

TCC Associates, Inc.
5821 SE 82nd Ave
Suite 111
Portland, OR 97266
Phone(503) 277-8143
Email: etawiah@TCCENGR.com

Prepared for:

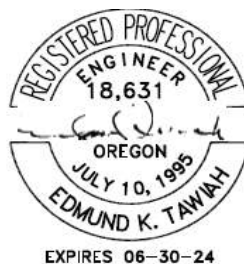
Siamak Lotfi
Siamak's Car Company
1241 Evergreen Rd
Woodburn, OR 97071

March 13, 2024

Stormwater Report

Siamak's Car Lot Facility Improvements 1241 Evergreen Rd Woodburn, Oregon 97071

T5N R2W SEC 12AC TL 04302 & 04303 Marion County, OR TCC Project No.: 23-028



Prepared By: Edmund Tawiah, PE

March 13, 2024

Contents

- Chapter 1: Background and Proposed Stormwater Management
- Chapter 2: Hydrologic Basin Areas
- Chapter 3: Pre and Post-Development Hydrographs
- Chapter 4: Sub-basin "A" Hydrograph and Routing Calculations

Appendix

- Drainage Plans

Project Overview

Background

This 1.24 acre parcel is located at the northwest corner of Tom Tennant Dr and Evergreen Rd. It is located in a commercial frontage area of fully developed lots. The site is currently used as a car dealership business. There is an existing office building on the site that will be demolished to make way for the site development.

Proposed Development

The site will be developed into an office building and car parking lot. There will be an on-site parking lot for cars for sale near the proposed building. There will be an entry and exit driveway from Evergreen Rd.

Existing Drainage Facilities & Watershed Draining to Site

There is an existing public storm drainage facilities in Evergreen Rd, where a curb inlet connects to the storm line. The site is relatively flat and slopes approximately 1% towards the west and northeast. There are private drainage system on-site for the existing parking lot. The existing impervious area of the site (pavement, walkways and roof areas) is 20,369 sf and pervious is 33,645.40 sf.

Existing Site Constraints, Sensitive Areas and Waterways

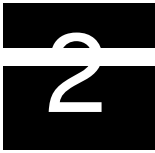
The site is in an urban commercial district with no site constraints, sensitive areas or waterways. The site's frontage at Evergreen Road has three trees in the planter strip of the public right of way. No existing tree on the site is affected by this development.

Proposed Stormwater Management

Stormwater from the roofs of the proposed buildings will be directed to an on-site storm system via downspouts. The proposed driveway aisles and parking lots will drain to a proposed flow-through swale for treatment and thereafter, disposed into the public street storm line in Evergreen Road. In the event of 100-yr storm, the runoff will partly overflow to Evergreen Road.

Field Test Infiltration Rate

Stormwater infiltration testing has been conducted by Rapid Soil Solutions and was found to be not viable because of high ground water. See attached infiltration report.

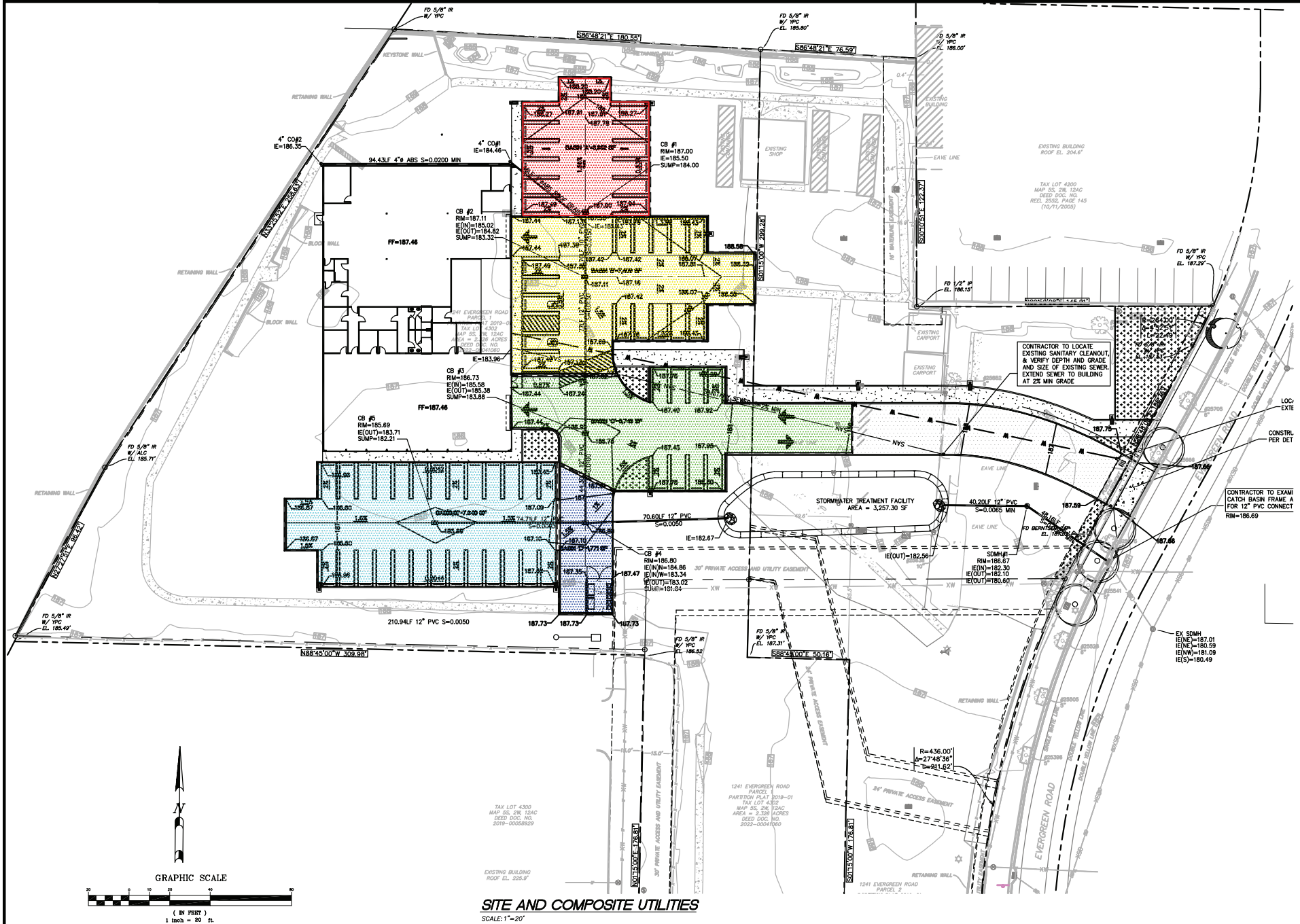


Hydrologic Areas

Pre-Development	Impervious Area (sf)	Pervious Area (sf)
Existing Building	4,118	
Walkways	7,163	
Parking	9,088	
Total Areas	21,567 (0.495Ac)	(25,700-21,567) = 4,133 (0.0949 Ac)
Post-Development	Impervious Area (sf)	Pervious Area (sf)
Proposed Building & Patio	3,024	
Parking Lot	13,305	
Walkways	382	
Total Areas	16,711 (0.384 Ac)	(54014.40-16,711) = 37303.40 (0.8564Ac)

Catchment and Facility Table							
Catchment Facility ID	Source	Impervious Area sf/ac	Pervious Area sf/ac	Ownership Private-Public	Facility Type	Facility Size sf/ac	Curve No.
Basin "A"	Parking Lot	3,952sf/0.091ac	0	Private	Private	N/A	98
Basin "B"	Parking Lot	7,409sf/0.170ac	0	Private	Private	N/A	98
Basin "C"	Parking Lot	6,748sf/0.155ac	0	Private	Private	N/A	98
Basin "D"	Parking Lot	1771sf/0.041ac	0	Private	Private	N/A	98
Basin "E"	Parking Lot	7,640sf/0.175ac	0	Private	Private	N/A	98

Pre vs Post Construction Flow Rates						
Facility ID	Peak Flow Rates (cfs)					
	Half of the 2-yr Storm		10-Year Storm		100-Year Storm	
Project Site	Pre	Post	Pre	Post	Pre	Post
Entire Site	0.28/2=0.14	0.23	0.42	0.40	0.60	0.64
Basin "A"	N/A	N/A	N/A	N/A	N/A	N/A
Basin "B"	N/A	N/A	N/A	N/A	N/A	N/A
Basin "C"	N/A	N/A	N/A	N/A	N/A	N/A
Basin "E"	N/A	N/A	N/A	N/A	N/A	N/A
Basin "F"	N/A	N/A	N/A	N/A	N/A	N/A



SITE AND COMPOSITE UTILITIES
SCALE: 1"=20'



SIAMAK'S CAR LOT FACILITY
1241 EVERGREEN RD
WOODBURN, OREGON 97071
TL4302, TSN R2W SEC 12AC
MARION COUNTY

DRAINAGE BASIN AREAS

NO.	DATE	REVISION	BY	CHK

TCC ASSOCIATES INC
1111 SW 27th Ave
Portland, OR 97204
PH: (503) 981-5400
FAX: (503) 981-5400
www.tccassoc.com

SIAMAK LOT#1
SIAMAK'S CAR COMPANY
1241 EVERGREEN RD
WOODBURN, OREGON 97071
PH: (503) 981-5400
FAX: (503) 981-5400

SHEET **3** OF **7**
23-028

Data for Storm Events Hydrograph

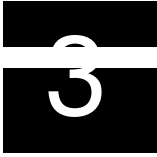
Entire Site	Impervious Areas	Pervious Areas
Pre-Development	21,567 sf / 0.50 ac	4,133 sf / 0.095 ac
Post-Development	16,711 sf / 0.384ac	8,989 sf / 0.206 ac

Curve Numbers	Impervious Roof, Parking & Concrete Areas	Pervious Land Cover
Pre-Development	98	72
Post-Development	98	72

24-hr Rainfall Depths for Salem	
Design Storm Event	Precipitation (inches/24hrs)
Water Quality Event	1.38
2-Yr	2.20
10-Yr	3.20
100-Yr	4.40

Steps to Sizing Flow-through Planter Facility:

- Calculate 10yr Storm Event for Basin Areas
- Use the 10yr hydrograph and route it through the swale facility
- Use the peak routing runoff volume to size the swale facility
- Adjust size per trial to ensure peak runoff volume is less or equal to facility volume
- Calculate the drawdown time to ensure it is less than or equal to 30hrs.



Hydrographs

2-Year Pre-Development Hydrograph

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
2, 24, 2.2

***** S.C.S. TYPE-1A DISTRIBUTION *****
***** 2-YEAR 24-HOUR STORM **** 2.20" TOTAL PRECIP. *****

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1
0.0949, 72, 0.495, 98, 5

AREA(ACRES)	PERVIOUS		IMPERVIOUS		TC(MINUTES)
	A	CN	A	CN	
0.6	0.1	72.0	0.5	98.0	5.0

PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
0.28	7.67	3675

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
c:\Evergreen\Pre2yr.hyd

2-Year Post-Development Hydrograph

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)
2, 24, 2.2

***** S.C.S. TYPE-1A DISTRIBUTION *****
***** 2-YEAR 24-HOUR STORM **** 2.20" TOTAL PRECIP. *****

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1
0.8564, 72, 0.384, 98, 5

AREA(ACRES)	PERVIOUS		IMPERVIOUS		TC(MINUTES)
	A	CN	A	CN	
1.2	0.9	72.0	0.4	98.0	5.0

PEAK-Q(CFS)	T-PEAK(HRS)	VOL(CU-FT)
0.23	7.67	3933

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
c:\Evergreen\Post2yr.hyd

10-Year Pre-Development Hydrograph

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)

10, 24, 3.0

***** S.C.S. TYPE-1A DISTRIBUTION *****

***** 10-YEAR 24-HOUR STORM **** 3.00" TOTAL PRECIP. *****

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1

0.0949, 72, 0.495, 98, 5

AREA(ACRES) PERVIOUS IMPERVIOUS TC(MINUTES)

	A	CN	A	CN	
0.6	0.01	72.0	0.5	98.0	5.0

PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT)

0.40 7.67 5252

10-Year Post-Development Hydrograph

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)

10, 24, 3

***** S.C.S. TYPE-1A DISTRIBUTION *****

***** 10-YEAR 24-HOUR STORM **** 3.00" TOTAL PRECIP. *****

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1

0.8564, 72, 0.384, 98, 5

AREA(ACRES) PERVIOUS IMPERVIOUS TC(MINUTES)

	A	CN	A	CN	
1.2	0.9	72.0	0.4	98.0	5.0

PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT)

0.41 7.67 6370

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:

100-Year Pre-Development Hydrograph

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)

100, 24, 4.4

***** S.C.S. TYPE-1A DISTRIBUTION *****
***** 100-YEAR 24-HOUR STORM **** 4.40" TOTAL PRECIP. *****

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1

0.0949, 72, 0.495, 98 5

AREA(ACRES) PERVIOUS IMPERVIOUS TC(MINUTES)

A CN A CN
0.6 0.1 72.0 0.5 98.0 5.0

PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT)

0.61 7.67 8084

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
c:/Evergreen/Pre100yr.hyd

100-Year Post-Development Hydrograph

ENTER: FREQ(YEAR), DURATION(HOUR), PRECIP(INCHES)

100, 24, 4.4

***** S.C.S. TYPE-1A DISTRIBUTION *****
***** 100-YEAR 24-HOUR STORM **** 4.40" TOTAL PRECIP. *****

ENTER: A(PERV), CN(PERV), A(IMPERV), CN(IMPERV), TC FOR BASIN NO. 1

0.8564, 72, 0.384, 98, 5

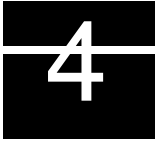
AREA(ACRES) PERVIOUS IMPERVIOUS TC(MINUTES)

A CN A CN
1.2 0.9 72.0 0.4 98.0 5.0

PEAK-Q(CFS) T-PEAK(HRS) VOL(CU-FT)

0.78 7.67 11234

ENTER [d:][path]filename[.ext] FOR STORAGE OF COMPUTED HYDROGRAPH:
c:/Evergreen/Post100yr.hyd



- 1 - INFO ON THIS PROGRAM
- 2 - SBUHYD
- 3 - MODIFIED SBUHYD
- 4 - ROUTE
- 5 - ROUTE2
- 6 - ADDHYD
- 7 - BASEFLOW
- 8 - PLOTHYD
- 9 - DATA
- 10 - RDFAC
- 11 - RETURN TO DOS

ENTER OPTION: **10**
R/D FACILITY DESIGN ROUTINE

SPECIFY TYPE OF R/D FACILITY:

- 1 - POND
 - 2 - TANK
 - 3 - VAULT
 - 4 - INFILTRATION POND
 - 5 - INFILTRATION TANK
 - 6 - GRAVEL TRENCH/BED
- 1**

Flow-through Planter Trench Sizing: Trial 1

Infiltration Planter Plan Area (Irregular): **584 sf**

Void Ratio of Rock Trench = **0.30**

Top section area = **584 ft²**

Bottom Section Area = **584 ft²**

Volume of Planter = $584\text{ft}^2 \times 3\text{ ft} \times 0.30 = \mathbf{525.60\text{ft}^3}$

Routing Peak Storage Volume (**85 ft³**) < **Volume of Swale (525.60ft³)**

Check Drawdown Time:

Drawdown Time = Runoff Volume / Infiltration Design Rate X Rectangular Surface Area

- Infiltration Design Rate = 2 inches / hr = **0.17 ft /hr**
- Runoff Peak Volume = **1,152 ft³**

ENTER: EFFECTIVE STORAGE DEPTH(ft) BEFORE OVERFLOW 3

ENTER: VERTICAL PERMEABILITY(min/in) 30

ENTER [d:][path]filename[.ext] OF PRIMARY DESIGN INFLOW HYDROGRAPH:

c:/basinf10.hyd

PRIMARY DESIGN INFLOW PEAK = **0.09 CFS**

0

ENTER PRIMARY DESIGN RELEASE RATE(cfs): **0.045 (Half of inflow)**

ENTER NUMBER OF INFLOW HYDROGRAPHS TO BE TESTED FOR PERFORMANCE (5 MAXIMUM):

1

ENTER [d:][path]filename[.ext] OF HYDROGRAPH 1: c:/basinf10.hyd

ENTER TARGET RELEASE RATE(cfs): **0.045**

ENTER: NUMBER OF ORIFICES, RISER-HEAD(ft), RISER-DIAMETER(in)

1, 3, 6

RISER OVERFLOW DEPTH FOR PRIMARY PEAK INFLOW = **0.07 FT**

SPECIFY ITERATION DISPLAY: Y - YES, N - NO y

SPECIFY: R - REVIEW/REVISE INPUT, C - CONTINUE c

INITIAL STORAGE VALUE FOR ITERATION PURPOSES: **399 CU-FT**

SINGLE ORIFICE RESTRICTOR: DIA= 0.98"

ITERATION COMPUTATION BEGINS...

TRIAL	BOTTOM-AREA	STOR-AVAIL	STOR-USED	PK-STAGE	PK-OUTFLOW
1	443.3	398	95 .72	.04	
2	274.9	247	96 1.17	.04	
3	190.8	171	93 1.63	.04	
4	147.3	132	89 2.03	.04	
5	123.5	111	86 2.33	.05	
6	109.8	98	84 2.55	.05	
7	101.7	91	82 2.70	.05	
8	96.6	86	81 2.80	.05	
9	93.4	84	80 2.87	.05	
10	91.4	82	79 2.91	.05	
11	90.0	81	79 2.94	.05	
12	89.2	80	79 2.96	.05	
13	88.6	79	79 2.97	.05	
14	88.2	79	78 2.98	.05	
15	88.0	79	78 2.99	.05	
16	87.8	79	78 2.99	.05	
17	87.7	78	78 3.00	.05	
18	87.7	78	78 3.00	.05	
19	87.6	78	78 3.00	.05	

PERFORMANCE:	INFLOW	TARGET-OUTFLOW	ACTUAL-OUTFLOW	PK-STAGE	STORAGE
DESIGN HYD:	.09	.05	.04	3.00	78
TEST HYD 1:	.09	.05	.04	3.00	70

SPECIFY: D - DOCUMENT, R - REVISE, A - ADJUST ORIF, E - ENLARGE, S - STOP d

PERFORMANCE:	INFLOW	TARGET-OUTFLOW	ACTUAL-OUTFLOW	PK-STAGE	STORAGE
DESIGN HYD:	.09	.05	.04	3.00	78
TEST HYD 1:	.09	.05	.04	3.00	70

STRUCTURE DATA: GRAVEL TRENCH/BED (30 PERCENT VOID VOLUME)

RISER-HEAD GRAVEL-BED-AREA STOR-DEPTH STORAGE-VOLUME
3.00 FT 87.6 SQ-FT 3.00 FT 78 CU-FT

SINGLE ORIFICE RESTRICTOR: DIA= **0.98"**

ROUTING DATA:

STAGE(FT)	DISCHARGE(CFS)	STORAGE(CU-FT)	PERM-AREA(SQ-FT)
.00	.00	.0	.0
.30	.01	7.9	87.6
.60	.02	15.8	87.6
.90	.02	23.7	87.6
1.20	.03	31.5	87.6
1.50	.03	39.4	87.6
1.80	.03	47.3	87.6
2.10	.04	55.2	87.6
2.40	.04	63.1	87.6
2.70	.04	71.0	87.6
3.00	.05	78.9	87.6
3.10	.20	78.9	87.6
3.20	.47	78.9	87.6
3.30	.57	78.9	87.6
3.40	.65	78.9	87.6
3.50	.72	78.9	87.6

AVERAGE VERTICAL PERMEABILITY: 30.0 MINUTES/INCH

SPECIFY: F - FILE, N - NEWJOB, P - PRINT IF/OF, R - REVISE, S - STOP p

INFLOW/OUTFLOW ANALYSIS:

PEAK-INFLOW(CFS)	PEAK-OUTFLOW(CFS)	OUTFLOW-VOL(CU-FT)
.09	.04	541

INITIAL-STAGE(FT)	TIME-OF-PEAK(HRS)	PEAK-STAGE-ELEV(FT)
.00	8.00	3.00

PEAK STORAGE **78 CU-FT**

INFILTRATED VOLUME: 0 CU-FT

SELECT PRINT-OPTION: "1"(SURFACE-OUTFLOW) OR "2"(SUBSURFACE-OUTFLOW)
2

INFLOW/OUTFLOW DATA PRINT-OUT:

T(HRS)	QI(CFS)	QO(CFS)	EL(FT)	T(HRS)	QI(CFS)	QO(CFS)	EL(FT)
.00	.00	.00	.00	5.50	.01	.00	.16
.17	.00	.00	.00	5.67	.02	.00	.23
.33	.00	.00	.00	5.83	.02	.00	.31
.50	.00	.00	.00	6.00	.02	.00	.34
.67	.00	.00	.00	6.17	.02	.00	.36
.83	.00	.00	.00	6.33	.02	.00	.37
1.00	.00	.00	.00	6.50	.02	.00	.38
1.17	.00	.00	.00	6.67	.02	.00	.38
1.33	.00	.00	.00	6.83	.02	.00	.38

1.50	.00	.00	.00	7.00	.02	.00	.38
1.67	.00	.00	.00	7.17	.03	.00	.48
1.83	.01	.00	.07	7.33	.03	.00	.63
2.00	.01	.00	.15	7.50	.05	.00	.93
2.17	.01	.00	.16	7.67	.09	.00	1.76
2.33	.01	.00	.16	7.83	.08	.00	2.72
2.50	.01	.00	.16	8.00	.04	.00	3.00
2.67	.01	.00	.16	8.17	.03	.00	2.70
2.83	.01	.00	.16	8.33	.03	.00	2.35
3.00	.01	.00	.16	8.50	.03	.00	2.06
3.17	.01	.00	.16	8.67	.02	.00	1.73
3.33	.01	.00	.16	8.83	.02	.00	1.36
3.50	.01	.00	.16	9.00	.02	.00	1.07
3.67	.01	.00	.16	9.17	.02	.00	.85
3.83	.01	.00	.16	9.33	.02	.00	.70
4.00	.01	.00	.16	9.50	.02	.00	.59
4.17	.01	.00	.16	9.67	.02	.00	.51
4.33	.01	.00	.16	9.83	.02	.00	.47
4.50	.01	.00	.16	10.00	.02	.00	.44
4.67	.01	.00	.16	10.17	.02	.00	.42
4.83	.01	.00	.16	10.33	.02	.00	.41
5.00	.01	.00	.16	10.50	.02	.00	.40
5.17	.01	.00	.16	10.67	.02	.00	.40
5.33	.01	.00	.16	10.83	.01	.00	.30

Swale Planter Trench Sizing: Trial 1

Swale Planter Plan Area (Rectangular): **455 sf**

Void Ratio of Rock Trench = **0.30**

Top section area = **455 ft²**

Bottom Section Area = **455 ft²**

Volume of Planter = **455 ft² X 3 ft X 0.30 = 409.50ft³**

Routing Peak Storage Volume (**78 ft³**) < **Volume of Swale (409.50ft³)**

Check Drawdown Time:

Drawdown Time = Runoff Volume / Infiltration Design Rate X Rectangular Surface Area

- Infiltration Design Rate = 2 inches / hr = **0.17 ft /hr**
- Runoff Peak Volume = **1,120 ft³**
- infiltration Planter Area = **455 ft²**
- Drawdown Time = $1120 \text{ ft}^3 / (0.17 \text{ ft/hr} \times 455 \text{ ft}^2) = \mathbf{14.48 \text{ hrs} < 30\text{hrs, Therefore OK.}$