Full-Sized legible color report is required to be provided by the Permittee on site for all Inspections

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

PRRNTH20250333

April 9, 2020
Updated January 21, 2021
ES-7182

Tac Build, LLC
729 North Stadium Way
Tacoma, Washington 98403

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

City of Puyallup
Building
REVIEWED FOR COMPLIANCE
BSnowden
03/26/2025
11:20:18 AM

Attention: Mr. Michael Hopkins

Subject: Preliminary Geotechnical Evaluation
Proposed Townhomes
1200 – 7th Avenue Southeast
Puyallup, Washington

Reference: CES NW, Inc.
Preliminary Site Plan, dated June 9, 2020

Puyallup Municipal Code (PMC) Chapter 21.06: Critical Areas

J. Eric Schuster et al.
Geologic Map of the Tacoma 1:100,000-scale Quadrangle, Washington, 2015

Stephen P. Palmer et al.
Liquefaction Susceptibility Map of Pierce County, Washington, 2004

United States Department of Agriculture (USDA)
Natural Resources Conservation Service (NRCS)
Online Web Soil Survey (WSS) resource

Washington State Department of Ecology
2014 Stormwater Management Manual for Western Washington

Dear Mr. Hopkins:

As requested, Earth Solutions NW, LLC (ESNW), has prepared this letter for the proposed project. The letter was prepared in general accordance with the scope of services outlined in the November 2020 change order to our original proposal, which was authorized by you. A summary of the subsurface exploration on site and preliminary geotechnical recommendations to aid with the site design are provided in this letter.

Project Description

We understand that the existing improvements will be razed, and a new townhome development will be constructed. The proposal consists of six townhomes, a parking area (providing access from 7th Avenue Southeast), and an open space area between the proposed townhomes and the southern property line.

The referenced preliminary site plan indicates the parking area is to be comprised of pervious pavement. Based on our discussion with the project civil engineer as a result of our subsurface exploration, we understand that the stormwater management scheme may be modified.

Surface Conditions

The subject site is located south of the intersection between 7th Avenue Southeast and 12th Street Southeast, in Puyallup, Washington. The approximate location of the property is illustrated on Plate 1 (Vicinity Map). The site consists of one tax parcel (Pierce County Parcel No. 7845001330), totaling about 20,000 square feet. The site is surrounded to the east, south, and west by residential structures and to the north by 7th Avenue Southeast.

Subsurface Conditions

An ESNW representative observed, logged, and sampled three test pits on March 5, 2020. Three additional test pits were excavated on December 22, 2020. The test pits were excavated within accessible site areas, using a mini trackhoe and operator retained by ESNW. The test pits were completed to evaluate and classify site soils, characterize groundwater conditions within accessible site areas, and perform in-situ infiltration testing.

The approximate locations of the test pits are depicted on Plate 2 (Test Pit Location Plan). Please refer to the attached test pit logs for a more detailed description of subsurface conditions. Representative soil samples collected at the test pit locations were analyzed in general accordance with both Unified Soil Classification System (USCS) and USDA methods and procedures.

Topsoil and Fill

Where encountered at surface grades, the topsoil was about 6 to 12 inches thick. The topsoil was characterized by the observed dark brown hue, the presence of fine organics, and small root intrusions.

Fill was encountered at test pit locations TP-1, TP-2, TP-5, and TP-6 to depths of about two to four feet below the existing ground surface (bgs). The fill was characterized as sandy silt and poorly graded sand with silt, in a loose to medium dense and moist to wet condition. Small pieces of brick and glass were observed in the fill.

Native Soil

Underlying the topsoil and fill, native soil consisted primarily of poorly graded sand (USCS: SP or SP-SM) with layers of sandy silt (USCS: ML) present. The poorly graded sand layer ranged in thickness between about three feet to more than seven feet. The in-situ density of the native soil was characterized primarily as “medium dense” at each test location, and the in-situ moisture content was characterized as “moist” or “wet” depending on the presence of groundwater. The maximum exploration depth was approximately nine feet bgs.

Geologic Setting

The referenced geologic map resource identifies alluvium (Qa) as the primary native soil unit underlying the subject site and proximate areas. As reported on the geologic map resource, alluvium is typified by well-rounded and moderately to well-sorted beds of fluvial silt, sand, and gravel. The referenced WSS resource identifies Puyallup fine sandy loam (Map Unit Symbol: 31A) as the primary soil unit underlying the subject development area. The Puyallup series was formed in alluvial deposits as a result of the Mount Rainier watershed. Based on our field observations, the on-site native soil is consistent with the local geologic mapping of alluvium.

Groundwater

The groundwater table was encountered at all test pits during our March 2020 and December 2020 explorations at depths of about three and one-half to five-and-one-half feet bgs. Groundwater was allowed to stabilize at TP-4 to a depth of approximately four feet bgs. Shallower groundwater seepage was encountered at depths of roughly two-and-one-half and three feet bgs. It should be noted that seepage rates and elevations fluctuate depending on many factors, including precipitation duration and intensity, the time of year, and soil conditions. In general, groundwater flow rates are higher during the winter, spring, and early summer months.

Geologically Hazardous Areas

We reviewed the referenced PMC chapter to determine the presence of geologically hazardous areas on site. Based on our field observations and our review of the PMC, the subject site lies within a seismic hazard area. The three remaining geologically hazardous areas recognized by the PMC—erosion hazard area, landslide hazard area, and volcanic hazard area—are not applicable to the subject site.

According to PMC 21.06.1210(3)(c), seismic hazard areas are defined as “areas subject to severe risk of damage as a result of earthquake-induced ground shaking, slope failure, settlement or subsidence, soil liquefaction, or tsunamis.” The referenced liquefaction susceptibility map indicates the site and surrounding areas possess high liquefaction susceptibility. Based on our field observations, it is our opinion that the site is correctly mapped within a seismic hazard area, and the site possesses moderate to high susceptibility to liquefaction during a seismic event. Given the level of existing development surrounding the subject site, it is our opinion that the presence of a seismic hazard area does not preclude the proposed townhome development; however, appropriate mitigation measures should be incorporated into the plans, as discussed in this letter.

Preliminary Geotechnical Recommendations

The primary geotechnical considerations for the proposal are associated with structural fill placement and compaction, earthwork and grading activities, foundation support, and stormwater management. Based on our field observations and our understanding of the proposed development, pertinent geotechnical recommendations and design parameters are provided below.

In-situ and Imported Soil

The native alluvium is moisture sensitive, and successful use of the native alluvium as structural fill will largely be dictated by the moisture content at the time of placement and compaction. If the native alluvium cannot be successfully compacted, the use of an imported soil may be necessary.

Performing grading activities during summer months of relatively low rainfall activity is recommended to minimize site degradation. In our opinion, a contingency should be provided in the project budget for the export of soil that cannot be successfully compacted as structural fill, particularly if grading activities take place during periods of extended rainfall activity. In general, soil with an appreciable fines content (greater than 5 percent) typically degrades rapidly when exposed to periods of rainfall.

Imported soil intended for use as structural fill should be evaluated by ESNW during construction. The imported soil must be able to achieve the necessary moisture content, as determined by the Modified Proctor Method (ASTM D1557), at the time of placement and compaction. During wet weather conditions, imported soil intended for use as structural fill should consist of a well-graded, granular soil with a fines content of 5 percent or less (where the fines content is defined as the percent passing the Number 200 sieve, based on the minus three-quarter-inch fraction).

Structural Fill

Structural fill is defined as compacted soil placed in foundation, slab-on-grade, roadway, permanent slope, retaining wall, and utility trench backfill areas. Structural fill placed and compacted during site grading activities should meet the following specifications:

- Structural fill material — Granular soil*
- Moisture content — At or slightly above optimum†
- Relative compaction (minimum) — 95 percent (Modified Proctor)
- Loose lift thickness (maximum) — 12 inches

* *The existing soil may not be suitable for use as structural fill unless the soil is at (or slightly above) the optimum moisture content at the time of placement and compaction*

† *Soil shall not be placed dry of optimum and should be evaluated by ESNW during construction*

Foundations

The proposed residential structures may be supported on conventional continuous and spread footing foundations bearing on either compact structural fill or competent native soil. In general, competent native soil should be encountered at a depth of roughly two to three feet bgs. Existing fill intended for reuse as structural fill must be free of debris and should be evaluated by ESNW prior to use. In general, if loose or unsuitable soil conditions are exposed at foundation subgrade elevations, additional mechanical compactive effort or overexcavation and replacement with suitable structural fill will likely be necessary.

Provided foundations will be supported as prescribed, the following parameters may be used for design:

- Allowable soil bearing capacity 2,500 psf
- Passive earth pressure 250 pcf (equivalent fluid)
- Coefficient of friction 0.35

A one-third increase in the allowable soil bearing capacity may be assumed for short-term wind and seismic loading conditions. The above passive pressure and friction values include a factor-of-safety of 1.5. With structural loading as expected, about one inch of total static settlement and about one-half inch of differential static settlement is anticipated. Most of the anticipated settlement should occur during construction when dead loads are applied.

Seismic Design

The 2015 International Building Code recognizes the American Society of Civil Engineers (ASCE) for seismic site class definitions. Based on the soil conditions observed at the test pit locations, in accordance with Table 20.3-1 of the ASCE Minimum Design Loads for Buildings and Other Structures manual, Site Class E should be used for design.

As summarized in the *Geologically Hazardous Areas* section of this letter, site susceptibility to liquefaction is characterized as moderate to high. Based on our experience with alluvial soil, liquefaction-induced settlement of the native soil may be roughly two to four inches and would likely not occur uniformly. ESNW can provide supplementary recommendations for soil improvement if the settlement estimates provided in this section are not tolerable, which may include a surcharge program, using grid foundations supported on at least two feet of structural fill, or pile-supported foundations.

Slab-on-Grade Floors

Slab-on-grade floors for the proposed residential structures should be supported on firm and unyielding subgrades comprised of competent native soil, compacted structural fill, or new structural fill. Unstable or yielding subgrade areas should be recompacted or overexcavated and replaced with suitable structural fill prior to slab construction.

A capillary break, consisting of at least four inches of free-draining crushed rock or gravel, should be placed below each slab. The free-draining material should have a fines content of 5 percent or less (where the fines content is defined as the percent passing the Number 200 sieve, based on the minus three-quarter-inch fraction). In areas where slab moisture is undesirable, installation of a vapor barrier below each slab should be considered. If a vapor barrier is to be utilized, it should be a material specifically designed for use as a vapor barrier and should be installed in accordance with the specifications of the manufacturer.

Retaining Walls

Retaining walls must be designed to resist earth pressures and applicable surcharge loads. The following parameters may be used for design:

• Active earth pressure (unrestrained condition)	40 pcf (equivalent fluid)
• At-rest earth pressure (restrained condition)	60 pcf
• Traffic surcharge* (passenger vehicles)	70 psf (rectangular distribution)
• Passive earth pressure	250 pcf (equivalent fluid)
• Coefficient of friction	0.35
• Seismic surcharge	8H psf†

* *Where applicable*
† *Where H equals the retained height (in feet)*

The above design parameters are based on a level backfill condition and level grade at the wall toe under the assumption that native soil will be retained. If a significant zone of imported structural fill will be retained directly behind the wall, less stringent design parameters can be provided. Revised design values will be necessary if sloping grades are to be used above or below retaining walls. Additional surcharge loading from adjacent foundations, sloped backfill, or other relevant loads should be included in the retaining wall design.

Retaining walls should be backfilled with free-draining material that extends along the height of the wall and a distance of at least 18 inches behind the wall. The upper 12 inches of the wall backfill may consist of a less permeable soil if desired. A perforated drainpipe should be placed along the base of the wall and connected to an approved discharge location. A typical retaining wall drainage detail is provided on Plate 3. If drainage is not provided, hydrostatic pressures should be included in the wall design.

Drainage

Groundwater will likely be encountered in site excavations, especially those necessary to construct utility trenches. Temporary measures to control surface water runoff and groundwater during construction would likely involve interceptor trenches and sumps. ESNW should be consulted during preliminary grading to both identify areas of seepage and provide recommendations to reduce the potential for seepage-related instability.

Finish grades must be designed to direct surface drain water away from structures and slopes. Water must not be allowed to pond adjacent to structures. In our opinion, foundation drains should be installed along building perimeter footings. A typical foundation drain detail is provided on Plate 4.

Infiltration Evaluation

The referenced preliminary site plan indicates the parking area will be comprised of pervious pavement. ESNW performed one small-scale Pilot Infiltration Test (PIT) at TP-5 at a depth of approximately three and one-half feet bgs. The PIT was performed outside of the building footprint. During the soaking and test periods, no measurable rate was obtained, i.e., the infiltration rate was 0 inches per hour. After the PIT was deemed complete, the test pit was advanced an additional five and one-half feet. Groundwater seepage was observed directly beneath the test depth and on intermittent silt layers, to the maximum exploration depth of about nine feet bgs.

Based on the results of our testing, ESNW interprets the sandy silt to represent an impermeable layer. Per the guidance provided in BMP T5.15 of the referenced 2014 Manual, endorsed by the City of Puyallup, it is our opinion that the impermeable sandy silt layer would create saturated conditions within one foot of the bottom of the lowest pavement gravel base course. As such, permeable pavement should not be considered feasible from a geotechnical standpoint. In addition, the presence of relatively shallow groundwater would preclude the use of deeper infiltration galleries.

In general, based on our field observations, the subject site is not suitable for infiltration. The presence of both uniform, shallow groundwater conditions and a uniformly present impermeable layer render infiltration impracticable from a geotechnical standpoint.

Limitations

This letter has been prepared for the exclusive use of Tac Build, LLC, and its representatives. No warranty, express or implied, is made. The recommendations and conclusions provided in this letter are professional opinions consistent with the level of care and skill that is typical of other members in the profession currently practicing under similar conditions in this area. Variations in the soil and groundwater conditions encountered at the test pit locations may exist and may not become evident until construction. ESNW should reevaluate the contents of this letter if variations are encountered.

We trust this letter meets your current needs. Please call if you have any questions about this letter or if we can be of further assistance.

Sincerely,

EARTH SOLUTIONS NW, LLC

01/21/2021

Samuel E. Suruda, G.I.T.
Staff Geologist

Keven D. Hoffmann, P.E.
Senior Project Manager

Attachments: Plate 1 – Vicinity Map
Plate 2 – Test Pit Location Plan
Plate 3 – Retaining Wall Drainage Detail
Plate 4 – Footing Drain Detail
Test Pit Logs
Grain Size Distribution

cc: CES NW, Inc.
Attention: Mr. Daniel Smith, P.E. (Email only)

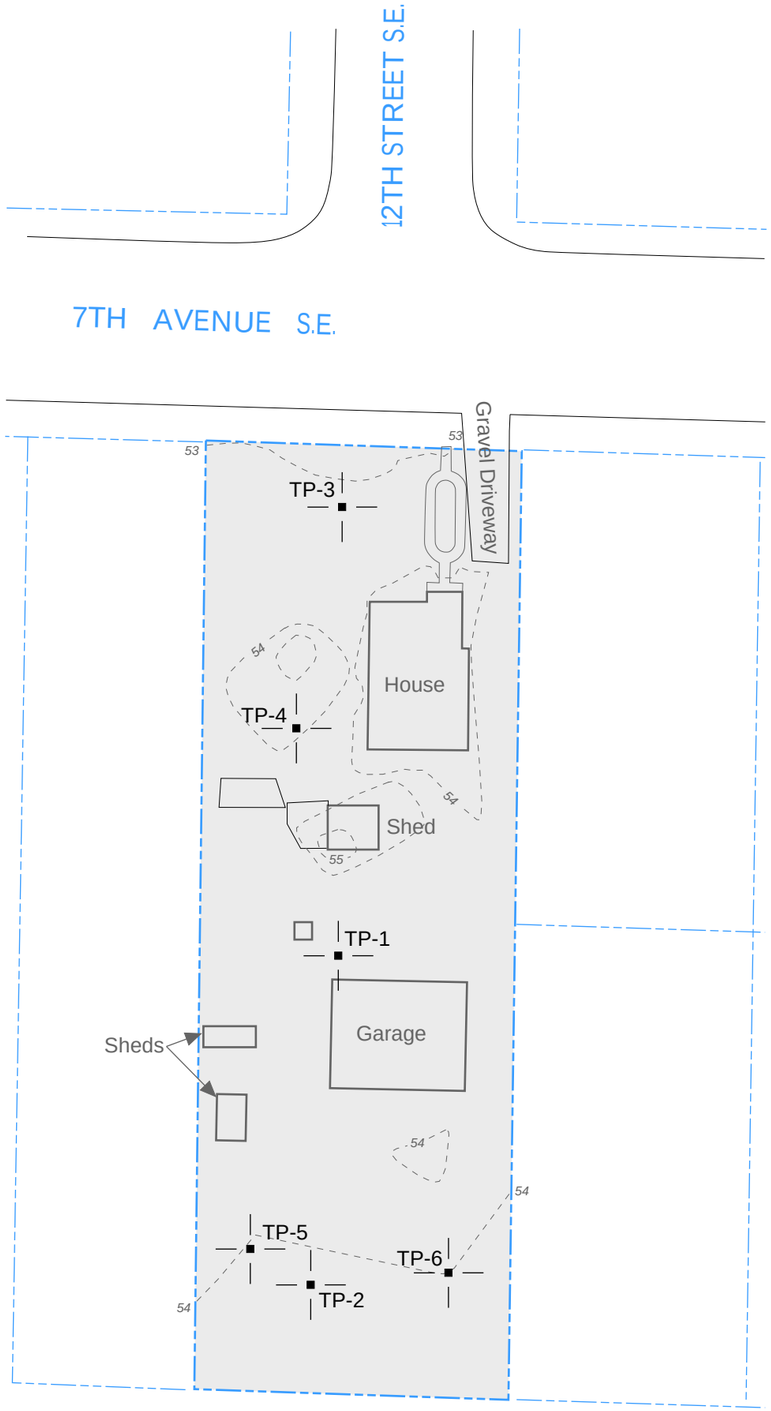
Earth Solutions NW LLC

Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Vicinity Map
1200 – 7th Ave Townhomes
Puyallup, Washington

Drwn. MRS	Date 01/19/2021	Proj. No. 7182
Checked SES	Date Jan. 2021	Plate 1

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.



City of Puyallup
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LEGEND

TP-1 — Approximate Location of ESNW Test Pit, Proj. No. ES-7182, Mar./Dec. 2020

Subject Site

Existing Building

NORTH

1"=40'

0 20 40 80

Scale in Feet

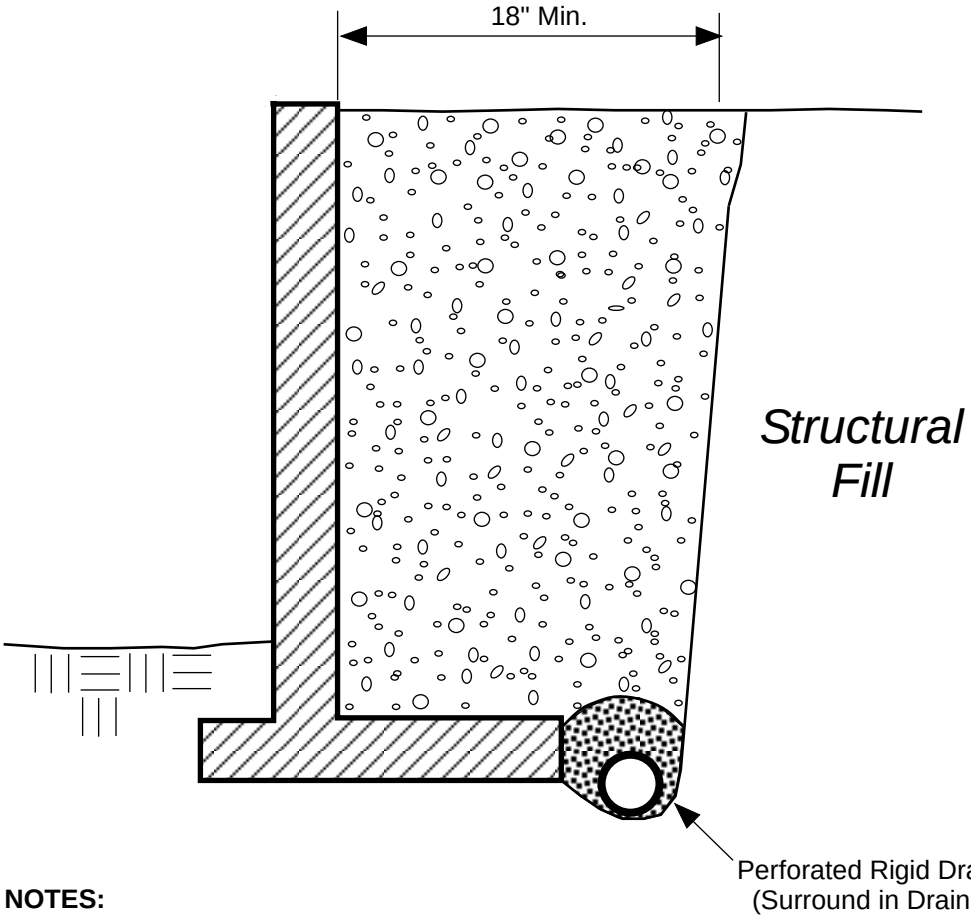
NOTE: The graphics shown on this plate are not intended for design purposes or precise scale measurements, but only to illustrate the approximate test locations relative to the approximate locations of existing and / or proposed site features. The information illustrated is largely based on data provided by the client at the time of our study. ESNW cannot be responsible for subsequent design changes or interpretation of the data by others.

NOTE: This plate may contain areas of color. ESNW cannot be responsible for any subsequent misinterpretation of the information resulting from black & white reproductions of this plate.

Test Pit Location Plan
1200 – 7th Ave Townhomes
Puyallup, Washington

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Drwn. By	MRS
Checked By	SES
Date	01/19/2021
Proj. No.	7182
Plate	2



NOTES:

- Free-draining Backfill should consist of soil having less than 5 percent fines. Percent passing No. 4 sieve should be 25 to 75 percent.
- Sheet Drain may be feasible in lieu of Free-draining Backfill, per ESNW recommendations.
- Drain Pipe should consist of perforated, rigid PVC Pipe surrounded with 1-inch Drain Rock.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

Free-draining Structural Backfill

1-inch Drain Rock

Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Retaining Wall Drainage Detail
1200 – 7th Ave Townhomes
Puyallup, Washington

Drwn. MRS	Date 01/19/2021	Proj. No. 7182
Checked SES	Date Jan. 2021	Plate 3

City of Puyallup
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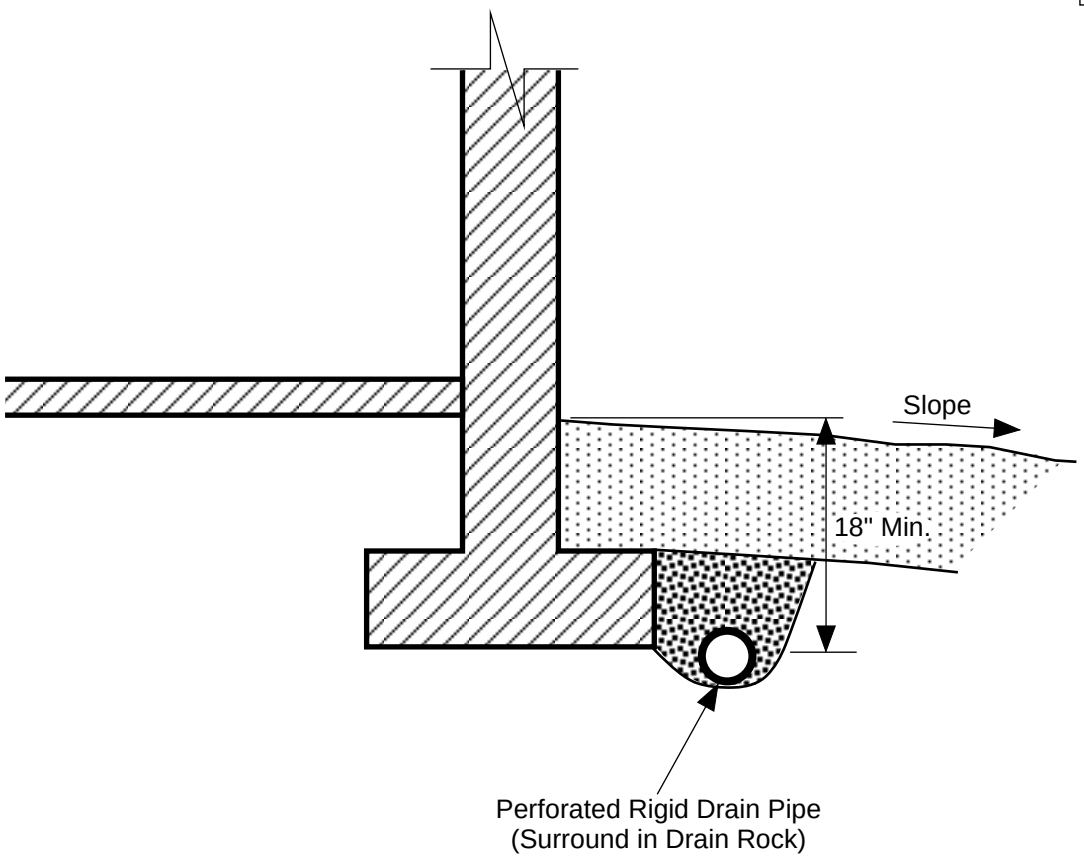


NOTES:

- Do NOT tie roof downspouts to Footing Drain.
- Surface Seal to consist of 12" of less permeable, suitable soil. Slope away from building.

SCHEMATIC ONLY - NOT TO SCALE
NOT A CONSTRUCTION DRAWING

LEGEND:

Surface Seal: native soil or other low-permeability material.

1-inch Drain Rock

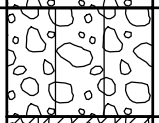
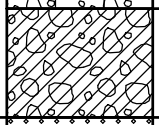
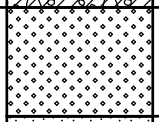
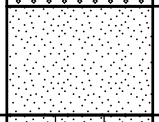
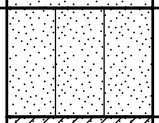
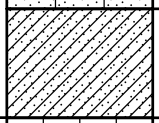
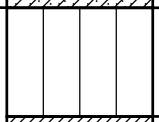
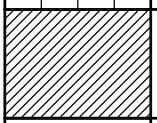
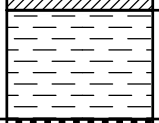
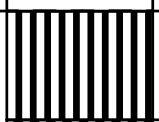
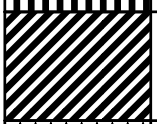
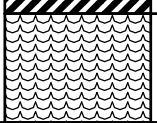
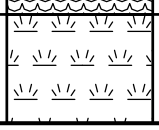
Earth Solutions NW LLC
Geotechnical Engineering, Construction Observation/Testing and Environmental Services

Footing Drain Detail
1200 – 7th Ave Townhomes
Puyallup, Washington

Drwn. MRS	Date 01/19/2021	Proj. No. 7182
Checked SES	Date Jan. 2021	Plate 4

Earth Solutions NW LLC

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	GRAVEL AND GRAVELLY SOILS — MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS — MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS — MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

DUAL SYMBOLS are used to indicate borderline soil classifications.

The discussion in the text of this report is necessary for a proper understanding of the nature of the material presented in the attached logs.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
Redmond, Washington 98052
Telephone: 425-449-4704
Fax: 425-449-4711

TEST PIT NUMBER TP-1

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

PROJECT NUMBER ES-7182 **PROJECT NAME** 1200 – 7th Ave Townhomes

DATE STARTED 3/5/20 **COMPLETED** 3/5/20 **GROUND ELEVATION** 55 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **GROUND WATER LEVELS:**

EXCAVATION METHOD ▽ **AT TIME OF EXCAVATION** 5.5 ft

LOGGED BY SES **CHECKED BY** KDH **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 12": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			TPSL		Dark brown TOPSOIL (Fill)	
				1.0		54.0
			SP-SM		Dark gray poorly graded SAND with silt, loose to medium dense, moist (Fill)	
		MC = 8.7% Fines = 7.9%			-moderate caving to BOH	
					-groundwater seepage	
				4.0	[USDA Classification: slightly gravelly SAND]	51.0
5		MC = 32.2%	ML		Dark gray sandy SILT, medium dense, wet	
				▽	-groundwater table, becomes water bearing	
		MC = 27.7%		7.0		48.0

Test pit terminated at 7.0 feet below existing grade due to caving. Groundwater seepage encountered at 3.0 feet and groundwater table encountered at 5.5 feet during excavation. Caving observed from 2.0 feet to BOH.

Earth Solutions NW, LLC
15365 N.E. 90th Street, Suite 100
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TEST PIT NUMBER TP-2

PROJECT NUMBER ES-7182 **PROJECT NAME** 1200 – 7th Ave Townhomes

DATE STARTED 3/5/20 **COMPLETED** 3/5/20 **GROUND ELEVATION** 54 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **GROUND WATER LEVELS:**

EXCAVATION METHOD ▽ **AT TIME OF EXCAVATION** 5.5 ft

LOGGED BY SES **CHECKED BY** KDH **AT END OF EXCAVATION** ---

NOTES Surface Conditions: grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0					Gray sandy SILT, loose to medium dense, wet (Fill)	
		MC = 33.0% Fines = 87.5%	ML		-mottled texture [USDA Classification: slightly gravelly LOAM]	
				2.0		52.0
			SP-SM		Dark gray poorly graded SAND with silt, medium dense, moist -groundwater seepage -moderate caving to BOH -becomes wet	
5		MC = 17.4% Fines = 5.8%			▽ [USDA Classification: gravelly SAND] -groundwater table	
				6.0		48.0
					Gray SILT, medium dense, water bearing	
		MC = 71.6%	ML		-wood debris	
		MC = 31.9% Fines = 25.3%		8.0	[USDA Classification: slightly gravelly LOAM]	46.0

Test pit terminated at 8.0 feet below existing grade. Groundwater seepage encountered at 3.0 feet and groundwater table encountered at 5.5 feet during excavation. Caving observed from 4.0 feet to BOH

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TEST PIT NUMBER TP-3

PROJECT NUMBER ES-7182 **PROJECT NAME** 1200 – 7th Ave Townhomes

DATE STARTED 3/5/20 **COMPLETED** 3/5/20 **GROUND ELEVATION** 53 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **GROUND WATER LEVELS:**

EXCAVATION METHOD ▽ **AT TIME OF EXCAVATION** 5.0 ft

LOGGED BY SES **CHECKED BY** KDH **AT END OF EXCAVATION** ---

NOTES Surface Conditions: grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION
0					Brown sandy SILT, medium dense, moist
		MC = 26.9% Fines = 56.3%	ML		-root intrusions to 1.5' -massive (blocky) bedding, iron oxide staining [USDA Classification: slightly gravelly LOAM]
				2.5	-groundwater seepage at 2.5' 50.5
		MC = 19.9% Fines = 4.0%	SP		Dark gray poorly graded SAND, medium dense, wet [USDA Classification: slightly gravelly coarse SAND]
					-moderate caving to BOH
5		MC = 25.3%		▽	-groundwater table, becomes water bearing
					-wood debris to BOH
		MC = 45.9%		8.5	44.5

Test pit terminated at 8.5 feet below existing grade. Groundwater seepage encountered at 2.5 feet and groundwater table encountered at 5.0 feet during excavation. Caving observed from 4.0 feet to BOH.

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TEST PIT NUMBER TP-4

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

PROJECT NUMBER ES-7182 **PROJECT NAME** 1200 – 7th Ave Townhomes

DATE STARTED 12/22/20 **COMPLETED** 12/22/20 **GROUND ELEVATION** 54 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **GROUND WATER LEVELS:**

EXCAVATION METHOD **AT TIME OF EXCAVATION** 5.0 ft

LOGGED BY SES **CHECKED BY** KDH **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 6": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			TPSL		0.5 Dark brown TOPSOIL, minimal root intrusions	53.5
					Black poorly graded SAND, medium dense, damp	
		MC = 8.5%				
		MC = 14.8%	SP			
					-groundwater table (after excavation)	
5					▽ -moderate caving to BOH	
					-groundwater table (during excavation)	
		MC = 28.8%			7.0	47.0

Test pit terminated at 7.0 feet below existing grade. Groundwater table stabilized at 4.0 feet during excavation. Caving observed from 4.0 feet to BOH.

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TEST PIT NUMBER TP-5

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning | Engineering | Public Works | Fire | Traffic

PROJECT NUMBER ES-7182 **PROJECT NAME** 1200 – 7th Ave Townhomes
DATE STARTED 12/22/20 **COMPLETED** 12/22/20 **GROUND ELEVATION** 54 ft **TEST PIT SIZE**
EXCAVATION CONTRACTOR NW Excavating **GROUND WATER LEVELS:**
EXCAVATION METHOD **AT TIME OF EXCAVATION** ---
LOGGED BY SES **CHECKED BY** KDH **AT END OF EXCAVATION** ---
NOTES Depth of Topsoil & Sod 12": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			TPSL		Dark brown TOPSOIL, shallow root intrusions (Fill)	
				1.0		53.0
			Fill		Construction debris (bricks, wood) (Fill)	
				2.5		51.5
					Gray sandy SILT, stiff, wet	
		MC = 39.3%			-infiltration test	
		Fines = 71.9%	ML		[USDA Classification: slightly gravelly LOAM]	
					-groundwater seepage	
					-moderate caving to BOH	
5				5.0		49.0
					Black poorly graded SAND, medium dense, wet	
		MC = 34.7%			-interbedded silt layers	
			SP		-wood pieces present in silt	
		MC = 22.2%			[USDA Classification: slightly gravelly SAND]	
		Fines = 1.3%		9.0		45.0

Test pit terminated at 9.0 feet below existing grade. Groundwater seepage encountered at 3.5 feet during excavation. Caving observed from 4.0 feet to BOH.

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TEST PIT NUMBER TP-6

PROJECT NUMBER ES-7182 **PROJECT NAME** 1200 – 7th Ave Townhomes

DATE STARTED 12/22/20 **COMPLETED** 12/22/20 **GROUND ELEVATION** 54 ft **TEST PIT SIZE**

EXCAVATION CONTRACTOR NW Excavating **GROUND WATER LEVELS:**

EXCAVATION METHOD ▽ **AT TIME OF EXCAVATION** 7.0 ft

LOGGED BY SES **CHECKED BY** KDH **AT END OF EXCAVATION** ---

NOTES Depth of Topsoil & Sod 12": grass **AFTER EXCAVATION** ---

DEPTH (ft)	SAMPLE TYPE NUMBER	TESTS	U.S.C.S.	GRAPHIC LOG	MATERIAL DESCRIPTION	
0			TPSL		Dark brown TOPSOIL, minimal root intrusions (Fill)	
				1.0		53.0
			Fill		Construction debris in ML (bricks, wood) (Fill)	
				2.5		51.5
			ML		Gray sandy SILT, stiff, wet -mottled texture -groundwater seepage, moderate caving to BOH	
		MC = 41.1%				
5				5.0		49.0
			SP-SM		Black poorly graded SAND with silt, medium dense, wet -interbedded ML layers 1.5" thick ▽ -groundwater table	
		MC = 36.5%		8.0		46.0

Test pit terminated at 8.0 feet below existing grade. Groundwater table encountered at 7.0 feet and groundwater seepage encountered at 3.5 feet during excavation. Caving observed from 3.5 feet to BOH.

Earth Solutions NW, LLC
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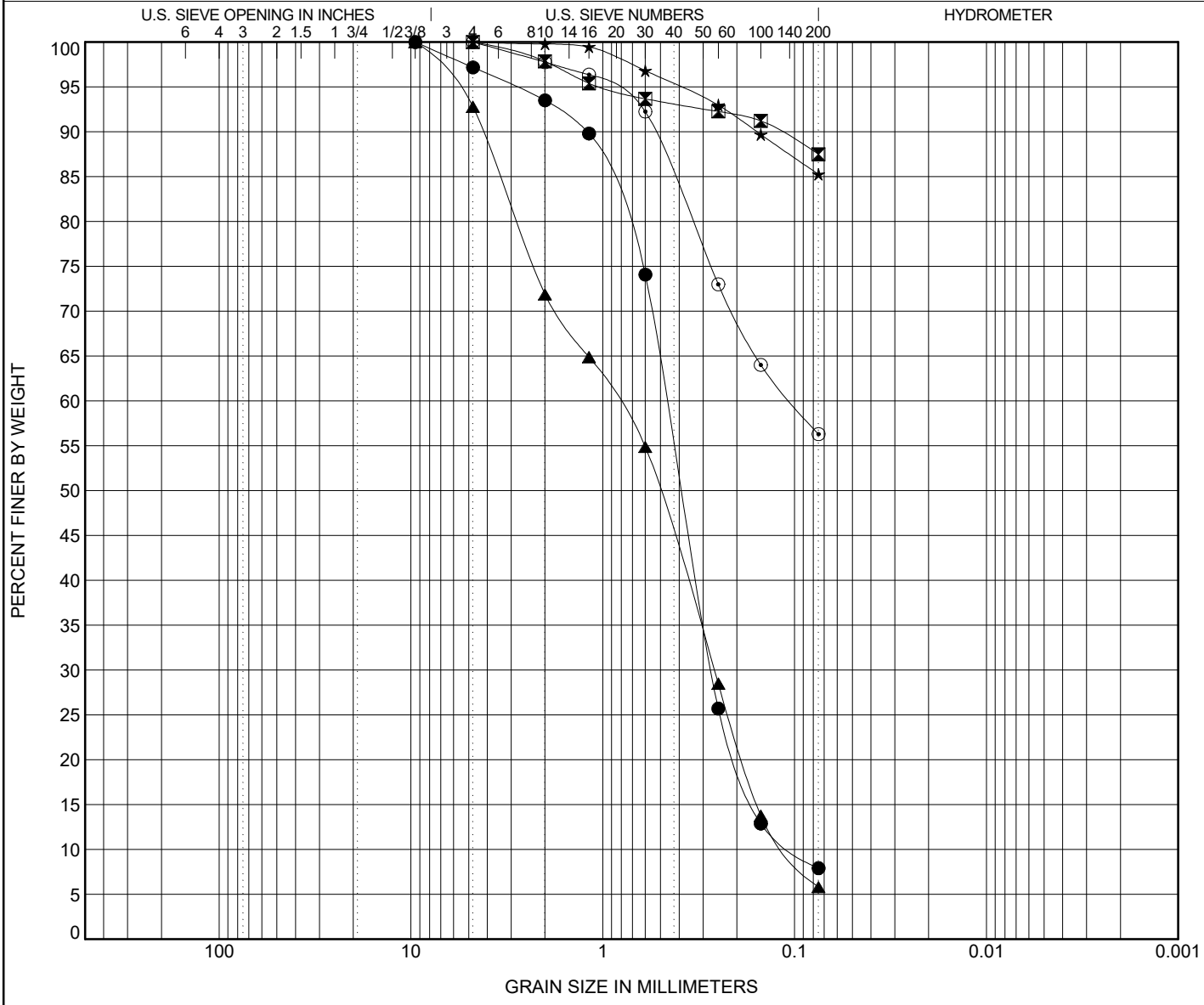
GRAIN SIZE DISTRIBUTION

City of Puyallup
Development & Permitting Services
ISSUED PERMIT
Building | Planning
Engineering | Public Works
Fire | Traffic

PROJECT NUMBER ES-7182 **PROJECT NAME** 1200 - 7th Ave Townhomes



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	Cc	Cu
●	TP-01	3.0ft.	USDA: Dark Gray Slightly Gravelly Sand. USCS: SP-SM.	1.56	4.63
⧓	TP-02	1.5ft.	USDA: Gray Slightly Gravelly Loam. USCS: ML.		
▲	TP-02	5.0ft.	USDA: Dark Gray Gravelly Sand. USCS: SP-SM.	0.75	7.86
★	TP-02	7.0ft.	UDSA: Gray Slightly Gravelly Loam. USCS: ML.		
⊙	TP-03	1.0ft.	USDA: Brown Slightly Gravelly Loam. USCS: Sandy ML.		

Specimen Identification			D100	D90	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	TP-01	3.0ft.	9.5	1.215	0.465	0.27	0.1				7.9	
⧓	TP-02	1.5ft.	4.75	0.12							87.5	
▲	TP-02	5.0ft.	9.5	4.232	0.849	0.263	0.108				5.8	
★	TP-02	7.0ft.	4.75	0.157							85.3	
⊙	TP-03	1.0ft.	4.75	0.542	0.105						56.3	

GRAIN SIZE USDA WITH D90 ES-7182 1200 - 7TH AVE TOWNHOMES.GPJ GINT US LAB.GDT 4/9/20

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GRAIN SIZE DISTRIBUTION

City of Puyallup
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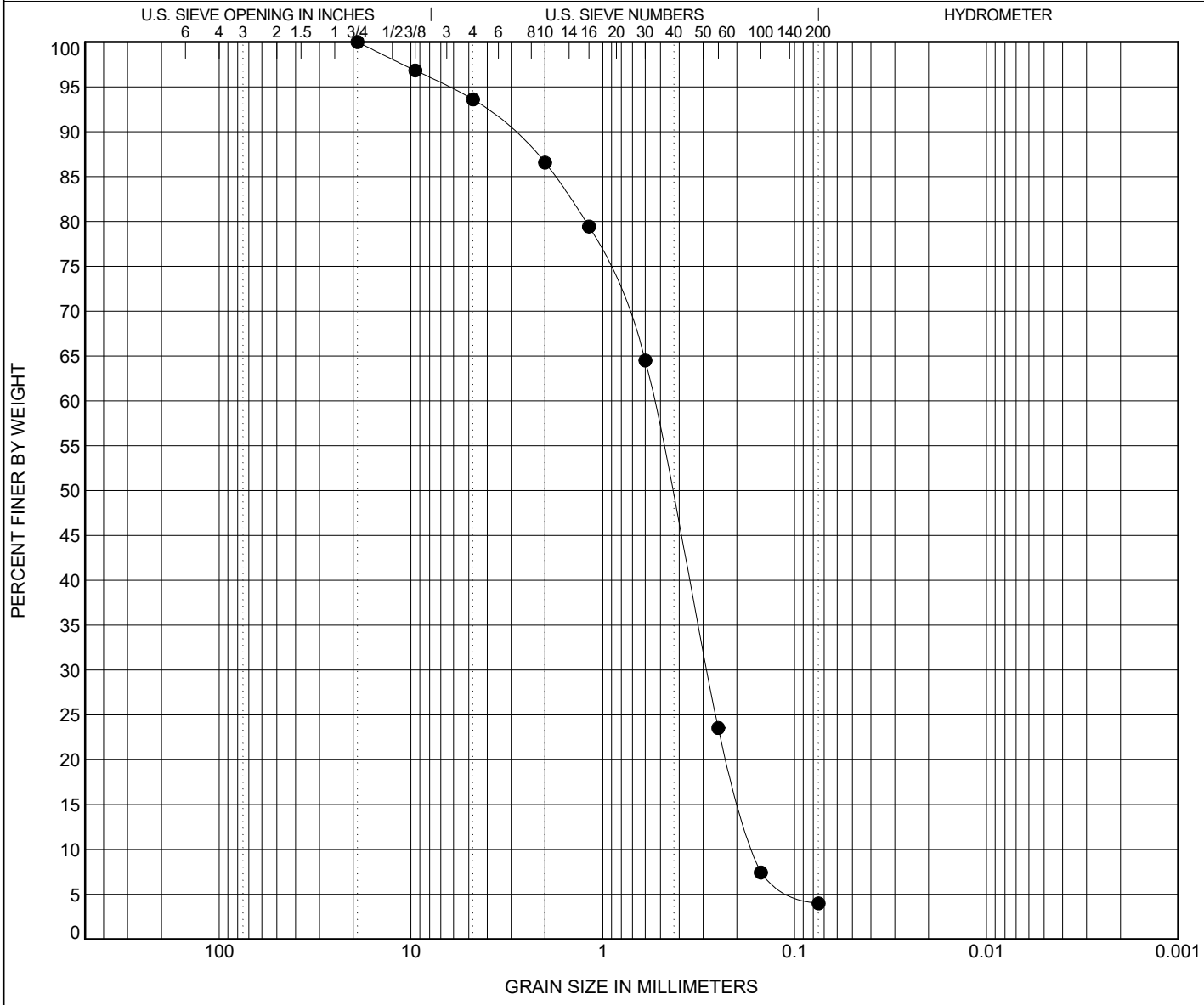
Building | Planning | Engineering | Public Works | Fire | Traffic

PROJECT NUMBER ES-7182 **PROJECT NAME** 1200 - 7th Ave Townhomes



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification		Classification	Cc	Cu
● **TP-03**	**3.0ft.**	**UDSA: Dark Gray Slightly Gravelly Coarse Sand. USCS: SP.**	**0.93**	**3.35**

Specimen Identification		D100	D90	D60	D30	D10	LL	PL	PI	%Silt	%Clay
● **TP-03**	**3.0ft.**	**19**	**3.051**	**0.545**	**0.287**	**0.163**				**4.0**	

GRAIN SIZE USDA WITH D90 ES-7182 1200 - 7TH AVE TOWNHOMES.GPJ GINT US LAB.GDT 4/9/20

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GRAIN SIZE DISTRIBUTION

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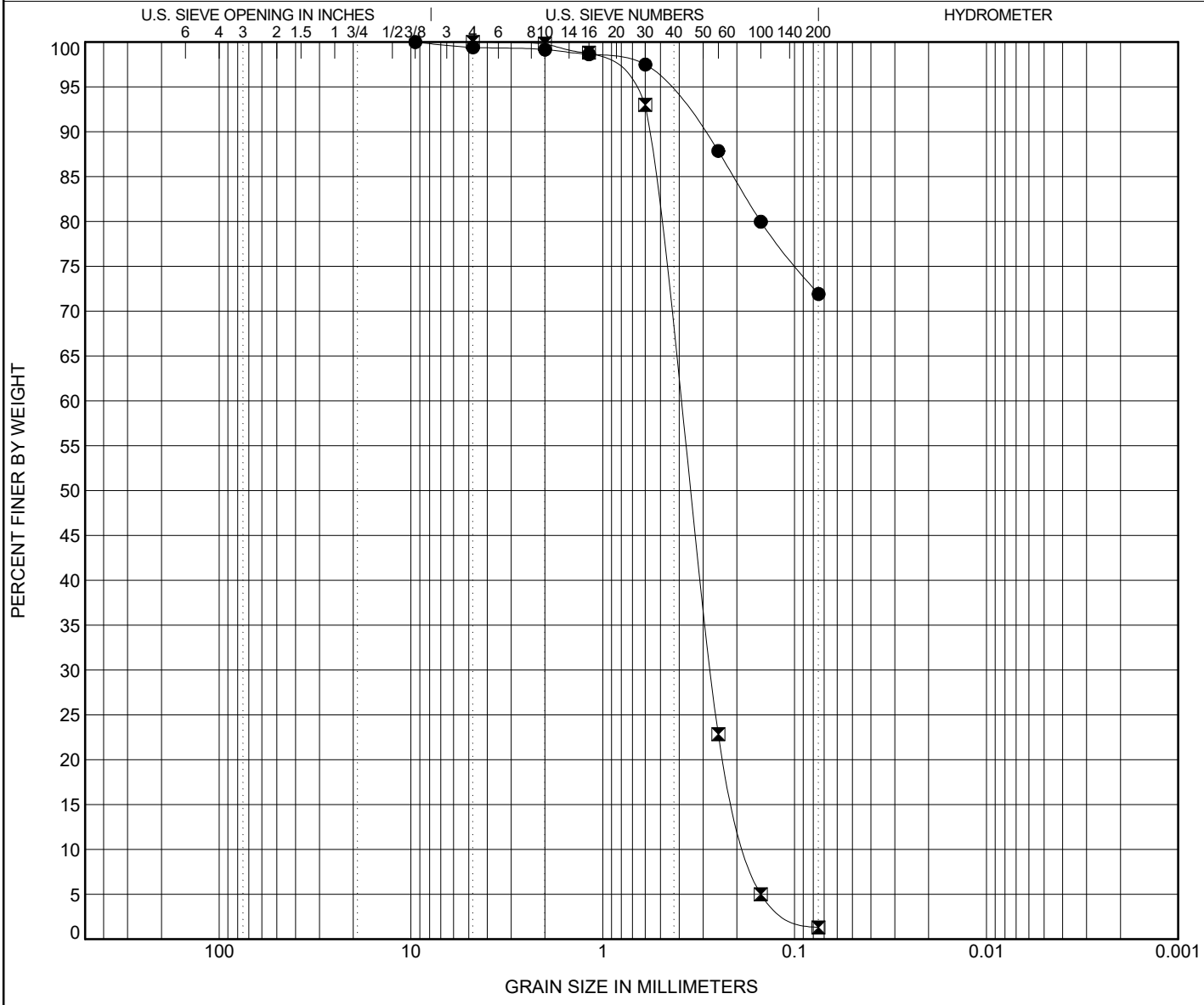
PROJECT NUMBER ES-7182 **PROJECT NAME** 1200 - 7th Ave Townhomes



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Specimen Identification			Classification	Cc	Cu
●	TP-05	3.50ft.	USDA: Gray Slightly Gravelly Loam. USCS: ML with Sand.		
⧓	TP-05	9.00ft.	USDA: Gray Slightly Gravelly Sand. USCS: SP.	1.09	2.30

Specimen Identification			D100	D60	D30	D10	LL	PL	PI	%Silt	%Clay
●	TP-05	3.5ft.	9.5							71.9	
⧓	TP-05	9.0ft.	4.75	0.397	0.273	0.173				1.3	

GRAIN SIZE USDA ES-7182 1200 - 7TH AVE TOWNHOMES.GPJ GINT US LAB.GDT 12/28/20