



ENVIRONMENTAL  
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10 26 2022  
Report # 22-0005-02

Nathan Johnson  
89125 Stellar Lane  
Warrenton, OR 97146

REGARDING: **Infiltration Testing**  
354 Pacific Dr. Hammond, OR 97121  
T: 8N R: 10W, Sec: 9, TL: 1100, 0.54 acres

Dear Mr. Johnson:

As requested, Environmental Management Systems Inc. (EMS) has performed the following services and provides this report for your use.

**Project description:**

The purpose of this report is to document the results of soil infiltration testing. On October 25<sup>th</sup>, 2022, EMS conducted three soil infiltration tests in the proposed stormwater infiltration areas. This report describes existing site conditions, methods used, and results.

**Summary:**

Six infiltration tests were conducted, with two tests being conducted for three separate test hole locations. The test holes were dug to a total depth of 30". Soil in Test hole 1 consisted of organic material and loamy sand at 0-1 inches below grade and sand at 1-30 inches below grade. Soil in Test hole 2 consisted of organic material and loamy sand at 0-1 inches below grade and sand at 1-30 inches below grade. Soil in test hole 3 consisted of organic material and loamy sand at 0-1 inches below grade and sand at 1-30 inches below grade.

Test Hole 1	Average infiltration rate of 74.3 inches per hour.
Test Hole 2	Average infiltration rate of 108.0 inches per hour.
Test Hole 3	Average infiltration rate of 96.0 inches per hour.

**Soils:**

According to mapping by the Natural Resource Conservation Service (NRCS), soil in the proposed development and infiltration area is 70C- Waldport fine sand, 3 to 15 percent slopes. The soil is listed as non-hydric.

Soil in Test hole 1 consisted of organic material and loamy sand at 0-1 inches below grade and sand at 1-30 inches below grade. Soil in Test hole 2 consisted of organic material and loamy sand at 0-1 inches below grade and sand at 1-30 inches below grade. Soil in test hole 3 consisted of organic material and loamy sand at 0-1 inches below grade and sand at 1-30 inches below grade.

**Methods:**

Three approximately 12" by 12" test holes were dug to a depth of 30" near the proposed infiltration facility. Water for the infiltration test was filled to 24" from the bottom of each test hole (6" below grade). Two infiltration tests were conducted for each test hole to obtain an average infiltration rate in inches per hour.

Weather during the tests was cloudy with precipitation. The air temperature was approximately 50 degrees Fahrenheit. Precipitation data was acquired from a nearby weather station (Astoria Airport) per the Natural Resources Conservation Service (NRCS) WETS table. The site area received approximately 0.89 inches of precipitation on October 25<sup>th</sup>, 2022. The month of October received 1.21 inches of precipitation as of October 24<sup>th</sup>, 2022. The site area received approximately 0.22 inches of precipitation over the 2 days prior to conducting the test.

**Results:**

Results of the infiltration tests are shown in Table 1-3 below.

**Table 1. Infiltration Test Results for Test Hole 1.**

Test 1	Time	Measurement (inches)	Rate (inches per hour)
	11:22	24.00	
	11:25	14.75	185.0
	11:28	10.63	82.4
	11:31	7.06	71.4
	11:34	5.00	41.2
	11:37	3.25	35.0
	11:40	1.50	30.0
	11:43	0.00	30.0
	Infiltration Rate =		
Test 2	Time	Measurement (inches)	Rate (inches per hour)
	11:49	24.00	
	11:52	16.00	160.0
	11:55	10.75	105.0
	11:58	6.75	80.0
	12:01	3.50	70.0
	12:04	0.38	62.4
	12:07	0.00	7.6
Infiltration Rate =			80.0

**Table 2. Infiltration Test Results for Test Hole 2.**

Test 1		
Time	Measurement (inches)	Rate (inches per hour)
11:54	24	
11:57	15.50	170.0
12:00	8.00	150.0
12:03	2.56	108.8
12:06	0.00	51.2
Infiltration Rate =		120.0
Test 2		
Time	Measurement (inches)	Rate (inches per hour)
12:12	24.00	
12:15	16.50	150.0
12:18	10.56	118.8
12:21	5.75	96.2
12:24	2.44	66.2
12:27	0.00	48.8
Infiltration Rate =		96.0

**Table 3. Infiltration Test Results for Test Hole 3.**

Test 1		
Time	Measurement (inches)	Rate (inches per hour)
12:39	24.00	
12:42	14.81	183.8
12:45	10.00	96.2
12:48	5.75	85.0
12:51	2.00	75.0
12:54	0.00	40.0
Infiltration Rate =		96.0
Test 2		
Time	Measurement (inches)	Rate (inches per hour)
12:58	24.00	
13:01	16.75	145.0
13:04	10.88	117.4
13:07	6.00	97.6
13:10	2.31	73.8
13:13	0.00	46.2
Infiltration Rate =		96.0

**CONCLUSIONS:**

<b>Test Hole #</b>	<b>Average Infiltration Rate</b>
<b>1</b>	<b>74.3 inches per hour</b>
<b>2</b>	<b>108.0 inches per hour</b>
<b>3</b>	<b>96.0 inches per hour</b>

An initial report (EMS Report #22-0005) was prepared based on preliminary infiltration testing conducted on June 14<sup>th</sup>, 2022, and is included in the appendix. In that report, it was noted that prominent redoximorphic features were indicating a possible seasonal water table around 20-24 inches below grade. Due to concerns of the possibility of a seasonal groundwater table and the ability of the soils to infiltrate stormwater run-off, an additional field investigation was conducted on October 25, 2022. The additional investigations included the three additional infiltration test holes above and their respective analyses. The information and conclusions included in this report supersedes that from the previous report. This report concludes that the initial site visit redoximorphic features at 20-24 inches were local to the test hole and were not indicative of the infiltration area. Of note during the October 25<sup>th</sup> field visit and testing, a 5-foot-deep test pit was excavated and observed. The soil profile contained prominent redoximorphic features at a depth of 36-39 inches below existing ground level. Based on the soil infiltration results above, the soil is well suited for infiltration if the facilities are located above 36 inches.

**Limitations:**

Findings and recommendations in this report are based infiltration testing performed in three locations. Subsurface conditions may vary across the site. If there are changes to the plan that involve infiltrating stormwater elsewhere onsite, additional testing may be required.

**DISCLOSURE:** The information and statements in this report are true and accurate to the best of our knowledge. Neither Environmental Management Systems, Inc., nor the undersigned have any economic interests in the project.

Sincerely,



Gus McKinley, BS, EHST  
Biologist,  
ENVIRONMENTAL MANAGEMENT SYSTEMS, Inc.

**Enclosed:**  
Infiltration Test Location Map



Figure 1. Test Hole Location Map.