GEOTECHNICAL SUPPLEMENT NO. 1: STORMWATER INFILTRATION

Central Kitsap High School and Middle School Redevelopment

10130 Frontier Place NW and 3700 NW Anderson Hill Road

Silverdale, Washington

Prepared for:

Central Kitsap School District #401
Jean-Wright Administration Center
9210 Silverdale, Washington 98383

Prepared by:

Amec Foster Wheeler Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, Washington 98011

March 10, 2017

Project No. 6-917-18096-0

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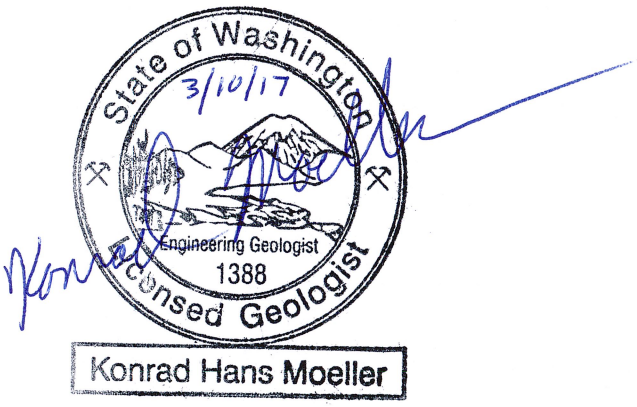

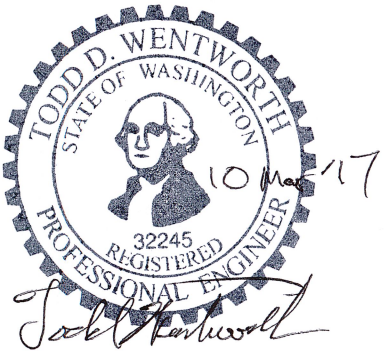

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EXECUTIVE SUMMARY

Amec Foster Wheeler Environment & Infrastructure, Inc., is please to submit this Geotechnical Supplemental No.1: Stormwater Infiltration report to Central Kitsap School District (CKSD) describing the results of groundwater measurements and infiltration testing for the Central Kitsap High School and Middle School redevelopment project. We previously completed a geotechnical engineering evaluation for the redevelopment titled *Preliminary Geotechnical Engineering Report, Central Kitsap High School and Middle School Campus Redevelopment,* dated October 18, 2016. The purpose of this supplement is to estimate infiltration rates for use in the design of infiltration facilities proposed for the redevelopment project. This executive summary is presented for introductory purposes and should be used only in conjunction with the full text of this report.

Project Description: The redevelopment plans provided call for construction of three infiltration ponds and one wet pond on the west side of the site near NW Anderson Hill Road. The ponds will be located at the existing Alternative High School Building (north infiltration pond), Science Building (central infiltration pond), and high school staff parking lot (south infiltration pond).

Summary of Infiltration Pond Results and Recommendations: Based on the soil and groundwater conditions encountered and results of pilot infiltration tests (PITs) completed at each location, we arrived at the following conclusions:

- North infiltration pond – Results of PITs, laboratory testing, and engineering analysis indicate infiltration is feasible using a long-term design infiltration rate of 1 inch per hour. The vertical groundwater separation of the pond base and highest groundwater reading from observation well OW-3 at the pond is 11 feet. Laboratory testing results for samples of soil underlying the pond showed organic content of 0.5 and 1.1 percent and cation exchange capacity (CEC) of 1.9 and 6.7 milliequivalents per 100 grams (meq/100 g). Fill was encountered to depths of 8.5 feet below the ground surface near the pond southwest corner. Because this pond is situated next to the top of a steep slope, we have recommended constructing a fill embankment to decrease the risk of seepage on the slope below the pond.
- Central infiltration pond – Results of PITs, laboratory testing, and engineering analysis indicate slow infiltration at this location, resulting in a long-term design infiltration rate of 0.16 inch per hour. The vertical groundwater separation of the pond base and highest groundwater reading from OW-1 just west of the pond is 5.5 feet. Laboratory testing results for a sample of the soil underlying the pond showed an organic content of 0.7 percent and a CEC of 1.2 meq/100g. Fill was encountered to 14 feet below the ground surface near the pond northwest corner. If fill is present at the pond subgrade, the fill should be overexcavated until the Advance Outwash soils are exposed.

- South infiltration pond – Results of PITs, laboratory testing, and engineering analysis indicate infiltration is feasible using a long-term design infiltration rate of 0.84 inch per hour. The vertical groundwater separation of the pond base and highest groundwater reading from observation well OW-2 at the pond is 4.5 feet. Laboratory testing of a sample of the soil underlying the pond showed an organic content of 0.7 percent and CEC of 2.6 meq/100g.

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GEOTECHNICAL SUPPLEMENT NO. 1: STORMWATER INFILTRATION

Central Kitsap High School and Middle School Redevelopment
Silverdale, Washington

1.0 PROJECT DESCRIPTION

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), is pleased to submit this supplemental report describing the results of groundwater measurements and infiltration testing for the Central Kitsap High School and Middle School Redevelopment project located in Silverdale, Washington. The purpose of our testing was to recommend an appropriate infiltration rate to be used in design of infiltration facilities planned for campus redevelopment, as shown on the enclosed Site Location Map (Figure 1). We previously completed a preliminary geotechnical engineering evaluation for the development (Amec Foster Wheeler, 2016). After completing our preliminary work, Central Kitsap School District (CKSD) requested additional exploration, infiltration testing, and analysis to estimate long-term design infiltration rates for proposed stormwater infiltration facilities. Additional subsurface explorations, infiltration testing, and analysis for long-term infiltration rates were completed in general accordance with requirements outlined in the Kitsap County Stormwater Manual, 2010 edition (Kitsap County, 2010), as requested by the project civil engineering firm, AHBL.

The current infiltration facility design is composed of three infiltration ponds and one wet pond. The proposed infiltration ponds are located at the existing Alternative High School Building (north infiltration pond), the existing Science Building (central infiltration pond), and the current high school staff parking lot (south infiltration pond) (Figure 2). The civil plans we received on March 2, 2017 call for the following design infiltration depths and surface areas:

- North infiltration pond: 7 feet below final grade (elevation 119 feet), with a base surface area of 25,379 square feet (sq.ft.);
- Central infiltration pond: 8 feet below final grade (elevation 113 feet), with a pond base area of 6,021 sq.ft; and
- South infiltration pond: varies from 7 to 9 feet below final grade (elevation 102 to 104 feet), with a base surface area of 13,348 sq.ft.

This study evaluated the subsurface conditions at all three infiltration pond locations. Our study did not include any subsurface evaluation or engineering for the planned wet pond.

As outlined in our proposals dated October 20, 2016, and February 14, 2017, our scope of work for this study included drilling soil borings, well installation, excavation of test pits, pilot infiltration tests (PITs), laboratory testing, data interpretation, and report preparation. To evaluate the subsurface soil and infiltration conditions at each infiltration pond location, we conducted four large-ring in situ PITs, designated IT-1 through IT-4. Two PITs were completed at the north infiltration pond, and one PIT each was completed at the south and central infiltration ponds.

The field work was performed on December 7, 2016, December 21 through 23, 2016, and February 20, 2017. Prior to, during, and after completing our field work, AHBL redesigned the infiltration facility multiple times. The exploration locations and testing were based on the infiltration pond locations, depths, and sizes provided by AHBL prior to our field work, and some of the locations were adjusted as the design progressed. The design infiltration facilities based on civil drawings received on March 2, 2017 are illustrated in the attached site and exploration plan (Figure 2).

2.0 SUBSURFACE SOIL CONDITIONS

The published geologic map for the site vicinity (Polenz et al., 2013) shows the infiltration facility area to be in or near the demarcation line separating Possession Advance Outwash (Qgap) on the western portion of the site and Pleistocene Vashon Lodgment Till (Qgt) on the east side of the site. Our explorations encountered both Possession Advance Outwash and Vashon Lodgment Till soils. For the purpose of this report, the Vashon Lodgment Till will be referred to as *Glacial Till* or *Sandy Glacial Till* and the Possession Advance Outwash will be referred to as *Advance Outwash*. All Advance Outwash encountered in this study contained thin layers or lenses of very dense silty sand or hard silt at variable depths.

In general, our explorations encountered fill over Glacial Till at the north and central ponds, and fill over Advance Outwash at the south pond. The approximate locations of our exploration borings, test pits, and infiltration pits are shown on Figure 2. This section summarizes the subsurface soil conditions encountered at each infiltration pond location.

2.1 North Infiltration Pond – Alternative High School Building

Boring B-8 and test pit IT-2 (PIT excavation) were advanced in the east side of the infiltration pond, and boring OW-3 and test pit IT-3 were advanced in or near the southwest corner of the pond. Boring B-8 and test pit IT-2 encountered 1 to 2 feet of fill over Sandy Glacial Till. The Sandy Glacial Till was composed of medium dense to very dense silty sand or gravelly silty sand. Underlying the Sandy Glacial Till was Advance Outwash at a depth of 8.5 feet below ground surface (bgs) (elevation 118.5 feet). The Advance Outwash was composed of dense to very dense sand with interbedded hard silt or very dense silty sand lenses. OW-3 and IT-3 encountered 7 to 8.5 feet of fill over Sandy Glacial

Till composed of dense and very dense silty sand. Boring OW-3 extended past the Sandy Glacial Till into the Advance Outwash at 13 feet bgs. The Advance Outwash was composed of dense sand containing some interbedded lenses of gravel and silt.

2.2 Central Infiltration Pond – Science Building

Test pit TP-1 and IT-4 (PIT excavation) were advanced in the pond footprint and encountered 4 to 5 feet of fill over Advance Outwash. The Advance Outwash was composed of dense to very dense sand and gravel with interbedded lenses of silty sand. Boring OW-1, advanced near the pond west side, encountered 14 feet of fill. Underlying the fill was Advance Outwash composed of dense to very dense sand to the extent of the boring. Four borings (B-1 through B-4) were previously advanced in 1994 in the pond vicinity, and boring B-11 was advanced east of the pond southeast corner in August 2016. These previous explorations confirm our recent findings and correlate with the soil units we encountered. The previous borings indicate that the thickness of fill varies across the site and that Glacial Till with increased fines content are present at the east and southeast area of the site.

2.3 South Infiltration Pond – High School Staff Parking Lot

Borings B-15 and OW-2 and test pit IT-1 (PIT excavation) encountered 1 to 3.5 feet of fill. Underlying the fill was Advance Outwash composed of dense to very dense sand with interbedded lenses of silty sand. In boring B-15, no silty sand lenses were encountered, indicating the silty sand lenses encountered in IT-1 and OW-2 were isolated deposits.

2.4 Laboratory Test Results

Geotechnical laboratory test results indicate the Sandy Glacial Till has a fines content of 21 to 27 percent, and the Advance Outwash fines content varied between 1 and 18 percent. Table 1 summarizes the geotechnical testing results. Boring logs and test pit logs are included in Appendix A, and complete grain size distribution test results are presented in Appendix B. The boring logs and lab test results provide a detailed description of the soil strata. The soil stratigraphy adjacent to the three proposed infiltration pond locations is shown on cross-section A-A' (Figure 3).

At each PIT location (IT-1 through IT-4), a sample was collected of the soil underlying the base of each designed infiltration pond after completing our infiltration testing. The samples were submitted for laboratory analysis of organic content and cation exchange capacity. The laboratory results are summarized in Table 2.

Table 1 Summary of Geotechnical Laboratory Test Results

Pond Location	Exploration	Sample	Depth (feet)	Soil Type	Gravel Content (%)	Sand Content (%)	Fines Content (%)	D-10 (mm)
North Pond	IT-2	G-1	9	Outwash	1	96	3	0.14
North Pond	IT-2	G-3	12.5	Silt Lens	4	25	72	0.003*
North Pond	IT-3	G-1	9	Sandy glacial till	16	60	23	0.02*
North Pond	IT-3	G-2	11.25	Sandy glacial till	14	65	21	0.03*
North Pond	B-8	S-3	11.5	Outwash	19	66	15	0.01*
North Pond	OW-3	S-2	10	Sandy glacial till	24	50	27	0.05*
North Pond	OW-3	S-4	20	Sandy glacial till	2	77	21	0.04*
North Pond	OW-3	S-6	30	Sandy glacial till	—	—	24	—
Central Pond	IT-4	G-4	3	Outwash	61	39	1	0.31
Central Pond	IT-4	G-7	13	Outwash	36	61	3	0.10
Central Pond	OW-1	S-3	16	Outwash	4	86	10	0.07*
Central Pond	OW-1	S-6	30	Outwash	7	88	5	0.12
South Pond	IT-1	G-1	7	Outwash	7	92	2	0.17
South Pond	IT-1	G-2	9.5	Outwash	—	—	18	—
South Pond	IT-1	G-3	11.5	Outwash	28	64	8	0.09
South Pond	B-15	S-4A	15.5	Outwash	4	85	11	0.06*
South Pond	B-15	S-5	21.5	Outwash	—	—	14	—
South Pond	OW-2	S-2B	11	Silt Lens	2	55	43	0.01*
South Pond	OW-2	S-3	15	Outwash	10	82	8	0.11

— = Not Tested
* = Amec Foster Wheeler estimated values based on extrapolation of laboratory data.

Table 2 Organic Content and Cation Exchange Capacity Test Results

Exploration	Sample	Pond Location	Depth (feet)	Organic Content (%)*	Cation Exchange Capacity (meq/100g)**
IT-2	G-2	North Pond – East Side	-11.5	0.5	1.9
IT-3	G-2	North Pond – West Side	-11.25	1.1	6.7
IT-4	G-1	Central Pond	-9.0	0.7	1.2
IT-1	G-2	South Pond	-9.5	0.7	2.6

* = Percent by weight. ** meq/100g = milliequivalents per 100 grams.

Test results for organic content met the Kitsap County Stormwater Manual minimum requirements of 0.5 percent. Cation exchange capacity testing results shows only sample IT-3/G-2 at the north infiltration pond southwest corner met the Kitsap County Stormwater Manual minimum requirement of 5 meq/100g.

3.0 GROUNDWATER CONDITIONS

During our preliminary geotechnical exploration in August 2016, only boring B-15 at the south infiltration pond encountered groundwater. Groundwater was encountered in boring B-15 at 18 feet bgs (elevation 91). To collect seasonal groundwater levels, three observation wells (OW-1 through OW-3) were installed near the infiltration pond locations on December 7, 2016.

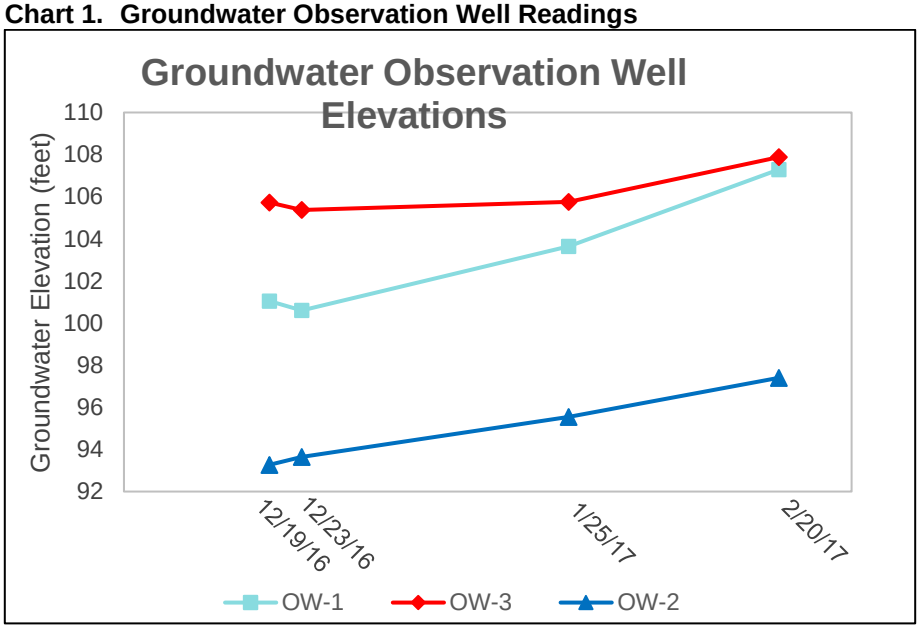
- Boring OW-3, at the north infiltration pond, encountered groundwater at 30 feet bgs (elevation 97).
- Boring OW-1, at the central infiltration pond, encountered groundwater 25 feet bgs (elevation 96).
- Boring OW-2, at the south infiltration pond, did not encounter groundwater at the time of drilling.

Within all three borings, mottling was noted on the native soil directly underlying the fill. We interpret the mottling to originate from groundwater infiltrating through the less dense fill soils, resting on the native soil horizon, and then infiltrating at a slower rate. Test Pit IT-4 at the central infiltration pond encountered groundwater seepage in the north sidewall at 7 to 8.75 feet bgs. The seepage appeared to originate from groundwater resting and infiltrating at a slower rate on the two very dense silty sand layers noted at 7.5 feet and 8.75 bgs.

From December 7, 2016, to February 20, 2017, five periodic groundwater readings were taken from OW-1 through OW-3. Based on the groundwater readings and subsurface exploration logs, the groundwater gradient at the site appears to be toward the south to southwest.

The groundwater data collected indicates 3 feet or more feet of vertical separation between the infiltration pond design base elevations and groundwater. The highest groundwater elevation readings and inferred groundwater gradient are displayed on Figure 3. Chart 1 summarizes our collected water level readings.

Chart 1. Groundwater Observation Well Readings



4.0 STEEP SLOPE EVALUATION

As a general guideline to prevent seepage on the face of slopes, the ponds should be set back from the top of steep slopes a horizontal distance equal to the vertical height of the slope, as referenced in the Kitsap County Stormwater Manual (Section 7.3.4.1.N). This guideline is appropriate for slopes that are 30 percent or flatter. Additionally, the level bench at the top of the slope should have a minimum width of 6 feet, but may need to be wider to provide an adequate setback distance.

Directly to the west and southwest of the north infiltration pond, the existing slope dips downward toward NW Anderson Hill Road, with a maximum slope of 55 percent for the first 10 vertical feet, and thereafter a reduced slope of approximately 11 percent. Geologic Cross-Section B-B' (Figure 4) illustrates the slope at the infiltration pond southwest corner. Although slope stability is not a concern, there is a risk of water infiltrating from the pond and seeping out onto the face of the slope. For this reason, we recommend constructing a fill embankment on the slope in order to increase the separation between the pond and the face of the slope, and flatten the slope. We understand that AHBL has revised the grading plans in this manner to mitigate the risk of seepage on the slope.

At the south side of the central pond, a steep cut slope is proposed between the pond and the regraded access drive. We understand that AHBL revised the pond location and grading according to these recommendations to mitigate the risk of seepage on the slope.

If utility trenches descend steep slopes, such as pond outfall pipes, anti-seepage diaphragms should be installed to reduce seepage through the trench backfill. The anti-seepage diaphragms should consist of concrete or controlled density fill that is at least 1 foot thick (in line with the pipe) and extends at least 1 foot beyond the trench bottom and sidewalls. We recommend installing at least one anti-seepage diaphragm every 100 feet along a trench that is on a steep slope (greater than 15 percent per Kitsap County requirements).

5.0 INFILTRATION TESTING METHOD

We conducted four PITs, designated IT-1 through IT-4, at the proposed location of the infiltration ponds at the time of testing. We conducted IT-1 in the south infiltration pond footprint and IT-2 and IT-3 in the north infiltration pond footprint from December 21 through 23, 2016. When the central infiltration pond was added to the infiltration facility, we completed PIT IT-4 in the infiltration pond footprint on February 20, 2017.

Our large-scale infiltration tests were performed in general accordance with the PIT methodology described in the *Kitsap County Stormwater Design Manual,* Chapter 7.3 and Appendix 7-B (Kitsap County, 2010). The *Kitsap County Stormwater Design Manual* also references testing procedures from the Washington State Department of Ecology (Ecology, 2005). As discussed in both referenced stormwater manuals, large-scale infiltration testing provides a more representative indicator of infiltration facility performance than smaller test methods. However, because of the large area required to perform a PIT, coupled with site restrictions and existing structures, we selected the large-diameter, single-ring percolation PIT to determine site infiltration rates. Prior to starting in situ infiltration testing (IT-1 through IT-4), AHBL provided the infiltration pond locations and design infiltration elevations. Our PIT testing method is described in Appendix C.

6.0 DESIGN INFILTRATION RATES AND TESTING DATA

Amec Foster Wheeler calculated the long-terms design infiltration rates for each of the four infiltration ponds using in situ infiltration testing data following methods specified in the 2010 Kitsap County Stormwater Manual, Section 7.3.4.1.C “General Requirements for Infiltration Facilities – Design Infiltration Rates” and design guidelines specified in Chapters 3.3.5 and 3.3.9 of Volume III of the 2005 Department of Ecology *Stormwater Manual for Western Washington* (Ecology, 2005). The correction factors and long-term design infiltration rates are tabulated in Table 3.

After compiling and analyzing the collected field data, the infiltration rates for each pond location were calculated. Plots of the measured infiltration rates over the duration of testing for the four PIT are presented in Charts 2 through 5.

Chart 2 North Infiltration Pond (East Side) Measured Infiltration Rate

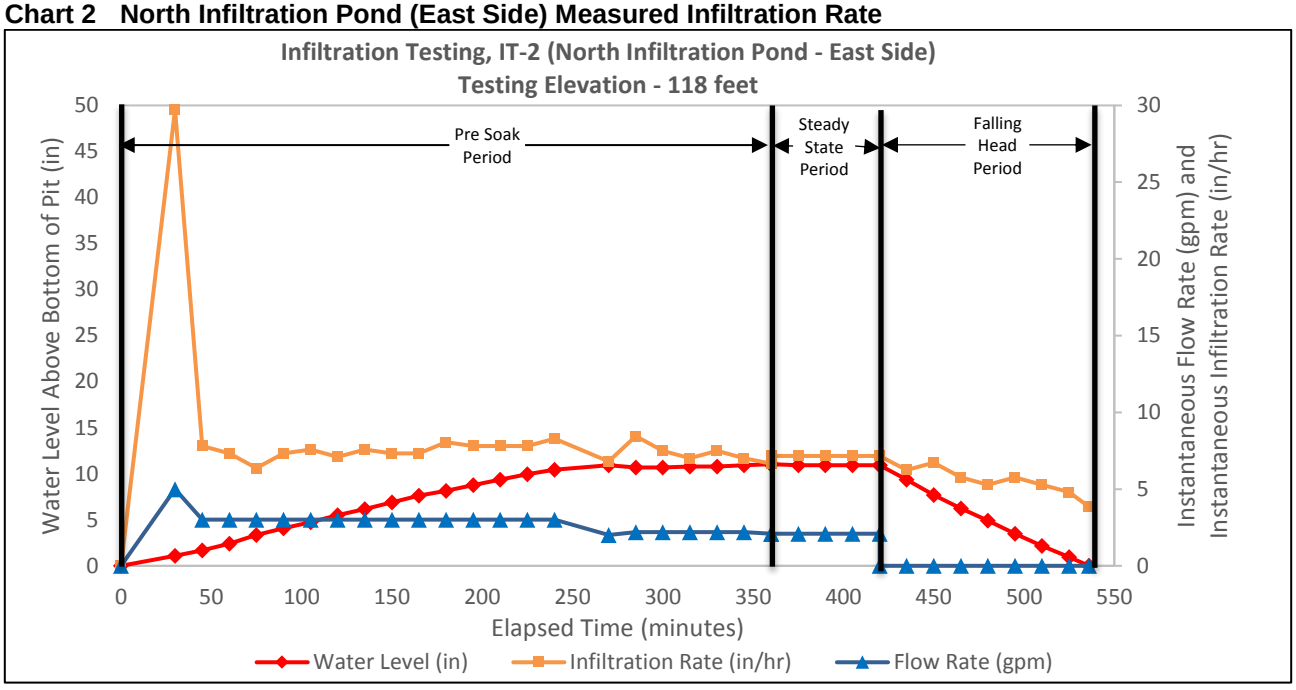
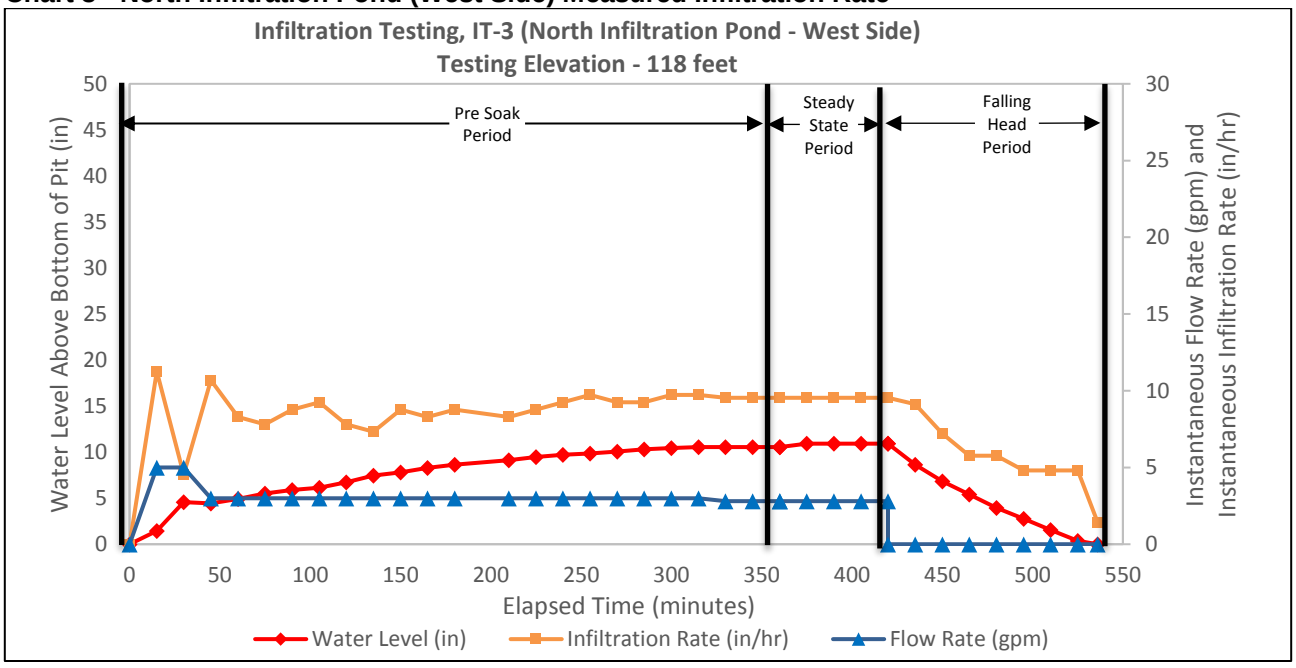


Chart 3 North Infiltration Pond (West Side) Measured Infiltration Rate



The constant-head (steady-state period) measured infiltration rates in the north infiltration pond were 7.1 inches/hour (IT-2) and 9.2 inches/hour (IT-3), for an average rate of 8.1 inches/hour. Using an intermediate correction factor for site variability, due to silt lenses, the design infiltration rate for the north infiltration pond was 0.8 inch per hour, after applying correction factors shown in Table 3.

Chart 4 Central Infiltration Pond Measured Infiltration Rate

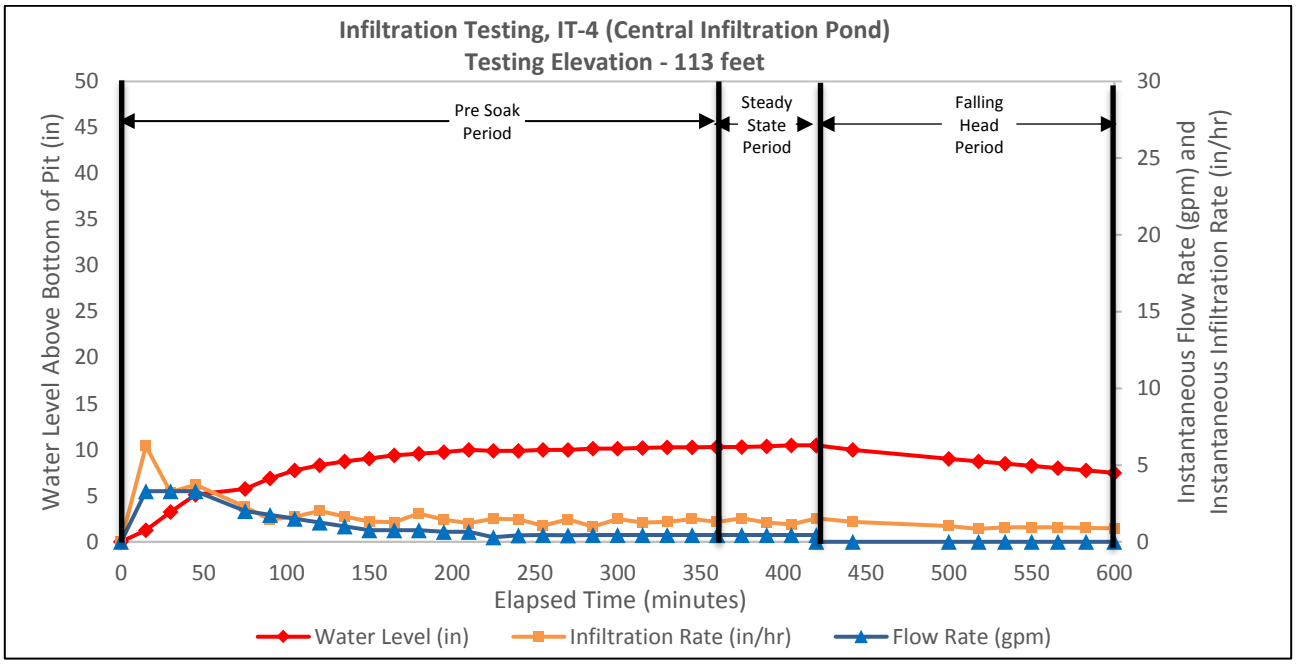
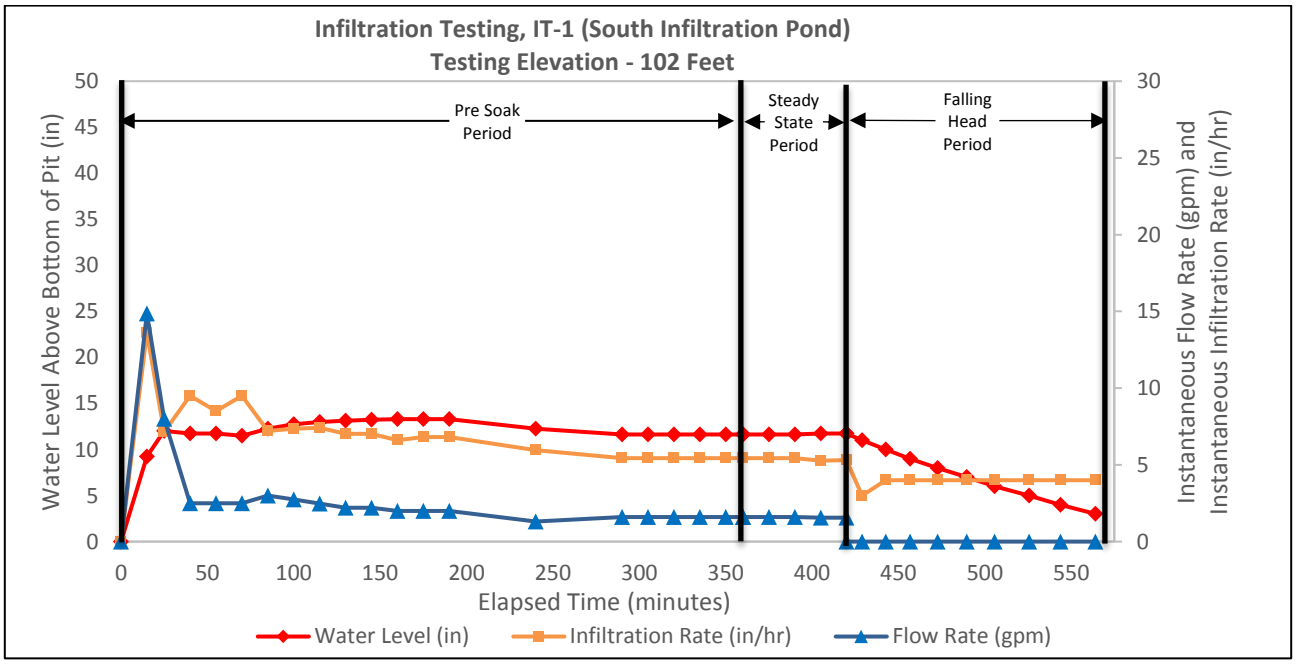


Chart 5 South Infiltration Pond Measured Infiltration Rate



Using the constant-head (steady-state period) measured infiltration rate (1.3 inches per hour) and an intermediate correction factor for site variability, due to silt lenses, the design infiltration rate for the central infiltration pond was found to be 0.16 inch per hour, after applying correction factors shown in Table 3.

Using the constant-head (steady-state period) measured infiltration rate (5.4 inches per hour), the design infiltration rate for the south infiltration pond was found to be 0.8 inch per hour, after applying correction factors shown in Table 3.

Table 3 Correction Factors and Infiltration Design Rate

PIT	Pond Location	Measured constant head infiltration rate (inches/hour)	*CFv* = correction factor for site variability	*CFm* = correction factor for long-term maintenance	CFi = correction factor for influent control	*Total Correction Factor*	Long-term Design Infiltration Rate (inches / hour)
IT-2 & IT-3	North Pond	8.1	3	3	2	8 (equivalent to 0.125)	1.0
IT-4	Central Pond	1.3	3	3	2	8 (equivalent to 0.125)	0.16
IT-1	South Pond	5.4	2	3	2	7 (equivalent to 0.84)	0.84

7.0 RECOMMENDED ADDITIONAL SERVICES

The *Kitsap County Stormwater Manual* (Section 7.3.4.1.E) requires performance testing of the completed infiltration facility. After the ponds have been excavated to subgrade elevation, Amec Foster Wheeler will confirm the subgrade soil types and work with the contractor to perform performance PITs.

8.0 LIMITATIONS

This report has been prepared for the exclusive use of Central Kitsap School District and their consultants for specific application to this project, in accordance with generally accepted geotechnical engineering and hydrogeologic practice. The infiltration recommendations presented in this report are based, in part, on the explorations Amec Foster Wheeler performed and used for this study and on information provided for the proposed project. Subsurface information obtained from borings, wells, test pits and PITs represents conditions at specific locations at the time of the observations and may not reflect conditions at other locations. If variations in subsurface conditions are observed at a later time, additional explorations may be needed and we may need to modify this report to reflect those

changes. We are available to provide geotechnical engineering throughout the design process, and construction and quality assurance monitoring during construction.

9.0 REFERENCES

Amec Foster Wheeler Environment & Infrastructure, Inc. (Amec Foster Wheeler), 2016, Preliminary Geotechnical Engineering Report, Central Kitsap High School and Middle School Campus Redevelopment, October 18.

Kitsap County Development Engineering Division, 2010, Kitsap County Stormwater Design Manual.

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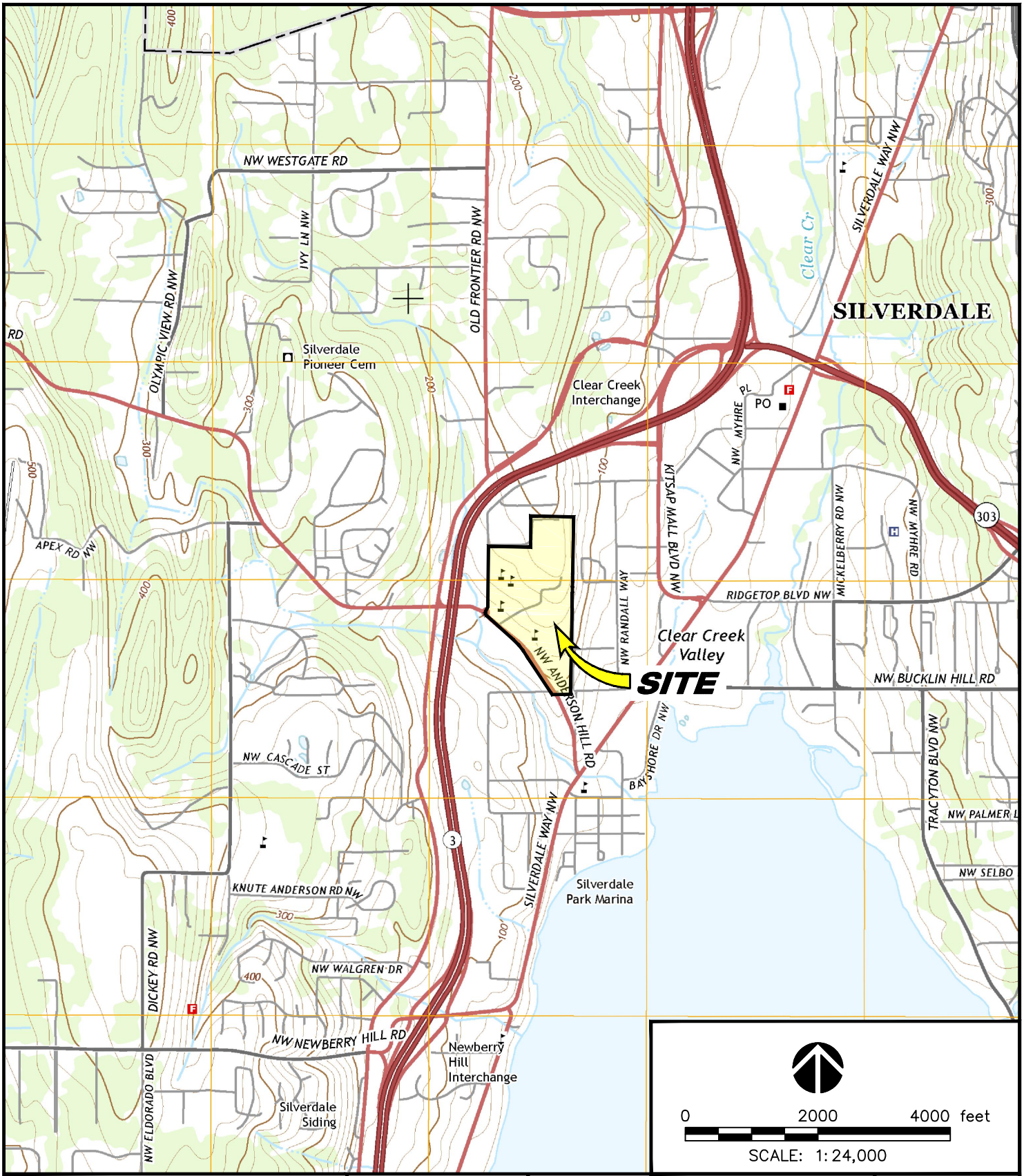
Washington State Department of Ecology (Ecology), 2005 Stormwater Manual for Western Washington, Volume III, Hydrologic Analysis, and Flow Control Design/BMPs, April.

amec foster wheeler

FIGURES



CENTRAL KITSAP SCHOOL DISTRICT

CENTRAL KITSAP HIGH SCHOOL AND MIDDLE SCHOOL CAMPUS

DATE
MARCH 2017

SCALE
1" = 2,000'

PROJECT NO.
6-917-18096-0

FIGURE
1

SITE LOCATION MAP

Amec Foster Wheeler
Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, WA 98011

amec foster wheeler

DRAWN BY: JRS CHECKED BY: KM

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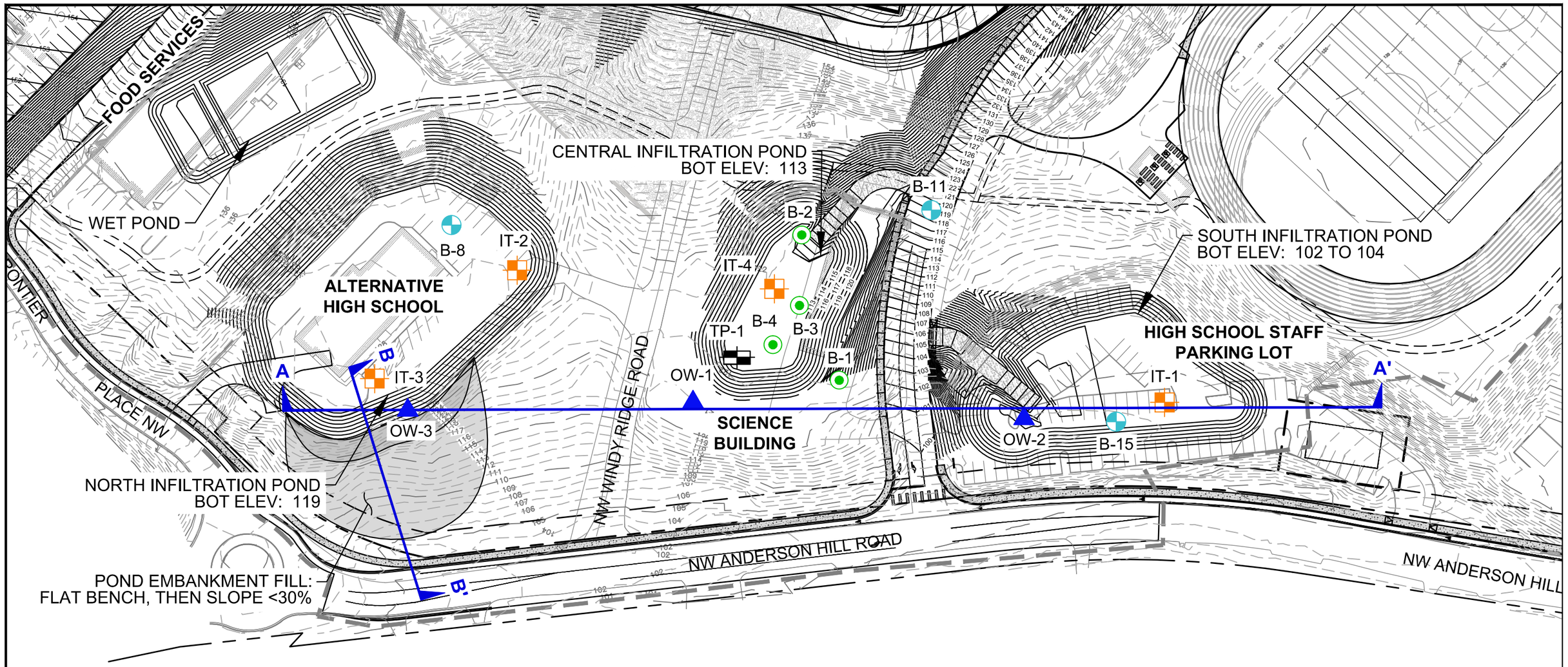

NOTE:

WE ESTIMATED THE RELATIVE LOCATION OF EACH EXPLORATION BY MEASURING FROM EXISTING FEATURES AND SCALING THESE MEASUREMENTS ONTO A LAYOUT PLAN SUPPLIED TO US. THE LOCATIONS DEPICTED ON THIS FIGURE SHOULD BE CONSIDERED ACCURATE ONLY TO THE DEGREE PERMITTED BY OUR DATA SOURCES AND IMPLIED BY OUR MEASURING METHODS.

LEGEND

- IT-4 — INFILTRATION LOCATION
- OW-3 — WELL LOCATION
- B-15 — BORING NUMBER AND LOCATION
- TP-1 — TEST PIT NUMBER AND LOCATION
- B-4 — 1994 BORING NUMBER AND LOCATION
- A — A' — CROSS-SECTION LOCATION

0' 40' 80' 120'

1" = 80'

NOTE:
SURVEY BASE PROVIDED BY AHBL, DATED MARCH 2nd, 2017.

CENTRAL KITSAP SCHOOL DISTRICT

Amec Foster Wheeler
Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, WA 98011

CENTRAL KITSAP HIGH SCHOOL AND MIDDLE SCHOOL CAMPUS

SITE AND EXPLORATION PLAN

DATE: MARCH 2017
SCALE: 1" = 80'
PROJECT NO.: 6-917-18096-0
FIGURE: 2

DRAWN BY: JRS CHECKED BY:

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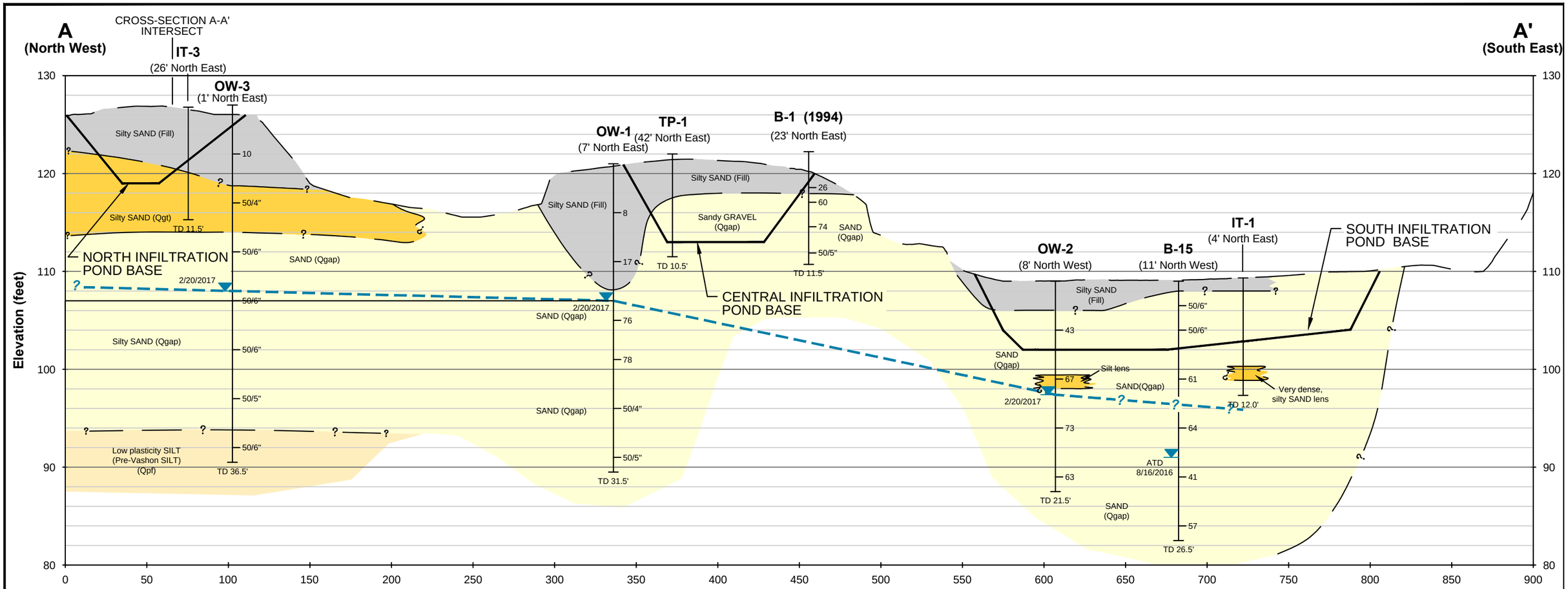


LEGEND

OW-3
(1' North)

BORING NUMBER AND APPROXIMATE LOCATION OFFSET FROM SECTION LINE

5

STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

GROUNDWATER LEVEL - HIGHEST ELEVATION DURING WINTER SEASON OR AT TIME OF DRILLING

TD 51.5'

TOTAL DEPTH OF BORING

0' 5' 10' 15'
VERTICAL SCALE: 1" = 10'

0' 30' 60' 90'
HORIZONTAL SCALE: 1" = 60'

NOTES:

THE STRATA ARE BASED UPON INTERPOLATION BETWEEN EXPLORATIONS AND MAY NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS.

SIMPLIFIED NAMES ARE SHOWN FOR SOIL DEPOSITS, BASED ON GENERALIZATIONS OF SOIL DESCRIPTIONS. SEE EXPLORATION LOGS AND REPORT TEXT FOR COMPLETE SOIL DESCRIPTIONS.

DRAWN BY: JRS CHECKED BY: KB

CENTRAL KITSAP SCHOOL DISTRICT

Amec Foster Wheeler
Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, WA 98011

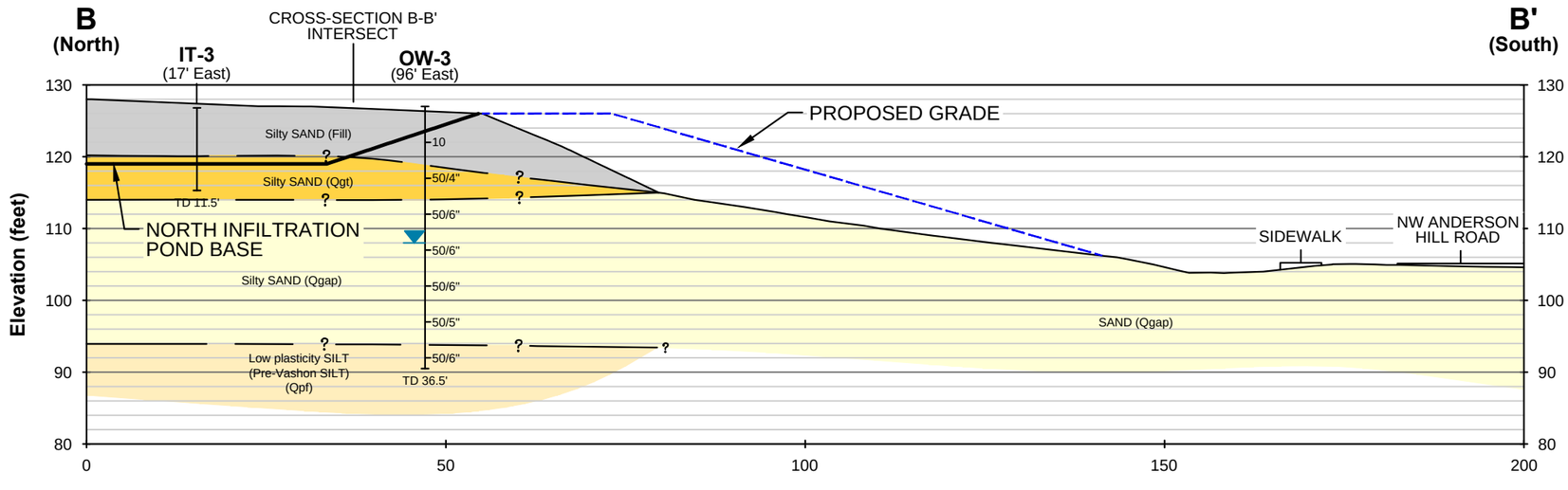
amec foster wheeler

CENTRAL KITSAP HIGH SCHOOL AND MIDDLE SCHOOL CAMPUS

GEOLOGIC CROSS-SECTION A-A'

DATE: MARCH 2017
SCALE: 1" = 60'
PROJECT NO.: 6-917-18096-0
FIGURE: 3

G:\91\18000\18096 - CKMS\18096-11.dwg - Geology A - Mar. 09, 2017 11:29pm - jeffrey.sanders



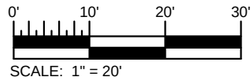
LEGEND

OW-3
(96' East)
BORING NUMBER AND APPROXIMATE LOCATION OFFSET FROM SECTION LINE

5
STANDARD PENETRATION RESISTANCE IN BLOWS PER FOOT

GROUNDWATER LEVEL - HIGHEST ELEVATION DURING WINTER SEASON OR AT TIME OF DRILLING

TD 36.5'
TOTAL DEPTH OF BORING



SCALE: 1" = 20'

NOTES:

THE STRATA ARE BASED UPON INTERPOLATION BETWEEN EXPLORATIONS AND MAY NOT REPRESENT ACTUAL SUBSURFACE CONDITIONS.

SIMPLIFIED NAMES ARE SHOWN FOR SOIL DEPOSITS, BASED ON GENERALIZATIONS OF SOIL DESCRIPTIONS. SEE EXPLORATION LOGS AND REPORT TEXT FOR COMPLETE SOIL DESCRIPTIONS.

CENTRAL KITSAP SCHOOL DISTRICT

Amec Foster Wheeler
Environment & Infrastructure, Inc.
11810 North Creek Parkway North
Bothell, WA 98011

CENTRAL KITSAP HIGH SCHOOL AND MIDDLE SCHOOL CAMPUS

GEOLOGIC CROSS-SECTION B-B'

DATE: MARCH 2017
SCALE: 1" = 60'
PROJECT NO.: 6-917-18096-0
FIGURE: 4

DRAWN BY: JRS CHECKED BY: KB

G:\91\18000\18096 - CKMS\18096-11.dwg - Geology B - Mar. 09, 2017 11:32pm - jeffrey.sanders

APPENDIX A

Field Exploration Procedures and Logs

APPENDIX A
FIELD EXPLORATION PROCEDURES AND LOGS

Central Kitsap High School and Middle School Redevelopment
Silverdale, Washington
Project No. 6-917-18096-0

The following paragraphs describe the procedures used for field explorations and field tests that Amec Foster Wheeler conducted for this project. Descriptive logs of our explorations are enclosed in this appendix.

AUGER BORING PROCEDURES

Exploratory borings were advanced with a hollow-stem auger, using a trailer-mounted drill rig operated by an independent drilling firm working under subcontract to Amec Foster Wheeler. An engineering geologist from Amec Foster Wheeler continuously observed the borings, logged the subsurface conditions, and collected representative soil samples. All samples were stored in watertight containers and later transported to the laboratory for further visual examination and testing. After each boring was completed, the borehole was backfilled with a mixture of bentonite chips and soil cuttings, and the surface was patched with asphalt or concrete (where appropriate).

Throughout the drilling operation, soil samples were obtained at 2.5- or 5-foot depth intervals by means of the standard penetration test (SPT) per ASTM D-1586. This testing and sampling procedure consists of driving a standard 2-inch-diameter steel split-spoon sampler 18 inches into the soil with a 140-pound hammer free-falling 30 inches. The number of blows required to drive the sampler through each 6-inch interval was counted, and the total number of blows struck during the final 12 inches was recorded as the standard penetration resistance, or “SPT blow count.” If a total of 50 blows were struck within any 6-inch interval, the driving was stopped and the blow count was recorded as 50 blows for the actual penetration distance. The resulting standard penetration resistance values indicate the relative density of granular soils and the relative consistency of cohesive soils.

The enclosed boring logs describe the vertical sequence of soils and materials encountered in each boring, based primarily on field classifications and supported by subsequent laboratory examination and testing. Where a soil contact was observed to be gradational, boring logs indicate the average contact depth. Where a soil type changed between sample intervals, we inferred the contact depth. The boring logs also graphically indicate the blow count, sample type, sample number, and approximate depth of each soil sample obtained from the borings, as well as any laboratory tests performed on these soil samples. If any groundwater was encountered in a borehole, the approximate

groundwater depth is depicted on the boring log. Groundwater depth estimates are typically based on the moisture content of soil samples, the wetted height on the drilling rods, and the water level measured in the borehole after the auger has been extracted.

WELL INSTALLATION PROCEDURES

Our groundwater observation wells consist of 1.5-inch-diameter polyvinyl chloride pipe, the lower 5 feet of which is finely slotted. The annular space around the slotted segment was backfilled with clean sand and gravel, and the upper portion of annulus was sealed with bentonite chips and concrete. A flush-mounted monument was placed over the top of each wellhead for protection. The as-built configuration of each observation well is illustrated on the respective *Boring Log*. Our logs also show any groundwater levels encountered at the time of our drilling.

TEST PIT PROCEDURES

Our exploratory test pits were excavated with a track-mounted hoe operated by an independent firm working under subcontract to Amec Foster Wheeler. A geotechnical specialist from our firm continuously observed the test pit excavations, logged the subsurface conditions, and obtained representative soil samples. All samples were stored in watertight containers and later transported to a laboratory for further visual examination and testing. After we logged each test pit, the hoe operator backfilled it in lifts and compacted each lift to a firm or firm and unyielding condition. The upper 1 foot was backfilled with crushed rock and compacted to the firm/unyielding condition. Approximately 4 inches of asphalt was placed at the surface for any test pits excavated within paved areas.

The enclosed *Test Pit Logs* indicate the vertical sequence of soils and materials encountered in each test pit, based primarily on our field classifications and supported by subsequent laboratory examination and testing. Where a soil contact was observed to be gradational or undulating, our logs indicate the average contact depth. We estimated the relative density and consistency of the in situ soils by means of the excavation characteristics and the stability of the test pit sidewalls. Our logs also indicate the approximate depths of any sidewall caving or groundwater seepage observed in the test pits, as well as all sample numbers and sampling locations

PROJECT: *Central Kitsap HS & MS Campus* JOB No. *6-917-18096-0* BORING No. *OW-1*

Location: NW Corner of Science Bldg Parking Lot
Approximate ground surface elevation: 121.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	3" crushed rock.				
	Loose, damp, gray-tan, silty SAND with trace gravel. (Fill)		50%	S-1	
5					
	Becomes medium dense, brown SAND with some silt and gravel (fill).		35%	S-2	
10					
	Very dense, moist, gray with orange mottling, fine to medium SAND with some silt and trace gravel (Qgap - Advance Outwash)		80%	S-3	
15					
20					12/19/2016

PENETRATION RESISTANCE
Standard ▲ Blows over inches ## Other △
Blows per foot
0 10 20 30 40 50

Page 1 of 2

TESTING

▲ 8
▲ 17
● 76 ▲ 10

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND

- 2.00-inch OD split-spoon sampler
- Observed groundwater level
- Groundwater level at time of drilling (ATD)
- Grain Size Analysis (% fines shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *December 07, 2016* Logged By: *KB*

Drilled by: *Geologic Drill*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 CKSD OW 1 THROUGH 3.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 1/24/17

PROJECT: *Central Kitsap HS & MS Campus* JOB No. *6-917-18096-0* BORING No. *OW-1*

Location: NW Corner of Science Bldg Parking Lot
Approximate ground surface elevation: 121.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard ▲ / Blows over inches ## / Other △; Blows per foot)	TESTING
20	Becomes wet, fine SAND with some silt.						
	3" silt lens		80%	S-4		78	
25	Becomes saturated.		100%	S-5	ATD	50/4"	
30	Trace fine gravel		100%	S-6		50/5"	5
	Boring terminated at approximately 31.5 feet						
35							
40							

Page 2 of 2

0 10 20 30 40 50

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND

- 2.00-inch OD split-spoon sampler
- Observed groundwater level
- ATD Groundwater level at time of drilling
- Grain Size Analysis (% fines shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *December 07, 2016* Logged By: *KB*

Drilled by: *Geologic Drill*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 CKSD OW 1 THROUGH 3.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 1/24/17

PROJECT: *Central Kitsap HS & MS Campus* JOB No. *6-917-18096-0* BORING No. *OW-2*

Location: North End of Planter in Staff Parking Lot
Approximate ground surface elevation: 109.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER
0	Vegetation/roots over 2" topsoil.				
	Damp, brown, silty SAND with some gravel (Fill).				
	Dense, moist, gray, fine to medium SAND with trace silt (Qgap - Advance Outwash).		33%	S-1	
5					
	Becomes very dense, silty SAND with trace gravel.				
10			50%	S-2A	
	Dense, wet, tannish grey low plasticity silt lens. Bottom 4" of samples		50%	S-2B	
	Becomes wet, SAND with some silt and gravel.				
15			66%	S-3	12/19/2016
20					

PENETRATION RESISTANCE
▲ Standard ##/ Blows over inches △ Other
Blows per foot
0 10 20 30 40 50

Page 1 of 2

TESTING

S-1: 43
S-2B: 67, 43
S-3: 73, 8

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND
2.00-inch OD split-spoon sampler
Observed groundwater level
Grain Size Analysis (% fines shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *December 07, 2016* Logged By: *KB*

Drilled by: *Geologic Drill*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 CKSD OW 1 THROUGH 3.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 1/24/17

PROJECT: *Central Kitsap HS & MS Campus* JOB No. *6-917-18096-0* BORING No. *OW-2*

Location: North End of Planter in Staff Parking Lot
Approximate ground surface elevation: 109.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard ▲, Blows over inches ##, Other △; Blows per foot 0 10 20 30 40 50)	TESTING
20	Becomes saturated fine SAND with some silt.		100%	S-4		63	
	Boring terminated at approximately 21.5 feet						
25							
30							
35							
40							

Page 2 of 2

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler

Observed groundwater level

Grain Size Analysis (% fines shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *December 07, 2016* Logged By: *KB*

Drilled by: *Geologic Drill*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 CKSD OW 1 THROUGH 3.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 1/24/17

PROJECT: *Central Kitsap HS & MS Campus* JOB No. *6-917-18096-0* BORING No. *OW-3*

Location: SW Corner of Alt. High School Parking Lot
Approximate ground surface elevation: 127.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard ▲, Blows over inches ##, Other △; Blows per foot)	TESTING
0	1.5" Asphalt.						
	Loose, damp, brown, silty SAND with some angular gravel and trace cellulose organics (Fill).						
5			50%	S-1		10	
	Very dense, moist, tannish gray with some mottling, silty SAND with some gravel (Qgt - Sandy Till).						
10	Interbedded 2.5" silt lens		60%	S-2		50/4"	27
	Very dense, moist, gray with some mottling, fine SAND with trace silt (Qgap - Advance Outwash)						
15			80%	S-3		50/6"	
	Becomes silty SAND with no mottling.						
20							

Page 1 of 2

0 20 40 60 80 100
Plastic Limit — MOISTURE CONTENT — Liquid Limit

LEGEND

- 2.00-inch OD split-spoon sampler
- Observed groundwater level
- P / ATD — Perched water level at time of drilling
- Grain Size Analysis (% fines shown)
- 200 Wash (% fines shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *December 07, 2016* Logged By: *KB*

Drilled by: *Geologic Drill*

PROJECT: *Central Kitsap HS & MS Campus* JOB No. *6-917-18096-0* BORING No. *OW-3*

Soil Description

Location: SW Corner of Alt. High School Parking Lot

Approximate ground surface elevation: 127.0 feet

Page 2 of 2

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard ▲, Blows over inches ##, Other △; Blows per foot 0–50)	TESTING
20	Interbedded 2" sand with gravel lens		66%	S-4	12/19/2016	50/6"	21
	Becomes wet with some fine gravel.						
25	Interbedded gravel and coarse sand lens		40%	S-5a			
			20%	S-5b		50/6"	
30	Becomes saturated.		66%	S-6	P ATD	50/5"	23
	Hard, saturated gray, low plasticity SILT with some fine sand (Qpf - Pre Vashon Silt)						
35			33%	S-7		50/6"	
	Boring terminated at approximately 36.5 feet						
40							

0 20 40 60 80 100

Plastic Limit — MOISTURE CONTENT — Liquid Limit

LEGEND

- 2.00-inch OD split-spoon sampler
- Observed groundwater level
- P ATD — Perched water level at time of drilling
- Grain Size Analysis (% fines shown)
- 200 Wash (% fines shown)

amec foster wheeler

11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *December 07, 2016* Logged By: *KB*

Drilled by: *Geologic Drill*

Test Pit No.: IT-1

Location: High School - Staff Parking Lot
Approximate ground surface elevation: 109.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE NUMBER	SEEPAGE	CAVING	MOISTURE CONTENT (Plastic Limit — Liquid Limit; 0 20 40 60 80 100)	TESTING
0	2.5" Asphalt over 2.5" Crush Rock			NS	NC		
	Medium dense, moist, brown, gravelly, silty SAND (Fill)						
	Medium dense, moist, gray, mottled, silty fine to medium SAND with gravel (Qgap - Advance Outwash)						
	6-inch layer of brownish-gray, silty fine Sand						
	Becomes dense with trace gravel						
5	Becomes with trace silt						
			G-1			●	2
	Becomes very dense and silty		G-2			●	1, 18
10	Very difficult to excavate						
	Becomes gravelly with some silt		G-3			●	8
			G-4				
	Test pit terminated at approximately 12 feet						
15							
20							

LEGEND

- Moderate Seepage
- NS no seepage observed
- NC no caving observed
- 200 Wash (% fines shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

Excavation Method: Trackhoe

Date Excavated: *December 21, 2016*

Logged By: *KHM*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: IT-2

Location: Alt. High School - Parking Lot East End
Approximate ground surface elevation: 127.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE NUMBER	SEEPAGE	CAVING	MOISTURE CONTENT (Plastic Limit / Liquid Limit; 0–20–40–60–80–100)	TESTING
0	2-inches Asphalt over 4-inches of Gravel			NS	NC		
	Dense, moist, light brownish - gray, gravelly, silty SAND with trace cobbles (Fill)						
	Medium dense, moist, gray, silty SAND with fine gravel (Qgt - Sandy Till)						
5	Becomes dense						
	Becomes very dense						
	Medium dense, moist, gray, fine to medium SAND with trace silt and gravel (Qgap - Advance Outwash)		G-1			●	3
10	Becomes intermixed with some silt lenses		G-2				1
	Hard, moist, gray, sandy SILT with trace gravel (Interbedded Silt Lense)		G-3			●	72
	Very dense, moist, gray, silty SAND with trace gravel (Qgap - Advance Outwash)		G-4				
	Test pit terminated at approximately 14.25 feet						
15							
20							

LEGEND

- Moderate Seepage
- NS no seepage observed
- NC no caving observed
- 200 Wash (% fines shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

Excavation Method: Trackhoe

Date Excavated: *December 22, 2016*

Logged By: *CJ*

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11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: IT-3

Location: Alt. High School - Near Building SW Corner
Approximate ground surface elevation: 127.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE NUMBER	SEEPAGE	CAVING	MOISTURE CONTENT (Plastic Limit – Liquid Limit; 0 20 40 60 80 100)	TESTING
0	4-inches of Topsoil over			NS	NC		
	Loose to medium dense, moist, grayish-brown, silty SAND with gravel and scattered organics - roots (Fill)						
5							
	Medium dense to dense, moist, light grayish-brown, gravelly, silty SAND (Qgt - Sandy Till)						
	Relic topsoil layer horizon						
	Becomes very dense		G-1			●	23
10							
	Difficult excavating - Refusal		G-2			●	1, 21
	Test pit terminated at approximately 11.5 feet						
15							
20							

LEGEND

- Moderate Seepage
- NS no seepage observed
- NC no caving observed
- 200 Wash (% fines shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

Excavation Method: Trackhoe

Date Excavated: *December 23, 2016*

Logged By: *CJ*

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11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: IT-4

Location: North Side of Science Building
Approximate ground surface elevation: 122.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE NUMBER	SEEPAGE	CAVING	MOISTURE CONTENT (Plastic Limit — Liquid Limit; 0 20 40 60 80 100)	TESTING
0	5-inches Crushed Rock over Medium dense, moist, gray with oxidation staining, silty SAND with some gravel and scattard organics (roots) with layers of silty, gravelly SAND (Fill).				NC		
5	Very dense, wet, gray, silty, sandy GRAVEL with interbedded cemented layers of silty gravelly SAND						
	Seepage 7 to 7.5 feet - North Sidewall			Moderate Seepage			
	4-inch cemented layer - N. half of Pit		G-1				
	Infiltration Pond Base		G-2	Moderate Seepage			
	Seepage - North Sidewall		G-3				
	1.5" Cemented layer at 8.75 to 9 feet						
	PIT Base		G-4				
10	Very dense, wet, gray, silty, sandy GRAVEL with interbedded cemented layers of silty gravelly SAND (Till)		G-5				
			G-6				
	Very dense, moist, gray, silty SAND with some gravel		G-7				
15	"Excavated from 9 to 14 feet below ground surface after PIT" Test pit terminated at approximately 14 feet						
20							

LEGEND

- Moderate Seepage
- NS no seepage observed
- NC no caving observed
- 200 Wash (% fines shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

Excavation Method: Trackhoe

Date Excavated: *February 20, 2017*

Logged By: *KHM*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

Test Pit No.: TP-1

Location: Science Building Between IT-4 and OW-1
Approximate ground surface elevation: 122.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE NUMBER	SEEPAGE	CAVING	MOISTURE CONTENT (Plastic Limit — Liquid Limit; 0 20 40 60 80 100)	TESTING
0	Loose, moist, gray, silty SAND with some gravel (Fill)			NS	NC		
5	Loose, moist, brown to dark brown, silty SAND with some gravel and intermixed with topsoil / roots (Relic Topsoil Horizon)		G-1				
	Loose, moist, light brown, silty SAND, trace gravel						
	Medium dense, moist, gray, silty SAND, trace to some gravel with scattered organics - (rootlets)		G-2				
10	Very dense, moist, gray with oxidation staining, silty gravelly SAND intermixed with some cemented layers of very dense silty sand (Till)		G-3				
			G-4				
	Test pit terminated at approximately 10.5 feet						
15							
20							

LEGEND

- Moderate Seepage
- NS no seepage observed
- NC no caving observed
- 200 Wash (% fines shown)
- Grain Size Analysis (% fines shown)
- Organic Content (% shown)

Excavation Method: Trackhoe

Date Excavated: *February 20, 2017*

Logged By: *KHM*

amec foster wheeler
11810 North Creek Parkway N
Bothell, Washington 98011

PROJECT: *Central Kitsap HS & MS Campus* JOB No. *6-917-18096-0* BORING No. *8*

Soil Description
CKSD Alternative HS Bldg - 34' E. of Bldg E. Door
Location:
Approximate ground surface elevation: 127.0 feet

DEPTH (feet)	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard ▲, Blows over inches ##, Other △; Blows per foot 0–50)	TESTING
0				N/E		
2.5-inches Asphalt						
Very dense, moist, grayish-brown, silty SAND (Qgt - Sandy Till).		20%	S-1		50/4"	
5		50%	S-2		50/6"	
Becomes gray						
10		50%	S-3		50/5"	15
Very dense, moist, gray, silty, gravelly SAND (Qgap - Advance Outwash).						
15		50%	S-4		50/5"	
Boring terminated at approximately 16.5 feet						
20						
25						
30						

Page 1 of 1

0 20 40 60 80 100
Plastic Limit MOISTURE CONTENT Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler

N/E No groundwater encountered

Grain Size Analysis (% fines shown)

amec foster wheeler
11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *August 15, 2016* Logged By: *FC*

Drilled by: *Geologic Dril*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 CKSD BORINGS 1 THROUGH 21.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 1/24/17

PROJECT: *Central Kitsap HS & MS Campus* JOB No. *6-917-18096-0* BORING No. *11*

Soil Description

Location: 27' SE of Career & Technical Bldg SE Corner

Approximate ground surface elevation: 132.0 feet

DEPTH (feet)	Soil Description	USCS/USGS GRAPHICS	SAMPLE TYPE	SAMPLE NUMBER	GROUND WATER	PENETRATION RESISTANCE (Standard ▲, Blows over inches ##, Other △; Blows per foot 0 10 20 30 40 50)	TESTING
0	2-inches Asphalt over 4-inches Base Course.				N/E		
	Very dense, moist, grayish-brown, silty SAND with some gravel (Qgt - Glacial Till).		40%	S-1		50/6"	
5			30%	S-2		50/6"	
	Becomes gray						
10			60%	S-3		50/6"	29
	Becomes brownish-gray						
15			30%	S-4		50/3"	
	Becomes gray, silty fine SAND						
20			50%	S-5		50/4"	
	Very dense, moist, gray, gravelly SAND with trace silt (Qgap - Advance Outwash).						
25			50%	S-6		50/6"	4
	Boring terminated at approximately 26.5 feet						
30							

Page 1 of 1

0 20 40 60 80 100

Plastic Limit — MOISTURE CONTENT — Liquid Limit

LEGEND

2.00-inch OD split-spoon sampler

N/E No groundwater encountered

Grain Size Analysis (% fines shown)

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 CKSD BORINGS 1 THROUGH 21.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 3/10/17

amec foster wheeler

11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *August 16, 2016* Logged By: *FC*

Drilled by: *Boretec*

PROJECT: *Central Kitsap HS & MS Campus* JOB No. *6-917-18096-0* BORING No. *15*

Soil Description
Location: CKHS Parking Lot W. of Football Field by Anderson Hill Rd
Approximate ground surface elevation: 109.0 feet

DEPTH (feet) | USCS/USGS GRAPHICS | SAMPLE TYPE | SAMPLE NUMBER | GROUND WATER | PENETRATION RESISTANCE (▲ Standard, ## Blows over inches, △ Other; Blows per foot 0 10 20 30 40 50) | Page 1 of 1 | TESTING

0 — 2 inches Asphalt over 4-inches Base Course.

Very dense, moist, gray, SAND with some silt and gravel (Qgap - Advance Outwash).

S-1 — 70% — 50/6"

5

S-2 — 80% — 50/6"

10

S-3 — 70% — 61

Becomes wet

15

S-4A — 50%

S-4B — 60% — 64

Becomes silty SAND

ATD

Becomes saturated and dense

20

S-5 — 60% — 41

Becomes very dense

25

S-6 — 80% — 57

30

Boring terminated at approximately 26.5 feet

MOISTURE CONTENT: 0 20 40 60 80 100 — Plastic Limit — Liquid Limit

LEGEND

- 2.00-inch OD split-spoon sampler
- ATD Groundwater level at time of drilling
- Grain Size Analysis (% fines shown)
- 200 Wash (% fines shown)

amec foster wheeler

11810 North Creek Parkway N
Bothell, WA 98011

Drilling Method: HSA Hammer Type: Cathead Date drilled: *August 16, 2016* Logged By: *FC*

Drilled by: *Geologic Dril*

BOTHELL_GEO_2015.GLB BOTHELL_LOG FORMAT 2012 CKSD BORINGS 1 THROUGH 21.GPJ BOTHELL GEO 2010 B&TP.GDT PRINTDATE 1/24/17

PROJECT: Performing Arts Center
Science Kit Center Site

W.O. 11-09290-00 BORING NO. B-1

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	OVM READING	GROUND WATER	STANDARD PENETRATION RESISTANCE Blows per foot	TESTING
0	2" Asphalt paving						
	Medium dense, moist, tan, fine to medium SAND with trace silt		S-1	0.0			
5	Very dense, moist, tan to gray, medium to coarse SAND with some gravel and trace silt		S-2	0.0		60	
	Very dense, moist, gray, silty, fine to medium SAND with trace gravel		S-3	0.0		74	
10	Some gravel		S-4	0.0		50/5"	
	Boring terminated at approximately 11.5 feet						
15							
20							
25							
30							

0 10 20 30 40 50

MOISTURE CONTENT

Plastic limit — Natural — Liquid limit

LEGEND

I 2-inch OD split-spoon sample

RZA AGRA, Inc
Engineering & Environmental Services

11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 06 December 1993 Drilling completed: 06 December 1993 Logged by: KHM

PROJECT: *Performing Arts Center Science Kit Center Site* W.O. *11-09290-00* BORING NO. *B-2*

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	OVM READING	GROUND WATER	STANDARD PENETRATION RESISTANCE ▲ Blows per foot 0 10 20 30 40 50	TESTING
0	*Very dense, moist, gray, silty, fine to medium SAND with some gravel*						
			S-1	0.0		● 50/5"	
5			S-2	0.0		● 50/5"	
			S-3	0.0		50/5"	
10			S-4	*		50/5"	
	Boring terminated at approximately 11.5 feet						
15							
20							
25							
30							

0 10 20 30 40 50

MOISTURE CONTENT

Plastic limit — Natural — Liquid limit

LEGEND

I 2-inch OD split-spoon sample

* Insufficent sample for OVM reading; however, no odor detected

RZA AGRA, Inc
Engineering & Environmental Services
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: *06 December 1993* Drilling completed: *06 December 1993* Logged by: *KHM*

PROJECT: Performing Arts Center
Science Kit Center Site

W.O. 11-09290-00 BORING NO. B-3

Page 1 of 1

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	OVM READING	GROUND WATER	STANDARD PENETRATION RESISTANCE Blows per foot 0 10 20 30 40 50	TESTING
0	Medium dense, moist, gray, fine to medium SAND with trace gravel and silt						
			S-1	*			
5	Very dense, moist, gray, silty, gravelly, fine to medium SAND		S-2	0.0		50/5"	
			S-3			50/5"	
10	Very dense, moist, gray, silty, fine to medium SAND with some gravel		S-4	*		95/6"	
	Boring terminated at approximately 11.5 feet						
15							
20							
25							
30							

0 10 20 30 40 50
MOISTURE CONTENT
Plastic limit Natural Liquid limit

LEGEND

I 2-inch OD split-spoon sample

X Sample not recovered

* Insufficient sample for OVM reading; however, no odor detected

RZA AGRA, Inc
Engineering & Environmental Services
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 06 December 1993 Drilling completed: 06 December 1993 Logged by: KHM

PROJECT: Performing Arts Center
Science Kit Center Site W.O. 11-09290-00 BORING NO. B-4

DEPTH (feet)	SOIL DESCRIPTION Approximate ground surface elevation:	SAMPLE TYPE	SAMPLE NUMBER	OVM READING	GROUND WATER
0	Loose, moist, tan, fine to medium SAND with trace silt (Possible Fill)	I	S-1	0.0	
5	Medium dense, moist, mottled gray, silty, fine SAND	I	S-2	0.0	
	Very dense, gray, some gravel	I	S-3	0.0	
10	Becoming gravelly	I	S-4	*	
	Boring terminated at approximately 11.5 feet				
15					
20					
25					
30					

STANDARD PENETRATION RESISTANCE
Blows per foot
0 10 20 30 40 50

50/6"

50/6"

Page 1 of 1

TESTING

0 10 20 30 40 50
MOISTURE CONTENT
Plastic limit Natural Liquid limit

LEGEND

I 2-inch OD split-spoon sample

* Insufficient sample for OVM reading; however, no odor detected

RZA AGRA, Inc
Engineering & Environmental Services
11335 NE 122nd Way, Suite 100
Kirkland, Washington 98034-6918

Drilling started: 06 December 1993 Drilling completed: 06 December 1993 Logged by: KHM

APPENDIX B

Laboratory Testing Procedures and Results

APPENDIX B
LABORATORY TESTING PROCEDURES AND RESULTS

Central Kitsap High School and Middle School Redevelopment
Silverdale, Washington
Project No. 6-917-18096-0

The following paragraphs describe procedures associated with the laboratory tests conducted for this project. Graphical results of certain laboratory tests are enclosed in this appendix.

VISUAL CLASSIFICATION PROCEDURES

Visual soil classifications were conducted on all samples in the field and on selected samples in the laboratory. All soils were classified in general accordance with the Unified Soil Classification System, which includes color, relative moisture content, primary soil type (based on grain size), and any accessory soil types. The resulting soil classifications are presented on the exploration logs contained in Appendix A.

MOISTURE CONTENT DETERMINATION PROCEDURES

Moisture content determinations were performed on representative samples to aid in identification and correlation of soil types. All determinations were made in general accordance with ASTM D-2216. The results of these tests are shown on the exploration logs in Appendix A.

GRAIN-SIZE ANALYSIS PROCEDURES

A grain-size analysis indicates the range of soil particle diameters included in a particular sample. Grain-size analyses were performed on representative samples in general accordance with ASTM D-422. The results of these tests are presented on the enclosed grain-size distribution graphs and were used in soil classifications shown on the exploration logs in Appendix A.

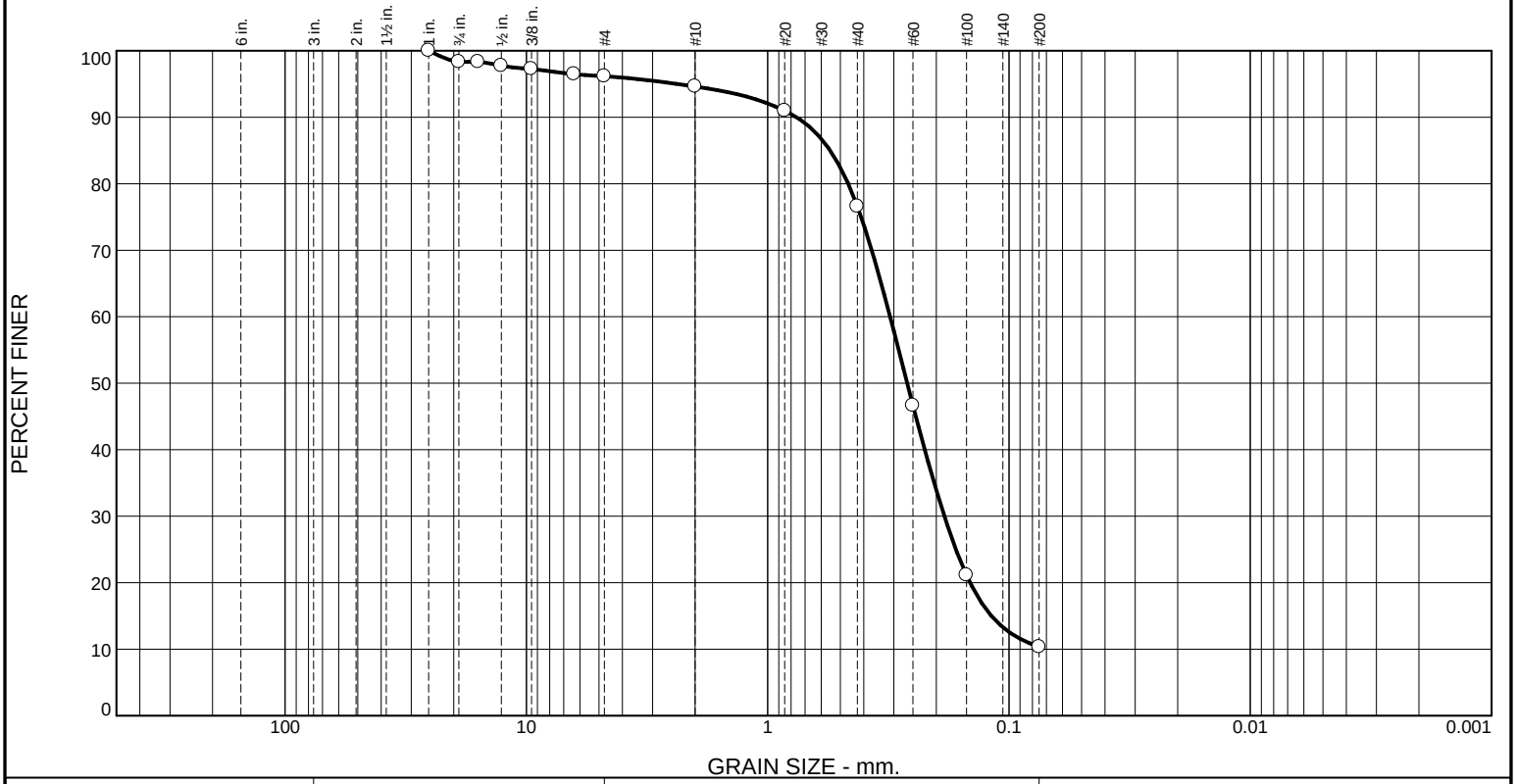
ORGANIC CONTENT PROCEDURES

Test method ASTM D-2974 covers the measurement of organic matter, ash content, and moisture content in peats and other organic soils, such as organic clays and silts. The results are presented on the enclosed lab data sheet and on the exploration logs presented in Appendix A.

CATION EXCHANGE CAPACITY PROCEDURES

A cation exchange capacity determination was performed on selected samples in general accordance with U.S. Environmental Protection Agency Method 9081. In this procedure, the soil sample is mixed with an excess of sodium acetate solution, resulting in an exchange of the added sodium cations for the matrix cations. The concentration of displaced sodium is then determined by atomic absorption, emission spectroscopy, or an equivalent means. The results are presented in this appendix.

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.7	2.1	1.6	18.0	66.3	10.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	98.3		
5/8"	98.3		
1/2"	97.7		
3/8"	97.2		
1/4"	96.5		
#4	96.2		
#10	94.6		
#20	91.0		
#40	76.6		
#60	46.6		
#100	21.1		
#200	10.3		

* (no specification provided)

Material Description

Poorly graded sand with silt
As Received Moisture: 8.3%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 0.7599 D_{85}= 0.5511 D_{60}= 0.3110
D_{50}= 0.2641 D_{30}= 0.1852 D_{15}= 0.1182
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-3

Remarks

ASTM: C136, D1140, D2216
Sampled: 12/7/16
Sampled By: Kori B.

Location: OW-1 / S-3
Sample Number: 7240.1 **Depth:** 16' **Date:** 12/19/2016

Terracon Consultants, Inc.

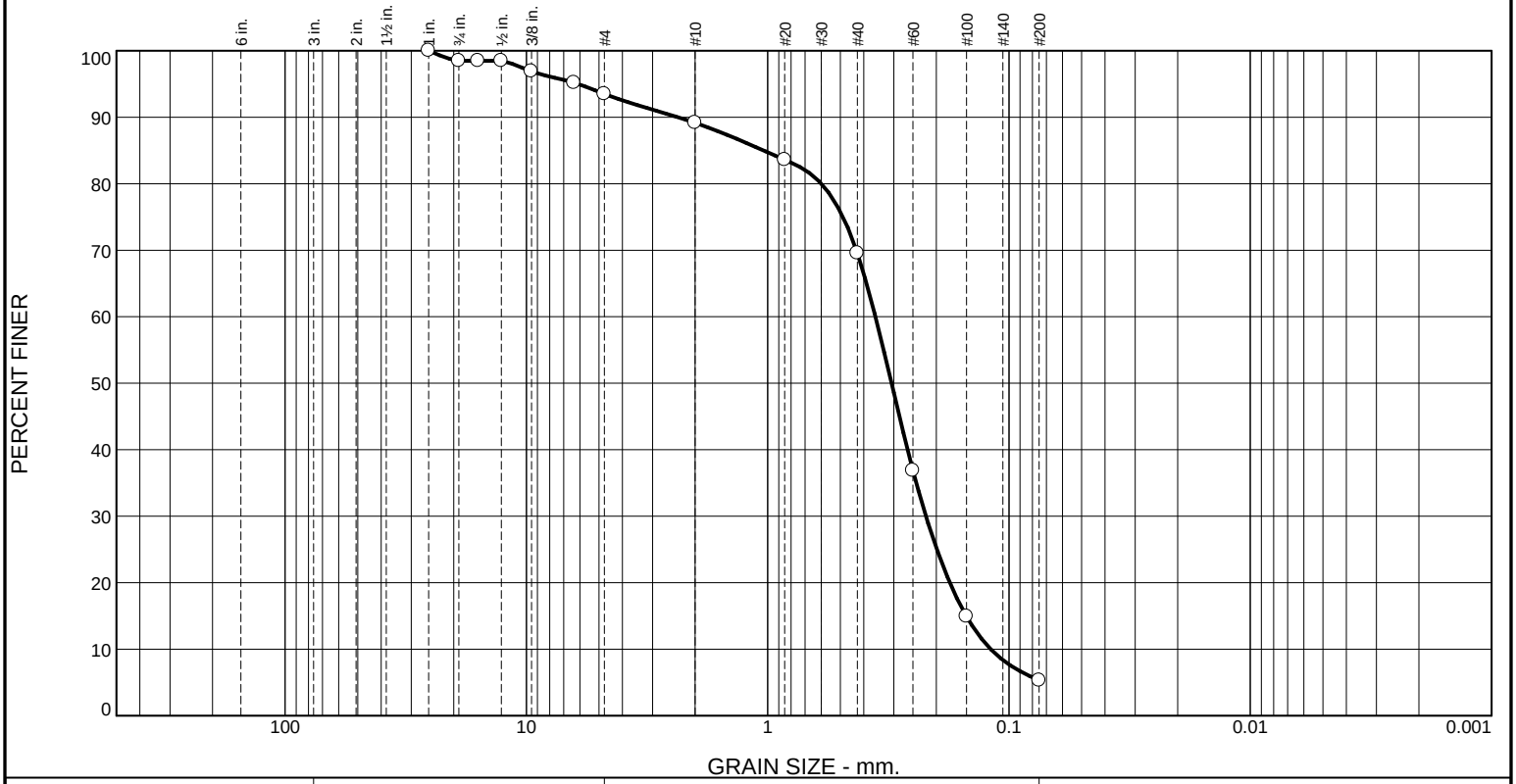
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Jeff W **Checked By:** Dave D

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.5	5.0	4.3	19.6	64.3	5.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	98.5		
5/8"	98.5		
1/2"	98.5		
3/8"	96.9		
1/4"	95.2		
#4	93.5		
#10	89.2		
#20	83.6		
#40	69.6		
#60	36.9		
#100	14.9		
#200	5.3		

* (no specification provided)

Material Description

Poorly graded sand with silt
As Received Moisture: 14.6%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 2.3533 D_{85}= 1.0400 D_{60}= 0.3577
D_{50}= 0.3067 D_{30}= 0.2209 D_{15}= 0.1504
D_{10}= 0.1190 C_u= 3.01 C_c= 1.15

Classification

USCS= SP-SM AASHTO= A-3

Remarks

ASTM: C136, D1140, D2216
Sampled: 12/7/16
Sampled By: Kori B.

Location: OW-1 - S-6
Sample Number: 7240.2 **Depth:** 30' **Date:** 12/19/2016

Terracon Consultants, Inc.

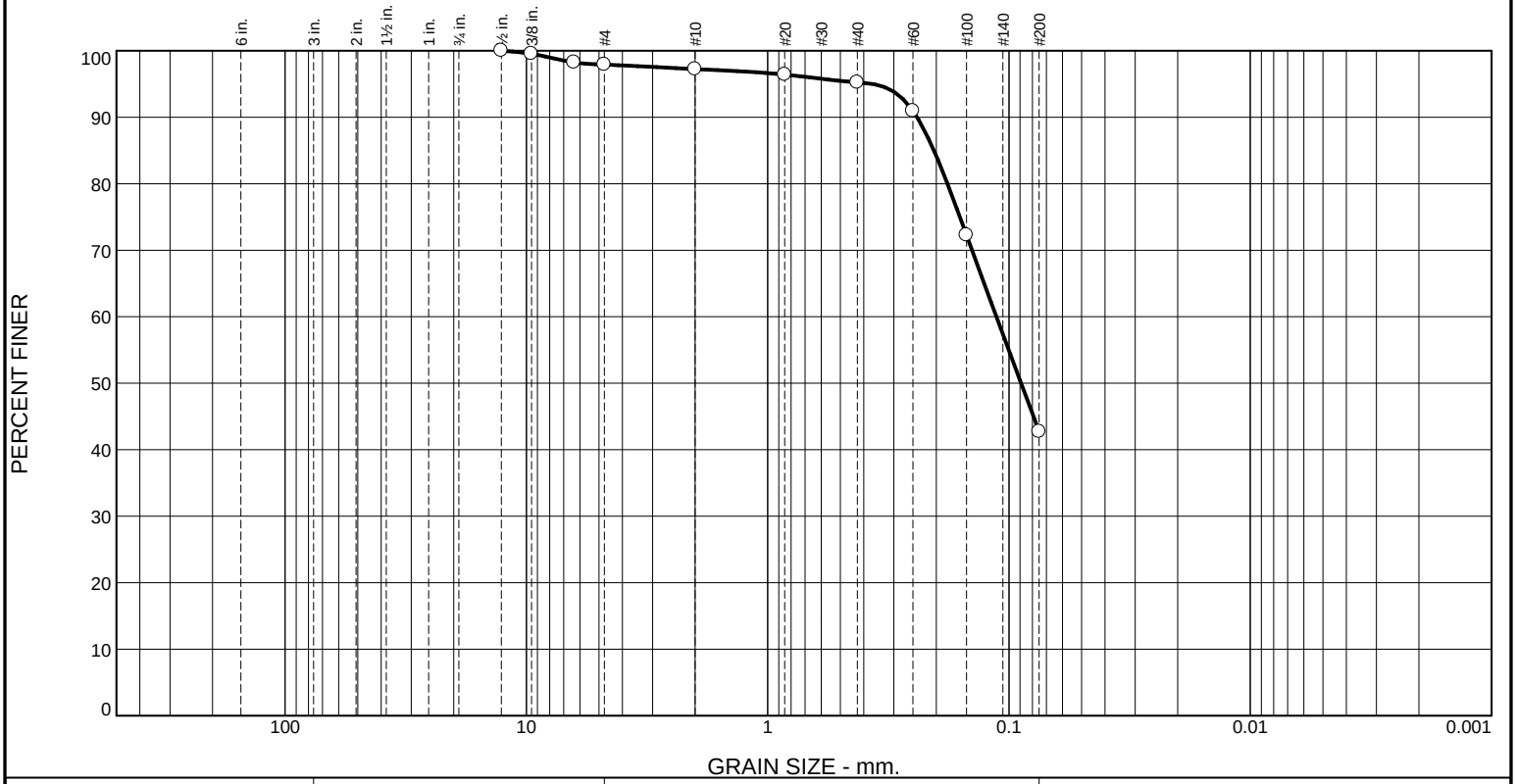
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Jeff W **Checked By:** Dave D

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	2.1	0.7	2.0	52.5	42.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	99.5		
1/4"	98.2		
#4	97.9		
#10	97.2		
#20	96.4		
#40	95.2		
#60	91.0		
#100	72.3		
#200	42.7		

* (no specification provided)

Material Description

Silty sand
As Received Moisture: 12.4%

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.2404 D_{85}= 0.2047 D_{60}= 0.1127
D_{50}= 0.0891 D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-4(0)

Remarks

ASTM: C136, D1140, D2216
Sampled: 12/7/16
Sampled By: Kori B.

Location: OW-2 / S-2B
Sample Number: 7240.3 **Depth:** 11' **Date:** 12/19/2016

Terracon Consultants, Inc.

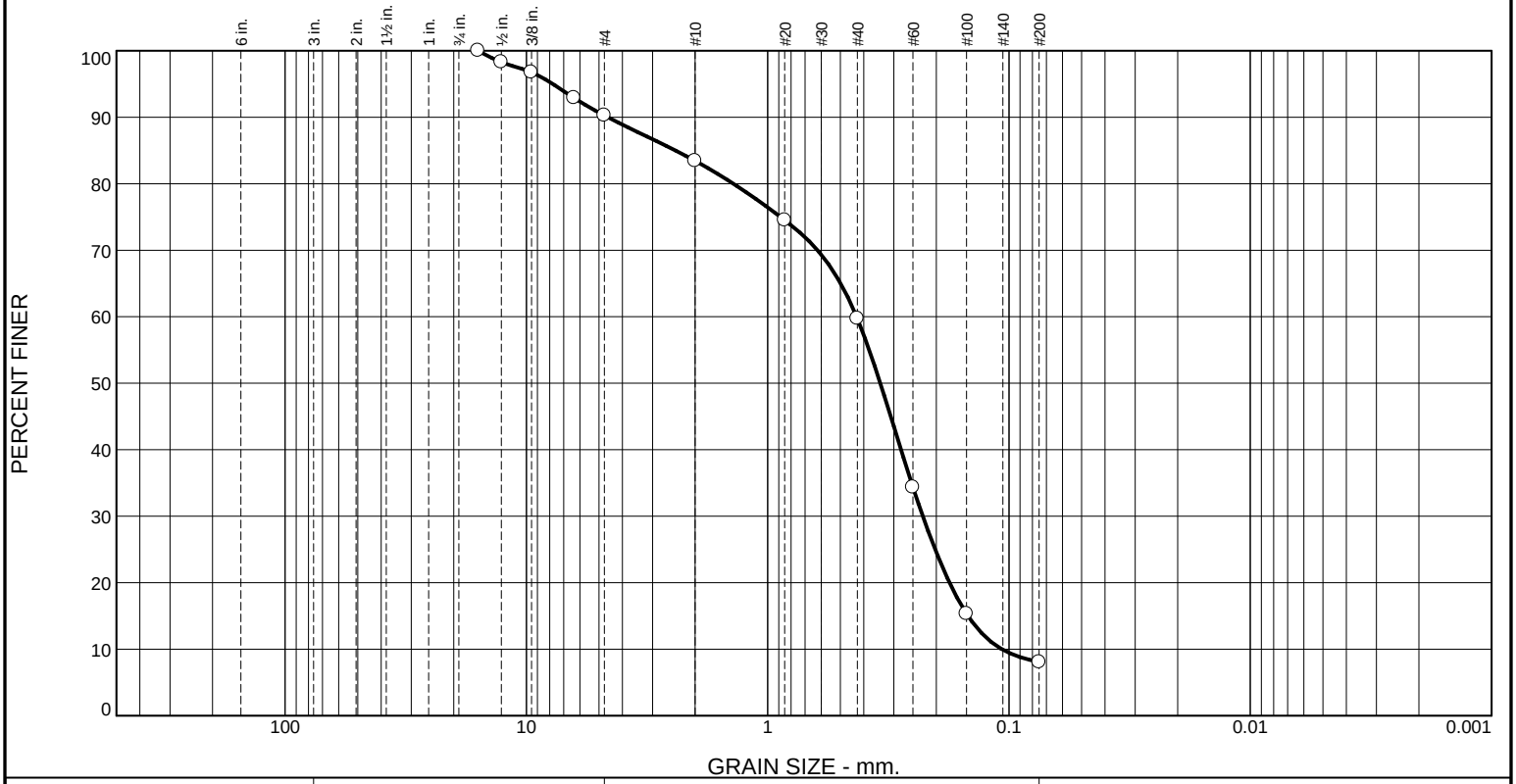
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Jeff W **Checked By:** Dave D

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	9.7	6.9	23.7	51.6	8.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
5/8"	100.0		
1/2"	98.3		
3/8"	96.8		
1/4"	92.9		
#4	90.3		
#10	83.4		
#20	74.5		
#40	59.7		
#60	34.4		
#100	15.3		
#200	8.1		

* (no specification provided)

Material Description

Poorly graded sand with silt
As Received Moisture: 12.5%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 4.5965 D_{85}= 2.4125 D_{60}= 0.4280
D_{50}= 0.3414 D_{30}= 0.2276 D_{15}= 0.1479
D_{10}= 0.1070 C_u= 4.00 C_c= 1.13

Classification

USCS= SP-SM AASHTO= A-3

Remarks

ASTM: C136, D1140, D2216
Sampled: 12/7/16
Sampled By: Kori B.

Location: OW-2 / S-3
Sample Number: 7240.4 **Depth:** 15' **Date:** 12/19/2016

Terracon Consultants, Inc.

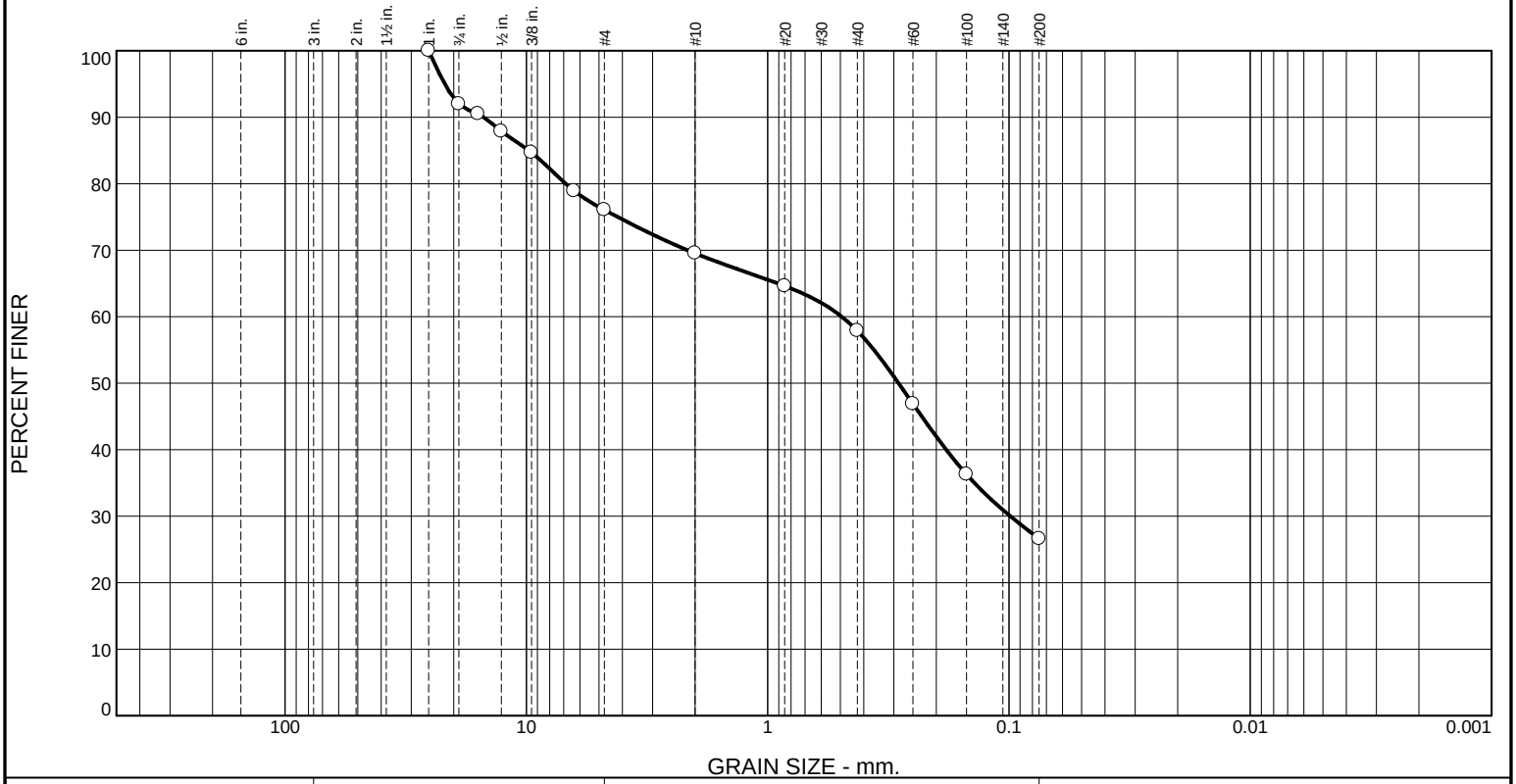
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Jeff W **Checked By:** Dave D

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	8.0	15.9	6.6	11.6	31.3	26.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	92.0		
5/8"	90.5		
1/2"	87.9		
3/8"	84.7		
1/4"	78.9		
#4	76.1		
#10	69.5		
#20	64.6		
#40	57.9		
#60	46.9		
#100	36.3		
#200	26.6		

* (no specification provided)

Material Description

Silty sand with gravel
As Received Moisture: 7.4%

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 15.0401 D_{85}= 9.7663 D_{60}= 0.4928
D_{50}= 0.2869 D_{30}= 0.0987 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

ASTM: C136, D1140, D2216
Sampled: 12/7/16
Sampled By: Kori B.

Location: OW-3 / S-2
Sample Number: 7240.5 **Depth:** 10' **Date:** 12/19/2016

Terracon Consultants, Inc.

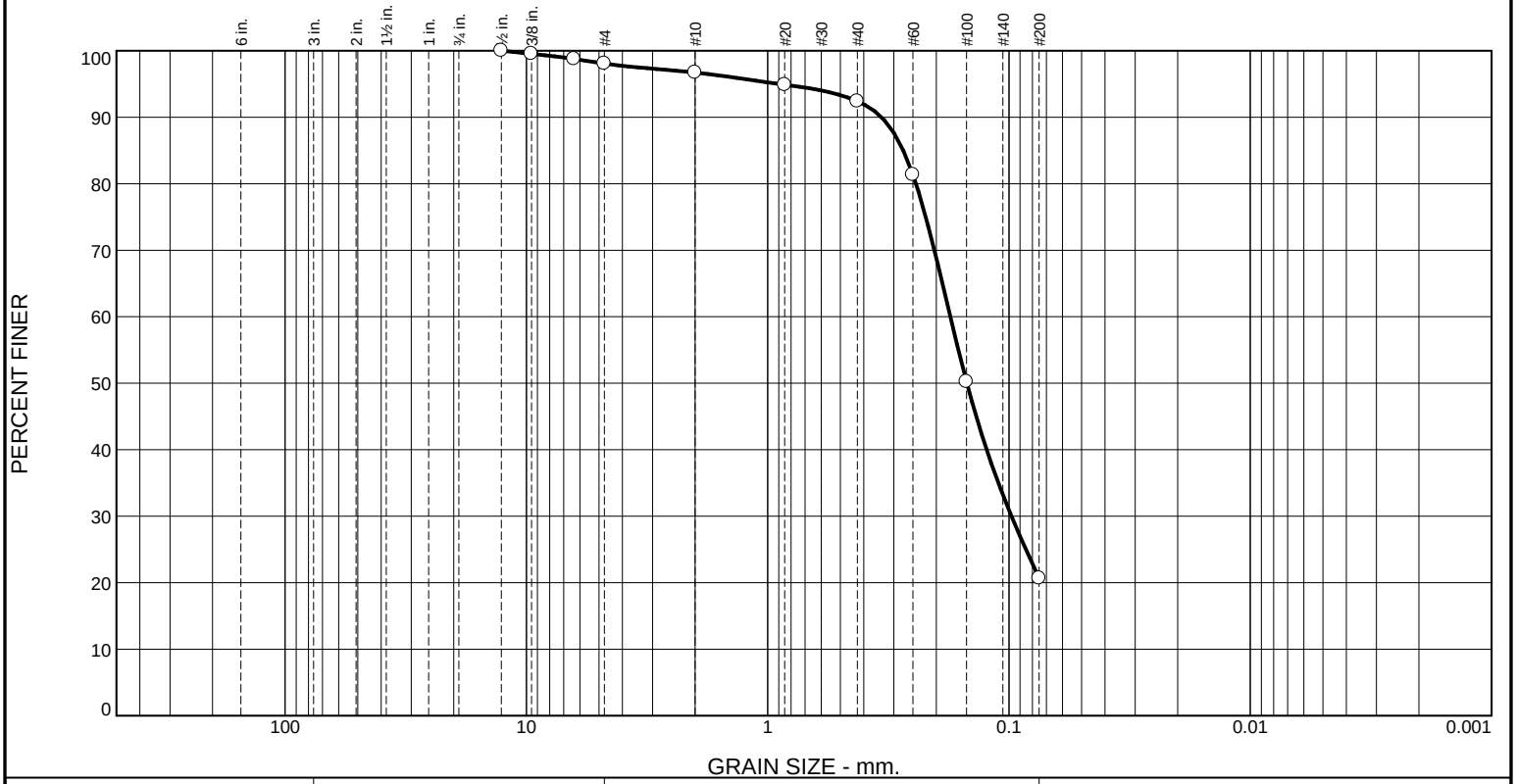
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Jeff W **Checked By:** Dave D

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.9	1.4	4.3	71.7	20.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	99.5		
1/4"	98.8		
#4	98.1		
#10	96.7		
#20	94.9		
#40	92.4		
#60	81.4		
#100	50.2		
#200	20.7		

* (no specification provided)

Material Description

Silty sand
As Received Moisture: 7.5%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 0.3373 D_{85}= 0.2743 D_{60}= 0.1749
D_{50}= 0.1495 D_{30}= 0.0976 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

ASTM: C136, D1140, D2216
Sampled: 12/7/16
Sampled By: Kori B.

Location: OW-3 / S-4
Sample Number: 7240.6 **Depth:** 20' **Date:** 12/19/2016

Terracon Consultants, Inc.

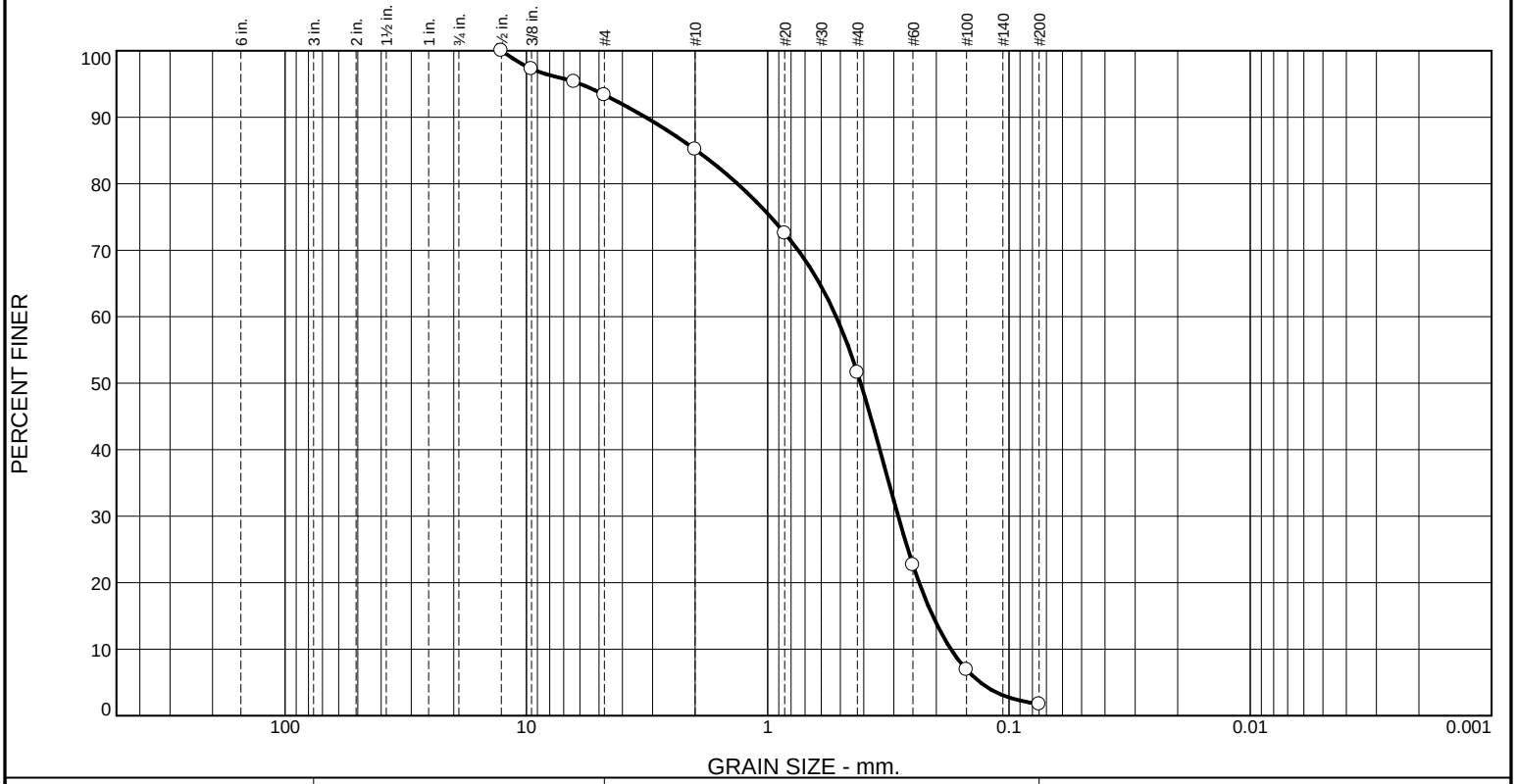
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Jeff W **Checked By:** Dave D

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	6.6	8.2	33.6	49.9	1.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	97.3		
1/4"	95.3		
#4	93.4		
#10	85.2		
#20	72.6		
#40	51.6		
#60	22.7		
#100	6.9		
#200	1.7		

* (no specification provided)

Material Description

Poorly graded sand
As Received Moisture: 4.7%

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 3.2043 D_{85}= 1.9723 D_{60}= 0.5197
D_{50}= 0.4114 D_{30}= 0.2880 D_{15}= 0.2070
D_{10}= 0.1742 C_u= 2.98 C_c= 0.92

Classification

USCS= SP AASHTO= A-3

Remarks

ASTM: C136, D1140, D2216
Sampled: 12/29/16
Sampled By: Konrad M.

Location: IT-1, G-1
Sample Number: 7248.1 **Depth:** 7' **Date:** 1/9/2017

Terracon Consultants, Inc.

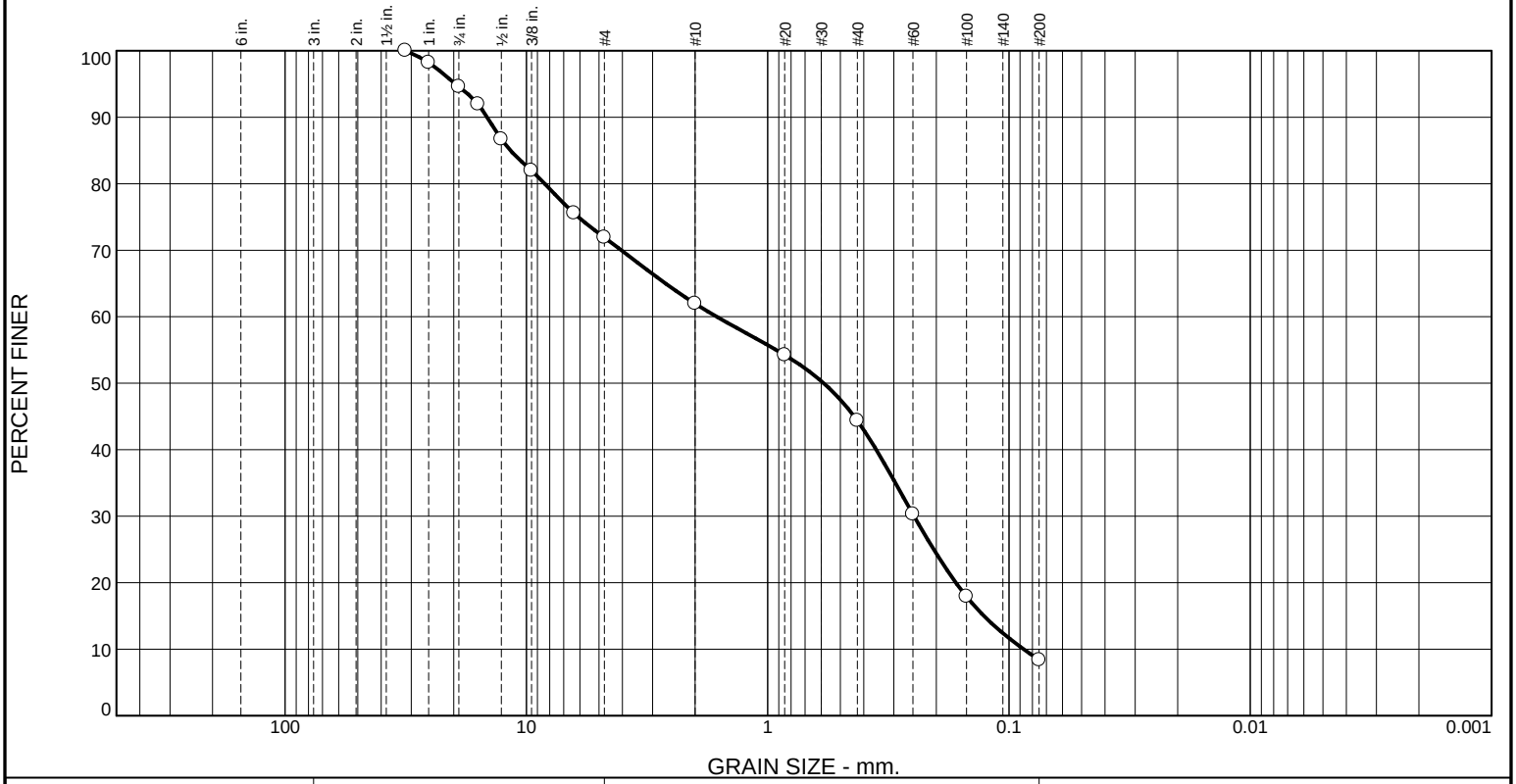
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Ryan G **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.4	22.7	9.9	17.6	36.0	8.4	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.25"	100.0		
1"	98.2		
3/4"	94.6		
5/8"	92.0		
1/2"	86.7		
3/8"	82.0		
1/4"	75.6		
#4	71.9		
#10	62.0		
#20	54.2		
#40	44.4		
#60	30.3		
#100	17.9		
#200	8.4		

* (no specification provided)

Material Description

Poorly graded sand with silt and gravel
As Received Moisture: 5.6%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 14.5441 D_{85}= 11.6485 D_{60}= 1.6266
D_{50}= 0.5853 D_{30}= 0.2474 D_{15}= 0.1270
D_{10}= 0.0869 C_u= 18.73 C_c= 0.43

Classification

USCS= SP-SM AASHTO= A-1-b

Remarks

ASTM: C136, D1140, D2216
Sampled: 1/3/17
Sampled By: Konrad M.

Location: IT-1, G-3
Sample Number: 7250.1 **Depth:** 11.5' **Date:** 1/9/2017

Terracon Consultants, Inc.

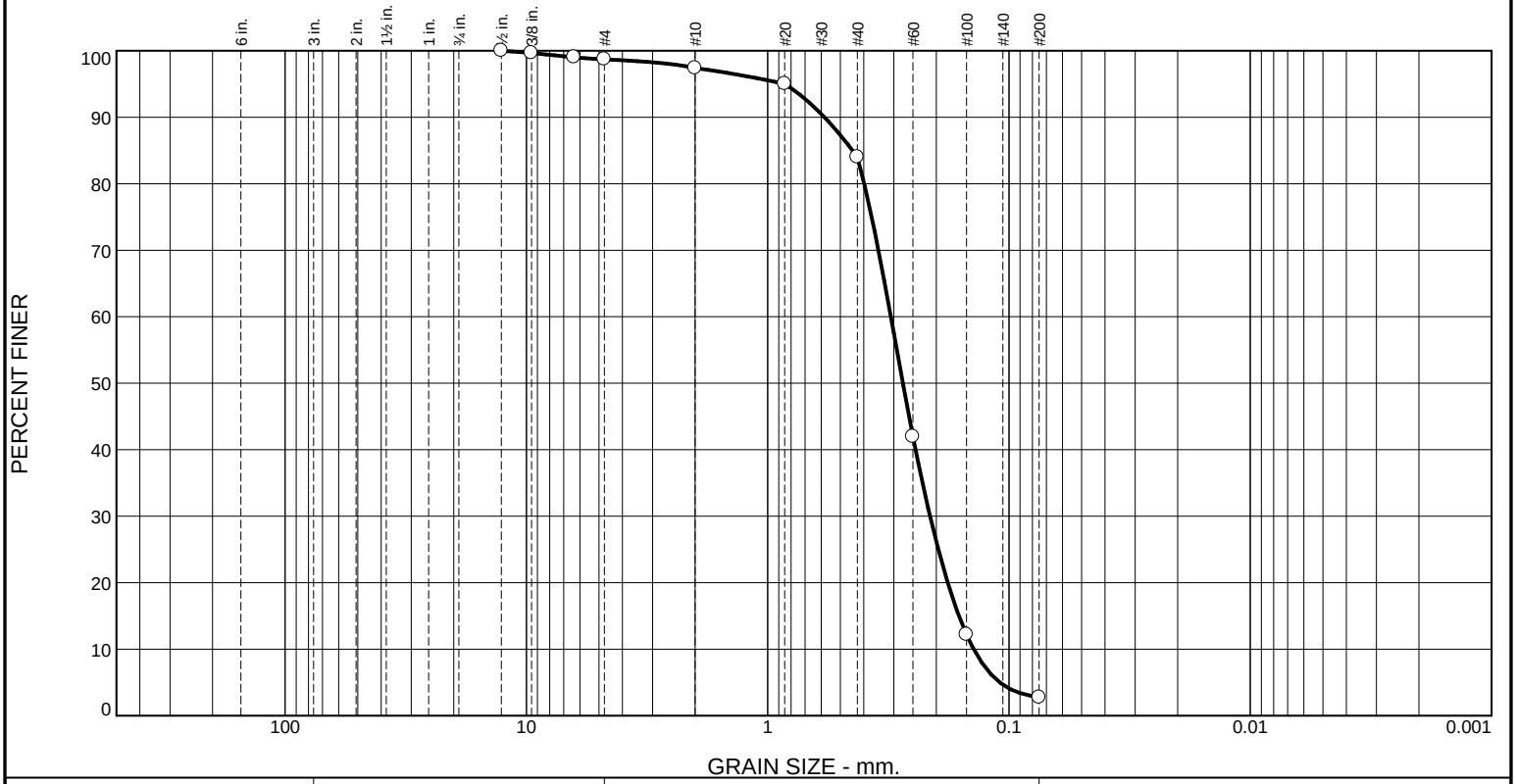
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Ryan G **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	1.3	1.3	13.4	81.2	2.8	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	99.7		
1/4"	99.0		
#4	98.7		
#10	97.4		
#20	95.0		
#40	84.0		
#60	42.0		
#100	12.2		
#200	2.8		

* (no specification provided)

Material Description

Poorly graded sand
As Received Moisture: 5.1%

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 0.5817 D_{85}= 0.4453 D_{60}= 0.3088
D_{50}= 0.2752 D_{30}= 0.2124 D_{15}= 0.1613
D_{10}= 0.1401 C_u= 2.20 C_c= 1.04

Classification

USCS= SP AASHTO= A-3

Remarks

ASTM: C136, D1140, D2216
Sampled: 12/29/16
Sampled By: Konrad M.

Location: IT-2, G-1
Sample Number: 7248.2 **Depth:** 9' **Date:** 1/9/2017

Terracon Consultants, Inc.

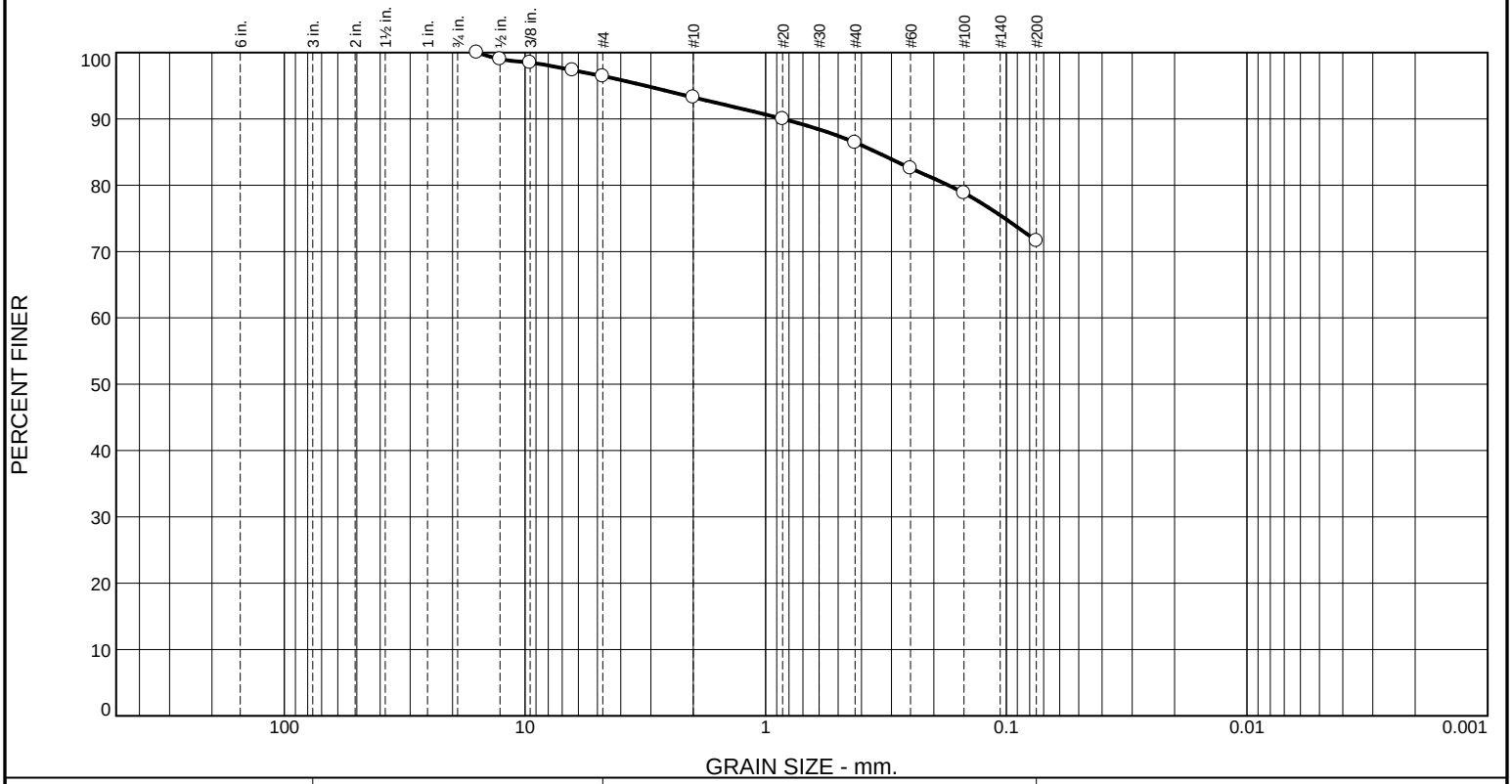
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Ryan G **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.6	3.2	6.8	14.8	71.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
5/8"	100.0		
1/2"	99.0		
3/8"	98.5		
1/4"	97.3		
#4	96.4		
#10	93.2		
#20	90.0		
#40	86.4		
#60	82.6		
#100	78.8		
#200	71.6		

* (no specification provided)

Material Description

Silt with sand
As Received Moisture: 18.1%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 0.8500 D_{85}= 0.3468 D_{60}=
D_{50}= D_{30}= D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= ML AASHTO= A-4(0)

Remarks

ASTM: C136, D1140, D2216
Sampled: 1/3/17
Sampled By: Konrad M.

Location: IT-2, G-3
Sample Number: 7250.2 **Depth:** 12.5' **Date:** 1/9/2017

Terracon Consultants, Inc.

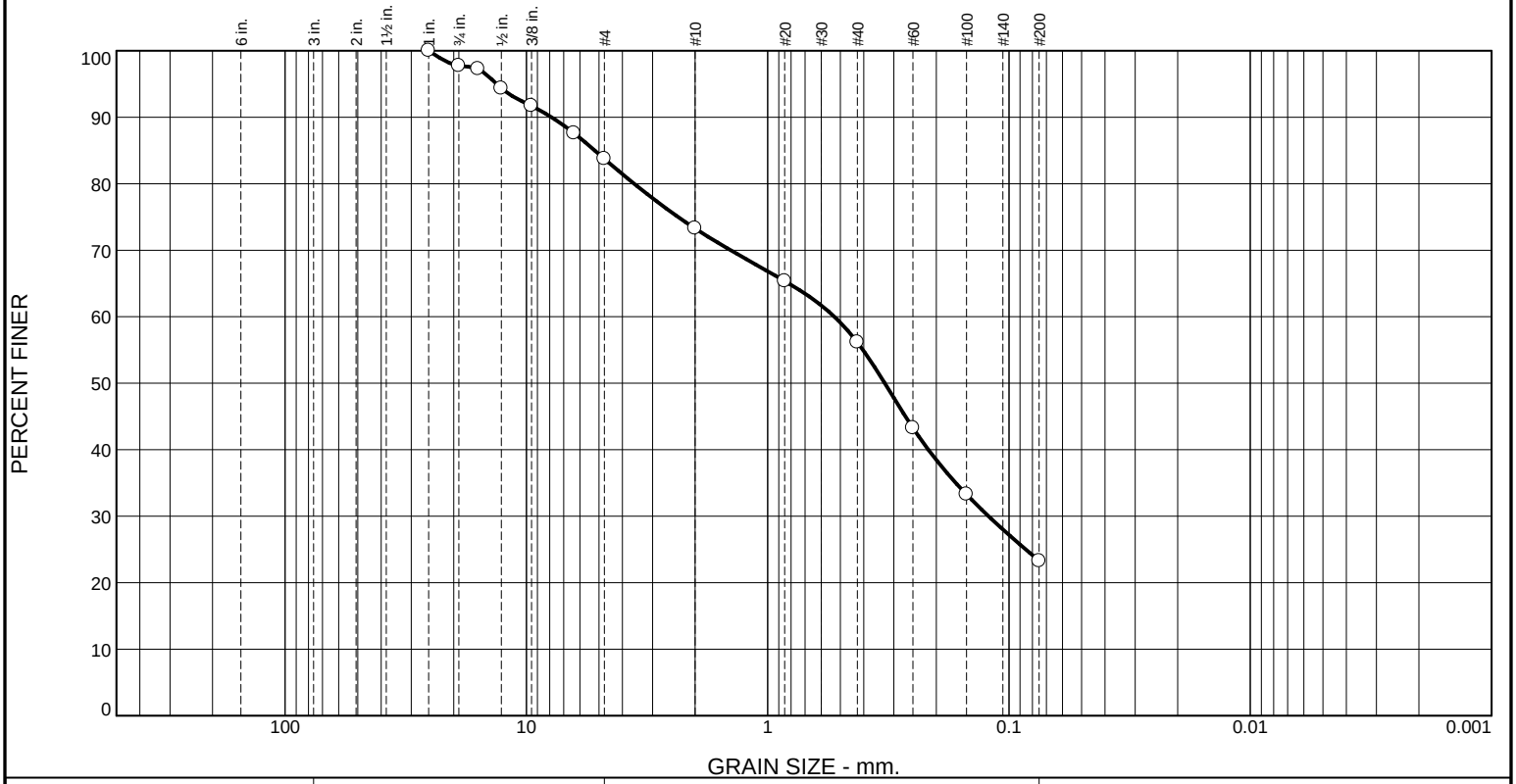
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Ryan G **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	2.3	14.0	10.4	17.1	32.9	23.3	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	97.7		
5/8"	97.3		
1/2"	94.3		
3/8"	91.7		
1/4"	87.6		
#4	83.7		
#10	73.3		
#20	65.4		
#40	56.2		
#60	43.3		
#100	33.3		
#200	23.3		

* (no specification provided)

Material Description

Silty sand with gravel
As Received Moisture: 9.1%

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 7.8644 D_{85}= 5.2095 D_{60}= 0.5290
D_{50}= 0.3272 D_{30}= 0.1215 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

ASTM: C136, D1140, D2216
Sampled: 12/29/16
Sampled By: Konrad M.

Location: IT-3, G-1
Sample Number: 7248.3 **Depth:** 9' **Date:** 1/9/2017

Terracon Consultants, Inc.

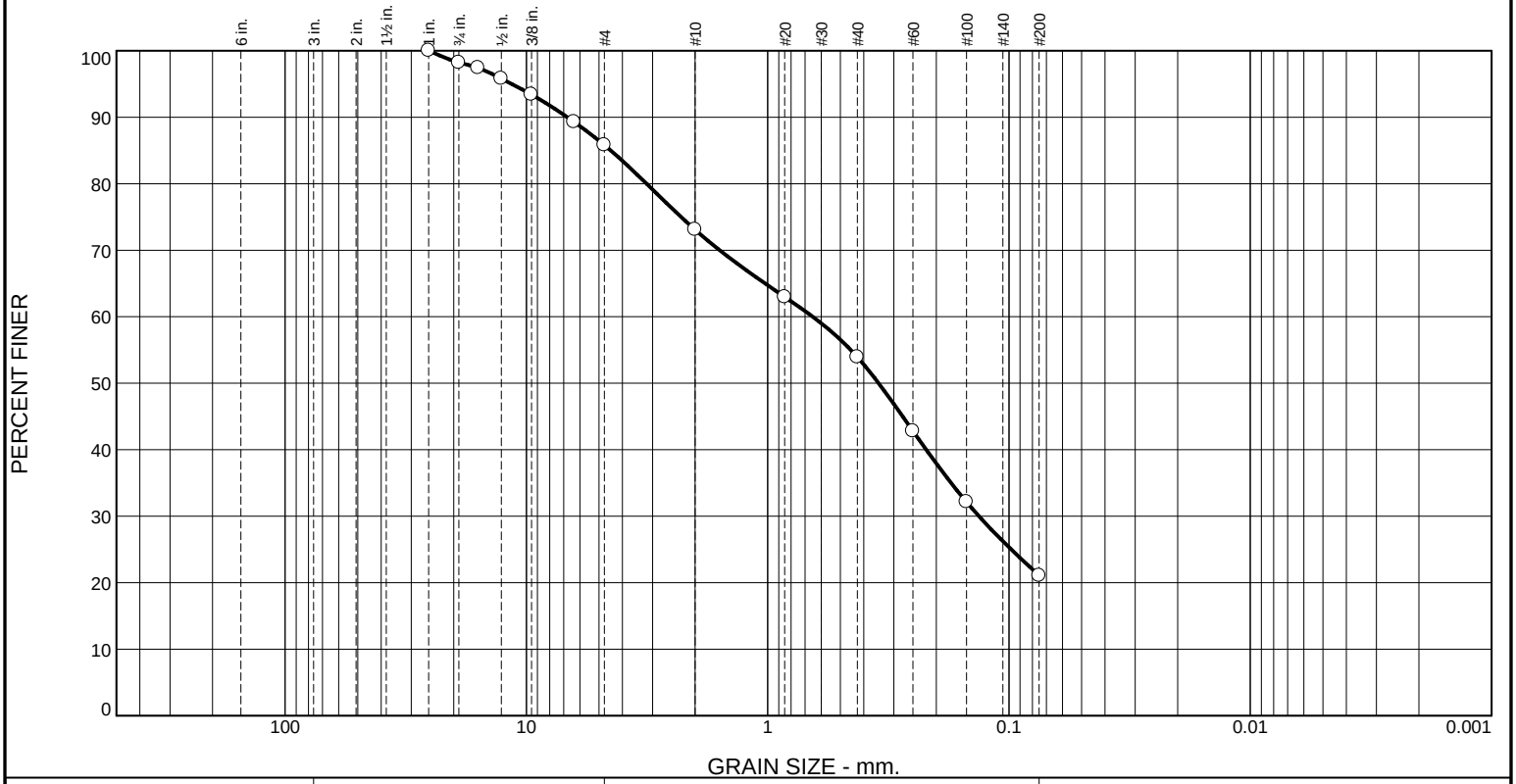
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Ryan G **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	1.8	12.4	12.7	19.2	32.8	21.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	98.2		
5/8"	97.4		
1/2"	95.8		
3/8"	93.4		
1/4"	89.3		
#4	85.8		
#10	73.1		
#20	63.0		
#40	53.9		
#60	42.8		
#100	32.1		
#200	21.1		

* (no specification provided)

Material Description

Silty sand
As Received Moisture: 9.6%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 6.7671 D_{85}= 4.4703 D_{60}= 0.6502
D_{50}= 0.3470 D_{30}= 0.1332 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

ASTM: C136, D1140, D2216
Sampled: 1/3/17
Sampled By: Konrad M.

Location: IT-3, G-2
Sample Number: 7250.3 **Depth:** 11.25' **Date:** 1/9/2017

Terracon Consultants, Inc.

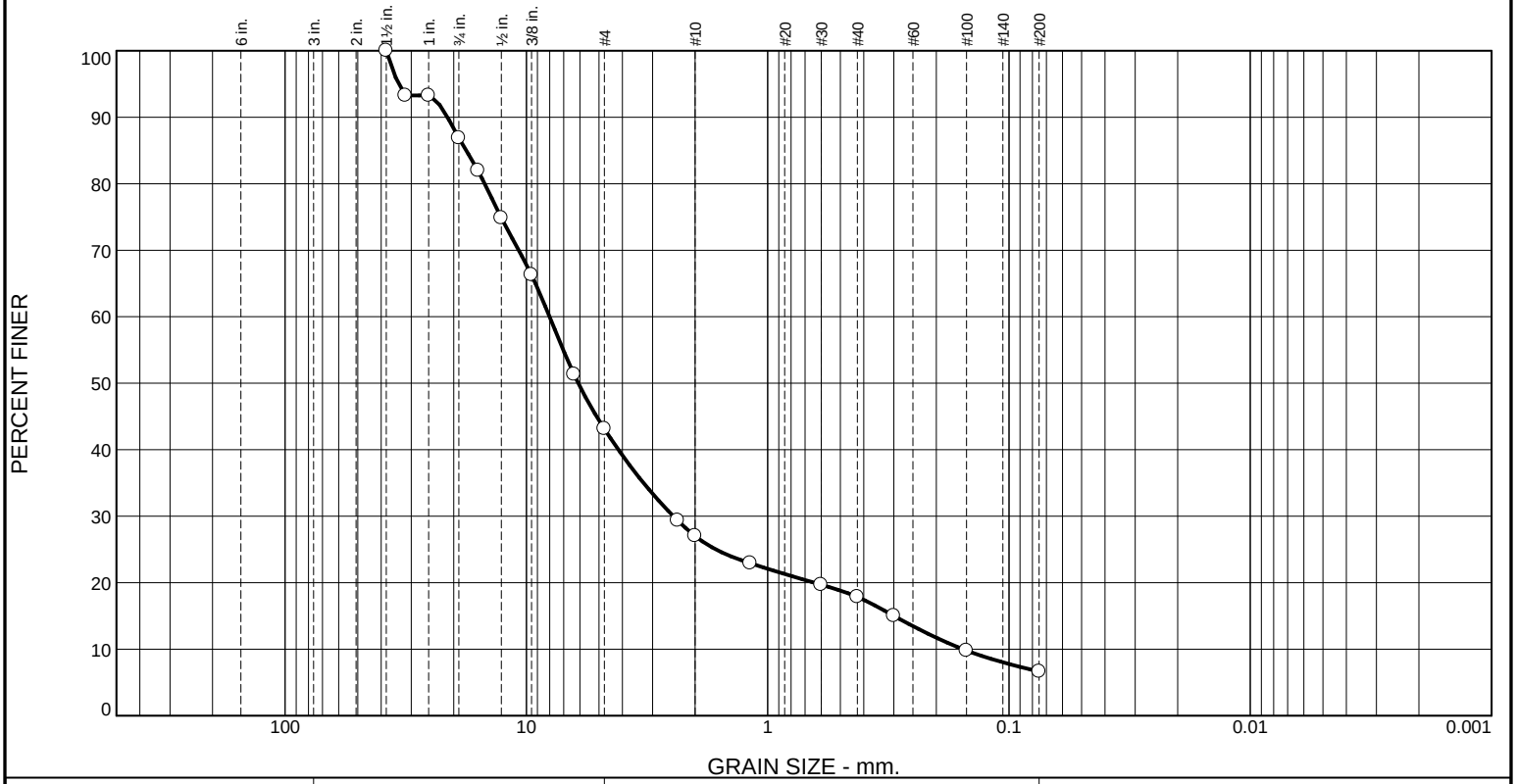
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Ryan G **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	13.1	43.8	16.1	9.1	11.3	6.6	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.5"	100.0		
1.25"	93.3		
1"	93.3		
3/4"	86.9		
5/8"	82.0		
1/2"	74.8		
3/8"	66.3		
1/4	51.3		
#4	43.1		
#8	29.4		
#10	27.0		
#16	22.9		
#30	19.7		
#40	17.9		
#50	15.0		
#100	9.8		
#200	6.6		

* (no specification provided)

Material Description

Poorly graded gravel with silt and sand
As Received Moisture: 5.9%

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 21.2355 D_{85}= 17.7658 D_{60}= 8.0122
D_{50}= 6.0980 D_{30}= 2.4585 D_{15}= 0.2994
D_{10}= 0.1551 C_u= 51.67 C_c= 4.87

Classification

USCS= GP-GM AASHTO= A-1-a

Remarks

ASTM: C136, D1140, D2216
Sampled: 2/21/17
Sampled by: Konrad M.

Location: IT-4, G-4
Sample Number: 9919 **Depth:** 9-10' **Date:** 3/1/2017

Terracon Consultants, Inc.

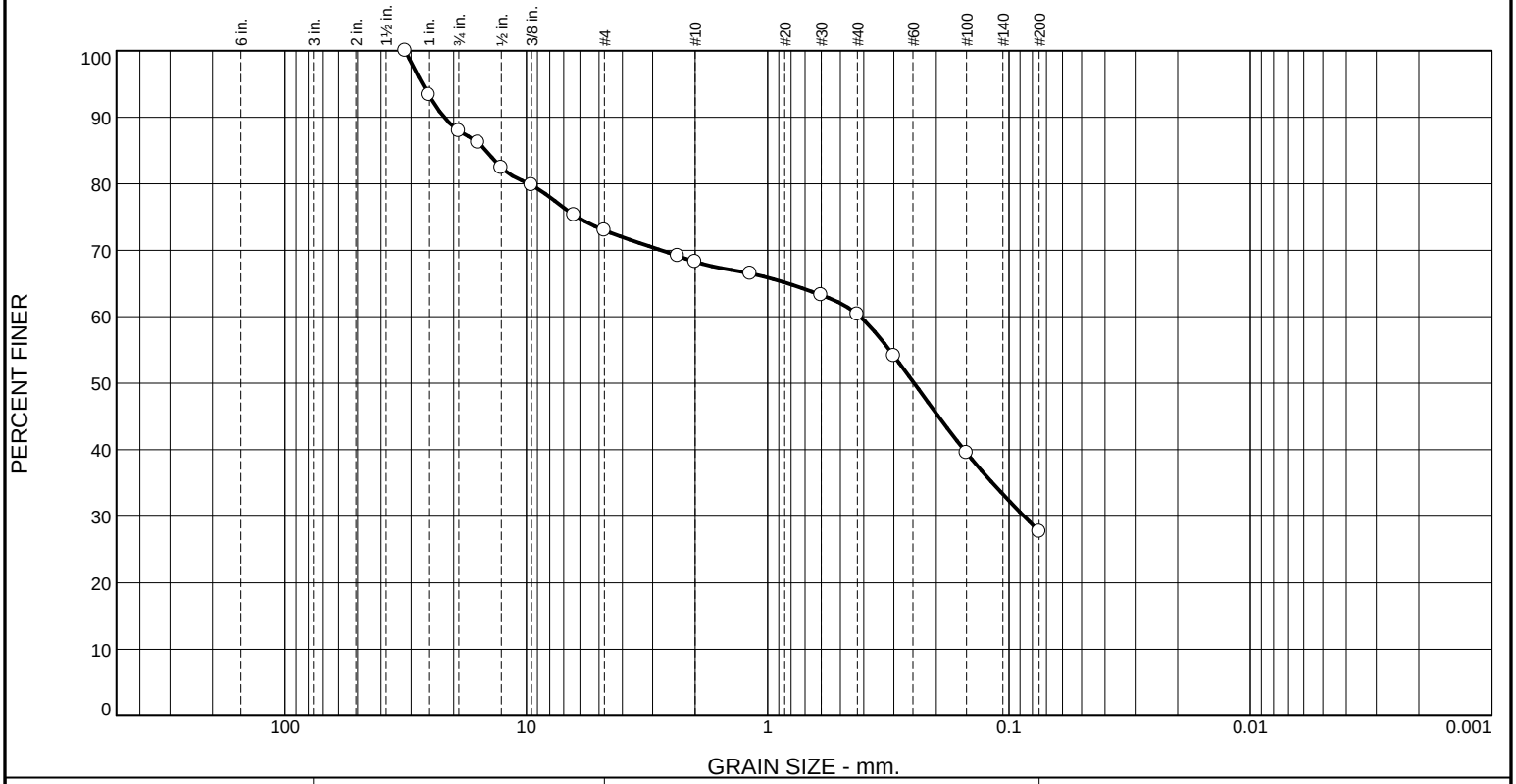
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Kinsey B **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	12.1	14.9	4.7	7.9	32.7	27.7	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1.25"	100.0		
1"	93.4		
3/4"	87.9		
5/8"	86.2		
1/2"	82.4		
3/8"	79.8		
1/4	75.3		
#4	73.0		
#8	69.2		
#10	68.3		
#16	66.5		
#30	63.3		
#40	60.4		
#50	54.1		
#100	39.5		
#200	27.7		

* (no specification provided)

Material Description

Silty sand with gravel
As Received Moisture: 10.5%

Atterberg Limits

PL= NP LL= NV PI= NP

Coefficients

D_{90}= 21.8880 D_{85}= 14.7151 D_{60}= 0.4137
D_{50}= 0.2472 D_{30}= 0.0866 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

ASTM: C136, D1140, D2216
Sampled: 2/21/17
Sampled by: Konrad M.

Location: IT-4, G-7
Sample Number: 9920 **Depth:** 13-14' **Date:** 3/1/2017

Terracon Consultants, Inc.

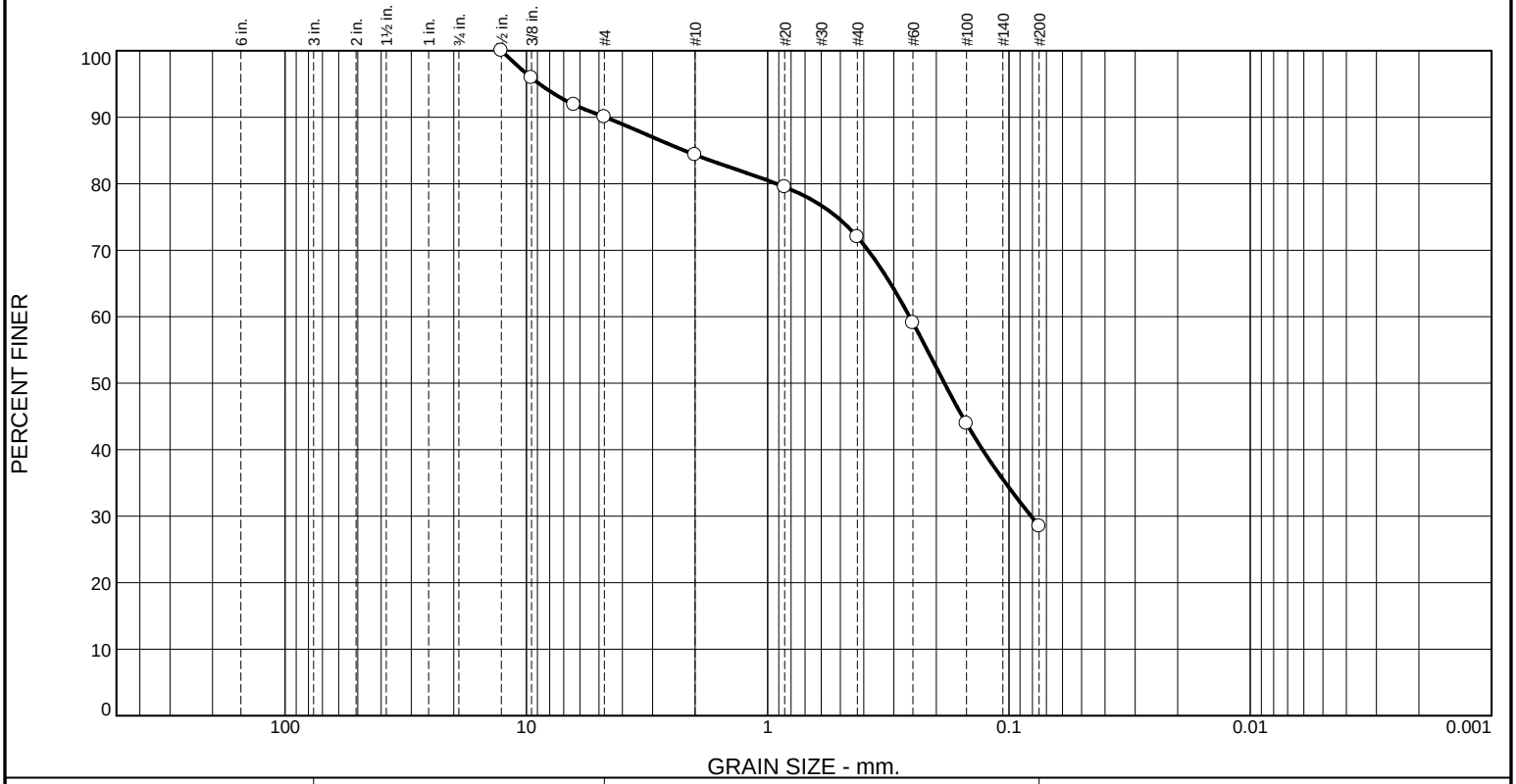
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Kinsey B **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	10.0	5.7	12.3	43.5	28.5	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	95.9		
1/4"	91.9		
#4	90.0		
#10	84.3		
#20	79.5		
#40	72.0		
#60	59.1		
#100	43.9		
#200	28.5		

* (no specification provided)

Soil Description

Silty sand
As Received Moisture: 6.6%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 4.7143 D_{85}= 2.2209 D_{60}= 0.2581
D_{50}= 0.1851 D_{30}= 0.0809 D_{15}=
D_{10}= C_u= C_c=

Classification

USCS= SM AASHTO= A-2-4(0)

Remarks

ASTM: C136, D1140, D2216
Sampled: 8/31/16
Sampled By: Konrad M. & Frank C.

Location: B-11, S-3
Depth: 10-11.5

Date: 9/14/2016

Terracon Consultants, Inc.

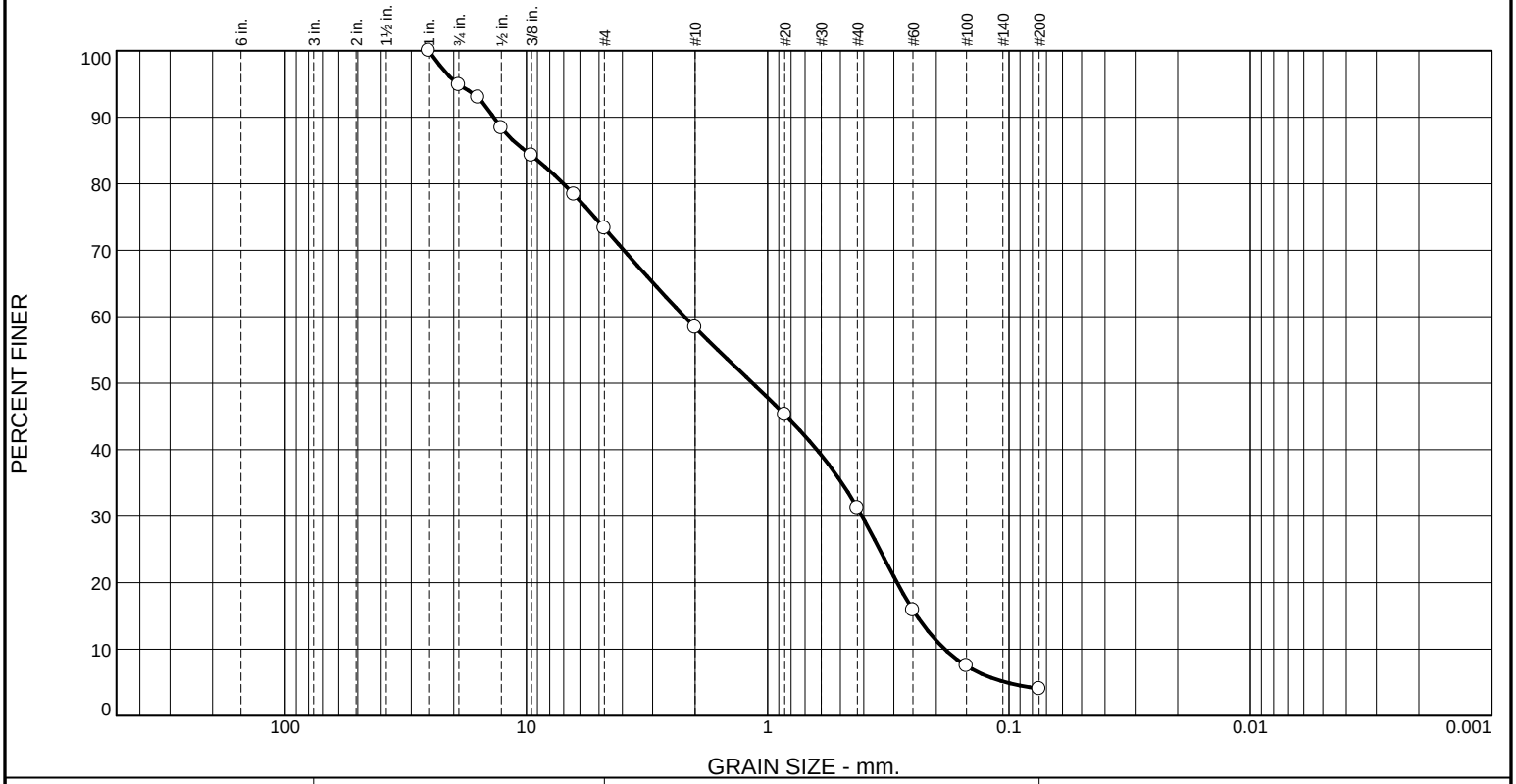
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Ryan G **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	5.1	21.6	14.9	27.2	27.2	4.0	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1"	100.0		
3/4"	94.9		
5/8"	93.0		
1/2"	88.4		
3/8"	84.3		
1/4"	78.4		
#4	73.3		
#10	58.4		
#20	45.3		
#40	31.2		
#60	15.9		
#100	7.5		
#200	4.0		

* (no specification provided)

Soil Description

Poorly graded sand with gravel
As Received Moisture: 0.6%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 13.6798 D_{85}= 10.1238 D_{60}= 2.2101
D_{50}= 1.1544 D_{30}= 0.4064 D_{15}= 0.2409
D_{10}= 0.1846 C_u= 11.97 C_c= 0.40

Classification

USCS= SP AASHTO= A-1-b

Remarks

ASTM: C136, D1140, D2216
Sampled: 8/31/16
Sampled By: Konrad M. & Frank C.

Location: B-11, S-6
Depth: 25-26.5

Date: 9/14/2016

Terracon Consultants, Inc.

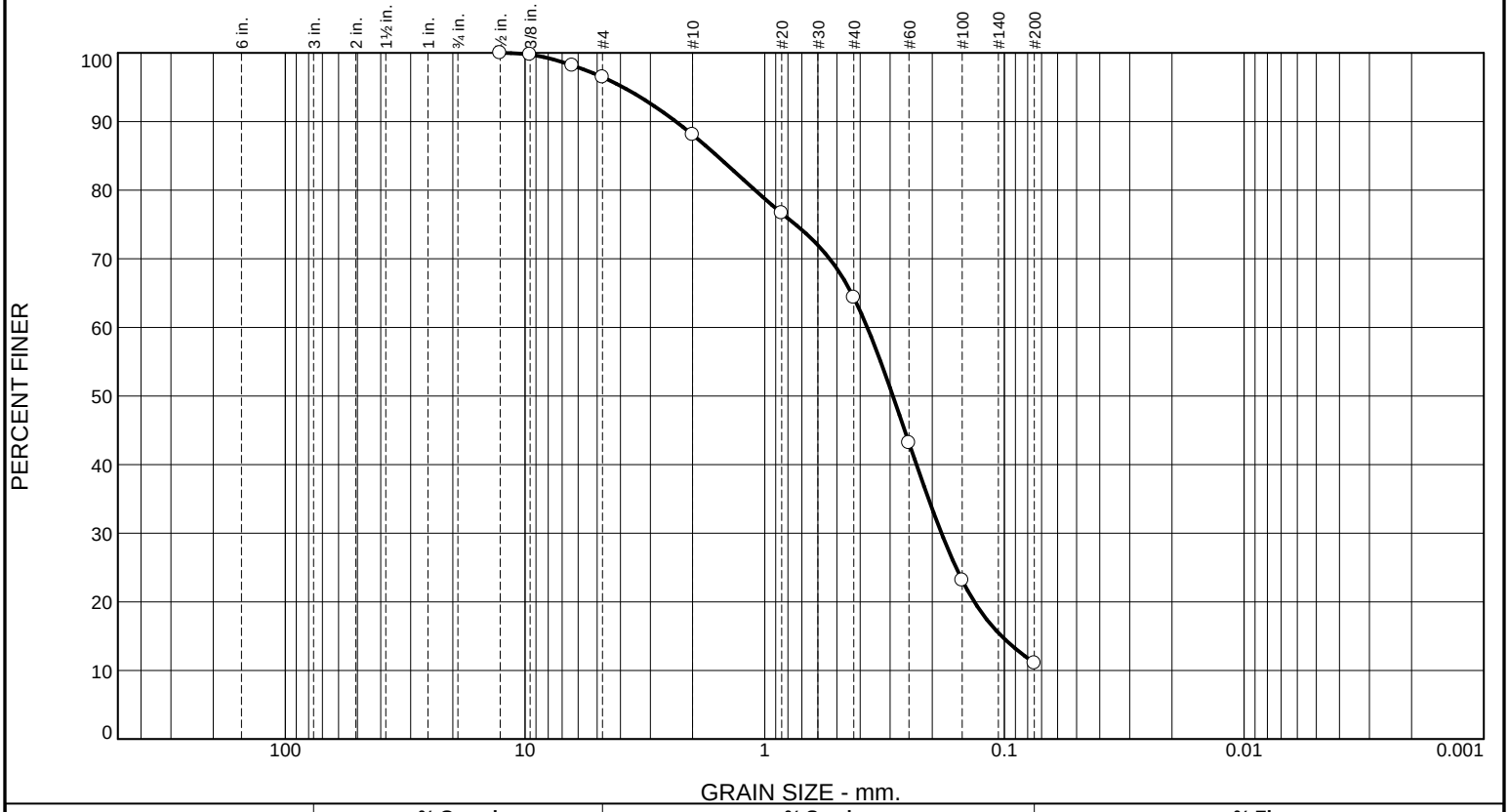
Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

Tested By: Ryan G **Checked By:** Jeff W

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	3.5	8.4	23.7	53.3	11.1	

SIEVE SIZE	PERCENT FINER	SPEC.* PERCENT	PASS? (X=NO)
1/2"	100.0		
3/8"	99.8		
1/4"	98.2		
#4	96.5		
#10	88.1		
#20	76.6		
#40	64.4		
#60	43.2		
#100	23.1		
#200	11.1		

* (no specification provided)

Soil Description

Poorly graded sand with silt
As Received Moisture: 5.2%

Atterberg Limits

PL= NP LL= NV PI=

Coefficients

D_{90}= 2.3471 D_{85}= 1.5800 D_{60}= 0.3733
D_{50}= 0.2919 D_{30}= 0.1830 D_{15}= 0.1027
D_{10}= C_u= C_c=

Classification

USCS= SP-SM AASHTO= A-2-4(0)

Remarks

ASTM: C136, D1140, D2216
Sampled: 8/31/16
Sampled By: Konrad M. & Frank C.

Location: B-15, S-4A
Depth: 15-16

Date: 9/19/2016

Terracon Consultants, Inc.

Mountlake Terrace, WA

Client: Central Kitsap School District
Project: Central Kitsap HS/MS

Project No: 6-917-18096-0 **Figure**

MOISTURE CONTENT AND MINUS 200 WASH
ASTM: D2216 D1140

Job Name: Central Kitsap High School/Middle School	Client: Central Kitsap School District
Job Number: 6-917-18096-0	Sample Date: 1/3/2017
Date: 1/9/2017	Sampled By: Konrad M.

Exploration:	IT-1
Sample Number:	G-2
Depth:	9.5'
% Moisture	9.6%
% -200 Wash	17.96%

Tested By: Jeff W.
Reveiwed By: Dave D.
Respectfully submitted,

By: Jeff Ward

Terracon
Consulting Engineers & Scientists

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

Professional Analytical Services

Jan 13 2017
AMEC FOSTER WHEELER
11810 NORTH CREEK PKWY N
BOTHELL, WA 98011
Attention: KONRAD MOELLER/TODD WENTWORTH

Dear KONRAD MOELLER/TODD WENTWORTH:

Enclosed please find the analytical data for your CENTRAL KITSAP HS/MS project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
IT-1	Soil	17-A000151	CONV
IT-2	Soil	17-A000152	CONV
IT-3	Soil	17-A000153	CONV

Your samples were received on Friday, January 6, 2017. At the time of receipt, the samples were logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,

Aaron W. Young
Laboratory Manager

BACT = Bacteriological
CONV = Conventionals
MET = Metals
ORG = Organics
NUT=Nutrients
DEM=Demand
MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com

AMTEST LABORATORIES

Professional Analytical Services

ANALYSIS REPORT

AMEC FOSTER WHEELER
11810 NORTH CREEK PKWY N
BOTHELL, WA 98011
Attention: KONRAD MOELLER/TODD WENTWORTH
Project Name: CENTRAL KITSAP HS/MS
All results reported on an as received basis.

Date Received: 01/06/17
Date Reported: 1/13/17

AMTEST Identification Number **17-A000151**
Client Identification **IT-1**
Sampling Date

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Cation Exchange Capacity	2.6	meq/100g		0.5	SW-846 9081	AY	01/12/17
Organic Matter	0.7	%		0.1	ASTM D 2974	SW	01/10/17

AMTEST Identification Number **17-A000152**
Client Identification **IT-2**
Sampling Date

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Cation Exchange Capacity	1.9	meq/100g		0.5	SW-846 9081	AY	01/12/17
Organic Matter	0.5	%		0.1	ASTM D 2974	SW	01/10/17

AMTEST Identification Number **17-A000153**
Client Identification **IT-3**
Sampling Date

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Cation Exchange Capacity	6.7	meq/100g		0.5	SW-846 9081	AY	01/12/17
Organic Matter	1.1	%		0.1	ASTM D 2974	SW	01/10/17

Aaron W. Young
Laboratory Manager

Am Test Inc.
13600 NE 126th PL
Suite C
Kirkland, WA, 98034
(425) 885-1664
www.amtestlab.com

AMTEST LABORATORIES

Professional Analytical Services

QC Summary for sample numbers: 17-A000151 to 17-A000153

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A000153	Organic Matter	%	1.1	1.5	31.

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Cation Exchange Capacity	meq/100g	4.0	4.0	100. %

BLANKS

ANALYTE	UNITS	RESULT
Cation Exchange Capacity	meq/100g	< 0.5

AMTEST LABORATORIES

AmTest Chain of Custody Record

13600 NE 126th PL, Suite C, Kirkland, WA 98034
Ph (425) 885-1664 Fx (425) 820-0245
www.amtestlab.com

Chain of Custody No. 30053

Client Name & Address: Amec Foster Wheeler	Invoice To:
Contact Person: Konrad Moeller / Todd Wentworth	Invoice Contact:
Phone No: 425-368-1000	PO Number:
Fax No:	Invoice Ph/Fax:
E-mail: todd.wentworth@amecfw.com Konrad.moeller@Amecfw.com	Invoice E-mail:
Report Delivery: (Choose all that apply) Mail / Fax / (Email) / Posted Online	Data posted to online account: YES / NO Web Login ID:
Special Instructions:	
Requested ~~TAT~~: **(Rush must be pre-approved by lab)** (Standard) RUSH (5 Day / 3 Day / 48 HR / 24 HR)	Temperature upon Receipt: 13.7
Project Name: Central Ketsup HS/MS	
Project Number:	

AmTest ID	Client ID (35 characters max)	Date Sampled	Time Sampled	Matrix	No. of containers	Analysis Requested: CEC	Analysis Requested: Organic content	Analysis Requested	Analysis Requested	Analysis Requested	Analysis Requested	Analysis Requested	Analysis Requested	Analysis Requested	QA/QC
151	IT-1					x	x								
52	IT-2					x	x								
53	IT-3					x	x								

Collected/Relinquished By:	Date	Time	Received By:	Date	Time
Karl Moeller	1/6/17	1140	RH	1/6/17	1140
Relinquished By:	Date	Time	Received By:	Date	Time
Relinquished By:	Date	Time	Received By:	Date	Time

COMMENTS:

Client

LABORATORY TESTING PROGRAM

amec

CLIENT: Amec Foster Wheeler | PROJ NAME: Central Kitsap High School / Middle School | PROJ #: 6-917-180960 | PHASE: | TASK:

P.6

Konrad Moeller / Todd Wentworth

SAMPLED BY: Konrad Moeller | DATE: Jan 6 2017 | PROJ MGR: KHM / TDW | DATE TASK REQUESTED: Jan 6 2017 | DUE DATE: Jan 13 2017

BORING OR TEST PIT #	SAMPLE #	DEPTH	VISUAL CLASSIFICATION	1 MOISTURE CONTENT	2 SIEVE ANALYSIS	3 PROCTOR "MOD "STD	4 ORGANIC CONTENT	5 IN-SITU DENSITY	6 SPECIFIC GRAVITY	7 LA ABRASION	9 - #200 WASH	EXT/GRAD A/B ATB G HMA	14 RICE	15 GYRATORY	16 SAND EQUIVALENT	17 SOUNDNESS	18 DEGRADATION	19 HYDROMETER ANALYSIS	20 ATTERBERG LIMITS	22 CBR	23 FRACTURED FACES	24 Cation Exchange	ID NUMBER	REMARKS: (e.g., SOURCE, SUPPLIER, INTENDED USE, DESCRIPTION, LOCATION, ETC. Use multiple lines for information if necessary. PLEASE NOTE REMARKS
IT-1	G-2	-9.5					/															/		Cation Exchange Capacity - EPA Method 9081 Organic Content - ASTM D2974
IT-2	G-2	-11.5					/															/		Cation Exchange Capacity - EPA Method 9081 Organic Content - ASTM D2974
IT-3	G-2	-11.25					/															/		Cation Exchange Capacity - EPA Method 9081 Organic Content - ASTM D2974

/ TEST TO BE PERFORMED | / TEST HAS BEEN SET UP | X TEST HAS BEEN COMPLETED

EH 1/6/17

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664

Professional Analytical Services

Mar 1 2017
AMEC FOSTER WHEELER
11810 NORTH CREEK PKWY N
BOTHELL, WA 98011
Attention: KONRAD MUELLER/TODD WENTWORTH

Dear KONRAD MUELLER/TODD WENTWORTH:

Enclosed please find the analytical data for your CENTRAL KITSAP HS/MS project.

The following is a cross correlation of client and laboratory identifications for your convenience.

CLIENT ID	MATRIX	AMTEST ID	TEST
IT-4/G-4E-9	Soil	17-A002444	CONV

Your sample was received on Wednesday, February 22, 2017. At the time of receipt, the sample was logged in and properly maintained prior to the subsequent analysis.

The analytical procedures used at AmTest are well documented and are typically derived from the protocols of the EPA, USDA, FDA or the Army Corps of Engineers.

Following the analytical data you will find the Quality Control (QC) results.

Please note that the detection limits that are listed in the body of the report refer to the Practical Quantitation Limits (PQL's), as opposed to the Method Detection Limits (MDL's).

If you should have any questions pertaining to the data package, please feel free to conact me.

Sincerely,

Aaron W. Young
Laboratory Manager

Project #: 6-917-180960

BACT = Bacteriological
CONV = Conventionals
MET = Metals
ORG = Organics
NUT=Nutrients
DEM=Demand
MIN=Minerals

Am Test Inc.
13600 NE 126TH PL
Suite C
Kirkland, WA 98034
(425) 885-1664
www.amtestlab.com

AMTEST LABORATORIES

Professional Analytical Services

ANALYSIS REPORT

AMEC FOSTER WHEELER
11810 NORTH CREEK PKWY N
BOTHELL, WA 98011
Attention: KONRAD MUELLER/TODD WENTWORTH
Project Name: CENTRAL KITSAP HS/MS
Project #: 6-917-180960
All results reported on an as received basis.

Date Received: 02/22/17
Date Reported: 3/ 1/17

AMTEST Identification Number **17-A002444**
Client Identification **IT-4/G-4E-9**
Sampling Date **02/20/17**

Conventionals

PARAMETER	RESULT	UNITS	Q	D.L.	METHOD	ANALYST	DATE
Cation Exchange Capacity	1.2	meq/100g		0.5	SW-846 9081	AY	03/01/17
Organic Matter	0.7	%		0.1	ASTM D 2974	SW	02/24/17

Aaron W. Young
Laboratory Manager

Am Test Inc.
13600 NE 126th PL
Suite C
Kirkland, WA, 98034
(425) 885-1664
www.amtestlab.com

AMTEST LABORATORIES

Professional Analytical Services

QC Summary for sample number: 17-A002444

DUPLICATES

SAMPLE #	ANALYTE	UNITS	SAMPLE VALUE	DUP VALUE	RPD
17-A002492	Cation Exchange Capacity	meq/100g	3.1	2.7	14.
17-A002444	Organic Matter	%	0.7	0.6	15.

STANDARD REFERENCE MATERIALS

ANALYTE	UNITS	TRUE VALUE	MEASURED VALUE	RECOVERY
Cation Exchange Capacity	meq/100g	4.0	3.9	97.5 %

BLANKS

ANALYTE	UNITS	RESULT
Cation Exchange Capacity	meq/100g	< 0.5
Organic Matter	%	< 0.1

AMTEST LABORATORIES

AmTest Chain of Custody Record

13600 NE 126th PL, Suite C, Kirkland, WA 98034
Ph (425) 885-1664 Fx (425) 820-0245
www.amtestlab.com

Chain of Custody No. 30336

Client Name & Address:	Invoice To:
Amec Foster Wheeler	
Contact Person: Kenneth Mueller / Todd Wentworth	Invoice Contact:
Phone No: 425-368-1000	PO Number:
Fax No:	Invoice Ph/Fax:
E-mail: Todd.wentworth@amecfw.com Kenneth.Mueller@amecfw.com	Invoice E-mail:
Report Delivery: (Choose all that apply) Mail / Fax / (Email) / Posted Online	Data posted to online account: YES / NO Web Login ID:
Special Instructions:	
Requested TAT: **(Rush must be pre-approved by lab)** Standard RUSH (5 Day / 3 Day / 48 HR / 24 HR)	Temperature upon Receipt: 6

Project Name: Central Kitsap HS/MS Project Number: 6-417-180460						Analysis Requested									
AmTest ID	Client ID (35 characters max)	Date Sampled	Time Sampled	Matrix	No. of containers	CEC	Organic Content								QA/QC
~~2443~~															
2444	IT-4 / 6-4e-9'	2/20/17		Soil	1	X	X								

Collected/Relinquished By:	Date	Time	Received By:	Date	Time
Kenneth Mueller	2/22/17	4:45	RH	2/22/17	1645
Relinquished By:	Date	Time	Received By:	Date	Time
Relinquished By:	Date	Time	Received By:	Date	Time

COMMENTS: Current

APPENDIX C

PIT Procedures and Data Sheets

APPENDIX C
PIT PROCEDURES AND DATA SHEETS

Central Kitsap High School and Middle School Redevelopment
Silverdale, Washington
Project No. 6-917-18096-0

At each infiltration testing location a test pit was excavated to the target infiltration depth. A soil sample of the subgrade soils at the test depth was taken to determine index properties of the proposed infiltration soils. At the test depth for each test location, a 6-foot-diameter, steel-ring infiltrometer with cover was tamped approximately 6 inches into the undisturbed soil at the bottom of the test pit by the bucket of the excavator. The area around the outside of the ring was then backfilled with soil up to the top of the ring. Water was pumped into the steel ring infiltrometer through a 2-inch- or ¾-inch-diameter hose, discharging into the bottom of the test ring through a machine-slotted polyvinyl chloride screen to minimize scour with the flow rate monitored by a rotameter, accurate to 0.1 gallon per minute. Water depths within the infiltrometer were measured by a vertical measuring rod, marked in inches or 0.1-foot increments.

Once the equipment had been set up, water was pumped into the ring, noting the flow rate and time. A maximum of 6 to 13 inches of water was maintained within the ring during the “pre-soak” period. For IT-1 through IT-4, the pre-soak time was 6 hours. Infiltration testing began once stabilized readings had been obtained for a steady state at the appropriate flow rate for a period of 1 hour. The flow rate, total volume of water added, and the time were regularly recorded during the pre-soaking and steady-state periods. Infiltration testing began immediately after completing the pre-soaking and steady-state phase. At that time, the flow of water into the steel ring was halted the drop in water level was monitored every 15 minutes (falling head test) until the 6-foot-diameter ring was empty or nearly empty of water. The infiltration data collected for each completed PIT are presented in this appendix.

Job Name: **Central Kitsap High School / Middle School**
Job Number: **6-917-180960**
Infiltration Test: **IT-1 (South Parking Lot)**
Date: **12/21/16**

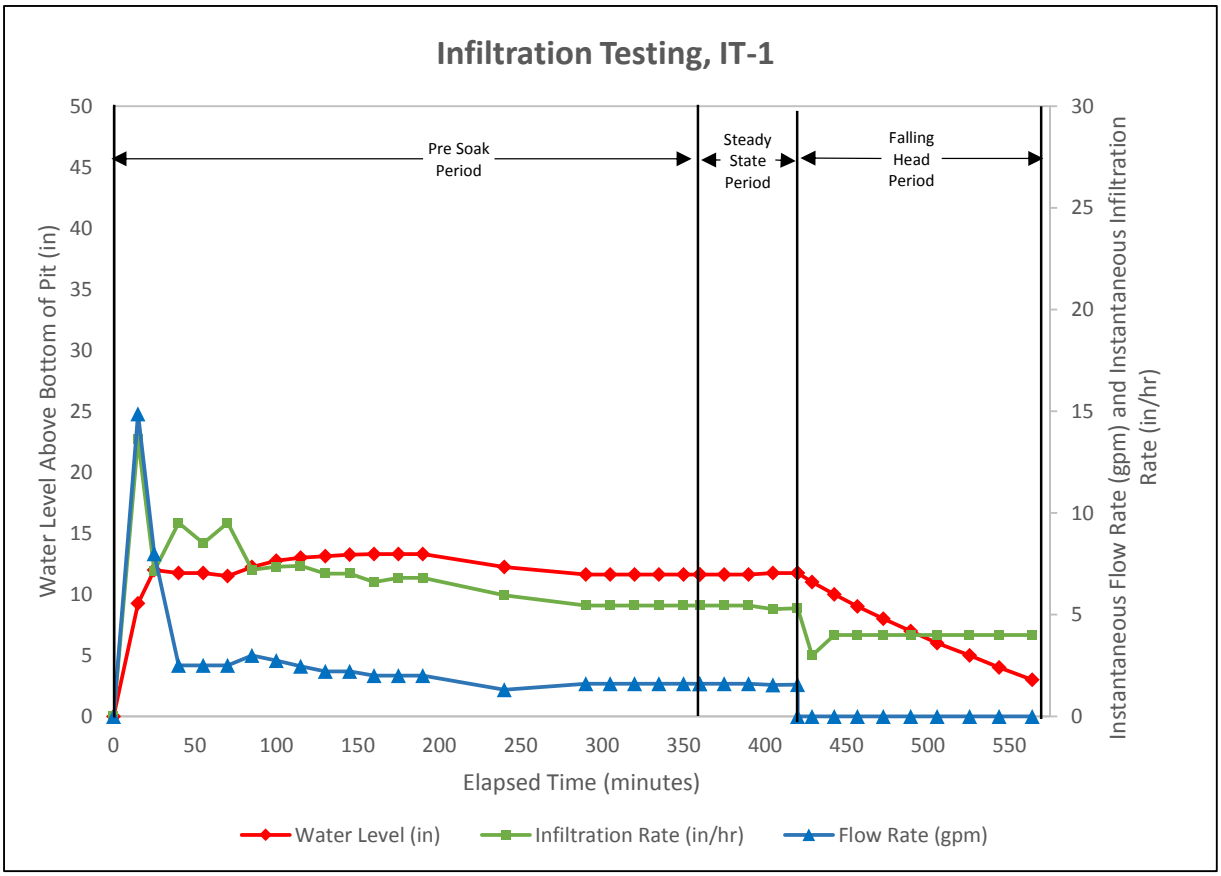
Test Pit Dimensions			
	Length (ft)	Width (ft)	Radius (ft)
Base			3
Surface			N/A
Area of Pit Base (in^2)		**4071.504079**	

Infiltration Information	
Falling Head Minimum (in/hr)	3.0
Falling Head Maximum (in/hr)	5.0
Falling Head Average (in/hr)	**3.8**
Constant Head Infiltration (in/hr)	**5.4**

	Time (hh:mm)	**Elapsed Time (min)**	**Water Level Stage (in)**	**Flow Rate (gal/min)**	**Pit Volume (in^3)**	**Volume Added (Gal)**	**Infiltration Rate (in/hr)**
	9:40 AM	0	0	0	0	-	-
	9:55 AM	15	9.25	14.87	37661.4127	223.05	**13.6**
	10:05 AM	25	12	8	48858.0489	80.00	**10.7**
	10:20 AM	40	11.75	2.5	47840.1729	37.50	**9.5**
	10:35 AM	55	11.75	2.5	47840.1729	37.50	**8.5**
	10:50 AM	70	11.5	2.5	46822.2969	37.50	**9.5**
	11:05 AM	85	12.25	3	49875.925	45.00	**7.2**
	11:20 AM	100	12.75	2.75	51911.677	41.25	**7.4**
	11:35 AM	115	13	2.47	52929.553	37.05	**7.4**
	11:50 AM	130	13.125	2.21	53438.491	33.15	**7.0**
	12:05 PM	145	13.25	2.21	53947.429	33.15	**7.0**
Pre Soak Period (6 hrs)	12:20 PM	160	13.3	2	54151.0043	30.00	**6.6**
	12:35 PM	175	13.3	2	54151.0043	30.00	**6.8**
	12:50 PM	190	13.3	2	54151.0043	30.00	**6.8**
	1:05 PM	205	13.5	1	54965.3051	15.00	**2.6**
Changed to low flow meter	1:25 PM	225	12.625	1.25	51402.739	25.00	**6.9**
	1:40 PM	240	12.25	1.31	49875.925	19.65	**6.0**
	1:55 PM	255	12.875	1.3	52420.615	19.50	**1.9**
Changed from gravity flow to pump flow	2:15 PM	275	11.625	1.6	47331.2349	32.00	**9.2**
	2:30 PM	290	11.625	1.6	47331.2349	24.00	**5.4**
	2:45 PM	305	11.625	1.6	47331.2349	24.00	**5.4**
	3:00 PM	320	11.625	1.6	47331.2349	24.00	**5.4**
	3:15 PM	335	11.625	1.6	47331.2349	24.00	**5.4**
	3:30 PM	350	11.625	1.6	47331.2349	24.00	**5.4**
	3:40 PM	360	11.625	1.6	47331.2349	16.00	**5.4**
	3:40 PM	360	11.625	1.6	47331.2349	16.0	**5.4**
Steady State Period (1 hr)	3:55 PM	375	11.625	1.6	47331.2349	24.000	**5.4**
	4:10 PM	390	11.625	1.6	47331.2349	24.000	**5.4**
	4:25 PM	405	11.75	1.55	47840.1729	23.250	**5.3**
	4:40 PM	420	11.75	1.56	47840.1729	23.400	**5.3**

Job Name: **Central Kitsap High School / Middle School**
Job Number: **6-917-180960**
Infiltration Test: **IT-1 (South Parking Lot)**
Date: **12/21/16**

	Time (hh:mm)	Elapsed Time (min)	Water Level Stage (in)	Flow Rate (gal/min)	Pit Volume (in^3)	Volume Added (Gal)	Infiltration Rate (in/hr)
Falling Head Period (2 hr, 21 min)	4:49 PM	429	11	0	44786.5449	0.0	**5.0**
	5:02 PM	443	10	0	40715.0408	0.0	**4.4**
	5:17 PM	457	9	0	36643.5367	0.0	**4.2**
	5:39 PM	473	8	0	32572.0326	0.0	**3.8**
	5:56 PM	490	7	0	28500.5286	0.0	**3.6**
	6:12 PM	506	6	0	24429.0245	0.0	**3.7**
	6:32 PM	526	5	0	20357.5204	0.0	**3.0**
	6:50 PM	544	4	0	16286.0163	0.0	**3.3**
	7:10 PM	564	3	0	12214.5122	0.0	**3.0**



Job Name: **Central Kitsap High School / Middle School**
Job Number: **6-917-180960**
Infiltration Test: **IT-2 (Alternative HS Parking Lot - East End)**
Date: **12/22/16**

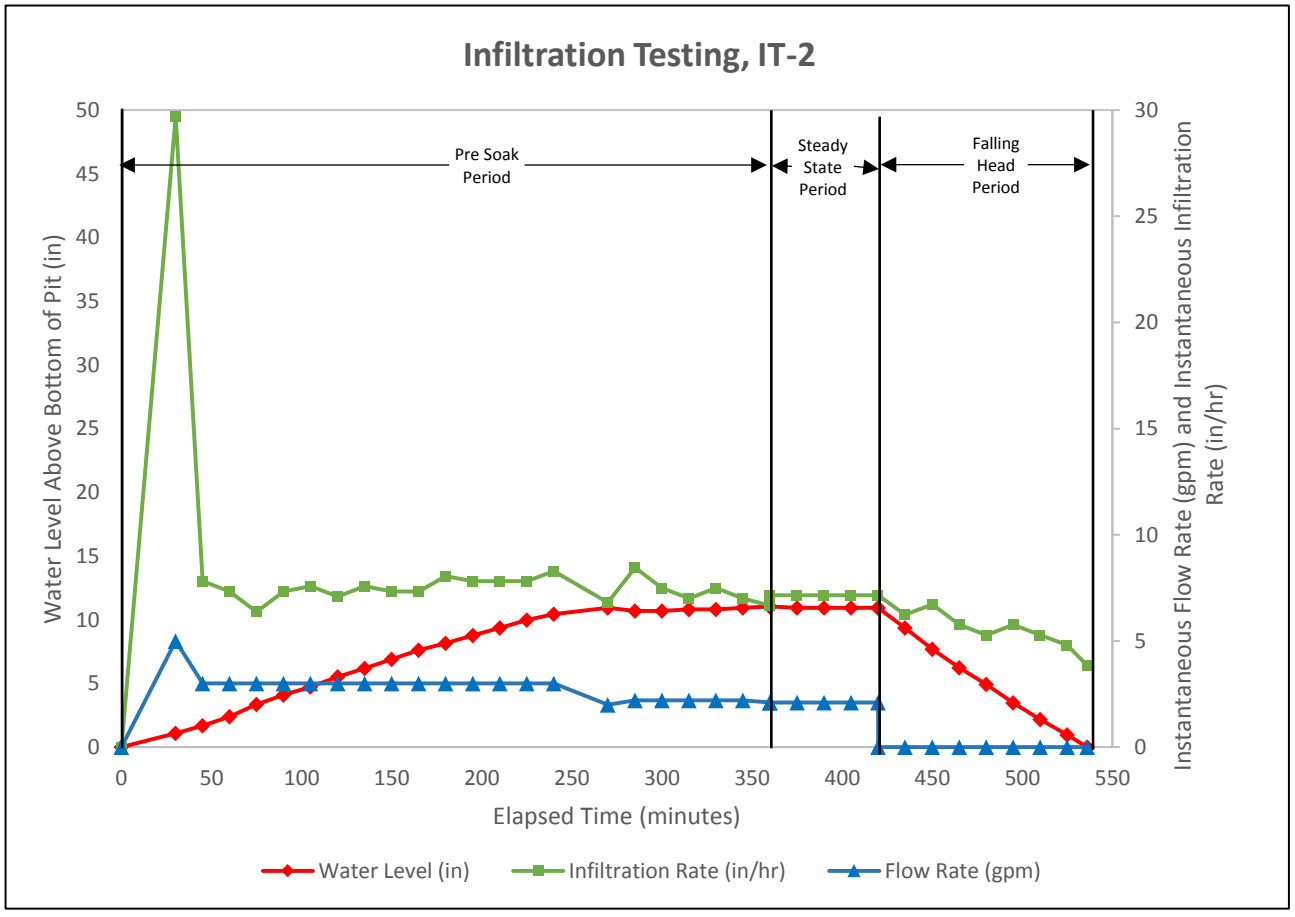
Test Pit Dimensions			
	Length (ft)	Width (ft)	Radius (ft)
Base			3
Surface			N/A
Area of Pit Base (in^2)		**4071.504079**	

Infiltration Information	
Falling Head Minimum (in/hr)	4.8
Falling Head Maximum (in/hr)	6.7
Falling Head Average (in/hr)	**5.6**
Constant Head Infiltration (in/hr)	**7.1**

	Time (hh:mm)	**Elapsed Time (min)**	**Water Level Stage (in)**	**Flow Rate (gal/min)**	**Pit Volume (in^3)**	**Volume Added (Gal)**	**Infiltration Rate (in/hr)**
Pre Soak Period (6 hrs)	8:45 AM	0	0	0	0	-	-
	9:15 AM	30	1.08	5	4397.22441	150.00	**14.9**
	9:30 AM	45	1.68	3	6840.12685	45.00	**7.8**
	9:45 AM	60	2.4	3	9771.60979	45.00	**7.3**
	10:00 AM	75	3.36	3	13680.2537	45.00	**6.4**
	10:15 AM	90	4.08	3	16611.7366	45.00	**7.3**
	10:30 AM	105	4.74	3	19298.9293	45.00	**7.6**
	10:45 AM	120	5.52	3	22474.7025	45.00	**7.1**
	11:00 AM	135	6.18	3	25161.8952	45.00	**7.6**
	11:15 AM	150	6.9	3	28093.3781	45.00	**7.3**
	11:30 AM	165	7.62	3	31024.8611	45.00	**7.3**
	11:45 AM	180	8.16	3	33223.4733	45.00	**8.1**
	12:00 PM	195	8.76	3	35666.3757	45.00	**7.8**
	12:15 PM	210	9.36	3	38109.2782	45.00	**7.8**
	12:30 PM	225	9.96	3	40552.1806	45.00	**7.8**
	12:45 PM	240	10.44	3	42506.5026	45.00	**8.3**
Possible anomoly in flow of stage reading	1:00 PM	255	10.92	2	44460.8245	30.00	**4.9**
	1:15 PM	270	10.92	2	44460.8245	30.00	**6.8**
	1:30 PM	285	10.68	2.2	43483.6636	33.00	**8.4**
	1:45 PM	300	10.68	2.2	43483.6636	33.00	**7.5**
	2:00 PM	315	10.8	2.2	43972.2441	33.00	**7.0**
	2:15 PM	330	10.8	2.2	43972.2441	33.00	**7.5**
	2:30 PM	345	10.92	2.2	44460.8245	33.00	**7.0**
	2:45 PM	360	11.04	2.1	44949.405	31.50	**6.7**
Steady State Period (1 hr)	2:45 PM	360	11.04	2.1	44949.405	31.50	**7.1**
	3:00 PM	375	10.92	2.1	44460.8245	31.500	**7.1**
	3:15 PM	390	10.92	2.1	44460.8245	31.500	**7.1**
	3:30 PM	405	10.92	2.1	44460.8245	31.500	**7.1**
	3:45 PM	420	10.92	2.1	44460.8245	31.500	**7.1**

Job Name: **Central Kitsap High School / Middle School**
Job Number: **6-917-180960**
Infiltration Test: **IT-2 (Alternative HS Parking Lot - East End)**
Date: **12/22/16**

	Time (hh:mm)	Elapsed Time (min)	Water Level Stage (in)	Flow Rate (gal/min)	Pit Volume (in^3)	Volume Added (Gal)	Infiltration Rate (in/hr)
Falling Head Period (1 hr, 41 min)	4:00 PM	435	9.36	0	38109.2782	0.0	**6.2**
	4:15 PM	450	7.68	0	31269.1513	0.0	**6.7**
	4:30 PM	465	6.24	0	25406.1855	0.0	**5.8**
	4:45 PM	480	4.92	0	20031.8001	0.0	**5.3**
	5:00 PM	495	3.48	0	14168.8342	0.0	**5.8**
	5:15 PM	510	2.16	0	8794.44881	0.0	**5.3**
	5:30 PM	525	0.96	0	3908.64392	0.0	**4.8**
	5:41 PM	536	0	0	0	0.0	**5.2**



Job Name: **Central Kitsap High School / Middle School**
Job Number: **6-917-180960**
Infiltration Test: **IT-3 (Alternative High School - SW Corner of Building)**
Date: **12/23/16**

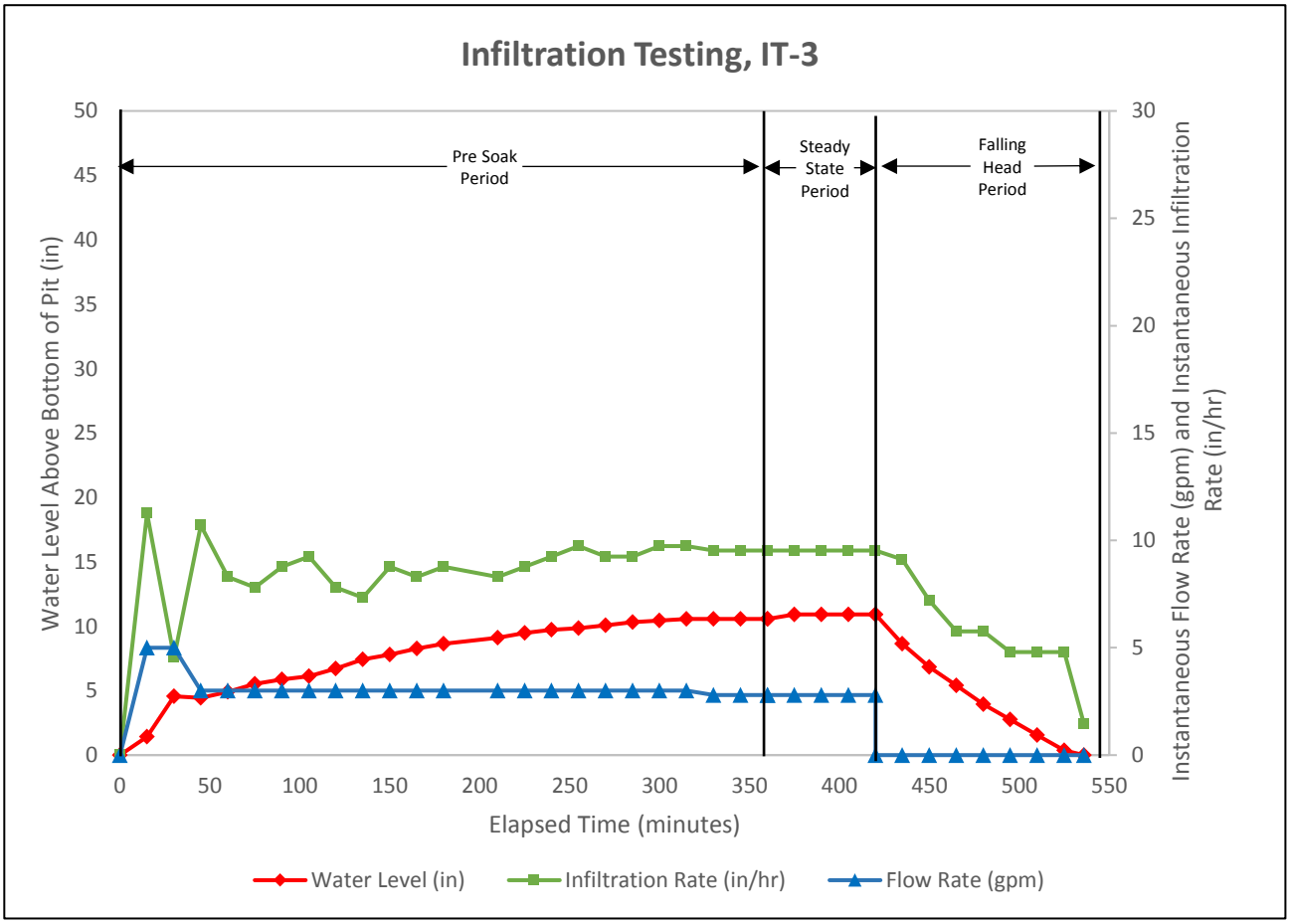
Test Pit Dimensions			
	Length (ft)	Width (ft)	Radius (ft)
Base			3
Surface			N/A
Area of Pit Base (in^2)		**4071.504079**	

Infiltration Information	
Falling Head Minimum (in/hr)	2.0
Falling Head Maximum (in/hr)	9.1
Falling Head Average (in/hr)	**5.5**
Constant Head Infiltration (in/hr)	**9.2**

	Time (hh:mm)	**Elapsed Time (min)**	**Water Level Stage (in)**	**Flow Rate (gal/min)**	**Pit Volume (in^3)**	**Volume Added (Gal)**	**Infiltration Rate (in/hr)**
	7:25 AM	0	0	0	0	-	**-**
	7:40 AM	15	1.44	5	5862.96587	75.00	**11.3**
Possible anomoly in flow of stage reading	7:55 AM	30	4.56	5	18566.0586	75.00	**4.5**
	8:10 AM	45	4.44	3	18077.4781	45.00	**10.7**
	8:25 AM	60	4.92	3	20031.8001	45.00	**8.3**
	8:40 AM	75	5.52	3	22474.7025	45.00	**7.8**
	8:55 AM	90	5.88	3	23940.444	45.00	**8.8**
	9:10 AM	105	6.12	3	24917.605	45.00	**9.3**
	9:25 AM	120	6.72	3	27360.5074	45.00	**7.8**
	9:40 AM	135	7.44	3	30291.9903	45.00	**7.3**
	9:55 AM	150	7.8	3	31757.7318	45.00	**8.8**
Pre Soak Period (6 hrs)	10:10 AM	165	8.28	3	33712.0538	45.00	**8.3**
	10:25 AM	180	8.64	3	35177.7952	45.00	**8.8**
Possible anomoly in flow of stage reading	10:40 AM	195	8.64	3	35177.7952	45.00	**10.2**
	10:55 AM	210	9.12	3	37132.1172	45.00	**8.3**
	11:10 AM	225	9.48	3	38597.8587	45.00	**8.8**
	11:25 AM	240	9.72	3	39575.0196	45.00	**9.3**
	11:40 AM	255	9.84	3	40063.6001	45.00	**9.7**
	11:55 AM	270	10.08	3	41040.7611	45.00	**9.3**
	12:10 PM	285	10.32	3	42017.9221	45.00	**9.3**
	12:25 PM	300	10.44	3	42506.5026	45.00	**9.7**
	12:40 PM	315	10.56	3	42995.0831	45.00	**9.7**
	12:55 PM	330	10.56	2.8	42995.0831	42.00	**9.5**
	1:10 PM	345	10.56	2.8	42995.0831	42.00	**9.5**
	1:25 PM	360	10.56	2.8	42995.0831	42.00	**9.5**
	1:25 PM	360	10.56	2.8	42995.0831	42.00	**9.5**
Steady State Period (1 hr)	1:40 PM	375	10.92	2.8	44460.8245	42.000	**8.1**
	1:55 PM	390	10.92	2.8	44460.8245	42.000	**9.5**
	2:10 PM	405	10.92	2.8	44460.8245	42.000	**9.5**
	2:25 PM	420	10.92	2.8	44460.8245	42.000	**9.5**

Job Name: **Central Kitsap High School / Middle School**
Job Number: **6-917-180960**
Infiltration Test: **IT-3 (Alternative High School - SW Corner of Building)**
Date: **12/23/16**

	Time (hh:mm)	Elapsed Time (min)	Water Level Stage (in)	Flow Rate (gal/min)	Pit Volume (in^3)	Volume Added (Gal)	Infiltration Rate (in/hr)
Falling Head Period (1 hr, 45 min)	2:40 PM	435	8.64	0	35177.7952	0.0	**9.1**
	2:55 PM	450	6.84	0	27849.0879	0.0	**7.2**
	3:10 PM	465	5.4	0	21986.122	0.0	**5.8**
	3:25 PM	480	3.96	0	16123.1562	0.0	**5.8**
	3:40 PM	495	2.76	0	11237.3513	0.0	**4.8**
	3:55 PM	510	1.56	0	6351.54636	0.0	**4.8**
	4:10 PM	525	0.36	0	1465.74147	0.0	**4.8**
	4:25 PM	536	0	0	0	0.0	**2.0**



Job Name: **Central Kitsap High School / Middle School**
Job Number: **6-917-180960**
Infiltration Test: **IT-4 (Science Building - North Gravel Parking Area)**
Date: **2/20/17**

Test Pit Dimensions			
	Length (ft)	Width (ft)	Radius (ft)
Base			3
Surface			N/A
Area of Pit Base (in^2)		**4071.504079**	

Infiltration Information	
Falling Head Minimum (in/hr)	0.8
Falling Head Maximum (in/hr)	1.5
Falling Head Average (in/hr)	**1.0**
Constant Head Infiltration (in/hr)	**1.3**

	Time (hh:mm)	**Elapsed Time (min)**	**Water Level Stage (in)**	**Flow Rate (gal/min)**	**Pit Volume (in^3)**	**Volume Added (Gal)**	**Infiltration Rate (in/hr)**
	9:10 AM	0	0	0	0	-	-
	9:25 AM	15	1.25	3.3	5089.3801	49.50	**6.2**
	9:40 AM	30	3.25	3.3	13232.3883	49.50	**3.2**
	9:55 AM	45	5.13	3.3	20886.8159	49.50	**3.7**
Changed out flow meter (turned off water)	10:10 AM	60	4.62	0	18810.3488	0.00	**2.0**
	10:25 AM	75	5.75	2	23411.1485	30.00	**2.3**
	10:40 AM	90	6.88	1.75	28011.9481	26.25	**1.4**
	10:55 AM	105	7.75	1.5	31554.1566	22.50	**1.6**
	11:10 AM	120	8.31	1.25	33834.1989	18.75	**2.0**
	11:25 AM	135	8.75	1	35625.6607	15.00	**1.6**
	11:40 AM	150	9.06	0.75	36887.827	11.25	**1.3**
Pre Soak Period (6 hrs)	11:55 AM	165	9.38	0.75	38190.7083	11.25	**1.3**
	12:10 PM	180	9.56	0.75	38923.579	11.25	**1.8**
	12:25 PM	195	9.75	0.65	39697.1648	9.75	**1.5**
	12:40 PM	210	10	0.65	40715.0408	9.75	**1.2**
	12:55 PM	225	9.88	0.3	40226.4603	4.50	**1.5**
	1:10 PM	240	9.88	0.43	40226.4603	6.45	**1.5**
	1:25 PM	255	10	0.45	40715.0408	6.75	**1.1**
	1:40 PM	270	10	0.43	40715.0408	6.45	**1.5**
	1:55 PM	285	10.13	0.44	41244.3363	6.60	**1.0**
	2:10 PM	300	10.13	0.44	41244.3363	6.60	**1.5**
	2:25 PM	315	10.19	0.44	41488.6266	6.60	**1.3**
	2:40 PM	330	10.25	0.45	41732.9168	6.75	**1.3**
	1:55 PM	345	10.25	0.44	41732.9168	6.60	**1.5**
	3:10 PM	360	10.31	0.45	41977.2071	6.75	**1.3**
	3:10 PM	360	10.31	0.45	41977.2071	6.75	**1.3**
Steady State Period (1 hr)	3:25 PM	375	10.31	0.45	41977.2071	6.75	**1.5**
	3:40 PM	390	10.38	0.45	42262.2123	6.75	**1.3**
	3:55 PM	405	10.48	0.45	42669.3627	6.75	**1.1**
	4:10 PM	420	10.48	0.45	42669.3627	6.75	**1.5**

Job Name: **Central Kitsap High School / Middle School**
Job Number: **6-917-180960**
Infiltration Test: **IT-4 (Science Building - North Gravel Parking Area)**
Date: **2/20/17**

	Time (hh:mm)	Elapsed Time (min)	Water Level Stage (in)	Flow Rate (gal/min)	Pit Volume (in^3)	Volume Added (Gal)	Infiltration Rate (in/hr)
Falling Head Period (3 hr)	4:10 PM	420	10.48	0	42669.3627	0.0	**1.5**
	4:32 PM	442	10	0	40715.0408	0.0	**1.3**
	5:30 PM	500	9	0	36643.5367	0.0	**1.0**
	5:48 PM	518	8.75	0	35625.6607	0.0	**0.8**
	6:04 PM	534	8.5	0	34607.7847	0.0	**0.9**
	6:20 PM	550	8.25	0	33589.9087	0.0	**0.9**
	6:36 PM	566	8	0	32572.0326	0.0	**0.9**
	6:53 PM	583	7.75	0	31554.1566	0.0	**0.9**
	7:10 PM	600	7.5	0	30536.2806	0.0	**0.9**