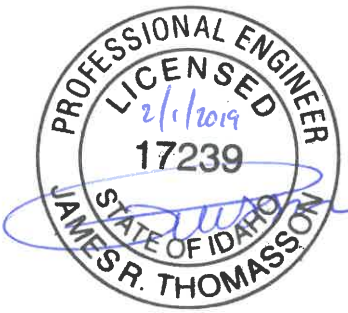
PRELIMINARY
GEOTECHNICAL EVALUATION
ATLAS WATERFRONT PROJECT – PHASE 4
3074 W. SELTICE WAY
COEUR D'ALENE, IDAHO
ALLWEST PROJECT NO. 118-014G



February 1, 2019

Prepared for:
Welch Comer & Associates, Inc.
350 E. Kathleen Drive
Coeur d'Alene, Idaho 83814

Prepared by:
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690 W Capstone Court
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Testing & Engineering

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ALLWEST Testing & Engineering

Construction Materials Testing & Special Inspection
Geotechnical Engineering
Environmental Consulting
Non-Destructive Testing
Welder Certification

February 1, 2019

Mr. Phil Boyd
Welch, Comer and Associates, Inc.
350 E. Kathleen Drive
Coeur d'Alene, Idaho 83814

RE: ALLWEST Project No. 118-014G
Preliminary Geotechnical Evaluation
Atlas Waterfront Project – Phase 4
3074 West Seltice Way
Coeur d'Alene, Idaho

Mr. Boyd,

ALLWEST Testing & Engineering, Inc. has completed the authorized preliminary geotechnical evaluation for the proposed Atlas Waterfront Project – Phase 4 at 3074 W Seltice Way in Coeur d'Alene, Idaho. The purpose of this evaluation was to characterize the soil and geologic conditions on the property. The attached report presents the results of the field evaluation and our recommendations to assist with design and construction of the proposed project.

We appreciate the opportunity to work with you on this project. If you have any questions or need additional information, please do not hesitate to call us at (208) 762-4721.

Sincerely,
ALLWEST Testing & Engineering, Inc.

Prepared by:

Scott Marshall, P.G.
Engineering Geologist

Reviewed by:

James Thomasson, P.E.
Senior Geotechnical Engineer

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3074 W. Seltice Way
Coeur d'Alene, Idaho

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Preliminary Geotechnical Evaluation
Atlas Waterfront Project – Phase 4
3074 W. Seltice Way
Coeur d'Alene, Idaho

ALLWEST Testing & Engineering, Inc. (ALLWEST) has completed the authorized preliminary geotechnical evaluation for the proposed Atlas Waterfront Project – Phase 4 (Phase 4) south of W. Seltice Way in Coeur D, Idaho. The general location of the project is shown on the Vicinity Map, Figure A-1, in Appendix A of this report. The purpose of the evaluation was to assess the subsurface conditions on the property with respect to the proposed conceptual construction. This report details the results of the field evaluation and laboratory testing and presents our recommendations to assist the design and construction of the proposed project.

This report was primarily prepared to provide design and construction recommendations for Phase 4. Findings and recommendations herein may contain preliminary guidance for construction but do not constitute a geotechnical evaluation report for individual lot development. Owners are encouraged to solicit the services of a licensed Geotechnical Engineer to evaluate specific single-lot conditions as they pertain to the proposed specific construction intent.

1.0 SCOPE OF SERVICES

To complete the geotechnical evaluation we accomplished the following scope of services:

1) Reviewed the USDA Natural Resources Conservation Service (NRCS) soil mapping and Idaho Geological Survey geologic mapping information for the project site area.

2) Completed a site reconnaissance by walking the property and observing exposed surface conditions including soil, vegetation, erosion, and surface drainage.

3) Performed a field evaluation by observing the excavation of test pits in the area of proposed construction. The subsurface conditions observed in the test pits were described and visually classified and the subsurface profiles were logged.

4) Performed laboratory tests on soil samples to assess some of the soil engineering characteristics.

5) Reviewed the results of the field evaluation and laboratory testing with respect to the proposed construction.

6) Performed engineering analyses and prepared recommendations to assist project planning, design, and construction.

7) Prepared this report.

Our services were provided in general accordance with ALLWEST proposal number 118-014P, dated October 23, 2018.

2.0 PROJECT DESCRIPTION

We understand the preliminary site layout will consist of small lot single-family residences with associated site improvements on the south side of Phase 4. Preliminary assumptions are that the buildings will be supported on shallow concrete spread footings. The building is expected to be lightly loaded with assumed wall loads of up to three kips per lineal foot. Site improvements will include the construction of asphalt paved parking areas and sidewalk, and a relatively tall retaining wall at the south end of Phase 4. Details regarding the retaining wall were not available. **If the building design or loads vary from the above stated we should be notified to review our recommendations.**

3.0 EVALUATION PROCEDURES

To complete this evaluation, we reviewed soil and geologic literature for the project area. The extents of the historic sand and gravel borrow pits were surveyed and staked on the ground by Welch Comer & Associates, Inc. (Welch Comer) to guide field evaluation. Previous geotechnical evaluation was completed for the site by ALLWEST Testing & Engineering, LLC dated May 8, 2014. Data from four test pits and two hollow-stem auger boring was utilized to help guide the field evaluation. We evaluated the subsurface conditions at the site by excavating six test pits in the area of the edge (staked) of the buried borrow pits to attempt to determine their subsurface location. Field exploration was limited by extensive stockpiles of debris and a 6-inch thick asphalt concrete pavement over the site. The approximate locations of the test pits are shown on Figure A-3, Borrow Pit Location Map included in Appendix A. Two test pits were excavated in the vicinity of the proposed retaining wall at the south end of Phase 4. Information obtained from the field evaluation, laboratory testing, and geotechnical analysis was utilized to develop preliminary recommendations for the geotechnical aspects of the project.

4.0 SITE CONDITIONS

The site was previously used as a lumber mill and log storage area. Phase 4 contains stockpiles of wood, topsoil, cobbles, and other various materials. The northern ¾ of the site is covered with asphalt pavement that is up to 6-inches thick. The asphalt concrete is depressed up to approximately 6-feet deep on the site in apparent response

to uncontrolled fill settlement at the site. Topographically, Phase 4 is relatively flat, but does slope to the south steeply at the south end. The site is currently vacant with some remnants of previous structures, excavations, railways and other previous site features. The site is bordered by W. Seltice Way to the north, Phase 2 to the south, Phase 3 to the east and vacant property to the west. Aerial images reviewed for the project site indicate borrow pits on the central portion of Phase 4 between approximately 1971 and 1981. The borrow pits were backfilled sometime after, and the area paved with asphalt sometime between 1998 and 2009.

4.1 GENERAL GEOLOGIC CONDITIONS

The geologic conditions on the property were mapped on the Geologic Map of the Coeur d'Alene 30 x 60 Minute Quadrangle, Idaho by Lewis, et al, 2002. The mapping indicates the geology is Channel gravel, undivided. The deposit consists of the latest Wisconsin age catastrophic flood and outwash gravel and sand deposited in channel ways cut into high energy fans and bars of Glacial Lake Missoula flood origin.

4.2 GENERAL SOIL CONDITIONS

The NRCS has mapped the soils on and around the property as McGuire-Marble association. The McGuire-Marble association is approximately 60 percent McGuire gravelly sandy loam and about 30 percent Marble sandy loam. The McGuire soil is described as very deep, somewhat excessively-drained soil formed in glacial outwash materials mixed with minor amounts of loess and volcanic ash. The permeability is estimated to be moderately rapid. Run-off is slow. The water erosion hazard is slight. The Marble soil is described as very deep, excessively-drained soil formed in wind- and water-worked sandy outwash materials. The permeability is estimated to be rapid. Run-off is slow. The water erosion hazard is slight.

4.3 HYDROGEOLOGIC CONDITIONS

The project site is underlain by the Rathdrum Prairie aquifer. We did not observe groundwater during our site evaluation. We did not observe surface water on the property. Well logs in the vicinity of the project report static groundwater depths of greater than 85 feet below ground surface. However, changes in precipitation, irrigation, construction, or other factors may impact depth to groundwater and the surface water flow on the property.

5.0 SUBSURFACE CONDITIONS

Six test pits were excavated at the site on January 9, 2019; and two test pits were excavated on December 12, 2018. The test pits were excavated with a Volvo 210 excavator with a standard soil excavation bucket. The approximate locations of the test pits are shown on Figure A-3, Borrow Pit Location Map in Appendix A. The soil conditions observed in the test pits were visually described and classified in general accordance with ASTM D2487 and D2488 and the subsurface profiles were logged.

Detailed descriptions of the soil observed in the test pits are presented on the Test Pit Logs in Appendix B of this report. The descriptive soil terms used on the 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 significantly between test pit locations. Such changes in conditions would not be apparent until construction. **If the subsurface conditions do change from those observed in the test pits, the construction timing, plans, and costs may change.**

5.1 SUBSURFACE SOIL CONDITIONS

The goal of the subsurface evaluation was to establish the approximate extents of the historic borrow pits, which for the most part are overlain by asphalt pavement and numerous stockpiles of recent construction and aggregate material debris. Soil observed in the test pits generally consisted of uncontrolled fill or wood debris underlain by native sands and gravels. At the completion of the field work most of the test pit locations were surveyed by Welch Comer. Descriptions of the soil types observed consisted of the following:

Uncontrolled fill – The uncontrolled fill was variable in composition but generally consisted of silty gravel with debris. The silty gravel with debris was observed to be brown, moist to dry, and loose. Debris was variable in abundance, and composition from concrete, wood, bark, topsoil, etc.

Wood waste – The wood waste identified as uncontrolled fill in 2014 generally consisted of decaying wood debris and bark, with variable amounts of sands and gravels. The wood waste was observed to be dark brown, moist, and loose.

Native sands and gravels – Native sands and gravels were encountered below the uncontrolled fill or wood waste. The native sands and gravels are highly variable granular aggregate. They contained varying amounts of silt and/or sand and/or gravel. It was generally observed to be brown, moist, and medium dense.

The central portion of Phase 4 is underlain by borrow pits that were backfilled with wood waste, construction debris, or sands and gravels to various depth, composition, and compaction. The approximate borrow pit edge based on direct and indirect subsurface observation in shown on Figure A-3, Borrow Pit Location Map, included in Appendix A. The subsurface test pit and boring information is coupled with surface observation that the asphalt concrete is depressed up to approximately 6-feet deep on the site in apparent response to uncontrolled fill settlement at the site. The southern boundary of the borrow pits is undetermined based on the subsurface exploration completed to date. Near the southern boundary of Phase 4, in the apparent vicinity of the proposed retaining wall, up to 14 feet of uncontrolled fill was observed in test pits TP-24 and TP-25.

5.2 GROUNDWATER CONDITIONS

Groundwater was not observed in the test pits at the time of the field evaluation. The presence of groundwater may vary with seasonal changes in precipitation, infiltration, irrigation, and other factors. We do not anticipate groundwater will be encountered to the anticipated depths to be excavated at the site.

6.0 LABORATORY TESTING

Laboratory testing was performed to supplement field classifications and to assess some of the soil engineering parameters. The laboratory testing included sieve analysis/gradation (ASTM D6913). The laboratory test results are presented in Appendix C of this report. The laboratory testing was performed by ALLWEST.

7.0 CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and recommendations are presented to assist the planning and design of the proposed Phase 4 development. The recommendations are based on our understanding of the conceptual proposed construction, the conditions observed in the test pits, and engineering analyses. **If the scope of the construction changes, or if conditions are encountered during construction which are different than those described in this report, we should be notified so we can review our recommendations and provide revisions if necessary**.

7.1 PLANNING CONSIDERATIONS

Phase 4 has a significant amount of buried debris in borrow pits and construction waste stockpiles. The uncontrolled fill as borrow pit backfill appears to be up to 20 feet in thickness as observed on boring B-2. Welch Comer is utilizing a 3-dimensional mapping platform to estimate the amount of unsuitable material. The buried debris and wood waste are not considered suitable for re-use as structural fill. The area is currently planned for small lot single family.

The southern edge of Phase 4 slopes down to the south, the southwest corner has relatively thin cover of uncontrolled fill at approximately 4-feet as observed in test pit TP-5D. The south east corner of Phase 4 also slopes down and has a significant amount of uncontrolled fill at up to 14-feet as observed in test pits TP-24 and TP-4D.

Caving of the natural sand and gravel was observed during the field evaluation and should be expected within the subgrade soil across the project site. The on-site sand and gravel soil will be susceptible to caving during excavation. Construction traffic may disturb the prepared subgrade due to the low content of fines (material passing the No. 200 sieve).

7.2 SITE PREPARATION

We recommend asphalt pavement, surface organics, uncontrolled fill, wood waste, and deleterious materials be removed to expose firm, non-yielding, inorganic natural soil. The unsuitable materials onsite maybe up to 20 feet thick. Subsequent to removal of unsuitable materials, we recommend the exposed subgrade surface be scarified to a depth of eight inches, properly moisture conditioned and compacted to a minimum of 90 percent of the maximum dry density established by ASTM D1557 (modified Proctor).

7.3 EXCAVATION

Excavation of the on-site soil can be achieved with typical excavation equipment. We recommend excavations greater than four feet deep be sloped no steeper than 1.5:1 (horizontal to vertical). Alternatively, deeper excavations may be shored or braced in accordance with Occupational Safety and Health Administration (OSHA) specifications and local codes. Regarding trench wall support, the site soil is considered Type C soil according to OSHA guidelines. The contractor is responsible to provide appropriate trench wall support and/or sloping. The natural granular soils are susceptible to caving.

7.4 MATERIALS

The on-site uncontrolled fill and wood waste (borrow pit backfill) are not considered suitable for re-use as structural fill, site grading, or utility trench backfill.

The on-site natural granular soils are generally suitable for re-use as structural fill, site grading, and utility trench backfill provided the soil is free of organics, debris, other deleterious material, and material larger than six inches in size. Use of natural sand may require screening to remove larger cobbles and boulders, if encountered.

Import materials, if required, should be well-graded granular soil free of organics, debris, and other deleterious material and meet the following recommendations. Import materials should be approved by the Geotechnical Engineer prior to delivery to the site.

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

7.5 FILL PLACEMENT AND COMPACTION

Fill should be placed in lift thicknesses which are appropriate for the compaction equipment used. Typically, 8-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 density established by ASTM D1557 (modified Proctor). In wet conditions, using silty or fine-grained soil for fill may delay construction and increase costs.

7.6 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 saturated 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.

7.7 COLD WEATHER CONSTRUCTION

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.

7.8 PRELIMINARY FOUNDATION RECOMMENDATIONS

The proposed buildings may be supported on conventional spread footings bearing directly on documented structural fill or native sands and gravels, but not a combination of both, if prepared as recommended in the Site Preparation section of this report. The following preliminary recommendations are provided for foundations based on the subsurface conditions observed and the stated assumptions:

- Footings bearing on properly prepared natural sand and gravel or documented structural fill subgrade may be designed for an allowable bearing pressure of 2,500 pounds per square foot (psf). The allowable bearing pressure value may be increased by one-third to account for transient loads such as wind and seismic.

- Unless specified by project engineer or governing codes, continuous footings should be a minimum of 18 inches in width and column footings should be a minimum of 24 inches in width.

- A coefficient of friction between cast-in-place concrete and natural sand and gravel soils or structural fill of 0.45 may be used for design.

- Foundation bearing surfaces should be free of loose soil and debris.

- Footings should be embedded at least 24 inches below finished exterior ground surface and interface with natural sands and gravels or structural fill to help protect against frost action.

- We recommend backfill placed adjacent to foundation walls be placed uniformly on both sides of the foundation walls to reduce displacement of the foundation walls.

- If the previous recommendations are implemented, it is our opinion the total settlement will be less than 1-inch and differential settlement will be less than ½-inch in 30-feet.

7.9 CONCRETE SLABS

Concrete slabs-on-grade should be supported by at least four 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 D1557). The slab subgrade should be prepared as previously recommended.

We recommend consideration be given to including a moisture vapor retarder or barrier beneath concrete slab-on-grade floors to retard moisture migration through the slabs if moisture sensitive floor coverings are planned. We recommend the moisture retarder or barrier be installed per American Concrete Institute (ACI) recommendations and specifications. To protect slabs from moisture migration which may impact flooring performance, it is important to include the moisture vapor retarder or barrier as well as directing surface and subsurface water away from the slabs. In addition, concrete should have adequate time to cure prior to placing impermeable flooring.

7.10 LATERAL EARTH PRESSURES

Below-grade walls should be designed to resist lateral earth pressures. The lateral earth pressures for approved import structural fill or structural fill derived from on-site soil should be calculated using the following equivalent fluid pressures:

Condition	Equivalent Fluid Pressure Structural Fill (pcf)
At-rest	60
Active	35
Passive	300

The above values are for level backfill 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.

7.11 SEISMICITY

We anticipate the 2015 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.

The following seismic parameters were calculated using USGS U.S. Seismic Design Maps for use with the 2015 IBC. The latitude and longitude for the site were used to specify the location of the subject property. The following Site Class D seismic parameters may be used for design.

Latitude (degrees)	Longitude (degrees)	Spectral Accelerations		Site Coefficients	
		S_s	S_1	F_a	F_v
47.6998	-116.8221	0.354g	0.116g	1.517	2.338

7.12 STORM WATER AND DRAINAGE

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.

Local codes require that grass infiltration areas be sized adequately to store and infiltrate the first ½-inch of runoff from a storm event. Drywells are suitable for additional stormwater disposal at this site and should be excavated to interface with the natural

poorly-graded sand with silt and gravel stratum. Double depth drywells are considered, by the City of Coeur d'Alene, to have an assumed capacity of 1.0 cubic foot per second (cfs); single depth drywells are considered to have an assumed capacity of 0.3 cfs.

Drywells placed within structural fill on the site should have specific borehole infiltration testing to determine the suitability of the fill for dry well placement. Drywells with in the compacted structural fill should have a minimum 25 feet set back from structures and site improvements.

It has been our experience that grass infiltration areas can fail if construction traffic and/or other activities impact the infiltration area. We recommend the grass infiltration areas be constructed at the end of the project when construction activity is ending. The areas should be scarified to loosen the upper soil profile if compaction has occurred. We recommend infiltration testing be conducted at the site to verify infiltration rates.

8.0 ADDITIONAL RECOMMENDED SERVICES

We recommend ALLWEST Testing & Engineering, Inc. 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 testing services, we cannot be responsible for soil engineering related construction errors or omissions.

9.0 EVALUATION LIMITATIONS

This report has been prepared to assist the planning and design of the proposed Atlas Waterfront Project – Phase 4, south of W. Seltice Way in Coeur d'Alene, Idaho. Reliance by any party other than the addressee 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 – Vicinity Map, Phase 4 Boundary Map, Borrow Pit Location Map
Appendix B – Test Pit Logs, Unified Soil Classification System
Appendix C – Laboratory Test Results

Appendix A

Vicinity Map
Atlas Waterfront – Phase 3 Boundary
Borrow Pit Location Map

ALLWEST
Testing & Engineering

USGS TOPO - COEUR D'ALENE QUADRANGLE, 2017

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FIGURE A-1: VICINITY MAP

PROJECT:	118-014G Atlas Waterfront - Phase 4		
LOCATION:	Seltice Way, Coeur d'Alene, Idaho		
CLIENT NAME:	Welch Comer & Associates, Inc.		
DATE:	February 2019	SCALE:	N/A

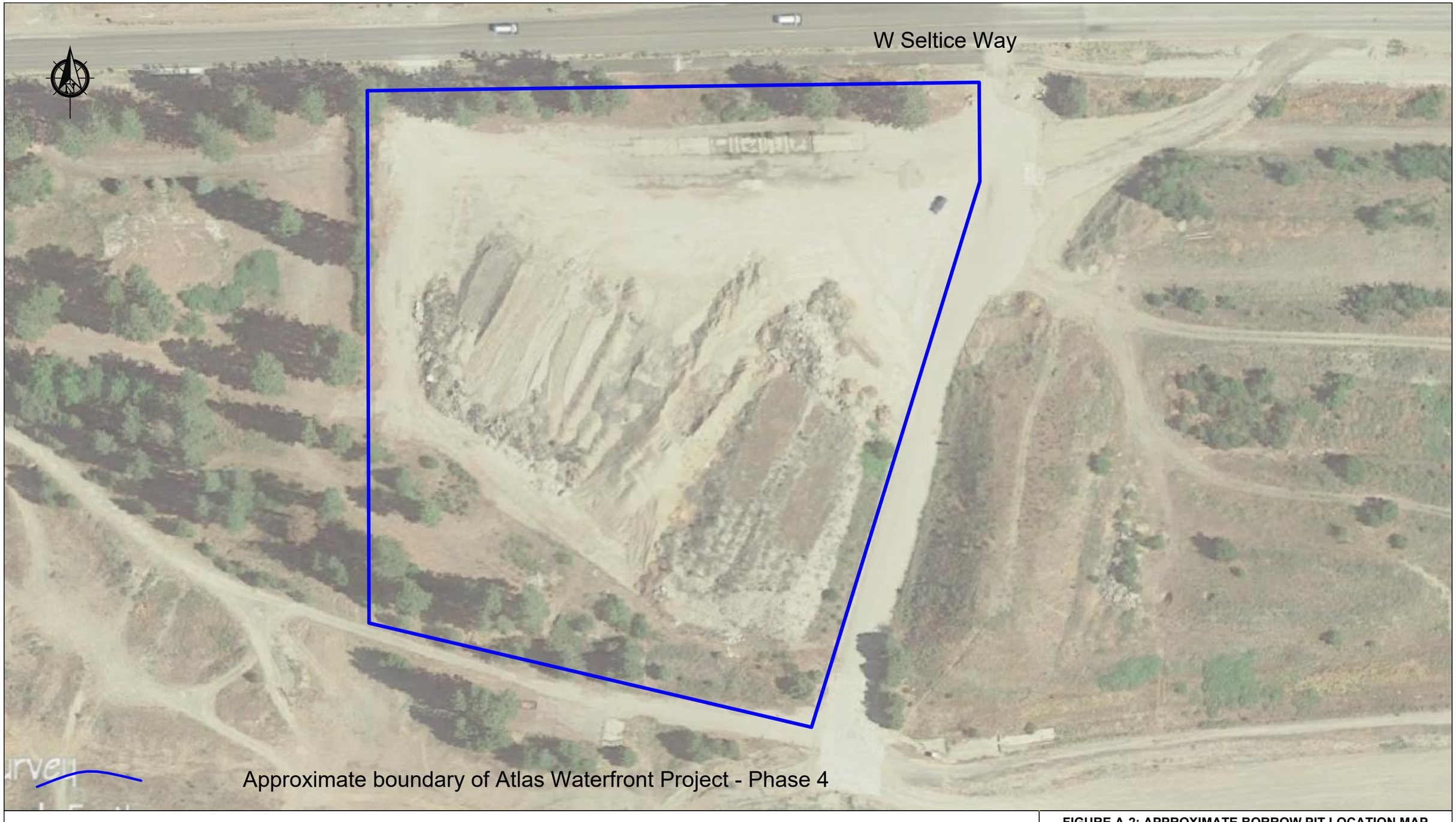

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FIGURE A-2: APPROXIMATE BORROW PIT LOCATION MAP

PROJECT:	118-014G Atlas Waterfront - Phase 4		
LOCATION:	W Seltice Way, Coeur d'Alene, Idaho		
CLIENT NAME:	Welch Comer & Associates, Inc.		
DATE:	February 2019	SCALE:	Not to Scale

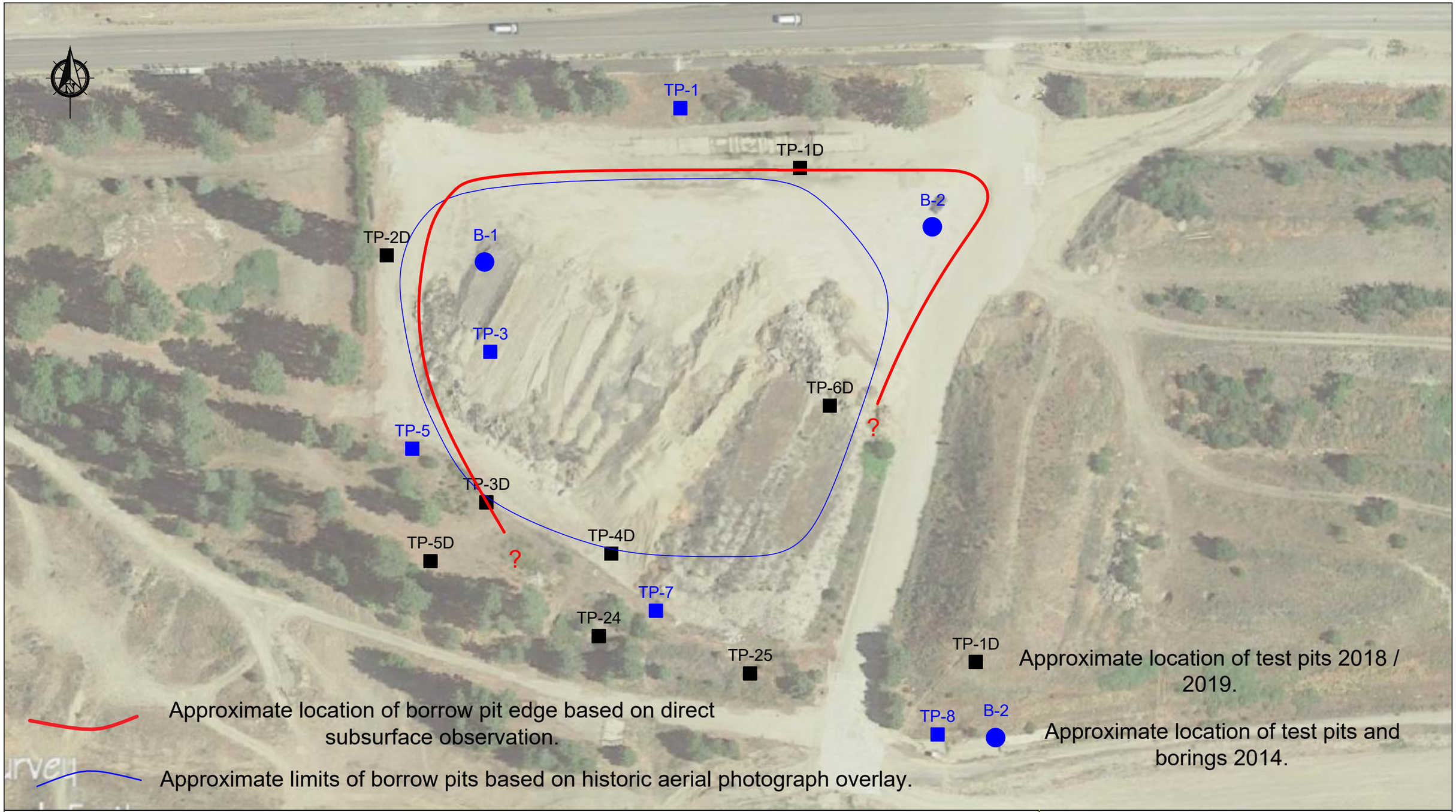

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FIGURE A-3: BORROW PIT LOCATION MAP

PROJECT:	118-014G Atlas Waterfront - Phase 4		
LOCATION:	W Seltice Way, Coeur d'Alene, Idaho		
CLIENT NAME:	Welch Comer & Associates, Inc.		
DATE:	February 2019	SCALE:	Not to Scale

Appendix B

Test Pit Logs
Unified Soil Classification System

ALLWEST TESTING & ENGINEERING, INC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 1/9/2019
DATE FINISHED: 1/9/2019
OPERATOR: Walt Bullard
COMPANY:
ENGINEER: Scott Marshall
WEATHER: Freezing Rain

TEST PIT TP-1D

EXCAVATOR: Volvo 210 Excavator
EXCAVATION METHOD: Toothed Excavation Bucket

PROJECT: 118-014G Atlas Waterfront Project - Phase 4

NOTES: Refer to Figure A-3 for approximate location.

\- Elevation: 2,189.5

TOTAL DEPTH: 14'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES
0	ASPHALT	Asphalt concrete			
1	GM	Uncontrolled fill: silty GRAVEL with wood debris, dark brown, moist, loose. Organic odor.			
10	SP	Native: poorly-graded SAND with gravel, brown, moist, medium dense.			Interpreted as borrow pit edge.
14		Test pit TP-1D terminated at 14 feet No groundwater observed. Minor caving.			

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING, INC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 1/9/2019
DATE FINISHED: 1/9/2019
OPERATOR: Walt Bullard
COMPANY:
ENGINEER: Scott Marshall
WEATHER: Freezing Rain

TEST PIT TP-2D

EXCAVATOR: Volvo 210 Excavator
EXCAVATION METHOD: Toothed Excavation Bucket

PROJECT: 118-014G Atlas Waterfront Project - Phase 4

NOTES: Refer to Figure A-3 for approximate location.

\- Elevation: 2,195.1

TOTAL DEPTH: 14'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES
0	ASPHALT	Asphalt concrete			
1	SM	Native: silty SAND with gravel, brown, moist, medium dense.			
10	SP-SM	Native: poorly-graded SAND with silt and gravel, brown, moist, medium dense.			
14		Test pit TP-2D terminated at 14 feet No groundwater observed. Minor caving.			

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING, INC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 1/9/2019
DATE FINISHED: 1/9/2019
OPERATOR: Walt Bullard
COMPANY:
ENGINEER: Scott Marshall
WEATHER: Freezing Rain

TEST PIT TP-3D

EXCAVATOR: Volvo 210 Excavator
EXCAVATION METHOD: Toothed Excavation Bucket

PROJECT: 118-014G Atlas Waterfront Project - Phase 4

NOTES: Refer to Figure A-3 for approximate location.

\- Elevation: 2,187.3

TOTAL DEPTH: 15'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES
0	GM	Uncontrolled fill: silty GRAVEL with debris, brown, moist, loose. Debris of wood, concrete and steel.			
10	GW	Native: well-graded GRAVEL with sand, brown, moist, medium dense.			Interpreted as borrow pit edge.
15		Test pit TP-3D terminated at 15 feet No groundwater observed. Minor caving.			

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING, INC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 1/9/2019
DATE FINISHED: 1/9/2019
OPERATOR: Walt Bullard
COMPANY:
ENGINEER: Scott Marshall
WEATHER: Freezing Rain

TEST PIT TP-4D

EXCAVATOR: Volvo 210 Excavator
EXCAVATION METHOD: Toothed Excavation Bucket

PROJECT: 118-014G Atlas Waterfront Project - Phase 4

NOTES: Refer to Figure A-3 for approximate location.

\- Elevation: 2,186.1

TOTAL DEPTH: 18'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES
0	ASPHALT	Asphalt concrete.			
1	GM	Uncontrolled fill: silty GRAVEL with debris, mottled black and brown, moist, loose.			
14	GW	Native: well-graded GRAVEL with sand, brown, moist, medium dense.			
18		Test pit TP-4D terminated at 18 feet No groundwater observed. Caving.			
20					

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING, INC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 1/9/2019
DATE FINISHED: 1/9/2019
OPERATOR: Walt Bullard
COMPANY:
ENGINEER: Scott Marshall
WEATHER: Freezing Rain

TEST PIT TP-5D

EXCAVATOR: Volvo 210 Excavator
EXCAVATION METHOD: Toothed Excavation Bucket

PROJECT: 118-014G Atlas Waterfront Project - Phase 4

NOTES: Refer to Figure A-3 for approximate location.

\- Elevation: 2,186.9

TOTAL DEPTH: 12'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES
0	GM	Uncontrolled fill: silty GRAVEL with cobble, moist to dry, loose. Minor inorganic debris.			
4	SM	Topsoil: silty SAND, dark brown, moist, loose. Roots and organics.			
5	GW	Native: well-graded GRAVEL with sand, brown, moist, medium dense.			
12		Test pit TP-5D terminated at 12 feet No groundwater observed. Minor caving.			
20					

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING, INC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 1/9/2019
DATE FINISHED: 1/9/2019
OPERATOR: Walt Bullard
COMPANY:
ENGINEER: Scott Marshall
WEATHER: Freezing Rain

TEST PIT TP-6D

EXCAVATOR: Volvo 210 Excavator
EXCAVATION METHOD: Toothed Excavation Bucket

PROJECT: 118-014G Atlas Waterfront Project - Phase 4

NOTES: Refer to Figure A-3 for approximate location.

\- Elevation: 2,186.4

TOTAL DEPTH: 6'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES
0	BLDRCBBL	Uncontrolled fill: cobble and boulders, moist, loose. Minor inorganic debris.			
6	ASPHALT	Asphalt concrete.			
7		Test pit TP-6D refusal at 6 feet No groundwater observed. Minor caving.			

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING, INC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 12/12/2018
DATE FINISHED: 12/12/2018
OPERATOR: Unknown
COMPANY:
ENGINEER: Kody Foote
WEATHER: Clear

TEST PIT TP-24

EXCAVATOR: Volvo 210 Excavator
EXCAVATION METHOD: Soil Excavation Bucket

PROJECT: 118-014G Atlas Waterfront - Phase 1

NOTES: Refer to Figure A-3 for approximate location.

\- WP-594, Elevation 2,180.4

TOTAL DEPTH: 14'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES
0	GP	Uncontrolled fill: Poorly-graded silty GRAVEL with boulders, concrete, wood, topsoil and roots, mottled brown-gray-black, dry, loose.			
9	GP-GM	Native: Poorly-graded GRAVEL with silt and sand, brown, moist, medium dense.			
14		Test pit TP-24 terminated at 14 feet No groundwater observed. Caving.			

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING, INC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 12/12/2018
DATE FINISHED: 12/12/2018
OPERATOR: Unknown
COMPANY:
ENGINEER: Kody Foote
WEATHER: Clear

TEST PIT TP-25

EXCAVATOR: Volvo 210 Excavator
EXCAVATION METHOD: Soil Excavation Bucket

PROJECT: 118-014G Atlas Waterfront - Phase 1

\- WP-595

NOTES: Refer to Figure A-3 for approximate location.

DEPTH (ft)	USCS	TOTAL DEPTH: 16' DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES
0	GP-GM	Uncontrolled fill: Poorly-graded GRAVEL with silt, logs, bark, cobbles, steel pipe and topsoil, mottled brown-black, moist, loose.			
14	GP-GM	Native: Poorly-graded GRAVEL with silt and sand, brown, moist, medium dense.			
16		Test pit TP-25 terminated at 16 feet No groundwater observed. Caving.			

WATER LEVELS
▽ WHILE EXCAVATING
▼ AT COMPLETION
▼ AFTER EXCAVATING

ALLWEST TESTING & ENGINEERING, LLC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG

DATE STARTED: 4/8/2014
DATE FINISHED: 4/8/2014
DRILLER: Jarod Willard
COMPANY: Haztech
ENGINEER: Sean Brady
WEATHER: Sunny, 60's

BORING B-1

DRILL: B-81
HAMMER: Automatic
DRILLING METHODS: 8" Hollow Stem Auger

PROJECT: Stimson Mill Site

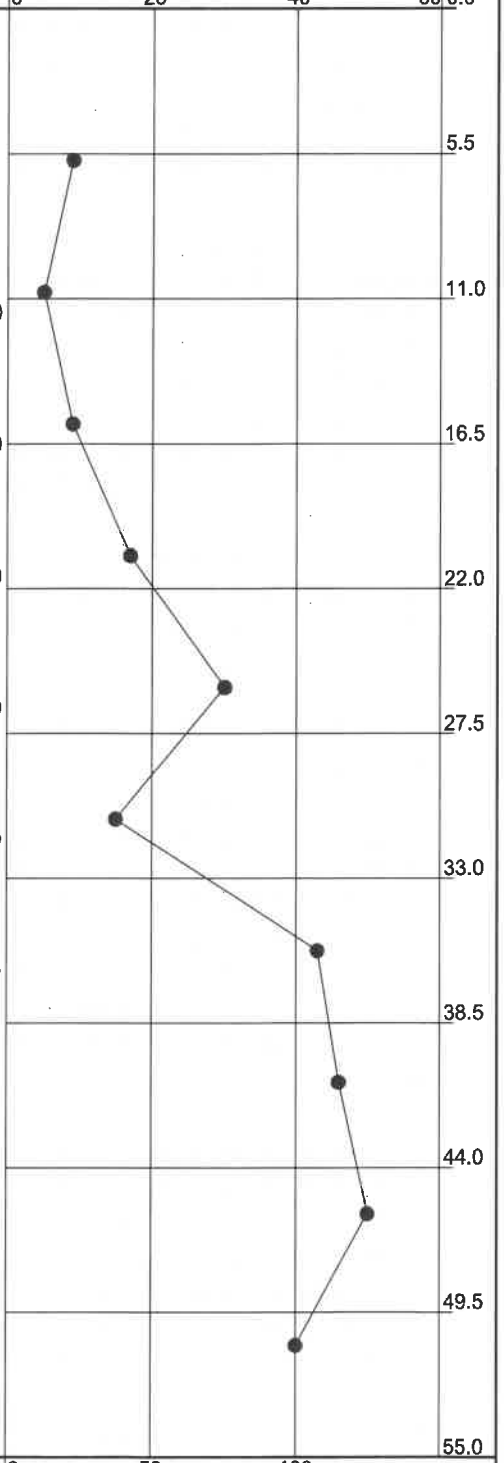
NOTES:

STATION, OFFSET:

LATITUDE (DEGREES): N 47°42'0.63" (47.700175°)
LONGITUDE (DEGREES): W -116°49'21.4464" (-116.822624°)

TOTAL DEPTH: 51.5'

DEPTH (ft)	USCS	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery)
0.0				
0.5	FILL	ASPHALT; good condition, black. UNCONTROLLED FILL; silty gravel with sand; organics, appeared moderately compacted, brown, dry to moist.		
5.0	FILL	UNCONTROLLED FILL; silty sand with gravel mixed with wood shavings/chips; poorly compacted, black, moist to wet.	B-1@5	4-4-5 (9" = 50%)
			B-1@10	2-2-3 (10" = 56%)
15.0	SW-SM	Well-graded SAND with silt and gravel; medium dense to dense, gray, dry.	B-1@15	3-5-4 (10" = 56%)
			B-1@20	2-8-9 (11" = 61%)
			B-1@25	8-14-16 (13" = 72%)
		Lens of fine grained sand, orange, moist to wet.	B-1@30	7-9-6 (15" = 83%)
		Gravel layer.	B-1@35	14-19-24 (17" = 94%)
40.0	GP-GM	Poorly-graded GRAVEL with silt and sand; subangular to rounded gravel, dense, gray, dry.	B-1@40	14-23-23 (14" = 78%)
			B-1@45	20-28-22 (12" = 67%)
51.5		Bottom of boring B-1 at approximately 51 1/2 feet below ground surface. No ground water encountered.	B-1@50	8-16-24 (12" = 67%)



WATER LEVELS
Dry ▽ WHILE DRILLING
Dry ▽ AT COMPLETION
Dry ▽ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING, LLC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

BORING LOG

DATE STARTED: 4/8/2014
DATE FINISHED: 4/8/2014
DRILLER: Jarod Willard
COMPANY: Haztech
ENGINEER: Sean Brady
WEATHER: Sunny, 60's

BORING B-2

DRILL: B-81
HAMMER: Automatic
DRILLING METHODS: 8" Hollow Stem Auger

PROJECT: Stimson Mill Site

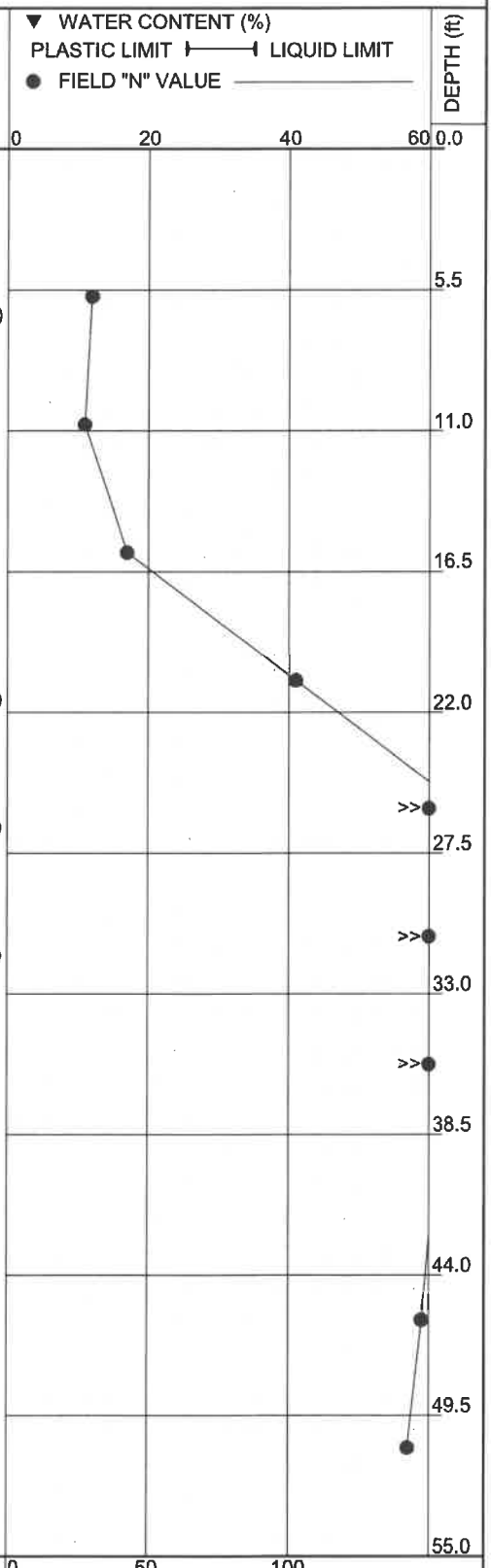
NOTES:

STATION, OFFSET:

LATITUDE (DEGREES): N 47°42'0.1764" (47.700049°)
LONGITUDE (DEGREES): W -116°49'15.7224" (-116.821034°)

TOTAL DEPTH: 51.5'

DEPTH (ft)	USCS	DESCRIPTION	SAMPLE #	FIELD BLOW COUNT (Recovery)
0.0				
0.5	FILL	ASPHALT; good condition, black. UNCONTROLLED FILL; silty gravel; organics, appeared moderately compacted, brown, dry to moist.		
5.5	FILL	UNCONTROLLED FILL; wood shavings/chips; poorly compacted, orange, moist.	B-2@5	7-6-6 (11" = 61%)
			B-2@10	6-5-6 (6" = 33%)
			B-2@15	4-9-8 (7" = 39%)
20.0	GP-GM	Poorly-graded GRAVEL with silt and sand; subangular to rounded gravel, dense to very dense, gray, dry.	B-2@20	6-20-21 (16" = 89%)
			B-2@25	19-34-31 (14" = 78%)
			B-2@30	20-40-27 (12" = 67%)
			B-2@35	16-30-32 (9" = 50%)
			B-2@40	50/2" (0" = 0%)
			B-2@45	11-35-24 (13" = 72%)
51.5		Bottom of boring B-2 at approximately 51 1/2 feet below ground surface. No ground water encountered.	B-2@50	8-30-27 (15" = 83%)



WATER LEVELS
Dry ▽ WHILE DRILLING
Dry ▼ AT COMPLETION
Dry ▼ AFTER DRILLING

Hollow Stem Auger
2" OD Split Spoon (SPT)

ALLWEST TESTING & ENGINEERING, LLC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 4/16/2014
DATE FINISHED: 4/16/2014
OPERATOR: Casey
COMPANY: Alamo Excavting
ENGINEER: Sean Brady
WEATHER: Raining, 50's

TEST PIT TP-1

EXCAVATOR: John Deere 120C
EXCAVATION METHOD: Soil Excavation Bucket

PROJECT: Stimson Mill Site

STATION, OFFSET:

NOTES:

DEPTH (ft)	USCS	TOTAL DEPTH: 6' DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0	TOPSOIL	TOPSOIL; silty sand with gravel; appeared loose, dark brown, moist. Surface organics and roots observed throughout.				0.0
1.0	SW-SM	Well-graded SAND with silt and gravel; appeared loose to medium dense, brown, moist. Caving of sidewalls.				1.0
6.0		Bottom of test pit TP-1 at approximately 6 feet below ground surface. No ground water encountered.				6.0

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

ALLWEST TESTING & ENGINEERING, LLC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 4/16/2014
DATE FINISHED: 4/16/2014
OPERATOR: Casey
COMPANY: Alamo Excavting
ENGINEER: Sean Brady
WEATHER: Raining, 50's

TEST PIT TP-3

EXCAVATOR: John Deere 120C
EXCAVATION METHOD: Soil Excavation Bucket

PROJECT: Stimson Mill Site

NOTES:

STATION, OFFSET:

TOTAL DEPTH: 12'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0						0.0
		ASPHALT; good condition, black.				
0.7	FILL	UNCONTROLLED FILL; silty gravel with sand; appeared moderately compacted, brown, dry to moist.				0.7
2.0	FILL	Geotextile Fabric. UNCONTROLLED FILL; silty sand with gravel; organics, appeared poorly compacted, black, moist.				2.0
4.0	WOOD	UNCONTROLLED FILL; wood shavings/chips; appeared poorly compacted, brown, moist.				4.0
12.0		Bottom of test pit TP-3 at approximately 12 feet below ground surface. No ground water encountered.				12.0

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

ALLWEST TESTING & ENGINEERING, LLC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 4/16/2014
DATE FINISHED: 4/16/2014
OPERATOR: Casey
COMPANY: Alamo Excavting
ENGINEER: Sean Brady
WEATHER: Raining, 50's

TEST PIT TP-5

EXCAVATOR: John Deere 120C
EXCAVATION METHOD: Soil Excavation Bucket

PROJECT: Stimson Mill Site

STATION, OFFSET:

NOTES:

TOTAL DEPTH: 10'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0	FILL	UNCONTROLLED FILL; silty sand with gravel; organics, appeared poorly compacted, black, moist.				0.0
2.0	FILL	UNCONTROLLED FILL; silty sand with gravel; appeared moderately compacted, brown, dry to moist.				2.0
2.5	GP-GM	Poorly-graded GRAVEL with silt and sand; appeared medium dense, blue/green, moist.				2.5
3.0	SW-SM	Well-graded SAND with silt and gravel; appeared loose to medium dense, brown, moist. Rounded cobbles and boulders up to 24 inches observed. Caving of sidewalls.		S114-243	40% retained on #4 sieve 6.8% passing #200 sieve 6.8% moisture content	3.0
10.0		Bottom of test pit TP-5 at approximately 10 feet below ground surface. No ground water encountered.				10.0

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

ALLWEST TESTING & ENGINEERING, LLC.
HAYDEN, IDAHO
GEOTECHNICAL SECTION

TEST PIT LOG

DATE STARTED: 4/16/2014
DATE FINISHED: 4/16/2014
OPERATOR: Casey
COMPANY: Alamo Excavting
ENGINEER: Sean Brady
WEATHER: Raining, 50's

TEST PIT TP-7

EXCAVATOR: John Deere 120C
EXCAVATION METHOD: Soil Excavation Bucket

PROJECT: Stimson Mill Site

STATION, OFFSET:

NOTES:

TOTAL DEPTH: 12'

DEPTH (ft)	USCS	DESCRIPTION	GRAPHIC LOG	SAMPLE #	NOTES	DEPTH (ft)
0.0	FILL	UNCONTROLLED FILL; silty sand with gravel; organics, appeared poorly compacted, black, moist.				0.0
2.0	FILL	Geotextile Fabric UNCONTROLLED FILL; silty gravel with sand; organics, appeared moderately compacted, gray, moist. Sub-rounded to rounded cobbles and boulders up to 24 inches. Trash and organics observed throughout.		TP-7 @ 4	Bulk sample obtained.	2.0
6.0	SW-SM	Well-graded SAND with silt and gravel; appeared loose, gray to brown, moist. Caving of sidewalls.				6.0
12.0		Bottom of test pit TP-7 at approximately 12 feet below ground surface. No ground water encountered.				12.0

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

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.

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Appendix C

Laboratory Test Results

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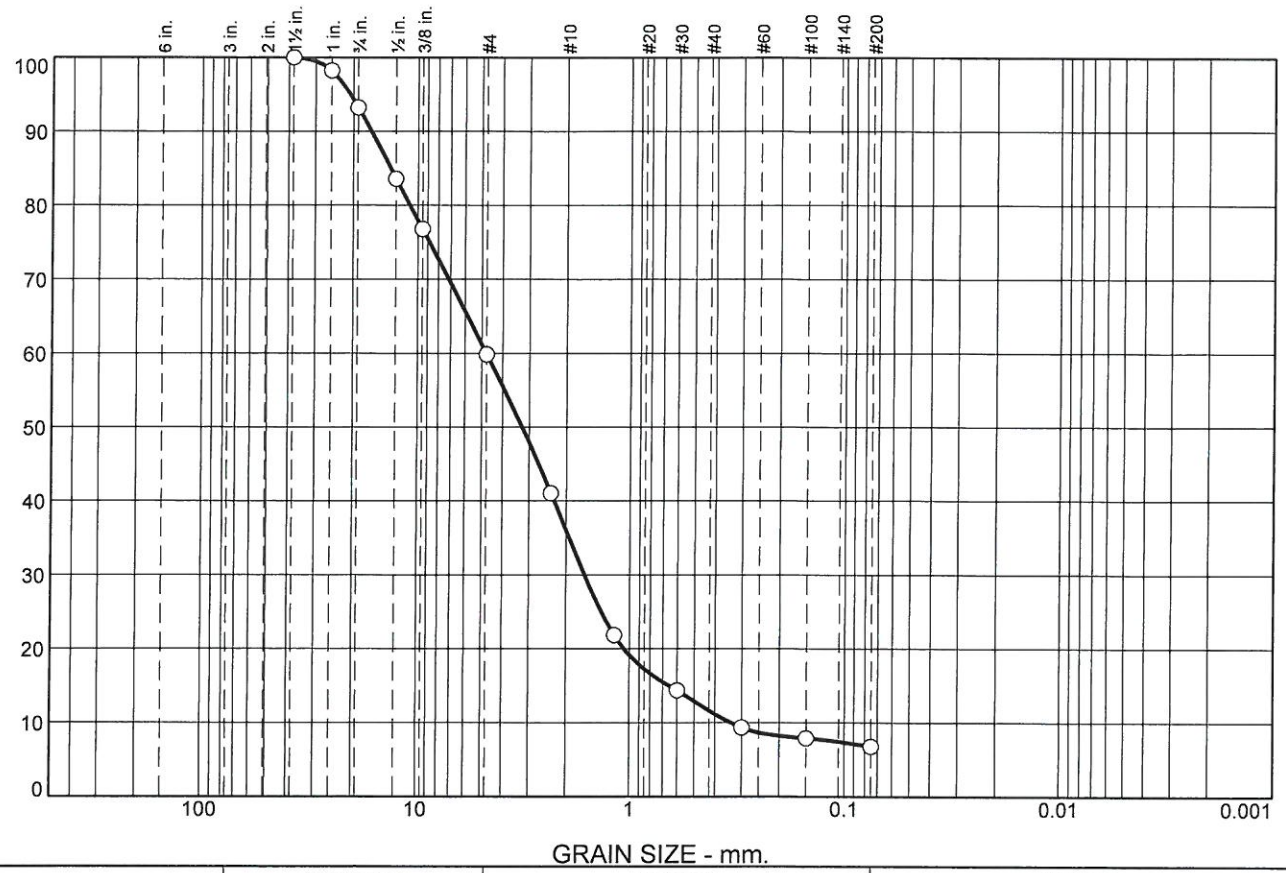
Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0	7	33	24	24	5	7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1-1/2"	100		
1"	98		
3/4"	93		
1/2"	84		
3/8"	77		
#4	60		
#8	41		
#16	22		
#30	14		
#50	9		
#100	8		
#200	6.8		

* (no specification provided)

Material Description

well-graded sand with silt and gravel

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 16.5296 D_{85}= 13.4628 D_{60}= 4.7731
D_{50}= 3.2391 D_{30}= 1.6357 D_{15}= 0.6516
D_{10}= 0.3370 C_u= 14.16 C_c= 1.66

Classification

USCS= SW-SM AASHTO= A-1-a

Remarks

Sampled By: S. Brady
Sample Date: 4/16/14
Moisture Content: 6.8%

Location: TP-5
Sample Number: S114-243 **Depth:** -6.0' **Date:** 4/30/14

ALLWEST TESTING & ENGINEERING Hayden, ID

Client: Abundant Land Partners
Project: Stimpson Mill Site
Project No: 114-094G **Checked By:**

Tested By: Kyle Ferguson WAQTC# 22305 **Checked By:** Chris McKissen WAQTC# 20561

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