

DRAINAGE ANALYSIS

LOCATED AT
90 HAVILAND ROAD – LOT 2B
STAMFORD, CONNECTICUT

PREPARED FOR
STEVE AIVALIS

August 30, 2024
Revised: September 24, 2024



Jim Kousidis, P.E.
CT License No. 26830

Site Vicinity Map



Kousidis Engineering, LLC

Land Development Consultants & Site Design

Note: This report has been prepared to depict the feasibility for a potential subdivision of the existing parcel located at 90 Haviland Road, Stamford, CT. This report provides analysis for the potential impervious area depicted on the “Subdivision Feasibility Plan” prepared by Kousidis Engineering, LLC, dated August 30, 2024, last revised September 24, 2024. The impervious area accounted for in this report is based on an assumed house footprint, potential driveway layout, and potential patio area. Any deviation from the “Subdivision Feasibility Plan” will require an amended Site Development Plan and Drainage Analysis to comply with the City of Stamford standards and any revisions.

1. EXISTING CONDITIONS

This 44,826-sq. ft. residential property is currently undeveloped land. Test pits at the site indicate highly pervious soils that are adequate to accept a subsurface storm drain system. The topography of the property slopes to the north and east. According to the Web Soil Survey website (map and soil table attached) the soils in the subject area consist of Canton and Charlton fine sandy loams, 3 to 8 percent slopes, a well-drained soil with a Hydrologic Soil Group “B”.

2. PROPOSED CONDITIONS

A new development is being proposed for the subject property. The owner is proposing to subdivide the parcel into two independent single-family lots. Each of the lots has been analyzed for drainage and septic feasibility based on an assumed house footprint, with an attached garage, new driveway, and new pool with attached patio, with associated site improvements. The total accounted for impervious surface is 6,000-sq.ft. Stormwater retention systems have been designed based on the assumed potential impervious areas and will need to be installed to satisfy the City of Stamford’s requirements of zero increase in runoff for the 24-hour, type III rainfall, 1 through 50-year storm events. The new roof area, patio areas and the driveway drains must be directed to the proposed retention systems as depicted on the Site Development Plan provided by Kousidis Engineering, LLC dated 08/30/2024, last revised 09/24/2024.

3. DRAINAGE

Under proposed conditions, the entire site will maintain historic flow patterns as depicted in the attached watershed maps. Refer to the following table for a summary of all existing vs. proposed peak stormwater flow rates and volumes. For all watersheds, the proposed flow is below or equivalent to the existing flow.

EXISTING vs PROPOSED CONDITIONS DRAINAGE SUMMARY TABLE
Peak Flows (cfs) & Runoff Volumes (cf)

Description	POC	Flow/Volume	Existing	Proposed	Δ	$\Delta\%$
1 yr	1	$Q(\text{ft}^3/\text{sec})$	0.23	0.23	0.00	0%
		$V(\text{ft}^3)$	1,399	1,189	-210	-15%
2 yr	1	$Q(\text{ft}^3/\text{sec})$	0.61	0.52	-0.09	-15%
		$V(\text{ft}^3)$	2,800	2,354	-446	-16%
5 yr	1	$Q(\text{ft}^3/\text{sec})$	1.02	0.84	-0.18	-18%
		$V(\text{ft}^3)$	4,270	3,591	-679	-16%
10 yr	1	$Q(\text{ft}^3/\text{sec})$	1.55	1.24	-0.31	-20%
		$V(\text{ft}^3)$	6,160	5,399	-761	-12%
25 yr	1	$Q(\text{ft}^3/\text{sec})$	2.58	2.23	-0.35	-14%
		$V(\text{ft}^3)$	9,861	9,458	-403	-4%
50 yr	1	$Q(\text{ft}^3/\text{sec})$	3.29	2.82	-0.47	-14%
		$V(\text{ft}^3)$	12,434	12,219	-215	-2%

In addition to the above, the drainage systems were checked for the capacity to hold 1.3” of runoff (First Flush Runoff) from all the new impervious surfaces. Using the State of Connecticut 2024 Stormwater Quality Manual, the required Water Quality Volume for the property is 827.81 cf. The provided storage in the detention systems below the overflow orifice elevation is 2,386 cf. The calculations are shown below:

Water Quality Volume :

$$WQV=(1.3'')*(R)*(A)/12$$

$$R=0.05+(0.009*I)$$

R=volumetric runoff coefficient

I= Percent Impervious Cover

A= Site Area

$$R= 0.05+(0.009*13.39)=0.1287$$

$$WQV = (1.3''*0.1705*44,826)/12 = 827.81 \text{ C.F.}$$

Volume provided: 2,386 C.F. > 827.81 C.F. Required

4. CONCLUSION

The proposed development will increase the amount of impervious area to this site, resulting in higher peak runoff rates. However, with the installation of the proposed stormwater retention systems, the original flow patterns will be maintained and there will be no increase in peak runoff up to the 50-year storm event. In addition to controlling stormwater peak runoff, the proposed design incorporates stormwater treatment to control pollution and provide groundwater recharge capacity. The implementation of these techniques and the overall site design layout will result in a finished project that will minimize sediment and erosion impacts during construction and will have no adverse impacts to adjoining properties upon completion. Based on the above information, the proposed improvements are designed in accordance with the City of Stamford Stormwater Drainage Manual and will not adversely impact adjacent or downstream properties or City-owned drainage facilities.

Drawdown Time Calculations

(DB2B-1)

24” High Concrete Galleries

$$TIME = Vol/(K*Bottom Area) = 2,059 / (0.52(1/12)*1,100)$$

$$Time = 43.20 \text{ hrs} < 72 \text{ hrs}$$

(DB2B-2)

12” High Concrete Galleries

$$TIME = Vol/(K*Bottom Area) = 327 / (0.52(1/12)*364)$$

$$Time = 20.73 \text{ hrs} < 72 \text{ hrs}$$

Conveyance Calculations

For the **6" PVC** Pipes @ a minimum 0.5% Slope, the maximum flow does not exceed 0.40 cfs under the 100-year storm event from the driveway area. Utilizing the Manning's Equation, the capacity of the 6" pvc pipe at full gravity flow is 0.468 cfs:

$$Q = (0.463/n)(d)^{2.667}(S)^{0.5} = (0.463/0.011)(0.50)^{2.667}(0.005)^{0.5}$$
$$Q = 42.09 * 0.1571 * 0.0707 = \mathbf{0.468 \text{ cfs} > 0.40 \text{ cfs}}$$

For the **4" PVC** Pipes @ a minimum 1% Slope the maximum flow does not exceed 0.20 cfs under the 100-year storm event from the roof area. Utilizing the Manning's Equation, the capacity of the 4" pipe at full gravity flow is 0.665 cfs:

$$Q = (0.463/n)(d)^{2.667}(S)^{0.5} = (0.463/0.011)(0.33)^{2.667}(0.005)^{0.5}$$
$$Q = 42.09 * 0.052 * 0.01 = \mathbf{0.219 \text{ cfs} > 0.20 \text{ cfs}}$$

All proposed pipe flows are below the maximum conveyance capabilities of the pipe.

EXISTING DRAINAGE CONDITIONS

EXHIBIT "A"

90 HAVILAND ROAD, STAMFORD, CT

PREPARED FOR

STEVE AIVALIS



KOUSIDIS ENGINEERING, LLC

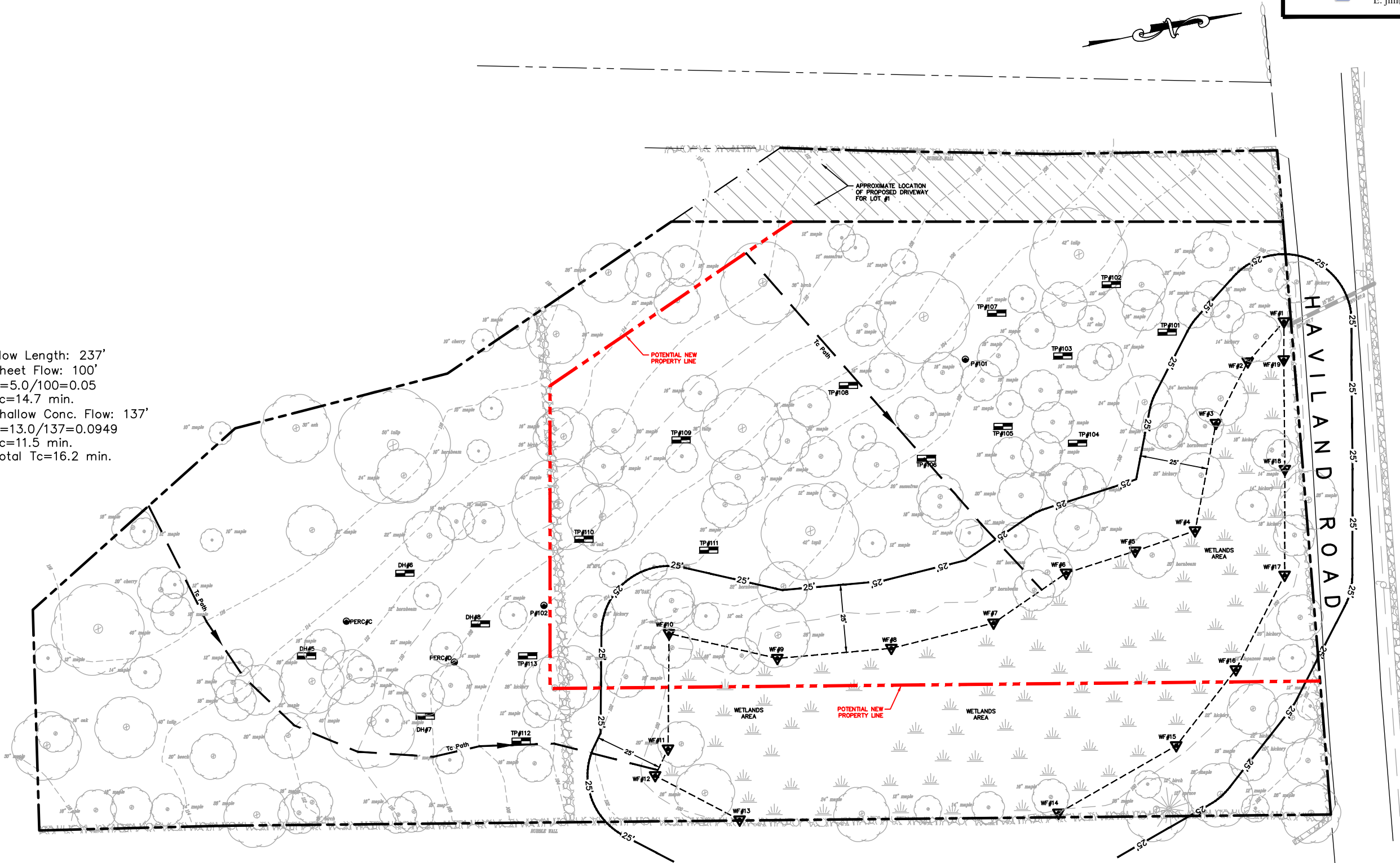
Land Development Consultants and Site Design

1525 Black Rock Turnpike, Fairfield, CT 06825 P: 203-557-8943

E: jim@kousidisengineering.com Web: www.kousidisengineering.com

Flow Length: 237'
Sheet Flow: 100'
 $S=5.0/100=0.05$
 $T_c=14.7$ min.
Shallow Conc. Flow: 137'
 $S=13.0/137=0.0949$
 $T_c=11.5$ min.
Total $T_c=16.2$ min.

Flow Length: 166'
Sheet Flow: 100'
 $S=11.0/100=0.11$
 $T_c=10.7$ min.
Shallow Conc. Flow: 66'
 $S=3.0/66=0.0455$
 $T_c=1.0$ min.
Total $T_c=11.7$ min.



SCALE:

1" = 40'

PROPOSED DRAINAGE CONDITIONS

EXHIBIT "B"

90 HAVILAND ROAD, STAMFORD, CT

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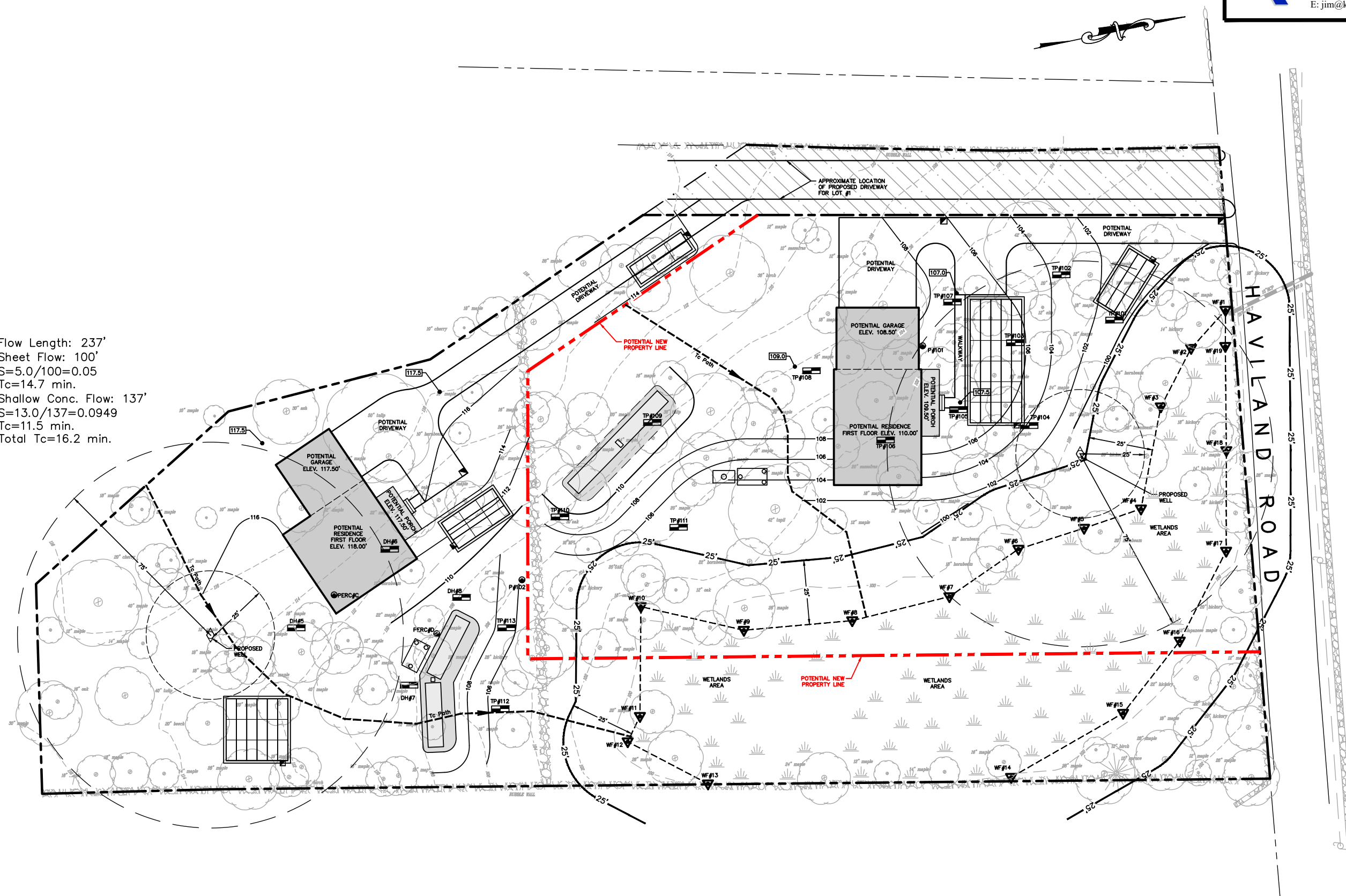
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Total $T_c=16.2$ min.

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 $S=3.0/66=0.0455$
 $T_c=1.0$ min.
Total $T_c=11.7$ min.



SCALE:

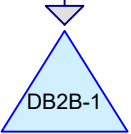
1" = 40'



Existing Conditions
Runoff Lot 2B



Impervious Area to
Detention System 2B-1



24" High Precast
Concrete Galleries



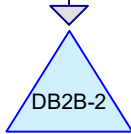
Proposed Bypass Area
Lot 2B



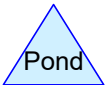
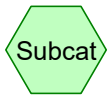
Overall Runoff Lot 2B



Impervious Area to
Detention System 2B-2



12" High Precast
Concrete Galleries



Routing Diagram for 90HavilandRd(09-24-24)_Exist&PropConditionsLot2B
Prepared by Kousidis Engineering, LLC, Printed 9/24/2024
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90HavilandRd(09-24-24)_Exist&PropConditionsLot2B

Type III 24-hr 1 yr Rainfall=2.70"

Prepared by Kousidis Engineering, LLC

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Page 2

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PA2B-1: Impervious Area to Runoff Area=10,500 sf 42.86% Impervious Runoff Depth>0.87"
Tc=6.0 min CN=77 Runoff=0.23 cfs 759 cf

Subcatchment PA2B-2: Impervious Area to Runoff Area=2,000 sf 75.00% Impervious Runoff Depth>1.63"
Tc=6.0 min CN=89 Runoff=0.09 cfs 272 cf

Subcatchment PB2B: Proposed Bypass Runoff Area=32,326 sf 0.00% Impervious Runoff Depth>0.44"
Flow Length=166' Tc=11.7 min CN=67 Runoff=0.23 cfs 1,189 cf

Subcatchment XC2B: Existing Conditions Runoff Area=44,826 sf 0.00% Impervious Runoff Depth>0.37"
Flow Length=166' Tc=11.7 min CN=65 Runoff=0.23 cfs 1,399 cf

Pond DB2B-1: 24" High Precast Concrete Peak Elev=103.47' Storage=759 cf Inflow=0.23 cfs 759 cf
Outflow=0.00 cfs 0 cf

Pond DB2B-2: 12" High Precast Concrete Peak Elev=100.12' Storage=272 cf Inflow=0.09 cfs 272 cf
Outflow=0.00 cfs 0 cf

Link OR2B: Overall Runoff Lot 2B

Inflow=0.23 cfs 1,189 cf
Primary=0.23 cfs 1,189 cf

Summary for Subcatchment PA2B-1: Impervious Area to Detention System 2B-1

Runoff = 0.23 cfs @ 12.10 hrs, Volume= 759 cf, Depth> 0.87"

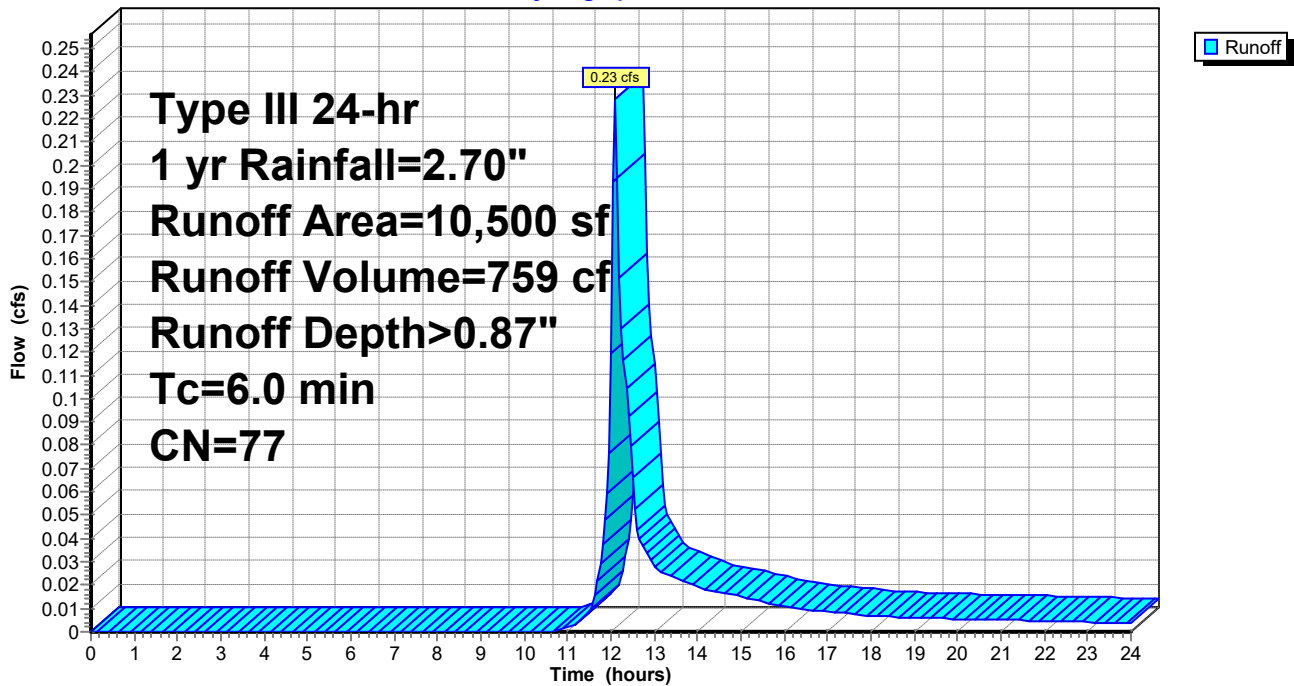
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1 yr Rainfall=2.70"

	Area (sf)	CN	Description
*	2,500	98	Building
*	1,250	98	Driveway
*	750	98	Patio
	6,000	61	>75% Grass cover, Good, HSG B
	10,500	77	Weighted Average
	6,000		57.14% Pervious Area
	4,500		42.86% Impervious Area

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

Subcatchment PA2B-1: Impervious Area to Detention System 2B-1

Hydrograph



Summary for Subcatchment PA2B-2: Impervious Area to Detention System 2B-2

Runoff = 0.09 cfs @ 12.09 hrs, Volume= 272 cf, Depth> 1.63"

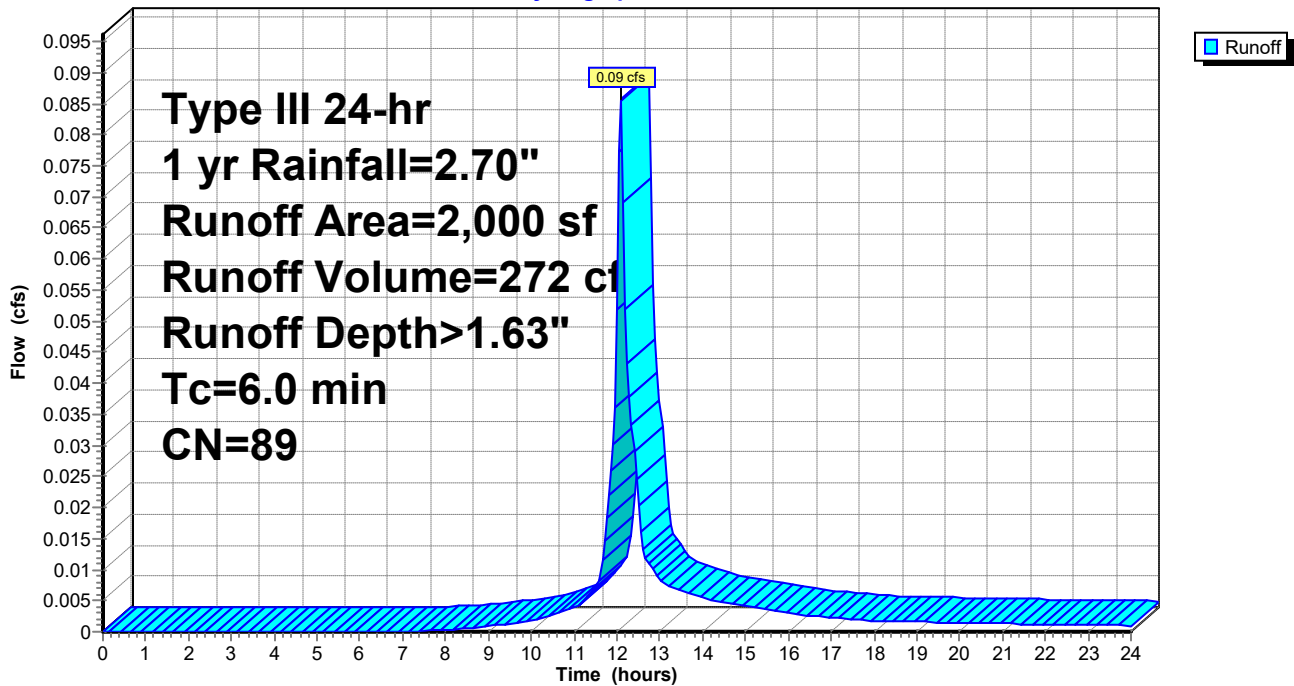
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Type III 24-hr 1 yr Rainfall=2.70"

	Area (sf)	CN	Description
*	1,500	98	Driveway
	500	61	>75% Grass cover, Good, HSG B
	2,000	89	Weighted Average
	500		25.00% Pervious Area
	1,500		75.00% Impervious Area

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

Subcatchment PA2B-2: Impervious Area to Detention System 2B-2

Hydrograph



Summary for Subcatchment PB2B: Proposed Bypass Area Lot 2B

Runoff = 0.23 cfs @ 12.21 hrs, Volume= 1,189 cf, Depth> 0.44"

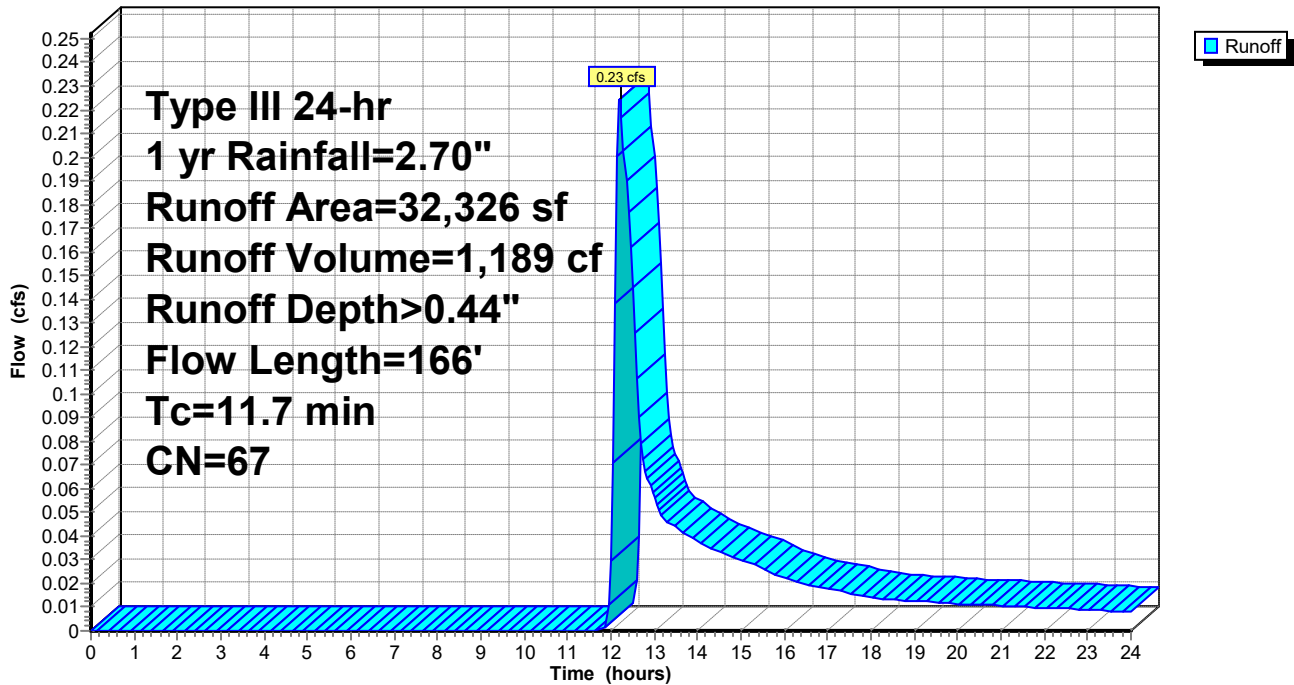
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 yr Rainfall=2.70"

Area (sf)	CN	Description
6,000	61	>75% Grass cover, Good, HSG B
18,237	60	Woods, Fair, HSG B
* 8,089	89	<50% Grass cover, Poor, HSG D (Wetlands)
32,326	67	Weighted Average
32,326		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.1100	0.16		Sheet Flow, Sheet Flow
					Woods: Light underbrush n= 0.400 P2= 3.30"
1.0	66	0.0455	1.07		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
11.7	166	Total			

Subcatchment PB2B: Proposed Bypass Area Lot 2B

Hydrograph



Summary for Subcatchment XC2B: Existing Conditions Runoff Lot 2B

Runoff = 0.23 cfs @ 12.23 hrs, Volume= 1,399 cf, Depth> 0.37"

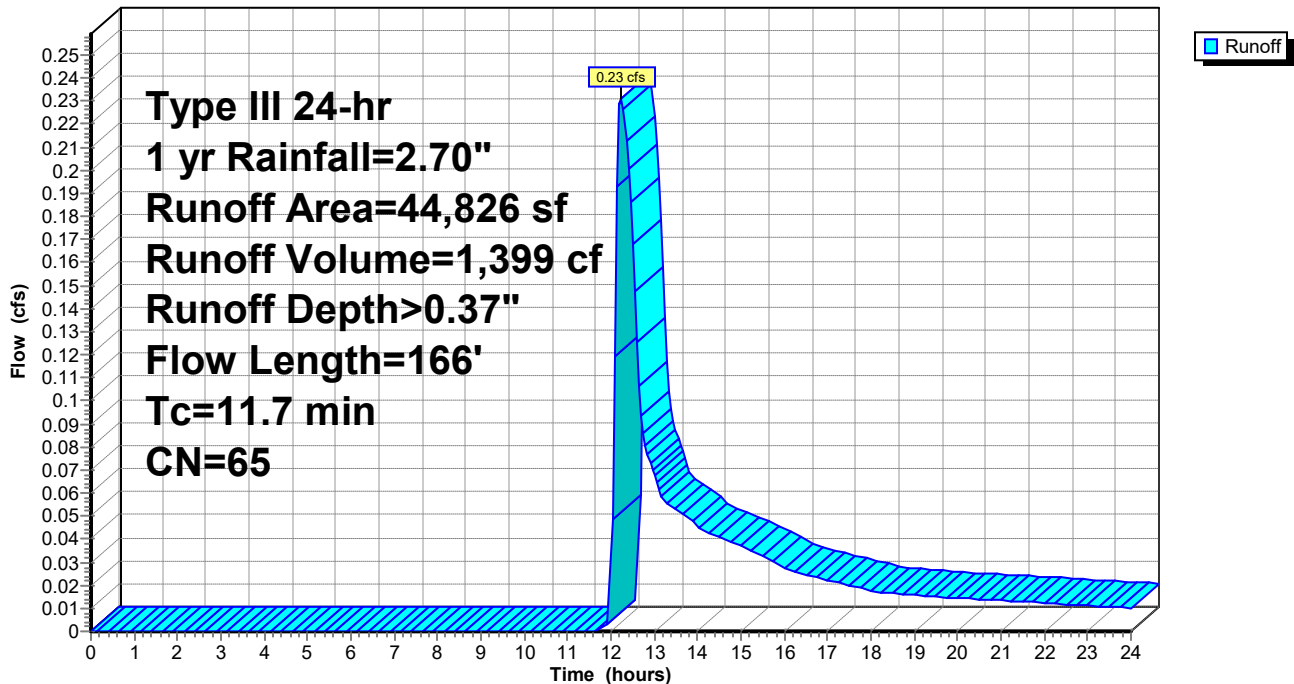
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
Type III 24-hr 1 yr Rainfall=2.70"

Area (sf)	CN	Description
36,737	60	Woods, Fair, HSG B
* 8,089	89	<50% Grass cover, Poor, HSG D (Wetlands)
44,826	65	Weighted Average
44,826		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
10.7	100	0.1100	0.16		Sheet Flow, Sheet Flow
					Woods: Light underbrush n= 0.400 P2= 3.30"
1.0	66	0.0455	1.07		Shallow Concentrated Flow, Shallow Concentrated Flow
					Woodland Kv= 5.0 fps
11.7	166	Total			

Subcatchment XC2B: Existing Conditions Runoff Lot 2B

Hydrograph



Summary for Pond DB2B-1: 24" High Precast Concrete Galleries

Inflow Area = 10,500 sf, 42.86% Impervious, Inflow Depth > 0.87" for 1 yr event
 Inflow = 0.23 cfs @ 12.10 hrs, Volume= 759 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 103.47' @ 24.00 hrs Surf.Area= 1,444 sf Storage= 759 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)

Center-of-Mass det. time= (not calculated: no outflow)

Volume	Invert	Avail.Storage	Storage Description
#1	102.50'	680 cf	6.00'W x 8.00'L x 2.50'H Stone Bed x 30 3,600 cf Overall - 1,901 cf Embedded = 1,699 cf x 40.0% Voids
#2	103.00'	1,359 cf	Concrete Galley 4x8x2 x 30 Inside #1 Inside= 42.0"W x 21.0"H => 6.04 sf x 7.50'L = 45.3 cf Outside= 48.0"W x 24.0"H => 7.92 sf x 8.00'L = 63.4 cf
#3	102.50'	20 cf	2.00'W x 2.00'L x 5.00'H Yard Drain
		2,059 cf	Total Available Storage

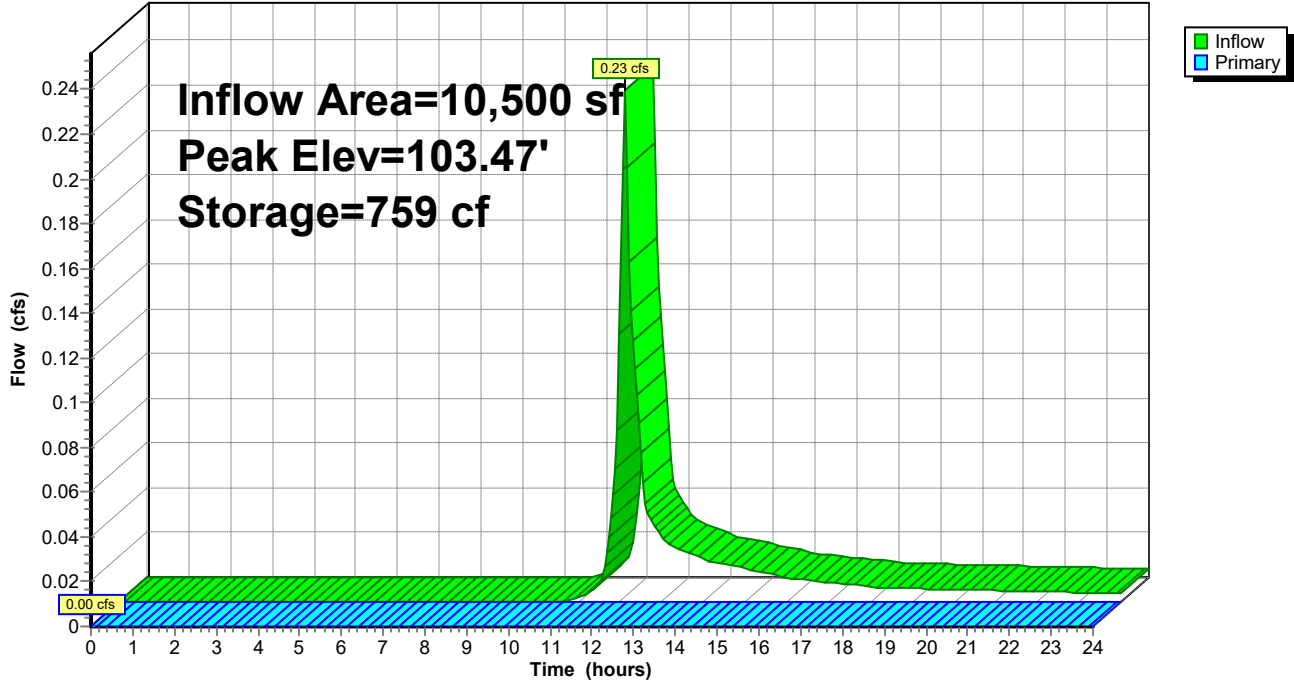
Device	Routing	Invert	Outlet Devices
#1	Primary	105.50'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=102.50' (Free Discharge)

↑1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond DB2B-1: 24" High Precast Concrete Galleries

Hydrograph



Stage-Area-Storage for Pond DB2B-1: 24" High Precast Concrete Galleries

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
102.50	0	105.10	2,049
102.55	29	105.15	2,049
102.60	58	105.20	2,049
102.65	87	105.25	2,050
102.70	116	105.30	2,050
102.75	145	105.35	2,050
102.80	174	105.40	2,050
102.85	203	105.45	2,050
102.90	232	105.50	2,051
102.95	261	105.55	2,051
103.00	290	105.60	2,051
103.05	339	105.65	2,051
103.10	389	105.70	2,051
103.15	438	105.75	2,052
103.20	487	105.80	2,052
103.25	537	105.85	2,052
103.30	586	105.90	2,052
103.35	636	105.95	2,052
103.40	685	106.00	2,053
103.45	734	106.05	2,053
103.50	784	106.10	2,053
103.55	833	106.15	2,053
103.60	882	106.20	2,053
103.65	932	106.25	2,054
103.70	981	106.30	2,054
103.75	1,031	106.35	2,054
103.80	1,080	106.40	2,054
103.85	1,129	106.45	2,054
103.90	1,179	106.50	2,055
103.95	1,228	106.55	2,055
104.00	1,277	106.60	2,055
104.05	1,327	106.65	2,055
104.10	1,376	106.70	2,055
104.15	1,425	106.75	2,056
104.20	1,475	106.80	2,056
104.25	1,524	106.85	2,056
104.30	1,574	106.90	2,056
104.35	1,623	106.95	2,056
104.40	1,672	107.00	2,057
104.45	1,722	107.05	2,057
104.50	1,771	107.10	2,057
104.55	1,820	107.15	2,057
104.60	1,868	107.20	2,057
104.65	1,912	107.25	2,058
104.70	1,956	107.30	2,058
104.75	1,999	107.35	2,058
104.80	2,009	107.40	2,058
104.85	2,019	107.45	2,058
104.90	2,029	107.50	2,059
104.95	2,039		
105.00	2,049		
105.05	2,049		

Summary for Pond DB2B-2: 12" High Precast Concrete Galleries

Inflow Area = 2,000 sf, 75.00% Impervious, Inflow Depth > 1.63" for 1 yr event
 Inflow = 0.09 cfs @ 12.09 hrs, Volume= 272 cf
 Outflow = 0.00 cfs @ 0.00 hrs, Volume= 0 cf, Atten= 100%, Lag= 0.0 min
 Primary = 0.00 cfs @ 0.00 hrs, Volume= 0 cf

Routing by Stor-Ind method, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs
 Peak Elev= 100.12' @ 24.00 hrs Surf.Area= 436 sf Storage= 272 cf

Plug-Flow detention time= (not calculated: initial storage exceeds outflow)
 Center-of-Mass det. time= (not calculated: no outflow)

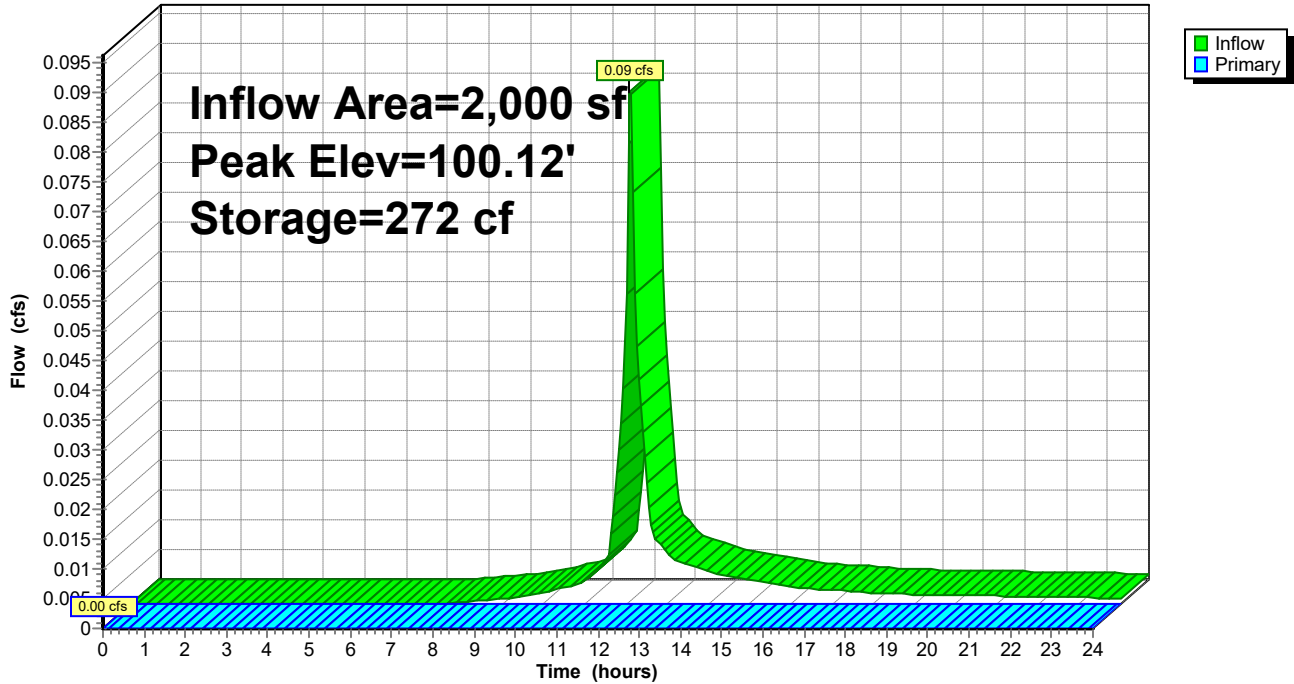
Volume	Invert	Avail.Storage	Storage Description
#1	99.00'	147 cf	6.00'W x 8.00'L x 1.50'H Stone Bed x 9 648 cf Overall - 279 cf Embedded = 369 cf x 40.0% Voids
#2	99.50'	168 cf	Concrete Galley 4x8x1 x 9 Inside #1 Inside= 42.0"W x 9.0"H => 2.49 sf x 7.50'L = 18.7 cf Outside= 48.0"W x 12.0"H => 3.88 sf x 8.00'L = 31.0 cf
#3	99.00'	12 cf	2.00'W x 2.00'L x 3.00'H Yard Drain
		327 cf	Total Available Storage

Device	Routing	Invert	Outlet Devices
#1	Primary	100.50'	8.0' long Sharp-Crested Rectangular Weir 2 End Contraction(s)

Primary OutFlow Max=0.00 cfs @ 0.00 hrs HW=99.00' (Free Discharge)
 ↑1=Sharp-Crested Rectangular Weir (Controls 0.00 cfs)

Pond DB2B-2: 12" High Precast Concrete Galleries

Hydrograph



Stage-Area-Storage for Pond DB2B-2: 12" High Precast Concrete Galleries

Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)	Elevation (feet)	Storage (cubic-feet)
99.00	0	100.04	249	101.08	324
99.02	4	100.06	254	101.10	324
99.04	7	100.08	260	101.12	324
99.06	11	100.10	266	101.14	324
99.08	14	100.12	271	101.16	324
99.10	18	100.14	276	101.18	324
99.12	21	100.16	282	101.20	324
99.14	25	100.18	287	101.22	324
99.16	28	100.20	292	101.24	324
99.18	32	100.22	297	101.26	325
99.20	35	100.24	303	101.28	325
99.22	39	100.26	306	101.30	325
99.24	42	100.28	307	101.32	325
99.26	46	100.30	308	101.34	325
99.28	50	100.32	310	101.36	325
99.30	53	100.34	311	101.38	325
99.32	57	100.36	312	101.40	325
99.34	60	100.38	314	101.42	325
99.36	64	100.40	315	101.44	325
99.38	67	100.42	316	101.46	325
99.40	71	100.44	318	101.48	325
99.42	74	100.46	319	101.50	325
99.44	78	100.48	320	101.52	326
99.46	81	100.50	321	101.54	326
99.48	85	100.52	322	101.56	326
99.50	88	100.54	322	101.58	326
99.52	94	100.56	322	101.60	326
99.54	100	100.58	322	101.62	326
99.56	106	100.60	322	101.64	326
99.58	112	100.62	322	101.66	326
99.60	118	100.64	322	101.68	326
99.62	124	100.66	322	101.70	326
99.64	130	100.68	322	101.72	326
99.66	136	100.70	322	101.74	326
99.68	142	100.72	322	101.76	327
99.70	148	100.74	322	101.78	327
99.72	154	100.76	323	101.80	327
99.74	160	100.78	323	101.82	327
99.76	166	100.80	323	101.84	327
99.78	171	100.82	323	101.86	327
99.80	177	100.84	323	101.88	327
99.82	183	100.86	323	101.90	327
99.84	189	100.88	323	101.92	327
99.86	195	100.90	323	101.94	327
99.88	201	100.92	323	101.96	327
99.90	207	100.94	323	101.98	327
99.92	213	100.96	323	102.00	327
99.94	219	100.98	323		
99.96	225	101.00	323		
99.98	231	101.02	324		
100.00	237	101.04	324		
100.02	243	101.06	324		

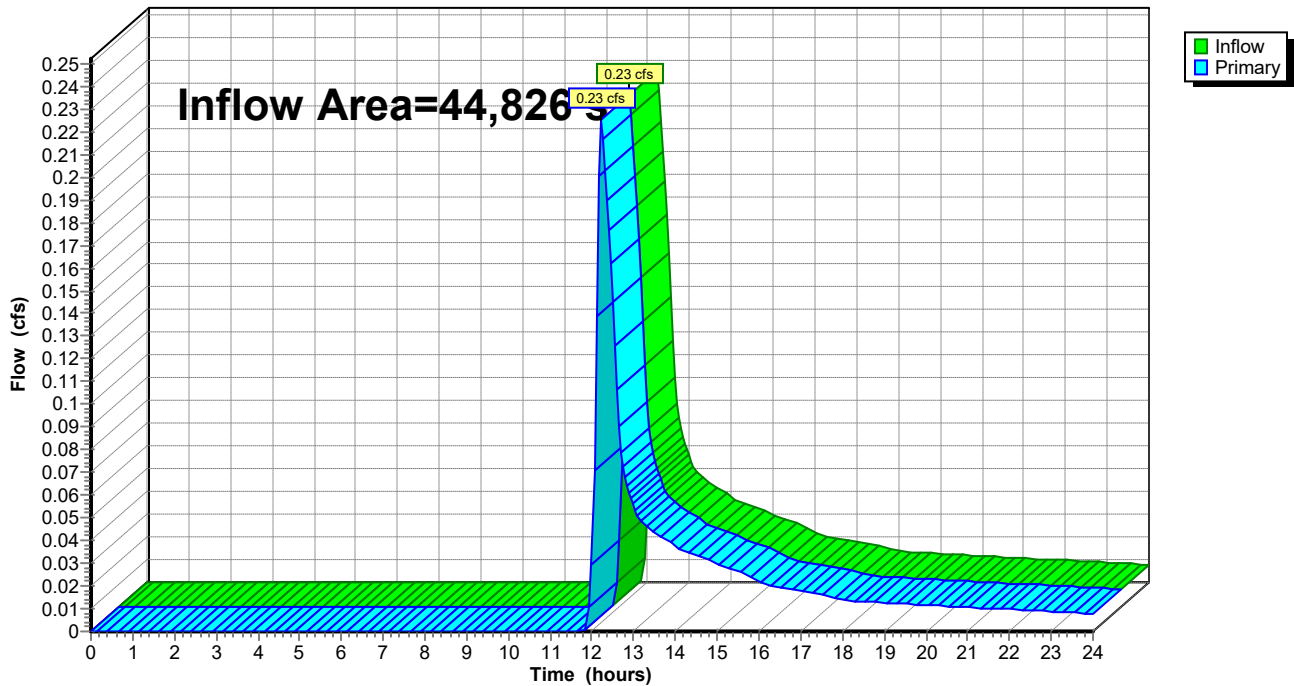
Summary for Link OR2B: Overall Runoff Lot 2B

Inflow Area = 44,826 sf, 13.39% Impervious, Inflow Depth > 0.32" for 1 yr event
Inflow = 0.23 cfs @ 12.21 hrs, Volume= 1,189 cf
Primary = 0.23 cfs @ 12.21 hrs, Volume= 1,189 cf, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 0.00-24.00 hrs, dt= 0.05 hrs

Link OR2B: Overall Runoff Lot 2B

Hydrograph



90HavilandRd(09-24-24)_Exist&PropConditionsLot2B

Type III 24-hr 2 yr Rainfall=3.50"

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PA2B-1: Impervious Area to Runoff Area=10,500 sf 42.86% Impervious Runoff Depth>1.43"
Tc=6.0 min CN=77 Runoff=0.39 cfs 1,250 cf

Subcatchment PA2B-2: Impervious Area to Runoff Area=2,000 sf 75.00% Impervious Runoff Depth>2.36"
Tc=6.0 min CN=89 Runoff=0.12 cfs 393 cf

Subcatchment PB2B: Proposed Bypass Runoff Area=32,326 sf 0.00% Impervious Runoff Depth>0.85"
Flow Length=166' Tc=11.7 min CN=67 Runoff=0.52 cfs 2,283 cf

Subcatchment XC2B: Existing Conditions Runoff Area=44,826 sf 0.00% Impervious Runoff Depth>0.75"
Flow Length=166' Tc=11.7 min CN=65 Runoff=0.61 cfs 2,800 cf

Pond DB2B-1: 24" High Precast Concrete Peak Elev=103.97' Storage=1,250 cf Inflow=0.39 cfs 1,250 cf
Outflow=0.00 cfs 0 cf

Pond DB2B-2: 12" High Precast Concrete Peak Elev=100.50' Storage=321 cf Inflow=0.12 cfs 393 cf
Outflow=0.01 cfs 71 cf

Link OR2B: Overall Runoff Lot 2B Inflow=0.52 cfs 2,354 cf
Primary=0.52 cfs 2,354 cf

90HavilandRd(09-24-24)_Exist&PropConditionsLot2B

Type III 24-hr 5 yr Rainfall=4.20"

Prepared by Kousidis Engineering, LLC

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Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PA2B-1: Impervious Area to Runoff Area=10,500 sf 42.86% Impervious Runoff Depth>1.97"
Tc=6.0 min CN=77 Runoff=0.54 cfs 1,722 cf

Subcatchment PA2B-2: Impervious Area to Runoff Area=2,000 sf 75.00% Impervious Runoff Depth>3.01"
Tc=6.0 min CN=89 Runoff=0.16 cfs 501 cf

Subcatchment PB2B: Proposed Bypass Runoff Area=32,326 sf 0.00% Impervious Runoff Depth>1.27"
Flow Length=166' Tc=11.7 min CN=67 Runoff=0.84 cfs 3,411 cf

Subcatchment XC2B: Existing Conditions Runoff Area=44,826 sf 0.00% Impervious Runoff Depth>1.14"
Flow Length=166' Tc=11.7 min CN=65 Runoff=1.02 cfs 4,270 cf

Pond DB2B-1: 24" High Precast Concrete Peak Elev=104.45' Storage=1,721 cf Inflow=0.54 cfs 1,722 cf
Outflow=0.00 cfs 0 cf

Pond DB2B-2: 12" High Precast Concrete Peak Elev=100.50' Storage=321 cf Inflow=0.16 cfs 501 cf
Outflow=0.02 cfs 180 cf

Link OR2B: Overall Runoff Lot 2B Inflow=0.84 cfs 3,591 cf
Primary=0.84 cfs 3,591 cf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PA2B-1: Impervious Area to Runoff Area=10,500 sf 42.86% Impervious Runoff Depth>2.62"
Tc=6.0 min CN=77 Runoff=0.73 cfs 2,293 cf

Subcatchment PA2B-2: Impervious Area to Runoff Area=2,000 sf 75.00% Impervious Runoff Depth>3.77"
Tc=6.0 min CN=89 Runoff=0.19 cfs 628 cf

Subcatchment PB2B: Proposed Bypass Runoff Area=32,326 sf 0.00% Impervious Runoff Depth>1.80"
Flow Length=166' Tc=11.7 min CN=67 Runoff=1.24 cfs 4,844 cf

Subcatchment XC2B: Existing Conditions Runoff Area=44,826 sf 0.00% Impervious Runoff Depth>1.65"
Flow Length=166' Tc=11.7 min CN=65 Runoff=1.55 cfs 6,160 cf

Pond DB2B-1: 24" High Precast Concrete Peak Elev=105.50' Storage=2,051 cf Inflow=0.73 cfs 2,293 cf
Outflow=0.02 cfs 242 cf

Pond DB2B-2: 12" High Precast Concrete Peak Elev=100.53' Storage=322 cf Inflow=0.19 cfs 628 cf
Outflow=0.16 cfs 312 cf

Link OR2B: Overall Runoff Lot 2B Inflow=1.24 cfs 5,399 cf
Primary=1.24 cfs 5,399 cf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PA2B-1: Impervious Area to Runoff Area=10,500 sf 42.86% Impervious Runoff Depth>3.83"
Tc=6.0 min CN=77 Runoff=1.06 cfs 3,349 cf

Subcatchment PA2B-2: Impervious Area to Runoff Area=2,000 sf 75.00% Impervious Runoff Depth>5.12"
Tc=6.0 min CN=89 Runoff=0.26 cfs 853 cf

Subcatchment PB2B: Proposed Bypass Runoff Area=32,326 sf 0.00% Impervious Runoff Depth>2.83"
Flow Length=166' Tc=11.7 min CN=67 Runoff=2.01 cfs 7,621 cf

Subcatchment XC2B: Existing Conditions Runoff Area=44,826 sf 0.00% Impervious Runoff Depth>2.64"
Flow Length=166' Tc=11.7 min CN=65 Runoff=2.58 cfs 9,861 cf

Pond DB2B-1: 24" High Precast Concrete Peak Elev=105.53' Storage=2,051 cf Inflow=1.06 cfs 3,349 cf
Outflow=0.19 cfs 1,299 cf

Pond DB2B-2: 12" High Precast Concrete Peak Elev=100.56' Storage=322 cf Inflow=0.26 cfs 853 cf
Outflow=0.38 cfs 539 cf

Link OR2B: Overall Runoff Lot 2B Inflow=2.23 cfs 9,458 cf
Primary=2.23 cfs 9,458 cf

Time span=0.00-24.00 hrs, dt=0.05 hrs, 481 points
Runoff by SCS TR-20 method, UH=SCS, Weighted-CN
Reach routing by Stor-Ind+Trans method - Pond routing by Stor-Ind method

Subcatchment PA2B-1: Impervious Area to Runoff Area=10,500 sf 42.86% Impervious Runoff Depth>4.63"
Tc=6.0 min CN=77 Runoff=1.28 cfs 4,053 cf

Subcatchment PA2B-2: Impervious Area to Runoff Area=2,000 sf 75.00% Impervious Runoff Depth>6.00"
Tc=6.0 min CN=89 Runoff=0.30 cfs 1,000 cf

Subcatchment PB2B: Proposed Bypass Runoff Area=32,326 sf 0.00% Impervious Runoff Depth>3.54"
Flow Length=166' Tc=11.7 min CN=67 Runoff=2.53 cfs 9,536 cf

Subcatchment XC2B: Existing Conditions Runoff Area=44,826 sf 0.00% Impervious Runoff Depth>3.33"
Flow Length=166' Tc=11.7 min CN=65 Runoff=3.29 cfs 12,434 cf

Pond DB2B-1: 24" High Precast Concrete Peak Elev=105.57' Storage=2,051 cf Inflow=1.28 cfs 4,053 cf
Outflow=0.50 cfs 2,003 cf

Pond DB2B-2: 12" High Precast Concrete Peak Elev=100.56' Storage=322 cf Inflow=0.30 cfs 1,000 cf
Outflow=0.35 cfs 681 cf

Link OR2B: Overall Runoff Lot 2B Inflow=2.82 cfs 12,219 cf
Primary=2.82 cfs 12,219 cf

Directly Connected Impervious Area Tracking Worksheet
City of Stamford Drainage Manual



Note to user: complete all cells of this color only, as indicated by section headings

Part 1: General Information (All Projects)	
Project Name	90 Haviland
Project Address	90 Haviland Road Lot 2B
Project Applicant	Stavros Aivalis
Title of Plan	Site Development Plan
Revision Date of Plan	24-Sep-24
Tax Account Number	003-4226

Part 2: Project Details (All Projects)	
1. What type of development is this? (choose from dropdown)	Redevelopment
2. What is the total area of the project site?	44,826 ft ²
3. What is the total area of land disturbance for this project?	30,000 ft ²
4. Does project site drain to High Quality Waters, a Direct Waterfront, or within 500 ft. of Tidal Wetlands? (Yes/No)	No
Does Standard 1 apply based on information above?	Yes


Part 3: Water Quality Target Total (Only for Standard 1 Projects)	
5. What is the <u>current</u> (pre-development) DCIA for the site?	0 ft ²
6. Will the proposed development increase DCIA (without consideration of proposed stormwater management)? (Yes/No)	Yes
7. What is the <u>proposed-development</u> total impervious area for the site?	6,000 ft ²
Water Quality Volume (WQV)	636.8 ft ³
Standard 1 requirement	Retain WQV on-site
Required retention volume	636.8 ft ³
Provided retention volume for proposed development	2,894.0 ft ³

Part 4: Proposed DCIA Tracking (Only for Standard 1 Projects)	
<u>Pre-development</u> total impervious area	0 ft ²
<u>Current</u> DCIA	0 ft ²
<u>Proposed-development</u> total impervious area	6,000 ft ²
<u>Proposed-development</u> DCIA (after stormwater management)	0 ft ²
<u>Net change in DCIA</u> from <u>current</u> to <u>proposed-development</u>	0 ft ²

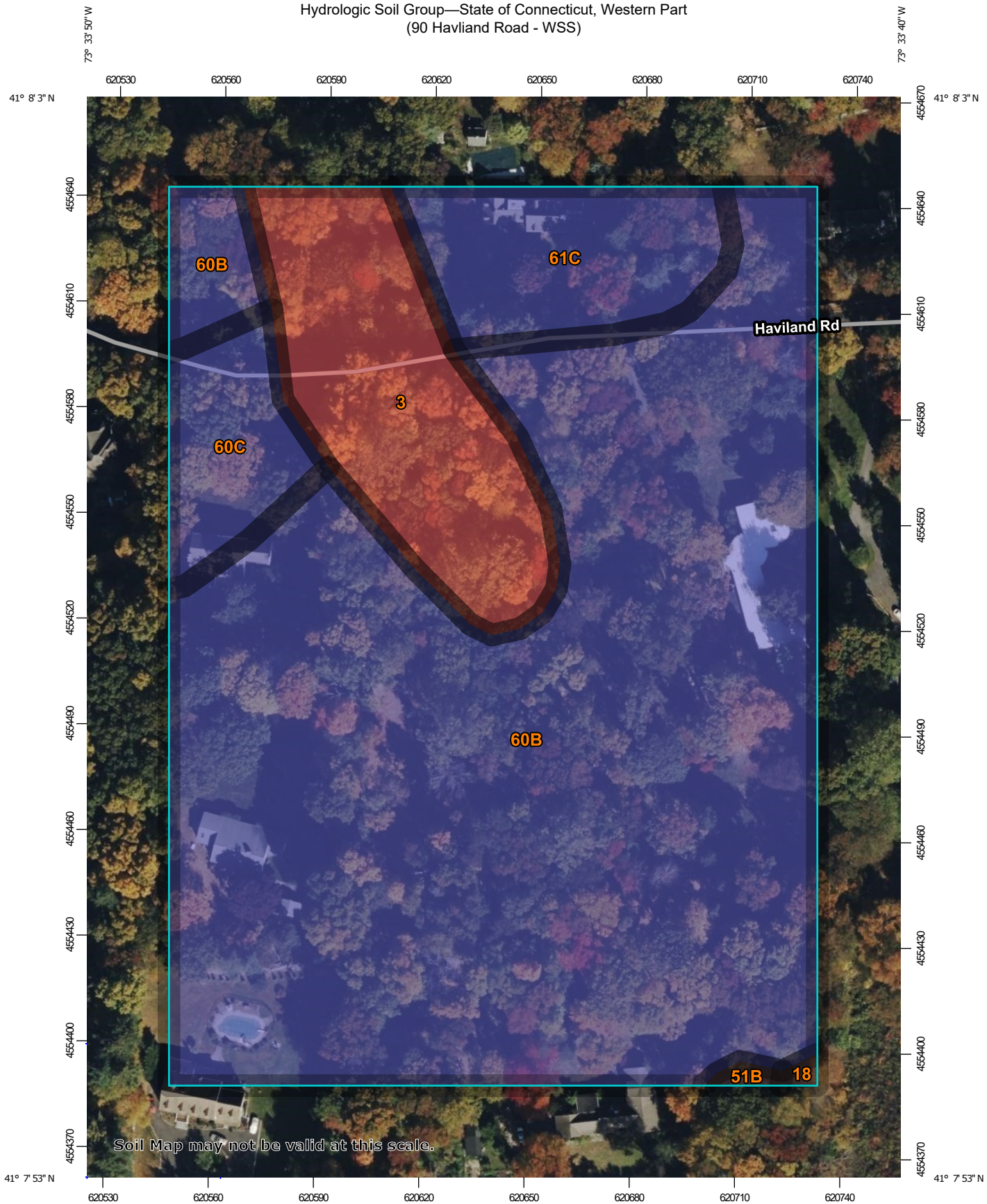
Part 5: Post-Development (As-Built Certified) DCIA Tracking (Only for Standard 1 Projects)	
<u>Post-development</u> (per as-built) total impervious area	ft ²
<u>Post-development</u> (per as-built) DCIA (after stormwater management)	ft ²
<u>Net change in DCIA</u> from <u>current</u> to <u>post-development</u>	ft ²

Certification Statement

I hereby certify that the information contained in this worksheet is true and correct.

Engineer's Signature J. Verito at 09/24/2024 Engineer's Seal 

Hydrologic Soil Group—State of Connecticut, Western Part
(90 Haviland Road - WSS)



Map Scale: 1:1,490 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 18N WGS84



Hydrologic Soil Group

Map unit symbol	Map unit name	Rating	Acres in AOI	Percent of AOI
3	Ridgebury, Leicester, and Whitman soils, 0 to 8 percent slopes, extremely stony	D	1.5	12.7%
18	Catden and Freetown soils, 0 to 2 percent slopes	B/D	0.0	0.1%
51B	Sutton fine sandy loam, 0 to 8 percent slopes, very stony	B/D	0.0	0.2%
60B	Canton and Charlton fine sandy loams, 3 to 8 percent slopes	B	8.7	74.5%
60C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes	B	0.6	4.7%
61C	Canton and Charlton fine sandy loams, 8 to 15 percent slopes, very stony	B	0.9	7.6%
Totals for Area of Interest			11.7	100.0%