

# JONES & BEACH ENGINEERS INC.

## DRAINAGE ANALYSIS

## EROSION AND SEDIMENT CONTROL PLAN

### VIOLETTE LANE ESTATES

Project Tax Map 1 / LOT 82

Scribner Road

Fremont, NH

### Prepared for:

Haus Emily, LLC

56 Westville Road #4

Plaistow, NH 03865



### Prepared by:

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August 31, 2020

Rev. #1 – November 23, 2020

JBE Project No. 19175.1

## 1. EXECUTIVE SUMMARY

The purpose of this project is to construct an 8-Lot Residential Open Space Preservation Subdivision on Town of Fremont Tax Map 1, Lot 82. The proposed project includes the construction of an 1,350 ± roadway with associated utilities and drainage infrastructures. Two models were compiled, one for the area in its existing (pre-development) condition, and a second for its proposed (post-development) condition. The analysis was conducted using the USDA SCS TR-20 method within the HydroCAD Stormwater Modeling System environment. A summary of the existing and proposed conditions peak rates of runoff is as follows:

Analysis Point	2 Year		10 Year		25 Year		50 Year	
	Pre	Post	Pre	Post	Pre	Post	Pre	Post
Analysis Point #1	0.54	0.17	2.16	1.88	3.78	3.35	5.47	4.77
Analysis Point #2	1.92	1.92	7.30	7.30	12.72	12.72	18.36	18.36
Analysis Point #3	6.19	6.49	23.45	23.70	40.88	40.59	59.01	59.32
Total	8.65	8.58	32.91	32.88	57.38	56.66	82.84	82.45

The drainage design intent for this site is to maintain the post-development peak flow to the pre-development peak flow conditions to the extent practicable. This has been accomplished through the use of two stormwater basins to maintain the peak discharge and infiltrate stormwater.

In addition, the potential for increased erosion and sedimentation is handled by way of erosion control blankets and outlet protection aprons. The use of Best Management Practices per the NHDES Stormwater Manual have been applied to the design of this drainage system and will be observed during all stages of construction. Existing wetlands and abutting property owners will suffer minimal impact resultant from this development.

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## **2. DRAINAGE ANALYSIS**

### **2.1 INTRODUCTION**

The purpose of this project is to construct an 8-Lot Residential Open Space Preservation Subdivision on Town of Fremont Tax Map 1, Lot 82. The proposed project includes the construction of a 1,350 ± roadway with associated utilities and drainage infrastructures. This project will be serviced by on-site sewer and water.

### **2.2 METHODOLOGY**

The existing and proposed watersheds were modeled utilizing HydroCad stormwater software, version 9.10. The watersheds were analyzed utilizing the SCS TR-20 methodology for hydrograph development and the TR-55 methodology for Time of Concentration (Tc) determination. The Dynamic-Storage-Indicating method for reach and pond routing was utilized. Type III, 24-hour hydrographs were developed for the 2-year, 10-year, 25-year, and 50-year storm events, corresponding to rainfall events of 3.08", 4.68", 5.94", and 7.12" respectively.

Existing topography and site features were obtained through on-ground topography completed by Jones & Beach Engineers. Existing soil conditions were derived from the NRCS Web Soil Survey.

### **2.3 EXISTING CONDITIONS ANALYSIS**

The study area consists of the subject property and upstream contributing area. The study area contains 46.957 acres including offsite contributing areas. The existing site is currently undeveloped and consists of partially forested areas and open farmland. The existing site generally drains from west to east.

The majority of the soils for this site are described as Hydrological Soils "B". A small area of soils in the western area of the subcatchment are described as Hydrological Soils "C".

Three (3) Analysis Points (AP's) were defined for this project. Analysis Points are described as below:

Analysis Point #1 is defined as the entrance to the existing culvert under Scribner Road at the north portion of the project along the eastern project property line. Stormwater to this Analysis Point is collected from the east central portion of the proposed project, generally south of the existing woods road.

Analysis Point #2 is defined as the entrance to the existing culvert under Scribner Road at the south portion of the project along the eastern project property line. Stormwater to this Analysis Point is collected from the south-eastern corner of the project and off-site areas to the south and west of the project to South Road.

Analysis Point #3 is defined as the northern property line along the existing wetland line. Stormwater to this Analysis Point is collected in the existing wetlands on- and off-site and discharge towards the existing fire pond located on the property north of the project along Scribner Road.

## 2.4 PROPOSED CONDITIONS ANALYSIS

The proposed site includes the construction of an approximately 1,350'  $\pm$  roadway to support an 8-lot residential subdivision.

The addition of the proposed impervious paved areas and buildings causes an increase in the curve number ( $C_n$ ) and a decrease in the time of concentration ( $T_c$ ), the net result being a potential increase in peak rates of runoff from the site. To mitigate the potential increase in the peak rate of runoff and to effectively treat the subsequent stormwater runoff the following Best Management Practices (BMP's) have been employed at the Analysis Points as follows:

Drainage along the eastern half of the proposed roadway is collected in a roadside ditch system and is directed to a proposed detention basin #1 (1P) along the eastern portion of the project adjacent to Scribner Road. Discharge from the proposed detention basin is discharged to the existing culvert located under Scribner Road at Analysis Point #1 (AP-1).

The watershed contributing to Analysis Point #2 remains unchanged.


Drainage developed by the cul-de-sac and portions of the developed area west of the cul-de-sac are directed to the proposed detention basin #2 located within the center of the proposed cul-de-sac bulb (5P). Discharge from detention basin #2 is directed through the proposed roadside ditch system along with stormwater developed along the western portion of the proposed roadway to the existing wetland system located in the center of the proposed roadway system (Reach 1R). This stormwater along with stormwater collected in the existing wetland system west of the proposed construction is directed to Analysis Point #3.

## 2.5 CONCLUSION

This proposed site development will have minimal adverse effect on abutting infrastructures or properties by way of stormwater runoff or siltation if properly constructed in accordance with this Drainage Analysis and approved project plan set. The post-construction peak rates of runoff for the site will be lower than the existing conditions for all analyzed storm events. Appropriate steps will be taken to control erosion and sedimentation; these will be accomplished through the construction of a drainage system consisting of site grading, roadside ditches, detention ponds, and riprap outlet protection aprons. The use of Best Management Practices developed by the State of New Hampshire have been utilized in the design of this system and their application will be enforced with regular inspections throughout the construction process.

An NHDES Alteration of Terrain Permit (RSA 485:A-17) is not required for this site plan due to the area of disturbance being less than 100,000 square-feet.

Respectfully Submitted,  
**JONES & BEACH ENGINEERS, INC.**

  
Barry W. Gier, P.E.  
Vice-President

## 2.6 DRAINAGE CALCUALTIONS

### PRE-DEVELOPMENT CONDITIONS ANALYSIS

- 2.6.1 2-Year 24-Hour Summary Analysis
- 2.6.2 10-Year 24-Hour Summary Analysis
- 2.6.3 25-Year 24-Hour Complete Analysis
- 2.6.4 50-Year 24-Hour Summary Analysis



EX-WS-1



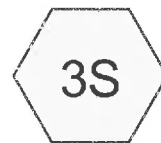
Analysis Point #1



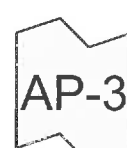
EX-WS-2



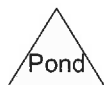
Analysis Point #2



EX-WS-3



Analysis Point #3



**Routing Diagram for 19175-EXIST-DRAINAGE**

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**19175-EXIST-DRAINAGE**

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**Area Listing (all nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
27.973	61	>75% Grass cover, Good, HSG B (1S, 2S, 3S)
0.530	96	Gravel surface, HSG B (1S, 2S, 3S)
0.889	98	Unconnected pavement, HSG B (1S, 2S, 3S)
12.056	58	Woods/grass comb., Good, HSG B (3S)
5.508	72	Woods/grass comb., Good, HSG C (3S)
<b>46.957</b>	<b>63</b>	<b>TOTAL AREA</b>



**19175-EXIST-DRAINAGE**

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**Soil Listing (all nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
41.449	HSG B	1S, 2S, 3S
5.508	HSG C	3S
0.000	HSG D	
0.000	Other	
<b>46.957</b>		<b>TOTAL AREA</b>

## 19175-EXIST-DRAINAGE

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PRE-DEVELOPMENT

Type III 24-hr 2-YR Rainfall=3.08"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

### Subcatchment 1S: EX-WS-1

Runoff Area=101,664 sf 2.42% Impervious Runoff Depth>0.37"  
Flow Length=618' Tc=17.6 min UI Adjusted CN=62 Runoff=0.54 cfs 0.073 af

### Subcatchment 2S: EX-WS-2

Runoff Area=444,071 sf 3.08% Impervious Runoff Depth>0.37"  
Flow Length=1,478' Tc=32.6 min CN=62 Runoff=1.92 cfs 0.314 af

### Subcatchment 3S: EX-WS-3

Runoff Area=1,499,727 sf 1.51% Impervious Runoff Depth>0.37"  
Flow Length=2,635' Tc=36.2 min UI Adjusted CN=62 Runoff=6.19 cfs 1.059 af

### Link AP-1: Analysis Point #1

Inflow=0.54 cfs 0.073 af  
Primary=0.54 cfs 0.073 af

### Link AP-2: Analysis Point #2

Inflow=1.92 cfs 0.314 af  
Primary=1.92 cfs 0.314 af

### Link AP-3: Analysis Point #3

Inflow=6.19 cfs 1.059 af  
Primary=6.19 cfs 1.059 af

Total Runoff Area = 46.957 ac Runoff Volume = 1.446 af Average Runoff Depth = 0.37"  
98.11% Pervious = 46.068 ac 1.89% Impervious = 0.889 ac

## 19175-EXIST-DRAINAGE

PRE-DEVELOPMENT

Type III 24-hr 10-YR Rainfall=4.68"

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Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

### Subcatchment 1S: EX-WS-1

Runoff Area=101,664 sf 2.42% Impervious Runoff Depth>1.12"  
Flow Length=618' Tc=17.6 min UI Adjusted CN=62 Runoff=2.16 cfs 0.218 af

### Subcatchment 2S: EX-WS-2

Runoff Area=444,071 sf 3.08% Impervious Runoff Depth>1.11"  
Flow Length=1,478' Tc=32.6 min CN=62 Runoff=7.30 cfs 0.944 af

### Subcatchment 3S: EX-WS-3

Runoff Area=1,499,727 sf 1.51% Impervious Runoff Depth>1.11"  
Flow Length=2,635' Tc=36.2 min UI Adjusted CN=62 Runoff=23.45 cfs 3.181 af

### Link AP-1: Analysis Point #1

Inflow=2.16 cfs 0.218 af  
Primary=2.16 cfs 0.218 af

### Link AP-2: Analysis Point #2

Inflow=7.30 cfs 0.944 af  
Primary=7.30 cfs 0.944 af

### Link AP-3: Analysis Point #3

Inflow=23.45 cfs 3.181 af  
Primary=23.45 cfs 3.181 af

Total Runoff Area = 46.957 ac Runoff Volume = 4.342 af Average Runoff Depth = 1.11"  
98.11% Pervious = 46.068 ac 1.89% Impervious = 0.889 ac

## 19175-EXIST-DRAINAGE

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PRE-DEVELOPMENT

Type III 24-hr 25-YR Rainfall=5.94"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

### Subcatchment 1S: EX-WS-1

Runoff Area=101,664 sf 2.42% Impervious Runoff Depth>1.86"  
Flow Length=618' Tc=17.6 min UI Adjusted CN=62 Runoff=3.78 cfs 0.363 af

### Subcatchment 2S: EX-WS-2

Runoff Area=444,071 sf 3.08% Impervious Runoff Depth>1.85"  
Flow Length=1,478' Tc=32.6 min CN=62 Runoff=12.72 cfs 1.574 af

### Subcatchment 3S: EX-WS-3

Runoff Area=1,499,727 sf 1.51% Impervious Runoff Depth>1.85"  
Flow Length=2,635' Tc=36.2 min UI Adjusted CN=62 Runoff=40.88 cfs 5.306 af

### Link AP-1: Analysis Point #1

Inflow=3.78 cfs 0.363 af  
Primary=3.78 cfs 0.363 af

### Link AP-2: Analysis Point #2

Inflow=12.72 cfs 1.574 af  
Primary=12.72 cfs 1.574 af

### Link AP-3: Analysis Point #3

Inflow=40.88 cfs 5.306 af  
Primary=40.88 cfs 5.306 af

Total Runoff Area = 46.957 ac Runoff Volume = 7.242 af Average Runoff Depth = 1.85"  
98.11% Pervious = 46.068 ac 1.89% Impervious = 0.889 ac

**19175-EXIST-DRAINAGE**

PRE-DEVELOPMENT

Type III 24-hr 25-YR Rainfall=5.94"

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**Summary for Subcatchment 1S: EX-WS-1**

Runoff = 3.78 cfs @ 12.26 hrs, Volume= 0.363 af, Depth&gt; 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YR Rainfall=5.94"

Area (sf)	CN	Adj	Description
2,464	98		Unconnected pavement, HSG B
2,576	96		Gravel surface, HSG B
96,624	61		>75% Grass cover, Good, HSG B
101,664	63	62	Weighted Average, UI Adjusted
99,200			97.58% Pervious Area
2,464			2.42% Impervious Area
2,464			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0350	0.15		<b>Sheet Flow, Through Grass</b> Grass: Dense n= 0.240 P2= 3.20"
6.2	518	0.0390	1.38		<b>Shallow Concentrated Flow, Over Grass</b> Short Grass Pasture Kv= 7.0 fps
17.6	618	Total			

**Summary for Subcatchment 2S: EX-WS-2**

Runoff = 12.72 cfs @ 12.49 hrs, Volume= 1.574 af, Depth&gt; 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YR Rainfall=5.94"

Area (sf)	CN	Description
13,673	98	Unconnected pavement, HSG B
2,972	96	Gravel surface, HSG B
427,426	61	>75% Grass cover, Good, HSG B
444,071	62	Weighted Average
430,398		96.92% Pervious Area
13,673		3.08% Impervious Area
13,673		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0350	0.15		<b>Sheet Flow, Over Grass</b> Grass: Dense n= 0.240 P2= 3.20"
21.2	1,378	0.0240	1.08		<b>Shallow Concentrated Flow, Over Grass</b> Short Grass Pasture Kv= 7.0 fps
32.6	1,478	Total			

**19175-EXIST-DRAINAGE**

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PRE-DEVELOPMENT

Type III 24-hr 25-YR Rainfall=5.94"

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**Summary for Subcatchment 3S: EX-WS-3**

Runoff = 40.88 cfs @ 12.54 hrs, Volume= 5.306 af, Depth&gt; 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YR Rainfall=5.94"

Area (sf)	CN	Adj	Description
22,590	98		Unconnected pavement, HSG B
17,545	96		Gravel surface, HSG B
694,474	61		>75% Grass cover, Good, HSG B
525,168	58		Woods/grass comb., Good, HSG B
239,950	72		Woods/grass comb., Good, HSG C
1,499,727	63	62	Weighted Average, UI Adjusted
1,477,137			98.49% Pervious Area
22,590			1.51% Impervious Area
22,590			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	100	0.0550	0.12		<b>Sheet Flow, Through Woods</b> Woods: Light underbrush n= 0.400 P2= 3.20"
8.2	965	0.0050	1.97	886.27	<b>Channel Flow, Large Wetland</b> Area= 450.0 sf Perim= 496.0' r= 0.91' n= 0.050 Scattered brush, heavy weeds
13.7	1,570	0.0140	1.91	114.76	<b>Channel Flow, Wetland Channel</b> Area= 60.0 sf Perim= 90.3' r= 0.66' n= 0.070 Sluggish weedy reaches w/pools
36.2	2,635	Total			

**Summary for Link AP-1: Analysis Point #1**

Inflow Area = 2.334 ac, 2.42% Impervious, Inflow Depth > 1.86" for 25-YR event  
 Inflow = 3.78 cfs @ 12.26 hrs, Volume= 0.363 af  
 Primary = 3.78 cfs @ 12.26 hrs, Volume= 0.363 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

**Summary for Link AP-2: Analysis Point #2**

Inflow Area = 10.194 ac, 3.08% Impervious, Inflow Depth > 1.85" for 25-YR event  
 Inflow = 12.72 cfs @ 12.49 hrs, Volume= 1.574 af  
 Primary = 12.72 cfs @ 12.49 hrs, Volume= 1.574 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

## 19175-EXIST-DRAINAGE

PRE-DEVELOPMENT

Type III 24-hr 25-YR Rainfall=5.94"

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### Summary for Link AP-3: Analysis Point #3

Inflow Area = 34.429 ac, 1.51% Impervious, Inflow Depth > 1.85" for 25-YR event  
Inflow = 40.88 cfs @ 12.54 hrs, Volume= 5.306 af  
Primary = 40.88 cfs @ 12.54 hrs, Volume= 5.306 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

## 19175-EXIST-DRAINAGE

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PRE-DEVELOPMENT

Type III 24-hr 50-YR Rainfall=7.12"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

### Subcatchment 1S: EX-WS-1

Runoff Area=101,664 sf 2.42% Impervious Runoff Depth>2.65"  
Flow Length=618' Tc=17.6 min UI Adjusted CN=62 Runoff=5.47 cfs 0.515 af

### Subcatchment 2S: EX-WS-2

Runoff Area=444,071 sf 3.08% Impervious Runoff Depth>2.63"  
Flow Length=1,478' Tc=32.6 min CN=62 Runoff=18.36 cfs 2.236 af

### Subcatchment 3S: EX-WS-3

Runoff Area=1,499,727 sf 1.51% Impervious Runoff Depth>2.63"  
Flow Length=2,635' Tc=36.2 min UI Adjusted CN=62 Runoff=59.01 cfs 7.539 af

### Link AP-1: Analysis Point #1

Inflow=5.47 cfs 0.515 af  
Primary=5.47 cfs 0.515 af

### Link AP-2: Analysis Point #2

Inflow=18.36 cfs 2.236 af  
Primary=18.36 cfs 2.236 af

### Link AP-3: Analysis Point #3

Inflow=59.01 cfs 7.539 af  
Primary=59.01 cfs 7.539 af

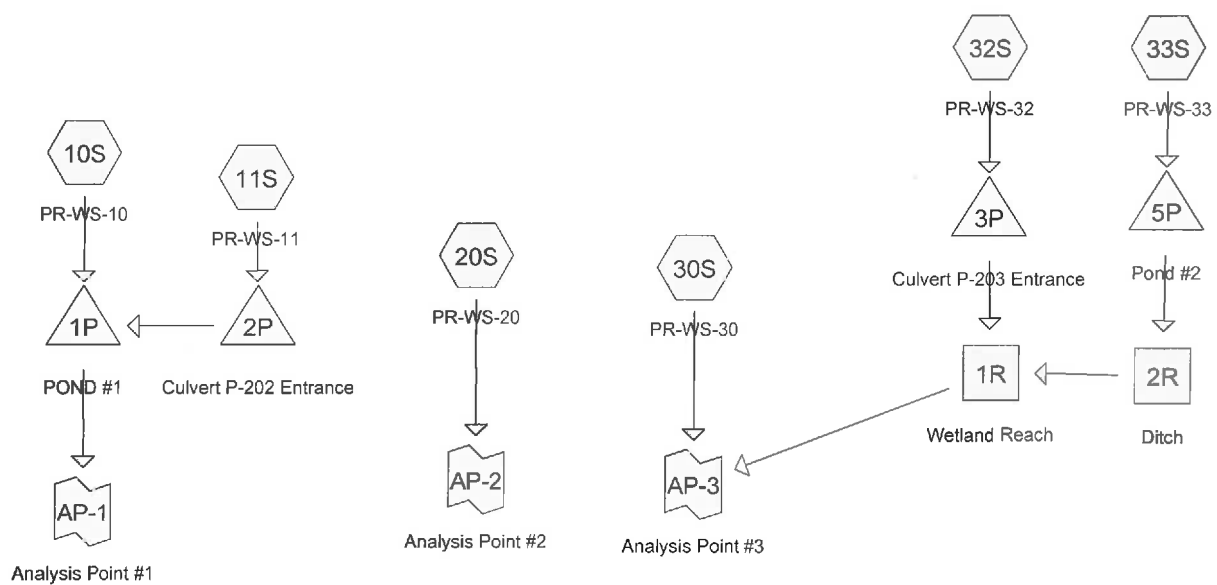
Total Runoff Area = 46.957 ac Runoff Volume = 10.290 af Average Runoff Depth = 2.63"  
98.11% Pervious = 46.068 ac 1.89% Impervious = 0.889 ac



## 2.7 APPENDIX II

### POST-DEVELOPMENT CONDITIONS ANALYSIS

- 2.7.1 2-Year 24-Hour Summary Analysis
- 2.7.2 10-Year 24-Hour Summary Analysis
- 2.7.3 25-Year 24-Hour Complete Analysis
- 2.7.4 50-Year 24-Hour Summary Analysis



**Routing Diagram for 19175-PROP-DRAINAGE**  
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**19175-PROP-DRAINAGE**

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**Area Listing (selected nodes)**

Area (acres)	CN	Description (subcatchment-numbers)
27.225	61	>75% Grass cover, Good, HSG B (10S, 11S, 20S, 30S, 32S, 33S)
0.173	96	Gravel surface, HSG B (20S, 32S)
2.411	98	Unconnected pavement, HSG B (10S, 11S, 20S, 30S, 32S, 33S)
11.640	58	Woods/grass comb., Good, HSG B (30S, 32S)
5.508	72	Woods/grass comb., Good, HSG C (32S)
<b>46.957</b>	<b>64</b>	<b>TOTAL AREA</b>

**19175-PROP-DRAINAGE**

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**Soil Listing (selected nodes)**

Area (acres)	Soil Group	Subcatchment Numbers
0.000	HSG A	
41.449	HSG B	10S, 11S, 20S, 30S, 32S, 33S
5.508	HSG C	32S
0.000	HSG D	
0.000	Other	
<b>46.957</b>		<b>TOTAL AREA</b>

**19175-PROP-DRAINAGE**

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POST-DEVELOPMENT

Type III 24-hr 2-YR Rainfall=3.08"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 10S: PR-WS-10** Runoff Area=36,060 sf 21.34% Impervious Runoff Depth>0.48"  
Flow Length=618' Tc=17.6 min UI Adjusted CN=65 Runoff=0.28 cfs 0.033 af

**Subcatchment 11S: PR-WS-11** Runoff Area=82,389 sf 7.98% Impervious Runoff Depth>0.37"  
Flow Length=754' Tc=18.3 min UI Adjusted CN=62 Runoff=0.44 cfs 0.059 af

**Subcatchment 20S: PR-WS-20** Runoff Area=444,071 sf 3.08% Impervious Runoff Depth>0.37"  
Flow Length=1,478' Tc=32.6 min CN=62 Runoff=1.92 cfs 0.314 af

**Subcatchment 30S: PR-WS-30** Runoff Area=282,028 sf 7.67% Impervious Runoff Depth>0.37"  
Flow Length=1,152' Tc=36.0 min UI Adjusted CN=62 Runoff=1.17 cfs 0.199 af

**Subcatchment 32S: PR-WS-32** Runoff Area=1,113,905 sf 2.59% Impervious Runoff Depth>0.40"  
Flow Length=2,433' Tc=34.4 min CN=63 Runoff=5.33 cfs 0.858 af

**Subcatchment 33S: PR-WS-33** Runoff Area=87,008 sf 30.60% Impervious Runoff Depth>0.78"  
Tc=5.0 min CN=72 Runoff=1.85 cfs 0.129 af

**Reach 1R: Wetland Reach** Avg. Flow Depth=0.56' Max Vel=1.50 fps Inflow=5.35 cfs 0.914 af  
n=0.070 L=171.0' S=0.0189 ' Capacity=83.06 cfs Outflow=5.33 cfs 0.911 af

**Reach 2R: Ditch** Avg. Flow Depth=0.13' Max Vel=1.97 fps Inflow=0.11 cfs 0.056 af  
n=0.022 L=338.0' S=0.0351 ' Capacity=161.36 cfs Outflow=0.11 cfs 0.056 af

**Pond 1P: POND #1** Peak Elev=189.47' Storage=1,273 cf Inflow=0.71 cfs 0.092 af  
Outflow=0.17 cfs 0.084 af

**Pond 2P: Culvert P-202 Entrance** Peak Elev=189.47' Storage=21 cf Inflow=0.44 cfs 0.059 af  
Outflow=0.43 cfs 0.059 af

**Pond 3P: Culvert P-203 Entrance** Peak Elev=209.62' Storage=96 cf Inflow=5.33 cfs 0.858 af  
36.0" Round Culvert n=0.012 L=63.0' S=0.0100 ' Outflow=5.33 cfs 0.858 af

**Pond 5P: Pond #2** Peak Elev=220.20' Storage=3,581 cf Inflow=1.85 cfs 0.129 af  
Outflow=0.11 cfs 0.056 af

**Link AP-1: Analysis Point #1** Inflow=0.17 cfs 0.084 af  
Primary=0.17 cfs 0.084 af

**Link AP-2: Analysis Point #2** Inflow=1.92 cfs 0.314 af  
Primary=1.92 cfs 0.314 af

**Link AP-3: Analysis Point #3** Inflow=6.49 cfs 1.110 af  
Primary=6.49 cfs 1.110 af

**Total Runoff Area = 46.957 ac Runoff Volume = 1.592 af Average Runoff Depth = 0.41"**  
**94.87% Pervious = 44.546 ac 5.13% Impervious = 2.411 ac**

**19175-PROP-DRAINAGE**

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Type III 24-hr 10-YR Rainfall=4.68"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 10S: PR-WS-10** Runoff Area=36,060 sf 21.34% Impervious Runoff Depth>1.31"  
Flow Length=618' Tc=17.6 min UI Adjusted CN=65 Runoff=0.92 cfs 0.090 af

**Subcatchment 11S: PR-WS-11** Runoff Area=82,389 sf 7.98% Impervious Runoff Depth>1.12"  
Flow Length=754' Tc=18.3 min UI Adjusted CN=62 Runoff=1.72 cfs 0.176 af

**Subcatchment 20S: PR-WS-20** Runoff Area=444,071 sf 3.08% Impervious Runoff Depth>1.11"  
Flow Length=1,478' Tc=32.6 min CN=62 Runoff=7.30 cfs 0.944 af

**Subcatchment 30S: PR-WS-30** Runoff Area=282,028 sf 7.67% Impervious Runoff Depth>1.11"  
Flow Length=1,152' Tc=36.0 min UI Adjusted CN=62 Runoff=4.42 cfs 0.598 af

**Subcatchment 32S: PR-WS-32** Runoff Area=1,113,905 sf 2.59% Impervious Runoff Depth>1.17"  
Flow Length=2,433' Tc=34.4 min CN=63 Runoff=19.04 cfs 2.495 af

**Subcatchment 33S: PR-WS-33** Runoff Area=87,008 sf 30.60% Impervious Runoff Depth>1.80"  
Tc=5.0 min CN=72 Runoff=4.52 cfs 0.300 af

**Reach 1R: Wetland Reach** Avg. Flow Depth=1.01' Max Vel=2.22 fps Inflow=19.30 cfs 2.678 af  
n=0.070 L=171.0' S=0.0189 '/' Capacity=83.06 cfs Outflow=19.28 cfs 2.673 af

**Reach 2R: Ditch** Avg. Flow Depth=0.19' Max Vel=2.55 fps Inflow=0.32 cfs 0.184 af  
n=0.022 L=338.0' S=0.0351 '/' Capacity=161.36 cfs Outflow=0.32 cfs 0.183 af

**Pond 1P: POND #1** Peak Elev=190.10' Storage=2,415 cf Inflow=2.56 cfs 0.266 af  
Outflow=1.88 cfs 0.244 af

**Pond 2P: Culvert P-202 Entrance** Peak Elev=190.12' Storage=92 cf Inflow=1.72 cfs 0.176 af  
Outflow=1.64 cfs 0.176 af

**Pond 3P: Culvert P-203 Entrance** Peak Elev=210.58' Storage=590 cf Inflow=19.04 cfs 2.495 af  
36.0" Round Culvert n=0.012 L=63.0' S=0.0100 '/' Outflow=19.02 cfs 2.495 af

**Pond 5P: Pond #2** Peak Elev=220.75' Storage=7,451 cf Inflow=4.52 cfs 0.300 af  
Outflow=0.32 cfs 0.184 af

**Link AP-1: Analysis Point #1** Inflow=1.88 cfs 0.244 af  
Primary=1.88 cfs 0.244 af

**Link AP-2: Analysis Point #2** Inflow=7.30 cfs 0.944 af  
Primary=7.30 cfs 0.944 af

**Link AP-3: Analysis Point #3** Inflow=23.70 cfs 3.271 af  
Primary=23.70 cfs 3.271 af

**Total Runoff Area = 46.957 ac Runoff Volume = 4.603 af Average Runoff Depth = 1.18"**  
**94.87% Pervious = 44.546 ac 5.13% Impervious = 2.411 ac**

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Type III 24-hr 25-YR Rainfall=5.94"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 10S: PR-WS-10**Runoff Area=36,060 sf 21.34% Impervious Runoff Depth>2.11"  
Flow Length=618' Tc=17.6 min UI Adjusted CN=65 Runoff=1.54 cfs 0.146 af**Subcatchment 11S: PR-WS-11**Runoff Area=82,389 sf 7.98% Impervious Runoff Depth>1.86"  
Flow Length=754' Tc=18.3 min UI Adjusted CN=62 Runoff=3.02 cfs 0.294 af**Subcatchment 20S: PR-WS-20**Runoff Area=444,071 sf 3.08% Impervious Runoff Depth>1.85"  
Flow Length=1,478' Tc=32.6 min CN=62 Runoff=12.72 cfs 1.574 af**Subcatchment 30S: PR-WS-30**Runoff Area=282,028 sf 7.67% Impervious Runoff Depth>1.85"  
Flow Length=1,152' Tc=36.0 min UI Adjusted CN=62 Runoff=7.71 cfs 0.998 af**Subcatchment 32S: PR-WS-32**Runoff Area=1,113,905 sf 2.59% Impervious Runoff Depth>1.93"  
Flow Length=2,433' Tc=34.4 min CN=63 Runoff=32.65 cfs 4.116 af**Subcatchment 33S: PR-WS-33**Runoff Area=87,008 sf 30.60% Impervious Runoff Depth>2.73"  
Tc=5.0 min CN=72 Runoff=6.89 cfs 0.455 af**Reach 1R: Wetland Reach**Avg. Flow Depth=1.30' Max Vel=2.62 fps Inflow=32.91 cfs 4.391 af  
n=0.070 L=171.0' S=0.0189 '/ Capacity=83.06 cfs Outflow=32.88 cfs 4.385 af**Reach 2R: Ditch**Avg. Flow Depth=0.23' Max Vel=2.94 fps Inflow=0.55 cfs 0.277 af  
n=0.022 L=338.0' S=0.0351 '/ Capacity=161.36 cfs Outflow=0.55 cfs 0.276 af**Pond 1P: POND #1**Peak Elev=190.58' Storage=3,423 cf Inflow=4.38 cfs 0.439 af  
Outflow=3.35 cfs 0.411 af**Pond 2P: Culvert P-202 Entrance**Peak Elev=190.60' Storage=197 cf Inflow=3.02 cfs 0.294 af  
Outflow=2.85 cfs 0.293 af**Pond 3P: Culvert P-203 Entrance**Peak Elev=211.34' Storage=1,608 cf Inflow=32.65 cfs 4.116 af  
36.0" Round Culvert n=0.012 L=63.0' S=0.0100 '/ Outflow=32.50 cfs 4.115 af**Pond 5P: Pond #2**Peak Elev=221.29' Storage=11,480 cf Inflow=6.89 cfs 0.455 af  
Outflow=0.55 cfs 0.277 af**Link AP-1: Analysis Point #1**Inflow=3.35 cfs 0.411 af  
Primary=3.35 cfs 0.411 af**Link AP-2: Analysis Point #2**Inflow=12.72 cfs 1.574 af  
Primary=12.72 cfs 1.574 af**Link AP-3: Analysis Point #3**Inflow=40.59 cfs 5.382 af  
Primary=40.59 cfs 5.382 af**Total Runoff Area = 46.957 ac Runoff Volume = 7.582 af Average Runoff Depth = 1.94"**  
**94.87% Pervious = 44.546 ac 5.13% Impervious = 2.411 ac**

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Type III 24-hr 25-YR Rainfall=5.94"

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**Summary for Subcatchment 10S: PR-WS-10**

Runoff = 1.54 cfs @ 12.26 hrs, Volume= 0.146 af, Depth&gt; 2.11"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YR Rainfall=5.94"

Area (sf)	CN	Adj	Description
7,695	98		Unconnected pavement, HSG B
28,365	61		>75% Grass cover, Good, HSG B
36,060	69	65	Weighted Average, UI Adjusted
28,365			78.66% Pervious Area
7,695			21.34% Impervious Area
7,695			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0350	0.15		<b>Sheet Flow, Through Grass</b>
					Grass: Dense n= 0.240 P2= 3.20"
6.2	518	0.0390	1.38		<b>Shallow Concentrated Flow, Over Grass</b>
					Short Grass Pasture Kv= 7.0 fps
17.6	618	Total			

**Summary for Subcatchment 11S: PR-WS-11**

Runoff = 3.02 cfs @ 12.27 hrs, Volume= 0.294 af, Depth&gt; 1.86"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YR Rainfall=5.94"

Area (sf)	CN	Adj	Description
6,575	98		Unconnected pavement, HSG B
75,814	61		>75% Grass cover, Good, HSG B
82,389	64	62	Weighted Average, UI Adjusted
75,814			92.02% Pervious Area
6,575			7.98% Impervious Area
6,575			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0350	0.15		<b>Sheet Flow, Through Grass</b>
					Grass: Dense n= 0.240 P2= 3.20"
6.7	559	0.0390	1.38		<b>Shallow Concentrated Flow, Over Grass</b>
					Short Grass Pasture Kv= 7.0 fps
0.2	95	0.0400	8.24	109.64	<b>Channel Flow, Through Ditch</b>
					Area= 13.3 sf Perim= 27.9' r= 0.48'
					n= 0.022 Earth, clean & straight
18.3	754	Total			



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Type III 24-hr 25-YR Rainfall=5.94"

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**Summary for Subcatchment 20S: PR-WS-20**

Runoff = 12.72 cfs @ 12.49 hrs, Volume= 1.574 af, Depth&gt; 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YR Rainfall=5.94"

Area (sf)	CN	Description
13,673	98	Unconnected pavement, HSG B
2,972	96	Gravel surface, HSG B
427,426	61	>75% Grass cover, Good, HSG B
444,071	62	Weighted Average
430,398		96.92% Pervious Area
13,673		3.08% Impervious Area
13,673		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
11.4	100	0.0350	0.15		<b>Sheet Flow, Over Grass</b> Grass: Dense n= 0.240 P2= 3.20"
21.2	1,378	0.0240	1.08		<b>Shallow Concentrated Flow, Over Grass</b> Short Grass Pasture Kv= 7.0 fps
32.6	1,478	Total			

**Summary for Subcatchment 30S: PR-WS-30**

Runoff = 7.71 cfs @ 12.54 hrs, Volume= 0.998 af, Depth&gt; 1.85"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YR Rainfall=5.94"

Area (sf)	CN	Adj	Description
21,623	98		Unconnected pavement, HSG B
245,939	61		>75% Grass cover, Good, HSG B
14,466	58		Woods/grass comb., Good, HSG B
282,028	64	62	Weighted Average, UI Adjusted
260,405			92.33% Pervious Area
21,623			7.67% Impervious Area
21,623			100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.9	100	0.0500	0.11		<b>Sheet Flow, Through Woods</b> Woods: Light underbrush n= 0.400 P2= 3.20"
20.9	1,028	0.0270	0.82		<b>Shallow Concentrated Flow, Through Woods</b> Woodland Kv= 5.0 fps
0.2	24	0.0140	1.91	114.76	<b>Channel Flow, Wetland Channel</b> Area= 60.0 sf Perim= 90.3' r= 0.66' n= 0.070 Sluggish weedy reaches w/pools
36.0	1,152	Total			

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Type III 24-hr 25-YR Rainfall=5.94"

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**Summary for Subcatchment 32S: PR-WS-32**

Runoff = 32.65 cfs @ 12.51 hrs, Volume= 4.116 af, Depth&gt; 1.93"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YR Rainfall=5.94"

Area (sf)	CN	Description
28,843	98	Unconnected pavement, HSG B
4,574	96	Gravel surface, HSG B
347,979	61	>75% Grass cover, Good, HSG B
492,559	58	Woods/grass comb., Good, HSG B
239,950	72	Woods/grass comb., Good, HSG C
1,113,905	63	Weighted Average
1,085,062		97.41% Pervious Area
28,843		2.59% Impervious Area
28,843		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
14.3	100	0.0550	0.12		<b>Sheet Flow, Through Woods</b> Woods: Light underbrush n= 0.400 P2= 3.20"
8.2	965	0.0050	1.97	886.27	<b>Channel Flow, Large Wetland</b> Area= 450.0 sf Perim= 496.0' r= 0.91' n= 0.050 Scattered brush, heavy weeds
11.9	1,368	0.0140	1.91	114.76	<b>Channel Flow, Wetland Channel</b> Area= 60.0 sf Perim= 90.3' r= 0.66' n= 0.070 Sluggish weedy reaches w/pools
34.4	2,433	Total			

**Summary for Subcatchment 33S: PR-WS-33**

Runoff = 6.89 cfs @ 12.08 hrs, Volume= 0.455 af, Depth&gt; 2.73"

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
Type III 24-hr 25-YR Rainfall=5.94"

Area (sf)	CN	Description
26,624	98	Unconnected pavement, HSG B
60,384	61	>75% Grass cover, Good, HSG B
87,008	72	Weighted Average
60,384		69.40% Pervious Area
26,624		30.60% Impervious Area
26,624		100.00% Unconnected

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.0					<b>Direct Entry, Min. Tc</b>

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Type III 24-hr 25-YR Rainfall=5.94"

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### Summary for Reach 1R: Wetland Reach

Inflow Area = 27.569 ac, 4.62% Impervious, Inflow Depth > 1.91" for 25-YR event  
Inflow = 32.91 cfs @ 12.54 hrs, Volume= 4.391 af  
Outflow = 32.88 cfs @ 12.55 hrs, Volume= 4.385 af, Atten= 0%, Lag= 0.8 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.62 fps, Min. Travel Time= 1.1 min

Avg. Velocity = 1.33 fps, Avg. Travel Time= 2.1 min

Peak Storage= 2,150 cf @ 12.55 hrs

Average Depth at Peak Storage= 1.30'

Bank-Full Depth= 2.00' Flow Area= 24.0 sf, Capacity= 83.06 cfs

18.00' x 2.00' deep Parabolic Channel, n= 0.070 Sluggish weedy reaches w/pools

Length= 171.0' Slope= 0.0189 '/'

Inlet Invert= 208.12', Outlet Invert= 204.89'



### Summary for Reach 2R: Ditch

Inflow Area = 1.997 ac, 30.60% Impervious, Inflow Depth > 1.66" for 25-YR event  
Inflow = 0.55 cfs @ 13.54 hrs, Volume= 0.277 af  
Outflow = 0.55 cfs @ 13.56 hrs, Volume= 0.276 af, Atten= 0%, Lag= 1.5 min

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

Max. Velocity= 2.94 fps, Min. Travel Time= 1.9 min

Avg. Velocity = 2.69 fps, Avg. Travel Time= 2.1 min

Peak Storage= 64 cf @ 13.56 hrs

Average Depth at Peak Storage= 0.23'

Bank-Full Depth= 1.95' Flow Area= 13.3 sf, Capacity= 161.36 cfs

0.00' x 1.95' deep channel, n= 0.022 Earth, clean & straight

Side Slope Z-value= 4.0 3.0 '/' Top Width= 13.65'

Length= 338.0' Slope= 0.0351 '/'

Inlet Invert= 220.00', Outlet Invert= 208.12'



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Type III 24-hr 25-YR Rainfall=5.94"

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**Summary for Pond 1P: POND #1**

Inflow Area = 2.719 ac, 12.05% Impervious, Inflow Depth > 1.94" for 25-YR event  
 Inflow = 4.38 cfs @ 12.27 hrs, Volume= 0.439 af  
 Outflow = 3.35 cfs @ 12.46 hrs, Volume= 0.411 af, Atten= 24%, Lag= 11.7 min  
 Primary = 3.35 cfs @ 12.46 hrs, Volume= 0.411 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 190.58' @ 12.46 hrs Surf.Area= 2,243 sf Storage= 3,423 cf

Plug-Flow detention time= 40.6 min calculated for 0.411 af (94% of inflow)  
 Center-of-Mass det. time= 19.0 min ( 842.5 - 823.5 )

Volume	Invert	Avail.Storage	Storage Description
#1	188.50'	7,212 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
188.50	925	175.5	0	0	925
189.00	1,376	207.7	572	572	1,912
190.00	1,926	218.8	1,643	2,215	2,344
192.00	3,119	250.1	4,997	7,212	3,603

Device	Routing	Invert	Outlet Devices
#1	Device 3	188.50'	<b>2.5" Vert. Orifice/Grate</b> C= 0.600
#2	Device 3	189.40'	<b>12.0" Vert. Orifice/Grate</b> C= 0.600
#3	Primary	188.50'	<b>15.0" Round P-201</b> L= 17.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 188.50' / 188.27' S= 0.0135 ' / Cc= 0.900 n= 0.012, Flow Area= 1.23 sf
#4	Device 3	191.00'	<b>4.0' long Sharp-Crested Vee/Trap Weir</b> Cv= 2.62 (C= 3.28)
#5	Primary	191.50'	<b>10.0' long x 4.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 2.00 2.50 3.00 3.50 4.00 4.50 5.00 5.50 Coef. (English) 2.38 2.54 2.69 2.68 2.67 2.67 2.65 2.66 2.66 2.68 2.72 2.73 2.76 2.79 2.88 3.07 3.32

**Primary OutFlow** Max=3.34 cfs @ 12.46 hrs HW=190.58' TW=0.00' (Dynamic Tailwater)

3=P-201 (Passes 3.34 cfs of 7.12 cfs potential flow)  
 1=Orifice/Grate (Orifice Controls 0.23 cfs @ 6.76 fps)  
 2=Orifice/Grate (Orifice Controls 3.11 cfs @ 3.96 fps)  
 4=Sharp-Crested Vee/Trap Weir ( Controls 0.00 cfs)  
 5=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 2P: Culvert P-202 Entrance**

Inflow Area = 1.891 ac, 7.98% Impervious, Inflow Depth > 1.86" for 25-YR event  
 Inflow = 3.02 cfs @ 12.27 hrs, Volume= 0.294 af  
 Outflow = 2.85 cfs @ 12.27 hrs, Volume= 0.293 af, Atten= 6%, Lag= 0.1 min  
 Primary = 2.85 cfs @ 12.27 hrs, Volume= 0.293 af

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Type III 24-hr 25-YR Rainfall=5.94"

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Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 190.60' @ 12.50 hrs Surf.Area= 273 sf Storage= 197 cf

Plug-Flow detention time= 1.6 min calculated for 0.292 af (100% of inflow)  
 Center-of-Mass det. time= 1.0 min ( 825.9 - 824.8 )

Volume	Invert	Avail.Storage	Storage Description
#1	188.75'	2,045 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
188.75	5	13.0	0	0	5
189.00	19	23.5	3	3	36
190.00	142	54.5	71	74	232
192.00	735	151.5	800	874	1,836
192.50	1,221	203.8	484	1,358	3,317
193.00	1,534	213.2	687	2,045	3,646

Device	Routing	Invert	Outlet Devices
#1	Primary	188.75'	<b>24.0" Round P-202</b> L= 56.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 188.75' / 188.47' S= 0.0050 ' / ' Cc= 0.900 n= 0.012, Flow Area= 3.14 sf
#2	Primary	192.50'	<b>10.0' long x 20.0' breadth Broad-Crested Rectangular Weir</b> Head (feet) 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 Coef. (English) 2.68 2.70 2.70 2.64 2.63 2.64 2.64 2.63

**Primary OutFlow** Max=0.00 cfs @ 12.27 hrs HW=190.26' TW=190.34' (Dynamic Tailwater)

1=P-202 ( Controls 0.00 cfs)

2=Broad-Crested Rectangular Weir ( Controls 0.00 cfs)

**Summary for Pond 3P: Culvert P-203 Entrance**

Inflow Area = 25.572 ac, 2.59% Impervious, Inflow Depth > 1.93" for 25-YR event  
 Inflow = 32.65 cfs @ 12.51 hrs, Volume= 4.116 af  
 Outflow = 32.50 cfs @ 12.54 hrs, Volume= 4.115 af, Atten= 0%, Lag= 1.7 min  
 Primary = 32.50 cfs @ 12.54 hrs, Volume= 4.115 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 211.34' @ 12.54 hrs Surf.Area= 1,834 sf Storage= 1,608 cf

Plug-Flow detention time= 0.5 min calculated for 4.115 af (100% of inflow)  
 Center-of-Mass det. time= 0.4 min ( 835.6 - 835.2 )

Volume	Invert	Avail.Storage	Storage Description
#1	208.75'	6,577 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

**19175-PROP-DRAINAGE**

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POST-DEVELOPMENT

Type III 24-hr 25-YR Rainfall=5.94"

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Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
208.75	12	44.6	0	0	12
209.00	62	87.4	8	8	462
210.00	411	142.5	211	219	1,476
212.00	2,913	240.0	2,945	3,165	4,469
213.00	3,938	272.6	3,413	6,577	5,823

Device	Routing	Invert	Outlet Devices
#1	Primary	208.75'	<b>36.0" Round P-203</b> L= 63.0' CPP, end-section conforming to fill, Ke= 0.500 Inlet / Outlet Invert= 208.75' / 208.12' S= 0.0100 '/' Cc= 0.900 n= 0.012, Flow Area= 7.07 sf

**Primary OutFlow** Max=32.43 cfs @ 12.54 hrs HW=211.33' TW=209.42' (Dynamic Tailwater)↑**1=P-203** (Barrel Controls 32.43 cfs @ 6.71 fps)**Summary for Pond 5P: Pond #2**

Inflow Area = 1.997 ac, 30.60% Impervious, Inflow Depth > 2.73" for 25-YR event  
 Inflow = 6.89 cfs @ 12.08 hrs, Volume= 0.455 af  
 Outflow = 0.55 cfs @ 13.54 hrs, Volume= 0.277 af, Atten= 92%, Lag= 87.5 min  
 Primary = 0.55 cfs @ 13.54 hrs, Volume= 0.277 af

Routing by Dyn-Stor-Ind method, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs  
 Peak Elev= 221.29' @ 13.54 hrs Surf.Area= 7,702 sf Storage= 11,480 cf

Plug-Flow detention time= 227.2 min calculated for 0.277 af (61% of inflow)  
 Center-of-Mass det. time= 150.6 min ( 946.7 - 796.1 )

Volume	Invert	Avail.Storage	Storage Description
#1	219.50'	19,288 cf	<b>Custom Stage Data (Irregular)</b> Listed below (Recalc)

Elevation (feet)	Surf.Area (sq-ft)	Perim. (feet)	Inc.Store (cubic-feet)	Cum.Store (cubic-feet)	Wet.Area (sq-ft)
219.50	2,817	194.1	0	0	2,817
220.00	6,541	286.9	2,275	2,275	6,371
221.00	7,430	305.7	6,981	9,256	7,306
222.00	8,375	324.6	7,898	17,154	8,305
222.25	8,703	330.8	2,135	19,288	8,638

Device	Routing	Invert	Outlet Devices
#1	Device 4	219.50'	<b>4.0" Vert. Orifice/Grate</b> C= 0.600
#2	Device 4	221.25'	<b>4.0' long Sharp-Crested Vee/Trap Weir</b> Cv= 2.62 (C= 3.28)
#3	Device 4	222.25'	<b>48.0" x 48.0" Horiz. Orifice/Grate</b> C= 0.600 Limited to weir flow at low heads
#4	Primary	219.50'	<b>15.0" Round P-204</b> L= 66.0' CPP, square edge headwall, Ke= 0.500 Inlet / Outlet Invert= 219.50' / 219.00' S= 0.0076 '/' Cc= 0.900 n= 0.012, Flow Area= 1.23 sf

## 19175-PROP-DRAINAGE

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POST-DEVELOPMENT

Type III 24-hr 25-YR Rainfall=5.94"

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**Primary OutFlow** Max=0.55 cfs @ 13.54 hrs HW=221.29' TW=220.23' (Dynamic Tailwater)

4=P-204 (Passes 0.55 cfs of 6.00 cfs potential flow)

1=Orifice/Grate (Orifice Controls 0.43 cfs @ 4.96 fps)

2=Sharp-Crested Vee/Trap Weir (Weir Controls 0.12 cfs @ 0.69 fps)

3=Orifice/Grate (Controls 0.00 cfs)

### Summary for Link AP-1: Analysis Point #1

Inflow Area = 2.719 ac, 12.05% Impervious, Inflow Depth > 1.81" for 25-YR event  
Inflow = 3.35 cfs @ 12.46 hrs, Volume= 0.411 af  
Primary = 3.35 cfs @ 12.46 hrs, Volume= 0.411 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Summary for Link AP-2: Analysis Point #2

Inflow Area = 10.194 ac, 3.08% Impervious, Inflow Depth > 1.85" for 25-YR event  
Inflow = 12.72 cfs @ 12.49 hrs, Volume= 1.574 af  
Primary = 12.72 cfs @ 12.49 hrs, Volume= 1.574 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

### Summary for Link AP-3: Analysis Point #3

Inflow Area = 34.044 ac, 5.20% Impervious, Inflow Depth > 1.90" for 25-YR event  
Inflow = 40.59 cfs @ 12.55 hrs, Volume= 5.382 af  
Primary = 40.59 cfs @ 12.55 hrs, Volume= 5.382 af, Atten= 0%, Lag= 0.0 min

Primary outflow = Inflow, Time Span= 5.00-20.00 hrs, dt= 0.05 hrs

## 19175-PROP-DRAINAGE

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POST-DEVELOPMENT

Type III 24-hr 50-YR Rainfall=7.12"

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Time span=5.00-20.00 hrs, dt=0.05 hrs, 301 points

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN

Reach routing by Dyn-Stor-Ind method - Pond routing by Dyn-Stor-Ind method

**Subcatchment 10S: PR-WS-10** Runoff Area=36,060 sf 21.34% Impervious Runoff Depth>2.94"  
Flow Length=618' Tc=17.6 min UI Adjusted CN=65 Runoff=2.17 cfs 0.203 af

**Subcatchment 11S: PR-WS-11** Runoff Area=82,389 sf 7.98% Impervious Runoff Depth>2.65"  
Flow Length=754' Tc=18.3 min UI Adjusted CN=62 Runoff=4.37 cfs 0.417 af

**Subcatchment 20S: PR-WS-20** Runoff Area=444,071 sf 3.08% Impervious Runoff Depth>2.63"  
Flow Length=1,478' Tc=32.6 min CN=62 Runoff=18.36 cfs 2.236 af

**Subcatchment 30S: PR-WS-30** Runoff Area=282,028 sf 7.67% Impervious Runoff Depth>2.63"  
Flow Length=1,152' Tc=36.0 min UI Adjusted CN=62 Runoff=11.13 cfs 1.418 af

**Subcatchment 32S: PR-WS-32** Runoff Area=1,113,905 sf 2.59% Impervious Runoff Depth>2.73"  
Flow Length=2,433' Tc=34.4 min CN=63 Runoff=46.70 cfs 5.810 af

**Subcatchment 33S: PR-WS-33** Runoff Area=87,008 sf 30.60% Impervious Runoff Depth>3.67"  
Tc=5.0 min CN=72 Runoff=9.21 cfs 0.610 af

**Reach 1R: Wetland Reach** Avg. Flow Depth=1.55' Max Vel=2.94 fps Inflow=48.27 cfs 6.223 af  
n=0.070 L=171.0' S=0.0189 '/ Capacity=83.06 cfs Outflow=48.24 cfs 6.215 af

**Reach 2R: Ditch** Avg. Flow Depth=0.39' Max Vel=4.16 fps Inflow=2.24 cfs 0.414 af  
n=0.022 L=338.0' S=0.0351 '/ Capacity=161.36 cfs Outflow=2.23 cfs 0.413 af

**Pond 1P: POND #1** Peak Elev=191.09' Storage=4,653 cf Inflow=6.23 cfs 0.620 af  
Outflow=4.77 cfs 0.589 af

**Pond 2P: Culvert P-202 Entrance** Peak Elev=191.13' Storage=379 cf Inflow=4.37 cfs 0.417 af  
Outflow=4.06 cfs 0.417 af

**Pond 3P: Culvert P-203 Entrance** Peak Elev=212.12' Storage=3,514 cf Inflow=46.70 cfs 5.810 af  
36.0" Round Culvert n=0.012 L=63.0' S=0.0100 '/ Outflow=46.08 cfs 5.809 af

**Pond 5P: Pond #2** Peak Elev=221.52' Storage=13,206 cf Inflow=9.21 cfs 0.610 af  
Outflow=2.24 cfs 0.414 af

**Link AP-1: Analysis Point #1** Inflow=4.77 cfs 0.589 af  
Primary=4.77 cfs 0.589 af

**Link AP-2: Analysis Point #2** Inflow=18.36 cfs 2.236 af  
Primary=18.36 cfs 2.236 af

**Link AP-3: Analysis Point #3** Inflow=59.32 cfs 7.633 af  
Primary=59.32 cfs 7.633 af

**Total Runoff Area = 46.957 ac Runoff Volume = 10.694 af Average Runoff Depth = 2.73"**  
**94.87% Pervious = 44.546 ac 5.13% Impervious = 2.411 ac**



# Extreme Precipitation Tables

## Northeast Regional Climate Center

Data represents point estimates calculated from partial duration series. All precipitation amounts are displayed in inches.

Smoothing	Yes
State	New Hampshire
Location	
Longitude	71.143 degrees West
Latitude	42.991 degrees North
Elevation	0 feet
Date/Time	Wed, 19 Aug 2020 10:34:59 -0400

### Extreme Precipitation Estimates

	5min	10min	15min	30min	60min	120min	1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.26	0.40	0.50	0.66	0.82	1.04	0.71	0.99	1.21	1.55	1.99	2.58	2.77	1yr	2.28	2.66	3.08	3.76	4.37	1yr
2yr	0.32	0.50	0.62	0.81	1.02	1.29	0.88	1.18	1.50	1.90	2.42	3.08	3.42	2yr	2.73	3.29	3.80	4.51	5.14	2yr
5yr	0.38	0.59	0.74	0.99	1.26	1.62	1.09	1.47	1.89	2.41	3.06	3.91	4.39	5yr	3.46	4.22	4.84	5.74	6.49	5yr
10yr	0.42	0.66	0.84	1.14	1.48	1.92	1.28	1.74	2.25	2.88	3.67	4.68	5.30	10yr	4.14	5.10	5.81	6.91	7.75	10yr
25yr	0.49	0.79	1.00	1.38	1.83	2.40	1.58	2.17	2.83	3.64	4.66	5.94	6.81	25yr	5.26	6.55	7.40	8.83	9.80	25yr
50yr	0.56	0.90	1.15	1.60	2.16	2.85	1.86	2.56	3.37	4.35	5.59	7.12	8.24	50yr	6.30	7.92	8.89	10.63	11.71	50yr
100yr	0.63	1.02	1.31	1.86	2.54	3.39	2.19	3.03	4.03	5.22	6.70	8.54	9.97	100yr	7.56	9.59	10.69	12.81	14.01	100yr
200yr	0.72	1.17	1.52	2.17	2.99	4.02	2.58	3.60	4.79	6.23	8.02	10.25	12.07	200yr	9.07	11.60	12.85	15.46	16.77	200yr
500yr	0.85	1.40	1.83	2.66	3.72	5.05	3.21	4.50	6.05	7.90	10.20	13.05	15.54	500yr	11.55	14.95	16.39	19.83	21.30	500yr

### Lower Confidence Limits

	5min	10min	15min	30min	60min	120min	1hr	2hr	3hr	6hr	12hr	24hr	48hr		1day	2day	4day	7day	10day	
1yr	0.23	0.36	0.44	0.59	0.72	0.88	0.62	0.86	1.01	1.30	1.56	2.10	2.54	1yr	1.86	2.44	2.83	3.42	3.90	1yr
2yr	0.31	0.48	0.60	0.81	1.00	1.18	0.86	1.15	1.35	1.79	2.29	2.97	3.26	2yr	2.63	3.14	3.65	4.30	4.91	2yr
5yr	0.36	0.55	0.68	0.93	1.19	1.41	1.03	1.38	1.60	2.08	2.68	3.54	3.89	5yr	3.14	3.74	4.30	5.37	5.83	5yr

Project Name: Scribner Road

JBE #: 19119

Town/City: East Kingston, NH

Date: 12/20/2019

### Rip Rap Outlet Protection Calculation

Outlet Designation: P-201

Pipe Size (Do): 15 in. 1.25 ft

Q25 (cfs): 3.24 cfs

Tailwater Elevation (TW): 0.25 if TW = 0, assume 3"

Apron Length (La):

TW < Do YES  $La = 1.8Q/Do^{1.5} + 7Do$   
La = 12.92 ft

TW > Do No  $La = 3.0Q/Do^{1.5} + 7Do$   
La =

Apron Width (W<sub>2</sub>):

TW < Do  $W_2 = 3Do + La$   
W<sub>2</sub> = 16.67 ft.

TW > Do  $W_2 = 3Do + .4La$   
W<sub>2</sub> = ft.

Rip-Rap Diameter (D<sub>50</sub>):

D<sub>50</sub>:  $D_{50} = 0.02Q^{1.3}/TW*Do$   
D<sub>50</sub> = 0.30 ft. 3.54 in.

Use 3" minimum D<sub>50</sub> ==> D50 = 4.0 in.

Rip-Rap Thickness (T):

$T = 2.5*D_{50}$   
T = 10.0 in.

Apron Width (W<sub>1</sub>):

$W_1 = 3*Do$   
W<sub>1</sub> = 3.75 ft.

Project Name: Scribner Road

JBE #: 19119

Town/City: East Kingston, NH

Date: 12/20/2019

### Rip Rap Outlet Protection Calculation

Outlet Designation: P-202

Pipe Size (Do): 15 in. 1.25 ft

Q25 (cfs): 2.86 cfs

Tailwater Elevation (TW): 0.25 if TW = 0, assume 3"

#### Apron Length (La):

TW < Do YES  $La = 1.8Q/Do^{1.5} + 7Do$   
La = 12.43 ft

TW > Do No  $La = 3.0Q/Do^{1.5} + 7Do$   
La =

#### Apron Width (W<sub>2</sub>):

TW < Do  $W_2 = 3Do + La$   
W<sub>2</sub> = 16.18 ft.

TW > Do  $W_2 = 3Do + .4La$   
W<sub>2</sub> = ft.

#### Rip-Rap Diameter (D<sub>50</sub>):

D<sub>50</sub>:  $D_{50} = 0.02Q^{1.3}/TW*Do$   
D<sub>50</sub> = 0.25 ft. 3.01 in.

Use 3" minimum D<sub>50</sub> ==> D<sub>50</sub> = 3.0 in.

#### Rip-Rap Thickness (T):

$T = 2.5*D_{50}$   
T = 7.5 in.

#### Apron Width (W<sub>1</sub>):

$W_1 = 3*Do$   
W<sub>1</sub> = 3.75 ft.

Project Name: Scribner Road

JBE #: 19119

Town/City: East Kingston, NH

Date: 12/20/2019

### Rip Rap Outlet Protection Calculation

Outlet Designation: P-203

Pipe Size (Do): 30 in. 2.5 ft

Q25 (cfs): 31.77 cfs

Tailwater Elevation (TW): 0.25 if TW = 0, assume 3"

#### Apron Length (La):

TW < Do YES  $La = 1.8Q/Do^{1.5} + 7Do$   
La = 31.97 ft

TW > Do No  $La = 3.0Q/Do^{1.5} + 7Do$   
La =

#### Apron Width (W<sub>2</sub>):

TW < Do  $W_2 = 3Do + La$   
W<sub>2</sub> = 39.47 ft.

TW > Do  $W_2 = 3Do + .4La$   
W<sub>2</sub> = ft.

#### Rip-Rap Diameter (D<sub>50</sub>):

D<sub>50</sub>:  $D_{50} = 0.02Q^{1.3}/TW*Do$   
D<sub>50</sub> = 2.87 ft. 34.43 in.

Use 3" minimum D<sub>50</sub> ==> D50 = 12.0 in.

#### Rip-Rap Thickness (T):

$T = 2.5*D_{50}$   
T = 30.0 in.

#### Apron Width (W<sub>1</sub>):

$W_1 = 3*Do$   
W<sub>1</sub> = 7.5 ft.

Project Name: Scribner Road

JBE #: 19119

Town/City: East Kingston, NH

Date: 12/20/2019

### Rip Rap Outlet Protection Calculation

Outlet Designation: P-204

Pipe Size (Do): 15 in. 1.25 ft

Q25 (cfs): 0.04 cfs

Tailwater Elevation (TW): 0.25 if TW = 0, assume 3"

#### Apron Length (La):

TW < Do YES  $La = 1.8Q/Do^{1.5} + 7Do$   
La = 8.80 ft

TW > Do No  $La = 3.0Q/Do^{1.5} + 7Do$   
La =

#### Apron Width (W<sub>2</sub>):

TW < Do  $W_2 = 3Do + La$   
W<sub>2</sub> = 12.55 ft.

TW > Do  $W_2 = 3Do + .4La$   
W<sub>2</sub> = ft.

#### Rip-Rap Diameter (D<sub>50</sub>):

D<sub>50</sub>:  $D_{50} = 0.02Q^{1.3}/TW*Do$   
D<sub>50</sub> = 0.00 ft. 0.01 in.

Use 3" minimum D<sub>50</sub> ==> D<sub>50</sub> = 3.0 in.

#### Rip-Rap Thickness (T):

$T = 2.5*D_{50}$   
T = 7.5 in.

#### Apron Width (W<sub>1</sub>):

$W_1 = 3*Do$   
W<sub>1</sub> = 3.75 ft.

Project Name: Scribner Road

JBE #: 19175.1

Town/City: Fremont, NH

Date: 11/23/2020

### Rip Rap Outlet Protection Calculation

Outlet Designation: P-205

Pipe Size (Do): 15 in. 1.25 ft

Q25 (cfs): 0.26 cfs

Tailwater Elevation (TW): 0.25 if TW = 0, assume 3"

Apron Length (La):

TW < Do YES  $La = 1.8Q/Do^{1.5} + 7Do$   
La = 9.08 ft

TW > Do No  $La = 3.0Q/Do^{1.5} + 7Do$   
La =

Apron Width (W<sub>2</sub>):

TW < Do  $W_2 = 3Do + La$   
W<sub>2</sub> = 12.83 ft.

TW > Do  $W_2 = 3Do + .4La$   
W<sub>2</sub> = ft.

Rip-Rap Diameter (D<sub>50</sub>):

D<sub>50</sub>:  $D_{50} = 0.02Q^{1.3}/TW*Do$   
D<sub>50</sub> = 0.01 ft. 0.13 in.

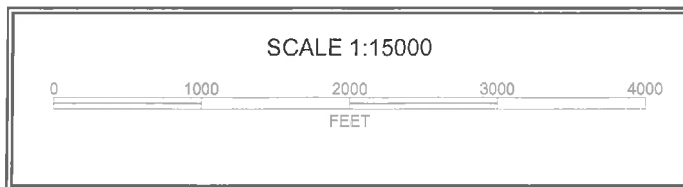
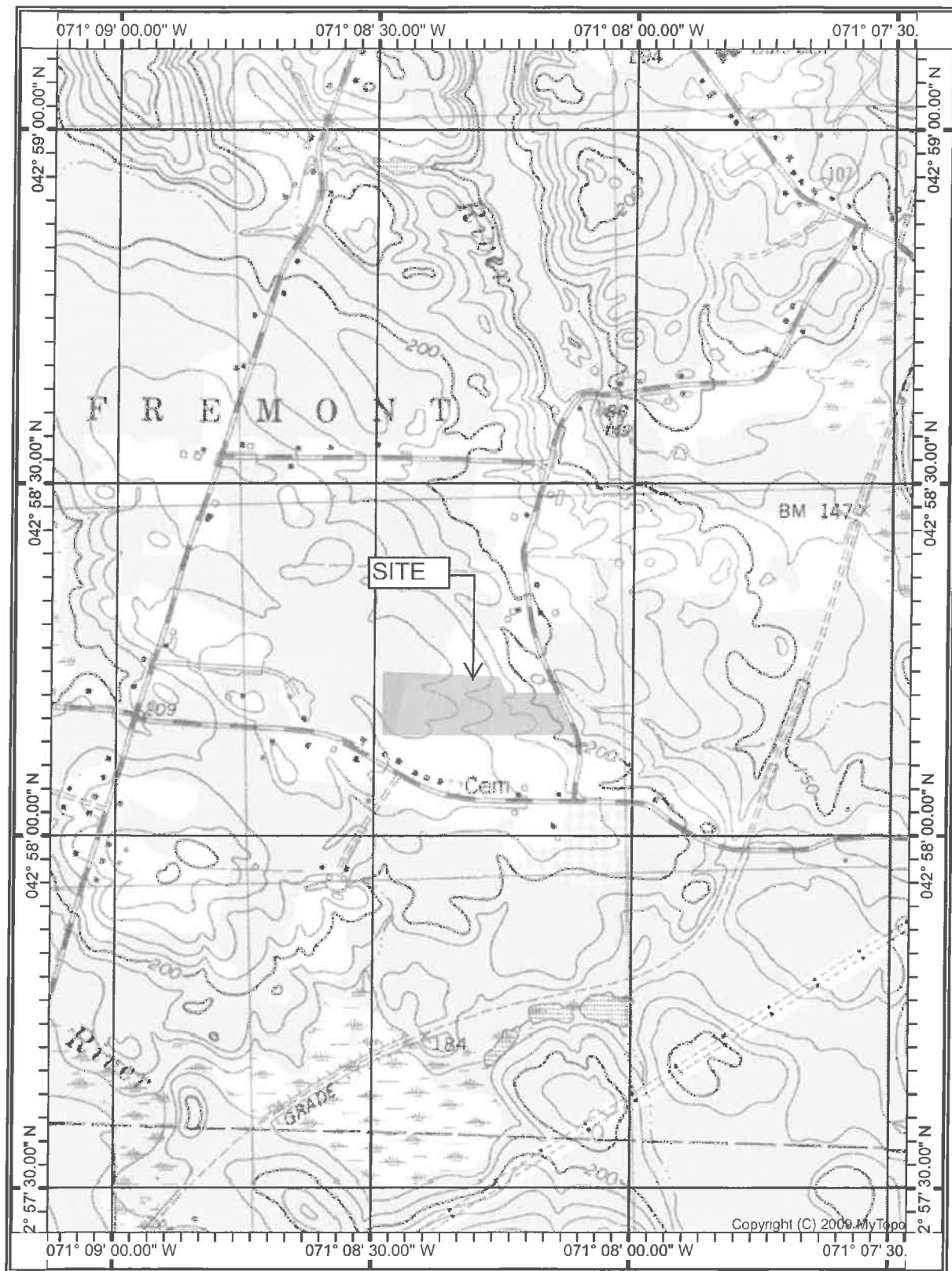
Use 3" minimum D<sub>50</sub> ==> D<sub>50</sub> = 3.0 in.

Rip-Rap Thickness (T):

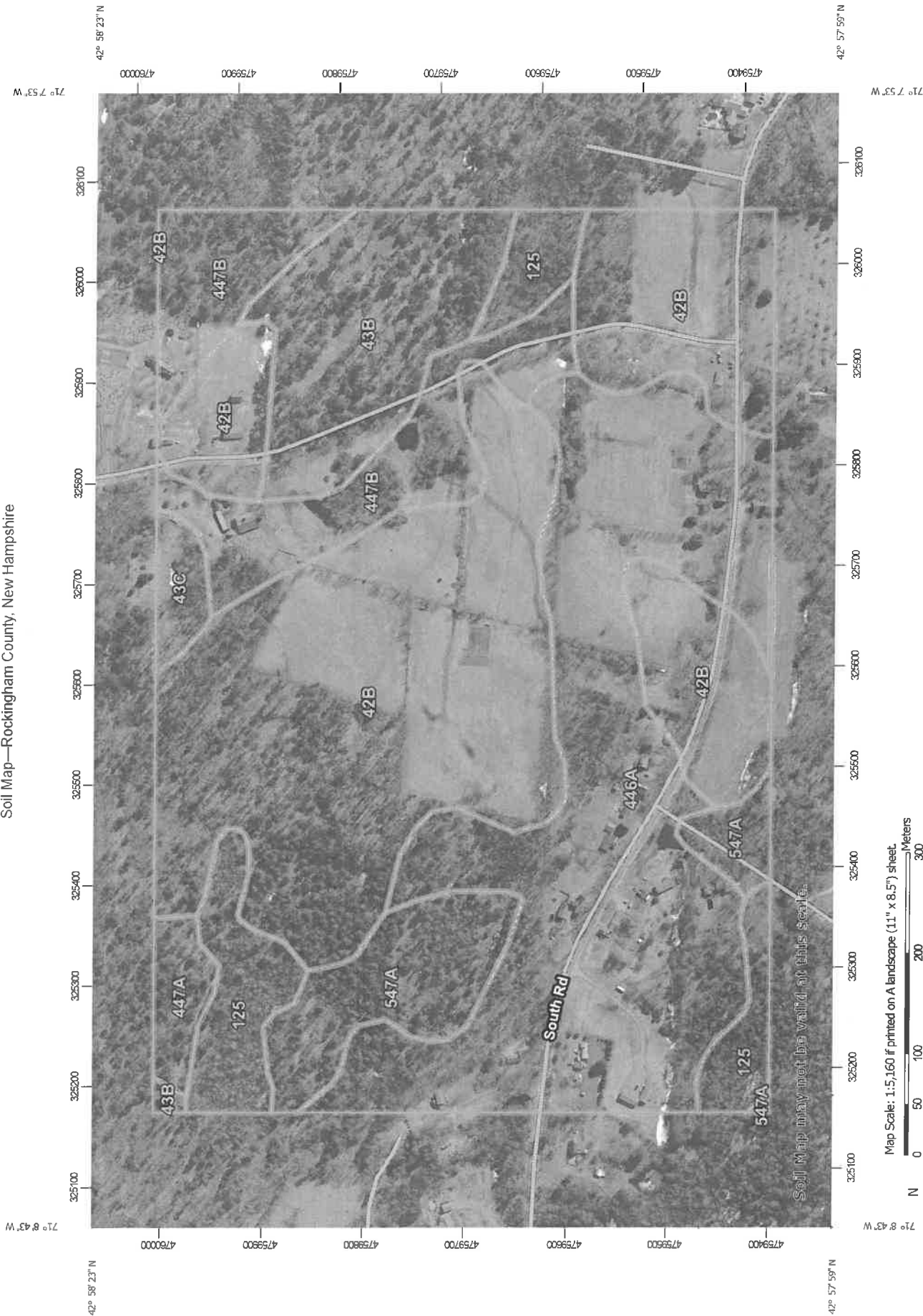
$T = 2.5*D_{50}$   
T = 7.5 in.

Apron Width (W<sub>1</sub>):

$W_1 = 3*Do$   
W<sub>1</sub> = 3.75 ft.






































# Soil Map—Rockingham County, New Hampshire





## MAP LEGEND

	Area of Interest (AOI)		Soil Area
	Soils		Stony Spot
	Soil Map Unit Polygons		Very Stony Spot
	Soil Map Unit Lines		Wet Spot
	Soil Map Unit Points		Other
	Special Point Features		Special Line Features
	Blowout		Water Features
	Borrow Pit		Streams and Canals
	Clay Spot		Transportation
	Closed Depression		Railroads
	Gravel Pit		Interstate Highways
	Gravelly Spot		US Routes
	Landfill		Major Roads
	Lava Flow		Local Roads
	Marsh or swamp		Background
	Mine or Quarry		Aerial Photography
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

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: Rockingham County, New Hampshire  
Survey Area Data: Version 22, May 29, 2020

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

Date(s) aerial images were photographed: Mar 30, 2011—Apr 8, 2011

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

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
42B	Canton fine sandy loam, 3 to 8 percent slopes	52.5	38.7%
43B	Canton fine sandy loam, 0 to 8 percent slopes, very stony	11.8	8.7%
43C	Canton fine sandy loam, 8 to 15 percent slopes, very stony	1.6	1.2%
125	Scarboro muck, very stony	8.5	6.3%
446A	Scituate-Newfields complex, 0 to 3 percent slopes	37.9	27.9%
447A	Scituate-Newfields complex, 0 to 3 percent slopes, very stony	2.0	1.5%
447B	Scituate-Newfields complex, 3 to 8 percent slopes, very stony	12.9	9.5%
547A	Walpole very fine sandy loam, 0 to 3 percent slopes, very stony	8.4	6.2%
<b>Totals for Area of Interest</b>		<b>135.6</b>	<b>100.0%</b>

# SCRIBNER ROAD - AERIAL



## Legend

- Polygons
- Additional lines
- Attributes for additional lines
- State
- County
- City/Town

Map Scale

1: 4,905

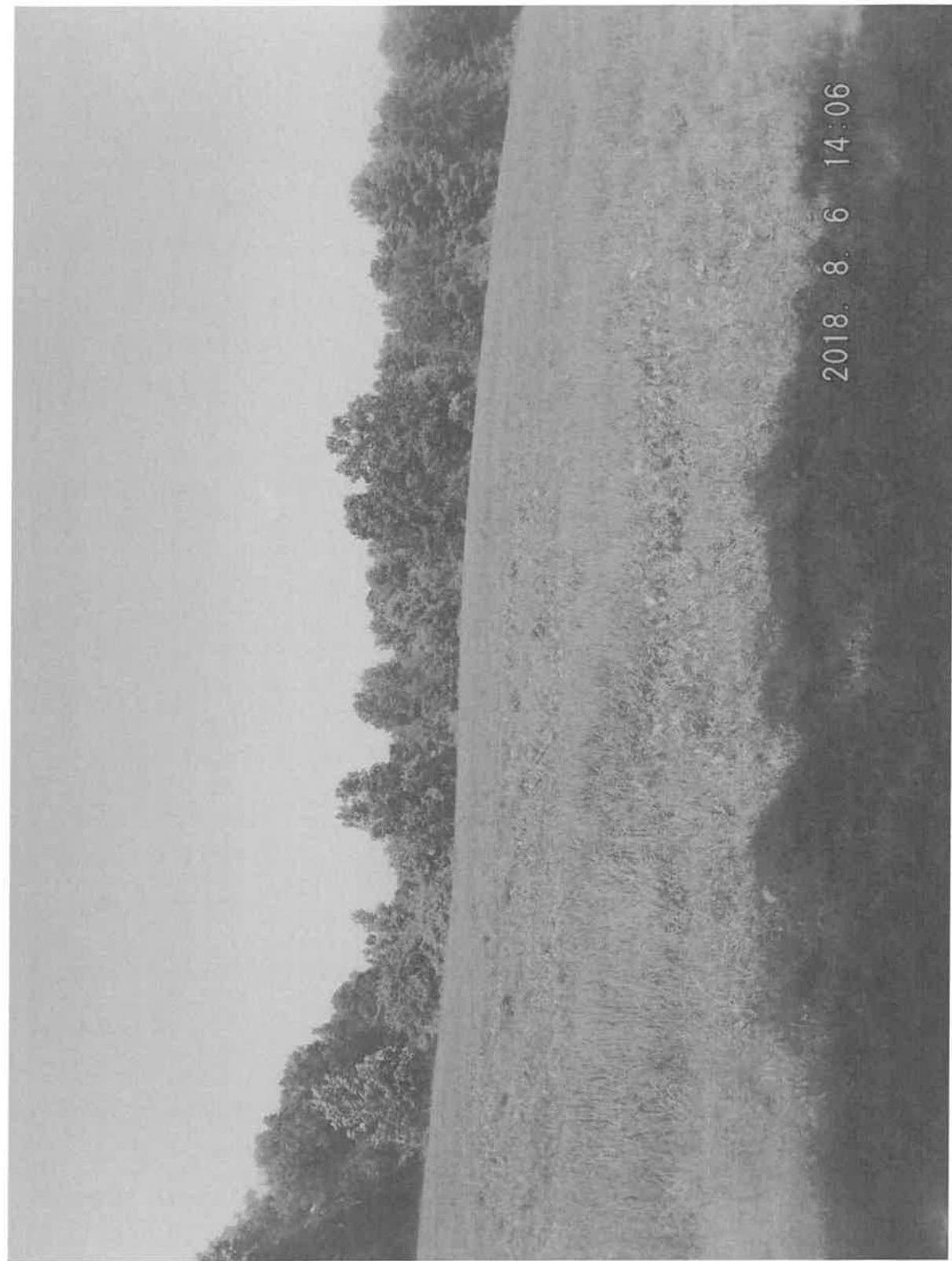
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Map Generated: 9/1/2020



## Notes

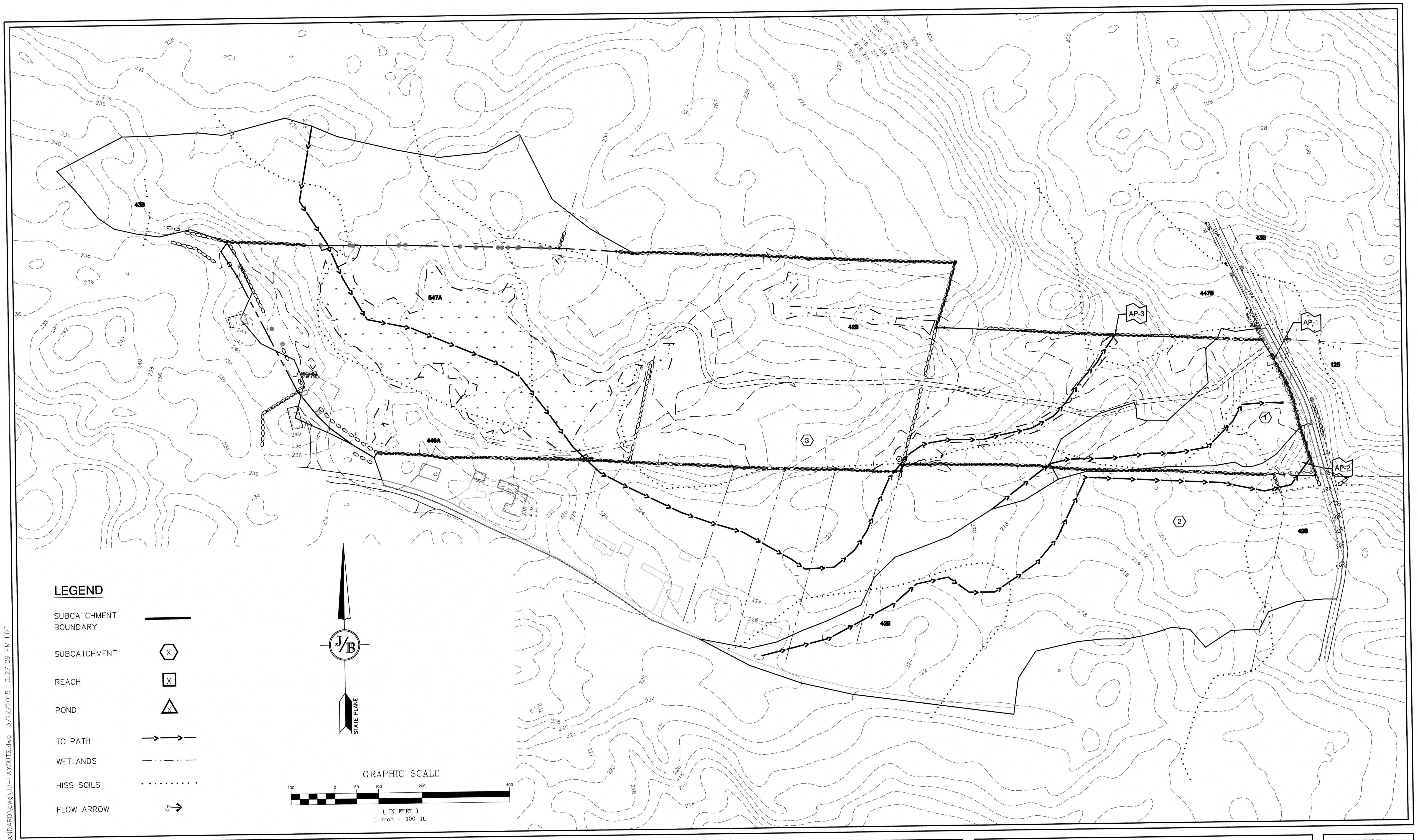






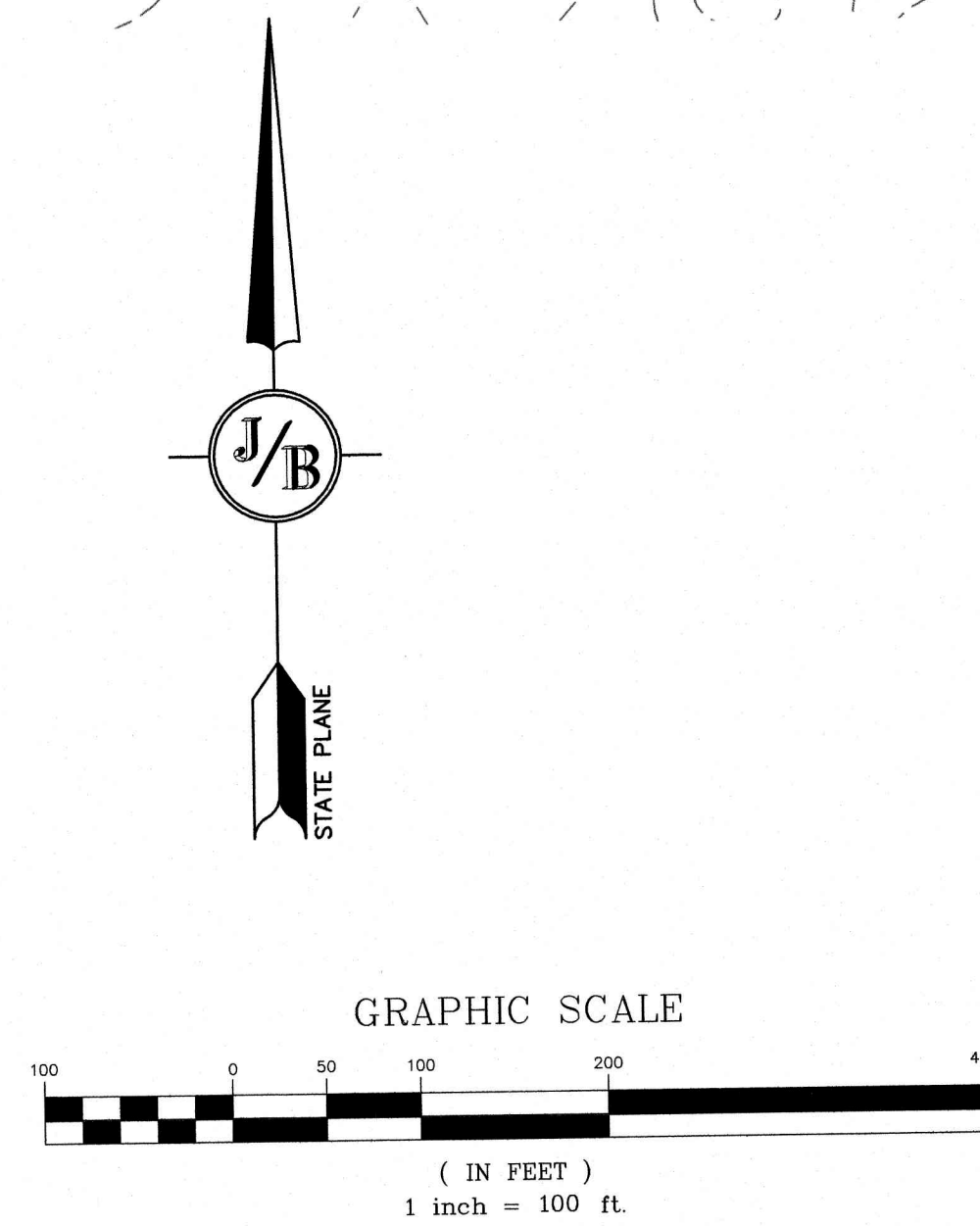


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# LEGEND

- SUBCATCHMENT BOUNDARY
- SUBCATCHMENT
- REACH
- POND
- TC PATH
- WETLANDS
- HISS SOILS
- FLOW ARROW



Design: BWG	Draft: BWG	Date: 08/31/20
Checked: BWG	Scale: 1"=100'	Project No.: 19175.1
Drawing Name: 19175-WATERSHED.dwg		
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REV.	DATE	REVISION	BY
1	11/23/20	REVISED PER PLANNING BOARD COMMENTS	BWG
0	08/31/20	ISSUED FOR REVIEW	BWG

Designed and Produced in NH

**J/B Jones & Beach Engineers, Inc.**

Civil Engineering Services

85 Portsmouth Ave. PO Box 219 Stratham, NH 03885

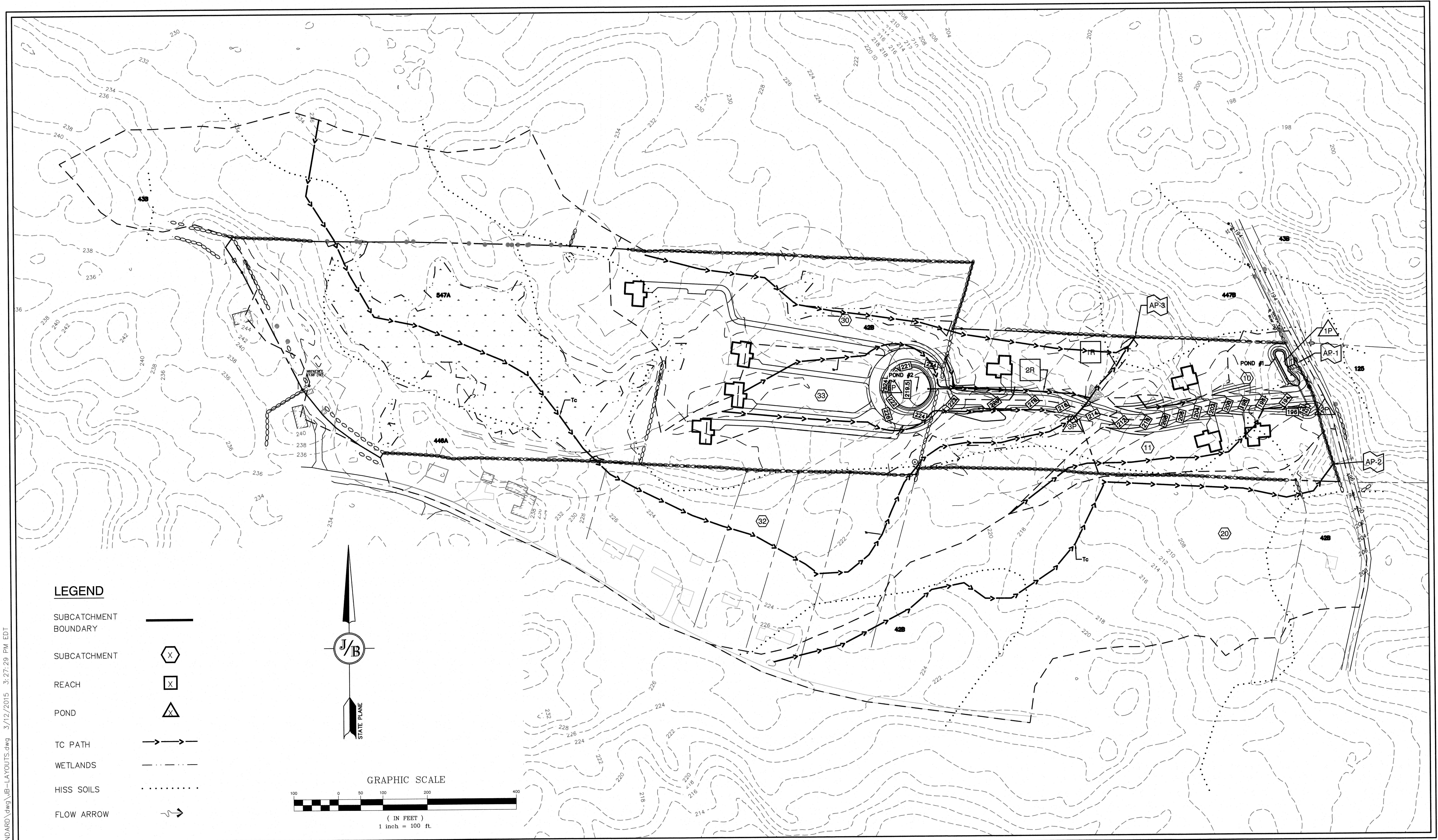
603-772-4746 FAX: 603-772-0227 E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	EXISTING WATERSHED PLAN
Project:	VIOLETTE LANE ESTATES FREMONT, NH
Owner of Record:	HERITAGE FARM TRUST PO BOX 212, NEWFIELDS, NH 03856

DRAWING No.	W1
SHEET 1 OF 2	JBE PROJECT NO. 19175.1



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Design: BWG	Draft: BWG	Date: 08/31/20
Checked: BWG	Scale: 1"=100'	Project No.: 19175.1
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REV.	DATE	REVISION	BY
1	11/23/20	REVISED PER PLANNING BOARD COMMENTS	BWG
0	08/31/20	ISSUED FOR REVIEW	BWG

**J/B** Jones & Beach Engineers, Inc.  
85 Portsmouth Ave.  
PO Box 219  
Stratham, NH 03885

Designed and Produced in NH  
*Civil Engineering Services*  
603-772-4746  
FAX: 603-772-0227  
E-MAIL: JBE@JONESANDBEACH.COM

Plan Name:	<b>PROPOSED WATERSHED PLAN</b>
Project:	<b>VIOLETTE LANE ESTATES FREMONT, NH</b>
Owner of Record:	<b>HERITAGE FARM TRUST PO BOX 212, NEWFIELDS, NH 03856</b>

DRAWING No.  
**W2**

SHEET 2 OF 2  
JBE PROJECT NO. 19175.1