Taylor
Engineering
Consultants

DRAINAGE REPORT

for the

Talerman Simon Residence

at
3879 W. Mercer Way
Mercer Island, WA 98040

Parcel Number 776700-0010

Prepared for: Edward Talerman

TEC Job #: 724-FSA

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Date: August 27, 2018

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Stormwater Site Plan Report
Talerman Simon Residence at 3879 W. Mercer Way

PROJECT OVERVIEW

This Stormwater Site Plan Report is submitted to the City of Mercer Island; together with civil engineering plans to assist in permitting for the replacement of an existing residence on parcel number 776700-0010. The report and analysis are in accordance with the Washington State Department of Ecology's Stormwater Management Manual for the Puget Sound Basin (DOE or Ecology Manual) and the City of Mercer Island's Storm Drainage Requirements.

The project address is 3879 W. Mercer Way, southwest of W. Mercer Way and one lot north of Freeman Avenue/SE 40th Street. The land slopes down to the south at about 15-18% overall, becoming very steep close to Lake Washington, but also with localized steeper areas. The property totals 30,000 square feet.

This project will replace the existing house and site hardscaping with a new house of similar size at the same location as the existing house. The project will increase the impervious coverage on the site and easement across the adjacent property to the north by 816 square feet; from 5,456 square feet to 6,272 square feet.

MINIMUM REQUIREMENTS

This report and the accompanying project plans meet the criteria listed in the City's Storm Drainage Review and Permit Process.

The following summary describes how this project will meet Minimum Requirements #1 through #5.

Minimum Requirement #1: Preparation of Stormwater Site Plans

This Drainage Report, together with the Civil Engineering Plans constitutes the Stormwater Site Plan for this project.

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

The SWPPP includes the SWPPP plan drawing in the civil drawing set and the following narrative addressing the items in the SMMWW's Construction Stormwater Pollution Prevention Plan Checklist.

Construction SWPPP Narrative

1. Construction Stormwater Pollution Prevention Elements

Each proposed BMP is identified on the plans and described below, where justification is also provided wherever an element is not applicable to the site.

Twelve (12) Required Elements – Construction Stormwater Pollution Prevention Plan

The following list explains the pollution prevention decisions made for the twelve SWPPP elements.

1. **Preserve Vegetation/Mark Clearing Limits:** The 0.69-acre site is currently developed as a single-family residence with the impervious areas concentrated on the northeast side of the lot. This project will construct the new house at the same location as the existing house, preserving trees and other vegetation on the lower portions of the lot. The clearing limits shown on the SWPPP ensure that the proposed construction activities will keep away from the steep slope areas on the site.
2. **Establish Construction Access:** A single construction access point is shown and detailed on the SWPPP, entering the site at the asphalt driveway from W. Mercer Way

(aka Shoreclift Lane). The proposed construction access will be over the existing asphalt driveway, which can be supplemented with a standard quarry spall BMP, if needed. Need for a wheel wash is not anticipated due to the relatively small size of the site and project.

3. **Control Flow Rates:** This project will add only 816 square feet of new impervious surface area and will control construction flow rates by preserving existing vegetation along the downhill side of the site and with silt fencing around the entire downhill and sloped sides of the site.
4. **Install Sediment Controls:** Sediment controls for this residential site are shown on the SWPPP, and include silt fencing, catch basin protection, and a stabilized construction entrance, if required.
5. **Stabilize Soils:** The Construction Sequence on the SWPPP stipulates cover practices for exposed soils to prevent erosion, including dry and wet season variations.
6. **Protect Slopes:** The SWPPP plan notes include language for protecting temporary slopes and exposed grading.
7. **Protect Drain Inlets:** Inlet protection is shown and detailed on the SWPPP plan for all proposed catch basins. There are no existing catch basins in the vicinity.
8. **Stabilize Channels and Outlets:** No conveyance channels are proposed.
9. **Control Pollutants:** Due to the small nature of the site and project, construction-related pollutants are anticipated to be minimal; however, the pH level in storm runoff from construction sites can be too high if storm runoff comes in contact with concrete, cement, mortars or other Portland cement or lime-containing materials. The contractor shall comply with BMP C253 (see Appendix) during construction of this project.
10. **Control Dewatering:** If necessary, dewatering can likely be dealt with at the surface as surface runoff on this sloping site.
11. **Maintaining BMPs:** Maintenance requirements for BMPs are included in the SWPPP notes.
12. **Manage the Project:** The SWPPP notes include requirements for inspecting and managing the site.

2. Project Description

- The total project area is 0.69 acres
- The total proposed impervious area is 6,272 sf.
- The maximum proposed area to be disturbed is 13,120 sf, including the proposed offsite driveway improvements and storm drain extension.
- The proposed project will require 385 cubic yards of excavation - 135 cy for the sitework elements and 250 cy for the building; and 225 cubic yards of fill – 175 cy for the sitework and 50 cy for the building.

3. Existing Site Conditions

The land slopes down to the south at about 23% in the area around the house, flattens to about 7 percent in the upper back yard, and then becomes very steep (70% to 100% slope) in the lowest portion of the back yard. The site vegetation is lawn, landscaping, and large trees and bushes.

4. Adjacent Areas

The project abuts W. Mercer Way on the northeast and is otherwise surrounded by private residential properties. The land to the southwest of the property is similarly steep and slopes down to Lake Washington about 60 feet from the southwest property line. There are no adjacent streams or wetlands that may be affected by the proposed site disturbance, but the hazard areas associated with the steep topography need to be taken into account. The adjacent residential properties should be protected from construction disturbance to the maximum extent possible.

5. Critical Areas

According to the City's GIS Portal mapping, site soils are sensitive to erosion and potential landslides, and the site is also mapped for seismic hazards and steep slopes.

6. Soils

According to the Natural Resources Conservation Service (NRCS), site soils are Kitsap Silt Loam, 15 to 30 percent slopes.

7. Erosion Problem Areas

The entire site is in an area mapped as a potential slide and erosion hazard area, and the lower portion of the site is also within a seismic and steep slope hazard area.

8. Construction Phasing

Construction phasing is not proposed. Construction sequence follows:

1) Hold an onsite pre-construction meeting.
2) Flag or fence clearing limits.
3) Install catch basin protection, if required.
4) Grade and install construction entrance(s).
5) Install perimeter protection (silt fence, brush barrier, etc.).
6) Construct sediment pond(s) and/or trap(s), if required
7) Construct surface water controls (interceptor dikes, pipe slope drains, etc.) simultaneously with clearing and grading for project development.
8) Maintain TESC measures in accordance with City standards and manufacturer's recommendations.
9) Relocate surface water controls or TESC measures, or install new measures so that as site conditions change, the TESC is always in accordance with Temporary Erosion and Sedimentation Control Requirements.
10) Cover all areas that will be un-worked for more than two days during the wet season (Oct. 1 to April 30) or seven days during the dry season (May 1 to Sept. 30) with straw, wood fiber mulch, compost, plastic sheeting, or equivalent.
11) Stabilize all areas within seven days of reaching final grade.
12) Seed or sod any areas to remain un-worked for more than 30 days.
13) Upon completion of the project, stabilize all disturbed areas and remove TESC measures if appropriate.

9. Construction Schedule

a) Construction is proposed to begin in October 2018 and sitework completion is expected in September 2019.

b) Wet Season Construction Activities outside the building footprint will be limited as much as possible, but all sitework construction activities must abide by the stipulations in the Erosion and Sediment Control Notes.

10. Financial/Ownership Responsibilities

Edward and Dyan Talerman

11. Engineering Calculations

A sediment trap is only anticipated in the event of wet season sitework construction. Runoff model input and output used for sediment trap sizing are included in the Appendix.

a) Sediment trap: SA = 2,080*Q2(15min) = 2,080*0.0747 = 155sf

b) Diversions: Not applicable

c) Waterways: Not applicable

d) Runoff/Stormwater Detention Calculations: Not applicable for erosion control.

Minimum Requirement #3: Source Control of Pollution

Not Applicable.

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

This property naturally drains to the southwest, and the property itself, and the parcel to the southwest include potential slide, steep slope, seismic, and erosion hazard areas, and there is no existing drainage conveyance across these sensitive areas. To protect the sensitive areas on the site and the adjacent property, as well as Lake Washington, a stabilized drainage connection is proposed across the adjacent parcel to the south to convey site runoff to an existing outfall at the extension of Freeman Avenue.

Minimum Requirement #5: Onsite Stormwater Management

To meet minimum requirement #5, this project proposes to amend all disturbed soil in accordance with WSDOE Manual BMP T5.13 Post-Construction Soil Quality and Depth.

Most on-site stormwater management BMPs are not practical on this already-developed sloping site. Based on the City's LID Infeasibility Map, dispersion is not feasible because the entire site is in an area mapped as a potential slide and erosion hazard area, and the lower portion of the site is also within a seismic and steep slope hazard area. Infiltration is similarly not permitted based on the City's Infiltration Infeasibility Map.

Because neither dispersion, nor infiltration BMPs are feasible, and the property is very close to Lake Washington, the project proposes to construct a storm drain in a new easement across the adjacent parcel to the south, to convey site runoff to the existing 18-inch storm drain that flows down Freeman Avenue to the lake. This would create a direct discharge connection from the property to a receiving water body.

A rational method analysis shows that the 18-inch pipe has at least 13 cfs excess conveyance capacity beyond what is predicted during the 100-year design storm with the basin developed to the maximum allowed by zoning. And for comparison, the 100-year flow predicted by WWHM

using 15-minute time steps is only 0.184 cfs, so directing the site runoff to this storm drain will not adversely impact its existing or future performance. See Appendix for calculations.

OFF-SITE ANALYSIS

Except for parks and natural drainage corridors, the entire area surrounding this site is developed with single-family uses. Uphill of the site, there is a storm drain flowing southeast on the south side of W. Mercer Way, with a catch basin midway along the project property that conveys road runoff north across W. Mercer Way, then southeast to Freeman Avenue, where it crosses back to the southwest, and down Freeman Avenue to Lake Washington.

Downstream of the site, runoff from the project site area flows overland down the steep slope, across the adjacent property to Lake Washington. Routing developed site runoff will reduce the risk of erosion on the steep slope between the site and Lake Washington.

CONVEYANCE DESIGN

Conveyance features for this project are limited to conveyance from pavement drains and roof and footing drain pipes to the drainage pipe in Freeman Avenue, as shown on the Civil/Sitework Improvements Plan. Standard recommended residential pipe sizes will be sufficient for this purpose.

FLOW CONTROL DESIGN

Not applicable. This project proposes a direct discharge pipe connection to an existing outfall to Lake Washington.

WATER QUALITY DESIGN

Not applicable. The project proposes only 518 square feet of new PGIS.

OPERATIONS & MAINTENANCE MANUAL

This project is not subject to Minimum Requirement #9, Operation and Maintenance. However, the storm drainage catch basins should be inspected regularly and any accumulated sediment removed before it can be transported downstream.

APPENDIX

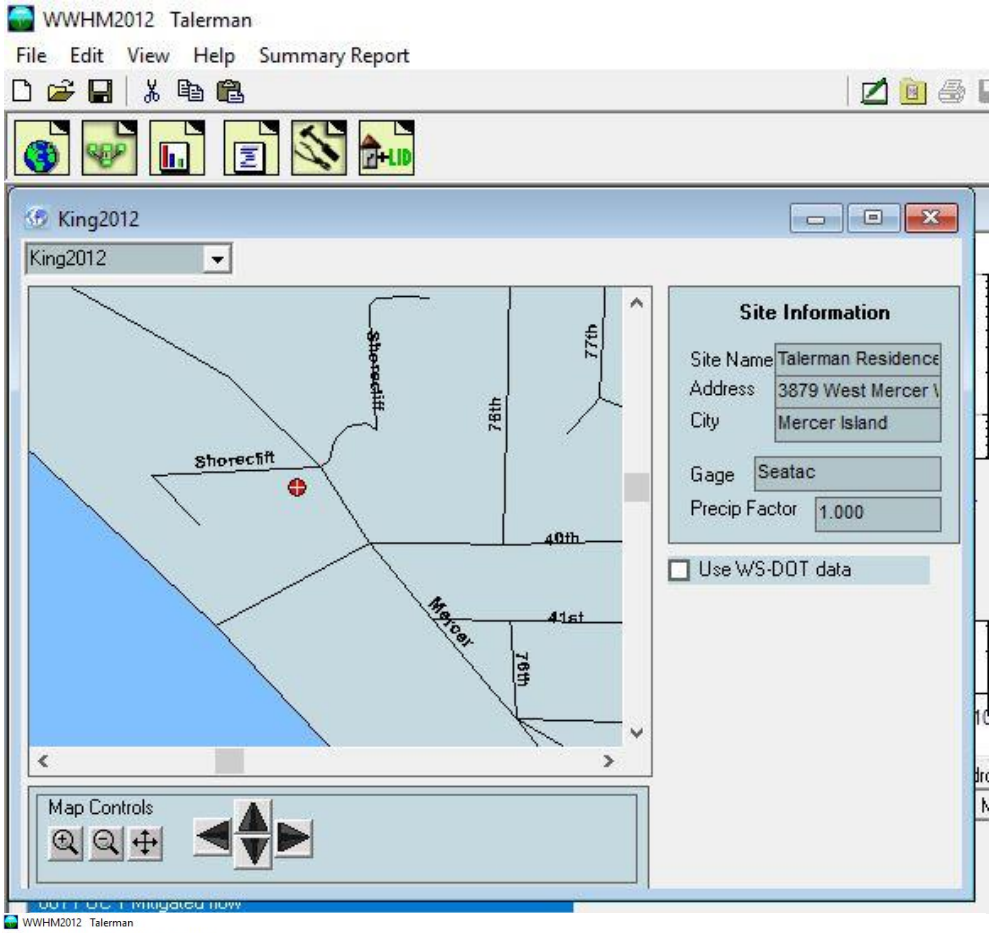
Summary of Impervious Areas

WWHM Analysis for Sediment Trap Sizing

Capacity Analysis for Downstream Storm Drain Connection

Talerman-Simon Residence

Project No.	724-FSA				
Date:	8/24/2018				
Property:	30,000	0.69			
Disturbance Area:	13,120	0.30	(includes offsite pavement improvements and storm drain pipe connection)		
Existing Impervious Surfaces (sf)		(ac)			
House Roof	1,730	0.04			
Carport Roof	644	0.01			
Front walk	255	0.01			
Front walk wall	10	0.00			
back patio, etc	895	0.02			
E wall	21	0.00			
W wall	13	0.00			
Driveway	1,888	0.04			
	5,456	0.13	1,194	0.03	non roof/dwy
Proposed Impervious Surfaces (sf)		(ac)			
House Roof	2,726	0.06			
W hardscape	234	0.01			
S hardscape	449	0.01			
E hardscape	173	0.00			
Front Stepping Stones	104	0.00			
Front patio	180	0.00			
Autocourt	2,021	0.05			
Asphalt infil (easmt)	385	0.01			
Total Impervious	6,272	0.14	1,140	0.03	non roof/dwy
Pervious	6,849	0.16			
New Imperv	816				
New PGIS	518				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Mercer
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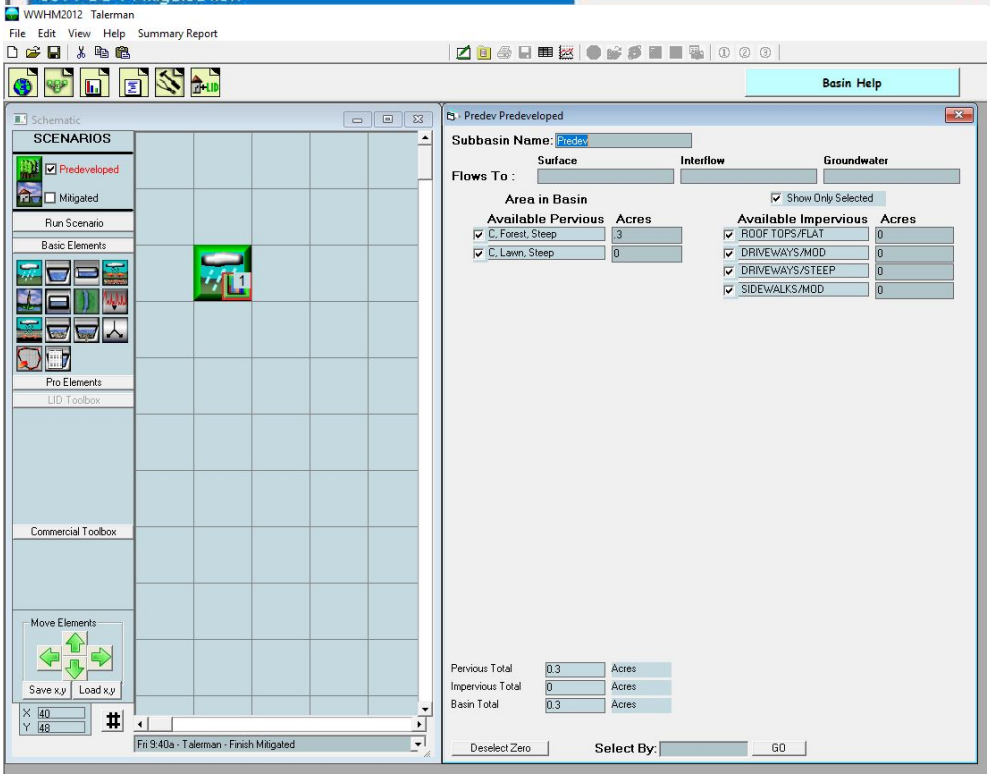
City Mercer Island
Gage Seatac
Precip Factor 1.000
Use WS-DOT data
Map Controls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Load x,y
Fri 9:40a - Talerman - Finish Mitigated
Predev Predeveloped
Subbasin Name: Predev
Surface
Interflow
Groundwater
Flows To :
Area in Basin
Show Only Selected
Available Pervious
Acres
C, Forest, Steep 3
C, Lawn, Steep 0
Available Impervious
Acres
ROOF TOPS/FLAT 0
DRIVEWAYS/MOD 0
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Impervious Total 0 Acres
Basin Total 0.3 Acres
Deselect Zero
Select By:
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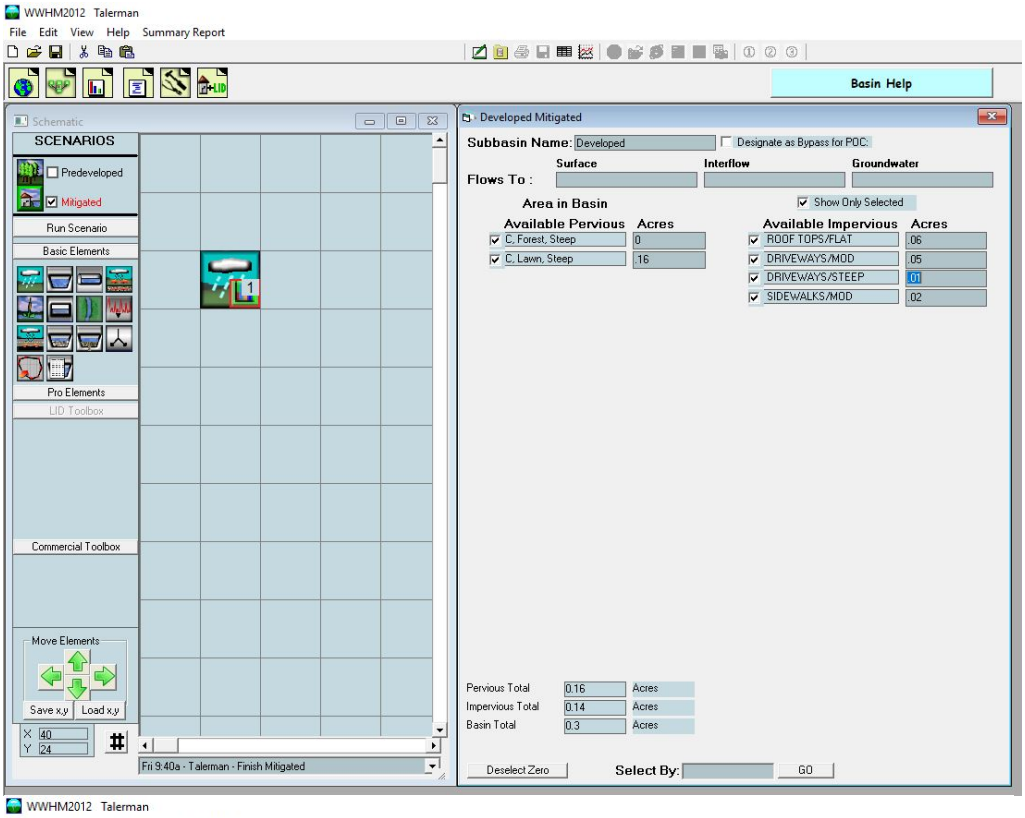

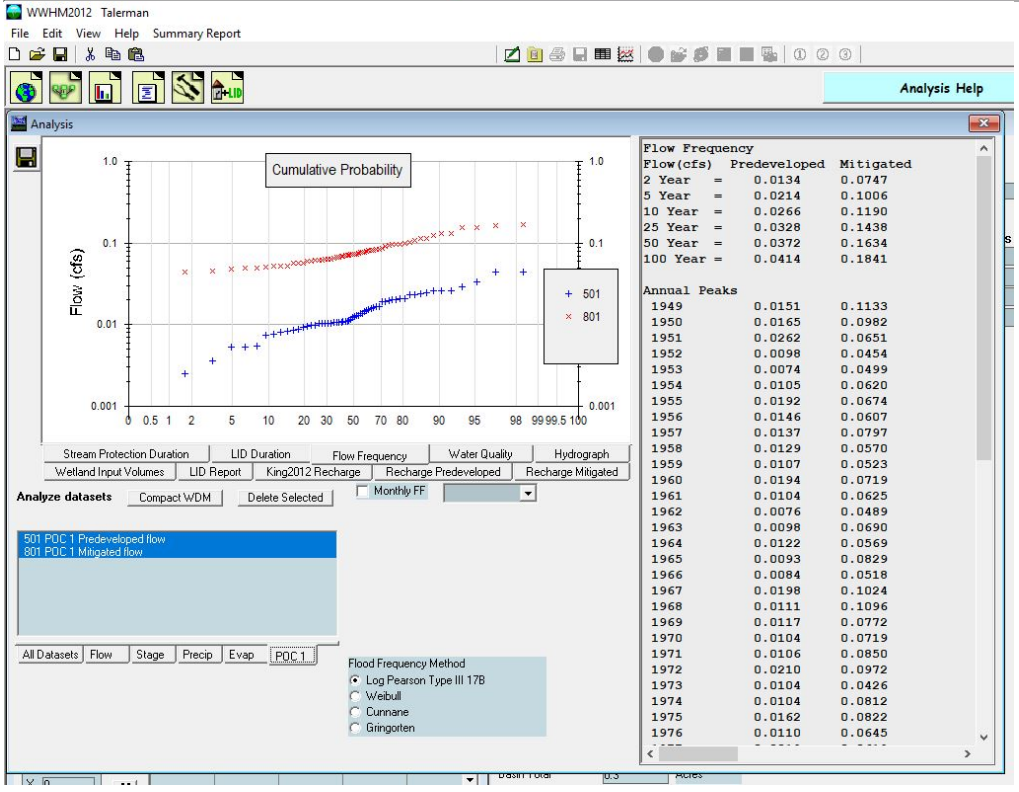

Sediment Trap Sizing: SA = 2,080 x Q2 = 2,080x0.0747 = 155 sf

Winter Construction: SA = 2,080 x Q10 = 2,080 x 0.1190 = 248 sf

7-2-18
LT

TALERMAN-SIMON RESIDENCE
DOWNSTREAM DRAINAGE SYSTEM
CAPACITY ANALYSIS

D.S. PIPE IS 18" ∅ @ 18% SLOPE (OR STEEPER)

TRIBUTARY AREA = 13.08 Ac ±

½ ZONED 15,000 SF/LOT

½ ZONED 9,600 SF/LOT

ASSUME 40% LOT COVERAGE @ FULL BUILDOUT FOR BOTH ZONES.

IMP = 0.4(13.08) = 5.23 Ac [C = 0.9]

PERV = 0.6(13.08) = 7.85 Ac [C = 0.25]

13 Ac IS TECHNICALLY TOO BIG FOR RATIONAL METHOD, BUT USE ANYWAY, SINCE CONSERVATIVE

P_{100} = 3.9"

L_1 = 100', S_1 = 0.05, k_R = 7.0 LAWN (ASSUMED)

L_2 = 100', S_1 = 0.05, k_R = 20 ROAD (ASSUMED)

Rational Method

Calculates the peak runoff

$Q=CI_RA$

1) Compute Composite Runoff Coefficient C_C:

	A_1	A_2	A_3	A_t, C_C	
A	5.23	7.85	0	13.08	(tributary areas, acres)
L	100	100	0		(length along flowpath, ft)
S_0	0.05	0.05	0.015		(slope along flowpath, ft/ft)
k_r	20	7	15		(from Table 3.2.1.C --- pg 3-13)
C	0.9	0.25	0.2	0.51	(from Table 3.2.1.A --- pg 3-13)

2) Compute Peak Rainfall Intensity I_R:

2a) First, compute Travel Time T_C:

	T_1	T_2	T_3	T_c	
T	0	1	0	6.3	(travel time, min)

2b) Second, compute unit peak rainfall intensity factor, $i_R = a_R*T_C\text{^}-b_R$:

R =	100	(storm return frequency, years)
a_R =	2.61	(coefficient from Table 3.2.1.B --- pg 3-13)
b_R =	0.63	(coefficient from Table 3.2.1.B --- pg 3-13)
i_R =	0.82	

2c) Third, compute $I_R = P_R*i_R$:

P_R =	3.9	(precipitation, in)
I_R =	3.19	

3) Compute Peak Runoff Rate, $Q_R = CI_RA$:

Q_R =	21.3	cfs

FIGURE 4.2.1.F NOMOGRAPH FOR SIZING CIRCULAR DRAINS FLOWING FULL