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March 29, 2021

Supplemental Geotechnical Report

Small Scale Pit Infiltration Test

Parcel No. 4389000160, 0170, 0180

Site Address – 4002, 0410, 4018 10th St SE

LS&E Job No. 13298

Tests Performed: 3/24/2021

Project Description

Per the 2014 Stormwater Manual for Western Washington, Volume III – Chapter 3; a Small-Scale Pilot Infiltration Test is indicated for sites with less than one acre of drainage to proposed infiltration facility (see page 525). The previous geotechnical site investigation, dated 3/5/21, confirmed uniform subsurface characteristics within the proposed infiltrative horizon.

Methodology

A Licensed Geologist and representative from our firm oversaw the preparation of the site and conducted the test. An excavation measuring 4-feet wide by 4-feet long (16 square feet) advanced approximately 6 inches into the underlying outwash deposit. The spoils were set back from the excavation. A water table review port was placed into a deep excavation near, and just down-gradient from, the pit.

- We installed a vertical measuring stake marked in half inch increments.
- We used a PVC pipe with bell-shaped base and small perforations within the test pit to dissipate water energy and thus limit movement and deposition of silts.
- A large water tank was mobilized with a section of fire hose that reached the pit.
- We pre-soaked the pit by maintaining a standing water head between 6 to 12 inches for 6 hours.
- At the end of the soaking period, we added water to the extent we could maintain the level between 6 and 12 inches for 1 hour.
- We made a measurement every 15 minutes of the amount of water it took to maintain the water lever at the same point each time (we chose 8 inches). We determined the volume and instantaneous flow rate.
- After 1 hour, we turned off the water and recorded the drop rate in inches per hour until the pit was empty.
- Finally, we reviewed the nearby water table review port (installed as described to a depth of 9 feet) to determine if water was mounding laterally. This step is intended for sites with restrictive layers. This analysis of the nearby port satisfies the requirement to over-excavate the test pit to look for groundwater mounding.

Figure 1: Infiltration Test (●) and Monitoring Port (◆) Locations

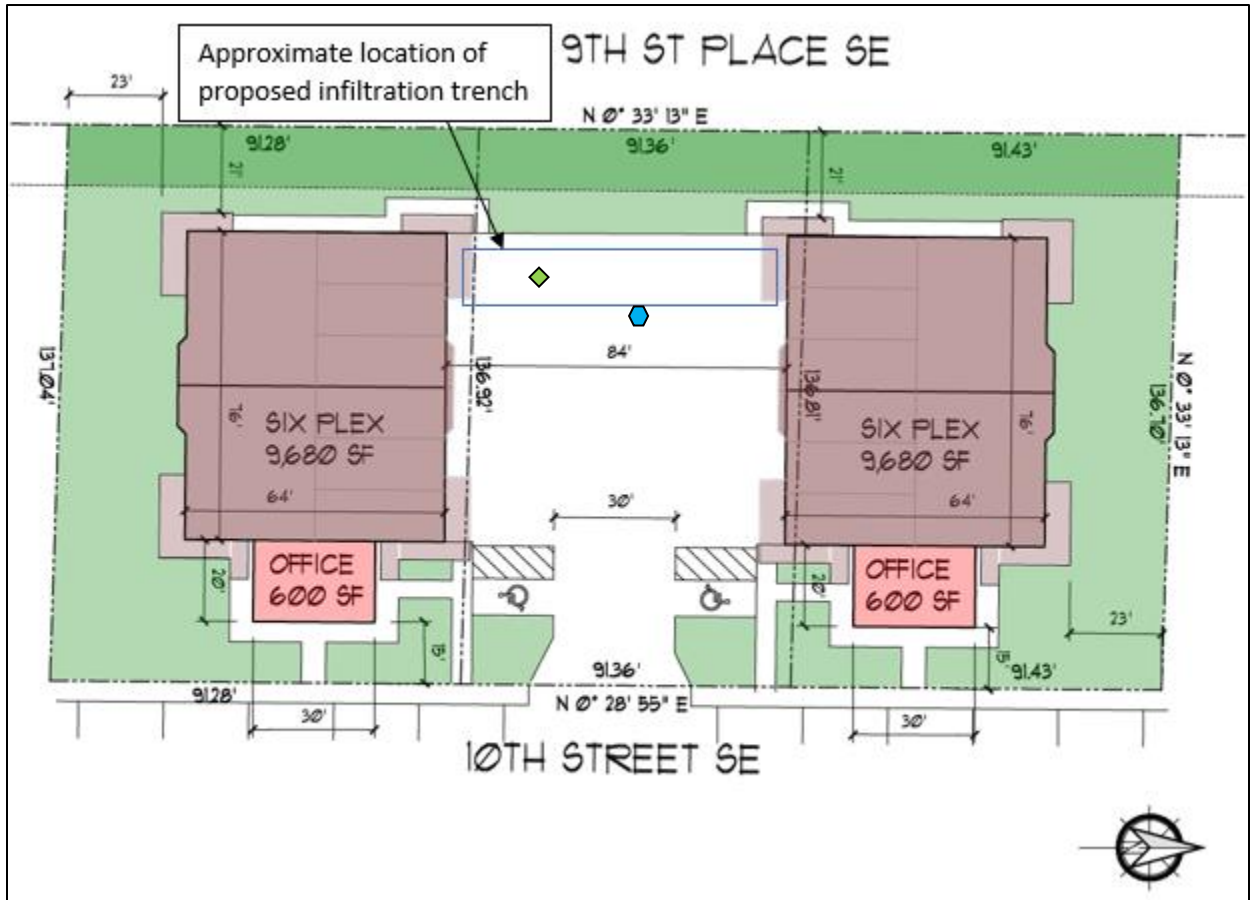


Figure 1 illustrates the test locations only. Our firm makes no assertion that the conceptual exhibit is the most current – it is the only plan provided to LS&E.

Table 1 illustrates the cumulative volume and instantaneous flow rate in gallons per minute to maintain the water level in the pit at 8 inches (measured every 15 minutes).

Table 1: Cumulative Volume and Instantaneous Flow Rate and Influence on Nearby Port

Period (each @15 min)	Cumulative Volume (gallons)	Instantaneous Flow Rate (gal/min)	Water Table Change in Adjacent Port?
1	38.1	2.5	None – dry (9 ft.)
2	39.9	2.7	None – dry (9 ft.)
3	38.0	2.5	None – dry (9 ft.)
4	37.4	2.5	None – dry (9 ft.)

At the conclusion of the test above for 1 hour, we discontinued application of water to the pit and recorded the drop in inches per hour until the pit emptied. Table 2 illustrates the results.

Table 2: Infiltration Test Results, Water Off, in Inches per Hour

Pit No.	Inches/Hour Drop Until Empty
1	14.5

As shown in Table 1 above, the nearby water table review port was observed at points throughout the PIT, as well as after the pit was fully infiltrated. **At no point during the onsite visit was water observed within the 9-foot port.**

The calculated infiltration rates observed for each 15 minute period during the PIT are shown below in Table 3. The slowest rate of infiltration observed for any period occurred during Period 4, the last period observed, with the average rate of infiltration for all four periods being 15.4 inches per hour. These values are all greater than the value found from the observation with the water off. After shutting off the water and waiting until the 4-foot by 4-foot pit was empty, the drop in water level was calculated to be approximately 14.5 inches per hour. **This is the most conservative value calculated for the entirety of the PIT; therefore 14.5 in./hr. will be the final reported value for infiltration observed.**

Table 3: Infiltration Test Results for Each Period in Inches per Hour

Period (each @15 min)	Converted inches/hour
1	15.3
2	16.0
3	15.2
4	15.0
Average =	15.4

During excavation of soil for placement of the water table review port, the soils were logged for further understanding of the site and ensuring proper depth for the PIT in relation to expected infiltrative horizon. The soils and depths and descriptions are found in Table 4, and are as follows:

Table 4: Soil Log – Excavation for Water Port

Soil Depth (in.)	Soil Descriptions	Water Encountered
0-36"	Brown fine-med sand w/gravel (FILL)	
36-47"	Dark Brown fine sand w/organics, gravel (FILL)	
47-108"	Gray med-coarse SAND w/gravel, cobbles, loose-to-mod dense, dry	None

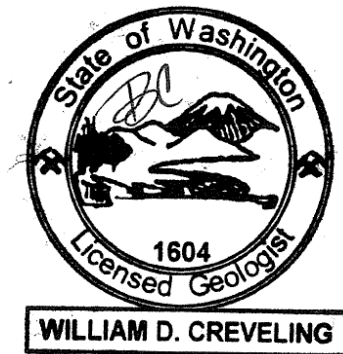
Figure 2: Infiltration Test in Progress



Closure

The information gathered for this report is standard practice and relevant for this type of project. The number and distribution of sampling locations is typical and reliable for obtaining an accurate understanding of the site of this size. The conclusions and recommendations presented in this letter are based on our observations, interpretations, and assumptions regarding shallow subsurface conditions. However, if any variations in the site conditions are discovered later, please contact our office to review and if necessary, modify this report accordingly. We appreciate the opportunity to be of service on this project. If you have any questions regarding this letter or any aspects of the project, please feel free to contact our office.

Respectfully submitted,
LeRoy Surveyors & Engineers, Inc.



3/29/2021

Bill Creveling, L.G.
Principal Geologist

A handwritten signature in black ink, appearing to read "Joshua Thompson". A vertical yellow line is positioned to the right of the signature.

Joshua Thompson, E.I.T.
Civil Engineering Technician