PRELIMINARY STORMWATER MANAGEMENT REPORT

FOR

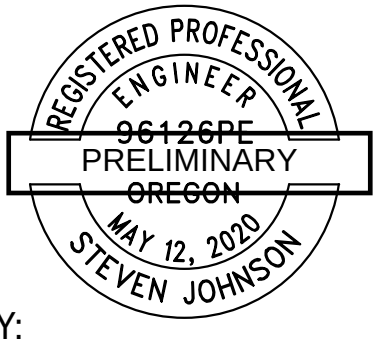
MULTIFAMILY DEVELOPMENT

At

3021 & 3027 D STREET NE

SALEM, OR. 97301

August 21st, 2024



PREPARED BY:

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I. PURPOSE OF REPORT

This report describes the proposed improvements compliance with the City of Salem Stormwater Design Handbook for Developers and Large Projects.

II. PROJECT DESCRIPTION

The site is located at 3021 & 3027 D Street NE in the City of Salem. The property is bordered by D Street NE to the south with private property to the west and north.

A. EXISTING CONDITION

The existing site is currently vacant with a portion of grass and an existing driveway made of concrete. Gravel can also be found on a portion of the site just east of the existing properties. The northeast portion of the site was found to have higher elevations which then slopes toward the northwest portion of the site. South of this portion of the site, is generally flat but slopes slightly towards the south.

The existing site is not located within a FEMA flood zone overlay per FIRM Map 41047C0375G, effective 1/19/2000.

B. PROPOSED CONDITION

The proposed development will be a new 3-story 12-unit multifamily building, with a proposed parking lot and proposed stormwater infrastructure. Where the parking lot is located, the draining pattern will generally remain the same, draining from the northeast portion of the lot to the west where the proposed rain garden will be located.

In the northeastern section of the site, there will be a parking lot that slopes downward toward the north, directing runoff into the bioswale. Simultaneously, the northwestern portion of the site will slope into the rain garden. The proposed rain garden and bioswale serve to address the site's zero-infiltration rate, as indicated in the Geotechnical Report (Branch Engineering Project No. 24-1447). Any excess water from the rain garden and bioswale will flow to the curb along D Street NE. Importantly, the total post-development flow rate will not exceed the predevelopment flow rate.

There is existing runon from the adjacent development, and although the proposed combination swale is not sized for the existing development, the overflow conveyance system has been sized to anticipate the small amount of runon.

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Geotechnical Report:

Branch Engineering, dated May 22, 2024
Project No. 24-1447

Infiltration Rates:

Table 1: Infiltration Test Results

Test ID	*Soil Description*	*Test Depth (inches)*	*Infiltration Rate (in/hr)*
IT-1	Light Brown - Clayey Silt (ML/CL)	56	0
IT-2	Light Brown – Clayey Silt (ML/CL)	58	0

Groundwater:
Groundwater was not encountered at the explored depth of 7-feet. One well log Mari 66067 showed no groundwater to a depth of 22-feet.

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III. METHODOLOGY

The City of Salem's stormwater design handbook for developers and large projects, and Chapter 71 of the Salem Revised Code (SRC) require the following;

Flow Control Requirements

- Stormwater detention facilities must be designed such that the post-development peak runoff rate is equal to or less than the pre-development peak runoff rate for half of the 2-year, 24-hour storm and the 10-year, 24-hour storm, 25-year and 100-year 24-hour storm event.

- The detention volume for a volume-based stormwater flow control facility (such as dry detention basin) shall be sufficient to detain a 100-year design storm event without overflow.

Water Quality Treatment Requirements

- Stormwater treatment facilities must be designed to treat 80% of the average annual rainfall using the water quality design storm event of 1.38 inches in 24 hours.

GSI Requirements

The City of Salem requires large projects to apply GIS to the maximum extent feasible (MEF). The MEF requirements are;

- The total area of the site covered by GSI facilities is at least 10 percent of the combined amount of new plus replaced impervious surfaces on the entire site or;

- GSI is used to fully mitigate the impacts of stormwater runoff from at least 80 percent of the total new plus replaced impervious surfaces.

The proposed development will utilize an infiltration rain garden to mitigate 80 percent of the total new impervious surface area.

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IV. CALCULATIONS

The development will be designed in accordance with the Design Standards in Division 004, Appendix D. The Santa Barbara Urban Hydrograph (SBUH) method will be the selected methodology used in the computer program HydroCAD Version 10.20. The following parameters were inputted;

Storm Type: *Type 1A Rainfall Distribution*
Soil Group: *Group C*

Curve Number:

Land Cover Category	Curve Numbers for Hydrologic Soil Group			
	A	B	C	D
Impervious Surface	**98**	**98**	**98**	**98**
Pervious Land Cover				
Pre-developed	35	58	72	79
Unamended Soils	72	82	87	89
Amended Soils	39	61	74	80

Rainfall Depth:

24-hour Rainfall Depths for Salem	
Design Storm Event	**Precipitation (inches/24 hours)**
WQ Event	1.38
2-year	2.20
10-year	3.20
100-year	4.40

The 25-year 24-hour storm event precipitation is 3.6 in/24 hr per PWDS Table 4D-3

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V. SUMMARY

The proposed development will implement a combination swale per City Std. No. 219 at the northwest corner of the site. A low flow pipe has been designed, with an orifice control, to reduce the post development flow rate to not exceed the pre development flow rate, as demonstrated below. The combination swale has been sized with a bottom surface area of 700 square feet.

Lastly, the GSI combination swale has been sized to properly treat the Water Quality Storm Event of 1.38 in/hr. The tables below provide the summary of calculations derived using HydroCAD. Please refer to the Appendix for the complete calculations.

ENGINEERED METHOD SUMMARY										
PRE VS. POST CONSTRUCTION FLOW RATES										
FACILITY ID	PEAK FLOW RATE (CFS)									
	HALF OF THE 2 YEAR STORM		5 YEAR STORM		10 YEAR STORM		25 YEAR STORM		100 YEAR STORM	
PROJECT SITE	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
A	0.1	0.08	0.16	0.09	0.2	0.09	0.25	0.1	0.34	0.27

CATCHMENT AND FACILITY TABLE			
AREA	TOTAL AREA (SF)/(AC.)	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)
A	19,553	13,687	5,866

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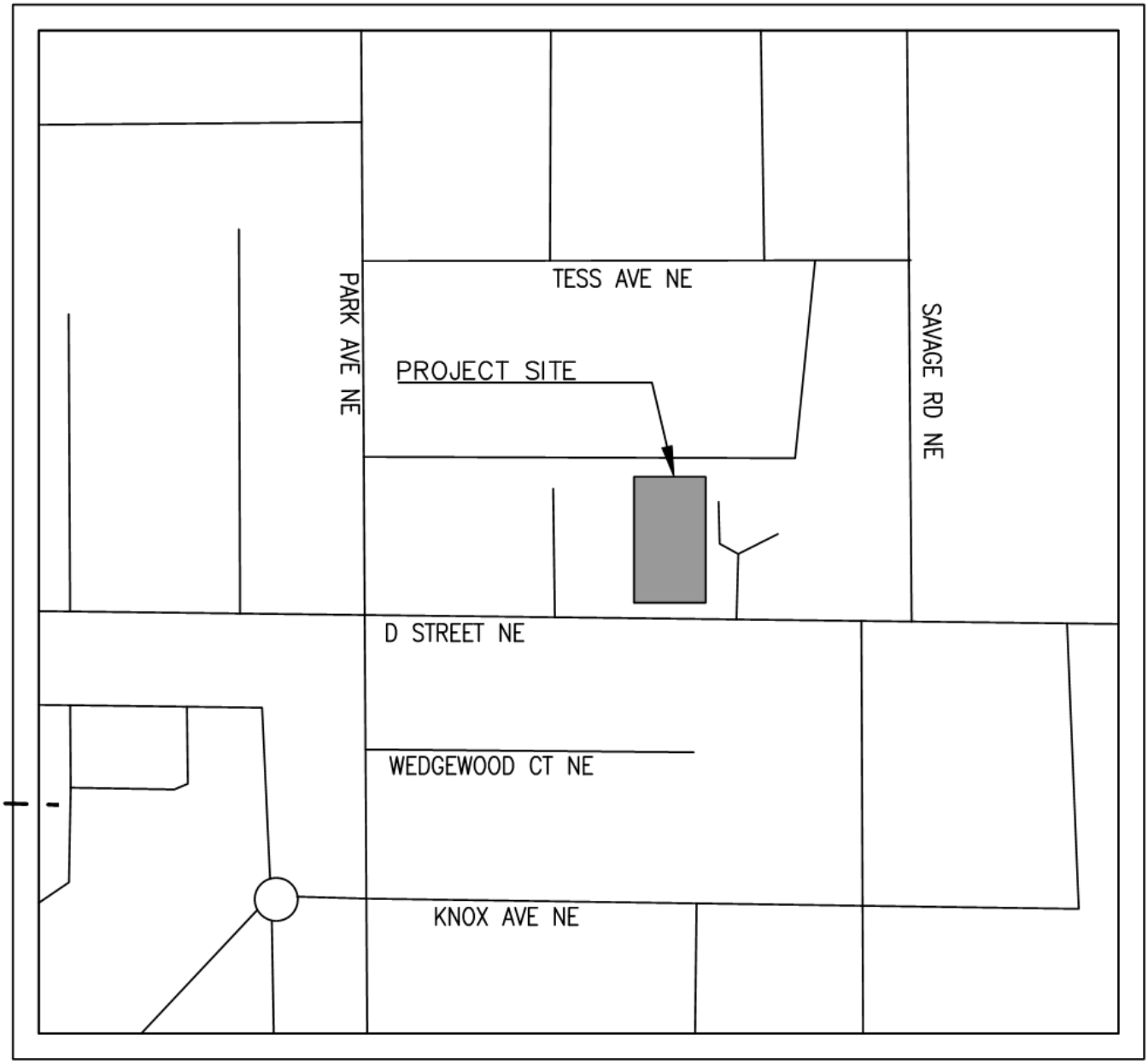
APPENDIX A – MAPS



VICINITY MAP
NOT TO SCALE

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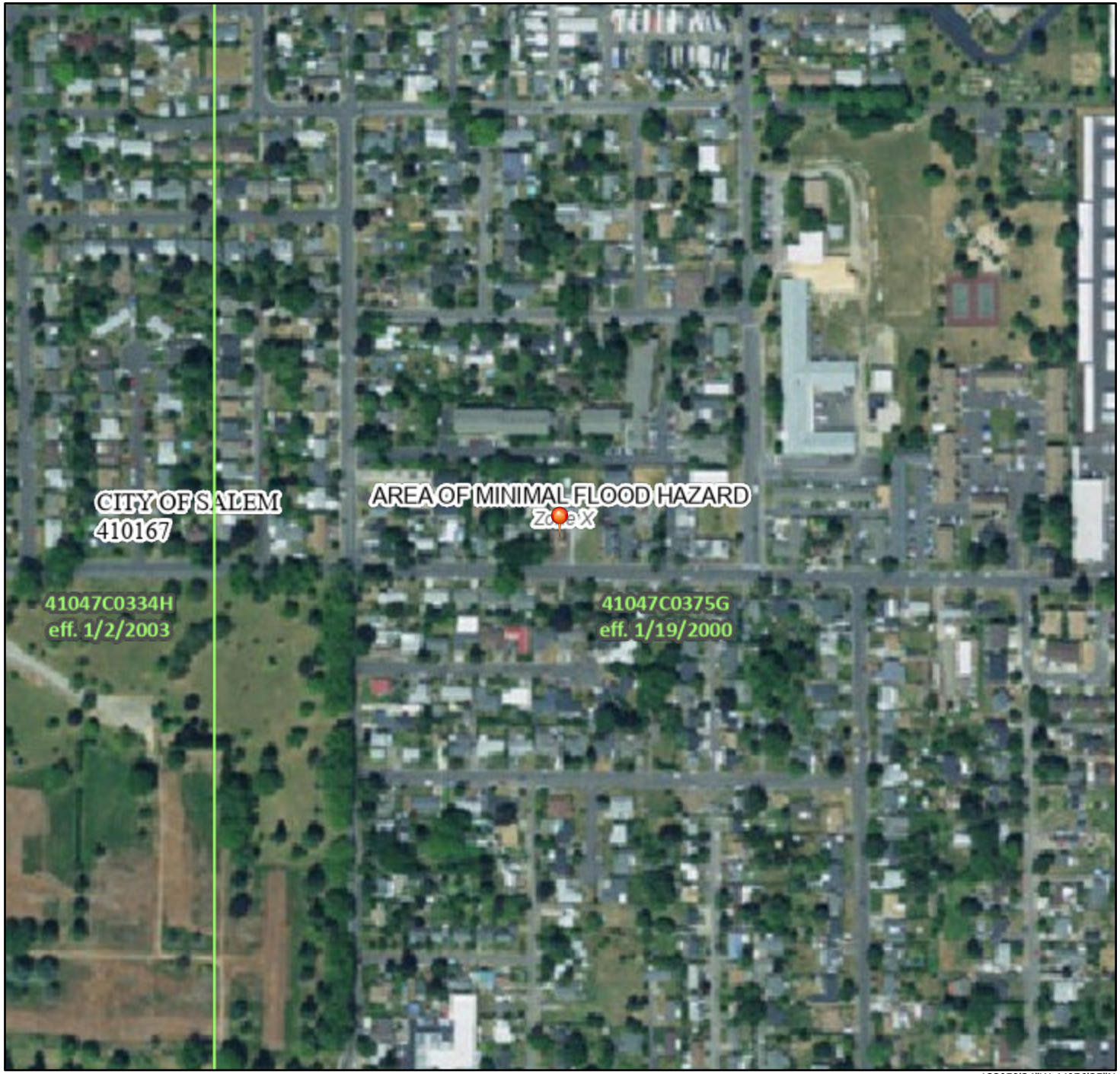
National Flood Hazard Layer FIRMette

123°0'11"W 44°56'50"N



122°59'34"W 44°56'25"N

Feet

0 250 500 1,000 1,500 2,000

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 7/23/2024 at 6:30 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

APPENDIX B – CALCULATIONS

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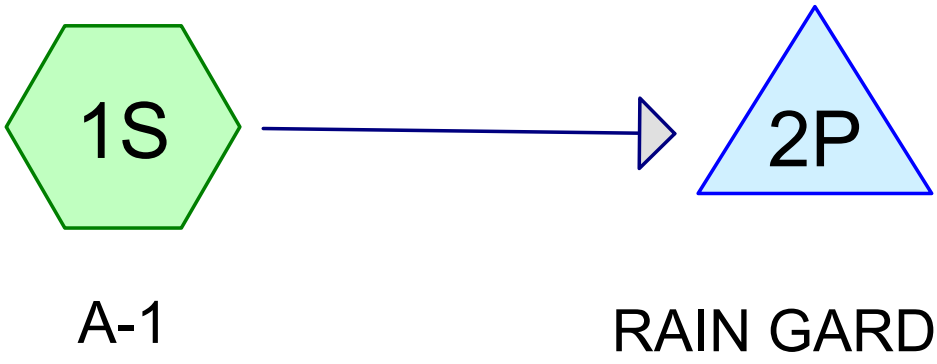
POST DEVELOPMENT HYDROCAD

THE ELEVATIONS SHOWN HEREIN ARE ARBITARY AND USED FOR CALCULATION PURPOSES ONLY



Subcat Reach Pond Link

Routing Diagram for Post_Development_00330
Prepared by 7 Oaks Engineering, Inc, Printed 8/20/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Yr	Type IA 24-hr		Default	24.00	1	2.20	2
2	5-Yr	Type IA 24-hr		Default	24.00	1	2.80	2
3	10-Yr	Type IA 24-hr		Default	24.00	1	3.20	2
4	25-Yr	Type IA 24-hr		Default	24.00	1	3.60	2
5	100-Yr	Type IA 24-hr		Default	24.00	1	4.40	2
6	WQV	Type IA 24-hr		Default	24.00	1	1.38	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.135	86	<50% Grass cover, Poor, HSG C (1S)
0.314	98	Paved parking, HSG C (1S)
0.449	**94**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.449	HSG C	1S
0.000	HSG D	
0.000	Other	
0.449		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.135	0.000	0.000	0.135	<50% Grass cover, Poor	1S
0.000	0.000	0.314	0.000	0.000	0.314	Paved parking	1S
0.000	**0.000**	**0.449**	**0.000**	**0.000**	**0.449**	**TOTAL AREA**	

Pipe Listing (all nodes)

Line#	Node Number	In-Invert (feet)	Out-Invert (feet)	Length (feet)	Slope (ft/ft)	n	Width (inches)	Diam/Height (inches)	Inside-Fill (inches)	Node Name
1	2P	203.18	203.17	2.0	0.0050	0.013	0.0	4.0	0.0	
2	2P	203.18	203.17	2.0	0.0050	0.013	0.0	1.5	0.0	

Time span=0.01-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: A-1 Runoff Area=19,553 sf 70.00% Impervious Runoff Depth=1.58"
Flow Length=175' Tc=5.0 min CN=94 Runoff=0.19 cfs 0.059 af

Pond 2P: RAIN GARDEN Peak Elev=205.04' Storage=339 cf Inflow=0.19 cfs 0.059 af
Outflow=0.08 cfs 0.059 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.059 af Average Runoff Depth = 1.58"
30.00% Pervious = 0.135 ac 70.00% Impervious = 0.314 ac

Summary for Subcatchment 1S: A-1

[49] Hint: Tc<2dt may require smaller dt

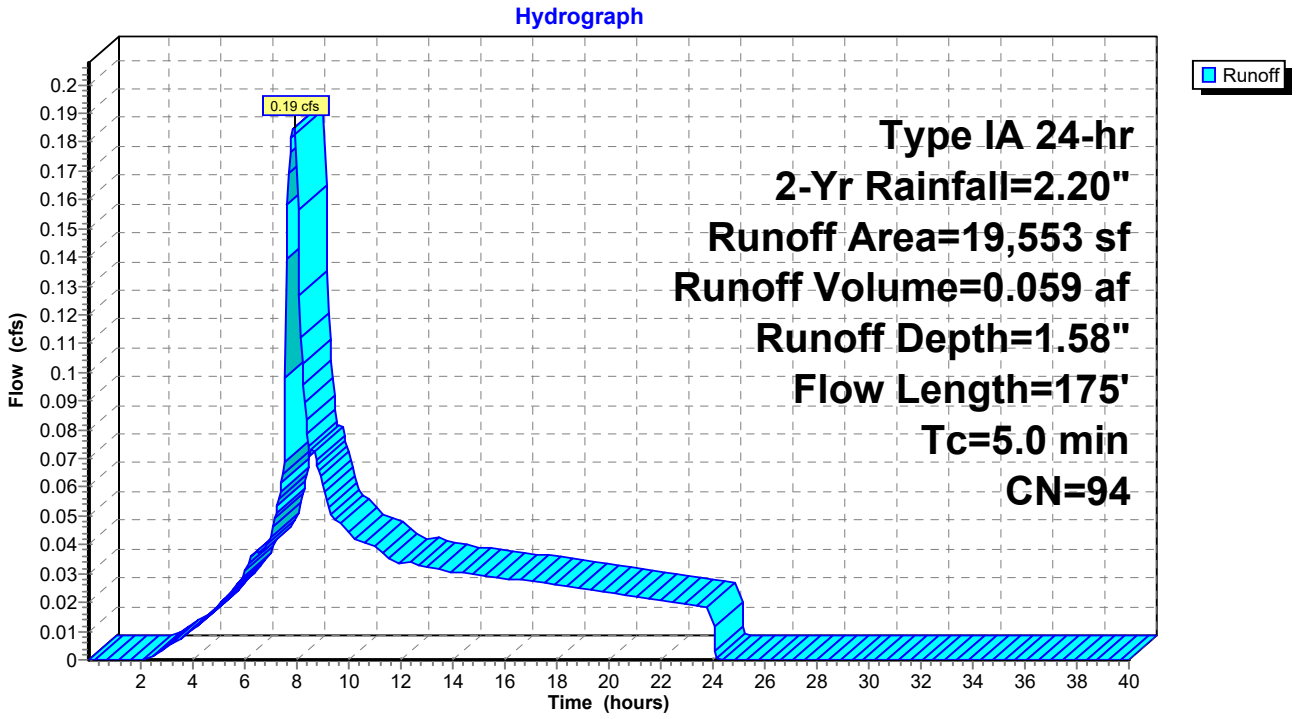
Runoff = 0.19 cfs @ 7.90 hrs, Volume= 0.059 af, Depth= 1.58"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs
Type IA 24-hr 2-Yr Rainfall=2.20"

Area (sf)	CN	Description
13,687	98	Paved parking, HSG C
5,866	86	<50% Grass cover, Poor, HSG C
19,553	94	Weighted Average
5,866	86	30.00% Pervious Area
13,687	98	70.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	175		0.58		**Direct Entry,**

Subcatchment 1S: A-1



Summary for Pond 2P: RAIN GARDEN

Inflow Area = 0.449 ac, 70.00% Impervious, Inflow Depth = 1.58" for 2-Yr event
Inflow = 0.19 cfs @ 7.90 hrs, Volume= 0.059 af
Outflow = 0.08 cfs @ 8.40 hrs, Volume= 0.059 af, Atten= 57%, Lag= 30.2 min
Primary = 0.08 cfs @ 8.40 hrs, Volume= 0.059 af

Routing by Stor-Ind method, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs / 2
Peak Elev= 205.04' @ 8.40 hrs Surf.Area= 700 sf Storage= 339 cf
Flood Elev= 206.34' Surf.Area= 700 sf Storage= 1,057 cf

Plug-Flow detention time= 47.4 min calculated for 0.059 af (100% of inflow)
Center-of-Mass det. time= 48.0 min (781.8 - 733.7)

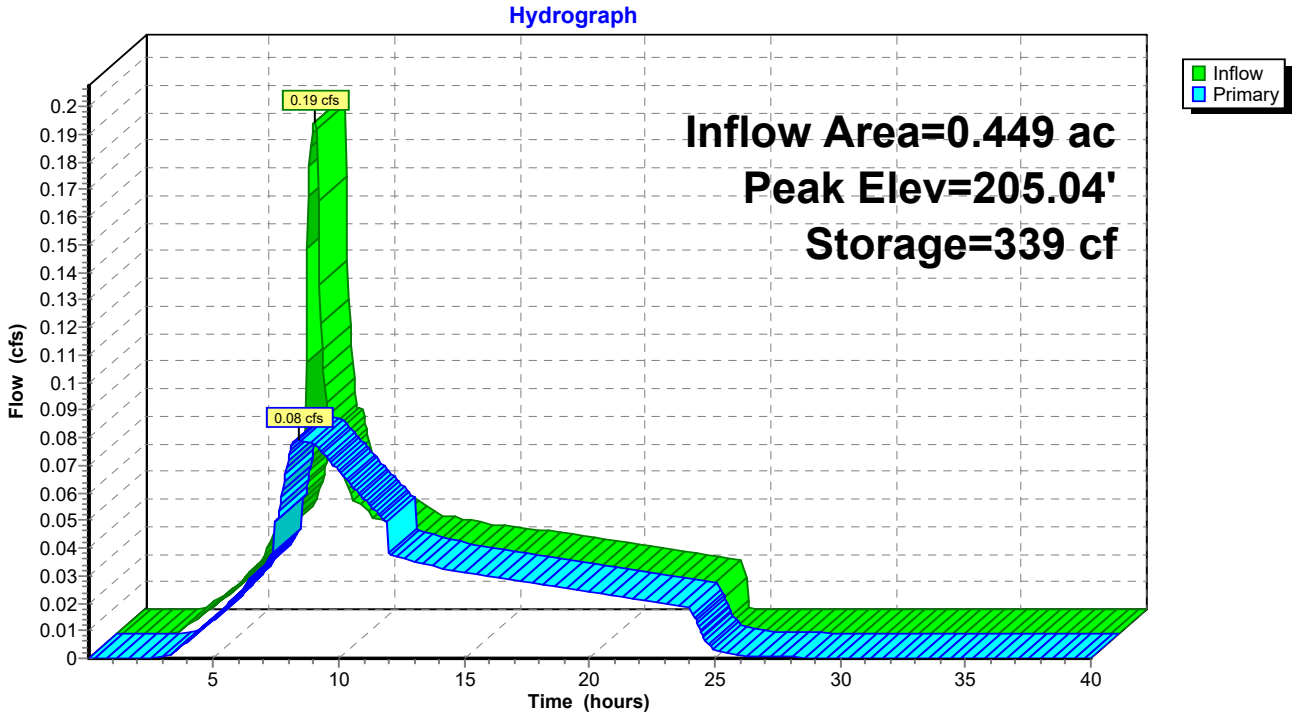
Volume	Invert	Avail.Storage	Storage Description
#1	203.18'	1,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.18	700	157.0	0.0	0	0	700
203.68	700	157.0	30.0	105	105	779
203.93	700	157.0	0.0	0	105	818
205.43	700	157.0	30.0	315	420	1,053
206.18	700	157.0	100.0	525	945	1,171
206.34	700	157.0	100.0	112	1,057	1,196

Device	Routing	Invert	Outlet Devices
#1	Device 2	206.18'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.18'	**4.0" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#3	Device 2	203.18'	**1.5" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.01 sf

Primary OutFlow Max=0.08 cfs @ 8.40 hrs HW=205.04' (Free Discharge)
└**2=Culvert** (Passes 0.08 cfs of 0.55 cfs potential flow)
  ├**1=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Culvert** (Inlet Controls 0.08 cfs @ 6.46 fps)

Pond 2P: RAIN GARDEN



Time span=0.01-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: A-1 Runoff Area=19,553 sf 70.00% Impervious Runoff Depth=2.16"
Flow Length=175' Tc=5.0 min CN=94 Runoff=0.25 cfs 0.081 af

Pond 2P: RAIN GARDEN Peak Elev=205.58' Storage=528 cf Inflow=0.25 cfs 0.081 af
Outflow=0.09 cfs 0.081 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.081 af Average Runoff Depth = 2.16"
30.00% Pervious = 0.135 ac 70.00% Impervious = 0.314 ac

Summary for Subcatchment 1S: A-1

[49] Hint: Tc<2dt may require smaller dt

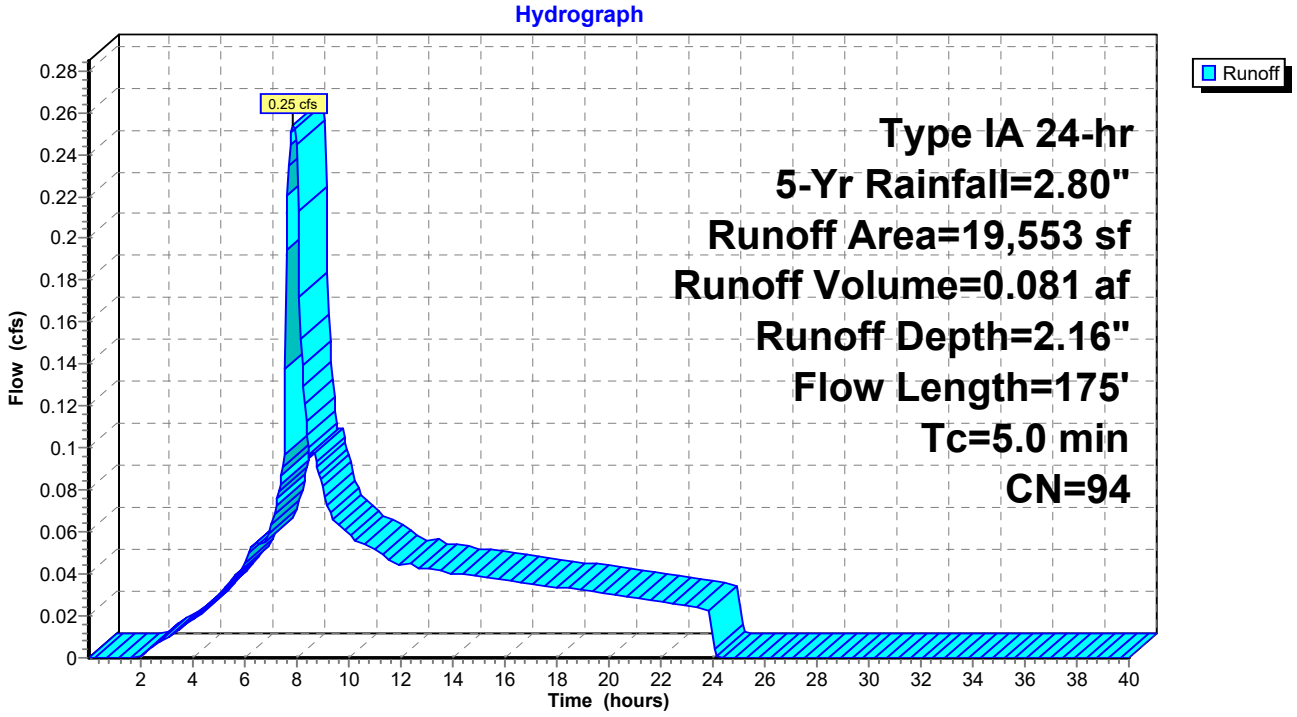
Runoff = 0.25 cfs @ 7.89 hrs, Volume= 0.081 af, Depth= 2.16"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs
Type IA 24-hr 5-Yr Rainfall=2.80"

Area (sf)	CN	Description
13,687	98	Paved parking, HSG C
5,866	86	<50% Grass cover, Poor, HSG C
19,553	94	Weighted Average
5,866	86	30.00% Pervious Area
13,687	98	70.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	175		0.58		**Direct Entry,**

Subcatchment 1S: A-1



Summary for Pond 2P: RAIN GARDEN

Inflow Area = 0.449 ac, 70.00% Impervious, Inflow Depth = 2.16" for 5-Yr event
Inflow = 0.25 cfs @ 7.89 hrs, Volume= 0.081 af
Outflow = 0.09 cfs @ 8.81 hrs, Volume= 0.081 af, Atten= 64%, Lag= 55.5 min
Primary = 0.09 cfs @ 8.81 hrs, Volume= 0.081 af

Routing by Stor-Ind method, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs / 2
Peak Elev= 205.58' @ 8.81 hrs Surf.Area= 700 sf Storage= 528 cf
Flood Elev= 206.34' Surf.Area= 700 sf Storage= 1,057 cf

Plug-Flow detention time= 57.7 min calculated for 0.081 af (100% of inflow)
Center-of-Mass det. time= 57.9 min (776.3 - 718.4)

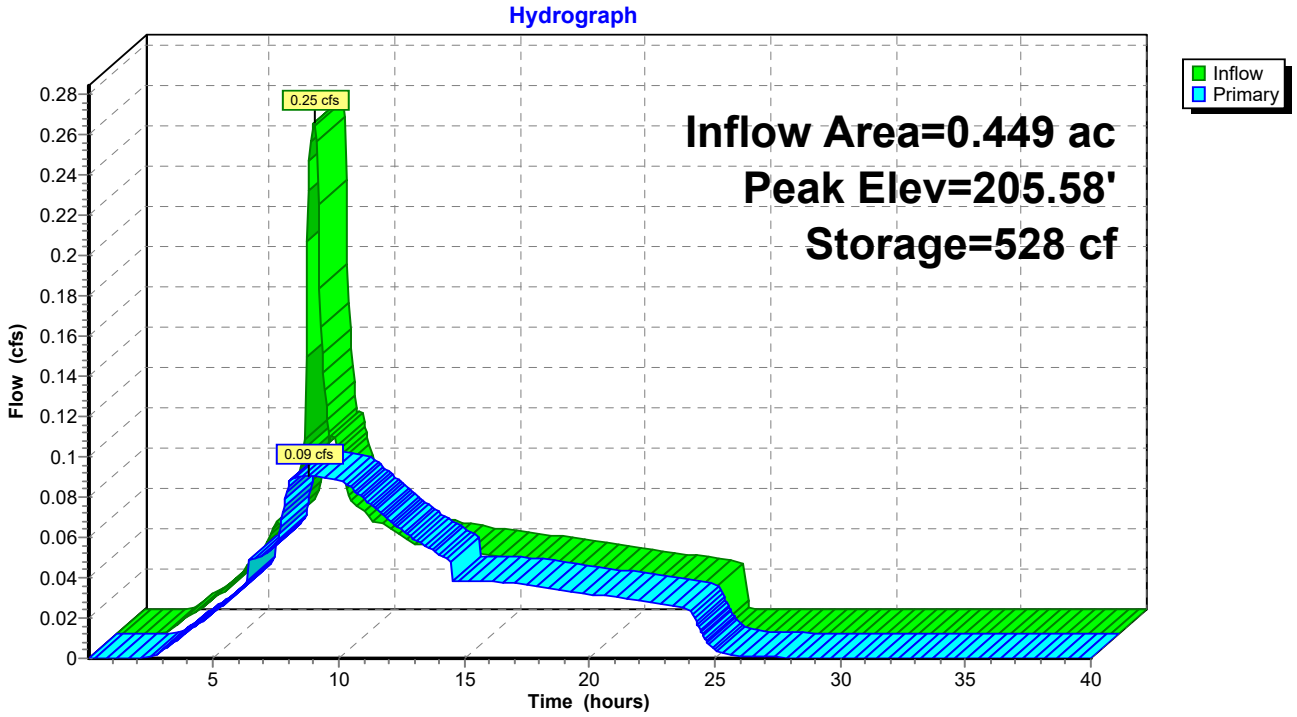
Volume	Invert	Avail.Storage	Storage Description
#1	203.18'	1,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.18	700	157.0	0.0	0	0	700
203.68	700	157.0	30.0	105	105	779
203.93	700	157.0	0.0	0	105	818
205.43	700	157.0	30.0	315	420	1,053
206.18	700	157.0	100.0	525	945	1,171
206.34	700	157.0	100.0	112	1,057	1,196

Device	Routing	Invert	Outlet Devices
#1	Device 2	206.18'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.18'	**4.0" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#3	Device 2	203.18'	**1.5" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.01 sf

Primary OutFlow Max=0.09 cfs @ 8.81 hrs HW=205.58' (Free Discharge)
└**2=Culvert** (Passes 0.09 cfs of 0.63 cfs potential flow)
  ├**1=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Culvert** (Inlet Controls 0.09 cfs @ 7.37 fps)

Pond 2P: RAIN GARDEN



Time span=0.01-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: A-1 Runoff Area=19,553 sf 70.00% Impervious Runoff Depth=2.54"
Flow Length=175' Tc=5.0 min CN=94 Runoff=0.30 cfs 0.095 af

Pond 2P: RAIN GARDEN Peak Elev=205.82' Storage=694 cf Inflow=0.30 cfs 0.095 af
Outflow=0.09 cfs 0.095 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.095 af Average Runoff Depth = 2.54"
30.00% Pervious = 0.135 ac 70.00% Impervious = 0.314 ac

Summary for Subcatchment 1S: A-1

[49] Hint: Tc<2dt may require smaller dt

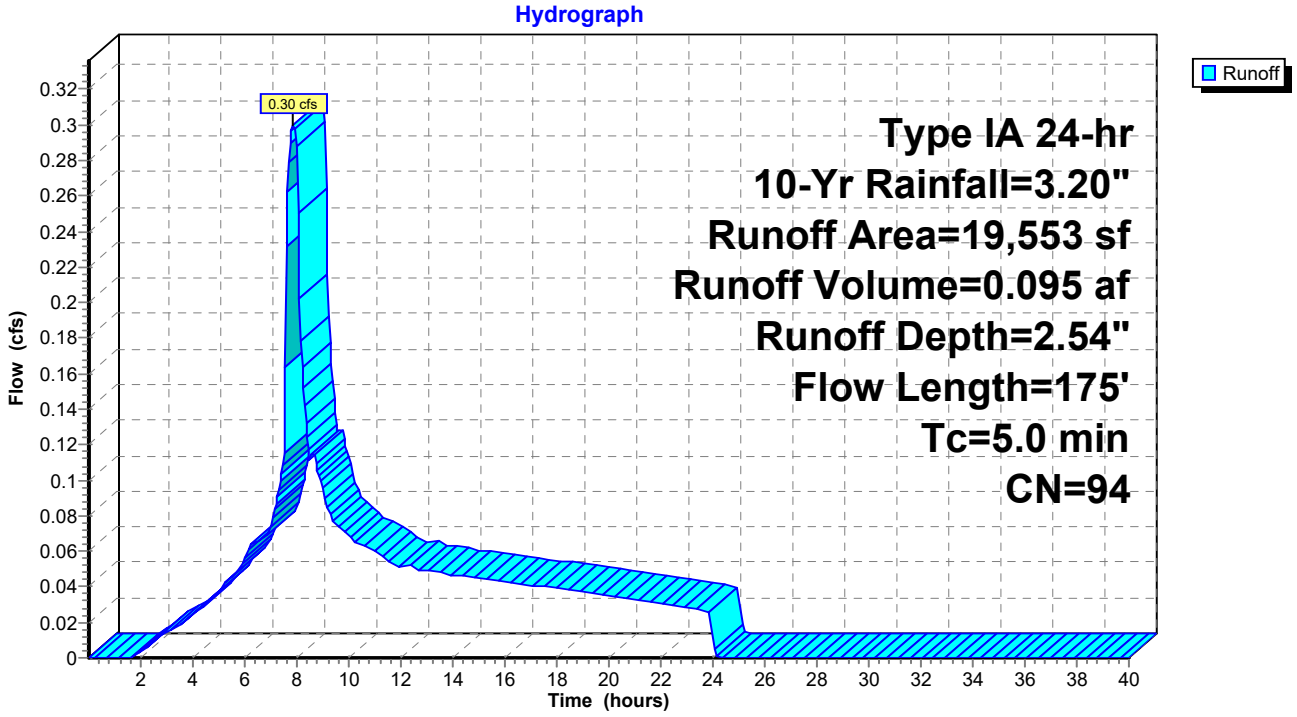
Runoff = 0.30 cfs @ 7.88 hrs, Volume= 0.095 af, Depth= 2.54"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs
Type IA 24-hr 10-Yr Rainfall=3.20"

Area (sf)	CN	Description
13,687	98	Paved parking, HSG C
5,866	86	<50% Grass cover, Poor, HSG C
19,553	94	Weighted Average
5,866	86	30.00% Pervious Area
13,687	98	70.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	175		0.58		**Direct Entry,**

Subcatchment 1S: A-1



Summary for Pond 2P: RAIN GARDEN

Inflow Area = 0.449 ac, 70.00% Impervious, Inflow Depth = 2.54" for 10-Yr event
Inflow = 0.30 cfs @ 7.88 hrs, Volume= 0.095 af
Outflow = 0.09 cfs @ 8.99 hrs, Volume= 0.095 af, Atten= 68%, Lag= 66.7 min
Primary = 0.09 cfs @ 8.99 hrs, Volume= 0.095 af

Routing by Stor-Ind method, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs / 2
Peak Elev= 205.82' @ 8.99 hrs Surf.Area= 700 sf Storage= 694 cf
Flood Elev= 206.34' Surf.Area= 700 sf Storage= 1,057 cf

Plug-Flow detention time= 69.1 min calculated for 0.095 af (100% of inflow)
Center-of-Mass det. time= 68.1 min (778.8 - 710.7)

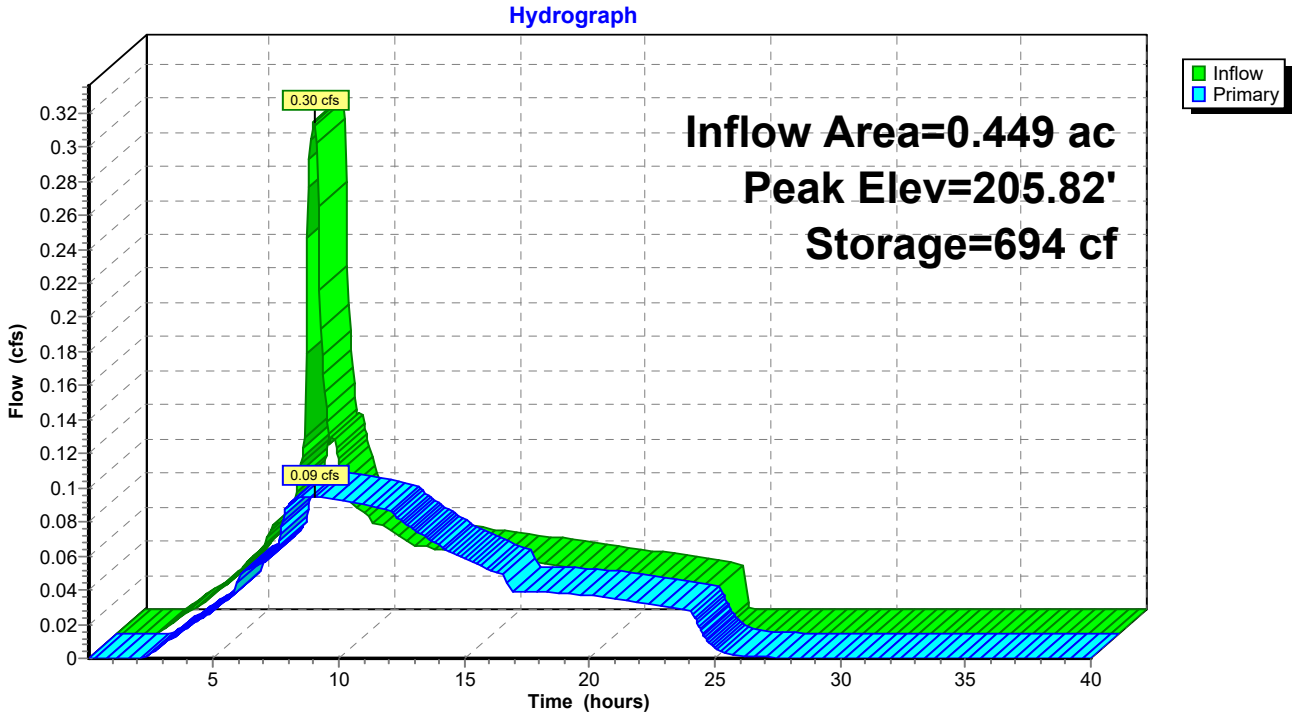
Volume	Invert	Avail.Storage	Storage Description
#1	203.18'	1,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.18	700	157.0	0.0	0	0	700
203.68	700	157.0	30.0	105	105	779
203.93	700	157.0	0.0	0	105	818
205.43	700	157.0	30.0	315	420	1,053
206.18	700	157.0	100.0	525	945	1,171
206.34	700	157.0	100.0	112	1,057	1,196

Device	Routing	Invert	Outlet Devices
#1	Device 2	206.18'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.18'	**4.0" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#3	Device 2	203.18'	**1.5" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.01 sf

Primary OutFlow Max=0.09 cfs @ 8.99 hrs HW=205.82' (Free Discharge)
└**2=Culvert** (Passes 0.09 cfs of 0.66 cfs potential flow)
  ├**1=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Culvert** (Inlet Controls 0.09 cfs @ 7.73 fps)

Pond 2P: RAIN GARDEN



Time span=0.01-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: A-1 Runoff Area=19,553 sf 70.00% Impervious Runoff Depth=2.93"
Flow Length=175' Tc=5.0 min CN=94 Runoff=0.35 cfs 0.110 af

Pond 2P: RAIN GARDEN Peak Elev=206.08' Storage=874 cf Inflow=0.35 cfs 0.110 af
Outflow=0.10 cfs 0.110 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.110 af Average Runoff Depth = 2.93"
30.00% Pervious = 0.135 ac 70.00% Impervious = 0.314 ac

Summary for Subcatchment 1S: A-1

[49] Hint: Tc<2dt may require smaller dt

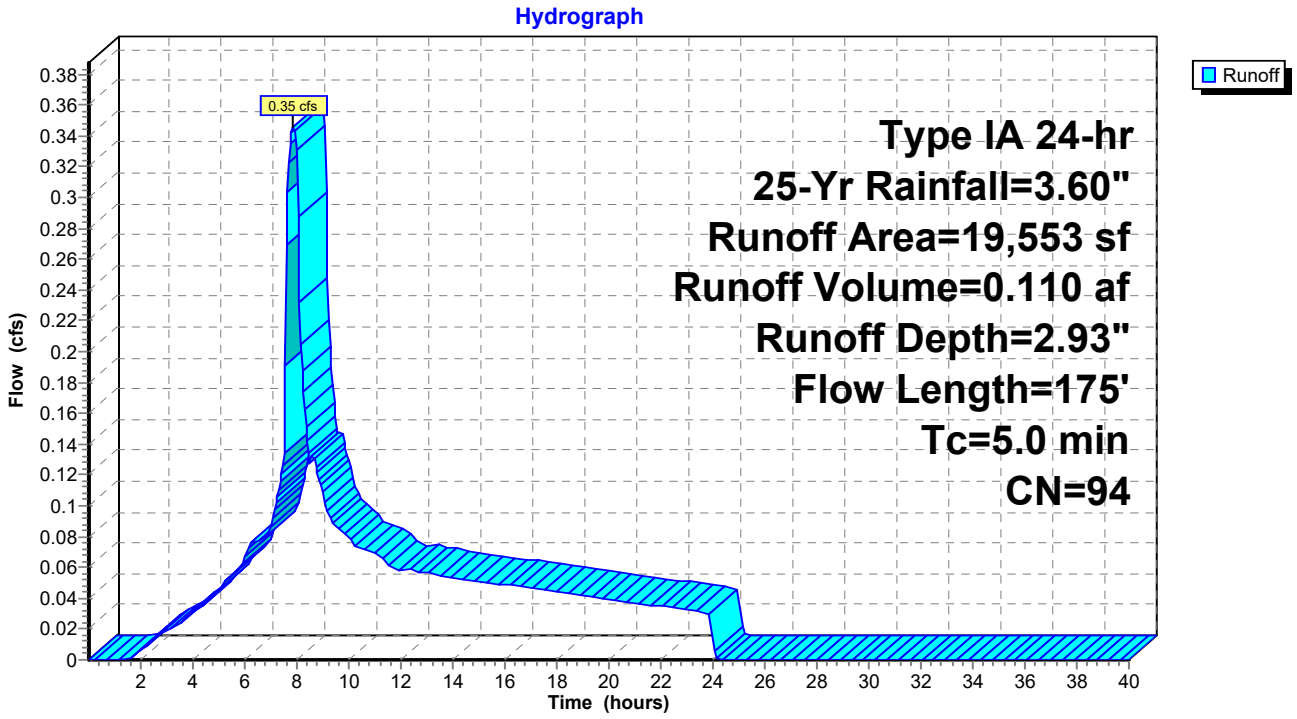
Runoff = 0.35 cfs @ 7.88 hrs, Volume= 0.110 af, Depth= 2.93"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Yr Rainfall=3.60"

Area (sf)	CN	Description
13,687	98	Paved parking, HSG C
5,866	86	<50% Grass cover, Poor, HSG C
19,553	94	Weighted Average
5,866	86	30.00% Pervious Area
13,687	98	70.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	175		0.58		**Direct Entry,**

Subcatchment 1S: A-1



Summary for Pond 2P: RAIN GARDEN

Inflow Area = 0.449 ac, 70.00% Impervious, Inflow Depth = 2.93" for 25-Yr event
Inflow = 0.35 cfs @ 7.88 hrs, Volume= 0.110 af
Outflow = 0.10 cfs @ 9.13 hrs, Volume= 0.110 af, Atten= 71%, Lag= 75.2 min
Primary = 0.10 cfs @ 9.13 hrs, Volume= 0.110 af

Routing by Stor-Ind method, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs / 2
Peak Elev= 206.08' @ 9.13 hrs Surf.Area= 700 sf Storage= 874 cf
Flood Elev= 206.34' Surf.Area= 700 sf Storage= 1,057 cf

Plug-Flow detention time= 80.7 min calculated for 0.110 af (100% of inflow)
Center-of-Mass det. time= 82.6 min (786.9 - 704.4)

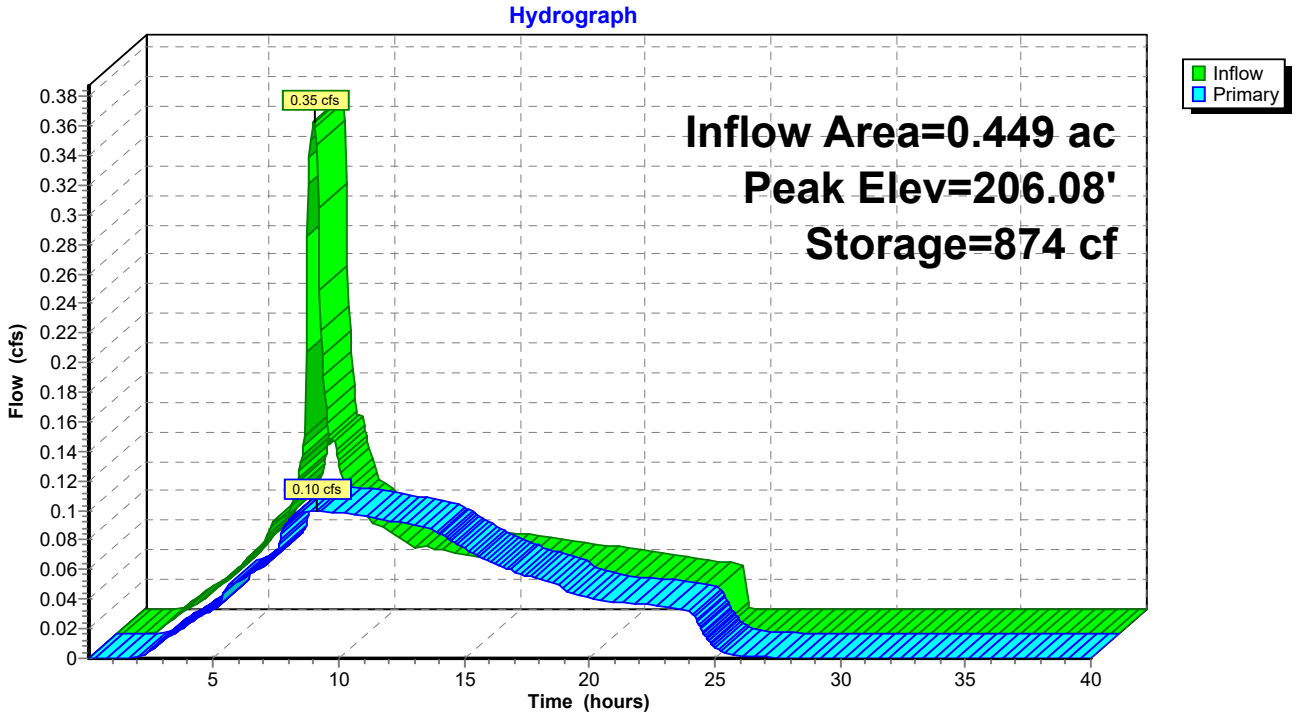
Volume	Invert	Avail.Storage	Storage Description
#1	203.18'	1,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.18	700	157.0	0.0	0	0	700
203.68	700	157.0	30.0	105	105	779
203.93	700	157.0	0.0	0	105	818
205.43	700	157.0	30.0	315	420	1,053
206.18	700	157.0	100.0	525	945	1,171
206.34	700	157.0	100.0	112	1,057	1,196

Device	Routing	Invert	Outlet Devices
#1	Device 2	206.18'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.18'	**4.0" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#3	Device 2	203.18'	**1.5" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.01 sf

Primary OutFlow Max=0.10 cfs @ 9.13 hrs HW=206.08' (Free Discharge)
└**2=Culvert** (Passes 0.10 cfs of 0.69 cfs potential flow)
  ├**1=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Culvert** (Inlet Controls 0.10 cfs @ 8.11 fps)

Pond 2P: RAIN GARDEN



Time span=0.01-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: A-1 Runoff Area=19,553 sf 70.00% Impervious Runoff Depth=3.72"
Flow Length=175' Tc=5.0 min CN=94 Runoff=0.44 cfs 0.139 af

Pond 2P: RAIN GARDEN Peak Elev=206.24' Storage=990 cf Inflow=0.44 cfs 0.139 af
Outflow=0.27 cfs 0.139 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.139 af Average Runoff Depth = 3.72"
30.00% Pervious = 0.135 ac 70.00% Impervious = 0.314 ac

Summary for Subcatchment 1S: A-1

[49] Hint: Tc<2dt may require smaller dt

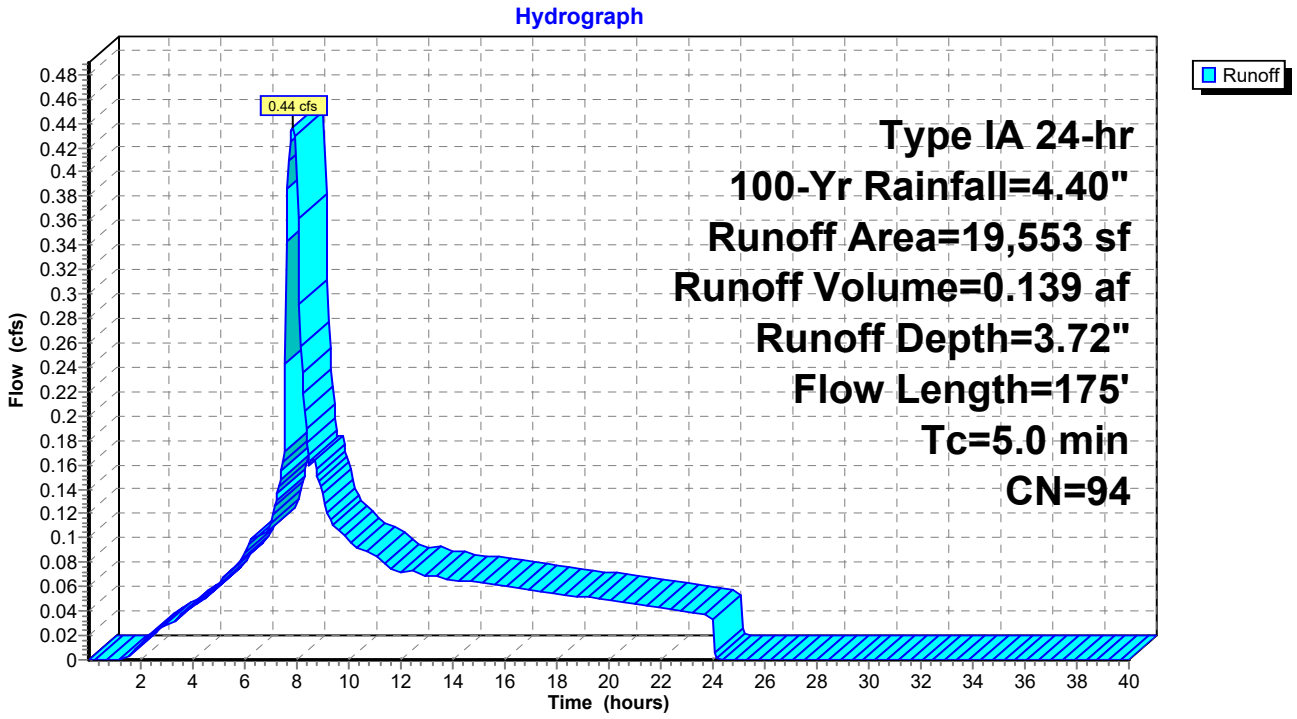
Runoff = 0.44 cfs @ 7.87 hrs, Volume= 0.139 af, Depth= 3.72"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs
Type IA 24-hr 100-Yr Rainfall=4.40"

Area (sf)	CN	Description
13,687	98	Paved parking, HSG C
5,866	86	<50% Grass cover, Poor, HSG C
19,553	94	Weighted Average
5,866	86	30.00% Pervious Area
13,687	98	70.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	175		0.58		**Direct Entry,**

Subcatchment 1S: A-1



Summary for Pond 2P: RAIN GARDEN

Inflow Area = 0.449 ac, 70.00% Impervious, Inflow Depth = 3.72" for 100-Yr event
Inflow = 0.44 cfs @ 7.87 hrs, Volume= 0.139 af
Outflow = 0.27 cfs @ 8.14 hrs, Volume= 0.139 af, Atten= 38%, Lag= 16.2 min
Primary = 0.27 cfs @ 8.14 hrs, Volume= 0.139 af

Routing by Stor-Ind method, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs / 2
Peak Elev= 206.24' @ 8.14 hrs Surf.Area= 700 sf Storage= 990 cf
Flood Elev= 206.34' Surf.Area= 700 sf Storage= 1,057 cf

Plug-Flow detention time= 89.7 min calculated for 0.139 af (100% of inflow)
Center-of-Mass det. time= 90.5 min (785.0 - 694.5)

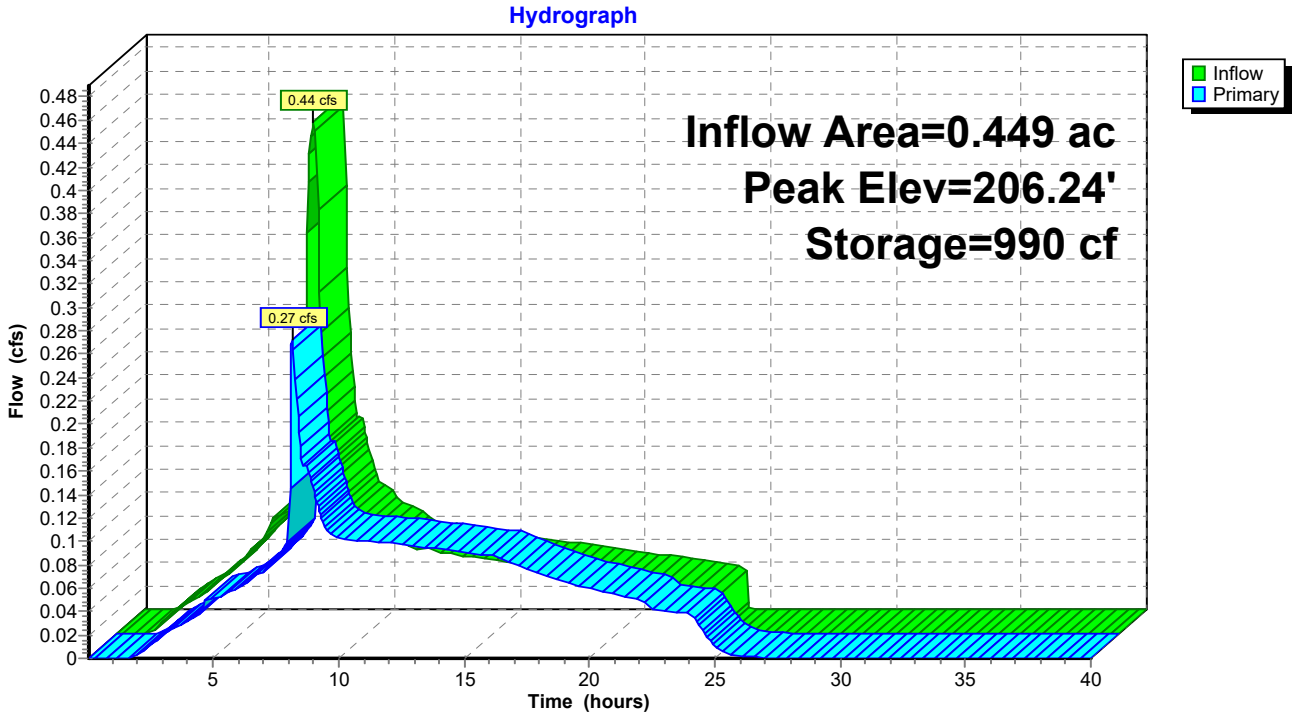
Volume	Invert	Avail.Storage	Storage Description
#1	203.18'	1,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.18	700	157.0	0.0	0	0	700
203.68	700	157.0	30.0	105	105	779
203.93	700	157.0	0.0	0	105	818
205.43	700	157.0	30.0	315	420	1,053
206.18	700	157.0	100.0	525	945	1,171
206.34	700	157.0	100.0	112	1,057	1,196

Device	Routing	Invert	Outlet Devices
#1	Device 2	206.18'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.18'	**4.0" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#3	Device 2	203.18'	**1.5" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.01 sf

Primary OutFlow Max=0.27 cfs @ 8.14 hrs HW=206.24' (Free Discharge)
└**2=Culvert** (Passes 0.27 cfs of 0.72 cfs potential flow)
  ├**1=Orifice/Grate** (Weir Controls 0.17 cfs @ 0.83 fps)
  └**3=Culvert** (Inlet Controls 0.10 cfs @ 8.34 fps)

Pond 2P: RAIN GARDEN



Time span=0.01-40.00 hrs, dt=0.05 hrs, 801 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: A-1 Runoff Area=19,553 sf 70.00% Impervious Runoff Depth=0.83"
Flow Length=175' Tc=5.0 min CN=94 Runoff=0.09 cfs 0.031 af

Pond 2P: RAIN GARDEN Peak Elev=204.09' Storage=138 cf Inflow=0.09 cfs 0.031 af
Outflow=0.05 cfs 0.031 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.031 af Average Runoff Depth = 0.83"
30.00% Pervious = 0.135 ac 70.00% Impervious = 0.314 ac

Summary for Subcatchment 1S: A-1

[49] Hint: Tc<2dt may require smaller dt

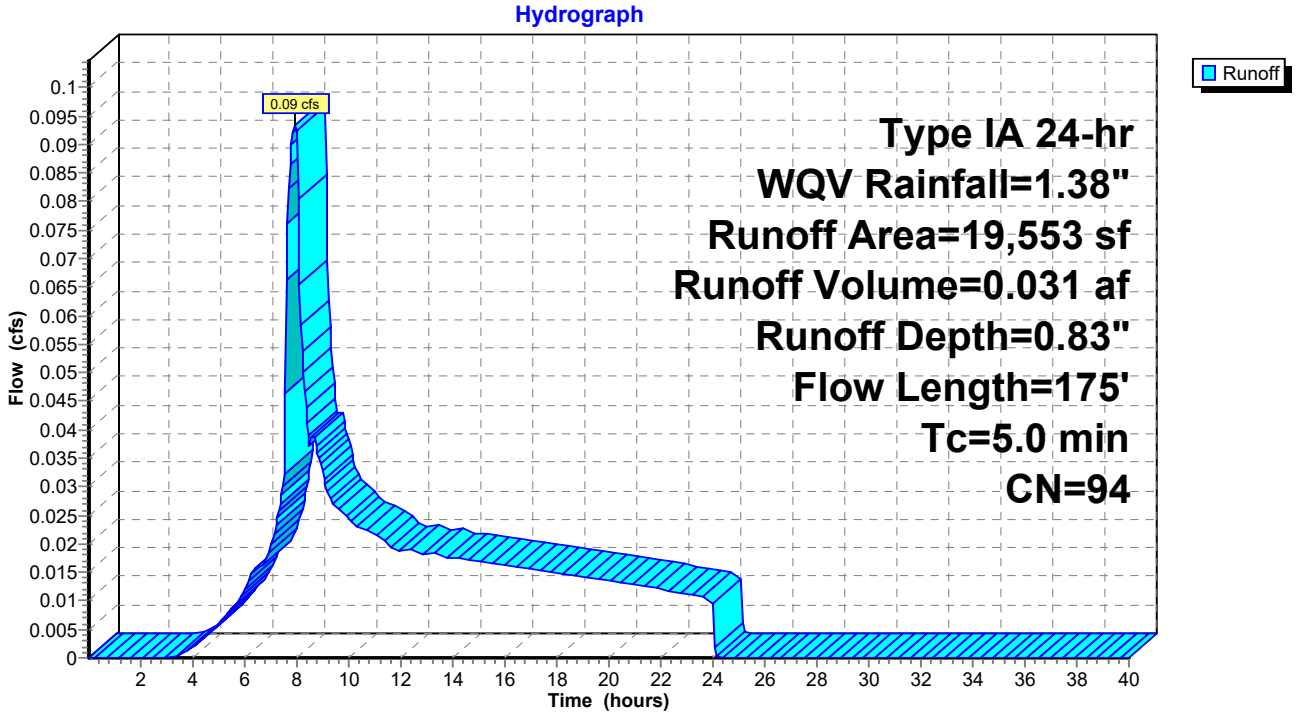
Runoff = 0.09 cfs @ 7.93 hrs, Volume= 0.031 af, Depth= 0.83"
Routed to Pond 2P : RAIN GARDEN

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs
Type IA 24-hr WQV Rainfall=1.38"

Area (sf)	CN	Description
13,687	98	Paved parking, HSG C
5,866	86	<50% Grass cover, Poor, HSG C
19,553	94	Weighted Average
5,866	86	30.00% Pervious Area
13,687	98	70.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0	175		0.58		**Direct Entry,**

Subcatchment 1S: A-1



Summary for Pond 2P: RAIN GARDEN

Inflow Area = 0.449 ac, 70.00% Impervious, Inflow Depth = 0.83" for WQV event
Inflow = 0.09 cfs @ 7.93 hrs, Volume= 0.031 af
Outflow = 0.05 cfs @ 8.21 hrs, Volume= 0.031 af, Atten= 42%, Lag= 16.4 min
Primary = 0.05 cfs @ 8.21 hrs, Volume= 0.031 af

Routing by Stor-Ind method, Time Span= 0.01-40.01 hrs, dt= 0.05 hrs / 2
Peak Elev= 204.09' @ 8.21 hrs Surf.Area= 700 sf Storage= 138 cf
Flood Elev= 206.34' Surf.Area= 700 sf Storage= 1,057 cf

Plug-Flow detention time= 40.5 min calculated for 0.031 af (100% of inflow)
Center-of-Mass det. time= 40.9 min (810.1 - 769.1)

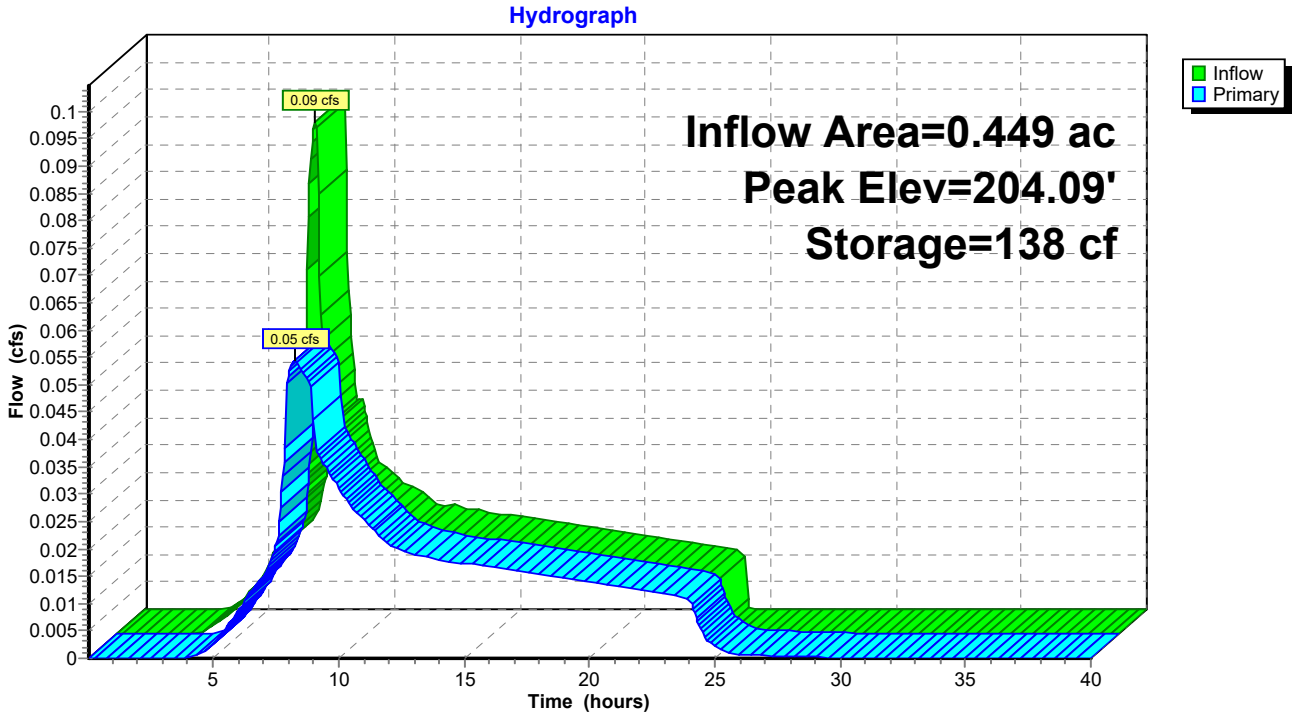
Volume	Invert	Avail.Storage	Storage Description
#1	203.18'	1,057 cf	**Custom Stage Data (Irregular)** Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Voids (%)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
203.18	700	157.0	0.0	0	0	700
203.68	700	157.0	30.0	105	105	779
203.93	700	157.0	0.0	0	105	818
205.43	700	157.0	30.0	315	420	1,053
206.18	700	157.0	100.0	525	945	1,171
206.34	700	157.0	100.0	112	1,057	1,196

Device	Routing	Invert	Outlet Devices
#1	Device 2	206.18'	**12.0" Horiz. Orifice/Grate** C= 0.600 Limited to weir flow at low heads
#2	Primary	203.18'	**4.0" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.09 sf
#3	Device 2	203.18'	**1.5" Round Culvert** L= 2.0' Ke= 0.500 Inlet / Outlet Invert= 203.18' / 203.17' S= 0.0050 '/' Cc= 0.900 n= 0.013, Flow Area= 0.01 sf

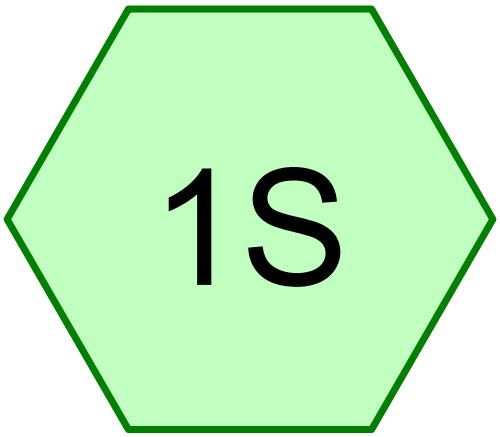
Primary OutFlow Max=0.05 cfs @ 8.21 hrs HW=204.09' (Free Discharge)
└**2=Culvert** (Passes 0.05 cfs of 0.36 cfs potential flow)
  └**1=Orifice/Grate** (Controls 0.00 cfs)
  └**3=Culvert** (Inlet Controls 0.05 cfs @ 4.42 fps)

Pond 2P: RAIN GARDEN



PRE DEVELOPMENT HYDROCAD

THE ELEVATIONS SHOWN HEREIN ARE ARBITARY AND USED FOR CALCULATION PURPOSES ONLY



EX

Subcat Reach Pond Link

Routing Diagram for Pre-Development - 00330
Prepared by 7 Oaks Engineering, Inc, Printed 8/20/2024

Rainfall Events Listing

Event#	Event Name	Storm Type	Curve	Mode	Duration (hours)	B/B	Depth (inches)	AMC
1	2-Yr	Type IA 24-hr		Default	24.00	1	2.20	2
2	5-Yr	Type IA 24-hr		Default	24.00	1	2.80	2
3	10-Yr	Type IA 24-hr		Default	24.00	1	3.20	2
4	25-Yr	Type IA 24-hr		Default	24.00	1	3.60	2
5	100-Yr	Type IA 24-hr		Default	24.00	1	4.40	2
6	WQV	Type IA 24-hr		Default	24.00	1	1.38	2

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.449	86	<50% Grass cover, Poor, HSG C (1S)
0.449	**86**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
0.000	HSG B	
0.449	HSG C	1S
0.000	HSG D	
0.000	Other	
0.449		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.000	0.000	0.449	0.000	0.000	0.449	<50% Grass cover, Poor	1S
0.000	**0.000**	**0.449**	**0.000**	**0.000**	**0.449**	**TOTAL AREA**	

Time span=0.01-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX Runoff Area=19,553 sf 0.00% Impervious Runoff Depth=1.00"
Flow Length=275' Slope=0.0200 '/' Tc=5.0 min CN=86 Runoff=0.10 cfs 0.038 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.038 af Average Runoff Depth = 1.00"
100.00% Pervious = 0.449 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX

[49] Hint: Tc<2dt may require smaller dt

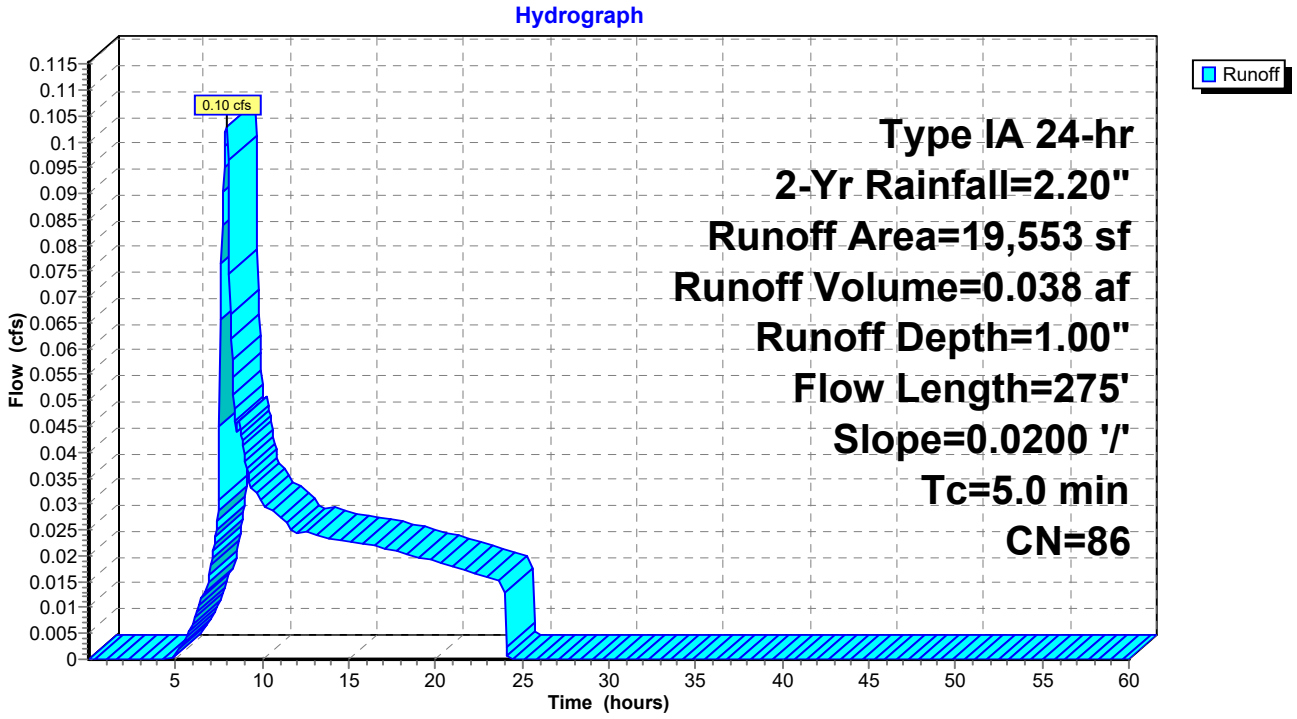
Runoff = 0.10 cfs @ 7.97 hrs, Volume= 0.038 af, Depth= 1.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-60.01 hrs, dt= 0.05 hrs
Type IA 24-hr 2-Yr Rainfall=2.20"

Area (sf)	CN	Description
19,553	86	<50% Grass cover, Poor, HSG C
19,553	86	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	275	0.0200	1.40		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.20"
3.3	275	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1S: EX



Time span=0.01-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX Runoff Area=19,553 sf 0.00% Impervious Runoff Depth=1.49"
Flow Length=275' Slope=0.0200 '/' Tc=5.0 min CN=86 Runoff=0.16 cfs 0.056 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.056 af Average Runoff Depth = 1.49"
100.00% Pervious = 0.449 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX

[49] Hint: Tc<2dt may require smaller dt

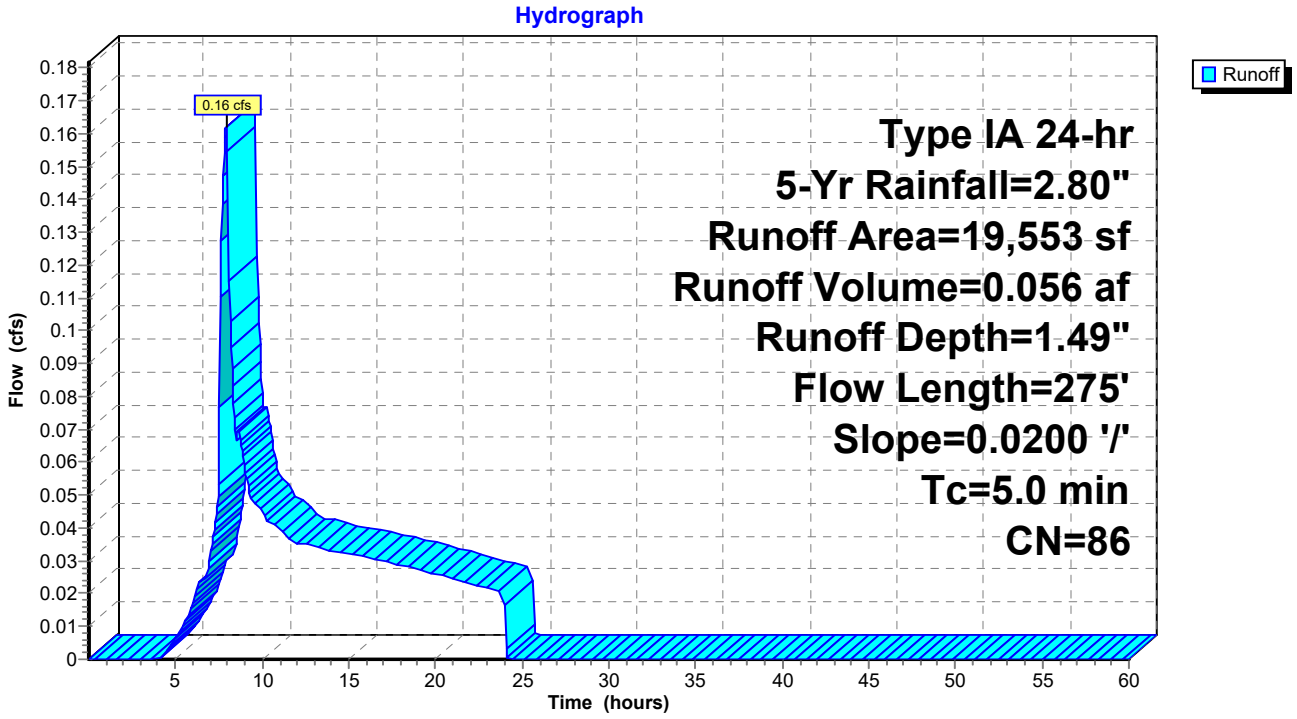
Runoff = 0.16 cfs @ 7.95 hrs, Volume= 0.056 af, Depth= 1.49"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-60.01 hrs, dt= 0.05 hrs
Type IA 24-hr 5-Yr Rainfall=2.80"

Area (sf)	CN	Description
19,553	86	<50% Grass cover, Poor, HSG C
19,553	86	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	275	0.0200	1.40		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.20"
3.3	275	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1S: EX



Time span=0.01-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX Runoff Area=19,553 sf 0.00% Impervious Runoff Depth=1.84"
Flow Length=275' Slope=0.0200 '/' Tc=5.0 min CN=86 Runoff=0.20 cfs 0.069 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.069 af Average Runoff Depth = 1.84"
100.00% Pervious = 0.449 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX

[49] Hint: Tc<2dt may require smaller dt

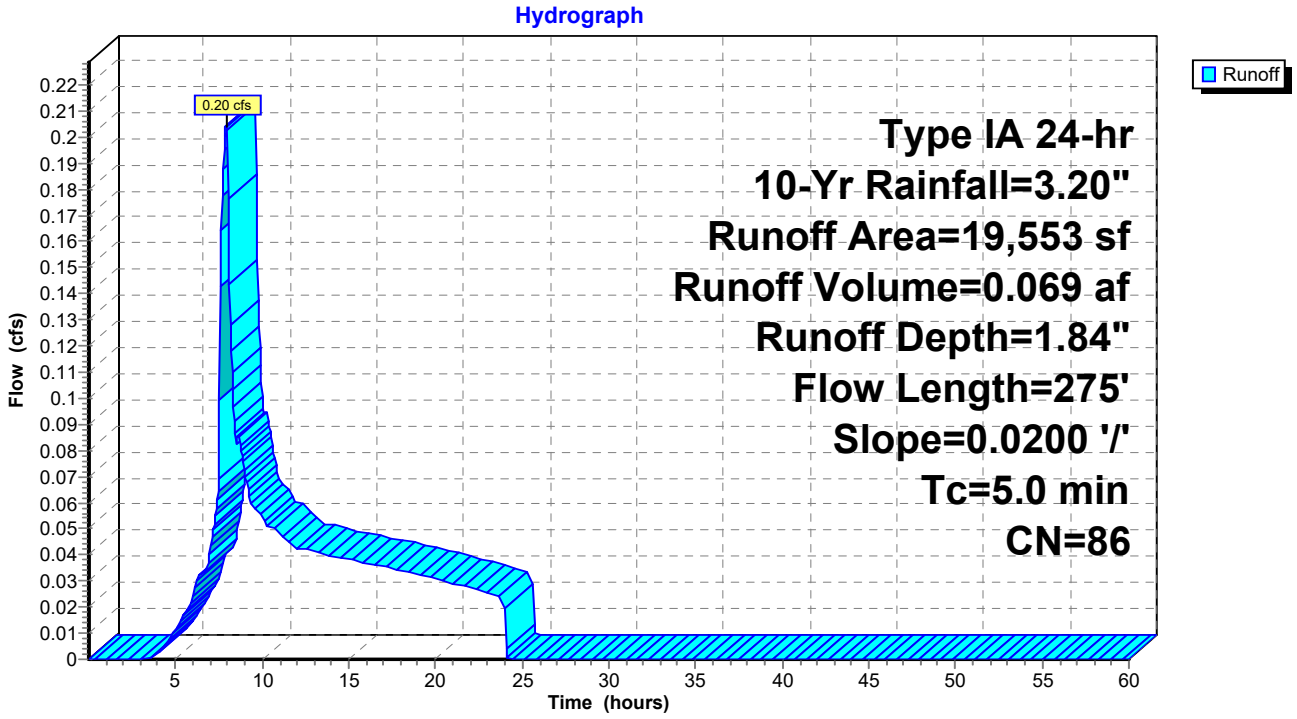
Runoff = 0.20 cfs @ 7.94 hrs, Volume= 0.069 af, Depth= 1.84"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-60.01 hrs, dt= 0.05 hrs
Type IA 24-hr 10-Yr Rainfall=3.20"

Area (sf)	CN	Description
19,553	86	<50% Grass cover, Poor, HSG C
19,553	86	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	275	0.0200	1.40		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.20"
3.3	275	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1S: EX



Time span=0.01-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX Runoff Area=19,553 sf 0.00% Impervious Runoff Depth=2.19"
Flow Length=275' Slope=0.0200 '/' Tc=5.0 min CN=86 Runoff=0.25 cfs 0.082 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.082 af Average Runoff Depth = 2.19"
100.00% Pervious = 0.449 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX

[49] Hint: Tc<2dt may require smaller dt

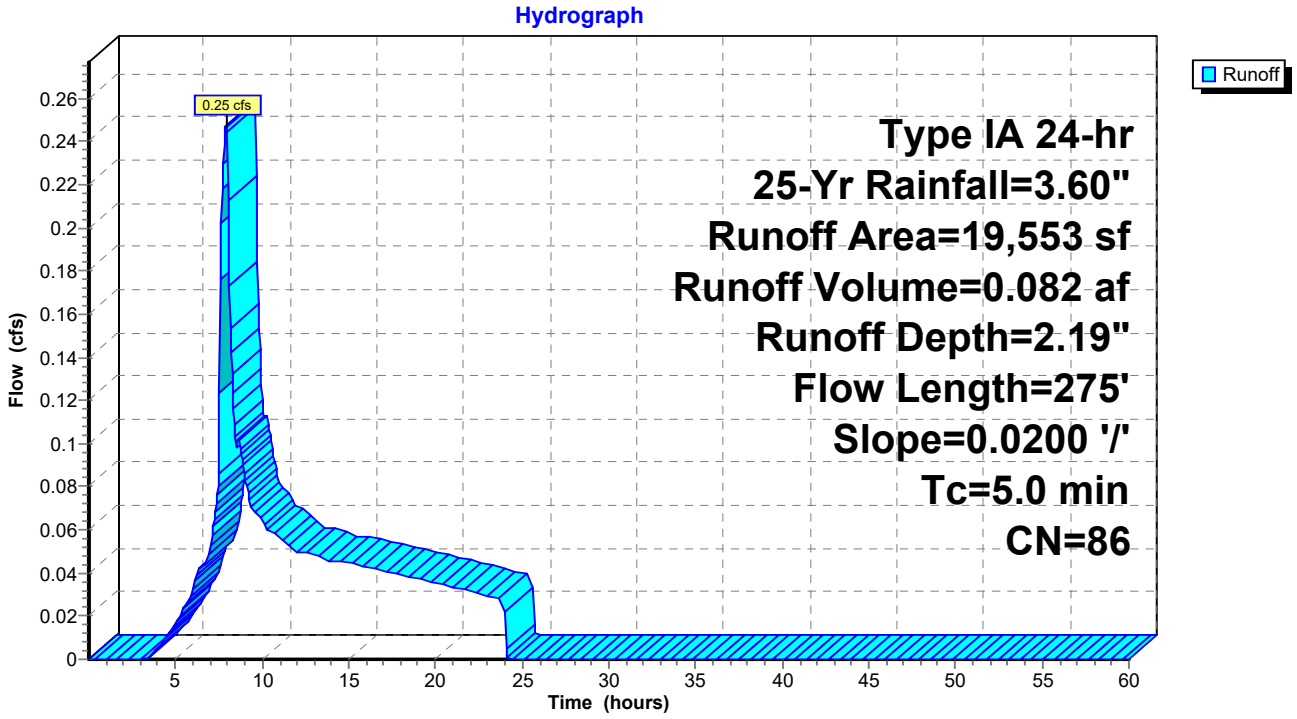
Runoff = 0.25 cfs @ 7.93 hrs, Volume= 0.082 af, Depth= 2.19"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-60.01 hrs, dt= 0.05 hrs
Type IA 24-hr 25-Yr Rainfall=3.60"

Area (sf)	CN	Description
19,553	86	<50% Grass cover, Poor, HSG C
19,553	86	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	275	0.0200	1.40		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.20"
3.3	275	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1S: EX



Time span=0.01-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX Runoff Area=19,553 sf 0.00% Impervious Runoff Depth=2.91"
Flow Length=275' Slope=0.0200 '/' Tc=5.0 min CN=86 Runoff=0.34 cfs 0.109 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.109 af Average Runoff Depth = 2.91"
100.00% Pervious = 0.449 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX

[49] Hint: Tc<2dt may require smaller dt

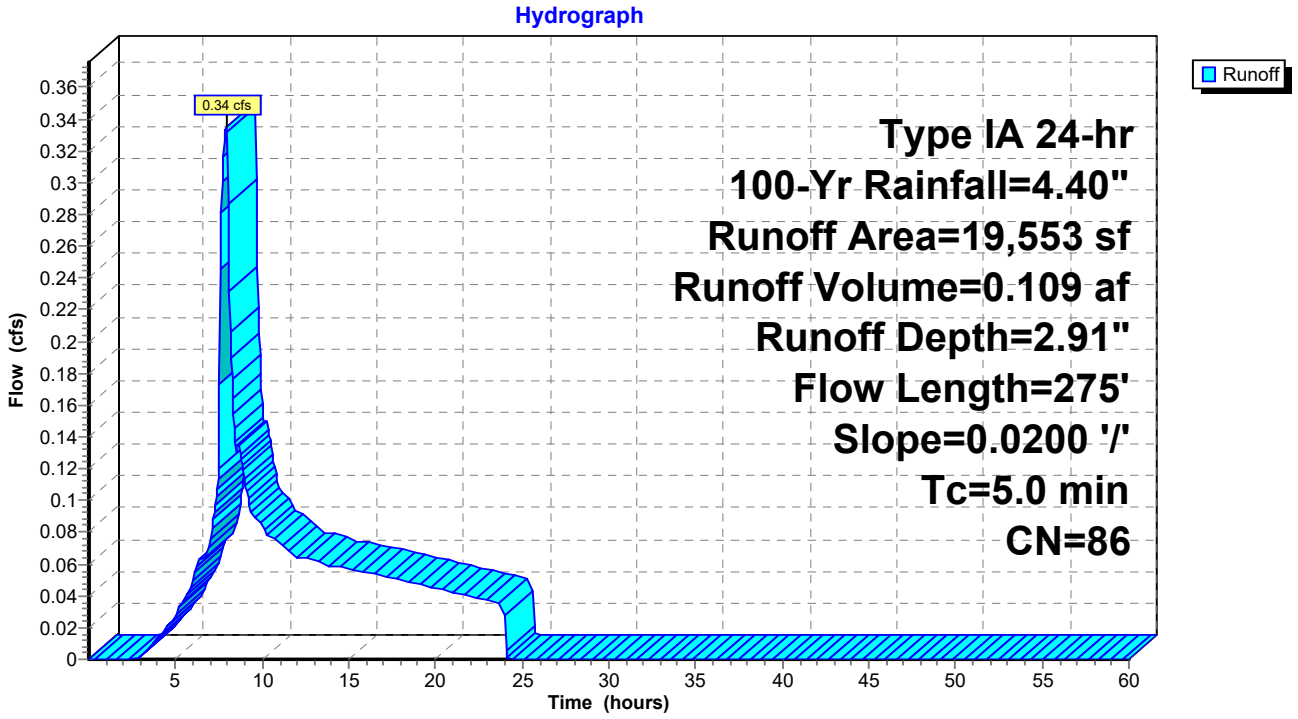
Runoff = 0.34 cfs @ 7.92 hrs, Volume= 0.109 af, Depth= 2.91"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-60.01 hrs, dt= 0.05 hrs
Type IA 24-hr 100-Yr Rainfall=4.40"

Area (sf)	CN	Description
19,553	86	<50% Grass cover, Poor, HSG C
19,553	86	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	275	0.0200	1.40		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.20"
3.3	275	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1S: EX



Time span=0.01-60.00 hrs, dt=0.05 hrs, 1201 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment1S: EX Runoff Area=19,553 sf 0.00% Impervious Runoff Depth=0.41"
Flow Length=275' Slope=0.0200 '/' Tc=5.0 min CN=86 Runoff=0.03 cfs 0.016 af

Total Runoff Area = 0.449 ac Runoff Volume = 0.016 af Average Runoff Depth = 0.41"
100.00% Pervious = 0.449 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 1S: EX

[49] Hint: Tc<2dt may require smaller dt

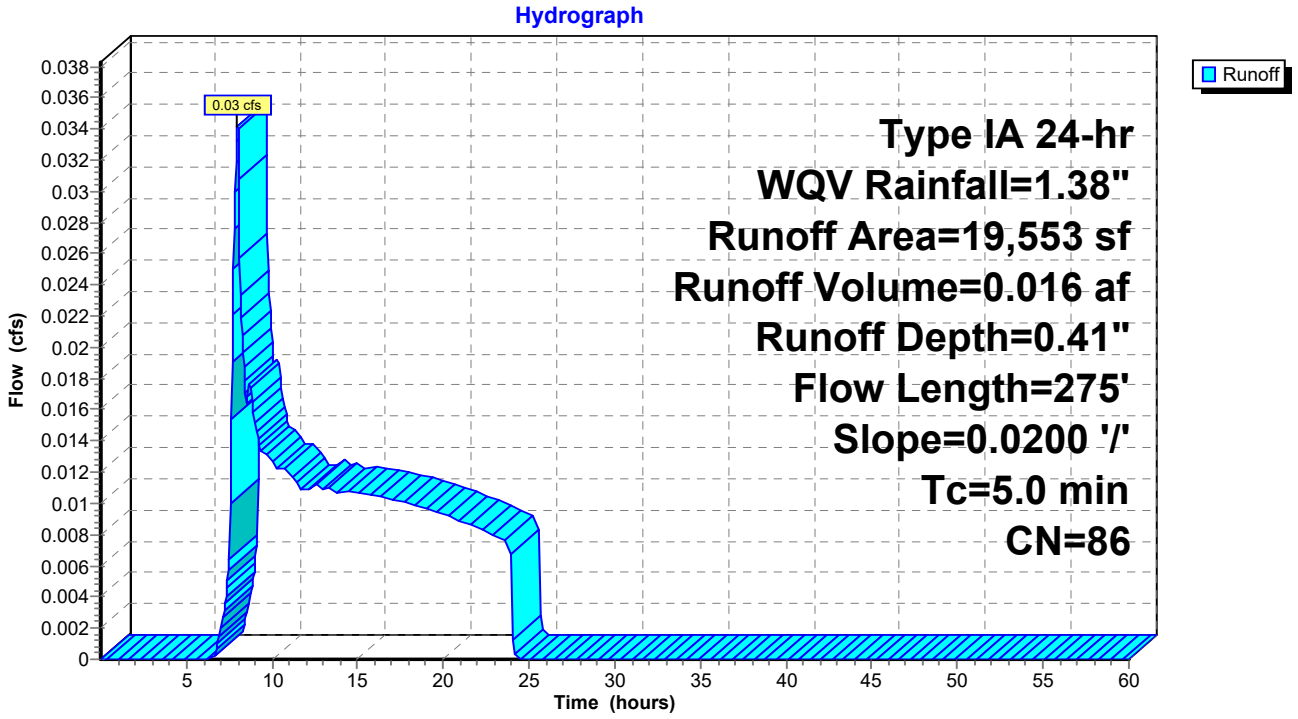
Runoff = 0.03 cfs @ 7.99 hrs, Volume= 0.016 af, Depth= 0.41"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.01-60.01 hrs, dt= 0.05 hrs
Type IA 24-hr WQV Rainfall=1.38"

Area (sf)	CN	Description
19,553	86	<50% Grass cover, Poor, HSG C
19,553	86	100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
3.3	275	0.0200	1.40		**Sheet Flow,** Smooth surfaces n= 0.011 P2= 2.20"
3.3	275	Total, Increased to minimum Tc = 5.0 min			

Subcatchment 1S: EX



APPENDIX C – PLANS

OREGON OFFICE
345 WESTFIELD ST. #107
SILVERTON, OR. 97381
503.308.8554

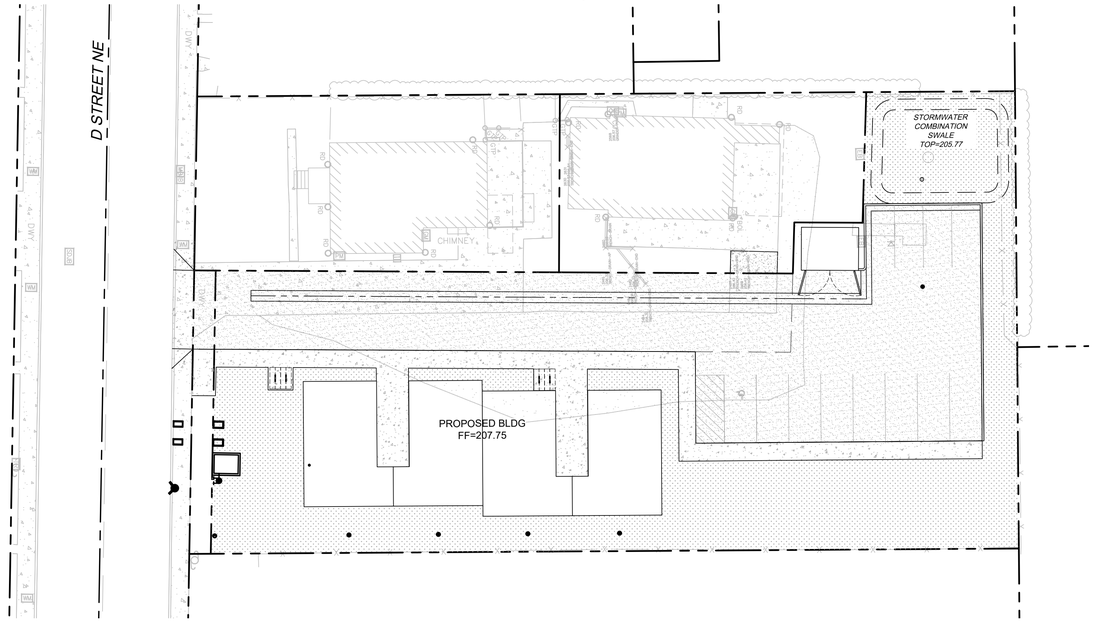
HELLO@7OAKSENGINEERING.COM

CALIFORNIA OFFICE
12337 SEAL BEACH BLVD. #1028
SEAL BEACH, CA. 90740
562.537.6038

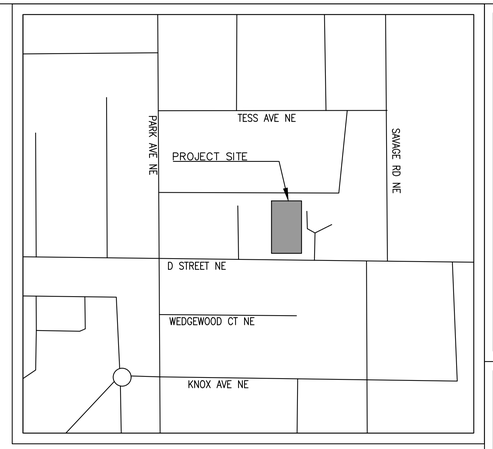
PRELIMINARY PLANS FOR:

MULTI-FAMILY DEVELOPMENT

3021 & 3027 D STREET
SALEM OR, 97301



INDEX MAP
SCALE:1":20'



VICINITY MAP
NOT TO SCALE

PROJECT DIRECTORY:

APPLICANT:
SKYLINE BUILDERS, LLC
1280 FIR ST S
SALEM, OR 97302
P:503.428.2758
LANDON@SKYLINE-CO.COM

CIVIL ENGINEER:
7 OAKS ENGINEERING, INC.
STEVEN JOHNSON, P.E.
345 WESTFIELD ST. #107
SILVERTON, OR. 97381
503.308.8520
STEVEN@7OAKSENGINEERING.COM

LAND SURVEYOR :
FFN SURVEYING
7230 3RD STREET SE #145
TURNER, OR 97392
P: 503.558.3330
INFO@FFNSURVEYING.COM

ARCHITECT:
LIFT ARCHITECTURE
1130 LIBERTY ST SE SUITE 230
SALEM, OR 97302
P: 503.420.8520
INFO@LIFTARCHITECTURE.COM

UTILITY PURVEYORS:

WATER:
CITY OF SALEM
555 LIBERTY STREET SE
SALEM, OREGON.
503.588.6311

STORM DRAIN:
CITY OF SALEM
555 LIBERTY STREET SE
SALEM, OREGON.
503.588.6311

SEWER:
CITY OF SALEM
555 LIBERTY STREET SE
SALEM, OREGON.
503.588.6311

FIRE:
CITY OF SALEM
555 LIBERTY STREET SE
SALEM, OREGON.
503.588.6311

ELECTRIC:
PORTLAND GENERAL ELECTRIC
KEN SPENCER
KENNETH.SPENCER@PGN.COM
503.970.7200

NATURAL GAS:
NORTHWEST NATURAL GAS COMPANY
3123 BROADWAY ST NE
SALEM, OR. 97303
503.585.6611

ROADWAYS:
CITY OF SALEM
555 LIBERTY STREET SE
SALEM, OREGON.
503.588.6311

SHEET INDEX:

NOTICE TO EXCAVATORS:

ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952-001-0010 THROUGH OAR 952-001-0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER. (NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS 503-232-1987).

POTENTIAL UNDERGROUND FACILITY OWNERS

Dig Safely.

Call the Oregon One-Call Center
DIAL 811 or 1-800-332-2344

ENGINEER'S NOTICE TO CONTRACTOR:

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN IN THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS, AND TO THE BEST OF OUR KNOWLEDGE, THERE ARE NOT EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN, AND ANY OTHER LINES OR STRUCTURES NOT SHOWN ON THESE PLANS, AND IS RESPONSIBLE FOR THE PROTECTION OF ANY DAMAGE TO THESE LINES OR STRUCTURES.

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION FOR THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENTS SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY, AND HOLD HARMLESS THE CITY, ITS EMPLOYEES, AND AGENTS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.

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ABBREVIATIONS:

PL	PROPERTY LINE	TYP.	TYPICAL
FF	FINISHED FLOOR	MIN.	MINIMUM
TC	TOP OF CURB	SS	SANITARY SEWER
FS	FINISHED SURFACE	SD	STORM DRAIN
FL	FLOW LINE	CF	CURB FACE
FG	FINISHED GRADE	WM	WATER METER
GB	GRADE BREAK	FDC	FIRE DEPARTMENT CONNECTION
CL	CENTERLINE	APN	ACCESSOR'S PARCEL MAP
R	RIDGE LINE	SQ.FT	SQUARE FEET
R/W	RIGHT OF WAY	INV.	INVERT
WV	WATER VALVE	BF	BACKFLOW
PR.	PROPOSED	CFS	CUBIC FEET PER SECOND
NAP	NOT A PART	SCH.	SCHEDULE
FT	FEET	PVC	POLYVINYL CHLORIDE
EV	ELECTRIC VEHICLE	SDR	SPECIAL DRAWING RIGHT
CAV	CLEAN AIR VEHICLE	PSI	POUNDS PER SQUARE INCH
STD.	STANDARD	NFPA	NATIONAL FIRE PREVENTION ASSOCIATION
AC.	ACRES	CB	CATCH BASIN
CUP	CONDITIONAL USE PERMIT	D	DIAMETER
EX.	EXISTING	VCP	VITRIFIED CLAY PIPE

PROJECT SURVEY:

IN THE SE ¼ OF SECTION 24, T.7S., R.3W., W.M.
CITY OF SALEM, MARION COUNTY OREGON

7 OAKS ENGINEERING
345 WESTFIELD ST. #107
SILVERTON, OR. 97381
503.308.8554
ADMIN@7OAKSENGINEERING.COM

STAMP:

REGISTERED PROFESSIONAL ENGINEER
96126PE
PRELIMINARY
OREGON
MAY 12, 2010
STEVEN JOHNSON

NO	DATE	ISSUE DESCRIPTION

QC BY:

DRAWN BY:

PROJECT NAME: MULTI-FAMILY DEVELOPMENT

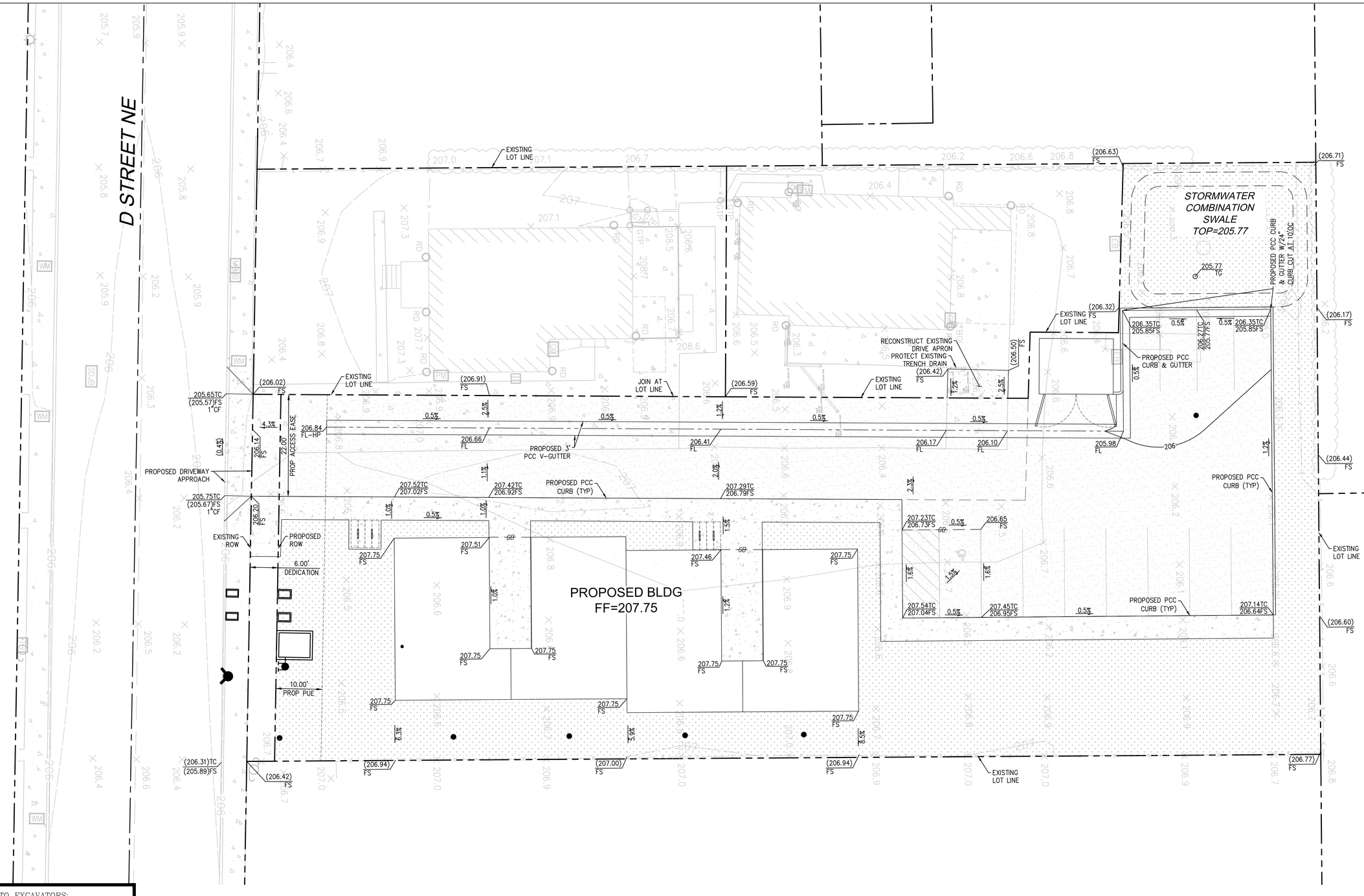
PROJECT ADDRESS: 3021 & 3027 D STREET NE SALEM OR, 97301

SHEET TITLE: TITLE SHEET

DATE: 08/20/2024

SHEET NUMBER: 1

JOB #00330



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7OAKS ENGINEERING
345 WESTFIELD ST. #107
SILVERTON, OR. 97381
503.308.8554
ADMIN@7OAKSENGINEERING.COM

STAMP:

REGISTERED PROFESSIONAL ENGINEER
96126PE
PRELIMINARY
OREGON
MAY 12, 2010
STEVEN JOHNSON

NO	DATE	ISSUE DESCRIPTION

QC BY: DRAWN BY:

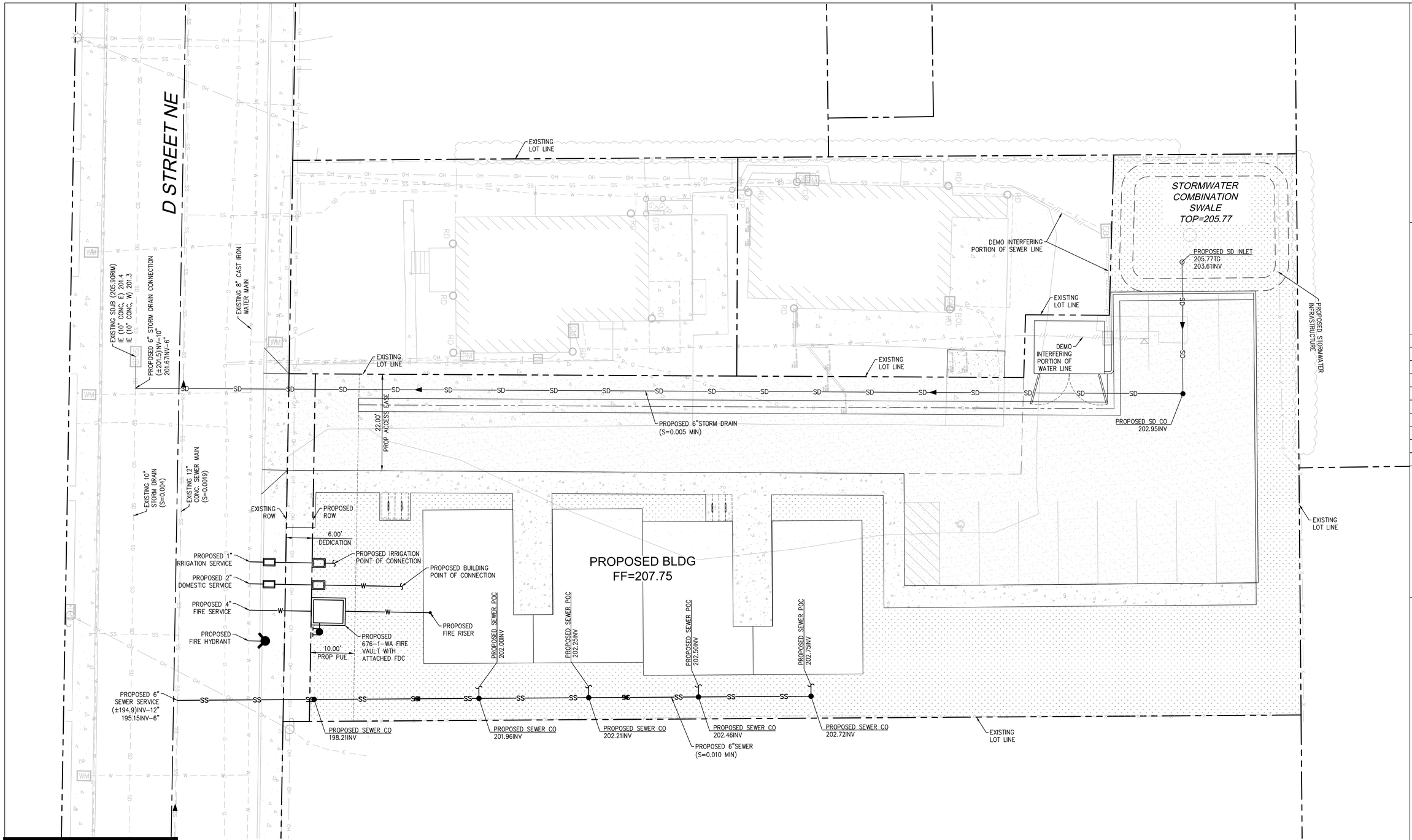
PROJECT NAME: MULTI-FAMILY DEVELOPMENT
PROJECT ADDRESS: 3021 & 3027 D STREET NE SALEM OR, 97301

SHEET TITLE: PRELIMINARY GRADING PLAN

DATE: 08/20/2024

SHEET NUMBER: 2

JOB #00330



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LEGEND:

- SD — PROPOSED DRAIN LINE
- SS — PROPOSED SEWER
- W — PROPOSED WATER
- APPROXIMATE LIMITS OF UTILITY REMOVAL
- PROPOSED WATER METER
- PROPOSED CLEANOUT

UTILITY GENERAL NOTES:

1. REFER TO SEPARATE UTILITY PURVEYOR FOR ELECTRICAL AND GAS SERVICES.
2. ALL EXISTING UTILITIES SHALL BE PROTECTED IN PLACE UNLESS OTHERWISE SPECIFICALLY CALLED FOR ON THE PLANS.
3. THE ENGINEER OF RECORD SHALL BE CONTACTED IF ANY DISCREPANCIES ARISE IN THE FIELD.

N

10 5 0 10 20

SCALE: 1"=10'

7OAKS ENGINEERING
345 WESTFIELD ST. #107
SILVERTON, OR. 97381
503.308.8554
ADMIN@7OAKSENGINEERING.COM

STAMP:

REGISTERED PROFESSIONAL ENGINEER
96126PE
PRELIMINARY
OREGON
MAY 12, 2010
STEVEN JOHNSON

NO	DATE	ISSUE DESCRIPTION

QC BY: DRAWN BY:

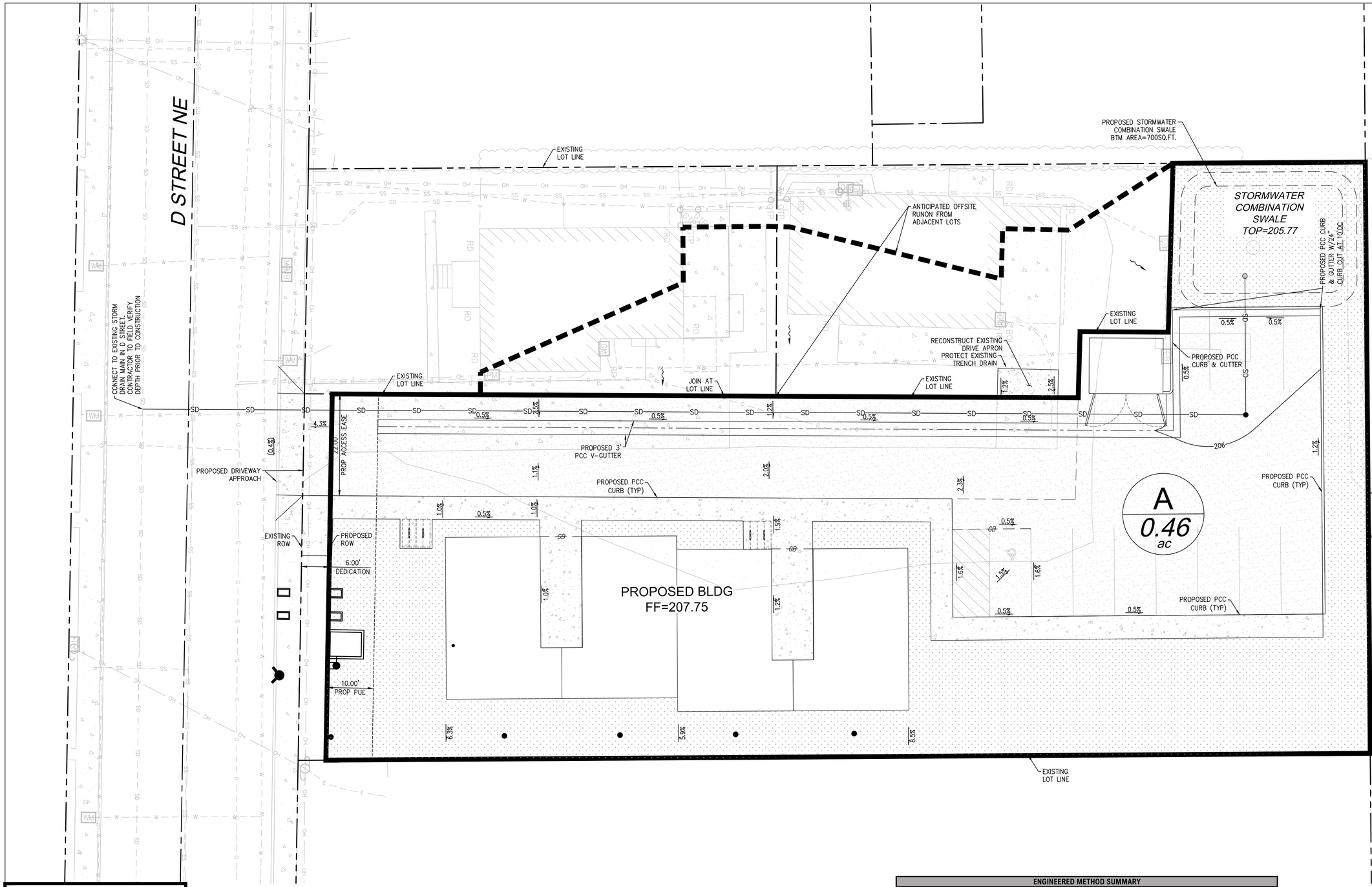
PROJECT NAME: MULTI-FAMILY DEVELOPMENT
PROJECT ADDRESS: 3021 & 3027 D STREET NE SALEM OR, 97301

SHEET TITLE: PRELIMINARY WET UTILITY PLAN

DATE: 08/20/2024

SHEET NUMBER: 3

JOB #00330



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LEGEND:

HYDROLOGY SUBAREA BOUNDARY LINE

XX / AC — SUB-AREA LABEL

ENGINEERED METHOD SUMMARY
PRE VS. POST CONSTRUCTION FLOW RATES

FACILITY ID	PEAK FLOW RATE (CFS)									
	HALF OF THE 2 YEAR STORM		5 YEAR STORM		10 YEAR STORM		25 YEAR STORM		100 YEAR STORM	
PROJECT SITE	PRE	POST	PRE	POST	PRE	POST	PRE	POST	PRE	POST
A	0.1	0.08	0.16	0.09	0.2	0.09	0.25	0.1	0.34	0.27

*Number were taken to the 100th place, and rounded accordingly.

CATCHMENT AND FACILITY TABLE

AREA	TOTAL AREA (SF)/(AC.)	IMPERVIOUS AREA (SF)	PERVIOUS AREA (SF)
A	19,553	13,687	5,866

N

10 5 0 10 20
SCALE: 1"=10'

7OAKS ENGINEERING
345 WESTFIELD ST. #107
SILVERTON, OR. 97381
503.308.8554
ADMIN@7OAKSENGINEERING.COM

STAMP:

REGISTERED PROFESSIONAL ENGINEER
96126PE
PRELIMINARY
OREGON
MAY 12, 2010
STEVEN JOHNSON

NO	DATE	ISSUE DESCRIPTION

QC BY: DRAWN BY:

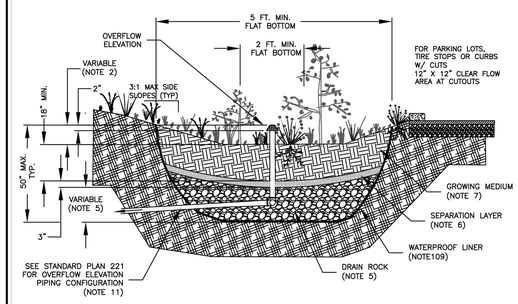
PROJECT NAME: MULTI-FAMILY DEVELOPMENT
PROJECT ADDRESS: 3021 & 3027 D STREET NE SALEM OR, 97301

SHEET TITLE: PRELIMINARY STORMWATER PLAN

DATE: 08/20/2024

SHEET NUMBER: 4

JOB #00330



NOTES:

1. PROVIDE PROTECTION FROM ALL VEHICLE TRAFFIC, EQUIPMENT STAGING, AND FOOT TRAFFIC IN PROPOSED INFILTRATION AREAS PRIOR TO, DURING, AND AFTER CONSTRUCTION.

2. DIMENSIONS:
   A. WIDTH OF SWALE: 5 FT. – 12 FT.
   B. DEPTH OF SWALE (FROM TOP OF GROWING MEDIUM TO OVERFLOW ELEVATION):
      SIMPLIFIED 9"
      ENGINEERED 6"–12"
   C. LONGITUDINAL SLOPE OF SWALE: 6.0% OR LESS
   D. FLAT BOTTOM WIDTH: 2 FT. MIN.
   E. SIDE SLOPES OF SWALE: 3:1 MAXIMUM

3. LOCATION / SETBACK:
   A.INFILTRATION VEGETATED SWALES MUST BE 10 FT. FROM FOUNDATION AND 5 FT. FROM PROPERTY LINES

4. OVERFLOW:
   A. EMERGENCY OVERFLOW PATH SHALL BE IDENTIFIED ON THE STORMWATER MANAGEMENT PLAN

5. DRAIN ROCK:
   A. SIZE: 1 1/2"–3/4" WASHED AGGREGATE
   B. DEPTH: 0"–48"

6. SEPARATION BETWEEN DRAIN ROCK AND GROWING MEDIUM: SHALL BE A 3" LAYER OF 3/4"–1/4" OPEN GRADED AGGREGATE

7. GROWING MEDIUM:
   A. DEPTH: 18" MINIMUM
   B. SEE DESIGN STANDARDS FOR REQUIREMENTS

8. VEGETATION: SEE DESIGN STANDARDS FOR REQUIREMENTS

9. CHECK DAMS: SHALL BE PLACED ACCORDING TO FACILITY DESIGN. REFER TO STANDARD PLAN 220

10. ALONG STREETS: PROTECT SUBGRADE WITHWATERPROOF LINER (30 mil. PVC OR EQUAL) ALONG STREET EDGE TO BOTTOM OF SWALE. SEE STANDARD PLAN 233

11. PIPING:
    SEE STANDARD PLAN 221

CITY OF SALEM
DEPARTMENT OF PUBLIC WORKS

STANDARD PLAN
COMBINATION SWALE

APPROVED	CITY ENGINEER	1/01/14 DATE	DRAWN BY	KAK	12/2013	**NO. 219**
			CHECKED BY	KR	12/2013	

NOTICE TO EXCAVATORS:

ATTENTION: OREGON LAW REQUIRES YOU TO FOLLOW RULES ADOPTED BY THE OREGON UTILITY NOTIFICATION CENTER. THOSE RULES ARE SET FORTH IN OAR 952–001–0010 THROUGH OAR 952–001–0090. YOU MAY OBTAIN COPIES OF THE RULES BY CALLING THE CENTER.
(NOTE: THE TELEPHONE NUMBER FOR THE OREGON UTILITY NOTIFICATION CENTER IS 503–232–1987).

POTENTIAL UNDERGROUND FACILITY OWNERS

Dig Safely.

Call the Oregon One-Call Center
DIAL 811 or 1-800-332-2344

ENGINEER'S NOTICE TO CONTRACTOR:

THE EXISTENCE AND LOCATION OF ANY UNDERGROUND UTILITIES OR STRUCTURES SHOWN IN THESE PLANS ARE OBTAINED BY A SEARCH OF AVAILABLE RECORDS, AND TO THE BEST OF OUR KNOWLEDGE, THERE ARE NOT EXISTING UTILITIES EXCEPT THOSE SHOWN ON THESE PLANS. THE CONTRACTOR IS REQUIRED TO TAKE ALL PRECAUTIONARY MEASURES TO PROTECT THE UTILITIES SHOWN, AND ANY OTHER LINES OR STRUCTURES NOT SHOWN ON THESE PLANS, AND IS RESPONSIBLE FOR THE PROTECTION OF ANY DAMAGE TO THESE LINES OR STRUCTURES.

CONSTRUCTION CONTRACTOR AGREES THAT IN ACCORDANCE WITH GENERALLY ACCEPTED CONSTRUCTION PRACTICES, CONSTRUCTION CONTRACTOR WILL BE REQUIRED TO ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION FOR THE PROJECT, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY; THAT THIS REQUIREMENTS SHALL BE MADE TO APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS, AND CONSTRUCTION CONTRACTOR FURTHER AGREES TO DEFEND, INDEMNIFY, AND HOLD HARMLESS THE CITY, ITS EMPLOYEES, AND AGENTS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED, IN CONNECTION WITH THE PERFORMANCE OF WORK ON THIS PROJECT.

THE CONTRACTOR SHALL BE RESPONSIBLE TO REPORT DISCREPANCIES IN PLANS AND/OR FIELD CONDITIONS IMMEDIATELY TO THE DESIGN ENGINEER FOR RESOLUTION PRIOR TO CONSTRUCTION, AND SHALL BE RESPONSIBLE FOR DISCREPANCIES NOT SO REPORTED AND RESOLVED.

7OAKS ENGINEERING
345 WESTFIELD ST. #107
SILVERTON, OR. 97381
503.308.8554
ADMIN@7OAKSENGINEERING.COM

STAMP:

REGISTERED PROFESSIONAL ENGINEER
96126PE
PRELIMINARY
OREGON
MAY 12, 2020
STEVEN JOHNSON

NO	DATE	ISSUE DESCRIPTION

QC BY: DRAWN BY:

PROJECT NAME: MULTI-FAMILY DEVELOPMENT
PROJECT ADDRESS: 3021 & 3027 D STREET NE
SALEM OR, 97301

SHEET TITLE:
STORMWATER DETAILS

DATE: 08/20/2024

SHEET NUMBER: 5

JOB #00330

APPENDIX D – SUPPORTING SOILS REPORT

OREGON OFFICE
345 WESTFIELD ST. #107
SILVERTON, OR. 97381
503.308.8554

HELLO@7OAKSENGINEERING.COM

CALIFORNIA OFFICE
12337 SEAL BEACH BLVD. #1028
SEAL BEACH, CA. 90740
562.537.6038

Marion County Area, Oregon

WuA—Woodburn silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 24s3
Elevation: 150 to 350 feet
Mean annual precipitation: 40 to 45 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodburn and similar soils: 85 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodburn

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium and mixed mineralogy loess

Typical profile

H1 - 0 to 17 inches: silt loam
H2 - 17 to 32 inches: silty clay loam
H3 - 32 to 68 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 25 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: R002XC008OR - Valley Terrace Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)

May 22, 2024

Landon Hattan
Skyline Builders
1280 Fir Street S
Salem, Oregon 97302

RE: SITE INFILTRATION TESTING
3021 D STREET NE
SALEM, OREGON
BRANCH ENGINEERING INC. PROJECT NO. 24-147

Branch Engineering Inc (BEI) visited the subject site, see Site Vicinity Map (Figure 1), on May 8, 2024 to conduct site infiltration testing in the two test sites shown on Figure 2 that had been previously set up on May 1, 2024. The results presented herein are for preliminary design of any on-site stormwater system and should be verified by the design engineer of record (EOR) for final design and at the time of construction. The following is a summary of our site visit and test results.

SITE SOILS

Four test pits were excavated using a rubber-tracked excavator on the site in the approximate locations shown on the attached Figure-2. Two of the pits (1 and 4 labeled as IT-1 and IT-2) were set up for preliminary infiltration testing of the subsurface soils at depth of 56- to 58-inches below surface grade (BSG). The observed soils were visually classified using the American Society of Testing and Materials (ASTM) Method D-2488. The soils observed in the test pits were generally consistent in material composition with about 1.5-feet of either soft topsoil overlying a clayey silt alluvium that was moist and medium stiff that extended to the maximum depth investigated.

A nearby Oregon Water Resources Department (OWRD) well logs, see attached, describe a similar soil type as what BEI observed to a depth over 20-feet BGS. The NRCS Web Soil Survey of Marion County maps the site soils as terrace deposits of Woodburn silt loam derived from silty alluvium and mixed mineralogy loess.

GROUNDWATER

We did not encounter any groundwater during our on-site explorations to a depth of 7-feet BGS and the well log Mari 66067 shows no groundwater to a depth of 22-feet. A 1961 well log from the area indicates a static groundwater depth of 19-feet BGS with first encountered groundwater appearing to be at 50-feet BGS.

INFILTRATION TESTING

Site infiltration testing was conducted on May 8, 2024 in general accordance with the procedures set forth in the Salem Administrative Rules 109-004 Appendix C for the encased falling head method. The soil is assumed to be laterally homogeneous and that sidewall infiltration is negligible as a 6-inch diameter, open-ended, plastic standpipe was used for containment of the water column. Standing water remained in the standpipe from the initial pre-saturation of the test holes seven days prior to testing. Additional water was to the test standpipes to create a 24- to 28-inch hydraulic head on the

soil and measured one hour later with no detectable change in the water level. The measured infiltration rate in both test holes is considered to be zero.

Table 1: Infiltration Test Results

Test ID	*Soil Description*	*Test Depth (inches)*	*Infiltration Rate (in/hr)*
IT-1	Light Brown - Clayey Silt (ML/CL)	56	0
IT-2	Light Brown – Clayey Silt (ML/CL)	58	0

CONCLUSIONS

The infiltration rates measured in the field are zero, this rate is considered preliminary and should be confirmed by the EOR for final design of the stormwater facility as soil type and consistency may vary with distance from the test location.

Although not considered feasible based on our preliminary results, any areas proposed for infiltration shall not be subjected to compaction of the soil by vehicle traffic, storage of materials, or other means that can influence the rate of infiltration in those areas. It is the client/design professional's responsibility to determine that the stormwater facility meets these requirements for sizing, setbacks, and overflow routing.

LIMITATIONS

This report has been prepared for the exclusive use of the addressee and their designated representatives for use in design of the proposed development. The analysis and recommendations contained herein were prepared in general accordance with the standards of practice for the area at the time of this report's preparation, and may not be suitable for purposes other than those described in this report.

Subsurface explorations indicate soil conditions at specific locations and depths and do not necessarily reflect soil and groundwater variations that may exist at other locations at the site; however, site conditions were generally consistent in all our explorations. If design changes are made that may affect the results of our testing, development plans change, or at least a year passes between our investigation and the site development, we reserve the right to review the changes for applicability.

We assume no responsibility or liability for engineering, inspection, or testing performed by others and no warranty, expressed or implied, is given. Use of this report constitutes an agreement and consent by the addressee and their designated representatives to the limitations listed above.

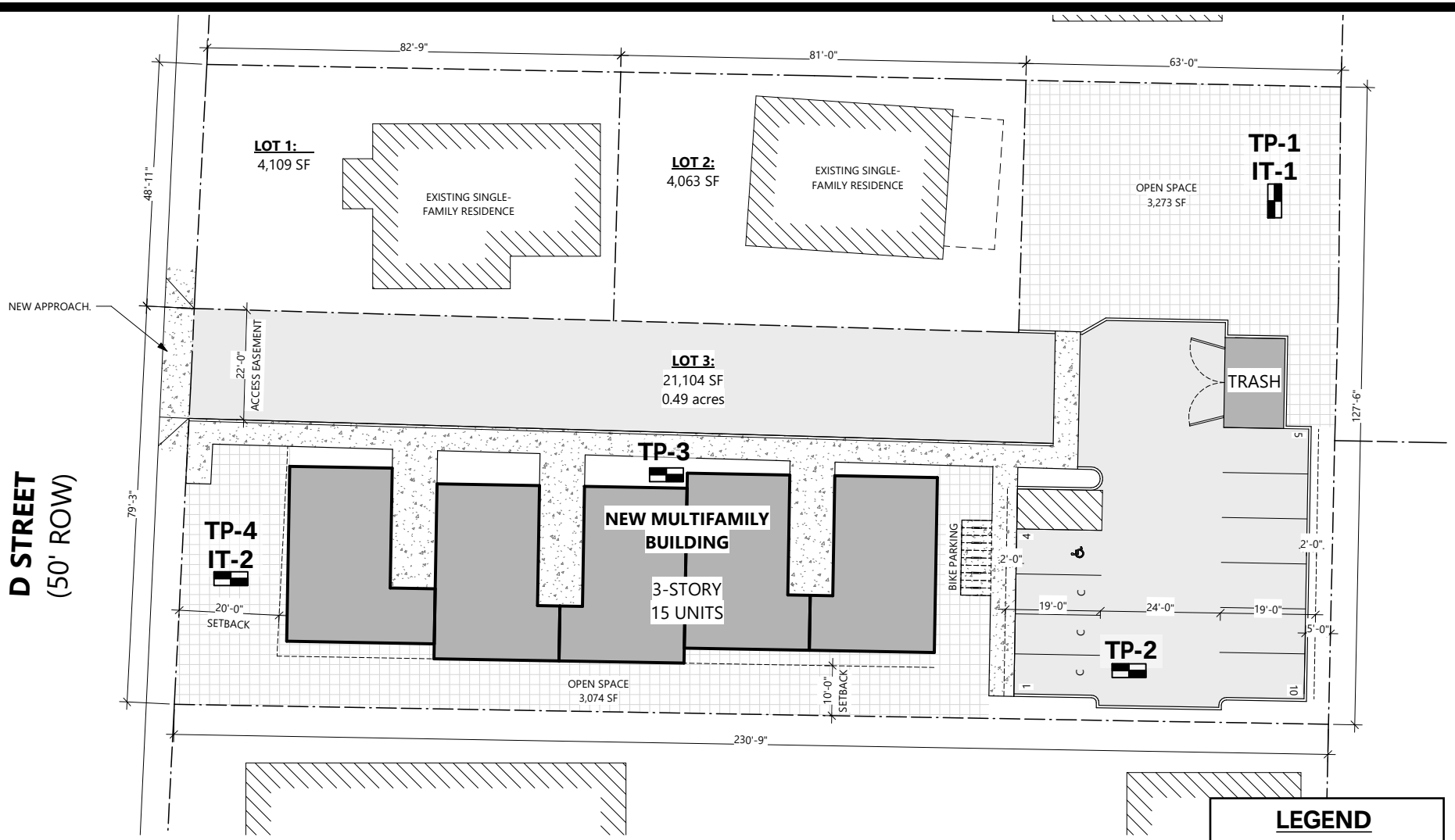
If you have any questions regarding the test method, please contact the undersigned.
Sincerely,

Branch Engineering Inc,

Ronald J. Derrick, P.E., G.E.
Principal Geotechnical Engineer

ATTACHED:

Figure-1, Site Vicinity Map
Figure-2, Site Exploration Map
ORWD Well Logs (3)
USDA NRCS Site Soil Mapping and Soil Description



SOURCE: LIFT ARCHITECTURE, NEW MULTIFAMILY 3021 D STREET, SEET A1.01, 4/4/2024

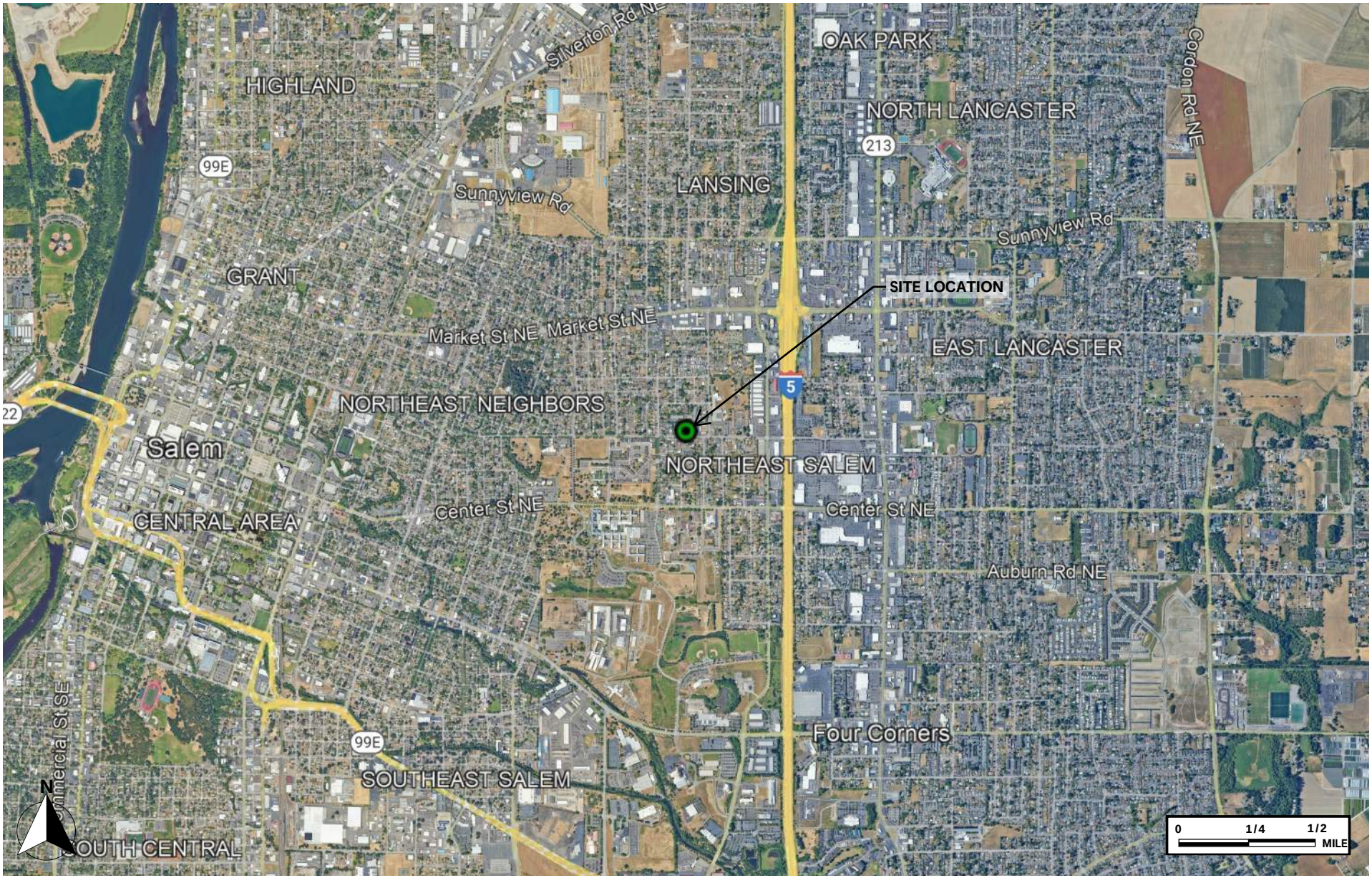
Branch ENGINEERING Inc Since 1977

SITE PLAN — D STREET MULTIFAMILY

3021 D STREET NE, SALEM, OREGON

FIGURE-2

PROJECT NO. 24-147



SOURCE: GOOGLE EARTH PRO®

Branch ENGINEERING Inc Since 1977

VICINITY MAP — D STREET MULTIFAMILY

3021 D STREET NE, SALEM, OREGON

FIGURE-1

PROJECT NO. 24-147

RECEIVED
AUG 1961
STATE ENGINEER
SALEM, OREGON

MARI.... 8058
MARI

File Original and First Copy with the STATE ENGINEER, SALEM, OREGON

WATER WELL REPORT
STATE OF OREGON

State Well No. 7/3W-24Q

State Permit No. .....

(1) OWNER:
Name WALTER. R. HOELCHER
Address 3281 D. ST
SALEM ORE

(2) LOCATION OF WELL:
County MARION Owner's number, if any—
¼ ¼ Section T. 7S R. 3W W.M.
Bearing and distance from section or subdivision corner
3281 D.ST. SALEM ORE

[redacted] Garden City Addition & City of Salem
Lot # 13

(3) TYPE OF WORK (check):
New Well ☒ Deepening ☐ Reconditioning ☐ Abandon ☐
If abandonment, describe material and procedure in Item 11.

(4) PROPOSED USE (check):
Domestic ☒ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

(5) TYPE OF WELL:
Rotary ☐ Driven ☐
Cable ☒ Jetted ☐
Dug ☐ Bored ☐

(6) CASING INSTALLED: Threaded ☐ Welded ☒
4" Diam. from 0 ft. to 90 ft. Gage 4"
..... Diam. from ..... ft. to ..... ft. Gage .....
..... Diam. from ..... ft. to ..... ft. Gage .....

(7) PERFORATIONS: Perforated? ☐ Yes ☒ No
Type of perforator used
SIZE of perforations in. by in.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
..... perforations from ..... ft. to ..... ft.
[redacted] perforations from ..... ft. to ..... ft.

(8) SCREENS: Well screen installed ☐ Yes ☒ No
Manufacturer's Name .....
Type ..... Model No. .....
[redacted] Slot size ..... Set from ..... ft. to ..... ft.
Diam. ..... Slot size ..... Set from ..... ft. to ..... ft.

(9) CONSTRUCTION:
Was well gravel packed? ☐ Yes ☒ No Size of gravel: .....
Gravel placed from ..... ft. to ..... ft.
Was a surface seal provided? ☒ Yes ☐ No To what depth? 1'— ft.
Material used in seal SANITARY SEAL
Did any strata contain unusable water? ☒ Yes ☐ No
Type of water? IRON Depth of strata 50'705'
Method of sealing strata off CASED

(10) WATER LEVELS:
Static level 19 ft. below land surface Date 7-1961
Artesian pressure lbs. per square inch Date

Log Accepted by:
[Signed] W. R. Hoelcher (Owner) Date July 27, 19 61

(11) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? ☐ Yes ☐ No If yes, by whom?
Yield: gal./min. with ft. drawdown after hrs.
" " " "
" " " "
Bailer test 15 gal./min. with 65 ft. drawdown after 1 hrs.
Artesian flow g.p.m. Date
Temperature of water 55° Was a chemical analysis made? ☐ Yes ☒ No

(12) WELL LOG: Diameter of well 4" inches.
Depth drilled 90' ft. Depth of completed well 90' ft.
Formation: *Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.*

MATERIAL	FROM	TO
TOPSOIL	0	2
YELLOW CLAY	2	30
BLUE CLAY	30	35
CONGLOMERATE	35	50
WATER GRAVEL	50	51
CONGLOMERATE	51	55
YELLOW CLAY	55	58
SAND FINE GRAIN	58	59
CONGLOMERATE	59	84
SAND FINE GRAIN	84	85
CONGLOMERATE	85	89
WATER GRAVEL #1"-	89	90

Work started 7-17- 1961 Completed 7-19- 1961

(13) PUMP:
Manufacturer's Name .....
Type: Jet H.P. 1

Well Driller's Statement:
This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME S. A. SHEDD + SONS
(Person, firm, or corporation) (Type or print)
Address 2505 BROOKS ST. SALEM O.

Driller's well number .....
[Signed] S. A. Shedd
(Well Driller)
License No. 6 Date 7-18-, 19 61

(USE ADDITIONAL SHEETS IF NECESSARY)

MARI 66067

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

MARI 66067

(1) OWNER/PROJECT

Hole Number B1

PROJECT NAME/NBR: 3194 Knox, Ruby Garner

First Name Ruby Last Name Garner
Company
Address 3194 Knox Ave NE
City Salem State Or Zip 97301

(2) TYPE OF WORK

☒ New ☐ Deepening ☒ Abandonment
☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☐ Hollow stem auger
☐ Rotary Mud ☐ Cable ☒ Push Probe
☐ Other

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanent
○ Uncased Permanent ○ Slope Stablity
○ Other
Other:

RECEIVED BY OWRD
AUG 26 2016
SALEM, OR

(5) USE OF HOLE

soil testing

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)
Depth of Completed Hole 22.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
2.25	0	22					

Backfill placed from ft. to ft. Material
Filter pack from ft. to ft. Material Size

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
◉	○	.75		0	10	40	○	◉		☒
○	◉	.75		10	22	40	○	◉		☒
○	○						○	○		
○	○						○	○		
○	○						○	○		

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature NA °F Lab analysis ☐ Yes By
Supervising Geologist/Engineer
Water quality concerns? ☐ Yes (describe below)

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County MARION Twp 7 S N/S Range 3 W E/W WM
Sec 24 SW 1/4 of the SW 1/4 Tax Lot 05400
Tax Map Number Lot
Lat ° ' " or DMS or DD
Long ° ' " or DMS or DD
◉ Street address of hole ○ Nearest address
3194 Knox Ave NE Salem Oregon

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening				N/A
Completed Well				

Flowing Artesian? ☐
WATER BEARING ZONES Depth water was first found N/A

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
						N/A

(11) SUBSURFACE LOG

Ground Elevation

Material	From	To
Top soil fill	0	2
brown silty clay	2	8
light brown silty clay	8	22

RECEIVED BY OWRD
JAN 15 2016
SALEM, OR

Date Started 12-05-2015 Completed 12-05-2015

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Chips	0	22	35	P

RECEIVED BY OWRD
MAR 10 2016
SALEM, OR

Date Started 12-05-2015 Completed 12-05-2015

Professional Certification (to be signed by an Oregon licensed water or monitoring well constructor, Oregon registered geologist or professional engineer).

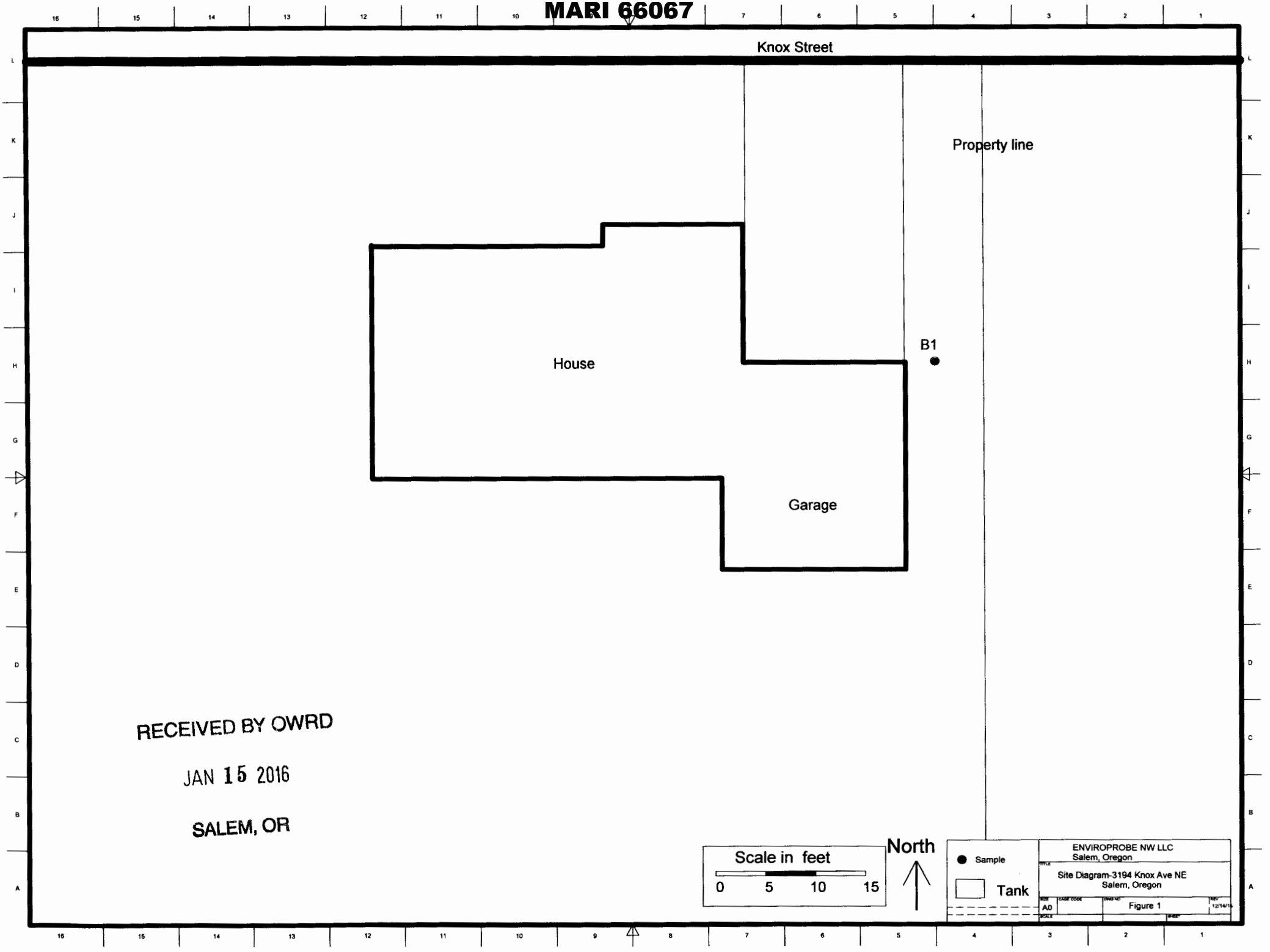
I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 10587 Date 12/15/15
First Name Karl Last Name Van Zandt
Affiliation Enviroprobe NW LLC

ORIGINAL - WATER RESOURCES DEPARTMENT
THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

Form Version: 0.96

MARI 66067



RECEIVED BY OWRD

JAN 15 2016

SALEM, OR

MARI 66144

STATE OF OREGON
GEOTECHNICAL HOLE REPORT
(as required by OAR 690-240-0035)

3/16/2016

(1) OWNER/PROJECT

Hole Number B8

PROJECT NAME/NBR: 5-648/DAS - SALEM

First Name _____ Last Name _____

Company OREGON DEPARTMENT OF ADMINISTRATIVE SERVICES

Address 155 COTTAGE ST NE

City SALEM State OR Zip 97301

(2) TYPE OF WORK

☒ New ☐ Deepening ☒ Abandonment
☐ Alteration (repair/recondition)

(3) CONSTRUCTION

☐ Rotary Air ☐ Hand Auger ☐ Hollow stem auger
☒ Rotary Mud ☐ Cable ☐ Push Probe
☐ Other _____

(4) TYPE OF HOLE:

◉ Uncased Temporary ○ Cased Permanent
○ Uncased Permanent ○ Slope Stablity
○ Other
Other: _____

(5) USE OF HOLE

GEOTECHNICAL

(6) BORE HOLE CONSTRUCTION

Special Standard ☐ (Attach copy)

Depth of Completed Hole 20.00 ft.

BORE HOLE Dia	From	To	SEAL Material	From	To	Amt	sacks/ lbs
3.87	0	20	Bentonite Chips	0	20	3	S

Backfill placed from _____ ft. to _____ ft. Material _____
Filter pack from _____ ft. to _____ ft. Material _____ Size _____

(7) CASING/SCREEN

Casing	Screen	Dia	+	From	To	Gauge	Stl	Plstc	Wld	Thrd
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐
○	○		☐				○	○	☐	☐

(8) WELL TESTS

○ Pump ○ Bailer ○ Air ○ Flowing Artesian

Yield gal/min	Drawdown	Drill stem/Pump depth	Duration(hr)

Temperature _____ °F Lab analysis ☐ Yes By _____

Supervising Geologist/Engineer _____

Water quality concerns? ☐ Yes (describe below) TDS amount _____ _____

From	To	Description	Amount	Units

(9) LOCATION OF HOLE (legal description)

County MARION Twp 7.00 S N/S Range 3.00 W E/W WM
Sec 24 SE 1/4 of the SW 1/4 Tax Lot 100
Tax Map Number _____ Lot _____
Lat ° ' " or 44.94238889 DMS or DD
Long ° ' " or -123.00056944 DMS or DD
○ Street address of hole ◉ Nearest address
901 PARK AVE NE SALEM, OR

(10) STATIC WATER LEVEL

	Date	SWL(psi)	+	SWL(ft)
Existing Well / Predeepening			☐	
Completed Well			☐	

WATER BEARING ZONES

Flowing Artesian? ☐
Depth water was first found _____

SWL Date	From	To	Est Flow	SWL(psi)	+	SWL(ft)
					☐	
					☐	
					☐	
					☐	
					☐	

(11) SUBSURFACE LOG

Ground Elevation _____

Material	From	To
Silt & Some Clay	0	10
Sandy Silt	10	20

Date Started 3/10/2016 Completed 3/10/2016

(12) ABANDONMENT LOG:

Material	From	To	Amt	sacks/ lbs
Bentonite Chips	0	20	3	S

Date Started 3/10/2016 Completed 3/10/2016

Professional Certification

(to be signed by an Oregon licensed water or monitoring well constructor, Oregon registered geologist or professional engineer).

I accept responsibility for the construction, deepening, alteration, or abandonment work performed during the construction dates reported above. All work performed during this time is in compliance with Oregon geotechnical hole construction standards. This report is true to the best of my knowledge and belief.

License/Registration Number 10607 Date 3/16/2016

First Name ADONIS Last Name PABLO

Affiliation WESTERN STATES SOIL CONSERVATION

ORIGINAL - WATER RESOURCES DEPARTMENT

THIS REPORT MUST BE SUBMITTED TO THE WATER RESOURCES DEPARTMENT WITHIN 30 DAYS OF COMPLETION OF WORK

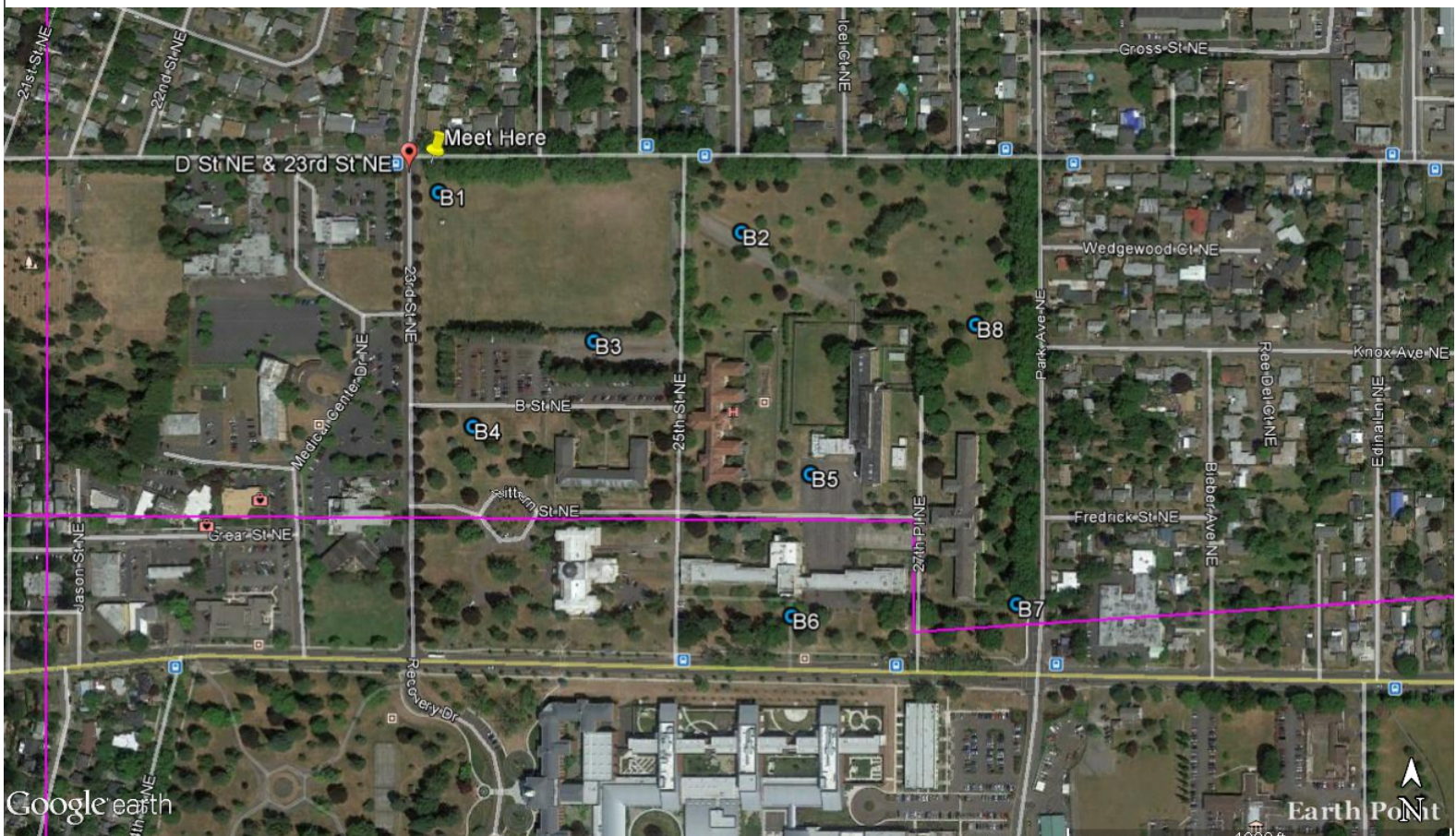
Form Version:

GEOTECHNICAL HOLE REPORT - Map with location identified must be attached and shall include an approximate scale and north arrow

MARI 66144

3/16/2016

Map of Hole



Soil Map—Marion County Area, Oregon
(3021 D Street NE, Salem OR)

Map Scale: 1:2,210 if printed on A landscape (11" x 8.5") sheet.

N

Meters
0 30 60 120 180

Feet
0 100 200 400 600

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Marion County Area, Oregon
Survey Area Data: Version 21, Sep 8, 2023

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: May 17, 2023—Jun 3, 2023

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
Am	Amity silt loam	3.8	16.0%
WuA	Woodburn silt loam, 0 to 3 percent slopes	19.8	84.0%
Totals for Area of Interest		**23.5**	**100.0%**

Marion County Area, Oregon

WuA—Woodburn silt loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 24s3
Elevation: 150 to 350 feet
Mean annual precipitation: 40 to 45 inches
Mean annual air temperature: 52 to 54 degrees F
Frost-free period: 200 to 210 days
Farmland classification: All areas are prime farmland

Map Unit Composition

Woodburn and similar soils: 85 percent
Minor components: 1 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Woodburn

Setting

Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Silty alluvium and mixed mineralogy loess

Typical profile

H1 - 0 to 17 inches: silt loam
H2 - 17 to 32 inches: silty clay loam
H3 - 32 to 68 inches: silt loam

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Moderately well drained
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: About 25 to 32 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: High (about 12.0 inches)

Interpretive groups

Land capability classification (irrigated): 2w
Land capability classification (nonirrigated): 2w
Hydrologic Soil Group: C
Ecological site: R002XC008OR - Valley Terrace Group
Forage suitability group: Moderately Well Drained < 15% Slopes (G002XY004OR)
Other vegetative classification: Moderately Well Drained < 15% Slopes (G002XY004OR)

Hydric soil rating: No

Minor Components

Aquolls, somewhat poorly drained
Percent of map unit: 1 percent
Landform: Terraces
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Marion County Area, Oregon
Survey Area Data: Version 21, Sep 8, 2023

Hydric soil rating: No

Minor Components

Aquolls, somewhat poorly drained
Percent of map unit: 1 percent
Landform: Terraces
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: Marion County Area, Oregon
Survey Area Data: Version 21, Sep 8, 2023