPARTMENT)

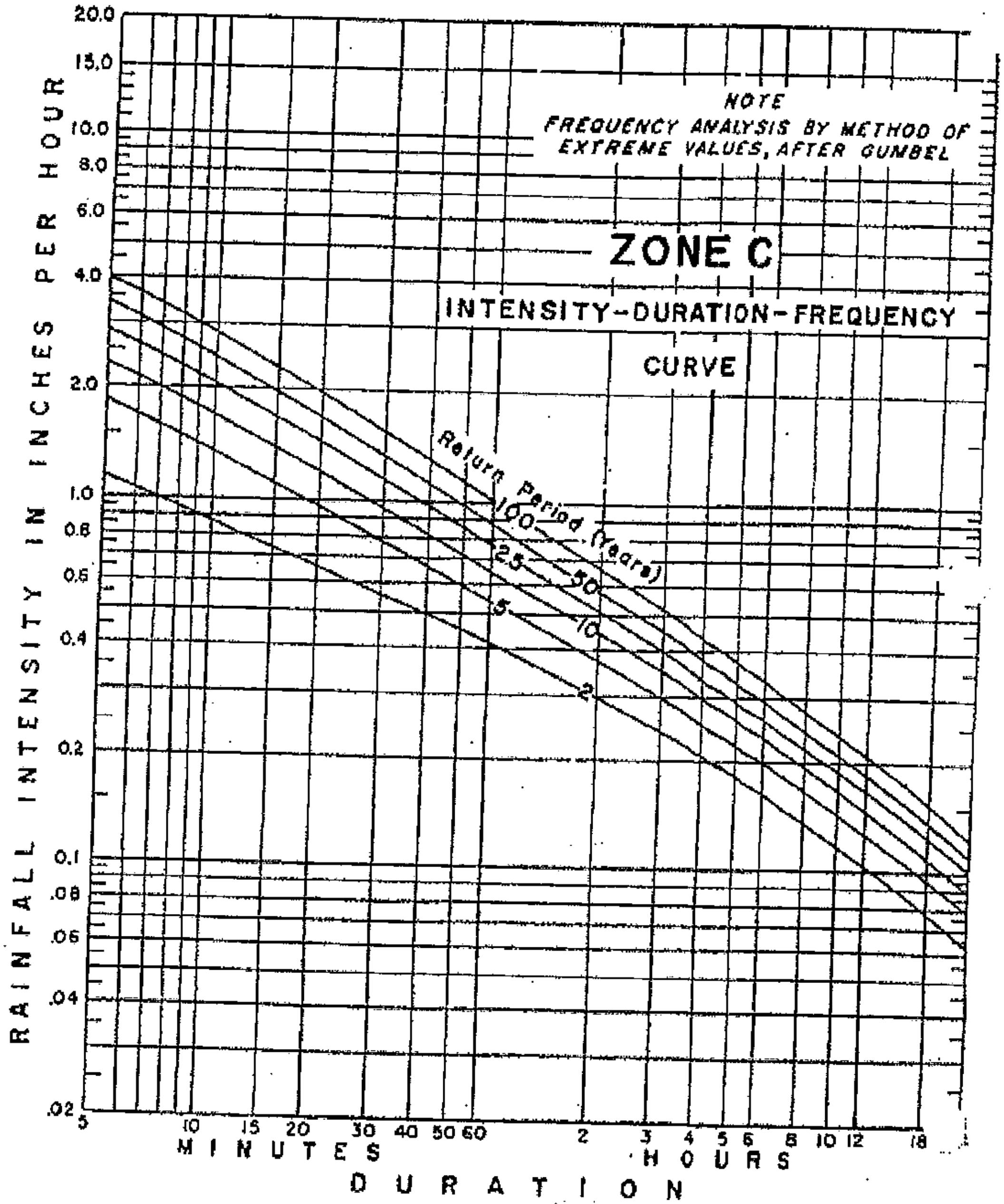


Table 4B.2. Values of Runoff Coefficient (C) for Rational Formula

Land Use	Description	Hydrologic Soils Group			
		A	B	C	D
Cultivated Land	Without conservation treatment	0.49	0.67	0.81	0.88
	With conservation treatment	0.27	0.43	0.67	0.67
Pasture or Range Land	Poor condition	0.38	0.63	0.78	0.84
	Good condition	---	0.25	0.51	0.65
Meadow	Good condition	---	---	0.41	0.61
Wood or Forest Land	Thin stand, poor cover, no mulch	---	0.34	0.59	0.70
	Good cover	---	---	0.45	0.59
Open Space, Lawn, Park, Golf Course, or Cemetery	Good condition (grass cover on 75% or more)	---	0.25	0.51	0.65
	Fair condition (grass cover on 50% to 75%)	---	0.45	0.63	0.74
Commercial and Business Area	85% impervious	0.84	0.90	0.93	0.96
Industrial District	72% impervious	0.67	0.81	0.88	0.92
Residential Lot Average lot size (acres):	Average % of lot impervious:				
1/8	65	0.59	0.76	0.86	0.90
1/4	38	0.29	0.55	0.70	0.80
1/3	30	---	0.49	0.67	0.78
1/2	25	---	0.45	0.65	0.76
1.0	20	---	0.41	0.63	0.74
Paved Area	Parking lots, roofs, driveways, etc.	0.99	0.99	0.99	0.99
Street or Road	Paved with curbs and storm sewers	0.99 0.57	0.99 0.76	0.99 0.84	0.99 0.88
	Gravel	0.49	0.69	0.80	0.84

Note: The designer must use judgment to select the appropriate C value within the range. Generally, larger areas with permeable soils, flat slopes, and dense vegetation should have the lowest C values. Smaller areas with dense soils, moderate to steep slopes, and sparse vegetation should assigned the highest C values.

SOURCE: Panhandle Stormwater Erosion Control and Education Program Training Manual (2007)

APPENDIX B

Storm Water Management Calculations

Grassy Filtration Area

BOWSTRING METHOD

DATE: 1/12/2022				
Design Storm Return Period	25	yr	**Infiltration (max. 2 in/hr)**	
Drywell Outflow	0.00	cfs	Infiltration Rate (in/hr)=	2.0
Bed of GIA Outflow	0.04	cfs	GIA Bed Area (sf) =	890
Check Dam Outflow (Geotex + Drain Rock)	0.000	cfs	**Fabric Transmissivity**	
Wier Outflow	0.00	cfs	Trans. Rate (cfs/sf)=	0.000
Orifice Outflow	0.00	cfs	Outlet Area (sf) =	0.00
Post Developed			**Treatment Storage (cf)**	
Area	2.55	acres	First 1/2-Inch Runoff =	4,629
Composite Runoff Coefficient	0.90			
AxC=	2.30			
Time of Concentration	5.00	min		
Pre-Developed:				
Sub Basin Area	2.55	acres		
Composite Runoff Coefficient	0.68			
AxC=	1.72			
Time of Concentration	10	min		
Pre-Developed Flow Rate (cfs)	3.74	*(flow rate based on 10-min time of concentration)*		

Time (min)	Time (sec)	25-Year Storm Intensity (in/hr)	Qpost(cfs)	Vpost (cf)	Qpre(cfs)	Vpre(cf)	Operating Storage (cf)
5	300	2.8	6.44	2,589	4.82	1,938	639
10	600	2.17	4.99	3,504	3.74	2,622	857
15	900	1.83	4.21	4,218	3.15	3,156	1,024
20	1200	1.65	3.80	4,942	2.84	3,698	1,194
25	1500	1.45	3.34	5,343	2.50	3,999	1,283
30	1800	1.27	2.92	5,556	2.19	4,158	1,324
35	2100	1.19	2.74	6,028	2.05	4,511	1,430
40	2400	1.11	2.55	6,388	1.91	4,781	1,509
45	2700	1.04	2.39	6,703	1.79	5,016	1,576
50	3000	0.96	2.21	6,850	1.65	5,126	1,600
55	3300	0.88	2.02	6,886	1.51	5,153	1,597
60	3600	0.8	1.84	6,812	1.38	5,098	1,566
65	3900	0.78	1.79	7,180	1.34	5,373	1,646
70	4200	0.75	1.73	7,422	1.29	5,554	1,695
75	4500	0.72	1.66	7,622	1.24	5,704	1,733
80	4800	0.7	1.61	7,893	1.20	5,907	1,789
85	5100	0.67	1.54	8,017	1.15	6,000	1,807
90	5400	0.65	1.50	8,226	1.12	6,156	1,848
95	5700	0.63	1.45	8,408	1.08	6,292	1,881

100	6000	0.61	1.40	8,562	1.05	6,407	1,908
105	6300	0.59	1.36	8,688	1.02	6,502	1,927
110	6600	0.57	1.31	8,787	0.98	6,576	1,939
115	6900	0.55	1.27	8,858	0.95	6,629	1,945
120	7200	0.53	1.22	8,902	0.91	6,662	1,944
125	7500	0.51	1.17	8,918	0.88	6,674	1,935
130	7800	0.49	1.13	8,907	0.84	6,665	1,920
135	8100	0.47	1.08	8,867	0.81	6,636	1,898
150	9000	0.43	0.99	9,003	0.74	6,737	1,895
165	9900	0.4	0.92	9,203	0.69	6,887	1,908
180	10800	0.38	0.87	9,529	0.65	7,131	1,953
195	11700	0.37	0.85	10,045	0.64	7,517	2,046
210	12600	0.36	0.83	10,518	0.62	7,871	2,128
225	13500	0.34	0.78	10,638	0.59	7,961	2,121
240	14400	0.33	0.76	11,008	0.57	8,238	2,177
300	18000	0.29	0.67	12,075	0.50	9,036	2,297
360	21600	0.25	0.58	12,480	0.43	9,339	2,251
365	21900	0.25	0.58	12,652	0.43	9,468	2,282
370	22200	0.25	0.58	12,825	0.43	9,597	2,313
1080	64800	0.14	0.32	20,901	0.24	15,641	2,590
1440	86400	0.11	0.25	21,887	0.19	16,379	1,948

GFA Design Dimensions

GFA Bed Variables:

Length =	500.00	ft
Width =	10.50	ft
Depth =	8.00	in
Side Slopes =	3	:1
Free Board =	2.00	in

Required Treatment Volume:

4,629 cf

Resulting Dimensions at Operating Level:

504.00	ft	Bed Area	6,422	sf
14.50	ft	Top Area	7,308	sf

Resulting Top Dimensions (including free board):

505.00	ft	Height	10.00	in
15.50	ft	Top Area	7,828	sf

Resulting Volume without freeboard:

4,969 cf

37,165 gal

Combined Volume with free board:

6,401 cf

47,881 gal