

July 7, 2023

Shawna Risotti
Administrative Assistant
Town of Sudbury
278 Old Sudbury Road
Sudbury, MA 01776

**Re: Stormwater Review
58 Massasoit Ave, Sudbury, MA**

Dear Shawna,

Our firm revised the plans and Stormwater Report to address the comments received in the email dated June 23, 2023 for the above captioned project. The following is a response to comments: (Response in italics)

Horsley Witten Comments:

- Stormwater Recharge Calculations:
 - Total storage in chambers does not appear to be correct. Draw down calculation seems inaccurate: “K” should be for a HSG B (1.02 iph); “Rv” should be volume below outlet.
Revised Calculations See Stormwater Report Recharge Calculations.
 - No outlet shown at chambers. If system fails the Applicant shows overflow at down spout.
No additional comment. Overflow as stated.
 - Plan shows 226.6 CF of recharge volume provided but it may be closer to 180 CF depending on the depth of stone below the chamber (6”, 12”, or 18”). Applicant should confirm depth of stone or confirm volume listed.
Revised See Plan Sheet 2 of 3.
 - Time to drain/drawdown calculation for roof should use the total volume in chambers below the outlet, since there is no outlet, this would be the total volume in the system. Applicant identified 21 CF of volume; request clarification. Again, “K” value should 1.02 iph here instead of the 2.41 in/hr factor used.
Revised See Stormwater Report.
 - Time to drain/drawdown calculation for driveway: again, “K” value should 1.02 iph instead of the 2.41 in/hr factor used.
Revised See Stormwater Report
- Hydrogeological Calculations for Pre & Post Development:
 - Routing diagram for 17240: can be considered conservative; did not model the stone trench or chambers in this model.
Revised Roof infiltration has been modeled in the design. See Report
 - Summary for 1S PreDev subcatchment should be for impervious area only Depth of runoff should be equal to 1” for this calculation. ***Roof Area calculation for 1”.***

- O&M Plan:
 - O&M must be signed by the property owner prior to land disturbance.
Owner will sign prior to construction.
 - Recharge facility inspections should occur after rainfall events greater than 1" in a 24 hour period, not 2.5" as stated.
Revised See O & M Stormwater Report
- Runoff Areas Plans:
 - Existing conditions:
 - More than one design point should be included (i.e., wetland & street)
Revised 2 Design points (Front towards street and Rear) See Report
 - Proposed conditions:
 - Clarify contours and catchment areas that go to wetland as well as to the street.
Revised See Plan
 - More than one design point should be included (i.e., wetland & street)
Revised 2 Design points (Front towards street and Rear) See Report
 - Contour labeled 102 or 103. One of them is wrong.
Revised See Plan

Town Engineer Comments:

- The engineer should set the basement floor elevation above all observed ground water and staining marks as a sump pump will have no location to drain.
The basement floor has been set one (1) foot above the possible water mark. A note has been added to plan. See Sheet 1 of 3.

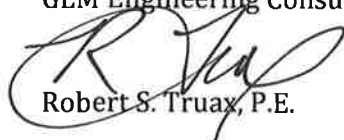
Conservation Coordinator Comments:

- The Conservation Commission discussed at their hearing that a sump pump will not be permitted for this project.
The plan does not require a sump pump.

Enclosed herewith are copies of the revised plans, stormwater report and other related documents for your review. If you have any questions please don't hesitate to contact our office.

Thank you for your cooperation in this matter.

Yours truly,
GLM Engineering Consultants Inc.



Robert S. Truax, P.E.

STORMWATER MANAGEMENT REPORT

58 Massasoit Avenue
Sudbury, Massachusetts

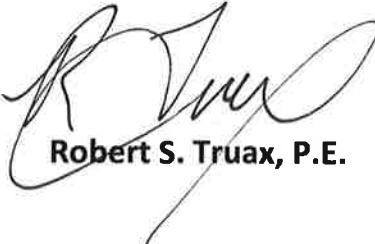
June 15, 2023
Revised: July 6, 2023

Prepared for:

JBJS Charles, LLC
15 Edwards Lane
Quincy, Massachusetts

Prepared by:

GLM Engineering Consultants, Inc.
19 Exchange Street
Holliston, Massachusetts 01746
(508) 429 - 1100


Robert S. Truax, P.E.



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<ul style="list-style-type: none">• 2-year storm• 10-year storm• 25-year storm• 100-year storm	
Appendix – B Stormwater Operation & Maintenance Plan	
Appendix – C Supplemental Plans	
<ul style="list-style-type: none">• Pre- & Post Development Subcatchment Areas	

Project Introduction:

The applicant, is proposing to demolish the existing single family dwelling located at 58 Massasoit Avenue, Sudbury, Massachusetts and construct a new single family dwelling. The existing property consists of approximately 37,800 square feet of land area.

The proposal will reduce the impervious coverage on the site. The existing impervious area is 4,256 square feet and the proposed is 3,443 square feet, a reduction of 813 square feet. The proposed recharge system has been design to exceed the required recharge volume as defined in the Massachusetts Stormwater Standards Handbook. The proposed project will reduce the stormwater runoff from the site.

The Project is serviced by town water, on-site sewage disposal system and other available public utilities. The stormwater generated from the Project will be captured, conveyed and mitigated on-site utilizing Best Management Practices.

The purpose of these calculations is to demonstrate design compliance of the Project’s stormwater management system, specifically post-development peak discharge rates per the Town of Natick Stormwater Management Regulations. As designed, the system will mitigate peak rates of runoff to the maximum extent practicle.

Methodology/Sources of Data:

The overall storm water management plan for the project is designed to maintain the peak rate of storm water runoff and runoff volumes from the site after development. The Soil Conservation Service Modified Soil Cover Complex Method, the computer program "HydroCAD" by Applied Microcomputer Systems, and the procedures specified in Urban Hydrology for storm Small Watersheds were used to determine pre-and post-developed peak flow rates of runoff from the site. The storm events have been compiled from the Soil Conservation Services Technical Report No. 55 and the U.S. Department of Commerce Technical Paper (TP 40). The 2-year, 10-year, 25-year and 100-year storm events have been utilized for hydrology calculations. The rainfall data for the Type III, 24-hour storm events follow:

<u>24-Hour Storm</u>	<u>Rainfall (inches)</u>
	1 Inch
2	3.20
10	4.80
25	6.00
100	8.60

Soils:

The Natural Resources Conservation Service (NRCS), Hydrologic Soils Group Map for Norfolk county, Massachusetts indicates that the on-site soils consist of Canton Fine Sandy Loam, 420B. NRCS assigned “B” hydrologic soil rating for these soils.

The site is comprised of Hydrologic soil group ‘B”. When designing BMP’s for sites comprised of D soils and rock outcrops at the surface, then the required recharge volume only to the maximum

extend practicable. DEP Stormwater Handbook recommends that infiltration systems should not be installed in D soils.

On-site soil testing was performed to determine groundwater elevations and confirm soil classifications. The soil testing confirmed the soil rating and groundwater was encountered during the testing.

Proposed Conditions Overview:

The applicant, is proposing to demolish the existing single family dwelling located at 58 Massasoit Avenue, Sudbury, Massachusetts and construct a new single family dwelling. The existing property consists of approximately 37,800 square feet of land area.

The proposal will reduce the impervious coverage on the site. The existing impervious area is 4,256 square feet and the proposed is 3,443 square feet, a reduction of 813 square feet. The proposed recharge system has been design to exceed the required recharge volume as defined in the Massachusetts Stormwater Standards Handbook. The proposed project will reduce the stormwater runoff from the site.

The proposed stormwater system for the redevelopment of the existing site has been designed to mitigate the increase in peak rate and volume of storm water runoff. The following is a summary of existing peak rates and volumes of runoff. The proposed roof recharge system has been model to mitigate the increase in runoff.

The following is a comparison of peak flows and volumes:

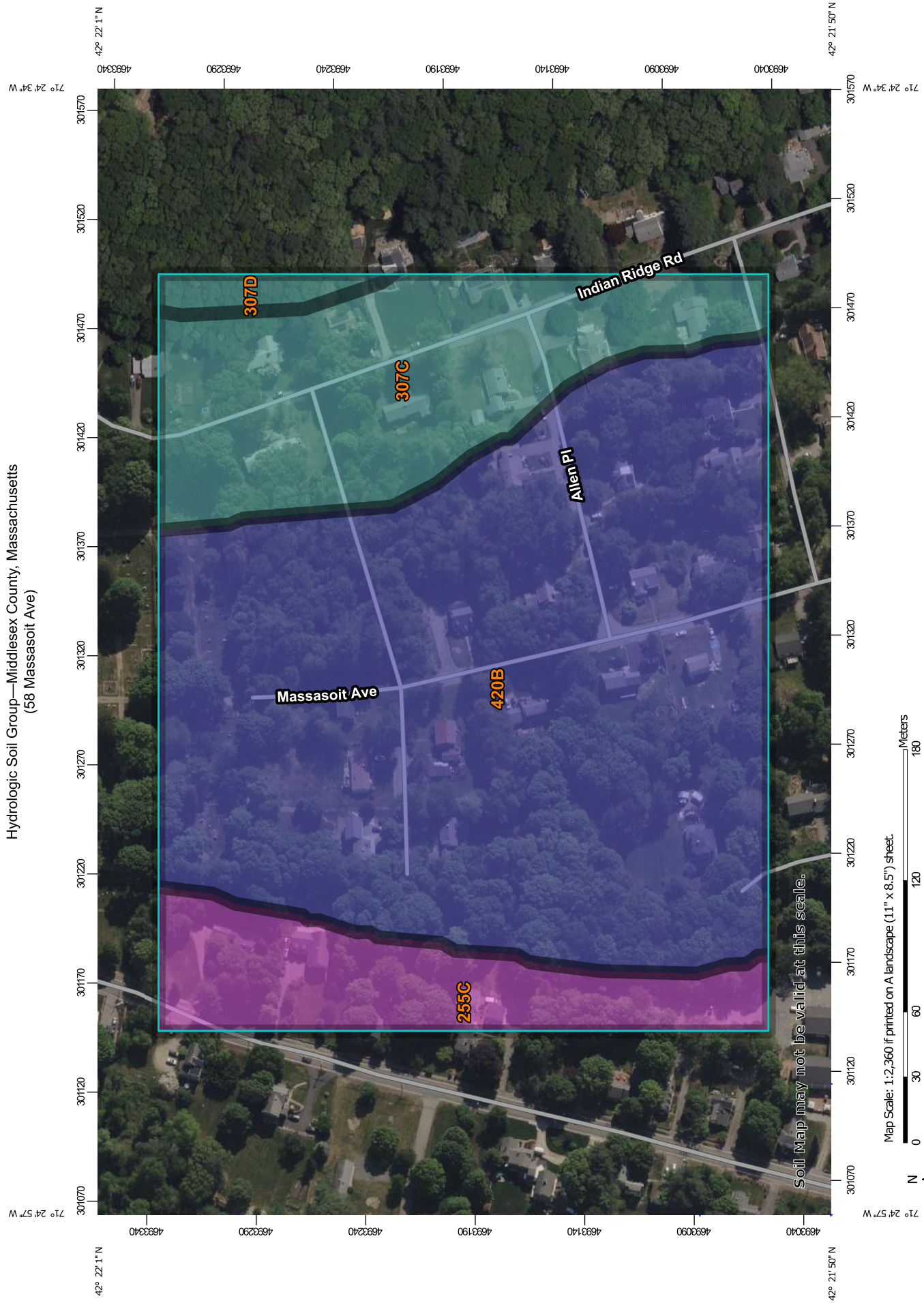
Summary of Peak Stormwater Runoff Rates:										
Design Point	1-Inch Flow (cfs)		2-Year Peak Flow (cfs)		10-Yr Peak Flow (cfs)		25-Yr Peak Flow (cfs)		100-Yr Peak Flow (cfs)	
	<i>Exist.</i>	<i>Prop.</i>	<i>Exist.</i>	<i>Prop.</i>	<i>Exist.</i>	<i>Prop.</i>	<i>Exist.</i>	<i>Prop.</i>	<i>Exist.</i>	<i>Prop.</i>
1S/3S (front)	0.00	0.00	0.11	0.09	0.29	0.26	0.45	0.41	0.81	0.75
2S/4S (rear)	0.00	0.00	0.21	0.22	0.61	0.58	0.96	0.91	1.80	1.72

Summary of Peak Stormwater Volumes:										
Design Point	1-Inch Flow (cu.ft.)		2-Year Peak Flow (cu.ft.)		10-Yr Peak Flow (cu.ft.)		25-Yr Peak Flow (cu.ft.)		100-Yr Peak Flow (cu.ft.)	
	<i>Exist.</i>	<i>Prop.</i>	<i>Exist.</i>	<i>Prop.</i>	<i>Exist.</i>	<i>Prop.</i>	<i>Exist.</i>	<i>Prop.</i>	<i>Exist.</i>	<i>Prop.</i>
1S/3S (front)	0.00	0.00	399	346	929	840	1,389	1,276	2,492	2,333
2S/4S (rear)	0.00	0.00	794	638	1,968	1,726	3,015	2,715	5,566	5,168
Total	0.00	0.00	1,193	984	2,897	2,566	4,404	3,991	8,058	7,501

Summary:

The calculations performed for all design storm events indicate that the total peak rates and volumes of runoff for the various storm events will have a no increase. With the implementation of the stormwater management system as designed, along with the Operation and Maintenance plan contained herein, all of the objectives of the Town of Sudbury Stormwater Regulations are satisfied.

Hydrologic Soil Group—Middlesex County, Massachusetts
(58 Massasoit Ave)
























Map Scale: 1:2,360 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 19N WGS84



MAP LEGEND

- Area of Interest (AOI)**
 Area of Interest (AOI)
- Soils**
Soil Rating Polygons
 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available
- Soil Rating Lines**
 A
 A/D
 B
 B/D
 C
 C/D
 D
 Not rated or not available
- Soil Rating Points**
 A
 A/D
 B
 B/D

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:25,000.

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: Middlesex County, Massachusetts
 Survey Area Data: Version 22, Sep 9, 2022

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

Date(s) aerial images were photographed: May 22, 2022—Jun 5, 2022

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.

Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
255C	Windsor loamy sand, 8 to 15 percent slopes	A	2.8	11.8%
307C	Paxton fine sandy loam, 8 to 15 percent slopes, extremely stony	C	5.0	20.9%
307D	Paxton fine sandy loam, 15 to 25 percent slopes, extremely stony	C	0.4	1.6%
420B	Canton fine sandy loam, 3 to 8 percent slopes	B	15.8	65.7%
Totals for Area of Interest			24.0	100.0%

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

APPENDIX – B Stormwater Recharge Calculations

Project:

58 Massasoit Avenue
Sudbury, Massachusetts
Date: June 15, 2023
Revised: July 6, 2023

Recharge Volume(Rv): Based on Soil Classification

Soil Classification: "B" F = 0.35 inch

Infiltration K = 1.02 in/hr (Rawles Table)

$R_v = F * \text{Impervious Area}$

Rv = Required Recharge Volume

F = Depth Factor

Soil Type A – 0.60 inch

Soil Type B – 0.35 inch

Soil Type C – 0.25 inch

Soil Type D – 0.00 inch

Proposed/Post Impervious Area:

Roadway/Drives: 1,669 s.f.

Roof Area: 1,774 s.f.

Total Imp. Area: 3,443 s.f.

Total Impervious to Roof Area to Recharge: 1,774 s.f.

Total Impervious Drive/Walks to Stone Trench: 1,669 s.f.

Recharge Volume Roof:

Recharge Volume Required: (Soil Type B – 0.35 inch)

Roof Area: 1,774 s.f

$R_v = (0.35 \text{ inch} * 1774 \text{ s.f.}) / 12 = 52 \text{ c.f.}$

Recharge Volume Provided:

Cultec Units C-100HD w/stone:

Volume provide (See Plan): 158 c.f.

Time to drain:

Drawdown time = Volume/(K*Bottom Area)

Volume = 158 cf

K=1.02 in/hr = 0.085 ft/hr

Bottom Area = 201 sf

Drawdown time = $158 / (0.085 \text{ ft/hr} \times 201 \text{ sf})$

Drawdown time = 9.2 hr < 72 hr *ok*

Recharge Volume Driveway:

Recharge Volume Required: (Soil Type B – 0.35 inch)

Roof Area: 1,669 s.f

$R_v = (0.35 \text{ inch} * 1669 \text{ s.f.}) / 12 = 49 \text{ c.f.}$

Recharge Volume Provided:
Cultec Units C-100HD w/stone:
Volume provided (See Plan): 120 c.f.

Time to drain:

Drawdown time = Volume/(K*Bottom Area)

Volume = 120 cf

K=1.02 in/hr = 0.085 ft/hr

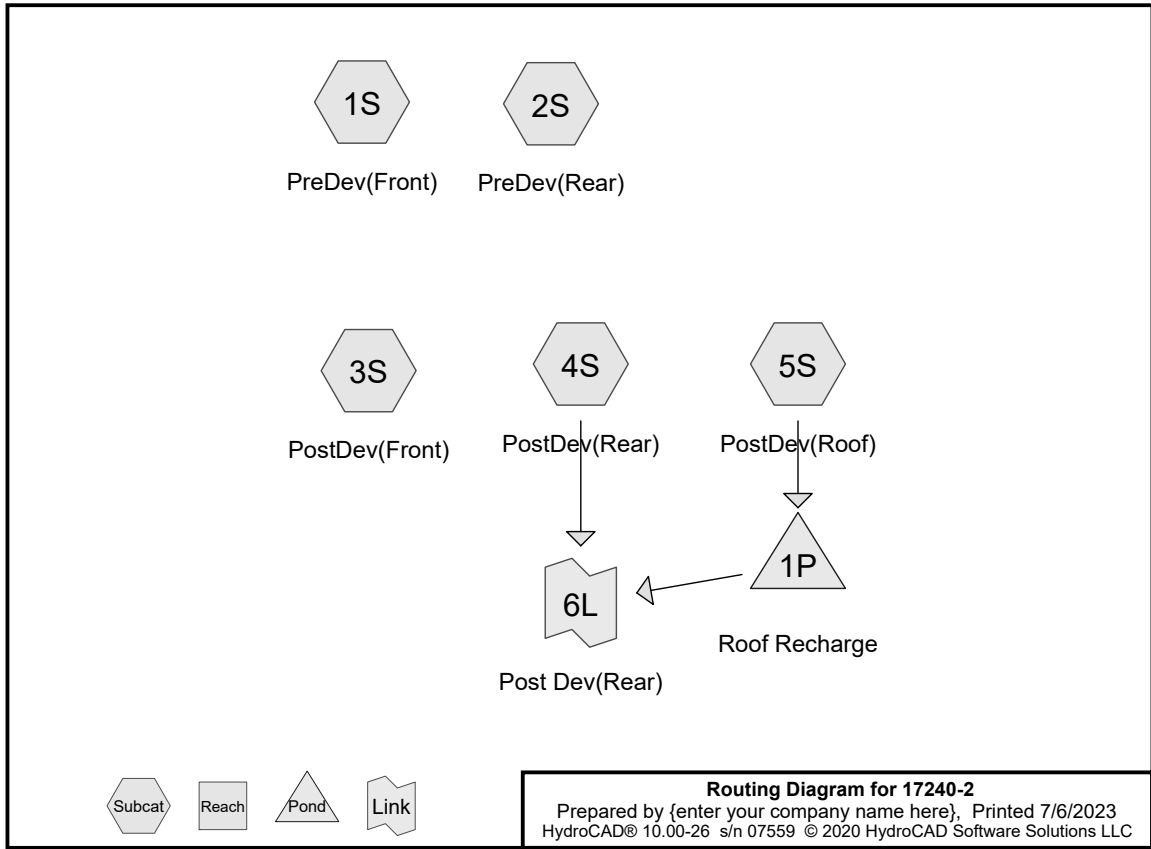
Bottom Area = 350 sf

Drawdown time = $120 / (0.085 \text{ ft/hr} \times 350 \text{ sf})$

Drawdown time = 4.0 hr < 72 hr **ok**

APPENDIX – A

Hydrogeological Calculations for Pre & Post Development



17240-2

Prepared by {enter your company name here}
 HydroCAD® 10.00-26 s/n 07559 © 2020 HydroCAD Software Solutions LLC

Type III 24-hr 1 Inch Rainfall=1.00"

Printed 7/6/2023

Page 2

Summary for Subcatchment 1S: PreDev(Front)

Runoff = 0.00 cfs @ 22.66 hrs, Volume= 1 cf, Depth> 0.00"

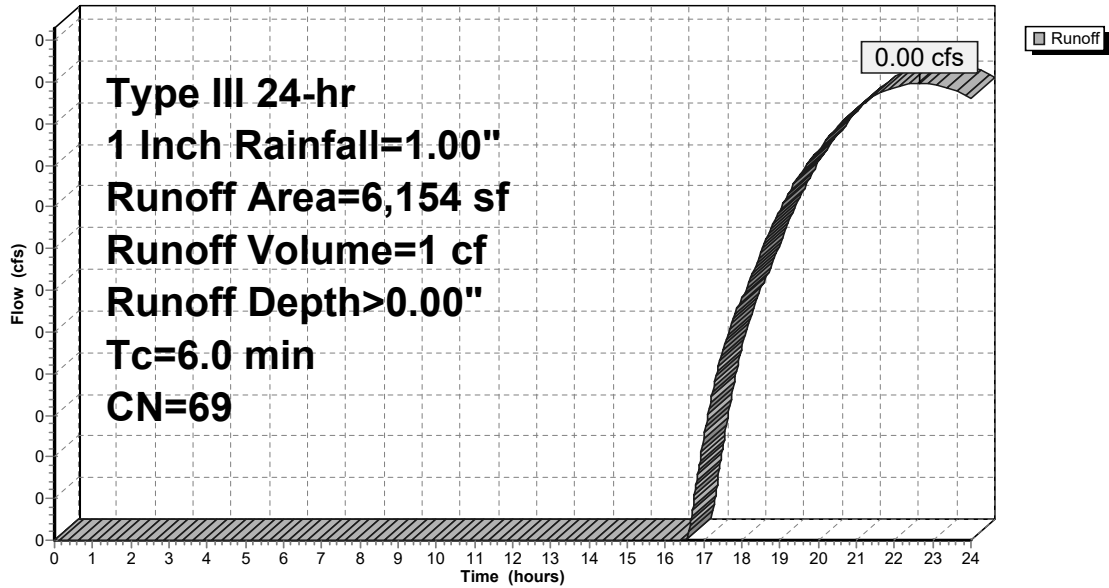
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1 Inch Rainfall=1.00"

Area (sf)	CN	Description
* 429	98	House/Gar/Shed HSG B
* 1,077	98	Drive/Walks
680	55	Woods, Good, HSG B
3,968	61	>75% Grass cover, Good, HSG B
6,154	69	Weighted Average
4,648		75.53% Pervious Area
1,506		24.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: PreDev(Front)

Hydrograph



Summary for Subcatchment 2S: PreDev(Rear)

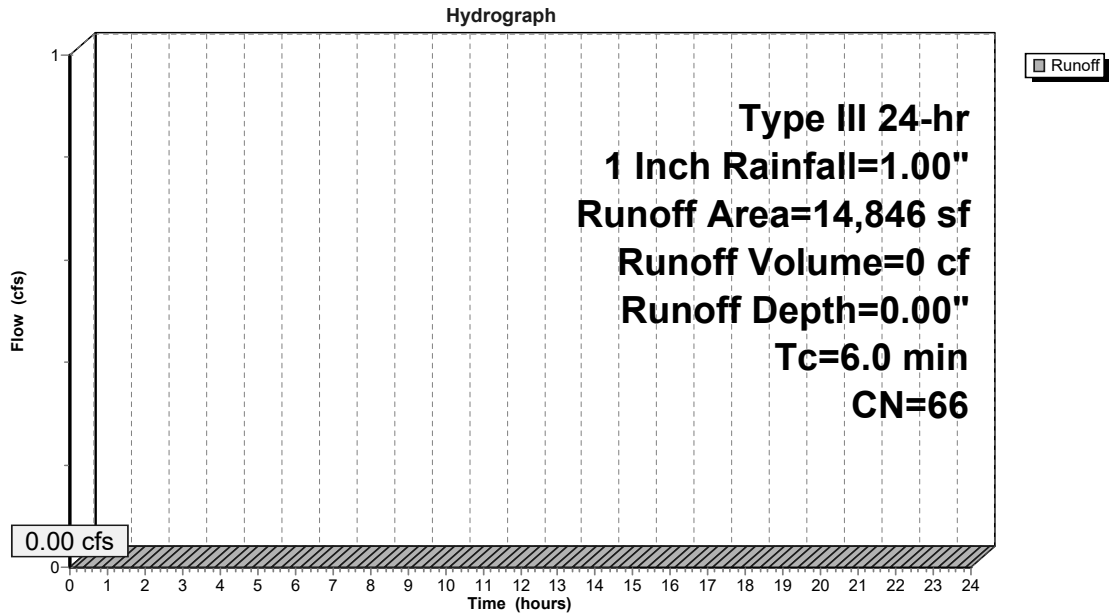
Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1 Inch Rainfall=1.00"

Area (sf)	CN	Description
* 1,511	98	House/Gar/Shed HSG B
* 1,239	98	Drive/Walks
3,359	55	Woods, Good, HSG B
8,737	61	>75% Grass cover, Good, HSG B
14,846	66	Weighted Average
12,096		81.48% Pervious Area
2,750		18.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: PreDev(Rear)



Summary for Subcatchment 3S: PostDev(Front)

Runoff = 0.00 cfs @ 24.00 hrs, Volume= 0 cf, Depth> 0.00"

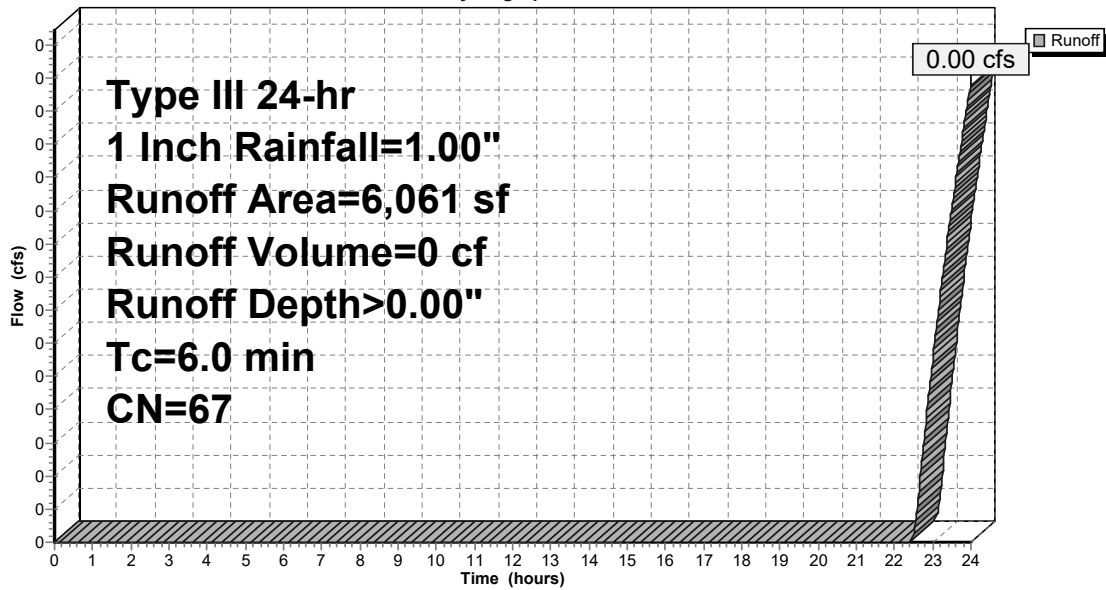
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1 Inch Rainfall=1.00"

Area (sf)	CN	Description
972	98	Driveway/Walks HSG B
327	55	Woods, Good, HSG B
4,762	61	>75% Grass cover, Good, HSG B
6,061	67	Weighted Average
5,089		83.96% Pervious Area
972		16.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: PostDev(Front)

Hydrograph



Summary for Subcatchment 4S: PostDev(Rear)

Runoff = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Depth= 0.00"

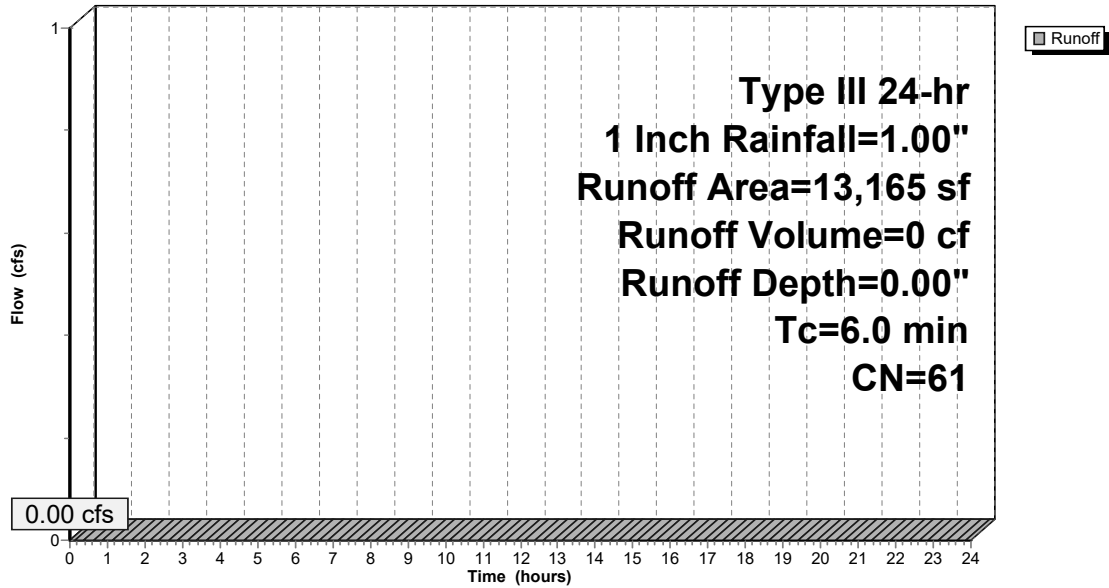
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1 Inch Rainfall=1.00"

Area (sf)	CN	Description
697	98	Driveway/Walks HSG B
3,224	55	Woods, Good, HSG B
9,244	61	>75% Grass cover, Good, HSG B
13,165	61	Weighted Average
12,468		94.71% Pervious Area
697		5.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: PostDev(Rear)

Hydrograph



Summary for Subcatchment 5S: PostDev(Roof)

Runoff = 0.04 cfs @ 12.08 hrs, Volume= 117 cf, Depth> 0.79"

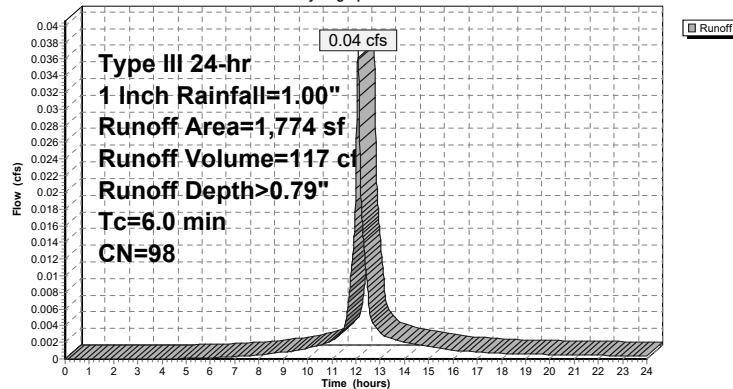
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 1 Inch Rainfall=1.00"

Area (sf)	CN	Description
1,774	98	House
1,774		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 5S: PostDev(Roof)

Hydrograph



Summary for Pond 1P: Roof Recharge

Inflow Area = 1,774 sf, 100.00% Impervious, Inflow Depth > 0.79" for 1 Inch event
 Inflow = 0.04 cfs @ 12.08 hrs, Volume= 117 cf
 Outflow = 0.00 cfs @ 14.05 hrs, Volume= 96 cf, Atten= 94.57%, Lag= 117.8 min
 Discarded = 0.00 cfs @ 14.05 hrs, Volume= 96 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 100.64' @ 14.05 hrs Surf.Area= 201 sf Storage= 59 cf

Plug-Flow detention time= 266.0 min calculated for 96 cf (82% of inflow)
 Center-of-Mass det. time= 195.2 min (982.5 - 787.3)

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	101 cf	6.00'W x 33.50'L x 1.54'H Field A 310 cf Overall - 57 cf Embedded = 253 cf x 40.0% Voids
#2A	100.50'	57 cf	Cultec C-100HD x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
		158 cf	Total Available Storage

Storage Group A created with Chamber Wizard

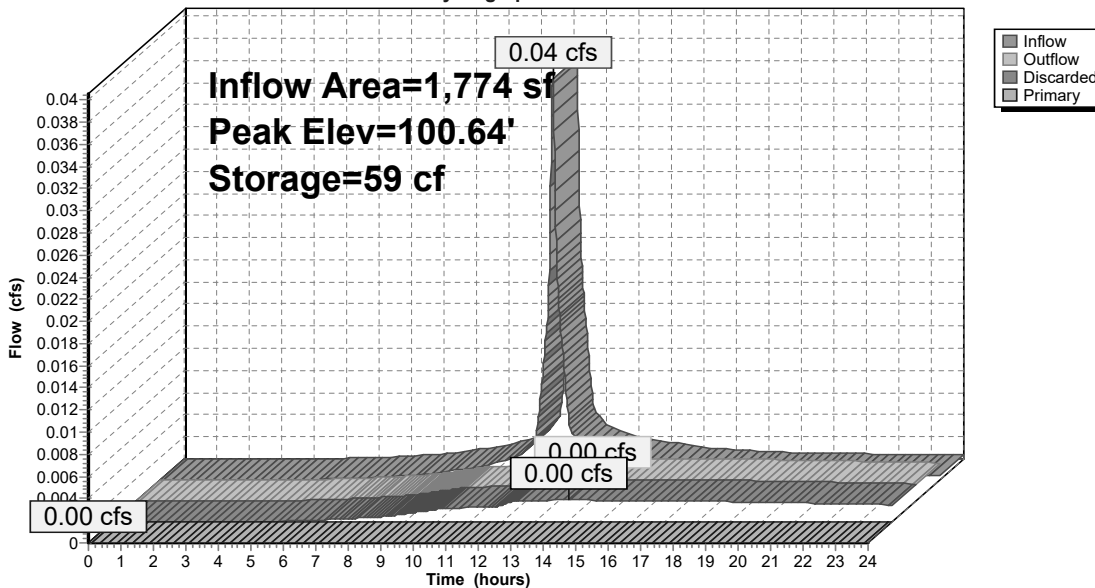
Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	0.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 97.70'
#2	Primary	101.40'	8.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 14.05 hrs HW=100.64' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=100.00' (Free Discharge)
 ↳ **2=Orifice/Grate** (Controls 0.00 cfs)

Pond 1P: Roof Recharge

Hydrograph



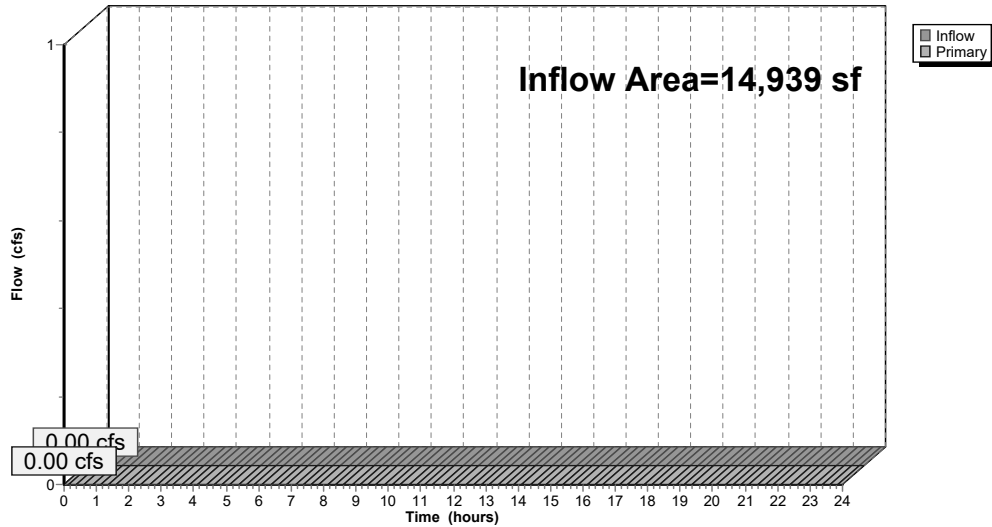
Summary for Link 6L: Post Dev(Rear)

Inflow Area = 14,939 sf, 16.54% Impervious, Inflow Depth = 0.00" for 1 Inch event
 Inflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 6L: Post Dev(Rear)

Hydrograph



Summary for Subcatchment 1S: PreDev(Front)

Runoff = 0.11 cfs @ 12.10 hrs, Volume= 399 cf, Depth> 0.78"

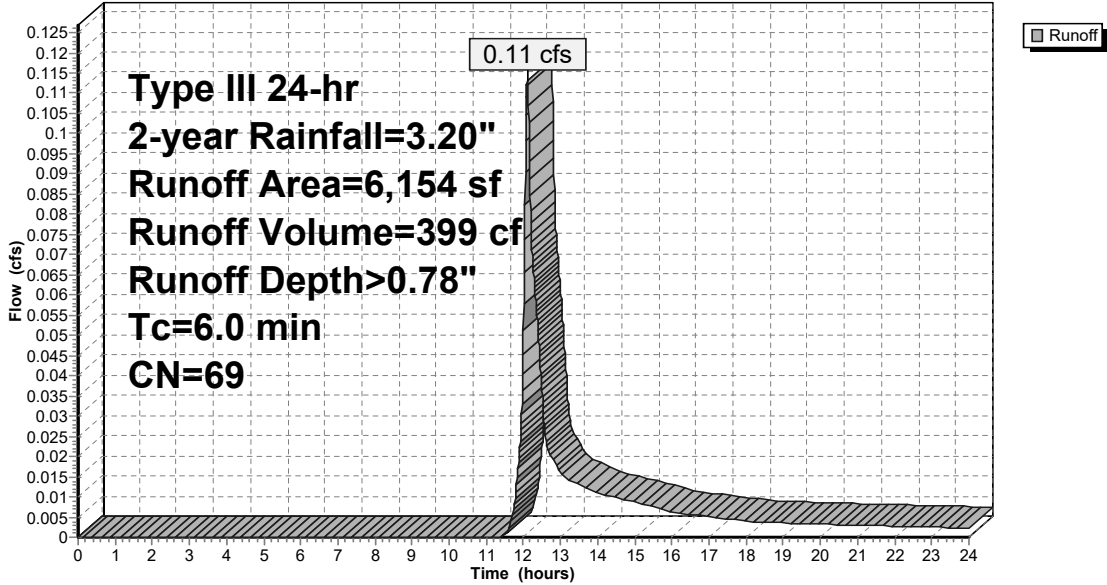
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
* 429	98	House/Gar/Shed HSG B
* 1,077	98	Drive/Walks
680	55	Woods, Good, HSG B
3,968	61	>75% Grass cover, Good, HSG B
6,154	69	Weighted Average
4,648		75.53% Pervious Area
1,506		24.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: PreDev(Front)

Hydrograph



Summary for Subcatchment 2S: PreDev(Rear)

Runoff = 0.21 cfs @ 12.11 hrs, Volume= 794 cf, Depth> 0.64"

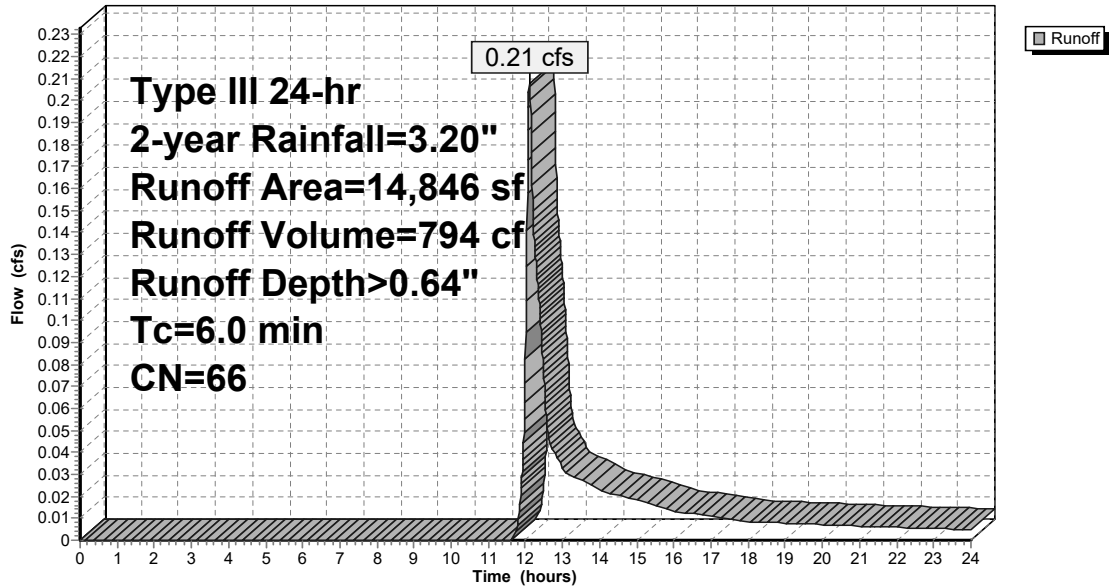
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
* 1,511	98	House/Gar/Shed HSG B
* 1,239	98	Drive/Walks
3,359	55	Woods, Good, HSG B
8,737	61	>75% Grass cover, Good, HSG B
14,846	66	Weighted Average
12,096		81.48% Pervious Area
2,750		18.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: PreDev(Rear)

Hydrograph



Summary for Subcatchment 3S: PostDev(Front)

Runoff = 0.09 cfs @ 12.10 hrs, Volume= 346 cf, Depth> 0.69"

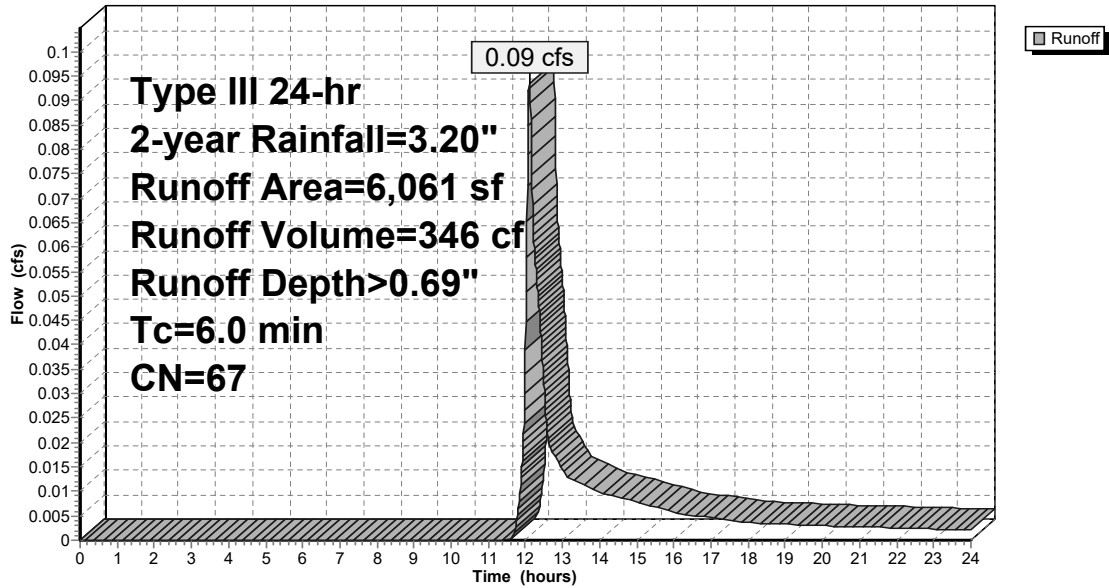
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
972	98	Driveway/Walks HSG B
327	55	Woods, Good, HSG B
4,762	61	>75% Grass cover, Good, HSG B
6,061	67	Weighted Average
5,089		83.96% Pervious Area
972		16.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: PostDev(Front)

Hydrograph



Summary for Subcatchment 4S: PostDev(Rear)

Runoff = 0.10 cfs @ 12.12 hrs, Volume= 486 cf, Depth> 0.44"

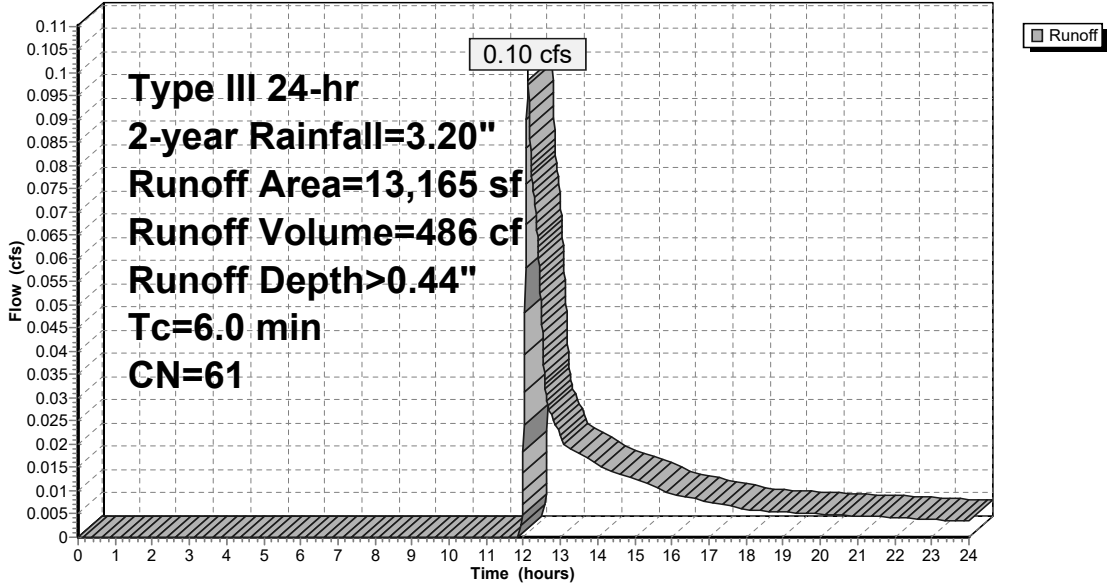
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
697	98	Driveway/Walks HSG B
3,224	55	Woods, Good, HSG B
9,244	61	>75% Grass cover, Good, HSG B
13,165	61	Weighted Average
12,468		94.71% Pervious Area
697		5.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: PostDev(Rear)

Hydrograph



Summary for Subcatchment 5S: PostDev(Roof)

Runoff = 0.13 cfs @ 12.08 hrs, Volume= 438 cf, Depth> 2.97"

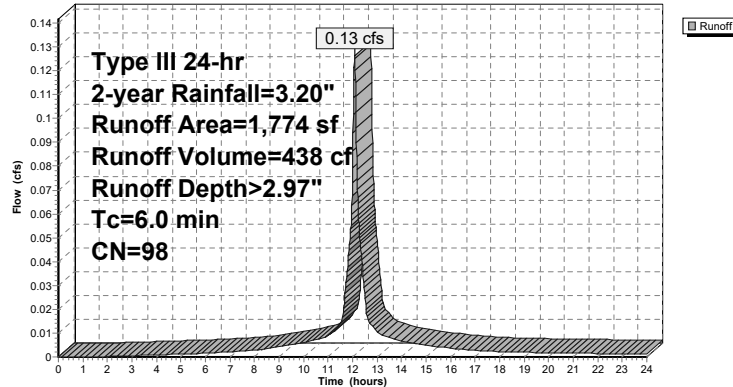
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 2-year Rainfall=3.20"

Area (sf)	CN	Description
1,774	98	House
1,774		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 5S: PostDev(Roof)

Hydrograph



Summary for Pond 1P: Roof Recharge

Inflow Area = 1,774 sf, 100.00% Impervious, Inflow Depth > 2.97" for 2-year event
 Inflow = 0.13 cfs @ 12.08 hrs, Volume= 438 cf
 Outflow = 0.12 cfs @ 12.11 hrs, Volume= 318 cf, Atten= 3.33%, Lag= 1.3 min
 Discarded = 0.00 cfs @ 12.11 hrs, Volume= 167 cf
 Primary = 0.12 cfs @ 12.11 hrs, Volume= 152 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 101.47' @ 12.11 hrs Surf.Area= 201 sf Storage= 152 cf

Plug-Flow detention time= 176.4 min calculated for 318 cf (73% of inflow)
 Center-of-Mass det. time= 87.1 min (843.0 - 755.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	101 cf	6.00'W x 33.50'L x 1.54'H Field A 310 cf Overall - 57 cf Embedded = 253 cf x 40.0% Voids
#2A	100.50'	57 cf	Cultec C-100HD x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
			158 cf Total Available Storage

Storage Group A created with Chamber Wizard

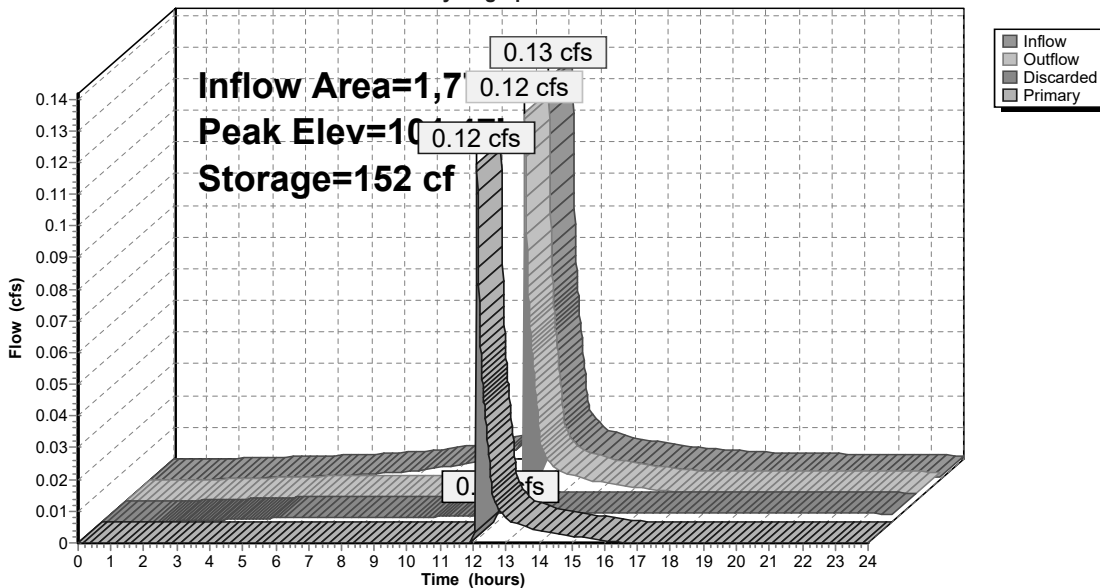
Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	0.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 97.70'
#2	Primary	101.40'	8.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.11 hrs HW=101.47' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.12 cfs @ 12.11 hrs HW=101.47' (Free Discharge)
 ↳ **2=Orifice/Grate** (Weir Controls 0.12 cfs @ 0.8 fps)

Pond 1P: Roof Recharge

Hydrograph



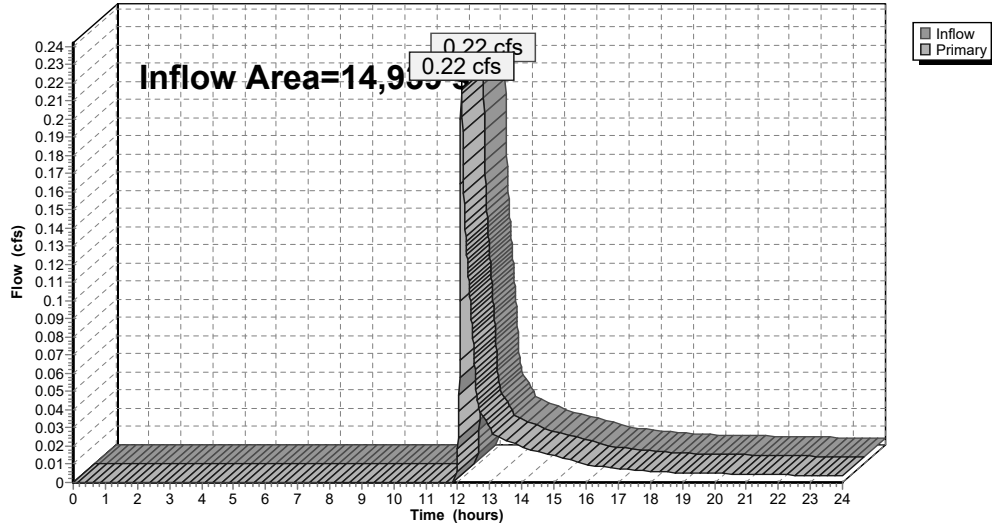
Summary for Link 6L: Post Dev(Rear)

Inflow Area = 14,939 sf, 16.54% Impervious, Inflow Depth > 0.51" for 2-year event
 Inflow = 0.22 cfs @ 12.11 hrs, Volume= 638 cf
 Primary = 0.22 cfs @ 12.11 hrs, Volume= 638 cf, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 6L: Post Dev(Rear)

Hydrograph



Summary for Subcatchment 1S: PreDev(Front)

Runoff = 0.29 cfs @ 12.09 hrs, Volume= 929 cf, Depth> 1.81"

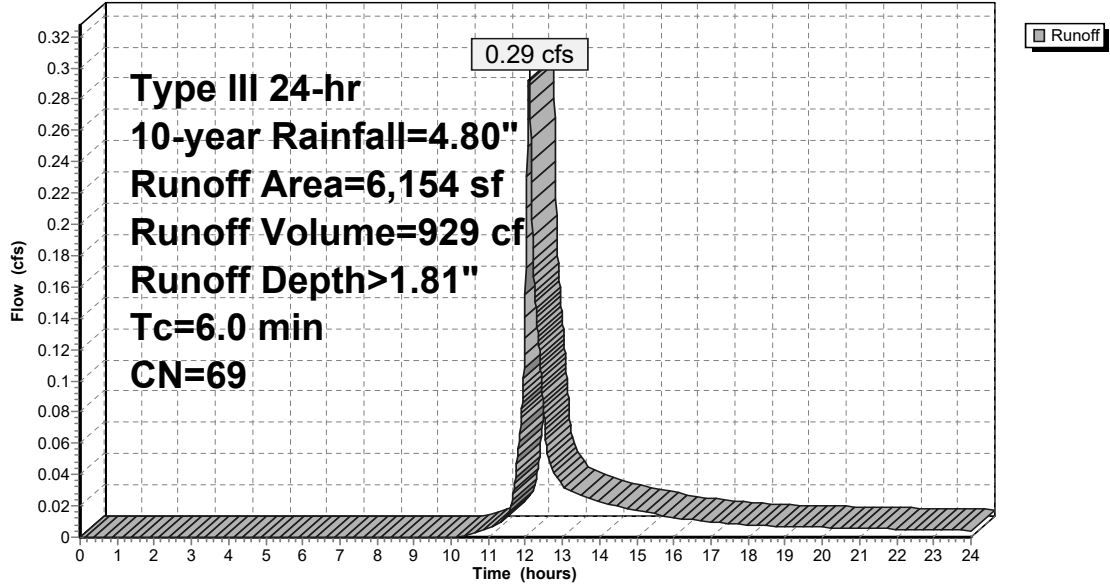
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
* 429	98	House/Gar/Shed HSG B
* 1,077	98	Drive/Walks
680	55	Woods, Good, HSG B
3,968	61	>75% Grass cover, Good, HSG B
6,154	69	Weighted Average
4,648		75.53% Pervious Area
1,506		24.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: PreDev(Front)

Hydrograph



Summary for Subcatchment 2S: PreDev(Rear)

Runoff = 0.61 cfs @ 12.10 hrs, Volume= 1,968 cf, Depth> 1.59"

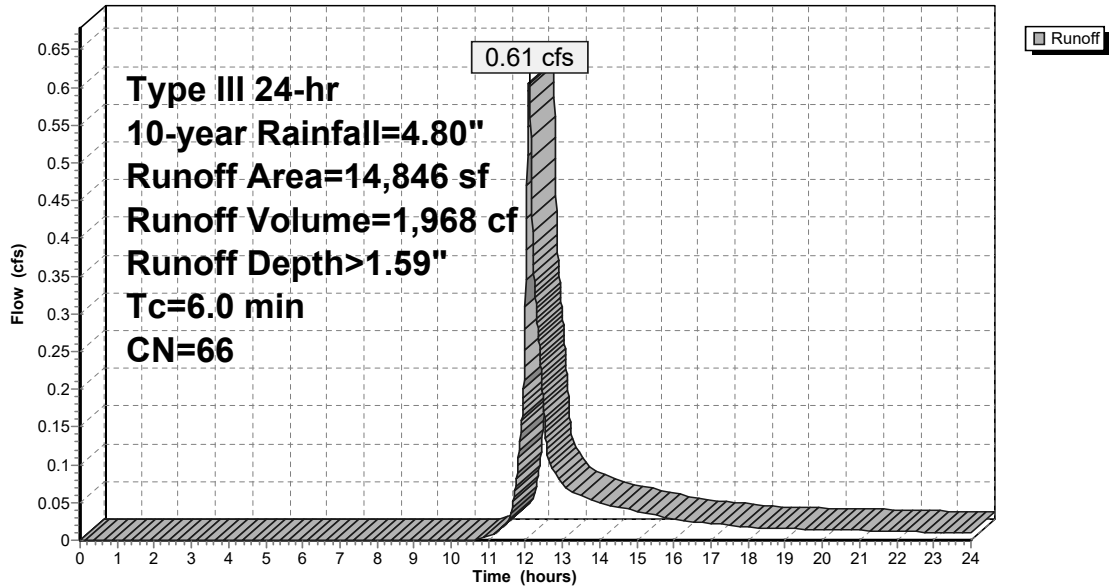
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
* 1,511	98	House/Gar/Shed HSG B
* 1,239	98	Drive/Walks
3,359	55	Woods, Good, HSG B
8,737	61	>75% Grass cover, Good, HSG B
14,846	66	Weighted Average
12,096		81.48% Pervious Area
2,750		18.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: PreDev(Rear)

Hydrograph



Summary for Subcatchment 3S: PostDev(Front)

Runoff = 0.26 cfs @ 12.09 hrs, Volume= 840 cf, Depth> 1.66"

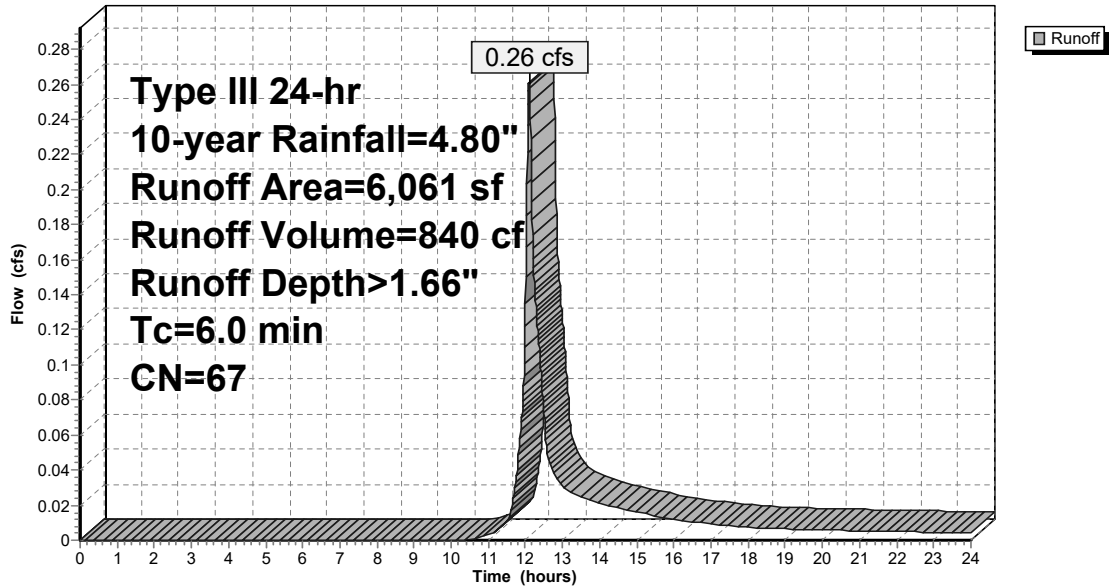
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
972	98	Driveway/Walks HSG B
327	55	Woods, Good, HSG B
4,762	61	>75% Grass cover, Good, HSG B
6,061	67	Weighted Average
5,089		83.96% Pervious Area
972		16.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: PostDev(Front)

Hydrograph



Summary for Subcatchment 4S: PostDev(Rear)

Runoff = 0.40 cfs @ 12.10 hrs, Volume= 1,370 cf, Depth> 1.25"

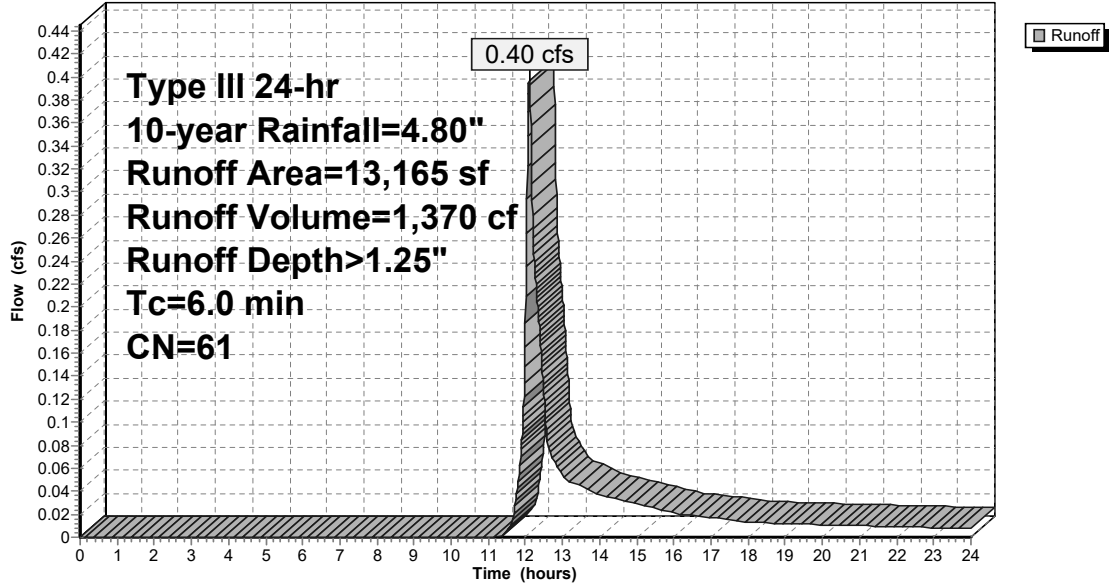
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
697	98	Driveway/Walks HSG B
3,224	55	Woods, Good, HSG B
9,244	61	>75% Grass cover, Good, HSG B
13,165	61	Weighted Average
12,468		94.71% Pervious Area
697		5.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: PostDev(Rear)

Hydrograph



Summary for Subcatchment 5S: PostDev(Roof)

Runoff = 0.19 cfs @ 12.08 hrs, Volume= 674 cf, Depth> 4.56"

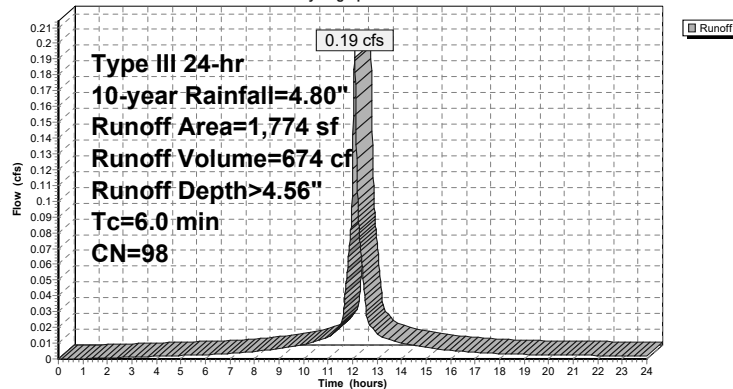
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 10-year Rainfall=4.80"

Area (sf)	CN	Description
1,774	98	House
1,774		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 5S: PostDev(Roof)

Hydrograph



Summary for Pond 1P: Roof Recharge

Inflow Area = 1,774 sf, 100.00% Impervious, Inflow Depth > 4.56" for 10-year event
 Inflow = 0.19 cfs @ 12.08 hrs, Volume= 674 cf
 Outflow = 0.19 cfs @ 12.09 hrs, Volume= 538 cf, Atten= 0.41%, Lag= 0.4 min
 Discarded = 0.00 cfs @ 12.09 hrs, Volume= 182 cf
 Primary = 0.19 cfs @ 12.09 hrs, Volume= 356 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 101.49' @ 12.09 hrs Surf.Area= 201 sf Storage= 154 cf

Plug-Flow detention time= 131.7 min calculated for 538 cf (80% of inflow)
 Center-of-Mass det. time= 55.0 min (803.1 - 748.2)

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	101 cf	6.00'W x 33.50'L x 1.54'H Field A 310 cf Overall - 57 cf Embedded = 253 cf x 40.0% Voids
#2A	100.50'	57 cf	Cultec C-100HD x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
		158 cf	Total Available Storage

Storage Group A created with Chamber Wizard

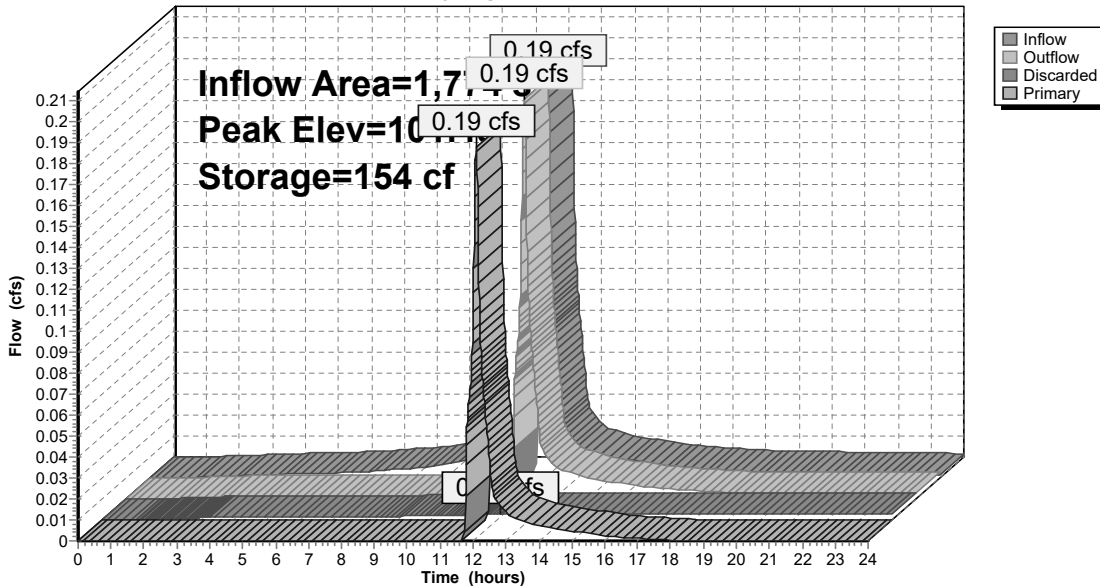
Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	0.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 97.70'
#2	Primary	101.40'	8.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=101.49' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.19 cfs @ 12.09 hrs HW=101.49' (Free Discharge)
 ↳ **2=Orifice/Grate** (Weir Controls 0.19 cfs @ 1.0 fps)

Pond 1P: Roof Recharge

Hydrograph



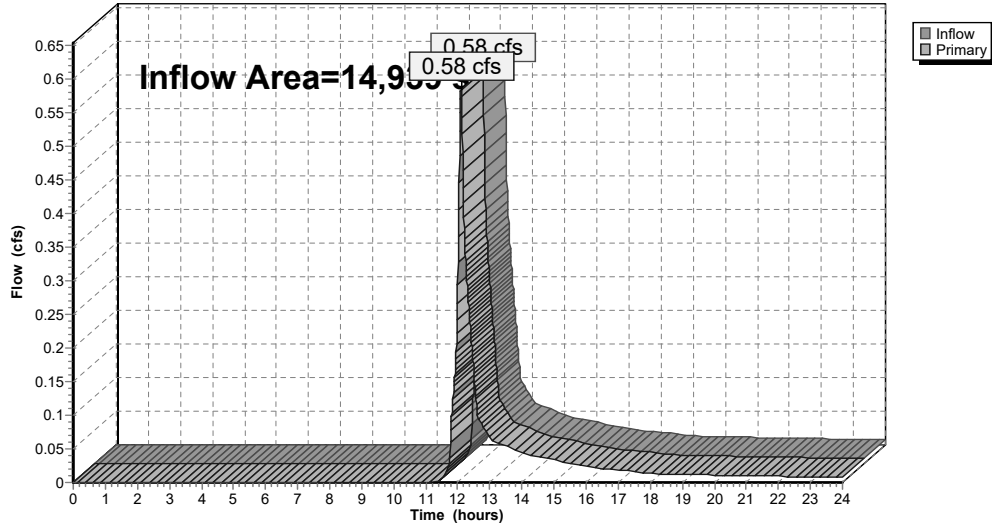
Summary for Link 6L: Post Dev(Rear)

Inflow Area = 14,939 sf, 16.54% Impervious, Inflow Depth > 1.39" for 10-year event
 Inflow = 0.58 cfs @ 12.10 hrs, Volume= 1,726 cf
 Primary = 0.58 cfs @ 12.10 hrs, Volume= 1,726 cf, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 6L: Post Dev(Rear)

Hydrograph



Summary for Subcatchment 1S: PreDev(Front)

Runoff = 0.45 cfs @ 12.09 hrs, Volume= 1,389 cf, Depth> 2.71"

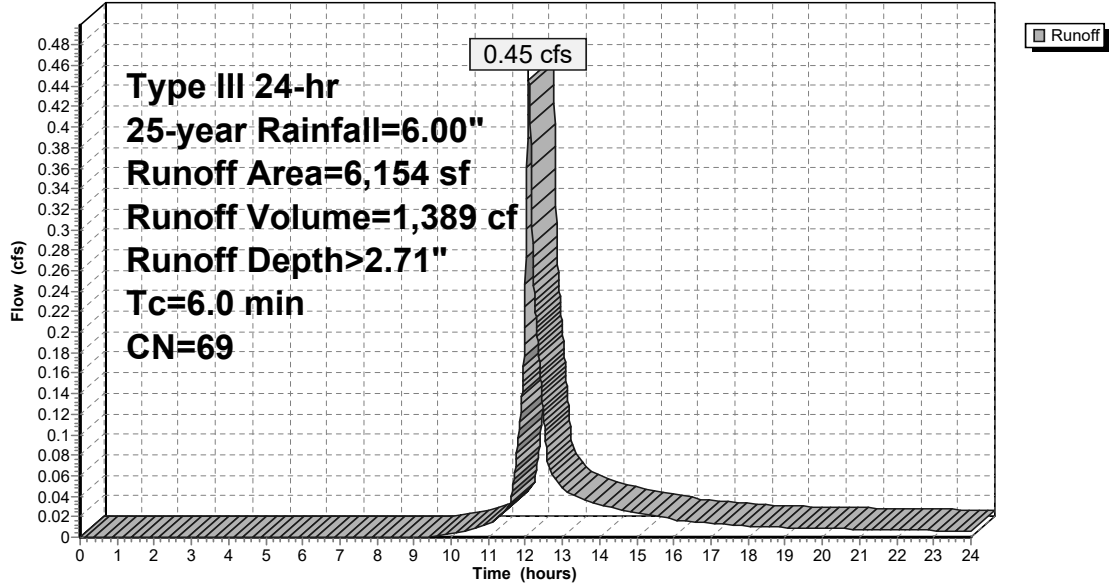
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=6.00"

Area (sf)	CN	Description
* 429	98	House/Gar/Shed HSG B
* 1,077	98	Drive/Walks
680	55	Woods, Good, HSG B
3,968	61	>75% Grass cover, Good, HSG B
6,154	69	Weighted Average
4,648		75.53% Pervious Area
1,506		24.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: PreDev(Front)

Hydrograph



Summary for Subcatchment 2S: PreDev(Rear)

Runoff = 0.96 cfs @ 12.09 hrs, Volume= 3,015 cf, Depth> 2.44"

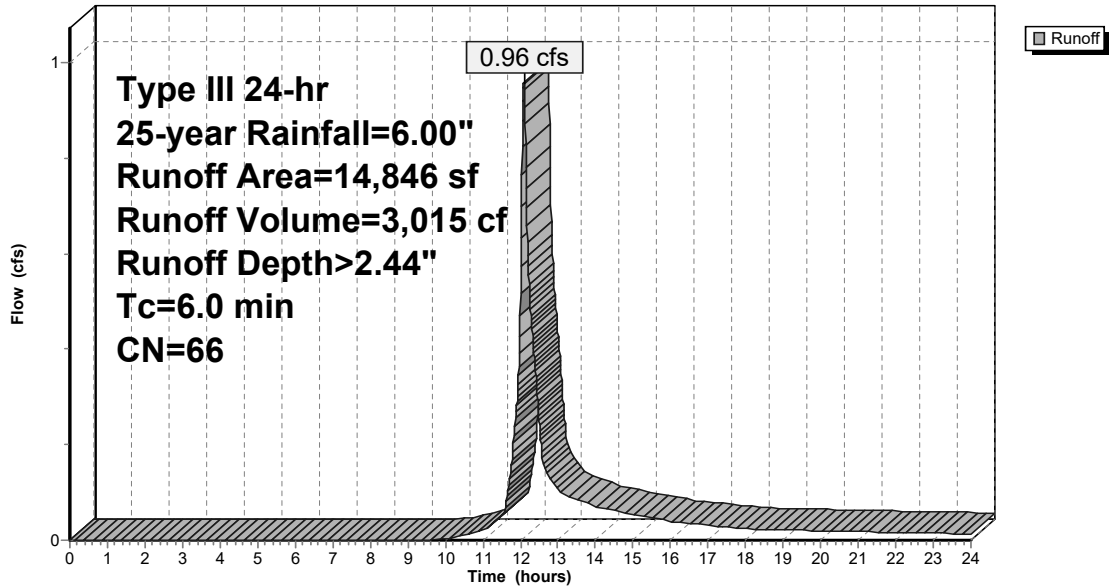
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=6.00"

Area (sf)	CN	Description
* 1,511	98	House/Gar/Shed HSG B
* 1,239	98	Drive/Walks
3,359	55	Woods, Good, HSG B
8,737	61	>75% Grass cover, Good, HSG B
14,846	66	Weighted Average
12,096		81.48% Pervious Area
2,750		18.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: PreDev(Rear)

Hydrograph



Summary for Subcatchment 3S: PostDev(Front)

Runoff = 0.41 cfs @ 12.09 hrs, Volume= 1,276 cf, Depth> 2.53"

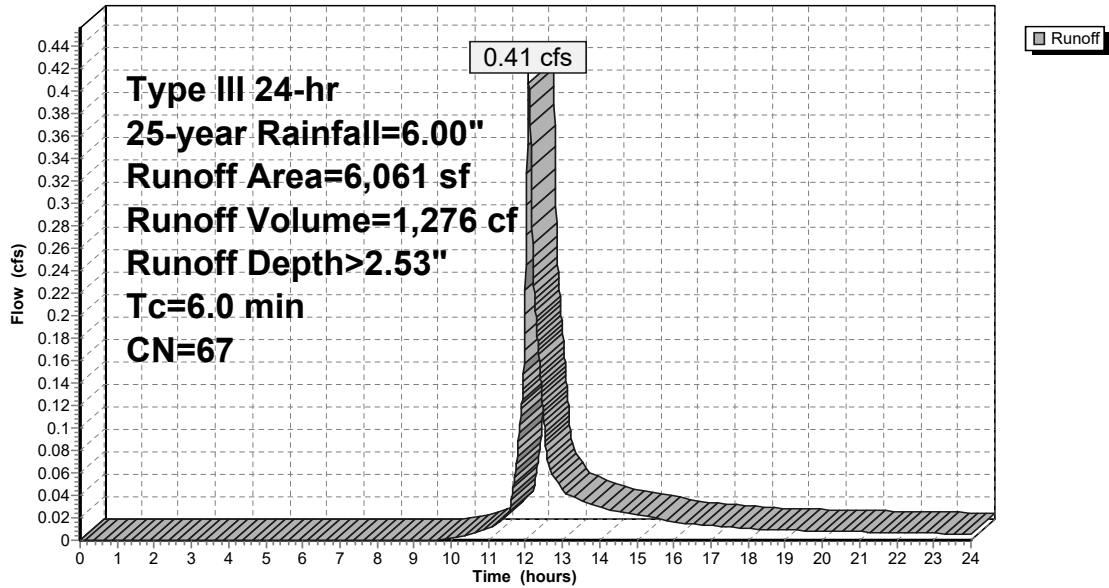
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=6.00"

Area (sf)	CN	Description
972	98	Driveway/Walks HSG B
327	55	Woods, Good, HSG B
4,762	61	>75% Grass cover, Good, HSG B
6,061	67	Weighted Average
5,089		83.96% Pervious Area
972		16.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: PostDev(Front)

Hydrograph



Summary for Subcatchment 4S: PostDev(Rear)

Runoff = 0.68 cfs @ 12.10 hrs, Volume= 2,197 cf, Depth> 2.00"

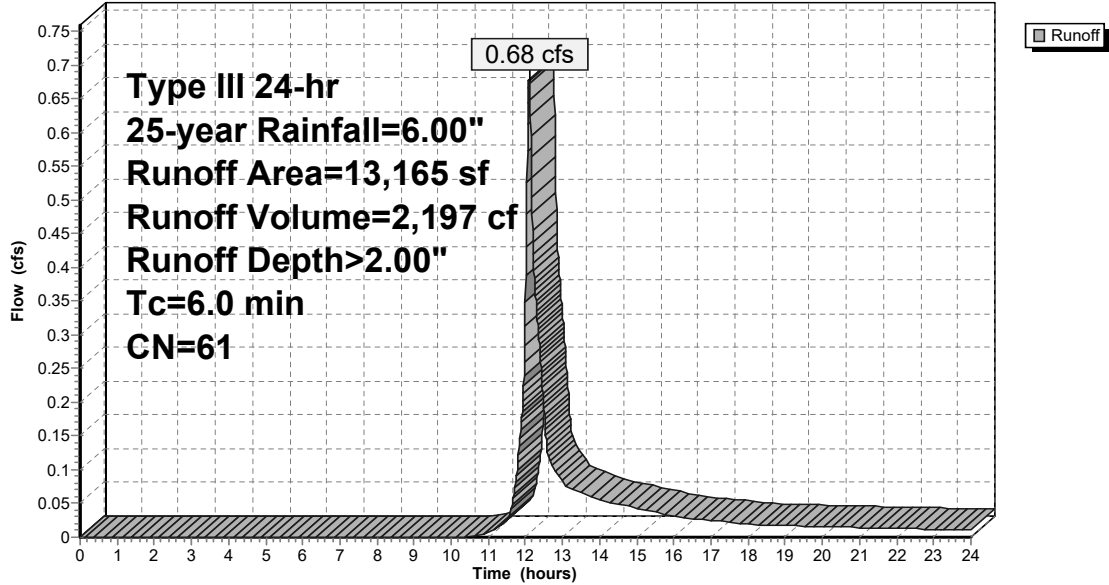
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=6.00"

Area (sf)	CN	Description
* 697	98	Driveway/Walks HSG B
3,224	55	Woods, Good, HSG B
9,244	61	>75% Grass cover, Good, HSG B
13,165	61	Weighted Average
12,468		94.71% Pervious Area
697		5.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: PostDev(Rear)

Hydrograph



Summary for Subcatchment 5S: PostDev(Roof)

Runoff = 0.24 cfs @ 12.08 hrs, Volume= 851 cf, Depth> 5.76"

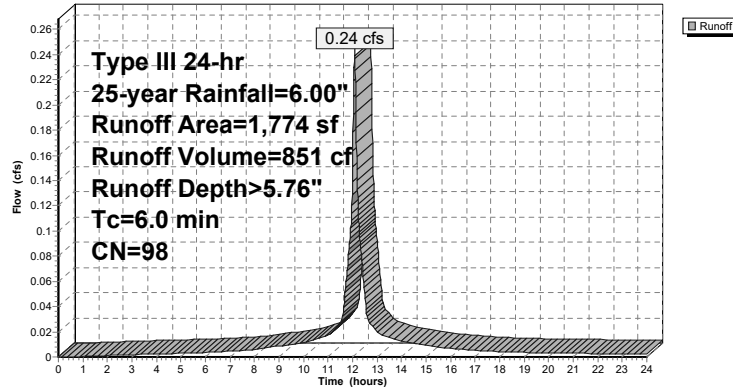
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 25-year Rainfall=6.00"

Area (sf)	CN	Description
1,774	98	House
1,774		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 5S: PostDev(Roof)

Hydrograph



Summary for Pond 1P: Roof Recharge

Inflow Area = 1,774 sf, 100.00% Impervious, Inflow Depth > 5.76" for 25-year event
 Inflow = 0.24 cfs @ 12.08 hrs, Volume= 851 cf
 Outflow = 0.24 cfs @ 12.09 hrs, Volume= 709 cf, Atten= 0.33%, Lag= 0.4 min
 Discarded = 0.00 cfs @ 12.09 hrs, Volume= 191 cf
 Primary = 0.24 cfs @ 12.09 hrs, Volume= 518 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 101.51' @ 12.09 hrs Surf.Area= 201 sf Storage= 155 cf

Plug-Flow detention time= 116.0 min calculated for 708 cf (83% of inflow)
 Center-of-Mass det. time= 46.6 min (791.2 - 744.6)

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	101 cf	6.00'W x 33.50'L x 1.54'H Field A 310 cf Overall - 57 cf Embedded = 253 cf x 40.0% Voids
#2A	100.50'	57 cf	Cultec C-100HD x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
		158 cf	Total Available Storage

Storage Group A created with Chamber Wizard

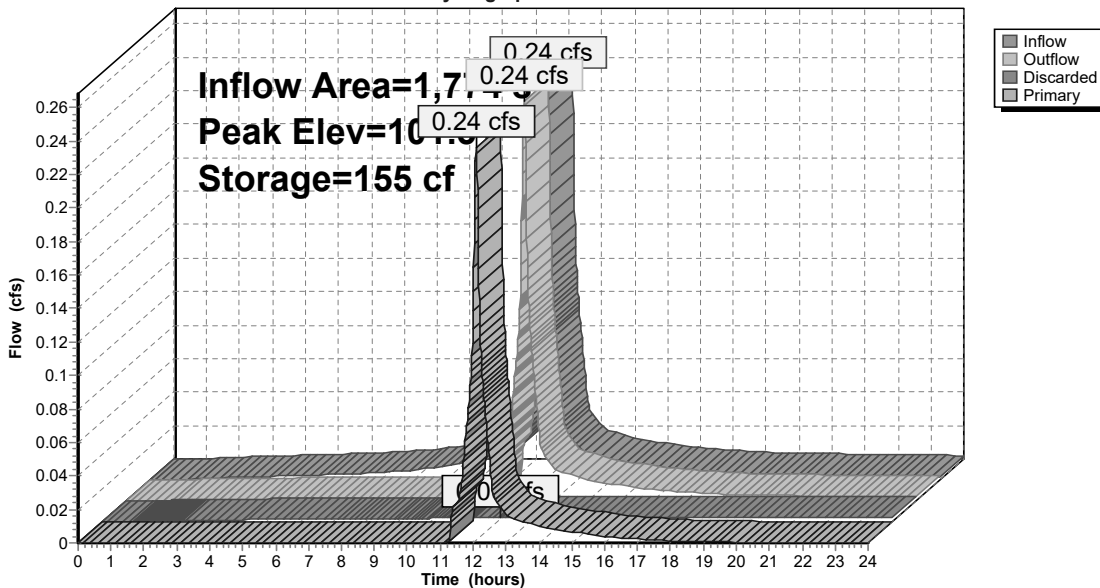
Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	0.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 97.70'
#2	Primary	101.40'	8.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=101.51' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.24 cfs @ 12.09 hrs HW=101.51' (Free Discharge)
 ↳ **2=Orifice/Grate** (Weir Controls 0.24 cfs @ 1.1 fps)

Pond 1P: Roof Recharge

Hydrograph



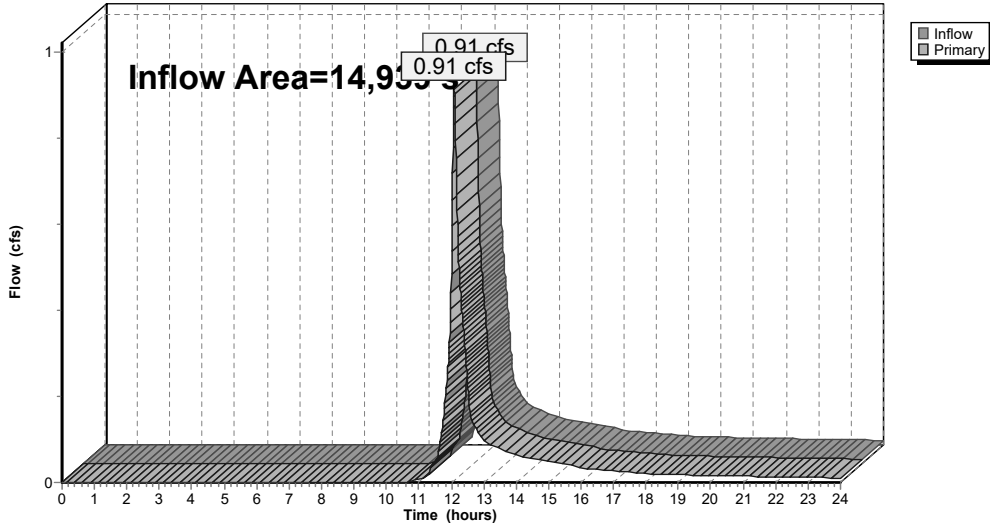
Summary for Link 6L: Post Dev(Rear)

Inflow Area = 14,939 sf, 16.54% Impervious, Inflow Depth > 2.18" for 25-year event
 Inflow = 0.91 cfs @ 12.09 hrs, Volume= 2,715 cf
 Primary = 0.91 cfs @ 12.09 hrs, Volume= 2,715 cf, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 6L: Post Dev(Rear)

Hydrograph



Summary for Subcatchment 1S: PreDev(Front)

Runoff = 0.81 cfs @ 12.09 hrs, Volume= 2,492 cf, Depth> 4.86"

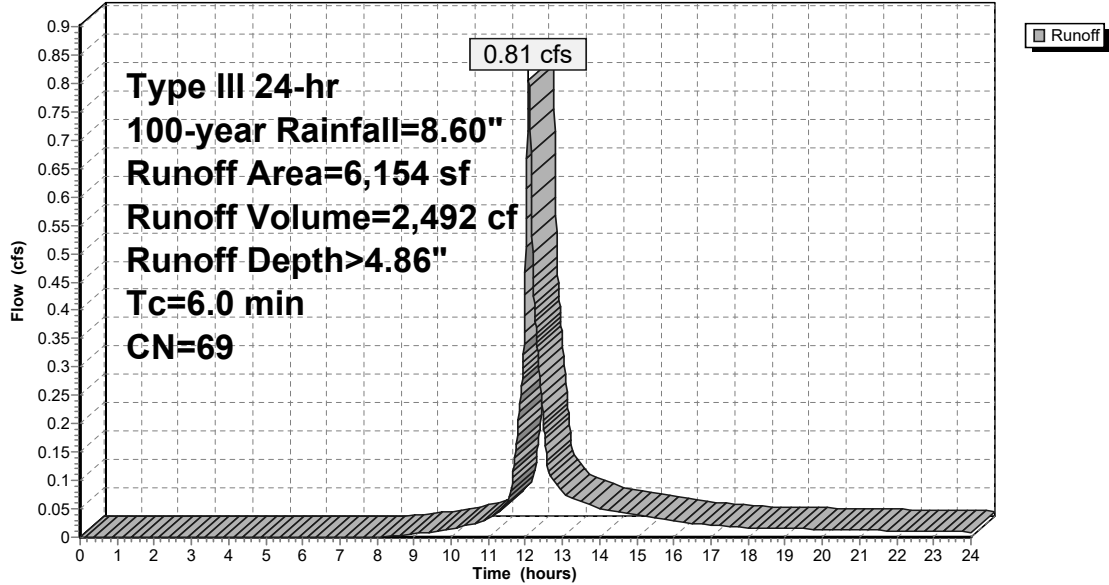
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-year Rainfall=8.60"

Area (sf)	CN	Description
* 429	98	House/Gar/Shed HSG B
* 1,077	98	Drive/Walks
680	55	Woods, Good, HSG B
3,968	61	>75% Grass cover, Good, HSG B
6,154	69	Weighted Average
4,648		75.53% Pervious Area
1,506		24.47% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 1S: PreDev(Front)

Hydrograph



Summary for Subcatchment 2S: PreDev(Rear)

Runoff = 1.80 cfs @ 12.09 hrs, Volume= 5,566 cf, Depth> 4.50"

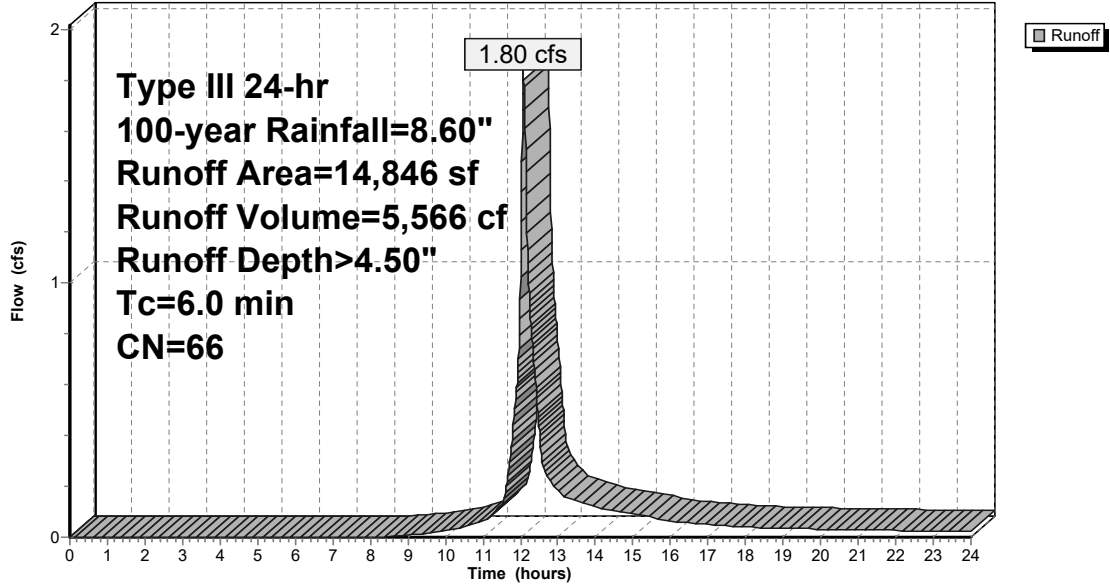
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-year Rainfall=8.60"

Area (sf)	CN	Description
* 1,511	98	House/Gar/Shed HSG B
* 1,239	98	Drive/Walks
3,359	55	Woods, Good, HSG B
8,737	61	>75% Grass cover, Good, HSG B
14,846	66	Weighted Average
12,096		81.48% Pervious Area
2,750		18.52% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 2S: PreDev(Rear)

Hydrograph



Summary for Subcatchment 3S: PostDev(Front)

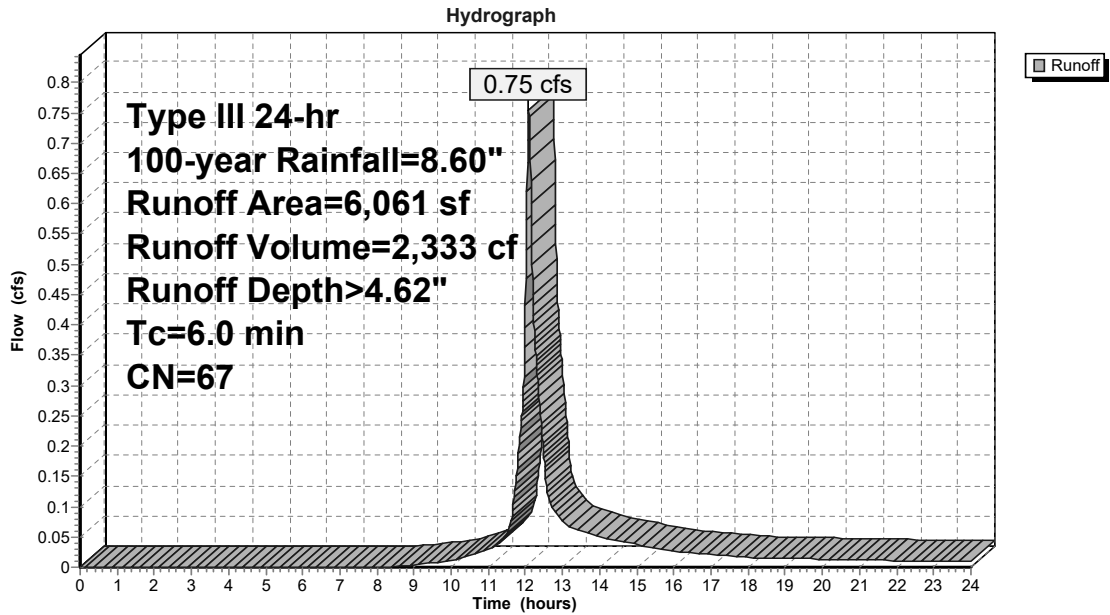
Runoff = 0.75 cfs @ 12.09 hrs, Volume= 2,333 cf, Depth> 4.62"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-year Rainfall=8.60"

Area (sf)	CN	Description
972	98	Driveway/Walks HSG B
327	55	Woods, Good, HSG B
4,762	61	>75% Grass cover, Good, HSG B
6,061	67	Weighted Average
5,089		83.96% Pervious Area
972		16.04% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 3S: PostDev(Front)



Summary for Subcatchment 4S: PostDev(Rear)

Runoff = 1.38 cfs @ 12.09 hrs, Volume= 4,282 cf, Depth> 3.90"

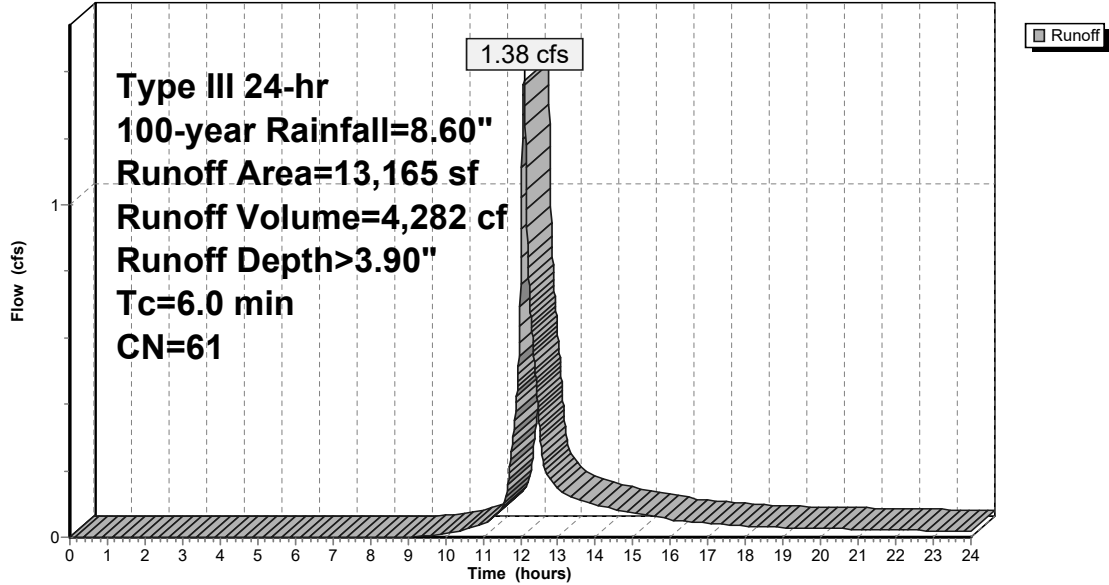
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-year Rainfall=8.60"

Area (sf)	CN	Description
697	98	Driveway/Walks HSG B
3,224	55	Woods, Good, HSG B
9,244	61	>75% Grass cover, Good, HSG B
13,165	61	Weighted Average
12,468		94.71% Pervious Area
697		5.29% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 4S: PostDev(Rear)

Hydrograph



Summary for Subcatchment 5S: PostDev(Roof)

Runoff = 0.34 cfs @ 12.08 hrs, Volume= 1,235 cf, Depth> 8.35"

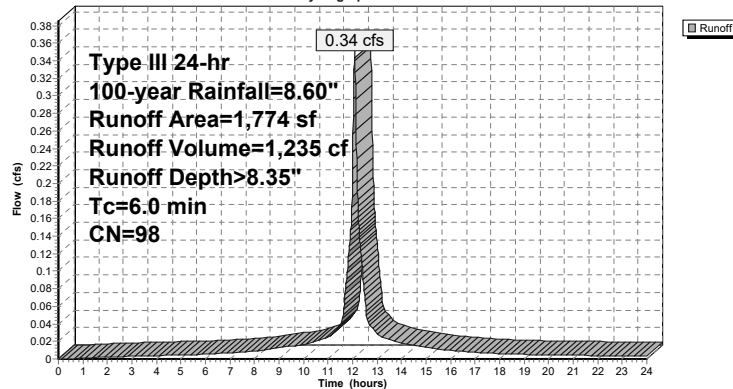
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Type III 24-hr 100-year Rainfall=8.60"

Area (sf)	CN	Description
1,774	98	House
1,774		100.00% Impervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
6.0					Direct Entry,

Subcatchment 5S: PostDev(Roof)

Hydrograph



Summary for Pond 1P: Roof Recharge

Inflow Area = 1,774 sf, 100.00% Impervious, Inflow Depth > 8.35" for 100-year event
 Inflow = 0.34 cfs @ 12.08 hrs, Volume= 1,235 cf
 Outflow = 0.34 cfs @ 12.09 hrs, Volume= 1,089 cf, Atten= 0.26%, Lag= 0.4 min
 Discarded = 0.00 cfs @ 12.09 hrs, Volume= 203 cf
 Primary = 0.34 cfs @ 12.09 hrs, Volume= 886 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs
 Peak Elev= 101.53' @ 12.09 hrs Surf.Area= 201 sf Storage= 157 cf

Plug-Flow detention time= 96.6 min calculated for 1,088 cf (88% of inflow)
 Center-of-Mass det. time= 40.5 min (780.3 - 739.8)

Volume	Invert	Avail.Storage	Storage Description
#1A	100.00'	101 cf	6.00'W x 33.50'L x 1.54'H Field A 310 cf Overall - 57 cf Embedded = 253 cf x 40.0% Voids
#2A	100.50'	57 cf	Cultec C-100HD x 4 Inside #1 Effective Size= 32.1"W x 12.0"H => 1.86 sf x 7.50'L = 14.0 cf Overall Size= 36.0"W x 12.5"H x 8.00'L with 0.50' Overlap Row Length Adjustment= +0.50' x 1.86 sf x 1 rows
158 cf			Total Available Storage

Storage Group A created with Chamber Wizard

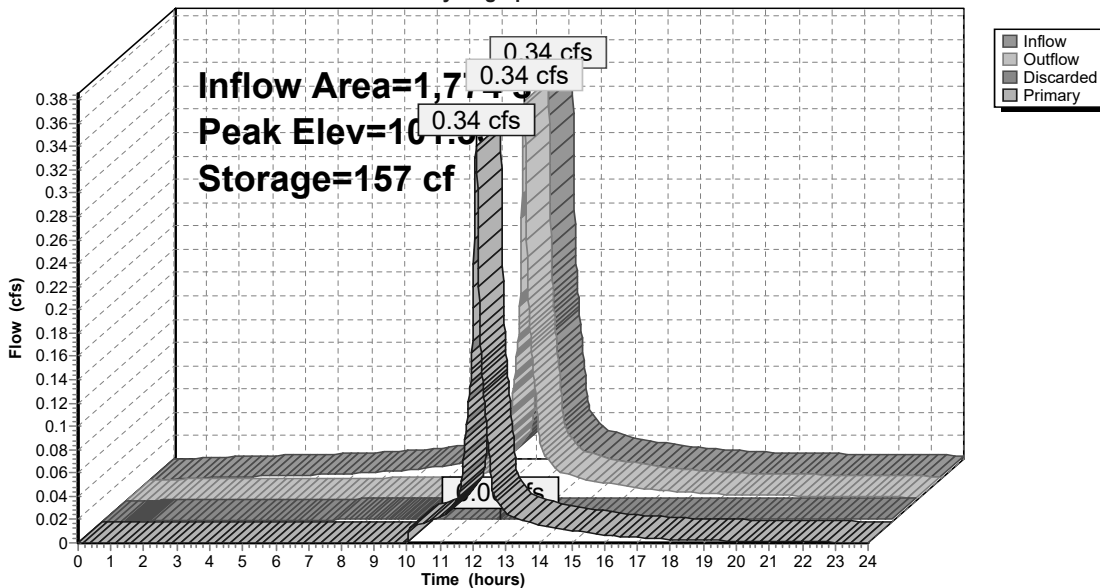
Device	Routing	Invert	Outlet Devices
#1	Discarded	100.00'	0.270 in/hr Exfiltration over Wetted area Conductivity to Groundwater Elevation = 97.70'
#2	Primary	101.40'	8.0" Horiz. Orifice/Grate C= 0.60 Limited to weir flow at low heads

Discarded OutFlow Max=0.00 cfs @ 12.09 hrs HW=101.53' (Free Discharge)
 ↳ **1=Exfiltration** (Controls 0.00 cfs)

Primary OutFlow Max=0.34 cfs @ 12.09 hrs HW=101.53' (Free Discharge)
 ↳ **2=Orifice/Grate** (Weir Controls 0.34 cfs @ 1.2 fps)

Pond 1P: Roof Recharge

Hydrograph



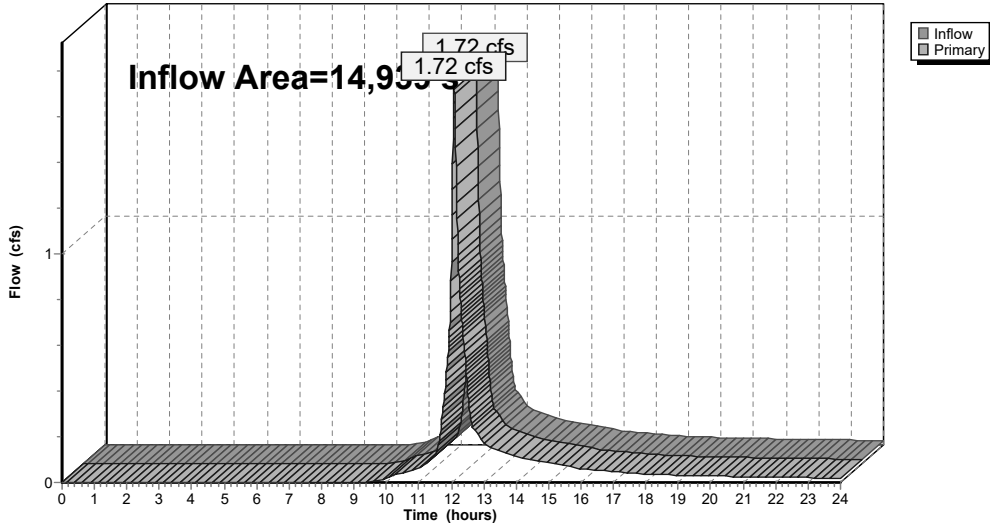
Summary for Link 6L: Post Dev(Rear)

Inflow Area = 14,939 sf, 16.54% Impervious, Inflow Depth > 4.15" for 100-year event
Inflow = 1.72 cfs @ 12.09 hrs, Volume= 5,168 cf
Primary = 1.72 cfs @ 12.09 hrs, Volume= 5,168 cf, Atten= 0.00%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.01 hrs

Link 6L: Post Dev(Rear)

Hydrograph



APPENDIX – B

Stormwater Operation and Maintenance Plan

Stormwater Management Operation and Maintenance Plan
Homeowners Maintenance Agreement
Roof Runoff Infiltration System
58 Massasoit Avenue
Sudbury, Massachusetts

June 15, 2023
Revised: July 6, 2023

In accordance with Standard 9 of the Massachusetts Department of Environmental Protection Stormwater Handbook (February 2008), the attached on-site maintenance program for the proposed stormwater management system has been developed to ensure the Best Management Practices (BMP's) in place will remain functioning as designed. The landowner/operator, or its successors shall be responsible for financing maintenance and emergency repairs of the entire stormwater management system on their property. The Plan contains maintenance responsibilities that shall "run" with the property when the ownership is transferred.

Responsible Operator:

Homeowner:

Signed

Date

Operation and Maintenance:

Gutter Cleaning:

Gutter cleaning shall be done at least once per year, in the fall after the trees have dropped their leaves. Inspect downspouts and overflows periodically to prevent debris buildup.

Recharge Systems (Infiltration Galley Chambers) :

The inlet pipe and observation access port shall be inspected 4 times per year. Inspect recharge facilities following a rainfall event greater than 1.0 inches in a 24 hour period. Any accumulated debris shall be removed.

If standing water is observed for more than 72 hours following a storm event, immediately retain a qualified professional to assess whether infiltration function has been lost and develop recommended correction actions.

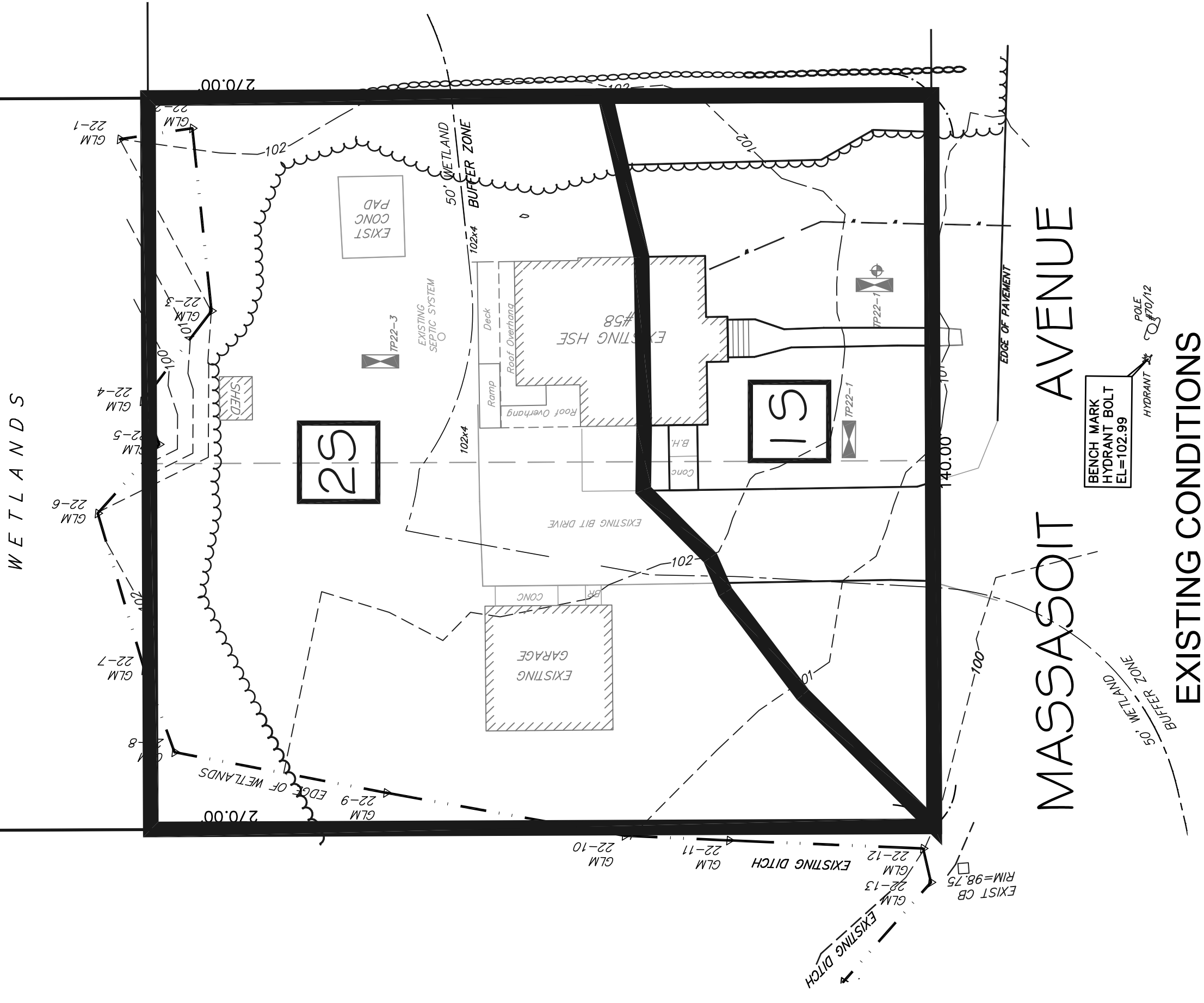
If upon visual inspection it is found that sediment has accumulated, a stadia rod should be inserted to determine the depth of sediment. When the average depth of sediment exceeds 3 inches throughout the length of the chambers, clean-out should be performed. Maintenance is accomplished with the JetVac process. Most sewer and pipe maintenance companies have vacuum/JetVac combination vehicles.

APPENDIX – C

Pre- & Post-Developed Runoff Area Plan

PARCEL AREA:
37,800 S.F.

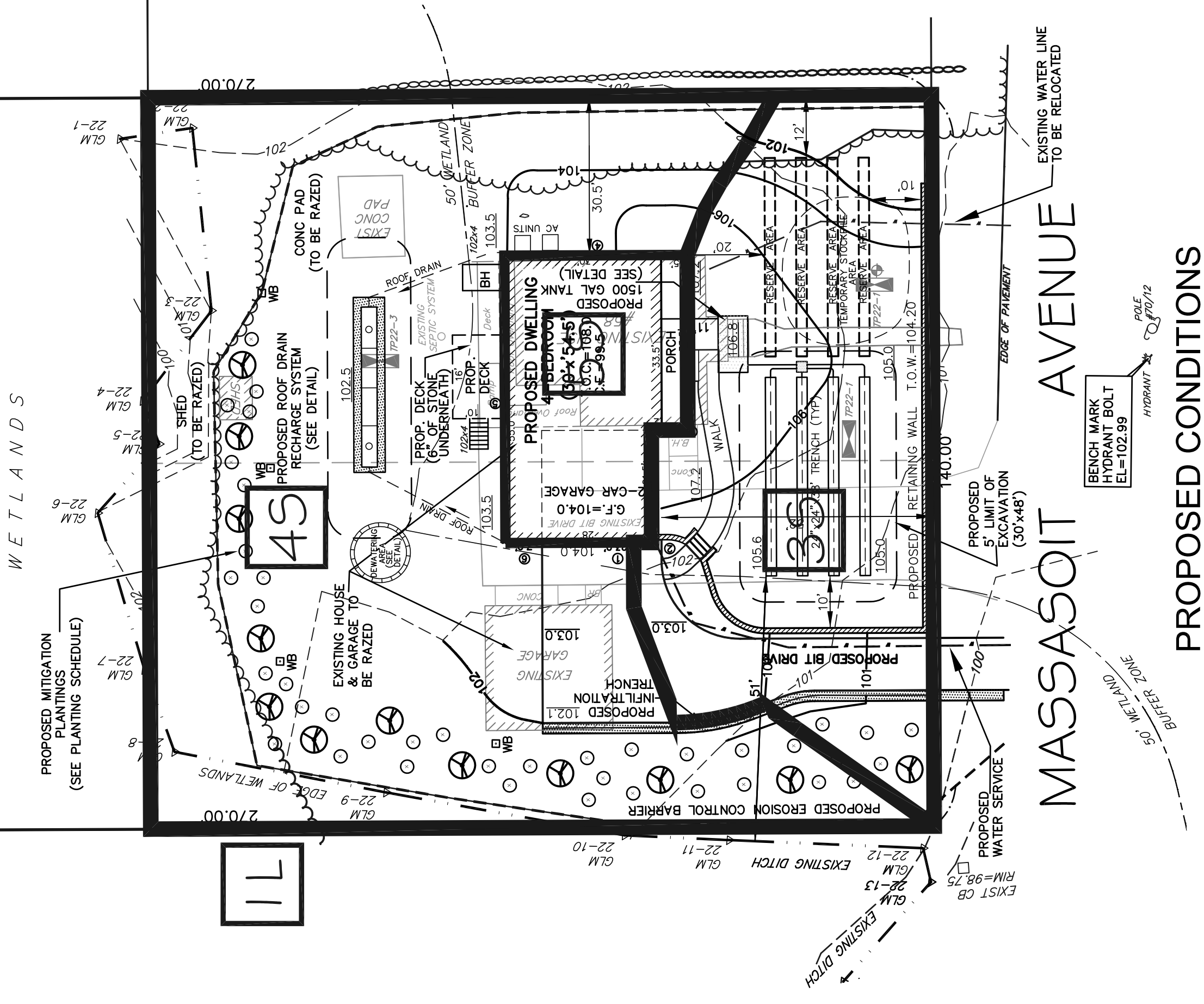
PARCEL AREA:
37,800 S.F.



EXISTING CONDITIONS

MASSASSOIT AVENUE

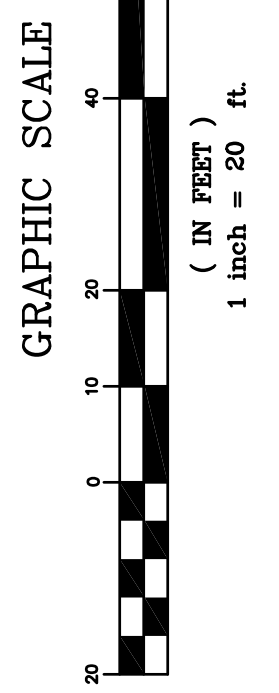
BENCH MARK
HYDRANT BOLT
EL=102.99



PROPOSED CONDITIONS

MASSASSOIT AVENUE

BENCH MARK
HYDRANT BOLT
EL=102.99



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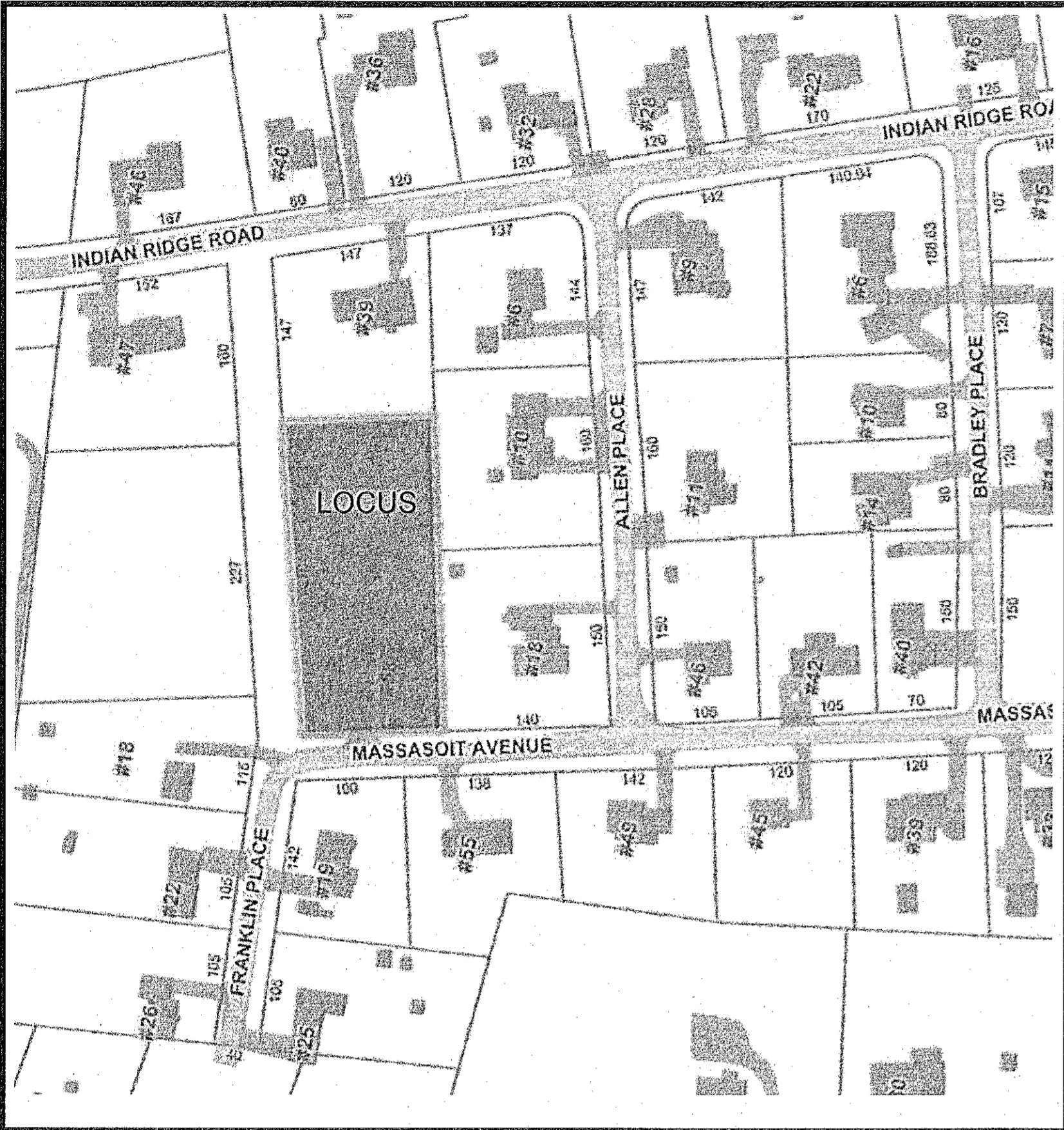
FLD.:
DRW.:
CHKD.:

RUNOFF AREAS
"58 MASSASSOIT AVENUE"
SUDBURY, MASSACHUSETTS

APPLICANT:
JBJS CHARLES, LLC
15 EDWARDS LANE
QUINCY, MA 02169

JOB No. 17,240
DATE: 6/15/2023
SCALE: 1"=20'
SHEET: 1 of 1

REVISED: 07/06/2023



LOCUS MAP

ASSESSOR'S REFERENCE:
K09-0425

DEED REFERENCE:
MIDDLESEX COUNTY REGISTRY OF DEEDS
Bk. 79979, Pg. 14

PLAN REFERENCE:
PLAN No. 933 OF 1949

OWNER OF RECORD:
JBJS CHARLES, LLC c/o JONATAS STORCK
15 EDWARDS LANE
QUINCY, MA 02169

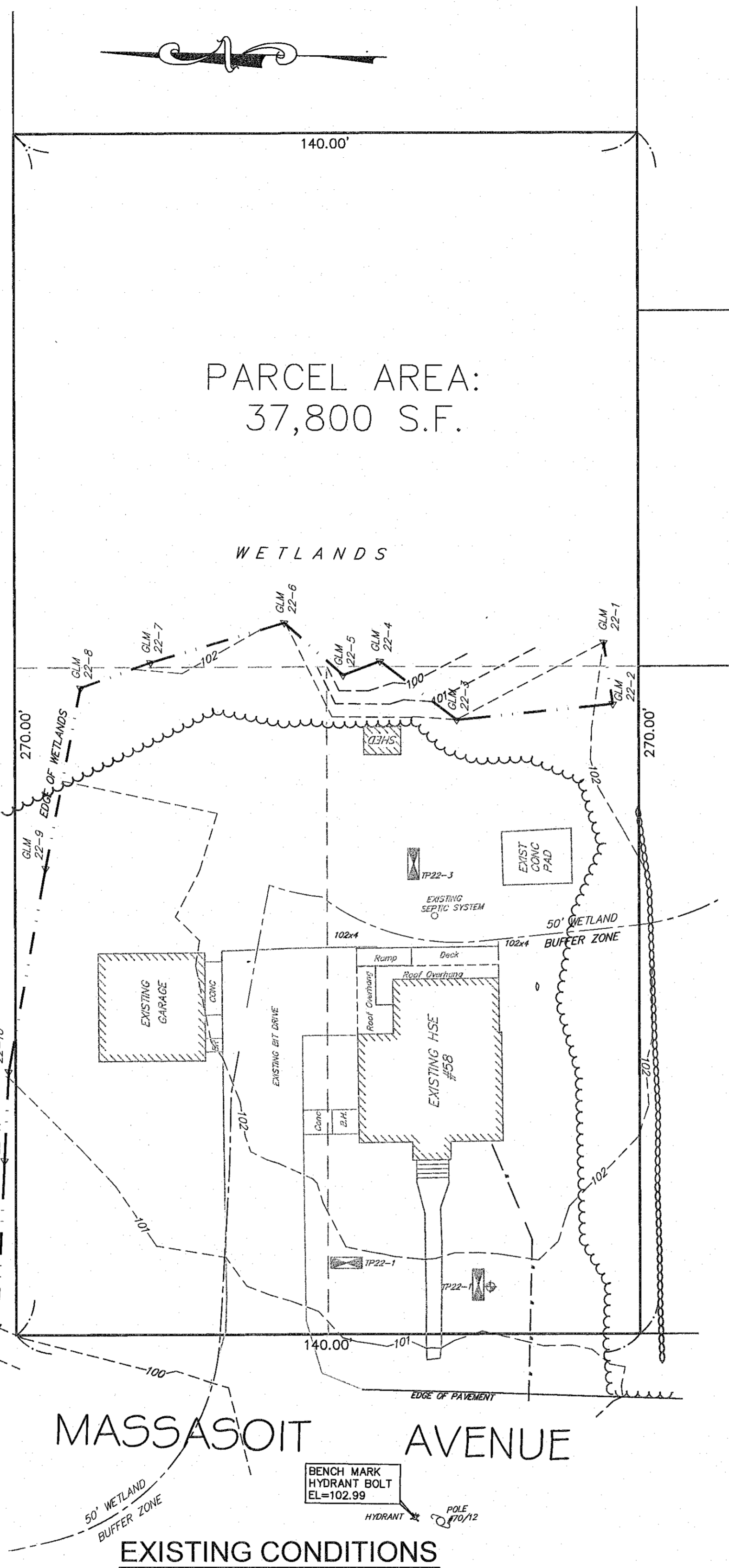
ZONING CLASSIFICATION:
RES A-1
MIN. LOT SIZE = 40,000 S.F.
MIN. FRONTAGE = 180 FEET

MIN. SETBACK REQUIREMENTS:
FRONT SET BACKS = 40 FEET
SIDE SETBACKS = 20 FEET
REAR SETBACKS = 30 FEET

WETLAND BUFFER ACTIVITY

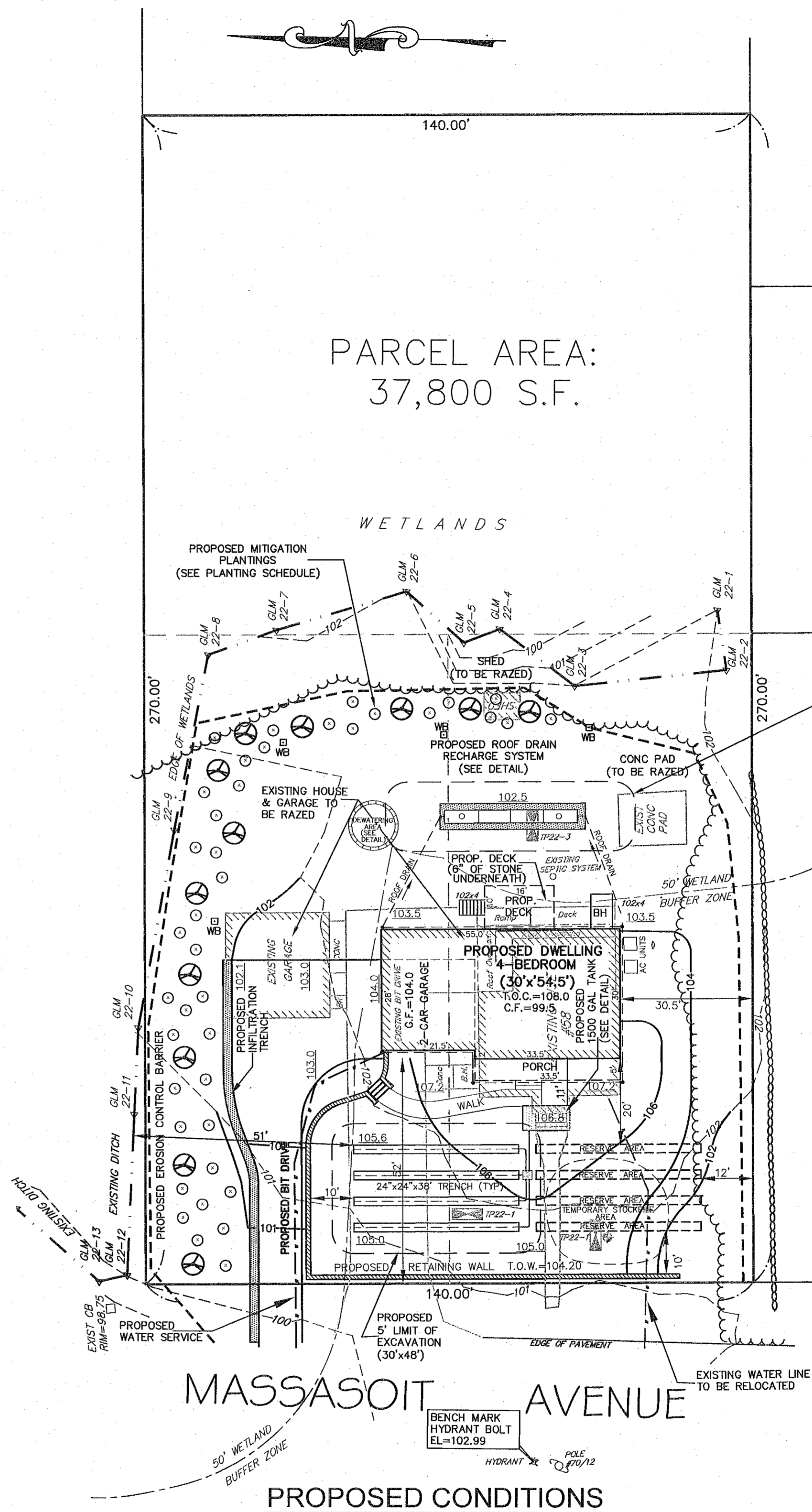
ACTIVITY	100' BUFFER
EXISTING CONDITIONS	
HOUSE & ROOF OH	1,305 S.F.
DRIVEWAY	2189 S.F.
CONC WALK/BULKHEAD	312 S.F.
GARAGE	581 S.F.
SHED	52 S.F.
CONC. PAD	189 S.F.
TOTAL:	4,628 S.F.
EXISTING DECK & RAMP - 130 S.F. (NOT INCLUDED IN IMPERVIOUS AREA)	
PROPOSED CONDITIONS	
HOUSE & PORCH	1,807 S.F.
DRIVEWAY	1,475 S.F.
WALK	161 S.F.
RETAINING WALL	203 S.F.
BULKHEAD	30 S.F.
DECK & STAIRS	180 S.F.
AC UNITS	18 S.F.
TOTAL:	3,874 S.F.

THE PROJECT RESULTS IN A 754 S.F. DECREASE IN BUFFER ZONE ACTIVITY



MASSASOIT AVENUE

EXISTING CONDITIONS



MASSASOIT AVENUE

PROPOSED CONDITIONS

PARCEL AREA:
37,800 S.F.

PARCEL AREA:
37,800 S.F.

ROOF INFILTRATION - 5' LIMIT OF EXCAVATION (16' x 57.5')
ALL TOPSOIL, SUBSOIL AND ANY DELETERIOUS MATERIAL (APPROXIMATELY ELEVATION 98.2) MUST BE REMOVED FROM THE AREA OF THE INFILTRATION SYSTEM AND OTHER DESIGNATED LIMITS AND FILLED WITH APPROVED, CLEAN, GRANULAR SAND. THE FILL SHALL NOT CONTAIN ANY MATERIAL LARGER THAN 2 INCHES AND BE GRADED SO NOT MORE THAN 45% OF THE SAMPLE IS RETAINED IN A #4 SIEVE, OF THAT PASSING, 20% OR LESS SHALL PASS A #100 SIEVE AND 5% OR LESS SHALL PASS THE #200 SIEVE. NOT MORE THAN 90% SHALL BE RETAINED ON THE #50 SIEVE. SAMPLE FOR SIEVE ANALYSIS TO BE TAKEN FROM SAMPLE IN PLACE.

WB - (4) WETLAND BOUNDS (SEE DETAIL)

A TEMPORARY STOCKPILE AREA IS SHOWN IN THE FRONT YARD, IN THE EXPANSION AREA (AS SHOWN ON THE PLAN). IF THERE IS A STOCKPILE, IT WILL BE SURROUNDED BY STAKED SILT FENCE.

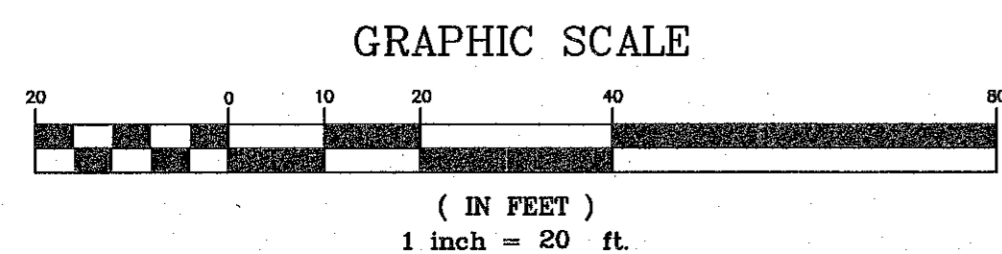
NOTE:
THE PROPOSED BASEMENT FLOOR ELEVATION IS 99.5 FEET. THE POSSIBLE WATER STAIN IN THE BASEMENT IS AT ELEVATION 98.5 FEET.

REVISIONS

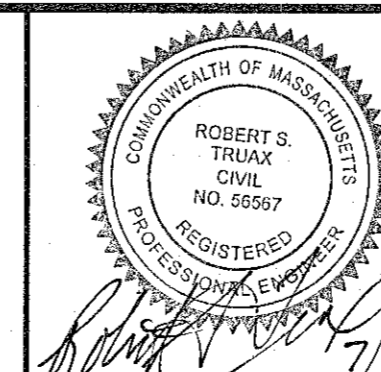
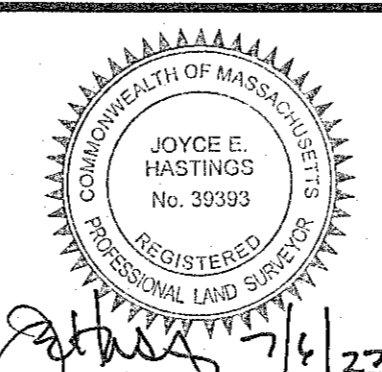
7	1/27/2023	REVISED PORCH
8	5/1/2023	REVISED HOUSE DIMENSIONS
9	7/6/2023	REVISED PER COMMENTS



NOTE: IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY LOCATIONS AND ELEVATIONS OF EXISTING UTILITIES PRIOR TO COMMENCEMENT OF ANY CONSTRUCTION. DIGSAFE IS TO BE NOTIFIED 72 WORKING HOURS IN ADVANCE OF CONSTRUCTION. DIGSAFE 1-888-344-7233



No.	DATE	DESCRIPTION	FLD. RC, ML
1	8/10/2022	DRAINAGE, GRADING, SEPTIC	DRW.: JEH
2	9/1/2022	STORMWATER, PLANTING	CHKD.: RST
3	9/16/2022	REDUCE HOUSE, CALCS	
4	10/10/2022	CONCOM COMMENTS	
5	10/21/2022	TOWN ENG. COMMENTS/RET. WALL	
6	1/2/2023	REDUCE HOUSE SIZE	



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PROPOSED HOUSE LOCATION PLAN
"58 MASSASOIT AVENUE"
SUDBURY, MASSACHUSETTS
APPLICANT:
JBJS CHARLES, LLC
15 EDWARDS LANE
QUINCY, MA 02169

JOB No. 17,240
DATE: 7/6/2022
SCALE: 1"=20'
SHEET: 1 of 3
PLAN #: 27,611

AS MITIGATION FOR ACTIVITY IN THE WETLAND BUFFER ZONE 2,200 S.F. OF EXISTING YARD WILL BE RESTORED WITH NATIVE VEGETATION.

PLANTING SCHEDULE

- - (40) SHRUBS (1 GALLON)
 - (10) - SWEET PEPPERBUSH (*Clethra alnifolia*)
 - (10) - Highbush Blueberry (*Vaccinium corymbosum*)
 - (10) - GRAY DOGWOOD (*Cornus racemosa*)
 - (5) - RED CHOKEBERRY (*Aronia arbutifolia*)
 - (5) - SERVICEBERRY (*Amelanchier arborea*)
- ⊗ - (12) TREES (2 GALLON) - 1.5 INCH CALIPER
 - (4) - RED MAPLE (*Acer rubrum*)
 - (4) - BALSAM FIR (*Abies balsamea*)
 - (4) - BLACK GUM (*Nyssa sylvatica*)

- NOTES:
1. TREES AND SHRUBS WILL BE PLANTED AS SHOWN ON THE PLAN, WITH MINOR DEVIATIONS TO LOCATION BASED ON SITE CONDITIONS.
 2. ALL PLANTINGS WILL BE WATERED AS NECESSARY AFTER PLANTING UNTIL SUCCESSFULLY ESTABLISHED.
 3. ANY MODIFICATIONS TO PLAN SPECIES SHALL ONLY BE ALLOWED IF APPROVED BY SUDBURY CONSERVATION COMMISSION STAFF PRIOR.
 4. THE RESTORATION AREA IS NOT INTENDED TO BE A LANDSCAPED AREA. IT IS TO BE REMAIN NATURAL. NO MULCH IS TO BE ADDED.
 5. AS GRASS WITHIN THE RESTORATION AREA REACHES A HEIGHT OF 12 TO 14 INCHES, THE AREA WILL BE MOWED TO A HEIGHT OF 4 INCHES TO ENCOURAGE THE GROWTH OF THE PLANTED TREES AND SHRUBS.
 6. AFTER THE SHRUBS AND TREES ARE PLANTED, THE RESTORATION SHALL BE OVERSEEDDED WITH A WETLAND SEED MIX.
 7. DURING THE MONITORING PERIOD, THE WEEDS AT THE BASE OF THE PLANTED TREES AND SHRUBS SHALL BE PULLED TO ENCOURAGE THE GROWTH OF THE TREES AND SHRUBS.

AS ADDITIONAL MITIGATION FOR WETLAND BUFFER ZONE ACTIVITY, THE PROJECT WILL INCLUDE INVASIVE SPECIES MANAGEMENT.

AS ADDITIONAL MITIGATION FOR WETLAND BUFFER ZONE ACTIVITY, THE PROJECT WILL INCLUDE INVASIVE SPECIES MANAGEMENT.

NOTES:
The applicant is proposing to reduce the prevalence of invasive species within the wetland buffer zone along the northerly side and easterly sides of the property.

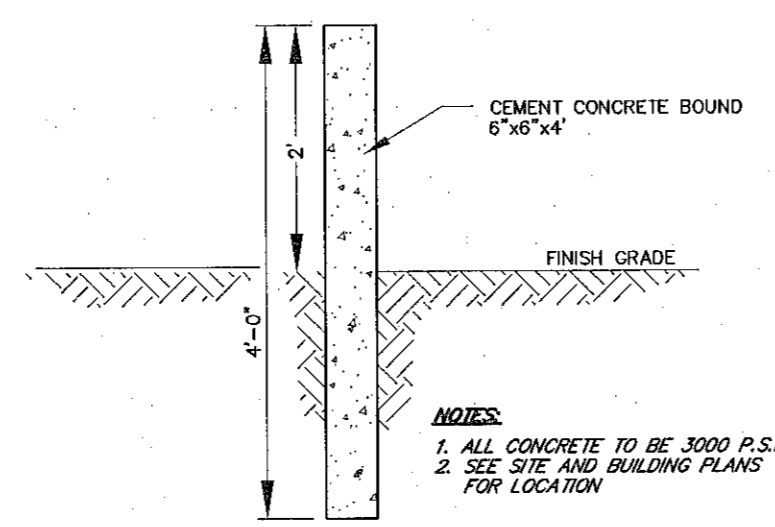
The undesirable species in this area include:
Tatarian honeysuckle (*Lonicera tatarica*)
Glossy Buckthorn (*Fragula alnus*)
Oriental Bittersweet (*Celastrus orbiculatus*)
Japanese Knotweed (*Polygonum cuspidatum*)

Methods
Woody shrubs and vines will be either pried (smaller specimens) using leverage tools (i.e. puller bar, weed wrench, etc.), or they will be cut and the stems/trunks will be and painted immediately with concentrated, wetland safe herbicide. Herbicides shall only be applied by a licensed applicator and the product will be approved by the Conservation Commission prior to use. The area will be monitored for re-sprouts or missed plants during the build out of the project; undesirable vegetation can be treated with a dilute herbicide solution (usually 2%) applied to the leaves during the mid-late growing season.

All woody or herbaceous materials will be removed from the site and disposed of so as not to foster propagation of these species elsewhere; either buried or properly composted, as appropriate. During the build out of the project, the areas of invasive treatment will be inspected and spot treated by either mechanical or legally applied chemical means so that at the closure of the Order of Conditions, the property will have benefited from one or more years of invasive species management that will diminish the prevalence of these species.

Invasive Vegetation Management for Habitat Improvement

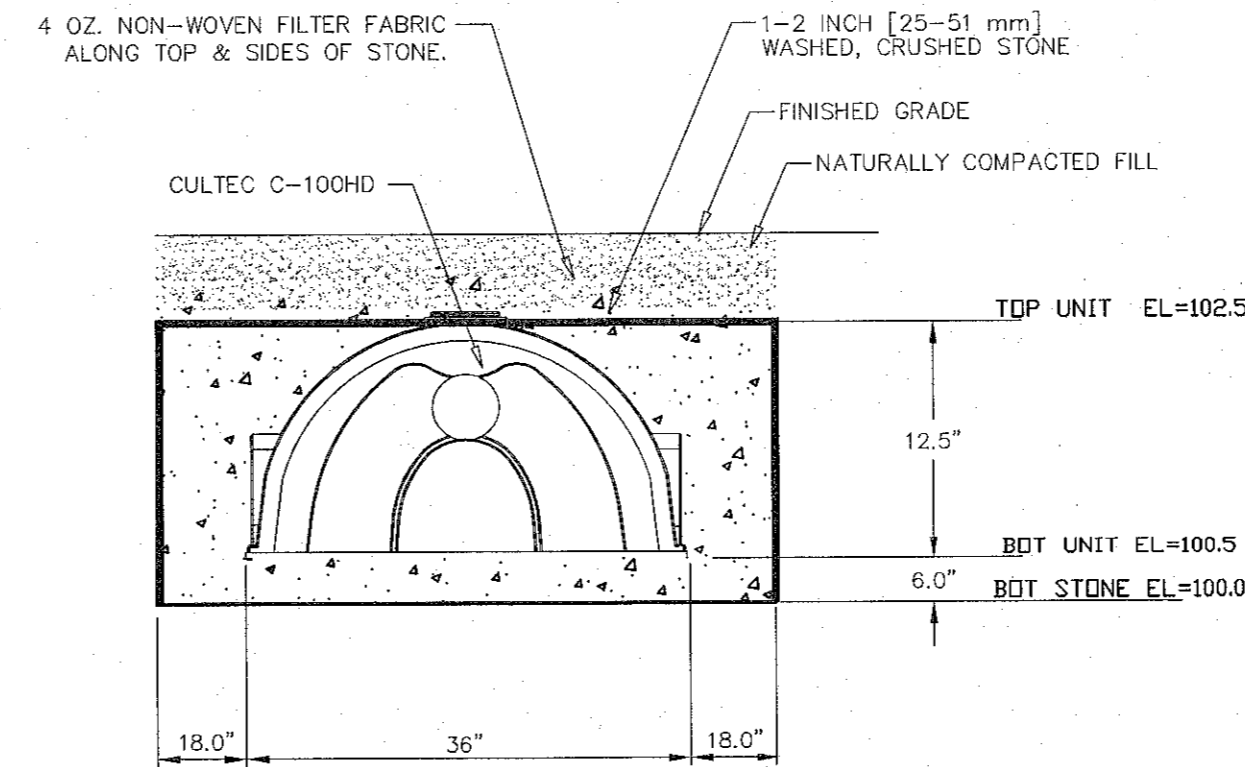
1. Remove small undesirable shrubs via wrenching tool as practicable.
2. Cut woody stems with licensed application of herbicide.
3. Legally dispose of all salvage vegetation.
4. Monitor for re-sprouts and spot treat/maintain treatment through issuance of Certificate of Compliance.



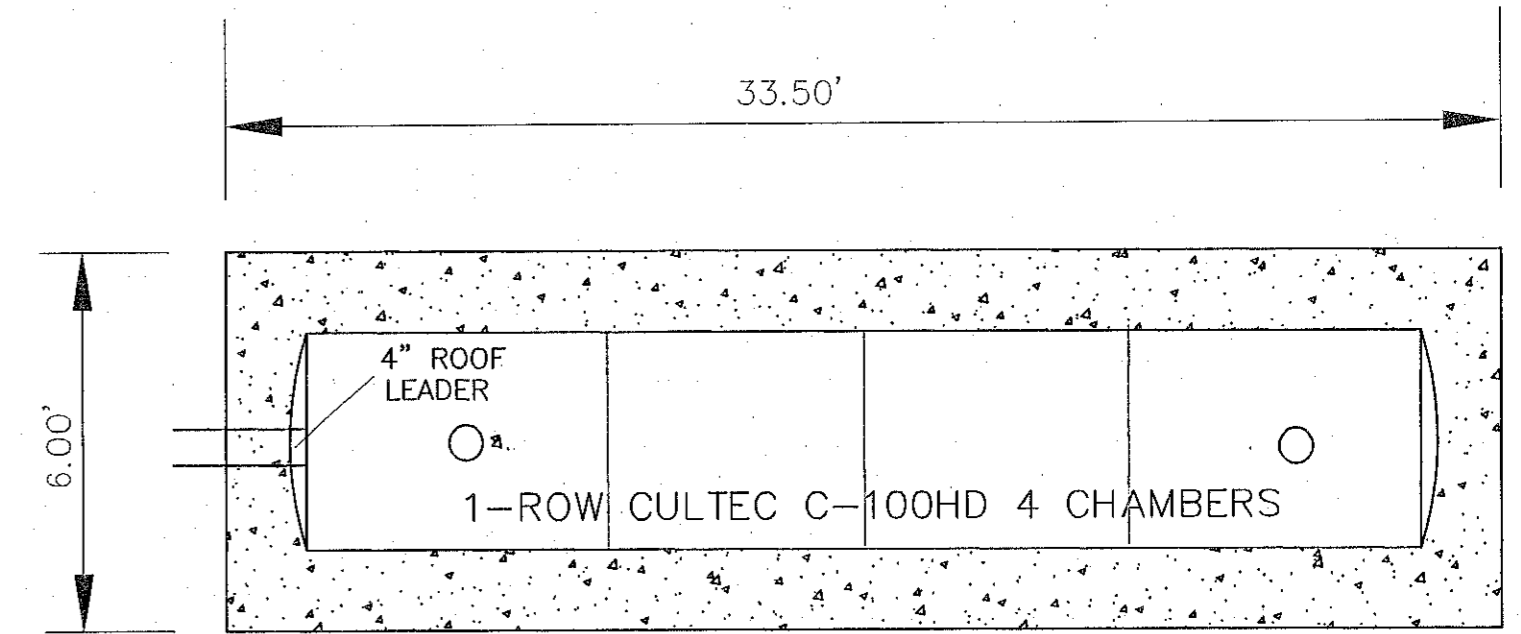
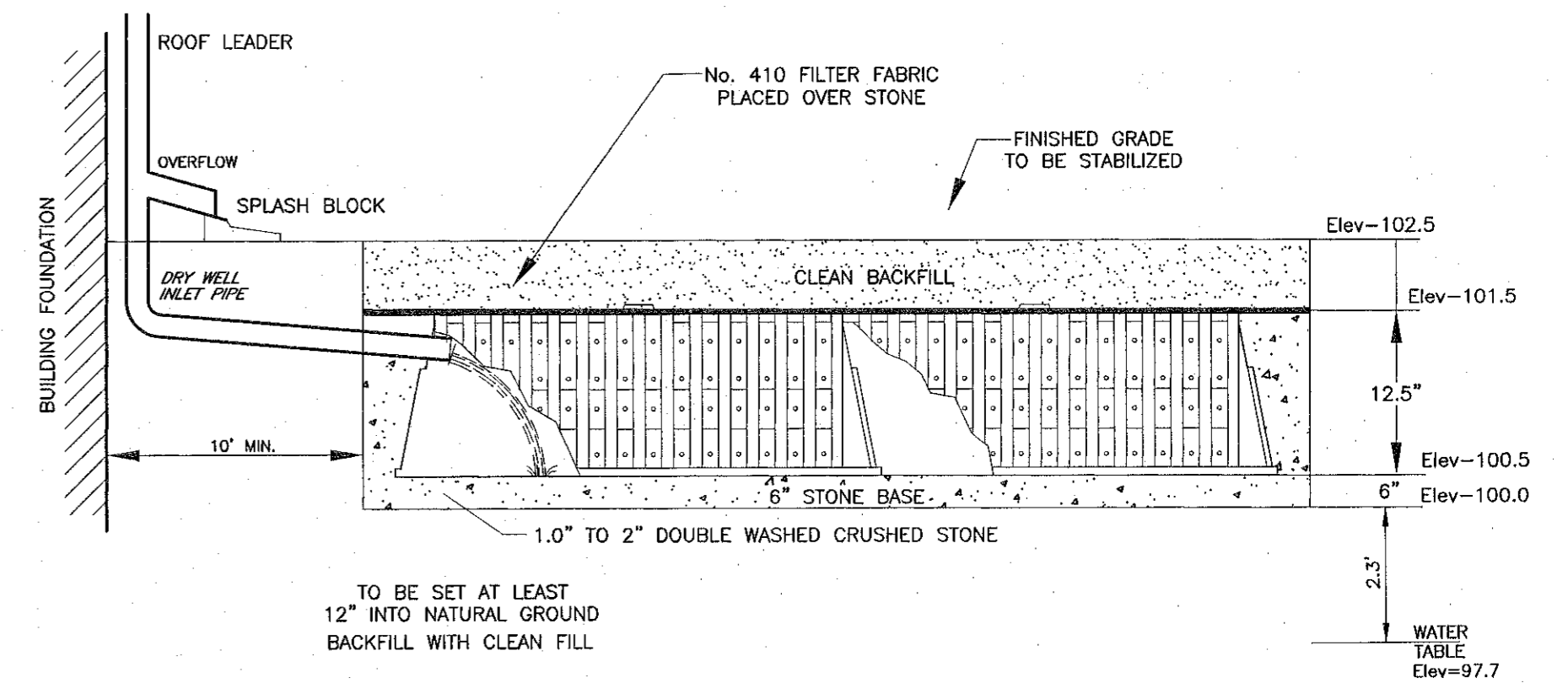
CONCRETE WETLAND BOUND
(NO SCALE)

DRAINAGE SYSTEM CALCULATIONS

ALL ROOF RUNOFF TO BE DIRECTED TO RECHARGE SYSTEM.
PROPOSED ROOF AREA = 1,774 S.F.
VOLUME REQUIRED FOR 1" OF RUNOFF OVER ROOF AREA:
1,774 S.F. x 1" = 148 C.F.
VOLUME PROVIDED CULTEC RECHARGER DRAINAGE SYSTEM:
CULTEC RECHARGER C-100HD 4-UNITS
STORAGE VOLUME PROVIDED = CHAMBER + STONE STORAGE
= 56.8 cu.ft. + 101.2 cu.ft. = 158.0 cu.ft.



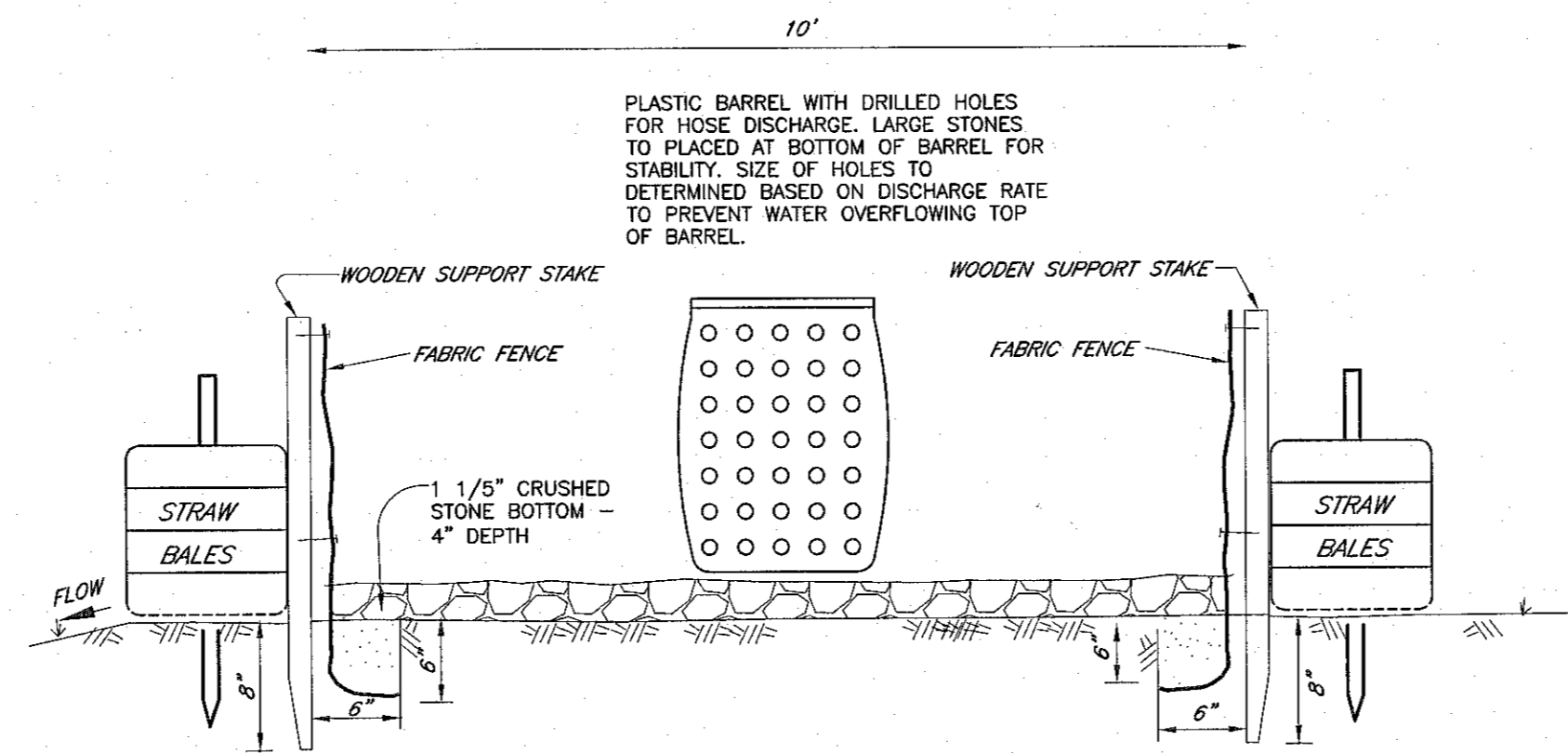
1-ROW CULTEC C-100HD 4 CHAMBERS



PLAN VIEW

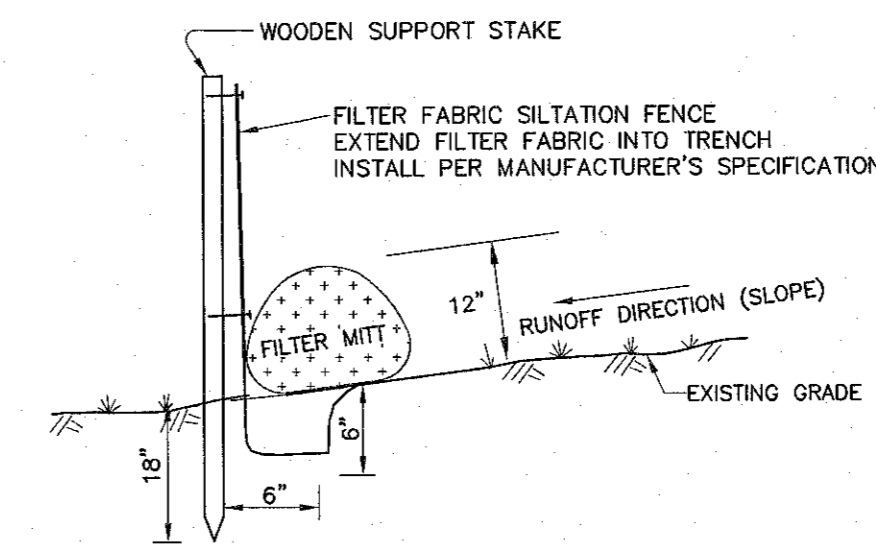
CULTEC DRY WELL SYSTEM
FOR ROOF RUNOFF INFILTRATION
CULTEC CONTRACTOR 100HD

N.T.S.



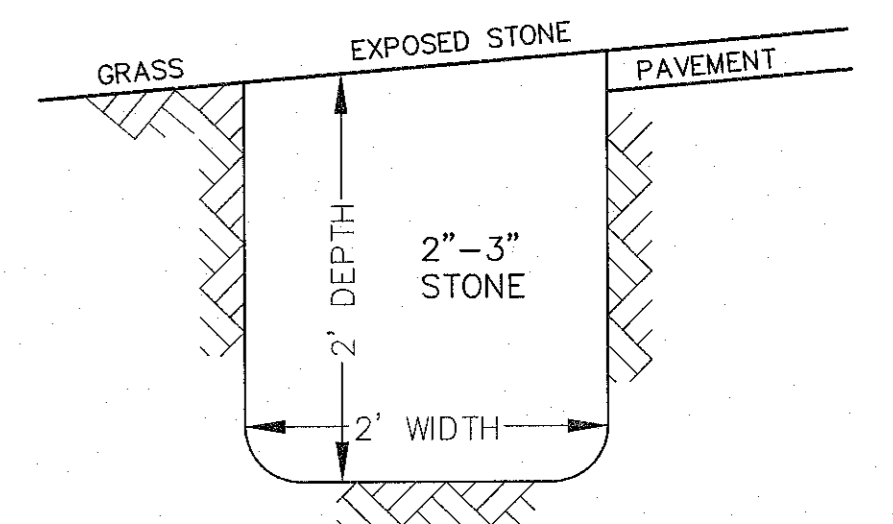
DE-WATERING:
IN THE EVENT DE-WATERING IS REQUIRED, GROUNDWATER WILL BE PUMPED FROM THE EXCAVATION AND DISCHARGED INTO A DESIGNATED DE-WATERING AREA AS SHOWN ON THE PLAN. THE DESIGN ENGINEER AND THE SUDBURY CONSERVATION AGENT SHALL BE NOTIFIED PRIOR TO DE-WATERING.

DE-WATERING DETAIL



EROSION CONTROL BARRIER
FILTER MITT W/ SILT FENCE

N.T.S.



INFILTRATION TRENCH DETAIL

N.T.S.

REVISIONS

No.	DATE	DESCRIPTION
7	1/27/2023	REVISED PORCH
8	5/1/2023	REVISED HOUSE DIMENSIONS
9	7/6/2023	REVISED PER COMMENTS

N.T.S.

No.	DATE	DESCRIPTION	FLD.:
1	8/10/2022	DRAINAGE, GRADING, SEPTIC DETAILS	RC, ML
	9/1/2022	STORMWATER PLANTING	DRW:
3	9/16/2022	REDUCE HOUSE, CALCS	JEH
4	10/10/2022	CONCOM COMMENTS	CHKD.:
5	10/21/2022	TOWN ENG. COMMENTS/RET. WALL	RST

JOYCE E. HASTINGS
REGISTERED PROFESSIONAL LAND SURVEYOR
NO. 93293

ROBERT S. TRUAX
REGISTERED PROFESSIONAL CIVIL ENGINEER
NO. 5557

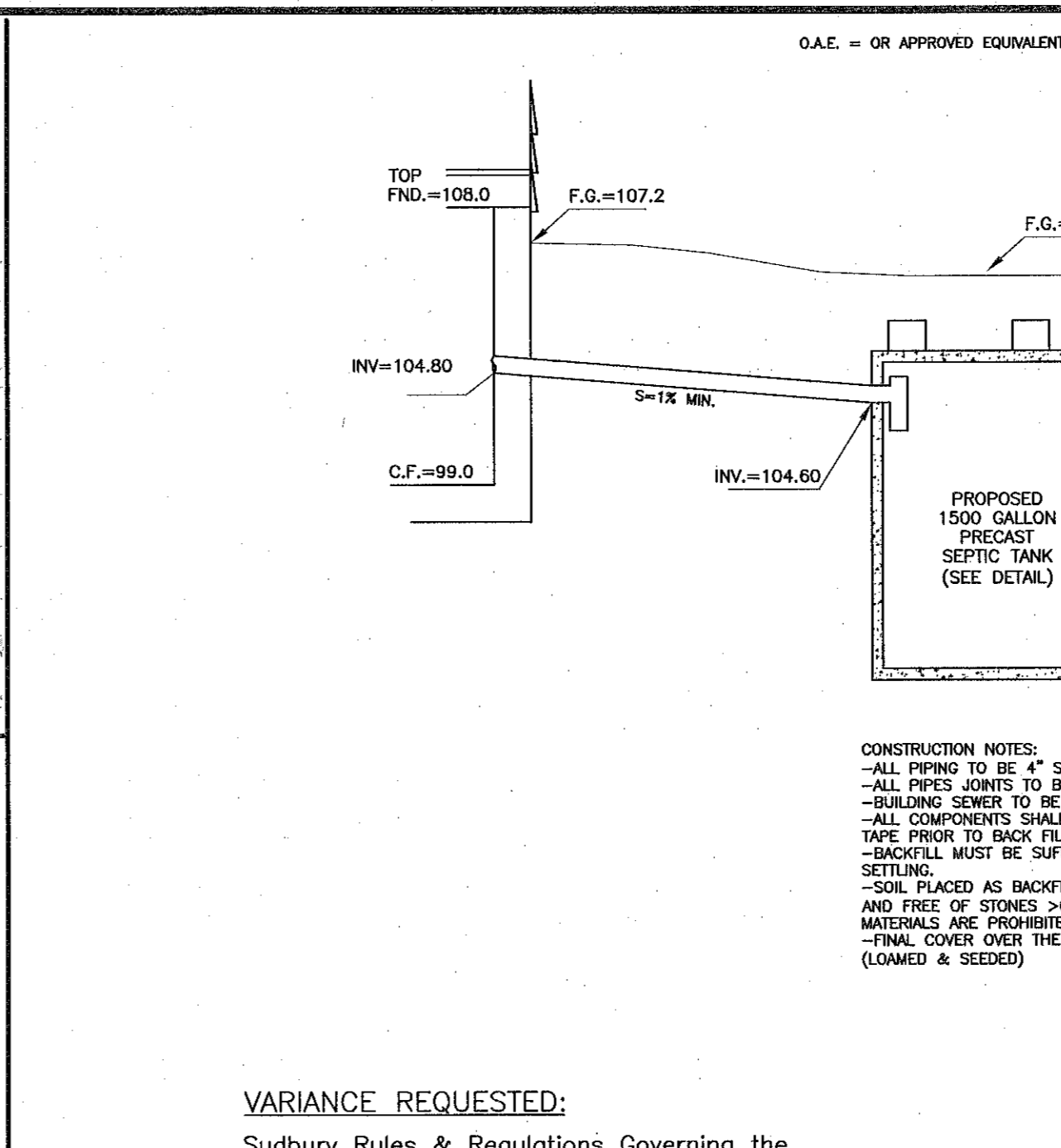
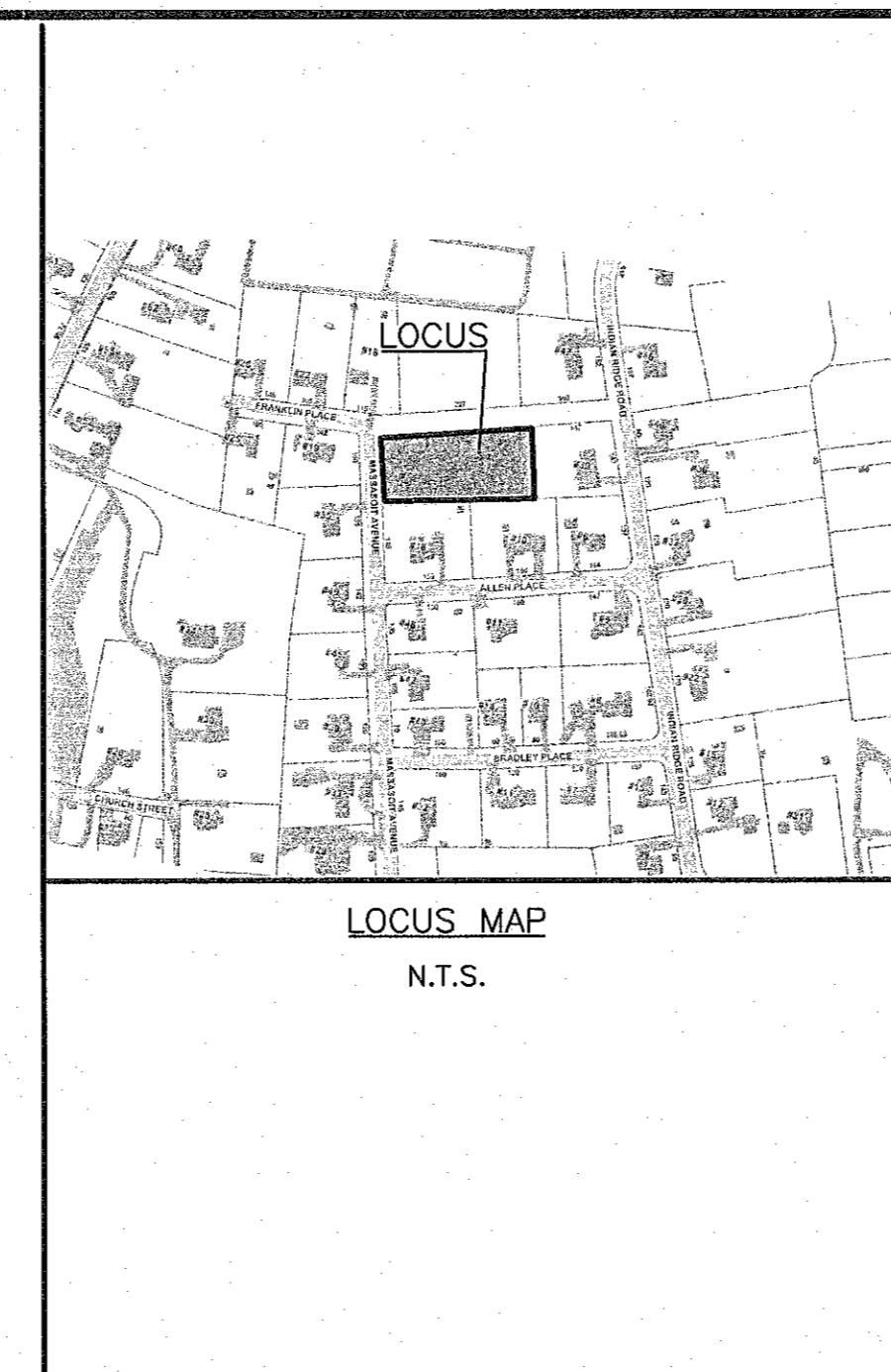
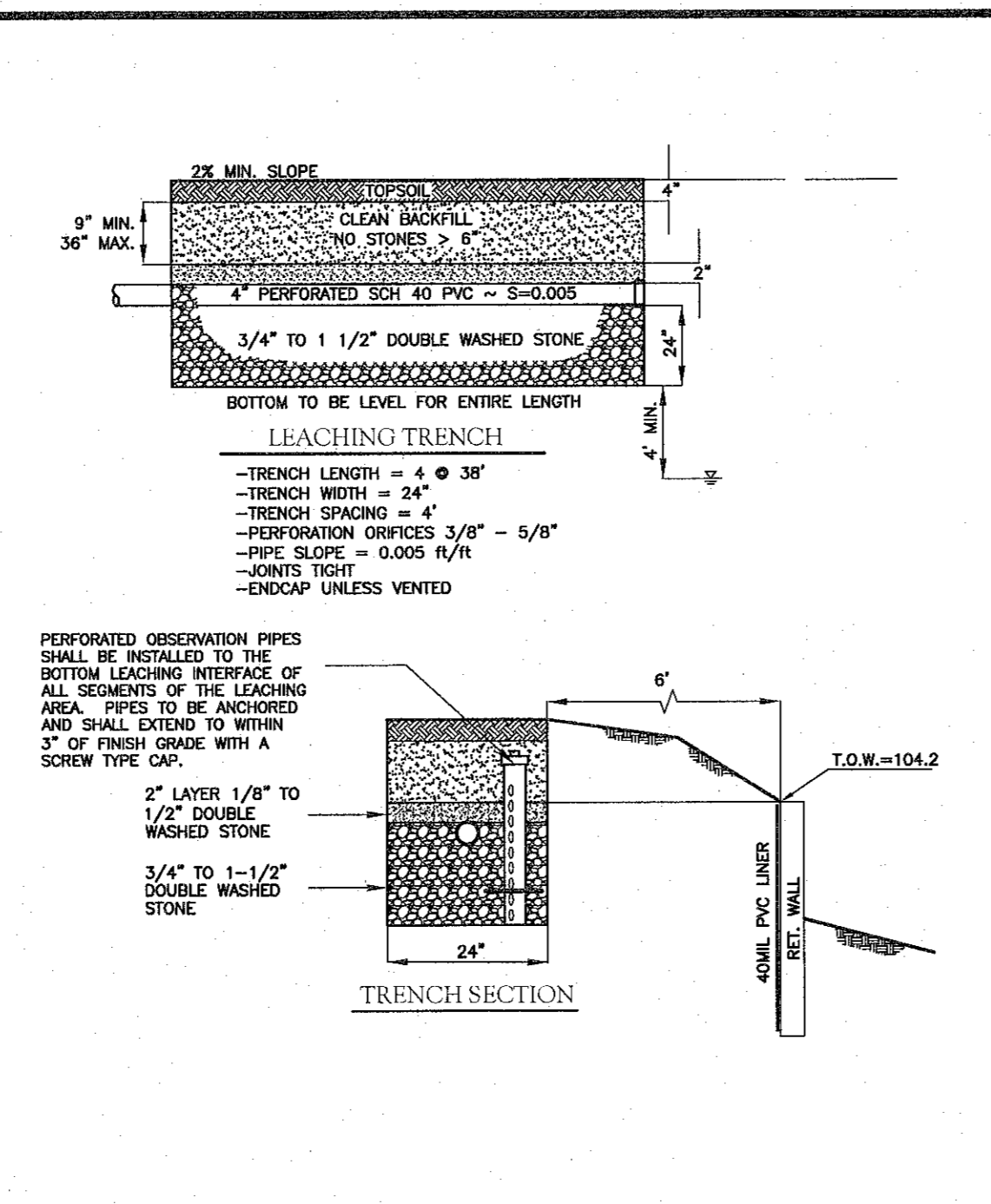
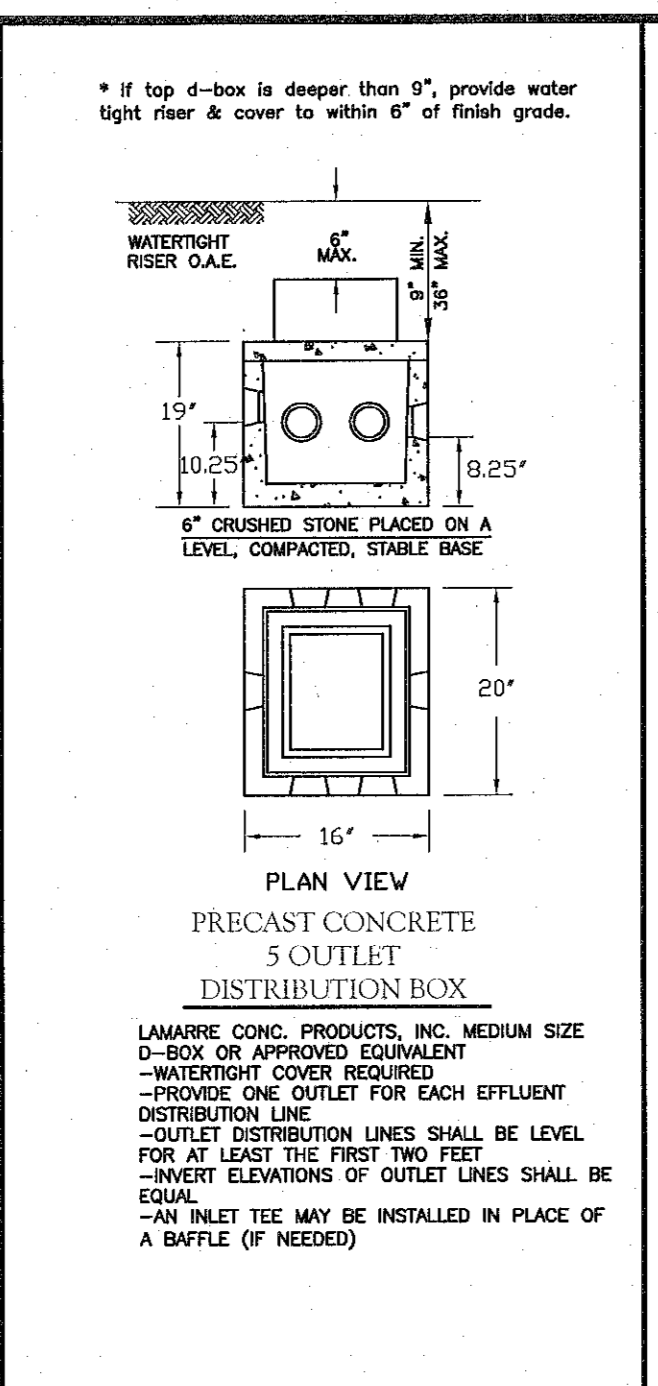
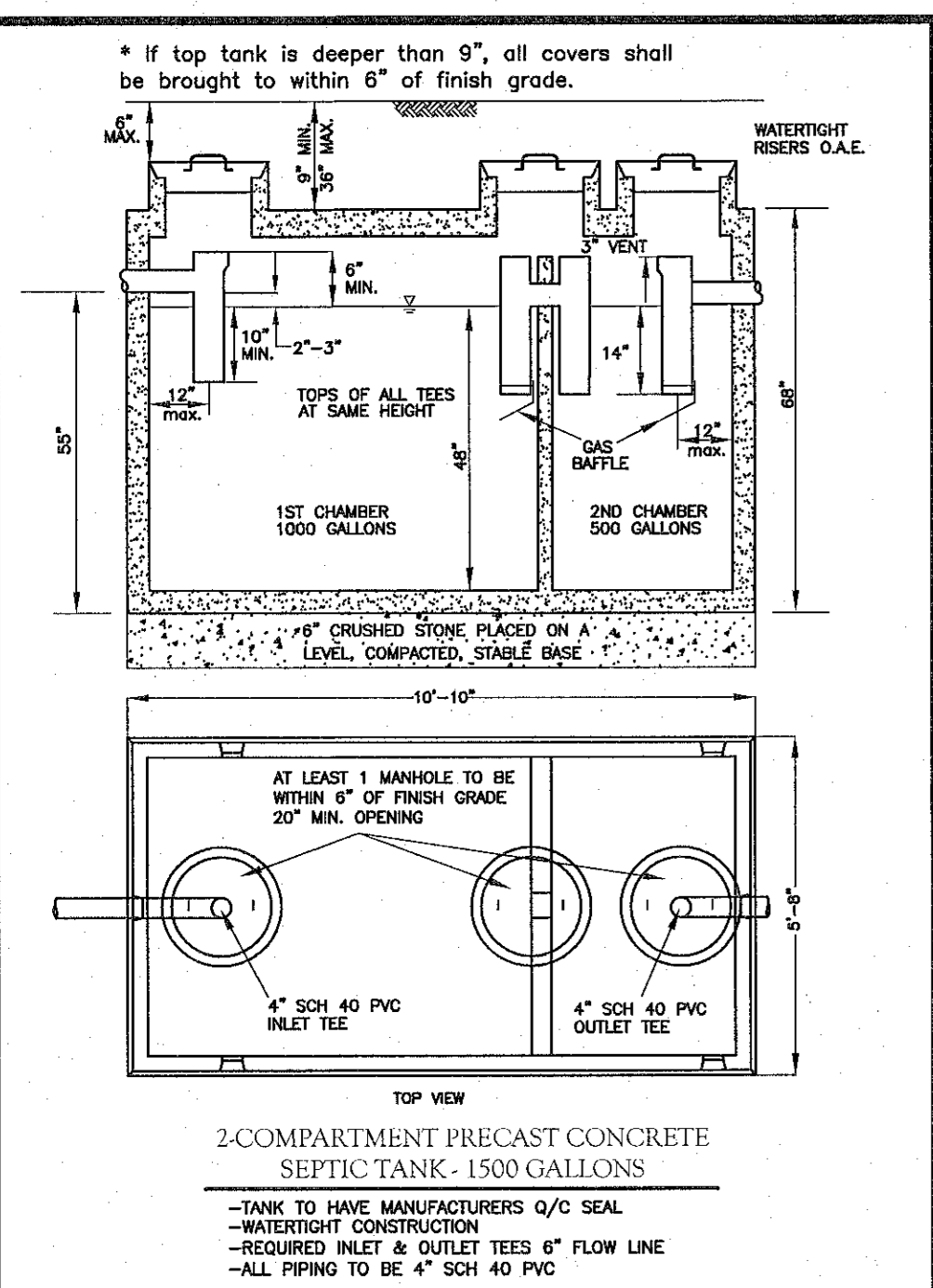
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SHEET: 2 of 3
PLAN #: 27,611



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CONSTRUCTION NOTES:

- ALL PIPING TO BE 4" SCH 40 PVC UNLESS OTHERWISE NOTED.
- ALL PIPES JOINTS TO BE WATER-TIGHT.
- BUILDING SEWER TO BE LAID ON COMPACTED FIRM BASE.
- ALL COMPONENTS SHALL BE MARKED WITH MAGNETIC MARKING TAPE PRIOR TO BACK FILLING.
- BACKFILL MUST BE SUFFICIENTLY COMPACTED TO PREVENT SETTLING.
- SOIL PLACED AS BACKFILL OVER THE SYSTEM MUST BE CLEAN AND FREE OF STONES > 1/4" TALUS, CLAY OR SIMILAR MATERIALS ARE PROHIBITED.
- FINAL COVER OVER THE SYSTEM SHALL BE STABILIZED (LOAMED & SEEDER)

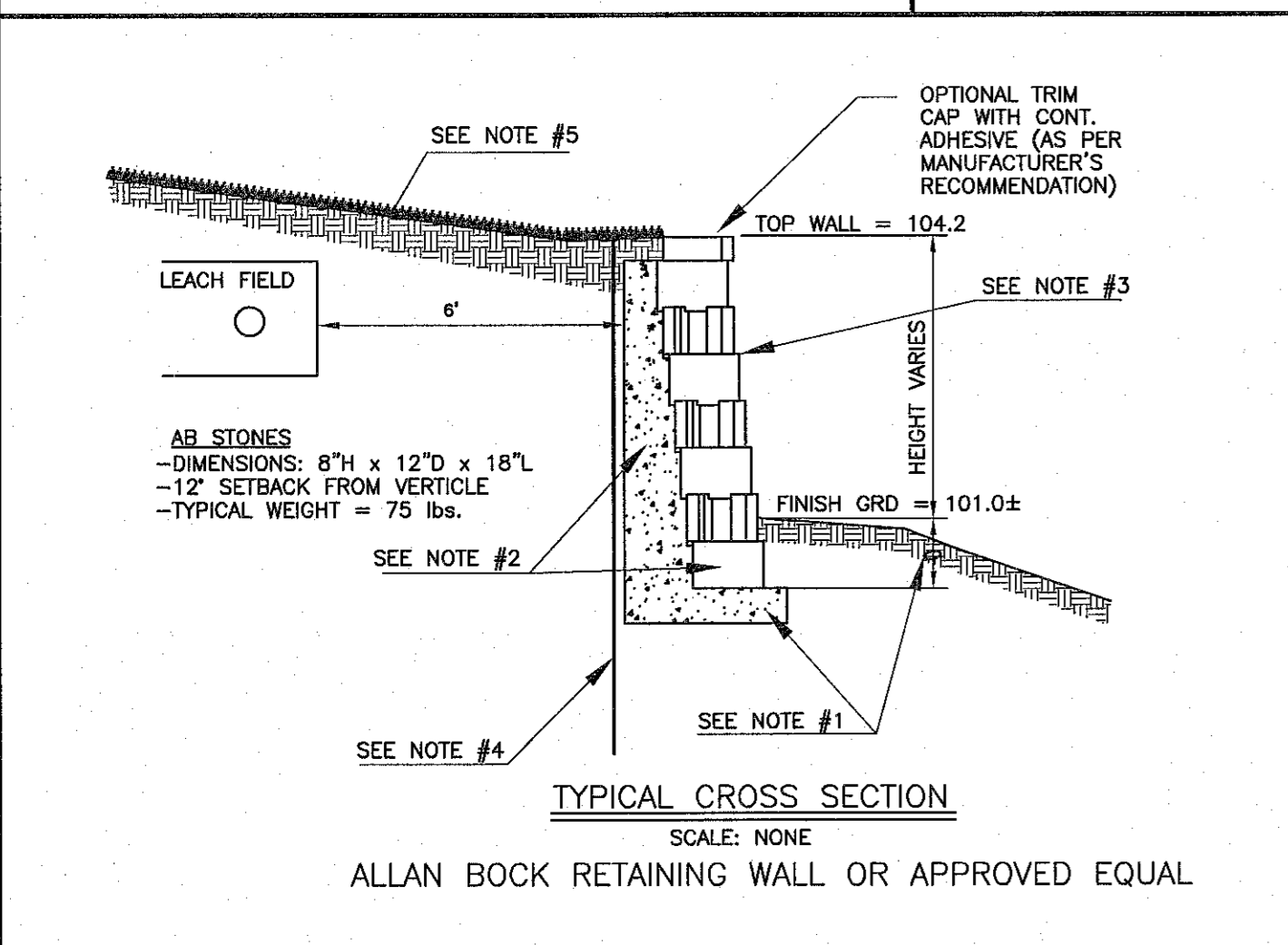
PERCOLATION TEST RESULTS			
PERC#	DEPTH	PERC#	DEPTH
3/23/22	40-58"		
SOAK	11:20	SOAK	
12"	11:35	12"	
6"	11:42	6"	
6"	11:50	6"	
RATE	3 MPI	RATE	

DEEP OBSERVATION HOLE LOGS

DEEP HOLE - 22-1			
HORIZ DEPTH	DATE: 3/23/22	ELEV.	
0"	FILL	101.5	
26"			
32"	A SANDY LOAM 10R3/2	99.1	
38"	Bw SANDY LOAM 10R5/6	98.3	
64"	C1 SAND Fine Sand 2.5S/4	98.2	
120"		91.5	
60"	GROUNDWATER OBSERVED	96.5	
48"	SOIL MOTTLING	97.5	
48"	GROUNDWATER MONITORED	97.5	
48"	ESTIMATED SEASONAL HIGH GROUNDWATER	97.5	

DEEP HOLE - 22-2			
HORIZ DEPTH	DATE: 3/23/22	ELEV.	
0"	FILL	101.8	
42"	A SANDY LOAM 10R3/2	98.3	
64"	Bw SANDY LOAM 10R5/6	96.2	
56"	Hole was collapsing Encountered Old Roof Drain	97.1	
56"	GROUNDWATER OBSERVED	97.1	
56"	SOIL MOTTLING	97.5	
56"	GROUNDWATER MONITORED	97.1	
56"	ESTIMATED SEASONAL HIGH GROUNDWATER	97.1	

DEEP HOLE - 22-3			
HORIZ DEPTH	DATE: 8/30/22	ELEV.	
0"	FILL	102.2	
48"		98.2	
54"	B SANDY LOAM 10R5/6	97.7	
92"	C2 SAND Med-Coarse 25% Gravel 2.5S/3	94.5	
54"	GROUNDWATER OBSERVED	97.7	
54"	SOIL MOTTLING	97.7	
54"	GROUNDWATER MONITORED	97.7	
54"	ESTIMATED SEASONAL HIGH GROUNDWATER	97.7	



RETAINING WALL NOTES:

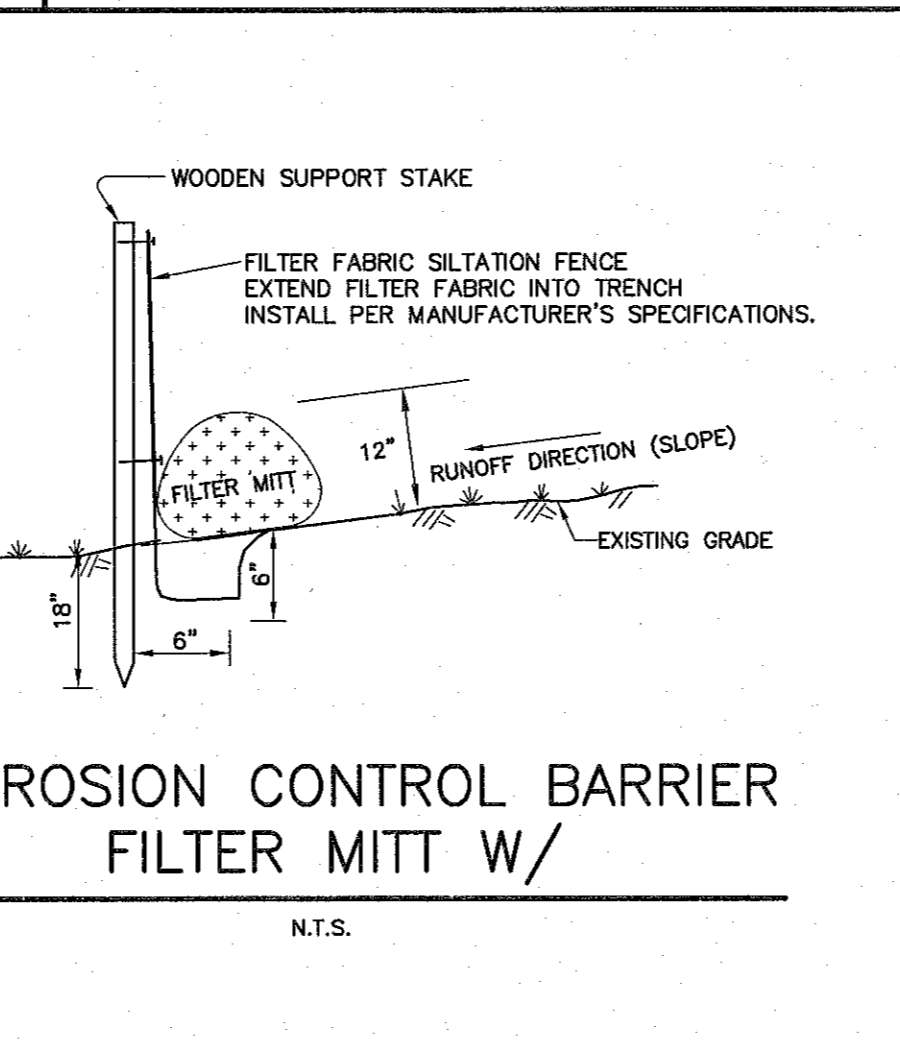
#1 - BASE TRENCH & BASE MATERIAL
TRENCH TO BE 18" WIDE AND MUST INCLUDE THE REMOVAL OF ANY ORGANIC/FILL MATERIAL. BASE MATERIAL IS ANY CLEAN, COMPACTIBLE GRANULAR MATERIAL 1/4"-3/4" DIAMETER, PLACE AT LEAST 12" OF BASE MATERIAL IN THE TRENCH AND COMPACT WITH A MECHANICAL PLATE COMPACTOR. BASE MUST BE LEVEL. A THIN LAYER OF SAND MAY BE USED TO MAKE LEVELING EASIER. A CONCRETE LEVELING PAD MAY BE USED INSTEAD OF USING BASE MATERIAL.

#2 - BASE COURSE AND DRAINAGE MATERIAL
LAY BASE COURSE BLOCKS CHECKING FOR STRAIGHTNESS AND LEVEL. FILL THE BLOCK HOLLOW CORES AND 6"-8" BEHIND BLOCKS WITH DRAINAGE MATERIAL (SAME AS BASE MATERIAL). USE A PLATE COMPACTOR TO COMPACT THE AGGREGATE IN THE BLOCKS AND BEHIND THE WALL. RUN COMPACTOR OVER TOP OF BLOCKS FIRST, AND THEN OVER DRAINAGE MATERIAL.

#3 - SECOND COARSE AND ADDITIONAL COARSE
STACK NEXT ROW OF BLOCKS, AND EACH ADDITIONAL ROW WITH SEAMS OFFSET FROM THE BLOCKS BELOW. CHECK FOR STRAIGHTNESS & LEVEL. FILL HOLLOW CORES AND 6"-8" BEHIND BLOCKS WITH DRAINAGE MATERIAL AND COMPACT.

#4 - IMPERVIOUS BARRIER
INSTALL A 40 MIL HDPE MEMBRANE BEHIND DRAINAGE MATERIAL. TOP OF LINER ELEV=104.0; BOT LINER ELEV=100.0

#5 - SLOPE STABILIZATION
AREA BETWEEN RETAINING WALL AND LEACH FIELD, AREA OVER LEACH FIELD AND ANY OTHER DISTURBED AREAS SHALL BE LOAMED & SEED. ALL HEAVY EQUIPMENT MUST BE KEPT AT LEAST 3 FEET FROM THE BACK OF THE WALL. WALL DESIGN DOES NOT ACCOUNT FOR SURCHARGES FROM HEAVY COMPACTION EQUIPMENT.



VARIANCE REQUESTED:
Sudbury Rules & Regulations Governing the Subsurface Disposal of Sewage.
Section X. Retaining Walls:
Request a variance to install a retaining wall in lieu of the slope requirement as detailed in Title V.

NOTES:

- EXISTING TANK SHALL BE PUMPED CLEAN, CRUSHED, FILLED WITH GRAVEL AND ABANDONED PER TITLE 5.
- ANY CONTAMINATED MATERIAL ENCOUNTERED DURING EXCAVATION SHALL BE REMOVED AND PROPERLY DISPOSED.
- EXISTING DWELLING TO BE RAZED.

ASSASSOR'S REFERENCE:
PARCEL ID: K09-0425

***NO GARBAGE GRINDER ALLOWED
NEW CONSTRUCTION**

TYPE OF FACILITY SERVED:
SINGLE FAMILY DWELLING - 4 BEDROOMS

DESIGN FLOW:
4 BEDROOMS x 110 GAL./DAY/BEDROOM = 440 G.P.D.

SEPTIC TANK SIZING:
DESIGN FLOW x 200%
440 GAL. x 200% = 880 GALLONS
SEPTIC TANK PROPOSED: 1500 GALLON 2-COMPARTMENT

SYSTEM SIZING CALCULATIONS:
GARBAGE GRINDER: NO
DESIGN FLOW = 440 GPD
EFFLUENT LOADING RATE = 0.74 GPD/SF
LEACHING AREA REQUIRED (Sudbury BOH): 150 sf/bedroom
LEACHING AREA REQUIRED = 150 x 4 = 600 s.f. (Sidewall Area)

SYSTEM DESIGN
LEACHING TRENCHES - 4 @ 38" L x 24" W x 24" H
SIDEWALL AREA = 8 x 38' x 24" = 608 S.F.
BOTTOM AREA = 304 S.F.
FLOW PROVIDED = 912 S.F. x 0.74 GAL./S.F. = 674 G.P.D.

GENERAL CONSTRUCTION NOTES:

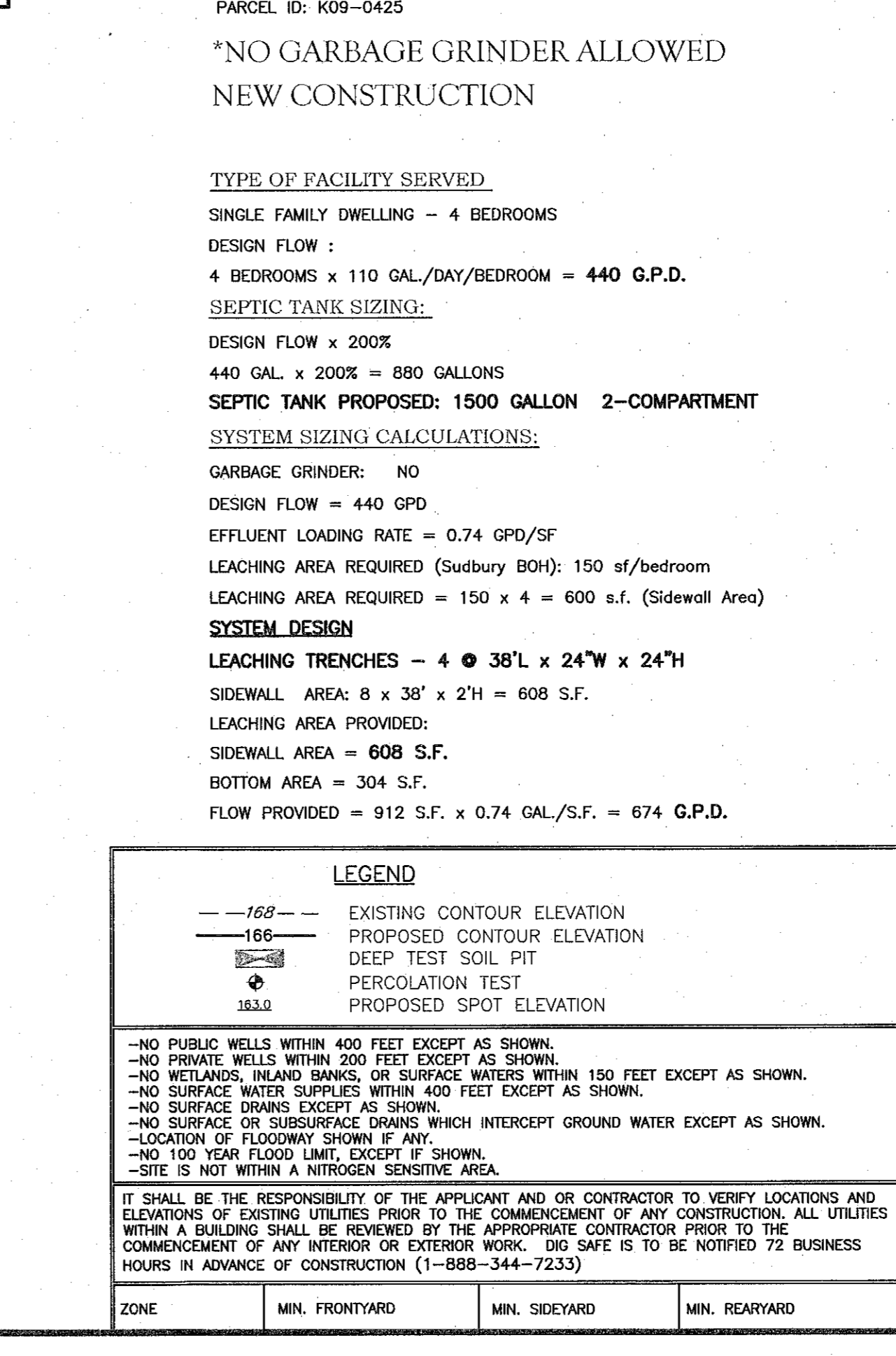
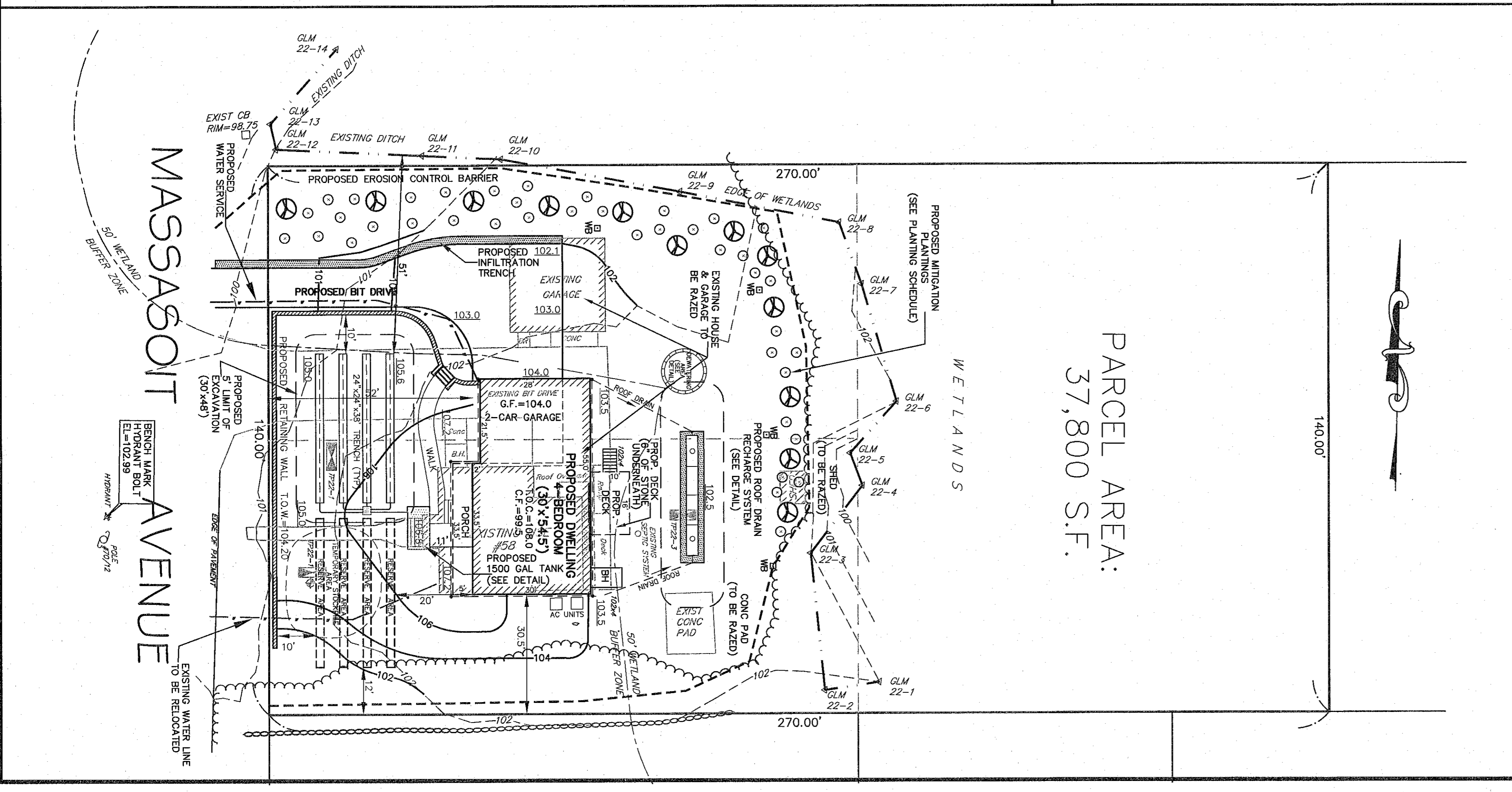
- THE DETAILS SHOWN ARE GENERAL IN NATURE AND ARE NOT INTENDED TO SHOW EVERY POSSIBLE INSTALLATION REQUIREMENT. THE CONTRACTOR SHALL BE KNOWLEDGABLE IN THE REFERENCED CODES. INSTALLATION REQUIREMENTS AND PROVIDE NECESSARY LABOR, MATERIALS AND EQUIPMENT TO INSTALL A FUNCTIONAL SYSTEM.
- COMPONENTS SHALL NOT TO BE BACKFILLED OR CONCEALED WITHOUT INSPECTION BY AND PERMISSION FROM BOARD OF HEALTH.
- IT IS THE RESPONSIBILITY OF THE APPLICANT TO OBTAIN THE SERVICES OF THE DESIGN ENGINEER TO PROVIDE PROPER INSPECTIONS FOR CERTIFICATIONS AND AS-BUILT PLANS.
- INSTALLER REQUIRED TO PROVIDE PROPER CERTIFICATION.
- LEACHING AREA TO BE FLAGGED FOR PROTECTION UNTIL CERTIFICATE OF COMPLIANCE IS OBTAINED.
- NO STOCKPILING OF MATERIALS OVER SYSTEM.
- NO TRAFFIC OR PARKING OVER SYSTEM.
- BOTTOM AND SIDES OF EXCAVATION AREA SHALL BE SCARIFIED.
- PLACEMENT OF FILL SHALL BE DONE BY STOCKPILING AT THE EDGE OF THE EXCAVATION AREA AND PUSHED OR CAST IN PLACE.
- FILL SHALL NOT BE PLACED IN THE EXCAVATION AREA DURING RAIN OR SNOW STORM.
- IF ANY FILL IS TO BE PLACED BELOW THE WATER TABLE, DEWATERING IS REQUIRED PRIOR TO PLACEMENT.

TO ENSURE THE PERFORMANCE OF THE SYSTEM, MAINTENANCE SHOULD BE PERFORMED ANNUALLY BY A LICENSED SEWAGE PUMPING CONTRACTOR.

GLM ENGINEERING CONSULTANTS, INC. WILL NOT BE RESPONSIBLE FOR THE PERFORMANCE OF THIS SYSTEM UNLESS CONSTRUCTED AND INSPECTED IN ACCORDANCE WITH THIS PLAN. INSPECTIONS TO BE DONE AFTER EXCAVATION FOR SYSTEM AND AFTER CONSTRUCTION, BUT PRIOR TO BACKFILLING. ANY ALTERATION MUST BE APPROVED IN WRITING BY GLM ENGINEERING CONSULTANTS, INC.

5' LIMIT OF EXCAVATION (30' x 91')
ALL TOPSOIL, SUBSOIL AND ANY DELETERIOUS MATERIAL MUST BE REMOVED FROM THE AREA OF THE SYSTEM AND OTHER DESIGNATED LIMITS AND FILLED WITH APPROVED, CLEAN, GRANULAR SAND. THE FILL SHALL NOT CONTAIN ANY MATERIAL LARGER THAN 2 INCHES AND BE GRADED SO NOT MORE THAN 45% OF THE SAMPLE IS RETAINED IN A #4 SIEVE, OF THAT PASSING, 20% OR LESS SHALL PASS A #100 SIEVE AND 5% OR LESS SHALL PASS THE #200 SIEVE. NOT MORE THAN 90% SHALL BE RETAINED ON THE #50 SIEVE. SAMPLE FOR SIEVE ANALYSIS TO BE TAKEN FROM SAMPLE IN PLACE.

ALL CONSTRUCTION & COMPONENTS SHALL CONFORM TO THE LATEST REQUIREMENTS OF 310 CMR 15.000 TITLE 5 OF THE STATE ENVIRONMENTAL CODE AND THE TOWN OF SUDBURY BOARD OF HEALTH REGULATIONS.



Soil Evaluator Certification: I certify that I am currently approved by the D.E.P. pursuant to 310 CMR 15.017 to conduct soil evaluations and that the above analysis has been performed by the consultant with the required training, expertise and experience described in 310 CMR 15.017. I further certify that the results of my soil evaluation are accurate and in accordance with 310 CMR 15.100 through 15.107.

CERTIFIED SOIL EVALUATOR: ROBERT TRUAX
WITNESSED BY B.O.H. AGENT: ROBERT LAZO
DESIGN PERCOLATION RATE: 3.0 M.P.I.

SOIL CLASSIFICATION: CLASS I

BENCH MARK
(DATUM = ASSUMED) FRONT HYDRANT BOLT: EL=102.99

PROPOSED SEWAGE DISPOSAL SYSTEM
58 MASSASOIT AVE
SUDBURY, MASSACHUSETTS

APPLICANT:
UNIVERSAL J&S CONST INC
15 EDWARDS LANE
QUINCY, AM 02169

DATE: MAY 16, 2022
REVISED:
JANUARY 27, 2023
5/1/2023 7/6/2023

GLM Engineering Consultants, Inc.
19 EXCHANGE STREET
HOLLISTON, MA 01746
P: 508-429-1100
F: 508-429-7160
www.GLMengineering.com

DES: RST SCALE: 1" = 20' JOB #17,240 SHEET #3 of 3

58 MASSASOIT AVE