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BELL APARTMENTS

Stormwater Site Plan
Preliminary Drainage Report

FOR: Bell Place, LLC
204 4th St SW
Puyallup, WA 98372

BY: Azure Green Consultants
409 East Pioneer
Puyallup, WA 98372
253.770.3144

DATE: October 3, 2022

JOB NO: 3256

ENGINEER: Robert A. Trivitt, P.E.

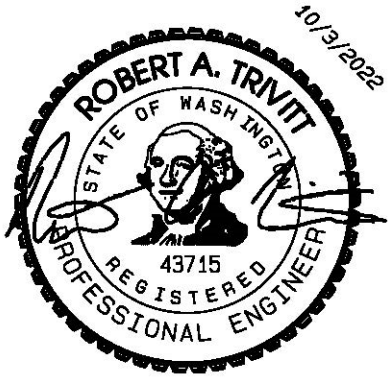


TABLE OF CONTENTS

DRAINAGE REPORT

APPENDICES

MAPS

Section I - Project Overview

Overview:

The project site is located on the northwest corner of the intersection of W Pioneer and 4th St SW. The site address is 204 4th St SW. The project will develop tax parcel numbers 5745001631, 5745001632, and 5745001641. Total site area is 32,085 sf = 0.737 acres. The project is an apartment building.

Improvements for the project will include the building, with in-building parking, underground detention system under the building, utility services, and frontage improvements on W Meeker.

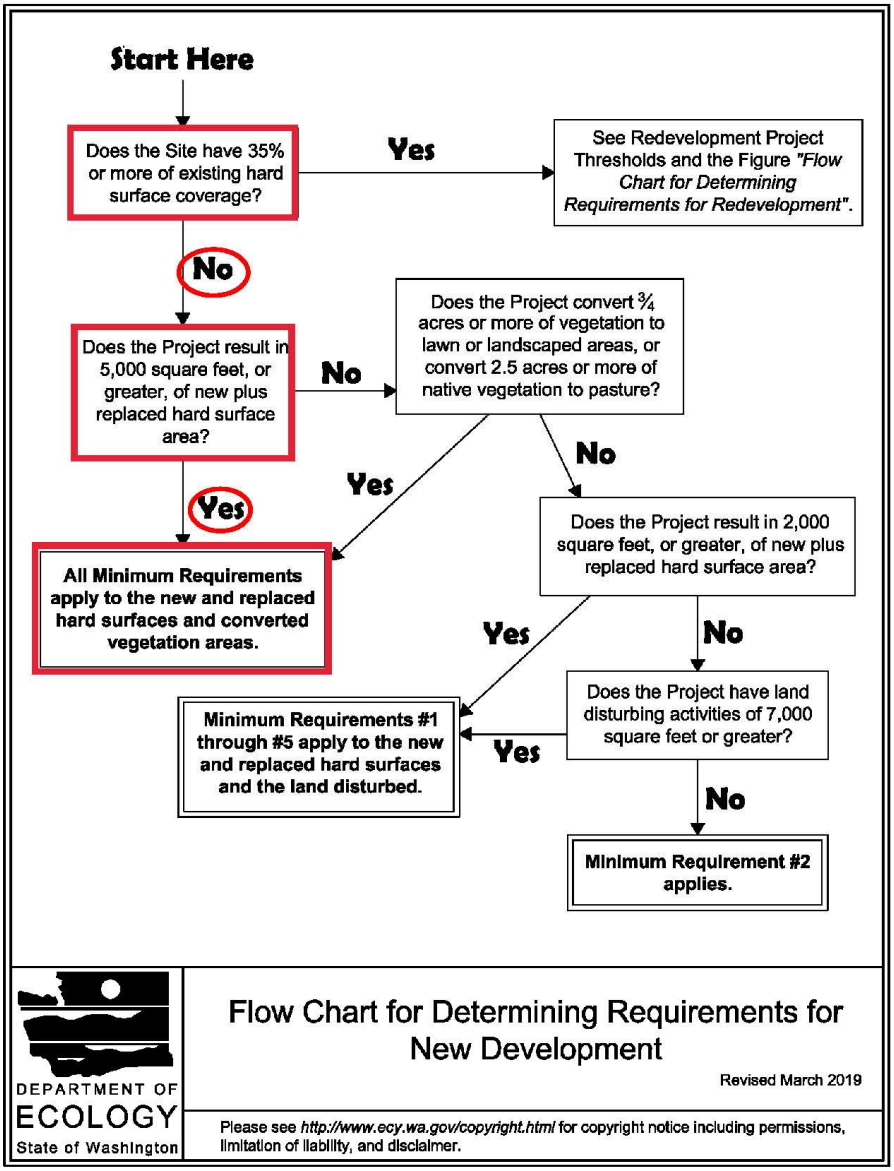
Project Requirements:

Determination of Applicable Minimum Requirements

Per PMC 21.10.040 the City of Puyallup has adopted the Washington State Department of Ecology Stormwater Management Manual for Western Washington (SMMWW), with the version in effect being "the most current version approved for city use by the council." The city adopted the 2019 DOE Manual on July 1, 2022, and it is the controlling regulation and is referred to as "the Manual" or "SMMWW" hereinafter.

The project consists of 28,532 sf of roof and 3,553 sf of new sidewalk. The proposed frontage improvements are primarily over existing paved surfaces and therefore the minimum requirements are not applied. The new sidewalk is minor widening of the existing sidewalk and drainage will be allowed to simply sheetflow onto the existing sidewalk and into the roadway. The existing hard surfaces onsite are 4,986 sf or approximately 15% of the project site and therefore, the project is considered new development. Since the total new plus replaced onsite hard surfaces for the project are greater than 5,000 square feet, and the value of improvements exceed 50% of the assessed value of the existing site improvements, all minimum requirements apply to the new and replaced onsite hard surfaces and converted vegetation areas. Note that all of the existing vegetated areas are already lawn/landscaping so therefore there are no converted vegetation areas. Therefore, the minimum requirements only apply to the new and replaced hard surfaces.

Figure I-3.1: Flow Chart for Determining Requirements for New Development



Discussion of Minimum Requirements

The Minimum Requirements per Section I-2.5 of the Manual:

Minimum Requirement #1: Preparation of Stormwater Site Plans

The Stormwater Site Plan consists of a report and construction plans. This report and the attached preliminary storm plan are preliminary versions of the Drainage Report and the site improvement plans that will be submitted for construction permits and will satisfy Minimum Requirement #1.

Minimum Requirement #2: Construction Stormwater Pollution Prevention (SWPPP)

The SWPPP consists of a narrative and drawings. The narrative will be addressed in Section V of the final version of the Drainage Report. The drawings will include a TESC plan, notes, and details as part of the site development construction plans. The narrative and drawings will be prepared and submitted at time of civil permit application.

Minimum Requirement #3: Source Control of Pollution

A Pollution Source Control Plan will be prepared in conformance with requirements of Section IV of the Manual and will be submitted as a separate document at time of civil permit application.

Minimum Requirement #4: Preservation of Natural Drainage Systems and Outfalls

Currently, drainage from the site sheet flows both north into W Meeker and south into W Pioneer. Drainage in both roads flows west along the curb line into catch basins in 5th St SW. These catch basins are tied through 8-inch laterals into a 15-inch storm main that flows south. The proposed design will connect to this same closed conveyance system to preserve existing drainage systems and outfalls.

Minimum Requirement #5: On-site Stormwater Management

Because the project triggers MR #1-9, and is inside the urban growth area, the project must either meet the Low Impact Development Performance Standard, or use List #2 to determine applicable On-Site Stormwater Management BMPs. This project will use List #2. For each surface the BMP's must be considered in the order listed for that type of surface and use the first BMP that is considered feasible.

Lawn and Landscaped Areas:

- All lawn and landscaped areas will meet the requirements of BMP T5.13, Post Construction Soil Quality and Depth with notes on the plans to this effect.

Roofs:

1. BMP T5.30: Full Dispersion – infeasible due to lack of native vegetation and flowpath length onsite; BMP T5.10A: Downspout Full Infiltration – infeasible based on depth to groundwater.
2. BMP T7.30: Bioretention – infeasible based on depth to groundwater
3. BMP T5.10B: Downspout dispersion system – not feasible based on required flowpath lengths
4. BMP T5.10C: Perforated Stub-out connections – not feasible due to depth to groundwater.

Other Hard Surfaces:

There are no other hard surfaces to which the minimum requirements apply.

Minimum Requirement #6: Runoff Treatment

There is no proposed PGHS for this project to which the minimum requirements apply.

Minimum Requirement #7: Flow Control

The total new plus replaced hard surface for the project is well over 10,000 sf and therefore flow control is required. Any existing pervious surface to be disturbed is already lawn, and therefore the converted vegetation thresholds are not exceeded, and the minimum requirements do not apply to the pervious areas. To meet this minimum requirement stormwater discharges shall match developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50 percent of the 2-year recurrence interval peak flow up to the full 50-year peak flow. Predeveloped condition to be matched shall be forested land cover. See below for hydrologic analysis.

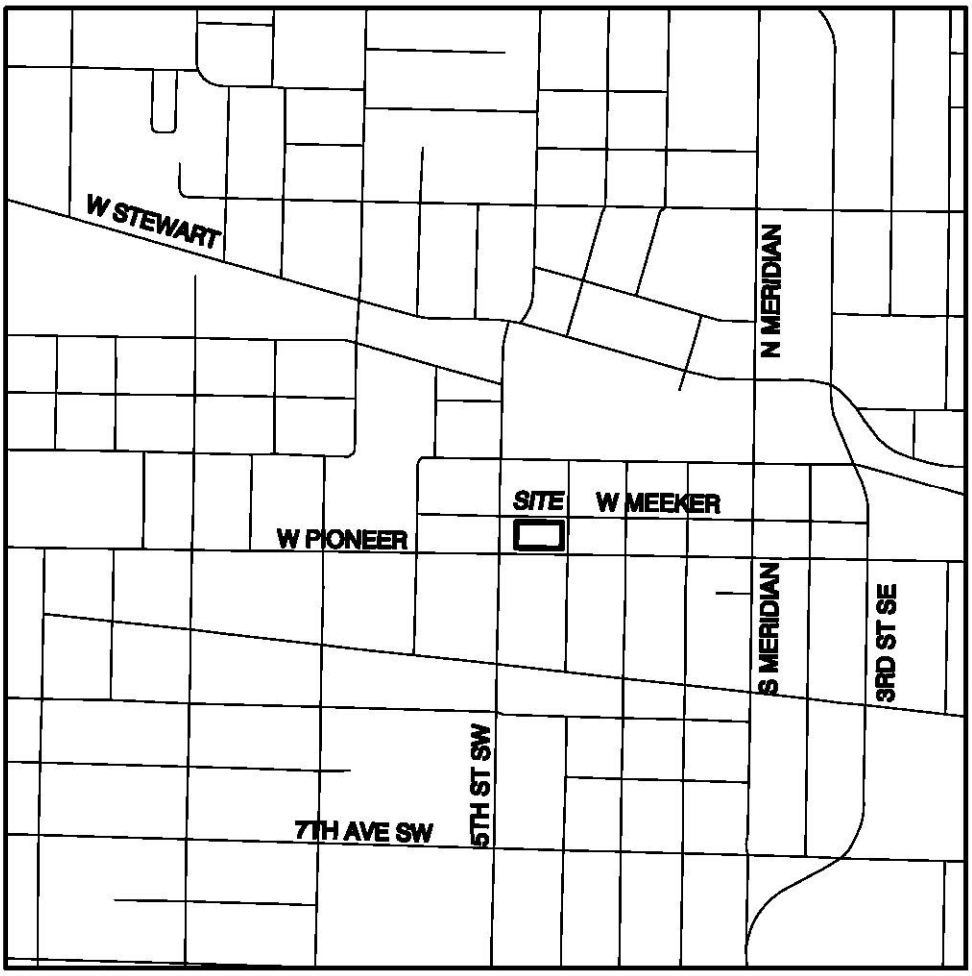
Minimum Requirement #8: Wetlands Protection

There are no wetlands on or near the site..

Minimum Requirement #9: Operation and Maintenance

The stormwater facilities required for this project that require a maintenance plan are: conveyance system, R-Tank detention system, and flow restrictor. All onsite stormwater facilities will be owned, operated, and maintained by the property owner. An O&M plan will be submitted with civil plan application in the future. Improvements in the right-of-way will be owned, operated and maintained by the City of Puyallup and consist of the conveyance system.

Figure 1. Site Location:



Section II – Existing Conditions Summary

Topography:
In existing conditions the site is nearly flat, slightly sloping to the north and south, while overall dropping from east to west.

Ground Cover:
The site is developed as a single family residence. The non-hard surface areas are covered with lawn and landscaping.

Drainage:
There is no defined drainage course onsite. Any surface runoff that does not infiltrate sheet flows north into W Meeker or south into W Pioneer.

Soils:
The NRCS Soil Survey of Pierce County indicates the soils on the site are Puyallup fine sandy loam (31A). Puyallup soils are hydrologic group A. Per the soils report for the site by GeoResources, the soils match the mapped soil type, primarily being sand. Groundwater monitoring was performed during the winter of 2022 with peak groundwater reaching elevation 42.0, approximately 3 feet deep. Infiltration testing was performed by GeoResources with a resulting long-term design infiltration rate of 1 in/hr. See Appendix B for soils reports. While the design infiltration rate is marginal for typical infiltration design, the depth to groundwater of 3 feet makes all infiltration BMPs infeasible given the proposed development.

Floodplain
The project site does not include a floodplain based on latest FIRM and Pierce County flood data.

Section III – Off-Site Analysis

Upstream

Existing topography and curbs in adjacent road result in no upstream area contributing drainage to the site.

Downstream

From the project site, runoff sheet flows north into W Meeker or south into West Pioneer, then west approximately 80 feet along curbing and into catch basins in 5th St SW. These catch basins have 8-inch leaders into a 15-inch storm main that flows south for about 640 feet into a 24-inch pipe in 4th Ave SW that flows west. The 24-inch pipe continues west, reaching the ¼ mile downstream point approximately 150 feet west of 6th St SW.

Problems

There are no known drainage problems along this downstream route.

Section IV – Permanent Stormwater Control Plan

Existing Site Hydrology

For existing conditions, only the proposed roof area is considered for the analysis. The roof area is 28,532 sf = 0.6550 acre. For flow control, this area is modeled as forest, flat for pre-developed conditions. Due to the high groundwater, and marginal infiltration rate, the soils are classified as "C". The project site is within the 42-inch, East rainfall zone and WWHM is run with 15-minute intervals. See Appendix A for WWHM analysis.

The peak runoff rates calculated by WWHM2012 for predeveloped conditions are:

```
   Flow Frequency
 Flow(cfs)  0501 15m
2 Year   =    0.0158
5 Year   =    0.0242
10 Year  =    0.0294
25 Year  =    0.0354
50 Year  =    0.0394
100 Year =    0.0431
```

Developed Site Hydrology

Drainage Basins

For developed conditions, the roof is routed to the detention system. As noted above, the roof area is 28,532 sf = 0.6550 acre.

The peak runoff rates calculated by WWHM2012 for developed conditions (prior to detention) are:

Flow Frequency		
Flow(cfs)		0701 15m
2 Year	=	0.2399
5 Year	=	0.3212
10 Year	=	0.3801
25 Year	=	0.4607
50 Year	=	0.5253
100 Year	=	0.5939

Flow Control

An underground lattice structure called R-Tank will be used to provide detention volume to meet flow control requirements. The R-Tank will be modeled as a vault. The requirement is that stormwater discharges shall match developed discharge durations to predeveloped durations for the range of predeveloped discharge rates from 50 percent of the 2-year recurrence interval peak flow up to the full 50-year peak flow. The vault is sized with 1.94 feet of live storage depth with no overflow through the standpipe for flows through the 50-year event. A single orifice, and notched standpipe is used for outlet control. The WWHM analysis shows that a vault with 11,000 sf of area resulting in 23,687 cf of storage is adequate to provide the required detention volume. The underground lattice system, and surrounding rock are not 100% voids. The system as designed has a storage volume of 23,767 cf. The depth of storage is limited by the minimum cover required and the existing pipe to which the outfall is connected. So that, while the R-Tank modules have 2.17 feet of storage depth, only the top 1.94 feet are used. Following are the developed flows, i.e. release from the vault.

Flow Frequency		
Flow(cfs)		0801 15m
2 Year	=	0.0071
5 Year	=	0.0110
10 Year	=	0.0144
25 Year	=	0.0199
50 Year	=	0.0251
100 Year	=	0.0313

The stage of detention in the vault:

Stage Frequency		
(feet)		1001 15m
2 Year	=	0.9430
5 Year	=	1.2238
10 Year	=	1.3901
25 Year	=	1.5818
50 Year	=	1.7135
100 Year	=	1.8370

Conclusions

The analysis shows that the flow control standard can be met.

Section V – Construction Stormwater Pollution Prevention Plan

An SWPPP will be prepared and submitted for this project with the final engineering.

Section VI – Special Reports and Studies

See Geotech reports in Appendix B.

Section VII – Other Permits

A building permit will be required for construction of the future buildings. Water and sewer service permits will be required.

Section VIII – Operation and Maintenance Manual

An Operations and Maintenance Manual is required for all storm drainage improvements. The O&M Manual will be prepared and submitted with the final engineering.

Section IX – Bond Quantities Worksheet

Any required bond amounts will be calculated when required for permit issuance.

APPENDIX A

WWHM Analysis

WWHM2012

PROJECT REPORT

General Model Information

Project Name:	Bell
Site Name:	Bell
Site Address:	
City:	Puyallup
Report Date:	10/3/2022
Gage:	42 IN EAST
Data Start:	10/01/1901
Data End:	09/30/2059
Timestep:	15 Minute
Precip Scale:	1.000
Version Date:	2019/09/13
Version:	4.2.17

POC Thresholds

Low Flow Threshold for POC1:	50 Percent of the 2 Year
High Flow Threshold for POC1:	50 Year

Landuse Basin Data

Predeveloped Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
C, Forest, Flat	0.655
Pervious Total	0.655
Impervious Land Use	acre
Impervious Total	0
Basin Total	0.655

Element Flows To:

Surface	Interflow	Groundwater

Mitigated Land Use

Basin 1

Bypass:	No
GroundWater:	No
Pervious Land Use	acre
Pervious Total	0
Impervious Land Use	acre
ROOF TOPS FLAT	0.655
Impervious Total	0.655
Basin Total	0.655

Element Flows To:

Surface	Interflow	Groundwater
Vault 1	Vault 1	

Routing Elements
Predeveloped Routing

Mitigated Routing

Vault 1

Width: 110 ft.
Length: 111 ft.
Depth: 4 ft.
Discharge Structure
Riser Height: 1.94 ft.
Riser Diameter: 8 in.
Notch Type: Rectangular
Notch Width: 0.021 ft.
Notch Height: 0.792 ft.
Orifice 1 Diameter: 0.5 in. Elevation:0 ft.
Element Flows To:
Outlet 1 Outlet 2

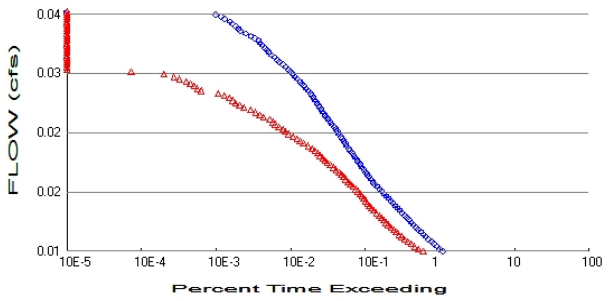
Vault Hydraulic Table

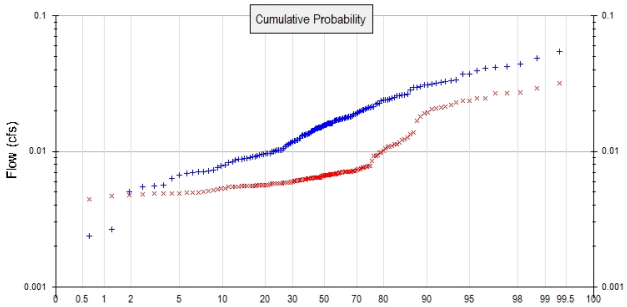
Stage(feet)	Area(ac.)	Volume(ac-ft.)	Discharge(cfs)	Infilt(cfs)
0.0000	0.280	0.000	0.000	0.000
0.0444	0.280	0.012	0.001	0.000
0.0889	0.280	0.024	0.002	0.000
0.1333	0.280	0.037	0.002	0.000
0.1778	0.280	0.049	0.002	0.000
0.2222	0.280	0.062	0.003	0.000
0.2667	0.280	0.074	0.003	0.000
0.3111	0.280	0.087	0.003	0.000
0.3556	0.280	0.099	0.004	0.000
0.4000	0.280	0.112	0.004	0.000
0.4444	0.280	0.124	0.004	0.000
0.4889	0.280	0.137	0.004	0.000
0.5333	0.280	0.149	0.005	0.000
0.5778	0.280	0.162	0.005	0.000
0.6222	0.280	0.174	0.005	0.000
0.6667	0.280	0.186	0.005	0.000
0.7111	0.280	0.199	0.005	0.000
0.7556	0.280	0.211	0.005	0.000
0.8000	0.280	0.224	0.006	0.000
0.8444	0.280	0.236	0.006	0.000
0.8889	0.280	0.249	0.006	0.000
0.9333	0.280	0.261	0.006	0.000
0.9778	0.280	0.274	0.006	0.000
1.0222	0.280	0.286	0.006	0.000
1.0667	0.280	0.299	0.007	0.000
1.1111	0.280	0.311	0.007	0.000
1.1556	0.280	0.323	0.007	0.000
1.2000	0.280	0.336	0.008	0.000
1.2444	0.280	0.348	0.009	0.000
1.2889	0.280	0.361	0.011	0.000
1.3333	0.280	0.373	0.013	0.000
1.3778	0.280	0.386	0.015	0.000
1.4222	0.280	0.398	0.017	0.000
1.4667	0.280	0.411	0.019	0.000
1.5111	0.280	0.423	0.022	0.000
1.5556	0.280	0.436	0.025	0.000
1.6000	0.280	0.448	0.027	0.000

1.6444	0.280	0.460	0.030	0.000
1.6889	0.280	0.473	0.033	0.000
1.7333	0.280	0.485	0.036	0.000
1.7778	0.280	0.498	0.039	0.000
1.8222	0.280	0.510	0.042	0.000
1.8667	0.280	0.523	0.045	0.000
1.9111	0.280	0.535	0.048	0.000
1.9556	0.280	0.548	0.064	0.000
2.0000	0.280	0.560	0.154	0.000
2.0444	0.280	0.573	0.284	0.000
2.0889	0.280	0.585	0.433	0.000
2.1333	0.280	0.598	0.578	0.000
2.1778	0.280	0.610	0.701	0.000
2.2222	0.280	0.622	0.788	0.000
2.2667	0.280	0.635	0.844	0.000
2.3111	0.280	0.647	0.904	0.000
2.3556	0.280	0.660	0.953	0.000
2.4000	0.280	0.672	1.001	0.000
2.4444	0.280	0.685	1.045	0.000
2.4889	0.280	0.697	1.088	0.000
2.5333	0.280	0.710	1.130	0.000
2.5778	0.280	0.722	1.169	0.000
2.6222	0.280	0.735	1.208	0.000
2.6667	0.280	0.747	1.245	0.000
2.7111	0.280	0.759	1.281	0.000
2.7556	0.280	0.772	1.316	0.000
2.8000	0.280	0.784	1.350	0.000
2.8444	0.280	0.797	1.383	0.000
2.8889	0.280	0.809	1.416	0.000
2.9333	0.280	0.822	1.447	0.000
2.9778	0.280	0.834	1.478	0.000
3.0222	0.280	0.847	1.509	0.000
3.0667	0.280	0.859	1.538	0.000
3.1111	0.280	0.872	1.567	0.000
3.1556	0.280	0.884	1.596	0.000
3.2000	0.280	0.897	1.624	0.000
3.2444	0.280	0.909	1.652	0.000
3.2889	0.280	0.921	1.679	0.000
3.3333	0.280	0.934	1.705	0.000
3.3778	0.280	0.946	1.732	0.000
3.4222	0.280	0.959	1.757	0.000
3.4667	0.280	0.971	1.783	0.000
3.5111	0.280	0.984	1.808	0.000
3.5556	0.280	0.996	1.833	0.000
3.6000	0.280	1.009	1.857	0.000
3.6444	0.280	1.021	1.881	0.000
3.6889	0.280	1.034	1.905	0.000
3.7333	0.280	1.046	1.928	0.000
3.7778	0.280	1.058	1.951	0.000
3.8222	0.280	1.071	1.974	0.000
3.8667	0.280	1.083	1.997	0.000
3.9111	0.280	1.096	2.019	0.000
3.9556	0.280	1.108	2.041	0.000
4.0000	0.280	1.121	2.063	0.000
4.0444	0.280	1.133	2.085	0.000
4.0889	0.000	0.000	2.106	0.000

Analysis Results

POC 1





\+ Predeveloped x Mitigated

Predeveloped Landuse Totals for POC #1
Total Pervious Area: 0.655
Total Impervious Area: 0

Mitigated Landuse Totals for POC #1
Total Pervious Area: 0
Total Impervious Area: 0.655

Flow Frequency Method: Log Pearson Type III 17B

Flow Frequency Return Periods for Predeveloped. POC #1

Return Period	**Flow(cfs)**
2 year	0.015774
5 year	0.0242
10 year	0.029376
25 year	0.035356
50 year	0.039407
100 year	0.043134

Flow Frequency Return Periods for Mitigated. POC #1

Return Period	**Flow(cfs)**
2 year	0.007139
5 year	0.01095
10 year	0.014353
25 year	0.019886
50 year	0.025074
100 year	0.031341

Annual Peaks

Annual Peaks for Predeveloped and Mitigated. POC #1

Year	**Predeveloped**	**Mitigated**
1902	0.015	0.006
1903	0.010	0.005
1904	0.018	0.006
1905	0.008	0.007
1906	0.005	0.005
1907	0.025	0.006
1908	0.017	0.006
1909	0.017	0.007
1910	0.024	0.006
1911	0.016	0.006

1912	0.054	0.008
1913	0.024	0.014
1914	0.006	0.005
1915	0.011	0.009
1916	0.016	0.006
1917	0.006	0.006
1918	0.016	0.019
1919	0.014	0.006
1920	0.016	0.006
1921	0.018	0.007
1922	0.017	0.006
1923	0.014	0.007
1924	0.007	0.006
1925	0.009	0.006
1926	0.015	0.006
1927	0.012	0.006
1928	0.012	0.007
1929	0.024	0.011
1930	0.015	0.006
1931	0.015	0.007
1932	0.011	0.007
1933	0.013	0.007
1934	0.031	0.027
1935	0.015	0.012
1936	0.014	0.008
1937	0.021	0.006
1938	0.013	0.007
1939	0.001	0.004
1940	0.015	0.007
1941	0.010	0.005
1942	0.022	0.021
1943	0.011	0.007
1944	0.024	0.008
1945	0.018	0.007
1946	0.010	0.006
1947	0.008	0.006
1948	0.033	0.006
1949	0.029	0.011
1950	0.009	0.006
1951	0.012	0.006
1952	0.042	0.010
1953	0.039	0.021
1954	0.014	0.007
1955	0.012	0.005
1956	0.007	0.005
1957	0.021	0.009
1958	0.041	0.032
1959	0.026	0.025
1960	0.007	0.005
1961	0.026	0.021
1962	0.015	0.007
1963	0.007	0.005
1964	0.008	0.006
1965	0.030	0.024
1966	0.009	0.006
1967	0.013	0.005
1968	0.015	0.007
1969	0.013	0.006

1970	0.021	0.006
1971	0.031	0.012
1972	0.020	0.007
1973	0.026	0.011
1974	0.014	0.006
1975	0.032	0.027
1976	0.018	0.007
1977	0.009	0.005
1978	0.028	0.024
1979	0.009	0.006
1980	0.017	0.007
1981	0.016	0.007
1982	0.009	0.005
1983	0.026	0.007
1984	0.012	0.006
1985	0.019	0.006
1986	0.016	0.007
1987	0.030	0.017
1988	0.019	0.010
1989	0.017	0.006
1990	0.020	0.006
1991	0.016	0.007
1992	0.020	0.019
1993	0.021	0.007
1994	0.031	0.007
1995	0.008	0.006
1996	0.034	0.025
1997	0.015	0.006
1998	0.017	0.006
1999	0.002	0.005
2000	0.013	0.007
2001	0.007	0.005
2002	0.023	0.006
2003	0.020	0.007
2004	0.017	0.007
2005	0.033	0.007
2006	0.010	0.006
2007	0.011	0.007
2008	0.017	0.006
2009	0.012	0.006
2010	0.010	0.007
2011	0.009	0.006
2012	0.016	0.006
2013	0.010	0.005
2014	0.007	0.005
2015	0.014	0.006
2016	0.006	0.006
2017	0.023	0.008
2018	0.042	0.029
2019	0.044	0.027
2020	0.013	0.006
2021	0.022	0.013
2022	0.009	0.006
2023	0.018	0.008
2024	0.049	0.006
2025	0.016	0.007
2026	0.026	0.011
2027	0.010	0.006

2028	0.009	0.005
2029	0.017	0.011
2030	0.032	0.007
2031	0.010	0.006
2032	0.007	0.005
2033	0.010	0.005
2034	0.010	0.006
2035	0.037	0.021
2036	0.019	0.007
2037	0.005	0.005
2038	0.016	0.009
2039	0.003	0.004
2040	0.010	0.006
2041	0.011	0.006
2042	0.037	0.018
2043	0.018	0.012
2044	0.024	0.011
2045	0.016	0.008
2046	0.018	0.022
2047	0.014	0.008
2048	0.018	0.006
2049	0.016	0.007
2050	0.012	0.006
2051	0.019	0.007
2052	0.010	0.007
2053	0.017	0.023
2054	0.021	0.009
2055	0.009	0.005
2056	0.008	0.006
2057	0.012	0.007
2058	0.015	0.010
2059	0.025	0.013

Ranked Annual Peaks

Ranked Annual Peaks for Predeveloped and Mitigated. POC #1

Rank	Predeveloped	Mitigated
1	0.0543	0.0318
2	0.0487	0.0292
3	0.0439	0.0274
4	0.0424	0.0270
5	0.0416	0.0267
6	0.0413	0.0248
7	0.0392	0.0246
8	0.0373	0.0236
9	0.0370	0.0236
10	0.0335	0.0231
11	0.0331	0.0221
12	0.0325	0.0213
13	0.0321	0.0211
14	0.0316	0.0208
15	0.0314	0.0205
16	0.0308	0.0193
17	0.0307	0.0191
18	0.0301	0.0181
19	0.0295	0.0167
20	0.0295	0.0139
21	0.0282	0.0134
22	0.0264	0.0127

23	0.0261	0.0123
24	0.0260	0.0122
25	0.0258	0.0116
26	0.0257	0.0113
27	0.0249	0.0112
28	0.0246	0.0110
29	0.0243	0.0109
30	0.0240	0.0108
31	0.0239	0.0106
32	0.0238	0.0100
33	0.0235	0.0099
34	0.0227	0.0098
35	0.0227	0.0094
36	0.0224	0.0093
37	0.0215	0.0093
38	0.0213	0.0085
39	0.0212	0.0078
40	0.0210	0.0078
41	0.0208	0.0077
42	0.0206	0.0076
43	0.0203	0.0076
44	0.0203	0.0075
45	0.0198	0.0075
46	0.0198	0.0073
47	0.0195	0.0073
48	0.0190	0.0073
49	0.0188	0.0072
50	0.0187	0.0072
51	0.0182	0.0071
52	0.0181	0.0071
53	0.0181	0.0071
54	0.0180	0.0071
55	0.0178	0.0071
56	0.0178	0.0071
57	0.0177	0.0071
58	0.0175	0.0071
59	0.0174	0.0070
60	0.0174	0.0070
61	0.0172	0.0070
62	0.0172	0.0070
63	0.0171	0.0069
64	0.0171	0.0069
65	0.0171	0.0069
66	0.0170	0.0068
67	0.0169	0.0068
68	0.0169	0.0068
69	0.0162	0.0068
70	0.0162	0.0068
71	0.0162	0.0067
72	0.0161	0.0067
73	0.0160	0.0067
74	0.0160	0.0067
75	0.0160	0.0067
76	0.0160	0.0067
77	0.0157	0.0067
78	0.0156	0.0066
79	0.0156	0.0066
80	0.0155	0.0066

81	0.0153	0.0066
82	0.0151	0.0065
83	0.0151	0.0065
84	0.0151	0.0064
85	0.0150	0.0064
86	0.0150	0.0064
87	0.0148	0.0064
88	0.0147	0.0064
89	0.0147	0.0064
90	0.0145	0.0064
91	0.0143	0.0064
92	0.0143	0.0064
93	0.0142	0.0063
94	0.0140	0.0063
95	0.0138	0.0063
96	0.0137	0.0063
97	0.0136	0.0063
98	0.0135	0.0063
99	0.0134	0.0063
100	0.0133	0.0062
101	0.0132	0.0062
102	0.0132	0.0062
103	0.0130	0.0062
104	0.0125	0.0062
105	0.0125	0.0061
106	0.0122	0.0061
107	0.0121	0.0061
108	0.0120	0.0060
109	0.0119	0.0060
110	0.0117	0.0060
111	0.0117	0.0060
112	0.0114	0.0059
113	0.0113	0.0059
114	0.0112	0.0059
115	0.0108	0.0058
116	0.0106	0.0058
117	0.0102	0.0058
118	0.0102	0.0058
119	0.0102	0.0058
120	0.0102	0.0058
121	0.0100	0.0058
122	0.0100	0.0058
123	0.0100	0.0058
124	0.0097	0.0057
125	0.0097	0.0056
126	0.0096	0.0056
127	0.0096	0.0056
128	0.0096	0.0056
129	0.0094	0.0056
130	0.0092	0.0056
131	0.0091	0.0056
132	0.0091	0.0056
133	0.0090	0.0056
134	0.0089	0.0056
135	0.0088	0.0056
136	0.0088	0.0055
137	0.0087	0.0055
138	0.0087	0.0055

139	0.0084	0.0055
140	0.0083	0.0054
141	0.0080	0.0053
142	0.0078	0.0053
143	0.0075	0.0052
144	0.0072	0.0052
145	0.0072	0.0051
146	0.0071	0.0050
147	0.0071	0.0050
148	0.0069	0.0049
149	0.0069	0.0049
150	0.0067	0.0049
151	0.0063	0.0049
152	0.0057	0.0049
153	0.0055	0.0049
154	0.0054	0.0048
155	0.0050	0.0047
156	0.0026	0.0047
157	0.0024	0.0044
158	0.0015	0.0041

Duration Flows

The Facility PASSED

Flow(cfs)	Predev	Mit	Percentage	Pass/Fail
0.0079	60054	33157	55	Pass
0.0082	55024	28393	51	Pass
0.0085	50359	25202	50	Pass
0.0088	46165	22814	49	Pass
0.0092	42337	20548	48	Pass
0.0095	38969	18543	47	Pass
0.0098	35988	16869	46	Pass
0.0101	33301	15568	46	Pass
0.0104	30714	14349	46	Pass
0.0108	28326	13291	46	Pass
0.0111	26326	12205	46	Pass
0.0114	24542	11363	46	Pass
0.0117	22808	10593	46	Pass
0.0120	21257	9789	46	Pass
0.0123	19845	9080	45	Pass
0.0127	18532	8460	45	Pass
0.0130	17207	7784	45	Pass
0.0133	16038	7152	44	Pass
0.0136	14936	6643	44	Pass
0.0139	13917	6282	45	Pass
0.0143	12991	5922	45	Pass
0.0146	12133	5607	46	Pass
0.0149	11318	5303	46	Pass
0.0152	10604	4996	47	Pass
0.0155	9872	4715	47	Pass
0.0158	9180	4438	48	Pass
0.0162	8543	4129	48	Pass
0.0165	7972	3809	47	Pass
0.0168	7429	3501	47	Pass
0.0171	6942	3261	46	Pass
0.0174	6565	3031	46	Pass
0.0178	6210	2853	45	Pass
0.0181	5900	2665	45	Pass
0.0184	5579	2481	44	Pass
0.0187	5274	2254	42	Pass
0.0190	5008	2071	41	Pass
0.0193	4770	1883	39	Pass
0.0197	4531	1721	37	Pass
0.0200	4295	1600	37	Pass
0.0203	4071	1486	36	Pass
0.0206	3861	1369	35	Pass
0.0209	3652	1268	34	Pass
0.0213	3444	1165	33	Pass
0.0216	3286	1067	32	Pass
0.0219	3128	951	30	Pass
0.0222	2976	822	27	Pass
0.0225	2829	740	26	Pass
0.0229	2682	674	25	Pass
0.0232	2578	592	22	Pass
0.0235	2452	515	21	Pass
0.0238	2359	468	19	Pass
0.0241	2239	435	19	Pass
0.0244	2140	384	17	Pass

0.0248	1991	344	17	Pass
0.0251	1869	317	16	Pass
0.0254	1759	292	16	Pass
0.0257	1673	239	14	Pass
0.0260	1583	212	13	Pass
0.0264	1506	187	12	Pass
0.0267	1429	159	11	Pass
0.0270	1353	130	9	Pass
0.0273	1296	115	8	Pass
0.0276	1234	101	8	Pass
0.0279	1182	93	7	Pass
0.0283	1119	83	7	Pass
0.0286	1072	71	6	Pass
0.0289	1025	59	5	Pass
0.0292	968	35	3	Pass
0.0295	896	31	3	Pass
0.0299	834	28	3	Pass
0.0302	781	25	3	Pass
0.0305	735	22	2	Pass
0.0308	678	18	2	Pass
0.0311	631	15	2	Pass
0.0314	589	11	1	Pass
0.0318	555	4	0	Pass
0.0321	510	0	0	Pass
0.0324	475	0	0	Pass
0.0327	431	0	0	Pass
0.0330	391	0	0	Pass
0.0334	368	0	0	Pass
0.0337	340	0	0	Pass
0.0340	304	0	0	Pass
0.0343	280	0	0	Pass
0.0346	265	0	0	Pass
0.0349	247	0	0	Pass
0.0353	233	0	0	Pass
0.0356	218	0	0	Pass
0.0359	205	0	0	Pass
0.0362	182	0	0	Pass
0.0365	161	0	0	Pass
0.0369	139	0	0	Pass
0.0372	117	0	0	Pass
0.0375	110	0	0	Pass
0.0378	101	0	0	Pass
0.0381	92	0	0	Pass
0.0385	85	0	0	Pass
0.0388	72	0	0	Pass
0.0391	64	0	0	Pass
0.0394	54	0	0	Pass

Water Quality

Water Quality BMP Flow and Volume for POC #1

On-line facility volume:	0 acre-feet
On-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.
Off-line facility target flow:	0 cfs.
Adjusted for 15 min:	0 cfs.

LID Report

LID Technique	Used for Treatment ?	Total Volume Needs Treatment (ac-ft)	Volume Through Facility (ac-ft)	Infiltration Volume (ac-ft)	Cumulative Volume Infiltration Credit	Percent Volume Infiltrated	Water Quality	Percent Water Quality Treated	Comment
Vault 1 POC	☐	269.93			☐	0.00			
Total Volume Infiltrated		269.93	0.00	0.00		0.00	0.00	0%	No Treat. Credit
Compliance with LID Standard 8% of 2-yr to 50% of 2-yr									Duration Analysis Result = Passed

Model Default Modifications

Total of 0 changes have been made.

PERLND Changes

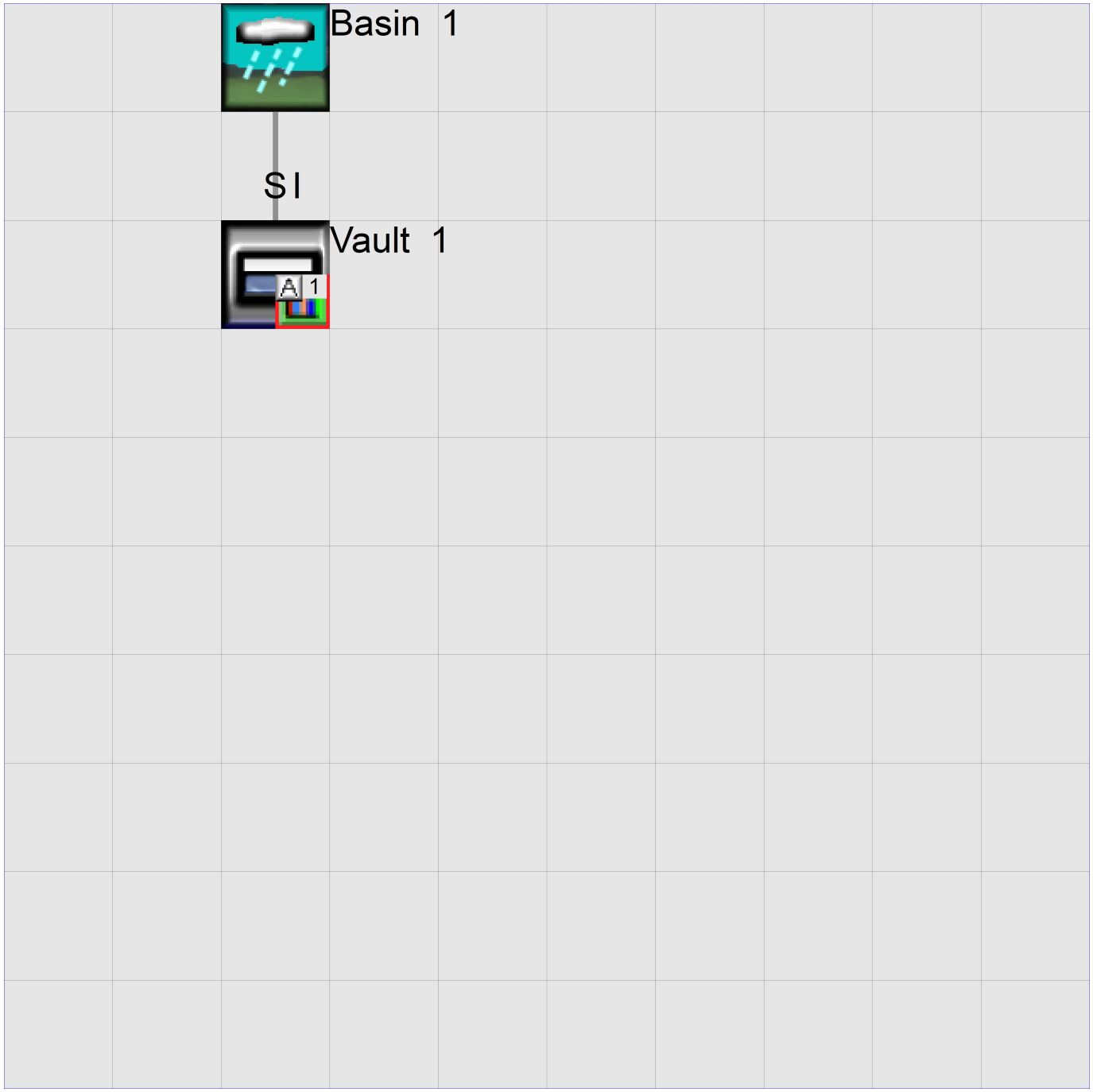
No PERLND changes have been made.

IMPLND Changes

No IMPLND changes have been made.

Appendix
Predeveloped Schematic

Mitigated Schematic



Predeveloped UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                   UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Bell.wdm
MESSU       25   PreBell.MES
            27   PreBell.L61
            28   PreBell.L62
            30   POCBell1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      PERLND      10
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Basin  1                   MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                          User  t-series Engl Metr ***
                                       in  out           ***
   10     C, Forest, Flat         1    1    1    1   27    0
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ******************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
   10         0    0    1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ***************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
   10         0    0    4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO
```

```
  PWAT-PARM1
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
   10         0    0    0    0    0    0    0    0    0    0    0
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
   10              0       4.5      0.08       400      0.05       0.5     0.996
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
   10             0         0         2         2         0         0         0
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
   10           0.2       0.5      0.35         6       0.5       0.7
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS      AGWS      GWVS
   10             0         0         0         0       2.5         1         0
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
PERLND  10                       0.655     COPY   501     12
PERLND  10                       0.655     COPY   501     13

******Routing******
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                 ***
    # -  #<------------------><---> User T-series  Engl Metr LKFG            ***
                                           in  out                           ***
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************* Active Sections *****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ****************** PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                      ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
            FG FG FG FG  possible  exit  *** possible  exit      possible  exit
             *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                         ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
FTABLES
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1              PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1              IMPLND   1 999 EXTNL  PREC
```

```
WDM      1 EVAP     ENGL    1              PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1              IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    501 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK       12
PERLND     PWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   12

  MASS-LINK       13
PERLND     PWATER IFWO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   13


END MASS-LINK

END RUN
```

Mitigated UCI File

```
RUN

GLOBAL
  WWHM4 model simulation
  START       1901 10 01        END    2059 09 30
  RUN INTERP OUTPUT LEVEL    3    0
  RESUME     0 RUN     1                    UNIT SYSTEM     1
END GLOBAL

FILES
<File>  <Un#>   <-----------File Name------------------------------>***
<-ID->                                                              ***
WDM         26   Bell.wdm
MESSU       25   MitBell.MES
            27   MitBell.L61
            28   MitBell.L62
            30   POCBell1.dat
END FILES

OPN SEQUENCE
    INGRP              INDELT 00:15
      IMPLND       4
      RCHRES       1
      COPY         1
      COPY       501
      DISPLY       1
    END INGRP
END OPN SEQUENCE
DISPLY
  DISPLY-INFO1
    # -  #<----------Title----------->***TRAN PIVL DIG1 FIL1  PYR DIG2 FIL2 YRND
    1        Vault  1                   MAX                     1    2   30    9
  END DISPLY-INFO1
END DISPLY
COPY
  TIMESERIES
    # -  #  NPT  NMN ***
    1         1    1
  501         1    1
  END TIMESERIES
END COPY
GENER
  OPCODE
    #    # OPCD ***
  END OPCODE
  PARM
    #    #         K ***
  END PARM
END GENER
PERLND
  GEN-INFO
    <PLS ><-------Name------->NBLKS   Unit-systems   Printer ***
    # -  #                         User  t-series Engl Metr ***
                                          in  out           ***
  END GEN-INFO
  *** Section PWATER***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC ***
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags **************************** PIVL  PYR
    # -  # ATMP SNOW PWAT  SED  PST  PWG PQAL MSTL PEST NITR PHOS TRAC  *********
  END PRINT-INFO

  PWAT-PARM1
```

```
    <PLS >  PWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP UZFG  VCS  VUZ  VNN VIFW VIRC  VLE INFC  HWT ***
  END PWAT-PARM1

  PWAT-PARM2
    <PLS >      PWATER input info: Part 2         ***
    # -  # ***FOREST      LZSN    INFILT      LSUR     SLSUR     KVARY     AGWRC
  END PWAT-PARM2

  PWAT-PARM3
    <PLS >      PWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN    INFEXP    INFILD    DEEPFR    BASETP    AGWETP
  END PWAT-PARM3
  PWAT-PARM4
    <PLS >     PWATER input info: Part 4                              ***
    # -  #     CEPSC      UZSN      NSUR     INTFW       IRC     LZETP ***
  END PWAT-PARM4

  PWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
               ran from 1990 to end of 1992 (pat 1-11-95) RUN 21 ***
    # -  # ***  CEPS      SURS       UZS      IFWS       LZS       AGWS      GWVS
  END PWAT-STATE1

END PERLND

IMPLND
  GEN-INFO
    <PLS ><-------Name------->   Unit-systems   Printer ***
    # -  #                     User  t-series Engl Metr ***
                                     in  out           ***
    4      ROOF TOPS/FLAT         1    1    1   27    0
  END GEN-INFO
  *** Section IWATER***

  ACTIVITY
    <PLS > ************* Active Sections ******************************
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL   ***
    4         0    0    1    0    0    0
  END ACTIVITY

  PRINT-INFO
    <ILS > ******** Print-flags ******** PIVL  PYR
    # -  # ATMP SNOW IWAT  SLD  IWG IQAL    *********
    4         0    0    4    0    0    0    1    9
  END PRINT-INFO

  IWAT-PARM1
    <PLS >  IWATER variable monthly parameter value flags  ***
    # -  # CSNO RTOP  VRS  VNN RTLI     ***
    4         0    0    0    0    0
  END IWAT-PARM1

  IWAT-PARM2
    <PLS >      IWATER input info: Part 2         ***
    # -  # ***  LSUR     SLSUR      NSUR     RETSC
    4            400      0.01       0.1       0.1
  END IWAT-PARM2

  IWAT-PARM3
    <PLS >      IWATER input info: Part 3         ***
    # -  # ***PETMAX    PETMIN
    4              0         0
  END IWAT-PARM3

  IWAT-STATE1
    <PLS > *** Initial conditions at start of simulation
    # -  # ***  RETS      SURS
    4              0         0
  END IWAT-STATE1
```

```
END IMPLND

SCHEMATIC
<-Source->                  <--Area-->     <-Target->   MBLK   ***
<Name>   #                  <-factor->     <Name>   #   Tbl#   ***
Basin  1***
IMPLND   4                       0.655     RCHRES   1      5

******Routing******
IMPLND   4                       0.655     COPY     1     15
RCHRES   1                           1     COPY   501     16
END SCHEMATIC

NETWORK
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
COPY   501 OUTPUT MEAN   1 1   48.4        DISPLY   1     INPUT  TIMSER 1



<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   #        <Name> # #<-factor->strg <Name>   #   #        <Name> # #  ***
END NETWORK

RCHRES
  GEN-INFO
    RCHRES       Name        Nexits   Unit Systems   Printer                ***
    # -  #<----------------><---> User T-series  Engl Metr LKFG             ***
                                       in  out                              ***
    1     Vault  1               1    1    1    1   28    0    1
  END GEN-INFO
  *** Section RCHRES***

  ACTIVITY
    <PLS > ************ Active Sections ****************************
    # -  # HYFG ADFG CNFG HTFG SDFG GQFG OXFG NUFG PKFG PHFG ***
    1         1    0    0    0    0    0    0    0    0    0
  END ACTIVITY

  PRINT-INFO
    <PLS > ***************** Print-flags ******************* PIVL  PYR
    # -  # HYDR ADCA CONS HEAT  SED  GQL OXRX NUTR PLNK PHCB PIVL  PYR  *********
    1         4    0    0    0    0    0    0    0    0    0    1    9
  END PRINT-INFO

  HYDR-PARM1
    RCHRES  Flags for each HYDR Section                                    ***
    # -  #  VC A1 A2 A3  ODFVFG for each *** ODGTFG for each     FUNCT  for each
          FG FG FG FG  possible  exit  *** possible  exit      possible  exit
           *  *  *  *    *  *  *  *  *       *  *  *  *  *         ***
    1        0  1  0  0    4  0  0  0  0       0  0  0  0  0       2  2  2  2  2
  END HYDR-PARM1

  HYDR-PARM2
    # -  #    FTABNO       LEN     DELTH     STCOR        KS      DB50       ***
  <------><--------><--------><--------><--------><--------><-------->       ***
    1             1      0.02       0.0       0.0       0.5       0.0
  END HYDR-PARM2
  HYDR-INIT
    RCHRES  Initial conditions for each HYDR section                       ***
    # -  # ***   VOL     Initial  value  of COLIND     Initial  value  of OUTDGT
          *** ac-ft     for each possible exit        for each possible exit
  <------><-------->     <---><---><---><---><---> *** <---><---><---><---><--->
    1            0         4.0  0.0  0.0  0.0  0.0       0.0  0.0  0.0  0.0  0.0
  END HYDR-INIT
END RCHRES

SPEC-ACTIONS
END SPEC-ACTIONS
```

FTABLES
FTABLE 1
92 4

Depth (ft)	Area (acres)	Volume (acre-ft)	Outflow1 (cfs)	Velocity (ft/sec)	Travel Time*** (Minutes)***
0.000000	0.280303	0.000000	0.000000		
0.044444	0.280303	0.012458	0.001430		
0.088889	0.280303	0.024916	0.002023		
0.133333	0.280303	0.037374	0.002477		
0.177778	0.280303	0.049832	0.002860		
0.222222	0.280303	0.062290	0.003198		
0.266667	0.280303	0.074747	0.003503		
0.311111	0.280303	0.087205	0.003784		
0.355556	0.280303	0.099663	0.004045		
0.400000	0.280303	0.112121	0.004291		
0.444444	0.280303	0.124579	0.004523		
0.488889	0.280303	0.137037	0.004744		
0.533333	0.280303	0.149495	0.004954		
0.577778	0.280303	0.161953	0.005157		
0.622222	0.280303	0.174411	0.005351		
0.666667	0.280303	0.186869	0.005539		
0.711111	0.280303	0.199327	0.005721		
0.755556	0.280303	0.211785	0.005897		
0.800000	0.280303	0.224242	0.006068		
0.844444	0.280303	0.236700	0.006234		
0.888889	0.280303	0.249158	0.006396		
0.933333	0.280303	0.261616	0.006554		
0.977778	0.280303	0.274074	0.006708		
1.022222	0.280303	0.286532	0.006859		
1.066667	0.280303	0.298990	0.007007		
1.111111	0.280303	0.311448	0.007151		
1.155556	0.280303	0.323906	0.007336		
1.200000	0.280303	0.336364	0.008238		
1.244444	0.280303	0.348822	0.009593		
1.288889	0.280303	0.361279	0.011251		
1.333333	0.280303	0.373737	0.013143		
1.377778	0.280303	0.386195	0.015228		
1.422222	0.280303	0.398653	0.017477		
1.466667	0.280303	0.411111	0.019866		
1.511111	0.280303	0.423569	0.022378		
1.555556	0.280303	0.436027	0.024997		
1.600000	0.280303	0.448485	0.027709		
1.644444	0.280303	0.460943	0.030504		
1.688889	0.280303	0.473401	0.033370		
1.733333	0.280303	0.485859	0.036299		
1.777778	0.280303	0.498316	0.039283		
1.822222	0.280303	0.510774	0.042313		
1.866667	0.280303	0.523232	0.045382		
1.911111	0.280303	0.535690	0.048484		
1.955556	0.280303	0.548148	0.064275		
2.000000	0.280303	0.560606	0.154149		
2.044444	0.280303	0.573064	0.284420		
2.088889	0.280303	0.585522	0.432972		
2.133333	0.280303	0.597980	0.578539		
2.177778	0.280303	0.610438	0.701305		
2.222222	0.280303	0.622896	0.788773		
2.266667	0.280303	0.635354	0.844011		
2.311111	0.280303	0.647811	0.904144		
2.355556	0.280303	0.660269	0.953863		
2.400000	0.280303	0.672727	1.000991		
2.444444	0.280303	0.685185	1.045896		
2.488889	0.280303	0.697643	1.088866		
2.533333	0.280303	0.710101	1.130132		
2.577778	0.280303	0.722559	1.169881		
2.622222	0.280303	0.735017	1.208271		
2.666667	0.280303	0.747475	1.245431		
2.711111	0.280303	0.759933	1.281473		
2.755556	0.280303	0.772391	1.316493		
2.800000	0.280303	0.784848	1.350573		
2.844444	0.280303	0.797306	1.383784		

```
  2.888889  0.280303  0.809764  1.416190
  2.933333  0.280303  0.822222  1.447847
  2.977778  0.280303  0.834680  1.478805
  3.022222  0.280303  0.847138  1.509108
  3.066667  0.280303  0.859596  1.538796
  3.111111  0.280303  0.872054  1.567905
  3.155556  0.280303  0.884512  1.596468
  3.200000  0.280303  0.896970  1.624514
  3.244444  0.280303  0.909428  1.652070
  3.288889  0.280303  0.921886  1.679162
  3.333333  0.280303  0.934343  1.705812
  3.377778  0.280303  0.946801  1.732041
  3.422222  0.280303  0.959259  1.757868
  3.466667  0.280303  0.971717  1.783312
  3.511111  0.280303  0.984175  1.808388
  3.555556  0.280303  0.996633  1.833113
  3.600000  0.280303  1.009091  1.857500
  3.644444  0.280303  1.021549  1.881564
  3.688889  0.280303  1.034007  1.905317
  3.733333  0.280303  1.046465  1.928770
  3.777778  0.280303  1.058923  1.951935
  3.822222  0.280303  1.071380  1.974822
  3.866667  0.280303  1.083838  1.997440
  3.911111  0.280303  1.096296  2.019800
  3.955556  0.280303  1.108754  2.041909
  4.000000  0.280303  1.121212  2.063777
  4.044444  0.280303  1.133670  2.085410
  END FTABLE  1
END FTABLES

EXT SOURCES
<-Volume-> <Member> SsysSgap<--Mult-->Tran <-Target vols> <-Grp> <-Member->  ***
<Name>   # <Name> # tem strg<-factor->strg <Name>   #   #        <Name> # #  ***
WDM      2 PREC     ENGL    1             PERLND   1 999 EXTNL  PREC
WDM      2 PREC     ENGL    1             IMPLND   1 999 EXTNL  PREC
WDM      1 EVAP     ENGL    1             PERLND   1 999 EXTNL  PETINP
WDM      1 EVAP     ENGL    1             IMPLND   1 999 EXTNL  PETINP

END EXT SOURCES

EXT TARGETS
<-Volume-> <-Grp> <-Member-><--Mult-->Tran <-Volume-> <Member> Tsys Tgap Amd ***
<Name>   #        <Name> # #<-factor->strg <Name>   # <Name>    tem strg strg***
RCHRES   1 HYDR   RO     1 1        1      WDM   1000 FLOW     ENGL      REPL
RCHRES   1 HYDR   STAGE  1 1        1      WDM   1001 STAG     ENGL      REPL
COPY     1 OUTPUT MEAN   1 1     48.4      WDM    701 FLOW     ENGL      REPL
COPY   501 OUTPUT MEAN   1 1     48.4      WDM    801 FLOW     ENGL      REPL
END EXT TARGETS

MASS-LINK
<Volume>   <-Grp> <-Member-><--Mult-->     <Target>       <-Grp> <-Member->***
<Name>            <Name> # #<-factor->     <Name>                <Name> # #***
  MASS-LINK        5
IMPLND     IWATER SURO       0.083333      RCHRES         INFLOW IVOL
  END MASS-LINK    5

  MASS-LINK       15
IMPLND     IWATER SURO       0.083333      COPY           INPUT  MEAN
  END MASS-LINK   15

  MASS-LINK       16
RCHRES     ROFLOW                          COPY           INPUT  MEAN
  END MASS-LINK   16


END MASS-LINK

END RUN
```

Predeveloped HSPF Message File

```
ERROR/WARNING ID:   238   1

The continuity error reported below is greater than 1 part in 1000 and is
therefore considered high.

Did you specify any "special actions"?  If so, they could account for it.

Relevant data are:
DATE/TIME: 2016/ 8/31 24: 0

RCHRES :    1

RELERR       STORS        STOR       MATIN      MATDIF
-1.538E-03     0.00000  4.5240E-10     0.00000  -2.725E-07

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or
reach/reservior) at the end of the present interval.
STORS  is the storage of material in the pu at the start of the present
printout reporting period.
MATIN  is the total inflow of material to the pu during the present printout
reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the
present printout reporting period.
```

```
ERROR/WARNING ID:   238   1

The continuity error reported below is greater than 1 part in 1000 and is
therefore considered high.

Did you specify any "special actions"?  If so, they could account for it.

Relevant data are:
DATE/TIME: 2037/ 5/31 24: 0

RCHRES :    1

RELERR       STORS        STOR       MATIN      MATDIF
-4.069E-03     0.00000  3.1898E-10     0.00000  -1.350E-07

Where:

RELERR is the relative error (ERROR/REFVAL).
ERROR  is (STOR-STORS) - MATDIF.
REFVAL is the reference value (STORS+MATIN).
STOR   is the storage of material in the processing unit (land-segment or
reach/reservior) at the end of the present interval.
STORS  is the storage of material in the pu at the start of the present
printout reporting period.
MATIN  is the total inflow of material to the pu during the present printout
reporting period.
MATDIF is the net inflow (inflow-outflow) of material to the pu during the
present printout reporting period.
```

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APPENDIX B

Soil Reports

GEORESOURCES
earth science & geotechnical engineering
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August 5, 2022

Azure Green Consultants
409 E Pioneer
Puyallup, WA 98372
(253) 770-3144

Attn: Jim Job
jim@mailagc.com

Soils Report
Proposed Redevelopment
204 4th Street SW
Puyallup, Washington
PN: 57450016-31, -32, -41
Doc ID: AGC.4thStSW.SR

INTRODUCTION

This *Soils Report* summarizes our site observations and geotechnical data review and addresses the feasibility of stormwater infiltration for the proposed residential redevelopment to be constructed at 204 – 4th Street SW in Puyallup, Washington. The approximate site location is shown on Figure 1.

Our understanding of the project is based on our correspondence with Azure Green Consultants, our understanding of the City of Puyallup's development codes, and our experience in the site area. We understand that the site is currently developed with a single-family residence. Furthermore, we understand that you propose to demolish the existing residence and construct a new mixed use building at the site. We have not been provided with conceptual plans for the proposed structure at the time of this report, but we anticipate the new structure will consist of one to two stories of concrete construction with two to four stories of wood-framing above. Support for the proposed structure will likely consist of shallow foundations bearing on improved ground, or deep foundations such as continuous flight auger piles.

SCOPE

The purpose of our services was to evaluate the surface and subsurface conditions across the site as a basis for providing geotechnical recommendations and design criteria for the proposed restaurant. Specifically, the scope of services for this project included the following:

1. Reviewing the available geologic, hydrogeologic, and geotechnical data for the site area;
2. Exploring the subsurface conditions by observing four direct push Geoprobes and installing groundwater monitoring wells in each exploration at selected locations at the site;
3. Installing Leveloggers in each well and monitoring of groundwater levels within each groundwater monitoring well during the prescriptive wet season (December 21 through April 1);

4. Providing our opinion about the feasibility of onsite infiltration in accordance with the 2014 SWMMWW, including a preliminary design infiltration rate based on grain size analysis and in-situ testing, as applicable; and,
5. Preparing a *Soils Report* that satisfies the 2014 SWMMWW requirements and summarizes our site observations and conclusions, our geotechnical recommendations and design criteria, along with the supporting data.

The above scope of work was summarized in our *Proposal for Geotechnical Engineering Services* dated December 2, 2021. We received authorization to proceed from you the same day.

SITE CONDITIONS

Surface Conditions

As stated, the site is located at 204 – 4th Street SW in Puyallup, Washington. The site consists of three tax parcels that, when combined, are generally rectangular in shape, measure approximately 135 feet wide (north to south) by approximately 240 feet long (east to west), and encompasses approximately 0.74 acres. The site is bounded by existing residential development to the west, West Pioneer Avenue to the south, West Meeker to the north, and 4th Street SW to the east.

Based on topographic information obtained from Pierce County Public GIS and our site observations, the ground surface of the site is generally level with small rises and falls in elevation on the order of approximately 1 foot. The total topographic relief of the site is on the order of approximately 2 feet. The existing site configuration and topography are shown on the Site Vicinity Map, Figure 3.

Vegetation across the site generally consisted of maintained grass with typical residential landscaping. No seeps or springs were observed at the site however some small areas of standing water were observed. No signs of erosion or soil instability were observed during our site reconnaissance.

Site Soils

The Natural Resource Conservation Service (NRCS) Web Soil Survey maps the site as being underlain by Puyallup fine sandy loam (31A) soils. These soils are derived from alluvium, form on slopes of 0 to 3 percent, are considered to have a “slight” erosion hazard when exposed, and are included in hydrologic soils group A. A copy of the NRCS soils map is included as Figure 3.

Site Geology

According to the *draft Geologic map of the Puyallup 7.5-minute Quadrangle, Washington* by Troost, (in review) the site is mapped as being underlain by Quaternary Alluvium (Qal). Alluvial soils generally consist of normally consolidated, stratified deposits of sand, silt, clay, and occasional peat that were deposited along the Puyallup River channel. The existing topography, as well as the surficial and shallow soils in the area, are the result of fluvial action, including down-cutting by the river, channel meandering and migration, and flood deposits. An excerpt from the geologic map is included as Figure 4.

Subsurface Explorations

On December 22, 2021, a field representative from GeoResources visited the site and monitored 4 direct push probes (GeoProbes) to a depth of approximately 15 feet, logged the

subsurface conditions, and obtained representative soils samples. The probes were completed by a licensed drilling company working for GeoResources. The approximate locations of the probes are indicated in the attached Site & Exploration Plan, Figure 2.

A representative from GeoResources continuously monitored the borings, maintained logs of the subsurface conditions encountered, and obtained representative samples in sealed containers for transportation to our laboratory. The soil densities presented on the logs were based on the difficulty of excavation and our experience. The number and location of the explorations were selected in the field based on project information provided by Azure Green Consultants, consideration for underground utilities, existing site conditions, and current site usage. Each exploration was completed as a groundwater monitoring well.

The subsurface explorations excavated as part of this evaluation indicate the subsurface conditions at specific locations only, as actual subsurface conditions can vary across the site. Furthermore, the nature and extent of such variation would not become evident until additional explorations are performed or until construction activities have begun. Based on our experience in the area and extent of prior explorations in the area, it is our opinion that the soils encountered in the explorations are generally representative of the soils at the site.

The soils encountered were visually classified in accordance with the Unified Soil Classification System (USCS) and ASTM D: 2488. The approximate locations of our explorations are indicated on the attached Site & Exploration Map, Figure 2. The USCS is included in Appendix A as Figure A-1, while the descriptive logs of our explorations are included as Figures A-2 through A-5.

Subsurface Conditions

At the locations of our explorations, we encountered relatively uniform subsurface conditions that in our opinion generally confirmed the mapped stratigraphy at the site. Our explorations encountered approximately ¾ to 1 foot of topsoil. Underlying the topsoil we encountered approximately 2¼ to 3 feet of brown poorly graded sand with some silt to brown sandy silt in a loose to medium dense/medium stiff, moist to wet condition. We interpret these soils to be weathered alluvium. Underlying the weathered alluvium we encountered brown-grey sand with varying amounts of silt interbedded with silt and varying amounts of sand. We interpret these soils to be alluvium. The alluvial soils were encountered to the full depth explored in each exploration.

Laboratory Testing

Geotechnical laboratory tests were performed on two samples retrieved from the explorations to estimate index engineering properties of the soils encountered. Laboratory testing included visual soil classification per ASTM D:2487 and ASTM D:2488, moisture content determinations per ASTM D:2216, and grain size analyses per ASTM D:6913 standard procedures. The results of the laboratory tests are included in Appendix B.

Groundwater Conditions

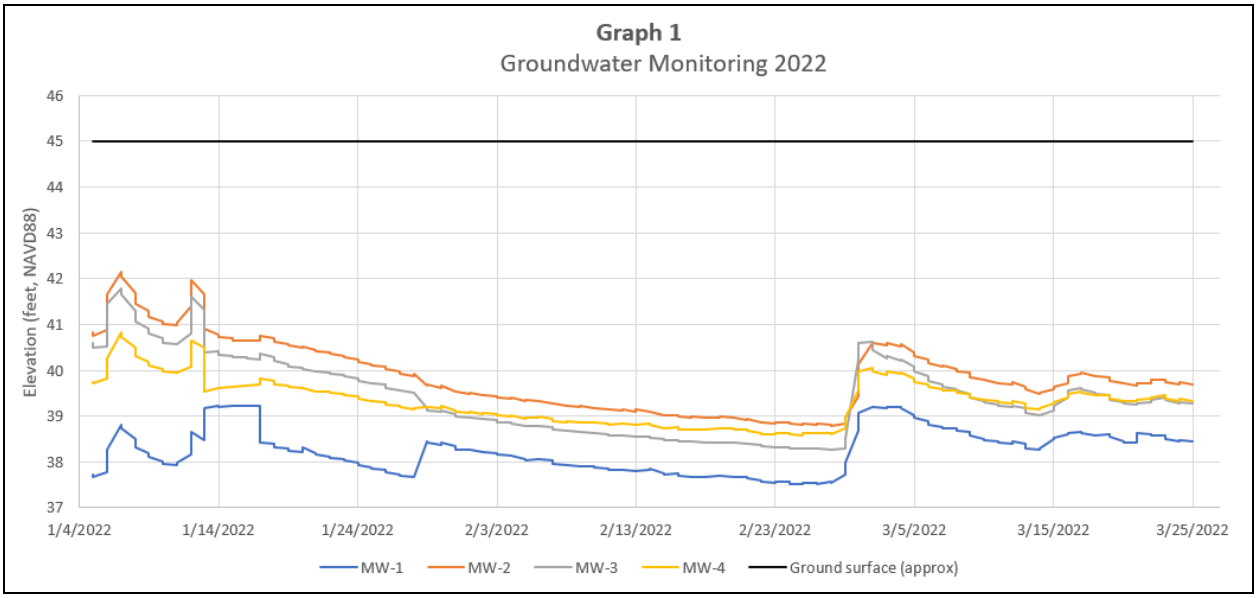
We encountered ground water in all explorations at approximately 3.7 to 6.2 feet below existing ground surface at the time of drilling. Additionally, mottling was encountered as shallow as 1 to 2½ feet below existing ground surface. Mottling may be indicative of a seasonal or fluctuating groundwater surface, often associated with perched groundwater. Perched groundwater table develops when the vertical infiltration of precipitation through a more permeable soil, is slowed at depth by a deeper, less permeable soil type. We anticipate fluctuations in the local groundwater levels will occur in response to precipitation patterns, off-site construction activities, and site

utilization. Analysis or modeling of anticipated groundwater levels during construction is beyond the scope of this report.

We installed downhole pressure transducers in each groundwater monitoring well on January 5, 2022. Water temperature and pressure were collected on 12-hour intervals on each instrument. An additional pressure transducer was installed in one monitoring well above the water line to record barometric pressure. All instruments were removed on March 25, 2022.

Data sets were uploaded into Solinst Levelogger Software (v 4.40), where water level measurements captured by the deployed instruments were adjusted to compensate for barometric pressure variations. The resulting compensated water level dataset provides a barometrically corrected record of groundwater levels within each groundwater monitoring well.

Based on our groundwater monitoring over the wet season, it appears that seasonal high groundwater levels occurred between elevation 39 to 42 feet (NAVD 88) in early to mid-January. Graph 1, below, summarizes the groundwater levels recorded as part of our groundwater monitoring program during our monitoring period.



CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our data review, site reconnaissance, and subsurface explorations, it is our opinion that soil conditions and shallow groundwater levels preclude the use of conventional infiltration facilities at the site. Low-impact development methods may be feasible, depending on site configuration. Additional discussion regarding stormwater management methods is included in the following sections.

Infiltration Recommendations

Low Impact Development (LID) BMPs

LID infiltration BMPs such as pervious pavement could be considered to manage stormwater for this project. Per the 2014 SWMMWW, Volume V, Chapter 5, BMP T5.15, permeable pavements are infeasible if saturated conditions would be created within 1 foot of the bottom elevation of the lowest layer and the seasonal high groundwater table or an underlying impermeable/low permeable layer.

Based on our groundwater monitoring measurements, the bottom of the proposed infiltration facilities should be no greater than 1.5 feet below existing grades, in order to meet the minimum 1 foot of vertical separation. We do not recommend infiltration in the area of MW-3. The surficial silty alluvium soils encountered at the surficial elevation of each exploration contain a significant amount of fines that will not support infiltration. The silty sands located at the surficial elevation in MW-1, MW-2, and MW-4 should be suitable for infiltration

Infiltration BMPs

Per the 2014 SWMMWW, Volume V, Chapter 4, BMP T5.10A, downspout infiltration is feasible on sites where 3 feet or more of permeable soil from the proposed final grade to the seasonal high-water table is available, and/or at least 1 foot of clearance from the bottom elevation of the infiltration trench to the seasonal high groundwater table is available. We observed 3 feet or more of permeable soil in MW-1, MW-2, and MW-4, however, based on our groundwater monitoring measurements to date, the vertical separation requirement from groundwater is not able to be met. Therefore, downspout infiltration does not appear feasible for this project. Stormwater runoff generated by the proposed impermeable surfaces should be collected and routed to an appropriate discharge location.

Design Infiltration Rate

We completed a soil gradation analyses on three representative soil sample from the site per the 2014 SWMMWW, Volume III, Section 3.3.6, Method 3 and in accordance with ASTM D6913. Based on our gradation analyses, we recommend a design infiltration rate of 0.5 inches per hour for permeable pavements or bio swales founded no greater than 1.5 feet below existing grades in the shallow silty sand alluvium soils encountered in the areas of MW-1, MW-2, and MW-4. Appropriate correction factors have been applied to these values in accordance with the 2014 SWMMWW, Volume III, Section 3.3.6, Table 3.3.1, including correction factors 0.33 for site variability ($F_{variability}$), 0.4 for testing method ($F_{testing}$) and 0.9 for maintenance for situation biofouling ($F_{maintenance}$).

Construction Considerations

We recommend that a representative from our firm be onsite at the time of excavation of the proposed infiltration facilities to verify that the soils encountered during construction are consistent with the soils observed in our subsurface explorations. Verification infiltration testing should also be performed at the time of construction to verify the recommended infiltration rates for infiltration facilities such as infiltration trenches and permeable pavements per the 2014 SWMMWW.

Appropriate design, construction and maintenance measures will be required to ensure the infiltration rate can be effectively maintained over time. Appropriate temporary erosion and sediment control methods should be included in the project plans and specifications to minimize the potential for fines contamination of infiltration facility utilized at the site. To further reduce the potential for fines migration, the infiltration system should not be connected to the stormwater runoff system until after construction is complete and the site area is landscaped, paved or otherwise protected.

Additional measures may also be taken during construction to minimize the potential of fines contamination of the proposed infiltration system, such as utilizing an alternative storm water management location during construction or leaving the bottom of the permanent systems 1 to 2 feet high, and subsequently excavating to the finished grade once the site soils have been stabilized. All contractors working on the site (builders and subcontractors) should divert sediment laden

stormwater away from proposed infiltration facilities during construction and landscaping activities. No concrete trucks should be washed or cleaned, and washout areas should not be within the vicinity of the proposed infiltration facilities. After construction activities have been completed, periodic sweeping of the paved areas will help extend the life of the infiltration system.

LIMITATIONS

We have prepared this report for use by Azure Green Consultants and other members of the design team, for use in the permitting and design of a portion of this project. The data used in preparing this report and this report should be provided to prospective contractors for their bidding or estimating purposes only. Our report, conclusions and interpretations are based on subsurface explorations and data from others and limited site reconnaissance, and should not be construed as a warranty of the subsurface conditions.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

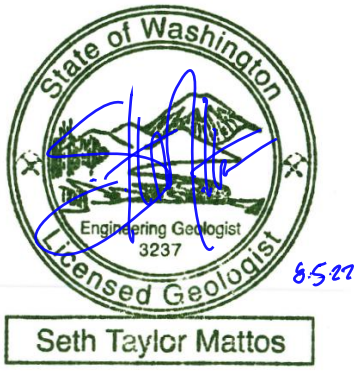
The scope of our services does not include services related to environmental remediation and construction safety precautions. Our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design.

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.

◆ ◆ ◆

We have appreciated the opportunity to be of service to you on this project. If you have any questions or comments, please do not hesitate to call at your earliest convenience.

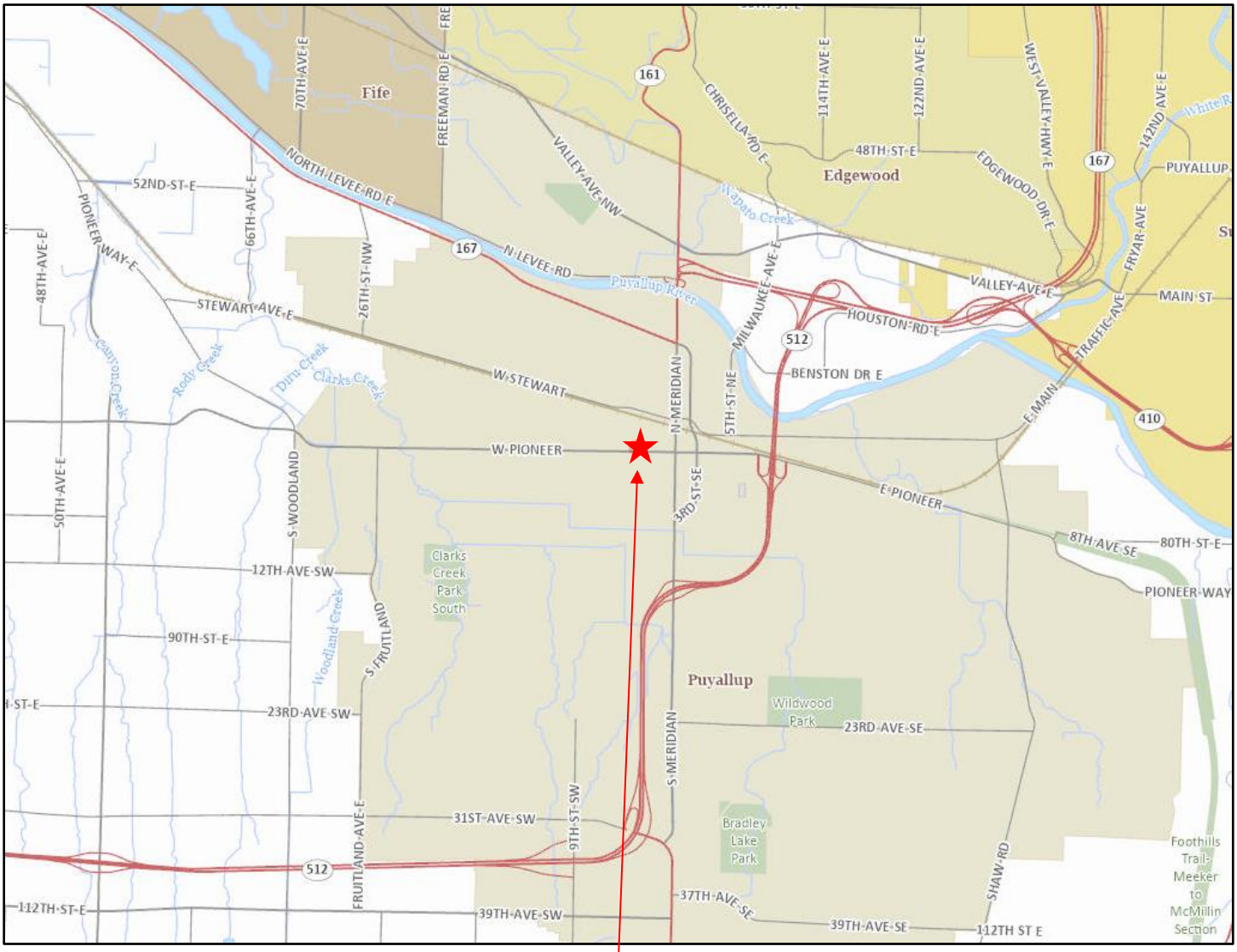
Respectfully submitted,
GeoResources, LLC



Andrew Schnitger, EIT
Staff Engineer

Seth Mattos, LEG
Associate

AES:STM/aes
DocID: AGC.4thStSW.SR.U
Attachments: Figure 1: Site Vicinity Map
Figure 2: Site & Exploration Map
Figure 3: NRCS Soils Map
Figure 4: Geologic Map
Appendix A – Subsurface Explorations
Appendix B – Laboratory Test Results



Approximate Site Location

Map created from Peirce County Public GIS (https://matterhornwab.co.pierce.wa.us/publicgis/)

N
W
E
S

Not to Scale

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Site Location Map

Proposed Redevelopment
204 4th Street SW
Puyallup, Washington
PN: 57450016-31,-32,-41

DocID: AGC.4thStSW.F	August 2022	Figure 1

Exploration number and approximate locations (GeoResources 2021)

Additional Notes:
Imagery and topography accessed from Pierce County Public GIS, not to scale, NAVD88
Downhole pressure transducers installed in all wells, suspended via mason line secured under well cap
Barometric pressure transducer installed in MW-1, suspended 18-inches below well cap
Must secure mason line before removing well cap
All instruments set to record at 1200 and 2400 hours daily

N W E S

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Site & Exploration Plan

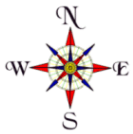
Proposed Mixed-use Development
204 – 4th St SW
Puyallup, Washington
PN: 5745001631, -32, -41

Doc ID: AGC.4thStSW.F2	December 2021	Figure 2

Approximate Site Location

Map created from Web Soil Survey (http://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx)

Soil Type	Soil Name	Parent Material	Slopes	Erosion Hazard	Hydrologic Soils Group
31A	Puyallup fine sandy loam	Alluvium	0 to 3	Slight	A



Not to Scale

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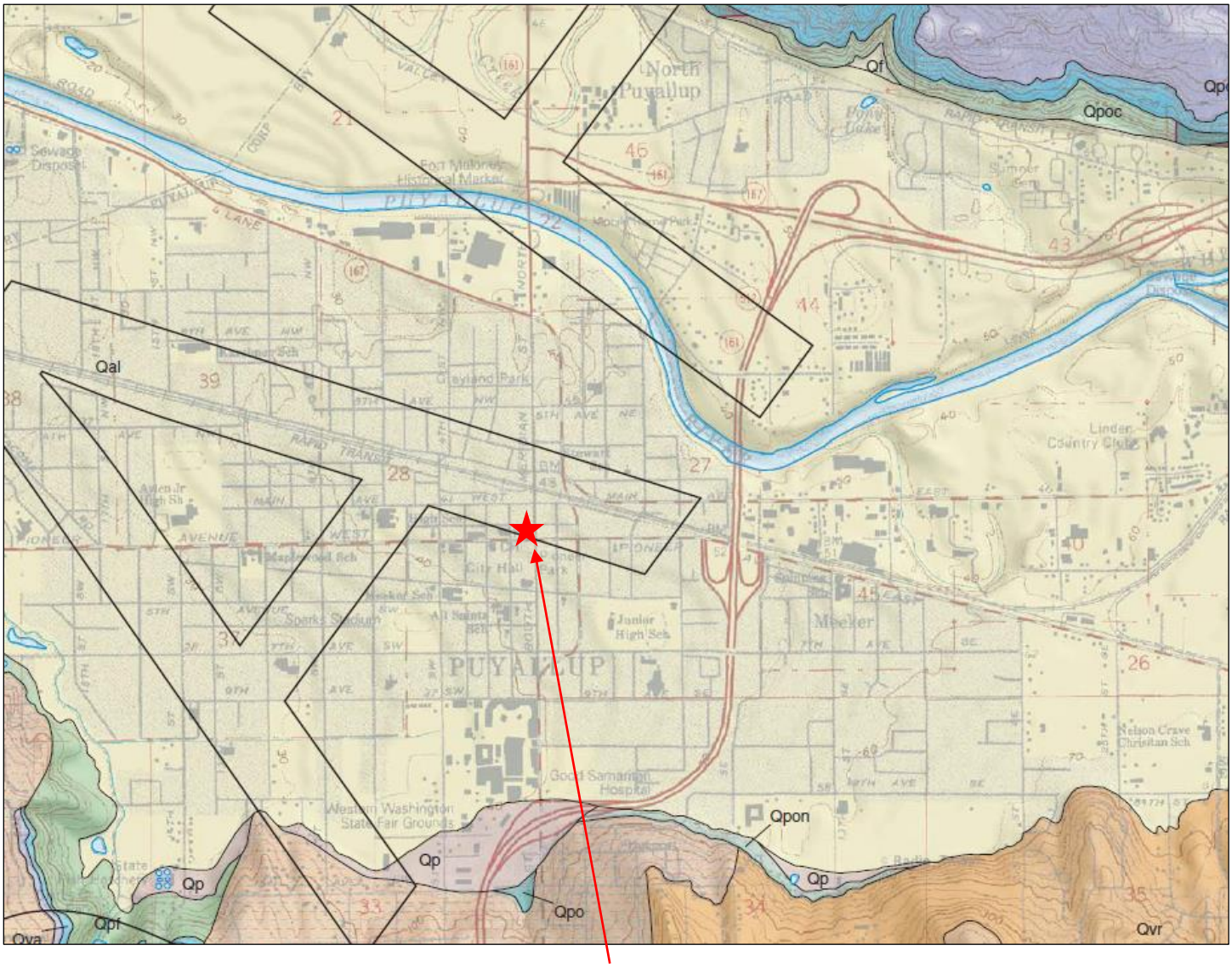
NRCS Soils Map

Proposed Redevelopment
204 4th Street SW
Puyallup, Washington
PN: 57450016-31,-32,-41



Approximate Site Location

Excerpt from the draft *Geologic Map of the Puyallup 7.5-Minute Quadrangle, Washington*
By Troost, K.G. (in review)

Qal	Alluvium

Not to Scale

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Geologic Map

Proposed Redevelopment
204 4th Street SW
Puyallup, Washington
PN: 57450016-31,-32,-41

DocID: AGC.4thStSW.F	August 2022	Figure 4

Appendix A

Subsurface Explorations

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LOG OF BORING

MW-1

AGC.4thStSW
204 4th Street SW
Puyallup, WA

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Notes: East side of site

Drilling Company:	ESN NW	**Logged By:**	DC
Drilling Method:	Direct push/Geoprobe	**Drilling Date:**	12/22/2021
Drilling Rig:	Truck	**Datum:**	NAVD 88
Sampler Type:	Dual Tube	**Elevation:**	42
Hammer Type:		**Termination Depth:**	15
Hammer Weight:		**Latitude:**	
		Longitude:	

Depth (feet)	Elevation (feet)	Soil description
0	42	Topsoil
		Brown poorly graded snad with some silt (loose to medium dense, moist to wet) (SP-SM) (Weathered Alluvium)
2.5	40	Poorly graded SAND with some silt (SP-SM)
		Brown-grey SILT with trace sand (medium stiff, moist) (ML) (Alluvium)
5	37.5	Brown poorly graded SAND with some SILT (loose to medium dense, moist to wet) (SP-SM) (Alluvium)
7.5	35	Brown sandy SILT (medium stiff, wet) (ML) (Alluvium)
		Grey SILT, trace organics (stiff, moist) (ML) (Alluvium)
10	32.5	Brown silty SAND (medium dense, moist to wet) (SM) (Alluvium)
12.5	30	
15	27.5	*(Termination Depth - 12/22/2021)*

Exploration notes

STP Blowcounts

Sampler

Symbol

Test Results
Plastic Limit — Liquid Limit
% Fines (<0.075mm) ◇
% Water Content ●
Penetration - ▲ (blows per foot)
10 20 30 40 50

Groundwater
ATD

Topsoil
Poorly graded sand with silt
Silt

Sheet 1 of 1	JOB:	FIG.

GEORESOURCES
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LOG OF BORING

MW-2

AGC.4thStSW
204 4th Street SW
Puyallup, WA

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Notes: Southern portion of site

Drilling Company:	ESN NW	**Logged By:**	DC
Drilling Method:	Direct push/geoprobe	**Drilling Date:**	12/22/2021
Drilling Rig:	truck	**Datum:**	NAVD 88
Sampler Type:	Dual Tube	**Elevation:**	42
Hammer Type:		**Termination Depth:**	15
Hammer Weight:		**Latitude:**	
		Longitude:	

Depth (feet)	Elevation (feet)	Soil description
0	42	Topsoil
		Brown poorly graded SAND interbedded with thin silt layers (loose to medium dense, moist to wet) (SP-SM) (Weathered Alluvium)
2.5	40	Silty SAND (SM)
5	37.5	Brown sandy SILT (medium stiff, wet) (ML) (Alluvium)
7.5	35	Grey SILT with trace organics (stiff, moist) (ML) (Alluvium)
10	32.5	Brown silty SAND (medium dense, moist) (SM) (Alluvium)
12.5	30	Brown sandy SILT (medium stiff, wet) (Alluvium)
15	27.5	*(Termination Depth - 12/22/2021)*

Exploration notes

STP Blowcounts

Sampler

Symbol

Test Results
Plastic Limit — Liquid Limit
% Fines (<0.075mm) ◇
% Water Content ●
Penetration - ▲ (blows per foot)
10 20 30 40 50

Groundwater
ATD

Topsoil
Poorly graded sand with silt
Silt
Silty sand

Sheet 1 of 1	JOB:	FIG.

GEORESOURCES
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LOG OF BORING

MW-3

AGC.4thStSW
204 4th Street SW
Puyallup, WA

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Notes: Northern portion of site

Drilling Company:	ESN NW	**Logged By:**	DC
Drilling Method:	Direct push/Geoprobe	**Drilling Date:**	12/22/2021
Drilling Rig:	truck	**Datum:**	NAVD 88
Sampler Type:	Dual Tube	**Elevation:**	42
Hammer Type:		**Termination Depth:**	15
Hammer Weight:		**Latitude:**	
		Longitude:	

Depth (feet)	Elevation (feet)	Soil description
0	40	Topsoil
2.5	37.5	Brown sandy SILT (medium stiff, moist to wet) (ML) (Weathered Alluvium)
5	35	Brown poorly graded SAND with some SILT (loose to medium dense, moist to wet) (SP-SM) (Alluvium)
7.5	32.5	grey-blue SILT, trace organics (Stiff, moist) (ML) (Alluvium)
10	30	Brown-grey sandy silt (medium stiff, wet) (ML) (Alluvium)
12.5	27.5	
15		*(Termination Depth - 12/22/2021)*

Exploration notes

STP Blowcounts

Sampler

Symbol

Test Results
Plastic Limit — Liquid Limit
% Fines (<0.075mm) ◇
% Water Content ●
Penetration - ▲ (blows per foot)
10 20 30 40 50

Groundwater
ATD

Topsoil
Poorly graded sand with silt
Silt
Silty sand

Sheet 1 of 1

JOB:

FIG.

GEORESOURCES
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LOG OF BORING

MW-4

AGC.4thStSW
204 4th Street SW
Puyallup, WA

1. Refer to log key for definition of symbols, abbreviations, and codes
2. USCS disination is based on visual manual classification and selected lab testing
3. Groundwater level, if indicated, is for the date shown and may vary
4. NE = Not Encountered
5. ATD = At Time of Drilling
6. HWM = Highest Groundwater Level

Drilling Company:	ESN NW	**Logged By:**	DC
Drilling Method:	Direct push/geprobe	**Drilling Date:**	12/22/2021
Drilling Rig:	truck	**Datum:**	NAVD 88
Sampler Type:	Dual Tube	**Elevation:**	42
Hammer Type:		**Termination Depth:**	15
Hammer Weight:		**Latitude:**	
		Longitude:	

Notes: Southwest portion of the Site

Depth (feet)	Elevation (feet)	Soil description
0	40	Topsoil
		Dark brown poorly graded SAND with some silt (loose to medium dense, moist to wet) (SP-SM) (Weathered Alluvium)
2.5	37.5	Brown poorly graded SAND with some silt (loose to medium dense, moist to wet) (SP-SM) (Alluvium)
		Brown sandy SILT (medium stiff, wet) (ML) (Alluvium)
5	35	Brown silty SAND (medium dense, moist, wet) (SM) (Alluvium)
7.5	32.5	Grey-blue SILT with trace organics, thin sand lenses (stiff, moist) (ML) (Alluvium)
10	30	
12.5	27.5	
15		*(Termination Depth - 12/22/2021)*

Exploration notes

STP Blowcounts

Sampler

Symbol

Test Results
Plastic Limit — Liquid Limit
% Fines (<0.075mm) ◇
% Water Content ●
Penetration - ▲ (blows per foot)
10 20 30 40 50

Groundwater
ATD

Topsoil | Poorly graded sand with silt | Silt | Silty sand

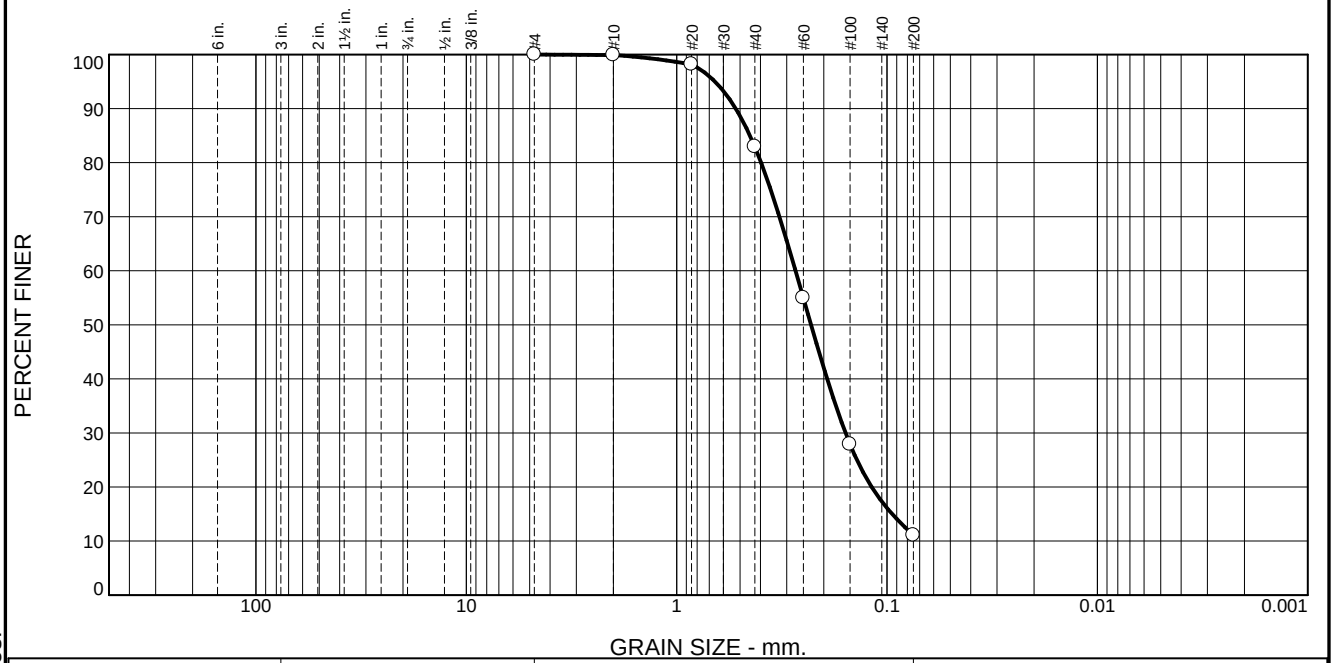
JOB:

FIG.

Appendix B

Laboratory results

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.1	17.0	71.8	11.1	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#4	100.0		
#10	99.9		
#20	98.2		
#40	82.9		
#60	55.0		
#100	27.9		
#200	11.1		

* (no specification provided)

Material Description

Poorly graded SAND with some silt (SP-SM)

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SP-SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.5235 D_{85}= 0.4483 D_{60}= 0.2724
D_{50}= 0.2297 D_{30}= 0.1576 D_{15}= 0.0946
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 15.7%

Date Received: 12/22/21 **Date Tested:** 12/28/21

Tested By: MAW

Checked By: STM

Title: PM

Source of Sample: B-1 **Depth:** 3 **Date Sampled:** 12/22/21

GeoResources, LLC

Fife, WA

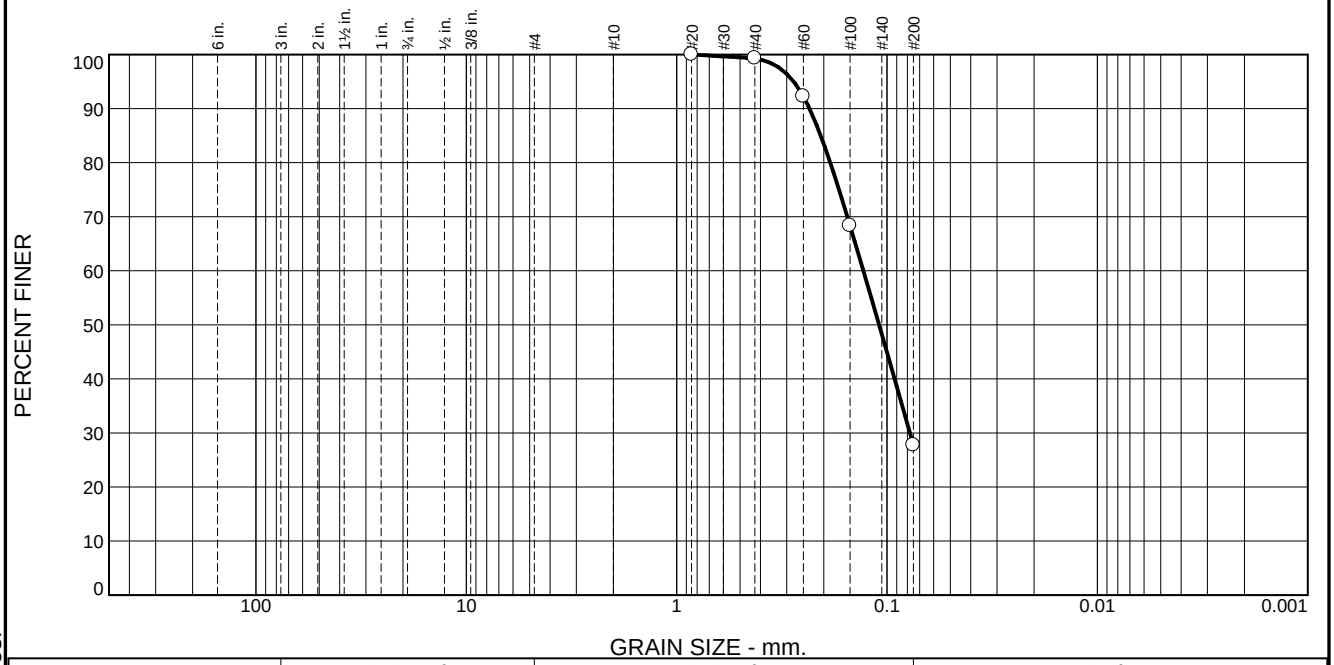
Client: Azure Green Consultants
Project: AGC.4thStSW

Project No: **Figure** B-1

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ **Checked By:** _____

Particle Size Distribution Report



% +3"	% Gravel		% Sand			% Fines	
	Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
0.0	0.0	0.0	0.0	0.7	71.6	27.7	

Test Results (ASTM D 6913 & ASTM D 1140)

Opening Size	Percent Finer	Spec.* (Percent)	Pass? (X=Fail)
#20	100.0		
#40	99.3		
#60	92.2		
#100	68.3		
#200	27.7		

* (no specification provided)

Material Description

Silty SAND (SM)

Atterberg Limits (ASTM D 4318)

PL= NP **LL=** NV **PI=** NP

Classification

USCS (D 2487)= SM **AASHTO (M 145)=** A-2-4(0)

Coefficients

D_{90}= 0.2337 D_{85}= 0.2067 D_{60}= 0.1296
D_{50}= 0.1091 D_{30}= 0.0779 D_{15}=
D_{10}= C_u= C_c=

Remarks

Natural Moisture: 31.5%

Date Received: 12/22/21 **Date Tested:** 12/28/21

Tested By: MAW

Checked By: STM

Title: PM

Source of Sample: B-2 **Depth:** 3

Date Sampled: 12/22/21

GeoResources, LLC

Fife, WA

Client: Azure Green Consultants
Project: AGC.4thStSW

Project No: **Figure** B-2

These results are for the exclusive use of the client for whom they were obtained. They apply only to the samples tested and are not indicitive of apparently identical samples.

Tested By: _____ **Checked By:** _____

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September 27, 2022

Jody Miller Construction
PO Box 44628
Tacoma, Washington 98448
(253) 405-1490
jody@jodymillerconstruction.com
CC: Azure Green Consultants

Soils Report Addendum:
Infiltration Testing
Proposed Redevelopment
204 – 4th Street Southwest
Puyallup, Washington
PN: 5745001631, -32, -41
Doc ID: JodyMillerConst.4thStSW.SRa

INTRODUCTION

This *Addendum* to our soils report summarizes the results of our in-situ infiltration testing performed at 204 – 4th Stret Southwest in Puyallup, Washington. The site consists of a three adjacent tax parcels.

On September 23, 2022, we performed two small-scale Pilot Infiltration Tests (PITs) in accordance with the 2019 Ecology Manual at two locations at the site. The location of our PITs is shown on Figure 1. Our PITs were performed at about 1.0 to 1.5 feet below existing grades in the silty sand which we had initially provided a preliminary design infiltration rate of 0.5 inches per hour based on grain size analysis in our *Soils Report* dated August 5, 2022. The exploration logs of our PITs are included in Appendix A.

During our PITs, we measured an infiltration rate of 8.0 inches per hour. Applying correction factors of 0.5 for test method, 0.3 for site variability and 0.9 for maintenance gives a design infiltration rate of 1.0 inch per hour. We over excavated the PIT and observed a restrictive layer at about 2.7 feet below existing grades. Groundwater was observed at 2.5 feet below existing grades in PIT-2. No groundwater was observed in PIT-1 during the over excavation.

LIMITATIONS

We have prepared this report for use by Jody Miller Construction, Azure Green Consultants, and other members of the design team, for use in the design of a portion of this project. The data used in preparing this report and this report should be provided to prospective contractors for their bidding or estimating purposes only. Our report, conclusions and interpretations are based on our subsurface explorations, data from others and limited site reconnaissance, and should not be construed as a warranty of the subsurface conditions.

Variations in subsurface conditions are possible between the explorations and may also occur with time. A contingency for unanticipated conditions should be included in the budget and schedule. Sufficient monitoring, testing and consultation should be provided by our firm during construction to confirm that the conditions encountered are consistent with those indicated by the explorations, to

provide recommendations for design changes should the conditions revealed during the work differ from those anticipated, and to evaluate whether earthwork and foundation installation activities comply with contract plans and specifications.

The scope of our services does not include services related to environmental remediation and construction safety precautions. Our recommendations are not intended to direct the contractor's methods, techniques, sequences or procedures, except as specifically described in our report for consideration in design.

If there are any changes in the loads, grades, locations, configurations or type of facilities to be constructed, the conclusions and recommendations presented in this report may not be fully applicable. If such changes are made, we should be given the opportunity to review our recommendations and provide written modifications or verifications, as appropriate.

◆ ◆ ◆

We have appreciated working for you on this project. Please do not hesitate to call at your earliest convenience if you have any questions or comments.

Respectfully submitted,
GeoResources, LLC

State of Washington
Engineering Geologist
3237
Licensed Geologist
9.27.22
Seth Taylor Mattos

Seth T. Mattos, LEG
Associate

Andrew Schnitger, EIT
Staff Engineer

AES:STM/aes
Doc ID: JodyMillerConst.4thStSW.SRa
Attachments: Figure 1: Site & Exploration Map
Appendix A – Subsurface Explorations

Notes:

An excerpt from the Pierce County Public GIS

Approximate location of PITs

Scale: Not to scale

North:

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Site & Exploration Map

Proposed Redevelopment

204 – 4th Street Southwest

Puyallup, Washington

PN: 57450016-31, -32, -41

Doc:ID: JodyMillerConst.4thStSW.Fa	September 2022	Figure 1

Appendix A

Subsurface Explorations

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS More than 50% Retained on No. 200 Sieve	GRAVEL More than 50% Of Coarse Fraction Retained on No. 4 Sieve	CLEAN GRAVEL	GW	WELL-GRADED GRAVEL, FINE TO COARSE GRAVEL
			GP	POORLY-GRADED GRAVEL
		GRAVEL WITH FINES	GM	SILTY GRAVEL
			GC	CLAYEY GRAVEL
	SAND More than 50% Of Coarse Fraction Passes No. 4 Sieve	CLEAN SAND	SW	WELL-GRADED SAND, FINE TO COARSE SAND
			SP	POORLY-GRADED SAND
		SAND WITH FINES	SM	SILTY SAND
			SC	CLAYEY SAND
FINE GRAINED SOILS More than 50% Passes No. 200 Sieve	SILT AND CLAY Liquid Limit Less than 50	INORGANIC	ML	SILT
			CL	CLAY
		ORGANIC	OL	ORGANIC SILT, ORGANIC CLAY
	SILT AND CLAY Liquid Limit 50 or more	INORGANIC	MH	SILT OF HIGH PLASTICITY, ELASTIC SILT
			CH	CLAY OF HIGH PLASTICITY, FAT CLAY
		ORGANIC	OH	ORGANIC CLAY, ORGANIC SILT
HIGHLY ORGANIC SOILS			PT	PEAT

NOTES:

1. Field classification is based on visual examination of soil in general accordance with ASTM D2488-90.
2. Soil classification using laboratory tests is based on ASTM D2487-90.
3. Description of soil density or consistency are based on interpretation of blow count data, visual appearance of soils, and or test data.

SOIL MOISTURE MODIFIERS:

Dry- Absence of moisture, dry to the touch

Moist- Damp, but no visible water

Wet- Visible free water or saturated, usually soil is obtained from below water table

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Unified Soils Classification System

Proposed Redevelopment
204 – 4th Street Southwest
Puyallup, Washington
PN: 57450016-31, -32, -41

Pilot Infiltration Test PIT-1

Location: North portion of site
Approximate Elevation: 42’

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Topsoil
0.5	-	2.7	SM	Brown silty SAND (loose, moist to wet)
2.7	-	4.0	SM	Gray, orange iron oxide stained silty SAND (loose to medium dense, moist)

PIT performed at 1.0 feet below existing grades.
Measured 8 inches per hour.
PIT overdug to 4.0 feet below ground surface.
No caving observed at the time of excavation.
No groundwater seepage observed.

Pilot Infiltration Test PIT-2

Location: East portion of site
Approximate Elevation: 42’

Depth (ft)			Soil Type	Soil Description
0	-	0.5	-	Topsoil
0.5	-	2.7	SM	Brown to black poorly graded silty SAND (loose, moist to wet)
2.7	-	3.0	SM	Gray, orange iron oxide stained silty SAND (loose to medium dense, moist)

PIT performed at 1.5 feet below existing grades.
Measured 8 inches per hour.
PIT overdug to 3.0 feet below ground surface.
No caving observed at the time of excavation.
Static groundwater observed at 2.5 feet below existing grades during overdig.

Logged by: AES **Excavated on: September 23, 2022**

Bell Apartments

Section 28, Township 20 N, Range 4 E, Willamette Meridian, Pierce County, Washington

PROJECT DESCRIPTION
APARTMENT BUILDING WITH IN-BUILDING PARKING.
UNDERGROUND DETENTION SYSTEM.

SITE ADDRESS:
204 4th St SW

PARCEL NUMBERS
5745001631
5745001632
5745001641

ZONING
RM-CORE

ENGINEER/SURVEYOR
AZURE GREEN CONSULTANTS
409 EAST PIONEER
PUYALLUP, WA 98372
PHONE: 253.770.3144

OWNER:
Bell Place, LLC
204 4th St SW
Puyallup, WA 98371
Phone

DEVELOPER
Bell Place, LLC
204 4th St SW
Puyallup, WA 98371
Phone

DATUM
NAVD88

BENCHMARK
BM 2403 SW-5-16, EL = 30.50 NGVD29
CONVERTED TO NAVD88 +3.49 PER VERTCON
CONVERTED ELEVATION = 33.99'

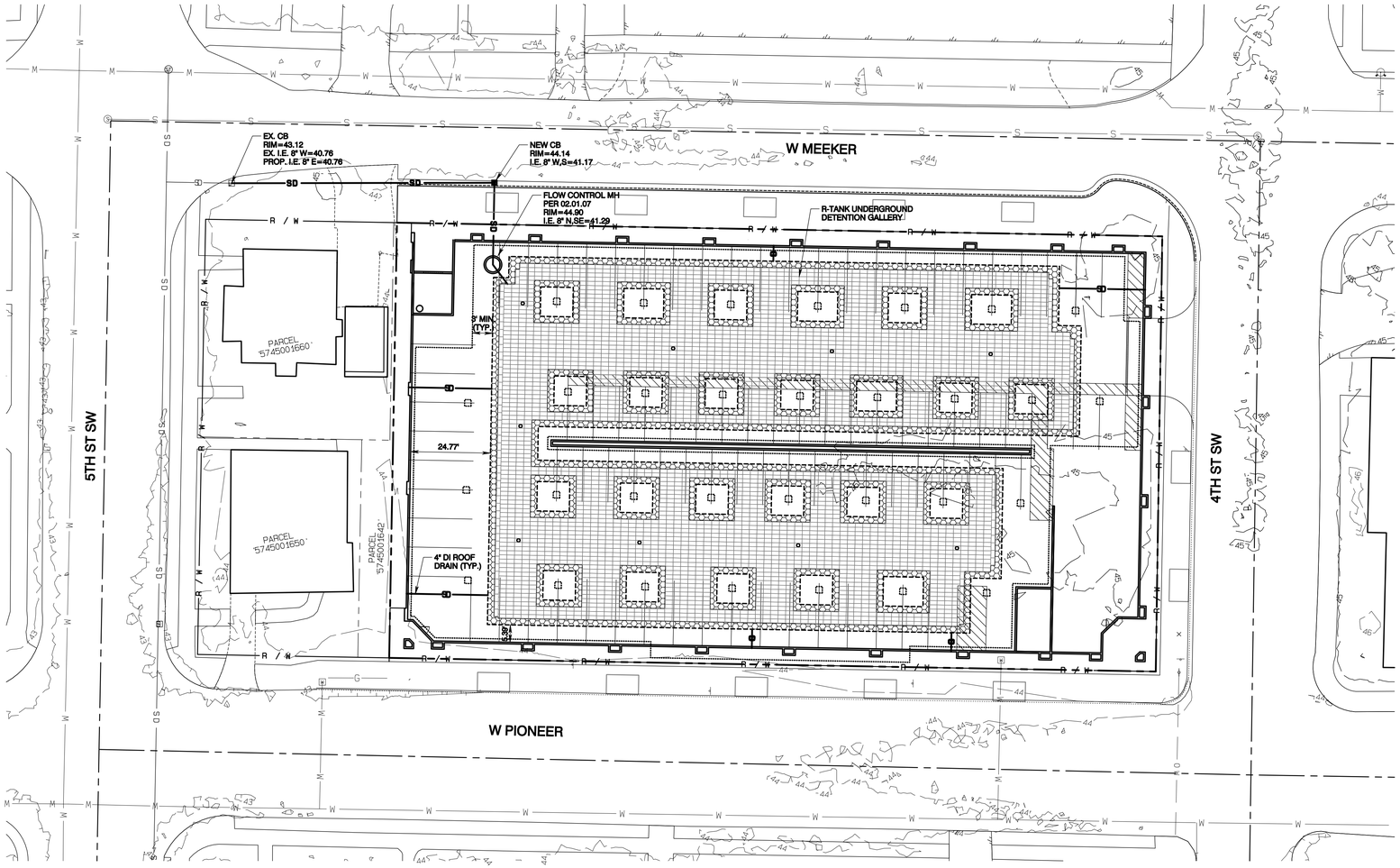
TOPOGRAPHIC INFORMATION
ONSITE TOPOGRAPHICAL DATA ARE PER FIELD SURVEY
PERFORMED BY AZURE GREEN CONSULTANTS IN DECEMBER 2021.
SURROUNDING OFFSITE AREA TOPOGRAPHY PER LIDAR
DATA OBTAINED FROM PUGET SOUND LIDAR CONSORTIUM.
CONTOURS ARE CALCULATED PER SPOT ELEVATIONS AND ARE NOT
REPRESENTED TO BE ACCURATE TO MORE THAN ONE-HALF CONTOUR INTERVAL.

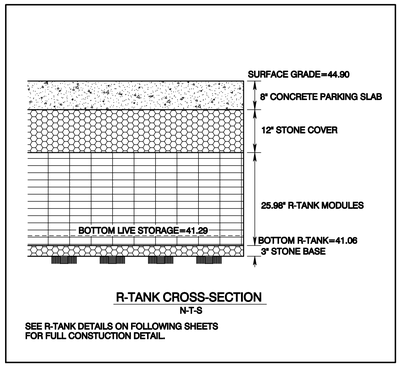
100-YEAR FLOOD
THE SITE IS LOCATED IN A FLOODPLAIN PER FEMA FIRM PANEL
53053C0329E EFFECTIVE MARCH 7, 2017.
100-YEAR FLOOD ELEVATION = 26.7 (NGVD29) = 30.2 (NAVD88)

N
W E
S

LEGEND
- RTANK BED LIMITS
- FOUNDATION FOOTING OR COLUMN
- EX. STORM LINE
- PROPOSED STORM LINE
- EX CATCH BASIN
- PROPOSED CATCH BASIN
- EX STORM DRAIN MANHOLE

GRAPHIC SCALE 1"=20'
0 20 40 60

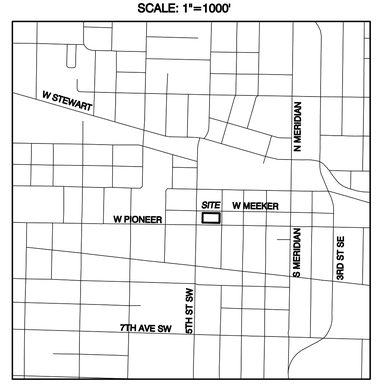




R-TANK CROSS-SECTION
N-T-S

SEE R-TANK DETAILS ON FOLLOWING SHEETS
FOR FULL CONSTUCTION DETAIL.

VICINITY MAP
204 4th St SW
SCALE: 1"=1000'



10/3/2022
ROBERT A. TRIVITT
STATE OF WASHINGTON
21615
REGISTERED PROFESSIONAL ENGINEER

REVISION	DATE
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JOB NO. 3256
DATE October 3, 2022
DESIGNED BY Paul Green
DRAWN BY Rob Trivitt
CHECKED BY Torey Azure
APPROVED BY Paul Green

AZURE GREEN CONSULTANTS
+feasibility +planning +engineering +surveying
409 East Pioneer, Suite A - Puyallup, WA 98372 phone 253.770.3144 fax 253.770.3142

Preliminary Storm Plan

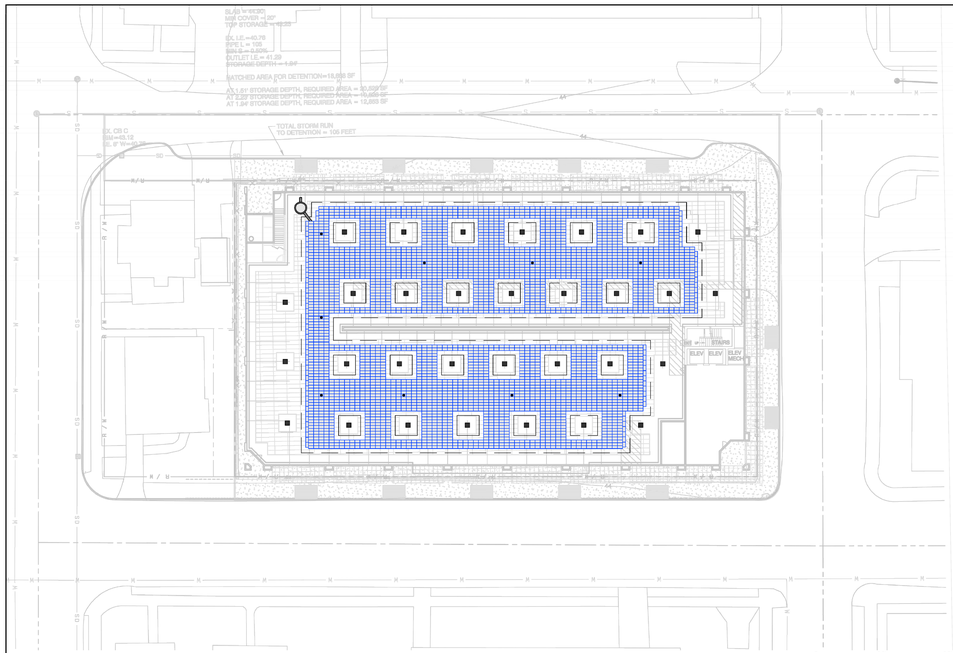
Bell Apartments

Bell Place, LLC
204 4th St SW
Puyallup, WA. 98371
Phone
Fax

DRAWING
PRE-1
SHEET 1
OF 5

Bell Apartments

Section 28, Township 20 N, Range 4 E, Willamette Meridian, Pierce County, Washington

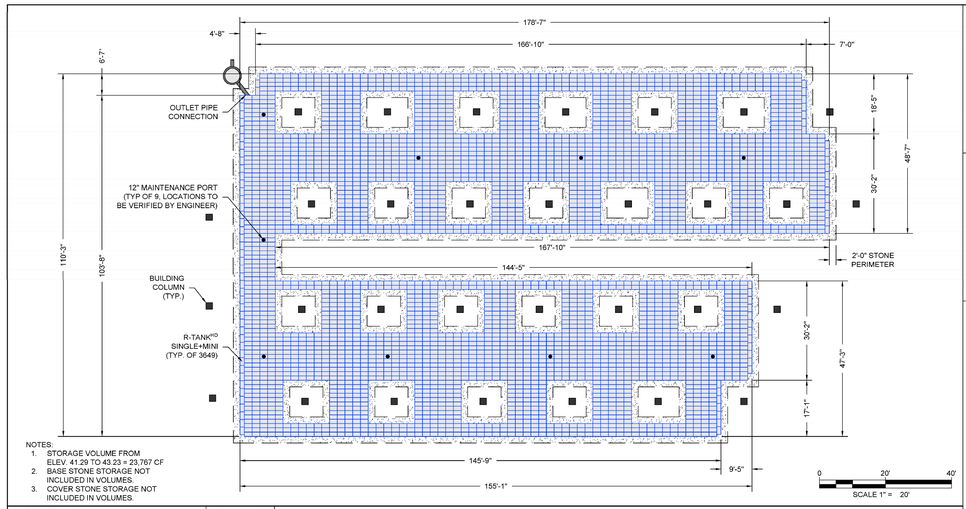


R-TANK^{HD} SYSTEM OVERLAY
SCALE: 1" = 30'

0 30' 60'
SCALE 1" = 30'

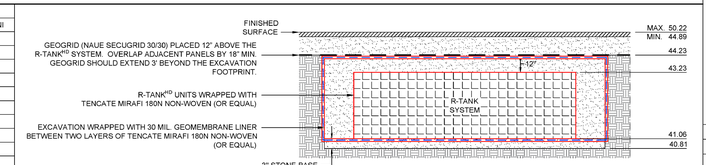
R-TANK^{HD} SYSTEM OVERLAY
BELL DETENTION
PUYALLUP, WA
SITE DESIGNATION: UGDS

DRAWN BY: EDQ
DATE: 09/30/2022
ACF WEST PROJECT NUMBER: 22-073WA
SHEET #: 1 of 6



NOTES:
1. STORAGE VOLUME FROM ELEV. 41.29 TO 43.23 = 23,787 CF
2. BASE STONE STORAGE NOT INCLUDED IN VOLUMES.
3. COVER STONE STORAGE NOT INCLUDED IN VOLUMES.

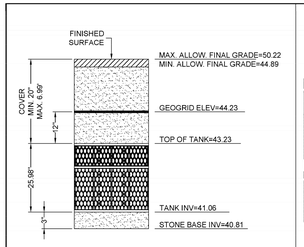
LAYOUT SCALE	1" = 20'
R-TANK^{HD} MODULE TYPE	SINGLE+MINI
TRAFFIC LOAD	HS-20
# OF SINGLE+MINI R-TANKS	3,649
TOTAL SYSTEM STORAGE	26,592 CF
R-TANK STORAGE VOLUME	23,098 CF
STONE STORAGE VOLUME (40% VOID RATIO)	3,494 CF
NAUE SECUGRID 30/30 GEOGRID ELEV.	44.23
TOP OF COVER STONE ELEV. (12")	44.23
TOP OF R-TANK ELEV.	43.23
TANK INVERT	41.06
INVERT OF STONE BASE (3")	40.81
MIN. STONE PERIMETER WIDTH	2.0 FT
SEE SHEETS 3 - 6 FOR DETAILS AND ADDITIONAL INFORMATION	



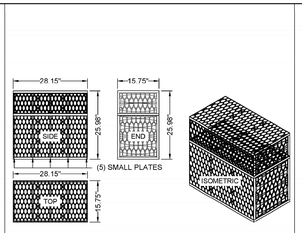
R-TANK^{HD} TANK WRAP & EXCAVATION ENVELOPE DETAIL

R-TANK^{HD} SYSTEM LAYOUT
BELL DETENTION
PUYALLUP, WA
SITE DESIGNATION: UGDS

DRAWN BY: EDQ
DATE: 09/30/2022
ACF WEST PROJECT NUMBER: 22-073WA
SHEET #: 2 of 6



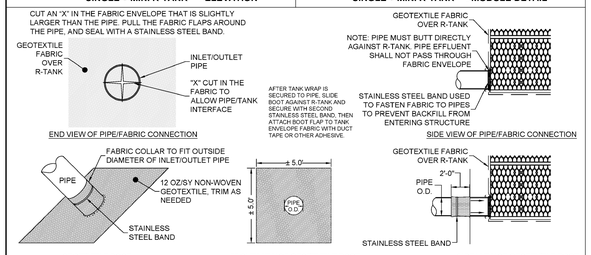
SINGLE + MINI R-TANK^{HD} - ELEVATION



MODULE DATA

GEOMETRY:	LOAD RATING:
LENGTH = 28.15 IN. (715 MM)	33.4 PSI, (MODULE ONLY)
WIDTH = 15.75 IN. (400 MM)	HS20/HS25 - SEE SPEC FOR
HEIGHT = 25.98 IN. (660 MM)	COVER REQUIREMENTS
TANK VOLUME = 6.67 CF	**MATERIAL:**
STORAGE VOLUME = 6.33 CF	100% RECYCLED POLYPROPYLENE
VOID INTERNAL VOLUME: 95%	**SMALL PLATES REQUIRED:**
VOID SURFACE AREA: 90%	5/SEGMENT, 10/MODULE

SINGLE + MINI R-TANK^{HD} - MODULE DETAIL



R-TANK^{HD} TYPICAL TANK INLET/OUTLET W/ GEOTEXTILE PIPE BOOT DETAIL

R-TANK^{HD} QUANTITIES	
R-TANK^{HD} MODULE TYPE	SINGLE+MINI
# OF SINGLE+MINI R-TANKS	3,649
TOTAL SYSTEM STORAGE	26,592 CF
R-TANK STORAGE VOLUME	23,098 CF
STONE STORAGE VOLUME (40% VOID RATIO)	3,494 CF
STONE BED FOOTPRINT	15,270 SF
STONE QUANTITY	1,030 CY
TENCATE MIRAFI 180N NON-WOVEN TANK WRAP	18,388 SF (2,043 SY)
30 MIL. GEOMEMBRANE LINER EXCAVATION WRAP	42,299 SF (4,700 SY)
TENCATE MIRAFI 180N NON-WOVEN LINER PROTECTION	84,598 SF (9,400 SY)
NAUE SECUGRID 30/30 GEOGRID	23,307 SF (2,590 SY)
12" MAINTENANCE PORTS	9
PIPE BOOTS (UNKNOWN SIZE)	TBD
NOTE: STONE QUANTITY INCLUDES 12" OF COVER AND 3" OF BASE.	
NOTE: GEOTEXTILE / LINER QUANTITIES INCLUDE A 15% WASTE FACTOR.	

NOTES:
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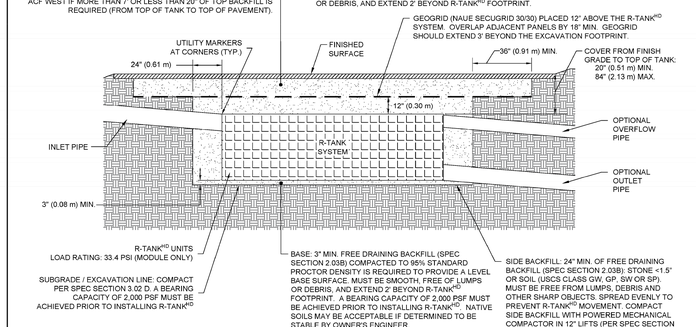
2. BASE STONE STORAGE NOT INCLUDED IN VOLUMES.
3. COVER STONE STORAGE NOT INCLUDED IN VOLUMES.

R-TANK^{HD} SYSTEM DETAILS
BELL DETENTION
PUYALLUP, WA
SITE DESIGNATION: UGDS

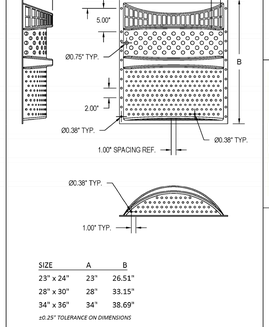
DRAWN BY: EDQ
DATE: 09/30/2022
ACF WEST PROJECT NUMBER: 22-073WA
SHEET #: 3 of 6

TOTAL COVER: 20" MINIMUM AND 84" MAXIMUM. FIRST 12" MUST BE FREE DRAINING BACKFILL (SPEC SECTION 2.03B): STONE <1.5" OR SOIL (USCS CLASS GW, GP, SW OR SP). ADDITIONAL FILL MAY BE STRUCTURAL FILL (SPEC SECTION 2.03C): STONE OR SOIL (USCS CLASS SM, SP, SW, GM, GP OR GW) WITH MAX CLAY CONTENT=10%, MAX 25% PASSING NO. 200 SIEVE, AND MAX PLASTICITY INDEX OF 4. A MIN. 12" COVER MUST BE MAINTAINED BETWEEN BACKFILL EQUIPMENT AND THE TOP OF THE R-TANK™ SYSTEM AT ALL TIMES. TOTAL HEIGHT OF TOP BACKFILL SHOULD NOT EXCEED 7'. CONTACT ACF WEST IF MORE THAN 7' OR LESS THAN 20" OF TOP BACKFILL IS REQUIRED (FROM TOP OF TANK TO TOP OF PAVEMENT).

NOTES:
1. FOR COMPLETE MODULE DATA, SEE APPROPRIATE R-TANK^{HD} MODULE SHEET.
2. INSTALLATIONS PER THIS DETAIL MEET GUIDELINES OF HL-93 LOADING PER THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS, CUSTOMARY U.S. UNITS, 7TH EDITION, 2014 WITH 2015 AND 2016 INTERIM REVISIONS.
3. PRE-TREATMENT STRUCTURES NOT SHOWN.
4. FOR INFILTRATION APPLICATIONS, GEOTEXTILE ENVELOPING R-TANK SHALL BE ACF M200 (PER SPEC SECTION 2.02A) AND BASE SHALL BE 4" MIN. UNCOMPACTED FREE DRAINING BACKFILL (SPEC SECTION 2.03A) TO PROVIDE A LEVEL BASE. SURFACE MUST BE SMOOTH, FREE OF LUMPS OR DEBRIS, AND EXTEND 2' BEYOND R-TANK^{HD} FOOTPRINT.



R-TANK^{HD} & HS-20 LOADS - SECTION VIEW

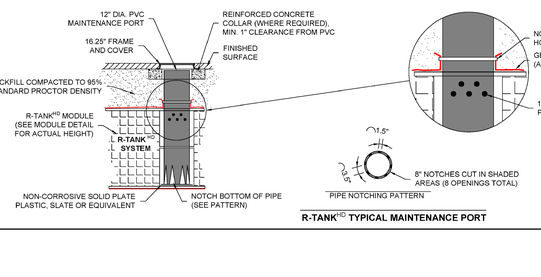


SIZE	A	B
23" x 24"	23"	26.51"
28" x 30"	28"	33.15"
34" x 36"	34"	38.69"

±0.25" TOLERANCE ON DIMENSIONS

TRASHGUARD PLUS PRETREATMENT DETAIL

NOTES
1. THIS PORT IS USED TO PUMP WATER INTO THE SYSTEM AND RE-SUSPEND ACCUMULATED SEDIMENT SO THAT IT MAY BE PUMPED OUT.
2. MINIMUM REQUIRED MAINTENANCE INCLUDES A QUARTERLY INSPECTION DURING THE FIRST YEAR OF OPERATION AND A YEARLY INSPECTION THEREAFTER. FLUSH AS NEEDED.
3. R-TANK^{HD}, R-TANK^{HD}, R-TANK^{HD} AND R-TANK^{HD} MAY BE USED IN TRAFFIC APPLICATIONS.
4. SEE TRAFFIC LOADING DETAIL FOR MINIMUM & MAXIMUM COVER REQUIREMENTS.
5. IF MAINTENANCE PORT IS LOCATED IN A NON-TRAFFIC AREA, A PLASTIC CAP CAN BE USED IN LIEU OF A FRAME AND COVER WITH CONCRETE COLLAR.



R-TANK^{HD} TYPICAL MAINTENANCE PORT

R-TANK^{HD} SYSTEM DETAILS
BELL DETENTION
PUYALLUP, WA
SITE DESIGNATION: UGDS

DRAWN BY: EDQ
DATE: 09/30/2022
ACF WEST PROJECT NUMBER: 22-073WA
SHEET #: 4 of 6

ROBERT A. TRIVITT
STATE OF WASHINGTON
21615
REGISTERED PROFESSIONAL ENGINEER
10/3/2022

REVISION	DATE
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JOB NO: 3256
DATE: October 3, 2022
DESIGNED BY: Paul Green
DRAWN BY: Rob Trivitt
CHECKED BY: Torey Azure
APPROVED BY: Paul Green

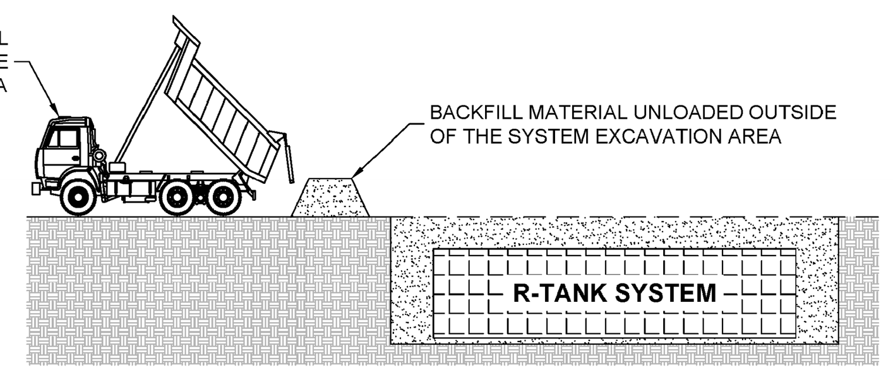
AZURE GREEN CONSULTANTS
409 East Pioneer, Suite A • Puyallup, WA 98372
phone: 253.770.3144 fax: 253.770.3142
+feasibility +planning +engineering +surveying

R-Tank Details
Bell Apartments
Bell Place, LLC
204 4th St SW
Puyallup, WA, 98371
Phone
Fax

DRAWING
PRE-2
SHEET 2
OF 5

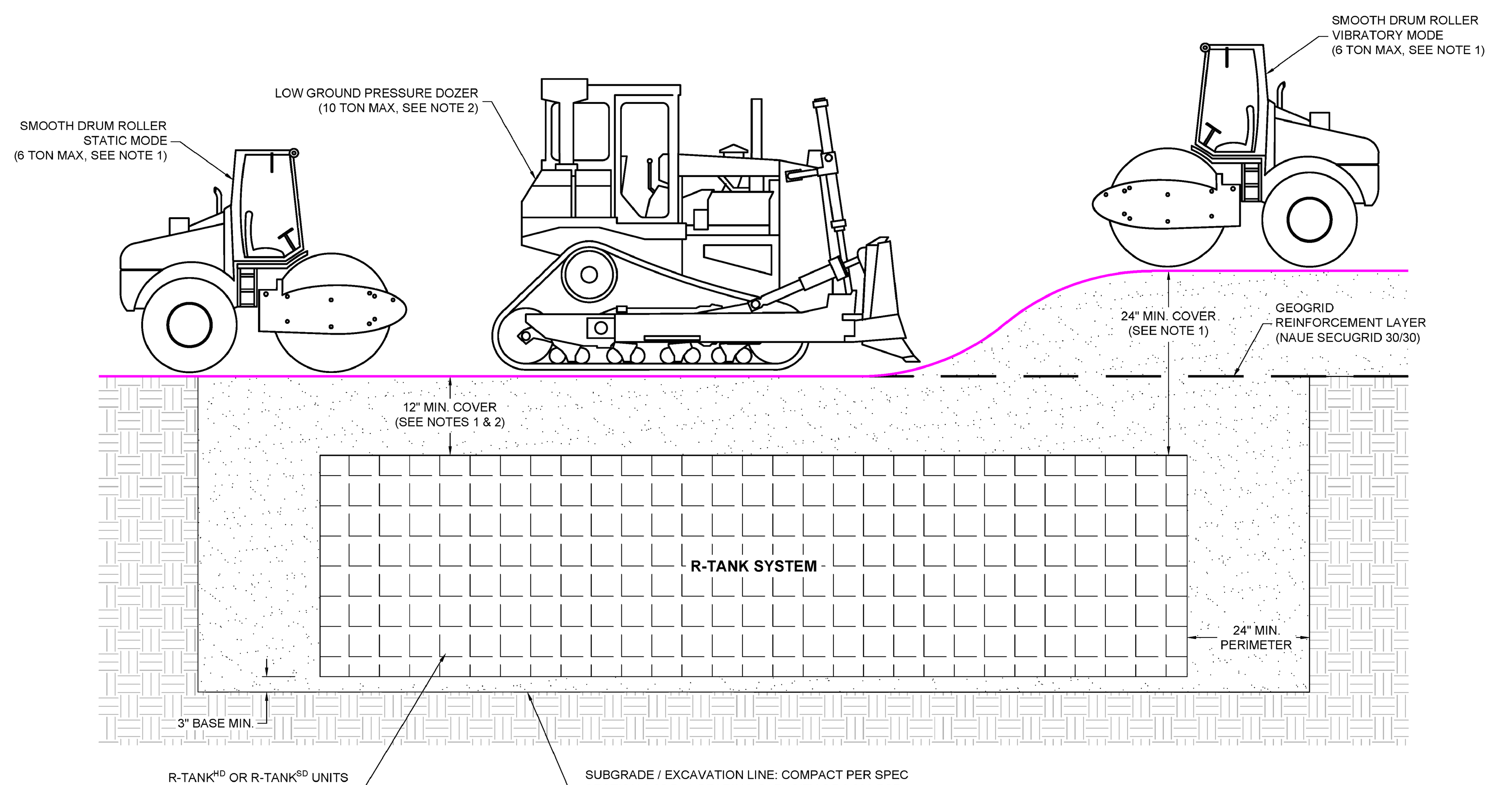
Bell Apartments

Section 28, Township 20 N, Range 4 E, Willamette Meridian, Pierce County, Washington



DUMP TRUCK DETAIL (SEE NOTE 3)

NOTES:
1. FOLLOWING PLACEMENT OF SIDE BACKFILL, A UNIFORM 12" LIFT OF THE FREELY DRAINING MATERIAL (SPEC SECTION 2.03 B2) SHALL BE PLACED OVER THE R-TANK AND LIGHTLY COMPACTED USING A WALK-BEHIND TRENCH ROLLER. ALTERNATELY, A ROLLER (MAXIMUM GROSS VEHICLE WEIGHT OF 6 TONS) MAY BE USED. ROLLER MUST REMAIN IN STATIC MODE UNTIL A MINIMUM OF 24" OF COVER HAS BEEN PLACED OVER THE MODULES. SHEEP FOOT ROLLERS SHOULD NOT BE USED. **SPEC SECTION 3.05 A5**
2. ONLY LOW PRESSURE TIRE OR TRACK VEHICLES (LESS THAN 7 PSI AND OPERATING WEIGHT OF LESS THAN 20,000 LBS) SHALL BE OPERATED OVER THE R-TANK SYSTEM DURING CONSTRUCTION. **SPEC SECTION 3.05 A5**
3. DUMP TRUCKS AND PANS SHALL NOT BE OPERATED WITHIN THE R-TANK SYSTEM AT ANY TIME. WHERE NECESSARY, THE HEAVY EQUIPMENT SHOULD UNLOAD IN AN AREA ADJACENT TO THE R-TANK SYSTEM AND THE MATERIAL SHOULD BE MOVED OVER THE SYSTEM WITH TRACKED EQUIPMENT. **SPEC SECTION 3.05 A5**
4. ENSURE THAT ALL UNRELATED CONSTRUCTION TRAFFIC IS KEPT AWAY FROM THE LIMITS OF EXCAVATION UNTIL THE PROJECT IS COMPLETE AND FINAL SURFACE MATERIALS ARE IN PLACE. NO NON-INSTALLATION RELATED LOADING SHOULD BE ALLOWED OVER THE R-TANK SYSTEM UNTIL THE FINAL DESIGN SECTION HAS BEEN CONSTRUCTED (INCLUDING PAVEMENT). **SPEC SECTION 3.05 B**
5. SEE R-TANK INSTALLATION GUIDE OR CONTACT YOUR LOCAL ACF WEST REPRESENTATIVE FOR ADDITIONAL INFORMATION.



CONSTRUCTION EQUIPMENT COVER DETAIL - VEHICULAR TRAFFIC

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF WEST, 1-800-423-4567, www.acfwest.com

R-TANK^HD CONSTRUCTION EQUIPMENT COVER DETAIL
BELL DETENTION
PUYALLUP, WA
SITE DESIGNATION: UGDS

DRAWN BY: EDQ
DATE: 09/30/2022
ACF WEST PROJECT NUMBER: 22-073WA
SHEET NO. 5 of 6

R-TANK SPECIFICATION

PART 1 - GENERAL
1.01 RELATED DOCUMENTS
A. Drawings, technical specification and general provisions of the Contract as modified herein apply to this section.

1.02 DESCRIPTION OF WORK INCLUDED
A. Provide excavation and base preparation per geotechnical engineer's recommendations and/or as shown on the design drawings, to provide adequate support for project design loads and safety from excavation sidewall collapse. Excavations shall be in accordance with the owner's and OSHA requirements.
B. Provide and install R-TankLD/, R-TankHD/, R-TankSD/, or R-TankU/D/ system (hereafter called R-Tank) and all related products including fill materials, geotextiles, geogrids, inlet and outlet pipe with connections per the manufacturer's installation guidelines provided in this section.
C. Provide and construct the cover of the R-Tank system including; stone backfill, structural fill cover, and pavement section as specified.
D. Protect R-Tank system from construction traffic after installation until completion of all construction activity in the installation area.

1.03 QUALITY CONTROL
A. All materials shall be manufactured in ISO certified facilities.
B. Installation Contractor shall demonstrate the following experience:
1. A minimum of three R-Tank or equivalent projects completed within 2 years; and,
2. A minimum of 25,000 cubic feet of storage volume completed within 2 years.
3. Contractor experience requirement may be waived if the manufacturer's representative provides on-site training and review during construction.
C. Installation Personnel: Performed only by skilled workers with satisfactory record of performance on bulk earthworks, pipe, chamber, or pond/landfill construction projects of comparable size and quality.
D. Contractor must have manufacturer's representative available for site review if requested by Owner.

1.04 SUBMITTALS
A. Submit proposed R-Tank layout drawings. Drawings shall include typical section details as well as the required base elevation of stone and tanks, minimum cover requirements and tank configuration.
B. Submit manufacturer's product data, including compressive strength and unit weight.
C. Submit manufacturer's installation instructions.
D. Submit R-Tank sample for review. Reviewed and accepted samples will be returned to the Contractor.
E. Submit material certificates for geotextile, geogrid, base course and backfill materials.
F. Submit required experience and personnel requirements as specified in Section 1.03.
G. Any proposed equal alternative product substitution to this specification must be submitted for review and approved prior to bid opening. Review package should include third party reviewed performance data that meets or exceeds criteria in Table 2.01 B.

1.05 DELIVERY, STORAGE, AND HANDLING
A. Protect R-Tank and other materials from damage during delivery, and store UV sensitive materials under tarp to protect from sunlight when time from delivery to installation exceeds two weeks. Storage of materials should be on smooth surfaces, free from dirt, mud and debris.
B. Handling is to be performed with equipment appropriate to the materials and site conditions, and may include hand, handcart, forklifts, extension lifts, etc.
C. Cold weather:
1. Care must be taken when handling plastics when air temperature is 40 degrees or below as plastic becomes brittle.
2. Do not use frozen materials or materials mixed or coated with ice or frost.
3. Do not build on frozen ground or wet, saturated or muddy subgrade.

1.06 PREINSTALLATION CONFERENCE.
A. Prior to the start of the installation, a preinstallation conference shall occur with the representatives from the design team, the general contractor, the excavation contractor, the R-Tank installation contractor, and the manufacturer's representative.

1.07 PROJECT CONDITIONS
A. Coordinate installation for the R-Tank system with other on-site activities to eliminate all non-installation related construction traffic over the completed R-Tank system. No loads heavier than the design loads shall be allowed over the system, and in no case shall loads higher than a standard AASHTO HS20 (or HS25, depending on design criteria) load be allowed on the system at any time.
B. Protect adjacent work from damage during R-Tank system installation.
C. All pre-treatment systems to remove debris and heavy sediments must be in place and functional prior to operation of the R-Tank system. Additional pretreatment measures may be needed if unit is operational during construction due to increased sediment loads.
D. Contractor is responsible for any damage to the system during construction.

PART 2 - PRODUCTS
2.01 R-TANK UNITS
A. R-Tank - Injection molded plastic tank plates assembled to form a 95% void modular structure of predesigned height (custom for each project).
B. R-Tank units shall meet the following Physical & Chemical Characteristics:

PROPERTY	DESCRIPTION	R-Tank^LD VALUE	R-Tank^HD VALUE	R-Tank^SD VALUE	R-Tank^UD VALUE
Void Area	Volume available for water storage	95%	95%	95%	95%
Surface Void Area	Percentage of exterior available for infiltration	90%	90%	90%	90%
Vertical Compressive Strength	ASTM D 2412 / ASTM F 2418	30.0 psi	33.4 psi	42.9 psi	134.2 psi
Lateral Compressive Strength	ASTM D 2412 / ASTM F 2418	20.0 psi	22.4 psi	28.9 psi	N/A
HS-20 Minimum Cover	Cover required to support HS-20 loads	N/A	20"	18"	12" (STONE BACKFILL)
HS-25 Minimum Cover	Cover required to support HS-25 loads	N/A	24"	19"	15" (STONE BACKFILL)
Maximum Cover	Maximum allowable cover depth	3 feet	< 7 feet	< 10 feet	5 feet
Unit Weight	Weight of plastic per cubic foot of tank	3.29 lbs / cf	3.62 lbs/cf	3.96 lbs / cf	4.33 lbs / cf
Rib Thickness	Thickness of load-bearing members	0.18 inches	0.18 inches	0.18 inches	N/A
Service Temperature	Safe temperature range for use	-14 – 167° F	-14 – 167° F	-14 – 167° F	-14 – 167° F

C. Supplier: ACF West 15540 Woodinville-Redmond Rd., Woodinville, Washington 98072, (425) 415-6115, www.acfwest.com

2.02 GEOSYNTHETICS
A. Geotextile. A geotextile envelope is required to prevent backfill material from entering the R-Tank modules.
1. Standard Application: The standard geotextile shall be an 8 oz per square yard nonwoven geotextile (ACF N080 or equivalent).
2. Infiltration Applications: When water must infiltrate/exfiltrate through the geotextile as a function of the system design, a woven monofilament (ACF M200 or equivalent) shall be used.
B. Geogrid. For installations subject to traffic loads and/or when required by project plans, install geogrid (ACF BX12 or equivalent) to reinforce backfill above the R-Tank system. Geogrid is not always required for R-TankUD/ installations, and is often not required for non-traffic load applications.

2.03 BACKFILL & COVER MATERIALS
A. Bedding Materials: Stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System) shall be used below the R-Tank system (3" minimum). Material must be free from lumps, debris, and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation. For infiltration applications bedding material shall be free draining.
B. Side and Top Backfill: Material must be free from lumps, debris and any sharp objects that could cut the geotextile. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.
1. Traffic Applications - Free draining material shall be used adjacent to (24" minimum) and above (for the first 12") the R-Tank system.
a. For HD, and SD modules, backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter) or soil (GW, GP, SW, or SP as classified by the Unified Soil Classification System).
b. For UD modules with less than 14" of top cover, backfill materials shall be free draining stone (angular and smaller than 1.5" in diameter). The use of soil backfill on the sides and top of the UD module is not permitted unless the modules are installed outside of traffic areas or with cover depths of 14" or more. Top backfill material (from top of module to bottom of pavement base or 12" maximum) must be consistent with side backfill.
2. Non-Traffic / Green Space Applications - For all R-Tank modules installed in green spaces and not subjected to vehicular loads, backfill materials may either follow the guidelines for Traffic Applications above, or the top backfill layer (12" minimum) may consist of AASHTO #57 stone blended with 30-40% (by volume) topsoil to aid in establishing vegetation.
C. Additional Cover Materials: Structural Fill shall consist of granular materials meeting the gradational requirements of SM, SP, SW, GM, GP or GW as classified by the Unified Soil Classification System. Structural fill shall have a maximum of 25 percent passing the No. 200 sieve, shall have a maximum clay content of 10 percent and a maximum Plasticity Index of 4. Material shall be within 3 percent of the optimum moisture content as determined by ASTM D698 at the time of installation.

2.04 OTHER MATERIALS
A. Utility Marker: Install metallic tape at corners of R-Tank system to mark the area for future utility detection.

PART 3 - EXECUTION
3.01 ASSEMBLY OF R-TANK UNITS
A. Assembly of modules shall be performed in accordance with the R-Tank Installation Manual, Section 2.

3.02 LAYOUT AND EXCAVATION
A. Installer shall stake out, excavate, and prepare the subgrade area to the required plan grades and dimensions, ensuring that the excavation is at least 2 feet greater than R-Tank dimensions in each direction allowing for installation of geotextile filter fabric, R-Tank modules, and free draining backfill materials.
B. All excavations must be prepared with OSHA approved excavated sides and sufficient working space.
C. Protect partially completed installation against damage from other construction traffic by establishing a perimeter with high visibility construction tape, fencing, barricades, or other means until construction is complete.
D. Base of the excavation shall be uniform, level, and free of lumps or debris and soft or yielding subgrade areas. A minimum 2,000 pounds per square foot bearing capacity is required.
1. Standard Applications: Compact subgrade to a minimum of 95% of Standard Proctor (ASTM D698) density or as required by the Owner's engineer.
2. Infiltration Applications: Subgrade shall be prepared in accordance with the contract documents. Compaction of subgrade should not be performed in infiltration applications.
E. Unsuitable Soils or Conditions: All questions about the base of the excavation shall be directed to the owner's engineer, who will approve the subgrade conditions prior to placement of stone. The owner's engineer shall determine the required bearing capacity of the R-Tank subgrade; however in no case shall a bearing capacity of less than 2,000 pounds per square foot be provided.
1. If unsuitable soils are encountered at the subgrade, or if the subgrade is pumping or appears excessively soft, repair the area in accordance with contract documents and/or as directed by the owner's engineer.
2. If indications of the water table are observed during excavation, the engineer shall be contacted to provide recommendations.
3. Do not start installation of the R-Tank system until unsatisfactory subgrade conditions are corrected and the subgrade conditions are accepted by the owner's engineer.

3.03 PREPARATION OF BASE
A. Place a thin layer (3" unless otherwise specified) of bedding material (Section 2.03 A), over the subgrade to establish a level working platform for the R-Tank modules. Level to within ½" (+/- ¼") or as shown on the plans. Native subgrade soils or other materials may be used if determined to meet the requirements of 2.03 A and are accepted by the owner's engineer.
1. Standard Applications: Static roll or otherwise compact bedding materials until they are firm and unyielding.
2. Infiltration Applications: Bedding materials shall be prepared in accordance with the contract documents.
B. Outline the footprint of the R-Tank system on the excavation floor using spray paint or chalk line to ensure a 2' perimeter is available around the R-Tank system for proper installation and compaction of backfill.

3.04 INSTALLATION OF THE R-TANKS
A. Where a geotextile wrap is specified on the stone base, cut strips to length and install in excavation, removing wrinkles so material lays flat. Overlap geotextile a minimum 12" or as recommended by manufacturer. Use tape, special adhesives, sandbags or other ballast to secure overlaps. As geotextiles can be damaged by extreme heat, smoking is not permissible on/near the geotextile, and tools using a flame to tack the overlaps, such as propane torches, are prohibited.
B. Where an impervious liner (for containment) is specified, install the liner per manufacturer's recommendations and the contract documents. The R-Tank units shall be separated from impervious liner by a non-woven geotextile fabric installed accordance with Section 3.04A.
C. Install R-Tank modules by placing side by side, in accordance with the design drawings. No lateral connections are required. It is advisable to use a string line to form square corners and straight edges along the perimeter of the R-Tank system. The modules are to be oriented as per the design drawing with required depth as shown on plans.
1. For LD, HD, and SD installations, the large side plate of the tank should be placed on the perimeter of the system. This will typically require that the two ends of the tank area will have a row of tanks placed perpendicular to all other tanks. If this is not shown in the construction drawings, it is a simple field adjustment that will have minimal effect on the overall system footprint. Refer to R-Tank Installation Guide for more details
2. For UD installations, there is no perpendicular end row required.
D. Wrap the R-Tank top and sides in specified geotextile. Cut strips of geotextile so that it will cover the sides and top, encapsulating the entire system to prevent backfill entry into the system. Overlap geotextile 12" or as recommended by manufacturer. Take great care to avoid damage to geotextile (and, if specified, impervious liner) during placement.
E. Identify locations of inlet, outlet and any other penetrations of the geotextile (and optional liner). These connections should be installed flush (butted up to the R-Tank) and the geotextile fabric shall be cut to enable hydraulic continuity between the connections and the R-Tank units. These connections shall be secured using pipe boots with stainless steel pipe clamps. Support pipe in trenches during backfill operations to prevent pipe from settling and damaging the geotextile, impervious liner (if specified) or pipe. Connecting pipes at 90 degree angles facilitates construction, unless otherwise specified. Ensure end of pipe is installed snug against R-Tank system.
F. Install Inspection and Maintenance Ports in locations noted on plans. At a minimum one maintenance port shall be installed within 10' of each inlet & outlet connection, and with a maximum spacing of one maintenance port for every 2,500 square feet. Install all ports as noted in the R-Tank Installation Guide.
G. If required, install ventilation pipes and vents as specified on drawings to provide ventilation for proper hydraulic performance. The number of pipes and vents will depend on the size of the system. Vents are often installed using a 90 degree elbow with PVC pipe into a landscaped area with 'U" bend or venting bollard to inhibit the ingress of debris. A ground level concrete or steel cover can be used.

3.05 BACKFILLING OF THE R-TANK UNITS
A. Backfill and fill with recommended materials as follows:
1. Place freely draining backfill materials (Section 2.03 B) around the perimeter in lifts with a maximum thickness of 12". Each lift shall be placed around the entire perimeter such that each lift is no more than 24" higher than the side backfill along any other location on the perimeter of the R-Tank system. No fill shall be placed over top of tanks until the side backfill has been completed.
2. Each lift shall be compacted at the specified moisture content to a minimum of 95% of the Standard Proctor Density until no further densification is observed (for self-compacting stone materials). The side lifts must be compacted with walk behind compaction equipment. Even when "self-compacting" backfill materials are selected, a walk behind vibratory compactor must be used.
3. Take care to ensure that the compaction process does not allow the machinery to come into contact with the modules due to the potential for damage to the geotextile and R-Tank units.
4. No compaction equipment is permissible to operate directly on the R-Tank modules.
5. Top Backfill: Only low pressure track vehicles shall be operated over the R-Tank system during construction. Dump Trucks and Pans shall not be operated within the R-Tank system footprint at any time. Heavy equipment should unload in an area adjacent to the R-Tank system and the material should be moved over the system using tracked equipment with an operating weight of less than 10 tons.
a. Typical Applications: Install a 12" (or as shown on plans) lift of freely draining material (Section 2.03 B) over the R-Tank Units, maintaining 12" between equipment tracks and R-Tank System. Lightly compacted using a walk-behind trench roller. Alternately, a roller (maximum gross vehicle weight of 6 tons) may be used. Roller must remain in static mode until a minimum of 24" of cover has been placed over the modules. Sheep foot rollers should not be used.
b. Shallow Applications (< 18" total cover): Install top backfill in accordance with plans.
6. If required, install a geogrid as shown on plans. Geogrid shall extend a minimum of 3 feet beyond the limits of the excavation wall.
7. Following placement and compaction of the initial cover, subsequent lifts of structural fill (Section 2.03 C) shall be placed at the specified moisture content and compacted to a minimum of 95% of the Standard Proctor Density and shall cover the entire footprint of the R-Tank system. During placement of fill above the system, unless otherwise specified, a uniform elevation of fill shall be maintained to within 12" across the footprint of the R-Tank system. Do not exceed maximum cover depths listed in Table 2.01 B.
8. Place additional layers of geotextile and/or geogrid at elevations as specified in the design details. Each layer of geosynthetic reinforcement placed above the R-Tank system shall extend a minimum of 3 feet beyond the limits of the excavation wall.
B. Ensure that all unrelated construction traffic is kept away from the limits of excavation until the project is complete and final surface materials are in place. No non-installation related loading should be allowed over the R-Tank system until the final design section has been constructed (including pavement).
C. Place surfacing materials, such as groundcovers (no large trees), or paving materials over the structure with care to avoid displacement of cover fill and damage to surrounding areas.
D. Backfill depth over R-Tank system must be within the limitations shown in the table in Section 2.01 B. If the total backfill depth does not comply with this table, contact engineer or manufacturer's representative for assistance.

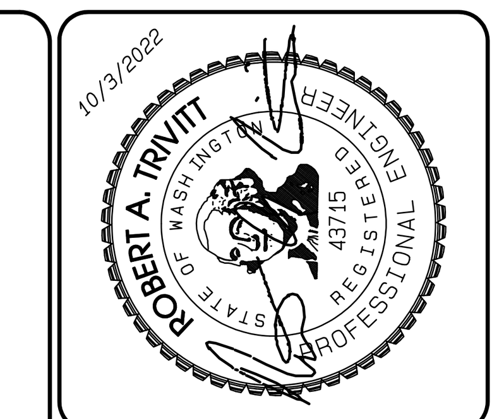
3.06 MAINTENANCE REQUIREMENTS
A. A routine maintenance effort is required to ensure proper performance of the R-Tank system. The Maintenance program should be focused on pretreatment systems. Ensuring these structures are clean and functioning properly will reduce the risk of contamination of the R-Tank system and stormwater released from the site. Pre-treatment systems shall be inspected yearly, or as directed by the regulatory agency and by the manufacturer (for proprietary systems). Maintain as needed using acceptable practices or following manufacturer's guidelines (for proprietary systems).
B. All inlet pipes and Inspection and/or Maintenance Ports in the R-Tank system will need to be inspected for accumulation of sediments at least quarterly through the first year of operation and at least yearly thereafter.
C. If sediment has accumulated to the level noted in the R-Tank Maintenance Guide or beyond a level acceptable to the Owner's engineer, the R-Tank system should be flushed.
D. All inspection and maintenance activities should be performed in accordance with the R-Tank Operation, Inspection & Maintenance Manual.

ENGINEER OF RECORD TO REVIEW, APPROVE AND ENDORSE FINAL SITE SPECIFIC DESIGN.

FOR ADDITIONAL INFORMATION PLEASE CONTACT: ACF WEST, 1-800-423-4567, www.acfwest.com

R-TANK SPECIFICATION
BELL DETENTION
PUYALLUP, WA
SITE DESIGNATION: UGDS

DRAWN BY: EDQ
DATE: 09/30/2022
ACF WEST PROJECT NUMBER: 22-073WA
SHEET NO. 6 of 6



REVISION	DATE
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JOB NO: 3256
DATE: October 3, 2022
DESIGNED BY: Paul Green
DRAWN BY: Rob Trivitt
CHECKED BY: Torey Azure
APPROVED BY: Paul Green

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R-Tank Details

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DRAWING
PRE-3
SHEET 3
OF 5