November 17, 2025
File No. 2025-085

Chrissy Almanzar
Land Use Administrator
Town of Warner
5 East Main Street
PO Box 265
Warner, NH 03278
landuse@warnernh.gov

Re: Site Plan Application Review Follow-Up
Map 7, Lot 39 and 39-1
Warner, New Hampshire

Dear Ms. Almanzar:

On behalf of the Town of Warner (Town) Planning Board, Aries Engineering, LLC (Aries) prepared this follow-up to our discussions at the November 3, 2025, Planning Board meeting where we discussed the Site Plan application prepared by Keach-Nordstrom Associates, Inc. (KNA) of Bedford, New Hampshire for the property identified as Lots 39 and 39-1 on Warner Tax Map 7 (site) in Warner, New Hampshire.

The objective of this letter is to demonstrate that the stormwater drainage system proposed by the applicant will substantially increase both off-site stormwater flow volumes and velocities onto the northerly abutting property. Attached Figure 1 depicts outlines of the pre-development and post-development areas modeled as part of this study.

The findings and conclusions presented herein are not scientific certainties, but rather our professional opinions concerning our evaluation of information and data submitted by others. Aries anticipates variations in actual site conditions beyond those interpreted and would have to re-evaluate the report conclusions and recommendations if additional site data are made available. Aries conducted this report in general accordance with accepted consulting practices. Aries makes no warranty, either expressed or implied.

SITE DOCUMENTS AND MAPS

In preparing this report, Aries reviewed the following documents and data:

1. *"Alteration of Terrain Permit Application & Stormwater Drainage Analysis, Jennesstown Manor,"* prepared by KNA, and revised October 2, 2025;

2. Comment Response Letter, prepared by KNA, dated October 31, 2025; and
3. "*Site Plan Review Regulations, Town of Warner, New Hampshire"*, amended March 11, 2020.

In this report, the above-referenced individual plans prepared by KNA are collectively referred to as "site plans".

STORMWATER MODEL SUMMARY

Design Criteria

The scope of our hydraulic modeling is limited to an examination of the stormwater runoff flow rate and volume that exits the northern property boundary in the vicinity of the proposed development. More specifically, our modeling focuses on subcatchments 40S and 46S, which were respectively modeled by KNA for pre-development and post-development site conditions. In developing our model, we looked only at stormwater flows that were likely to flow off-site onto the northerly abutting property, with the exception of KNA's subcatchment 50S, which had no change between pre-development and post-development conditions.

Aries evaluated the existing (pre-development) and proposed (post-development) stormwater runoff rates and volumes for a 50-year storm event, which was modeled to receive approximately 6.34 inches of rainfall during a 24-hour storm event.

The computations performed in support of this report are based upon existing and proposed site conditions. The analysis was done using HydroCAD software, which utilizes the Soil Conservation Service (SCS) TR-55 and TR-20 methodology, as well as the Rationale Method.

Model Parameters

The pre-development drainage area, identified as subcatchment 40.1S, is depicted on Figure 2 and covers an approximate 80,667-square-foot (sf) area, while the approximate 193,501-sf post-development drainage area, identified as subcatchment 46.1S, is depicted on Figure 3. As noted during the November 3, 2025, meeting, Figure 3 depicts a drainage swale at an approximate elevation starting at 506 feet that captures surface water from the upper portion of Lot 39 and directs this stormwater to a level spreader that is located near the northerly boundary of Lot 39. The presence of the drainage swale increases the area of contribution to the off-site stormwater flows by a factor of approximately 2.4. As discussed at the meeting, this significant increase in area capturing rainfall during storm events is the primary reason for the increased off-site stormwater flows.

Aries used the soil types for the study area that were depicted on the KNA site drainage areas plans. The soil types are generally designated as hydrological soil group A soils along the Route 103 frontage and hydrological soil group C soils on the uphill areas of the site study area, with areas of apparent ledge designated as group D soils. Aries did not independently verify the soil data.

Specific model parameters, including, sub-catchment drainage areas, discharge points, and ground cover are provided in the attached HydroCAD model files for pre- and post-development site conditions. Aries notes that impervious surfaces were not addressed in the model, as the impervious surfaces were limited to a woods road present in both areas modeled by Aries.

Model Summary

Table 1 provides a summary of anticipated off-site stormwater flow rate in cubic feet per second (cfs) and runoff volume in acre-feet (af) that exits the northerly property boundary during a 50-year, 24-hour frequency storm event.

Table 1 - Summary of Stormwater Runoff Flow Rate and Volume

Site Condition	Storm Frequency (years)	Peak Flow Rate (cfs)	Runoff Volume (af)
Pre-Development	50 Years	2.10	0.168
Post-Development	50 Years	7.09	0.575
% Increase	-	338%	342%

Based on Aries' stormwater modeling results, Aries anticipates that both post-development stormwater peak flow rates and runoff volume will increase by more than 3 times compared to the modeled pre-development stormwater flows that exit the northern site property boundary.

The New Hampshire Department of Environmental Services (NHDES) Alteration of Terrain (AoT) Rules, part Env-Wq 1507.06 - Peak Runoff Control, require no increase in the stormwater peak flow rate of the site during the 2-year, 10-year, 25-year or 50-year, 24-hour design storms for all design points on-site. Based on this requirement, the proposed stormwater management practices do not comply with the NHDES AoT rules.

Further, Section XVIII - Erosion/ Sedimentation and Storm-Water Control of the Warner Site Plan regulations requires that, "…development of the site shall not result in increased runoff or velocity of surface runoff onto adjacent properties or surface water bodies." Based on this requirement, the proposed stormwater management practices do not comply with the Warner Site Plan regulations.

Recommendations

Aries recommends that the stormwater drainage from upslope drainage swales be directed to a stormwater management practice located at distance from the northerly site property boundary to limit concentrated stormwater flows toward the northerly abutting property and to reduce the off-site post-development stormwater flows to be less than the pre-development peak rate and volume.

Please contact me at (603) 228-0008 if you have any questions regarding this report and its findings.

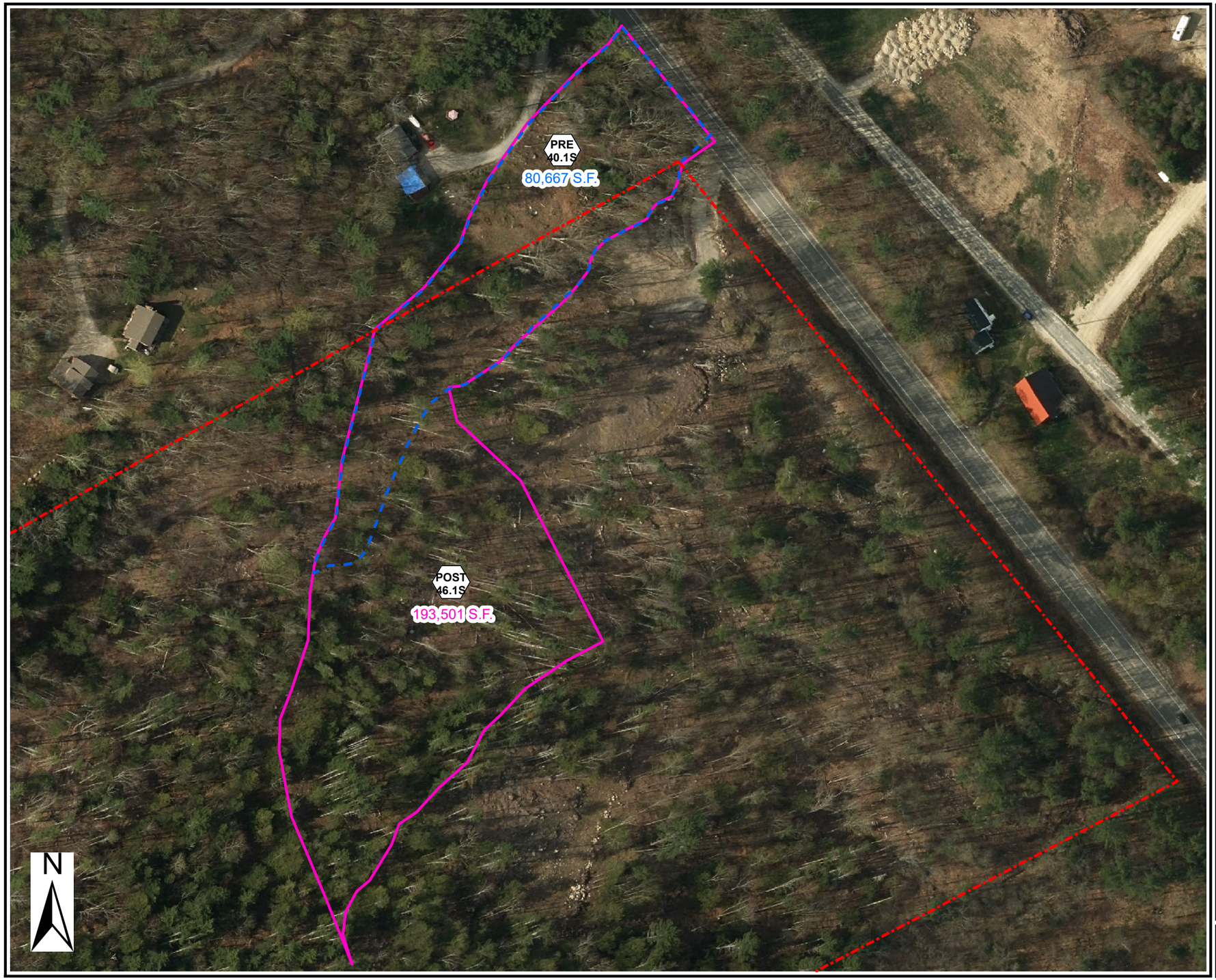
Sincerely,
Aries Engineering, LLC

George C. Holt, P.G.
Principal Hydrogeologist

Kathryn A, Ward, P.E.
Principal Engineer

GCH:pj

Attachments:
Figure 1 – Drainage Plan Overlays
Figure 2 – Pre-Development Drainage Plan
Figure 3 – Post-Development Drainage Plan
Pre-Development HydroCAD Model Summary
Post-Development HydroCAD Model Summary



NOTES

1. Plan prepared from: Post-Development Drain Areas Plan, prepared by Keach-Nordstrom Associates, Inc. of Bedford, NH and dated May 22, 2025; and Geographic Information System (GIS) data provided by the New Hampshire Geographically Referenced Analysis and Information Transfer System (NH GRANIT) maintained by University of New Hampshire and the NH Office of Strategic Initiatives.

2. Site boundary locations are based on an overlay of the site features on NH GRANIT GIS data. Therefore, all site features are approximately located.

3. This plan is not to be used for construction, survey or boundary purposes.

APPROXIMATE DRAINAGE AREAS TO NORTHERLY ABUTTING PROPERTY

PRE-DEVELOPMENT = 80,667 S.F. +/-

POST-DEVELOPMENT = 193,501 S.F. +/-

Legend

- Surveyed Site Boundary
- Pre-Subcatchment
- Post-Subcatchment

0 60 120 240 360 480 Feet

Aries Project # 2025-085
File # 2025-085(1)11.25.MXD

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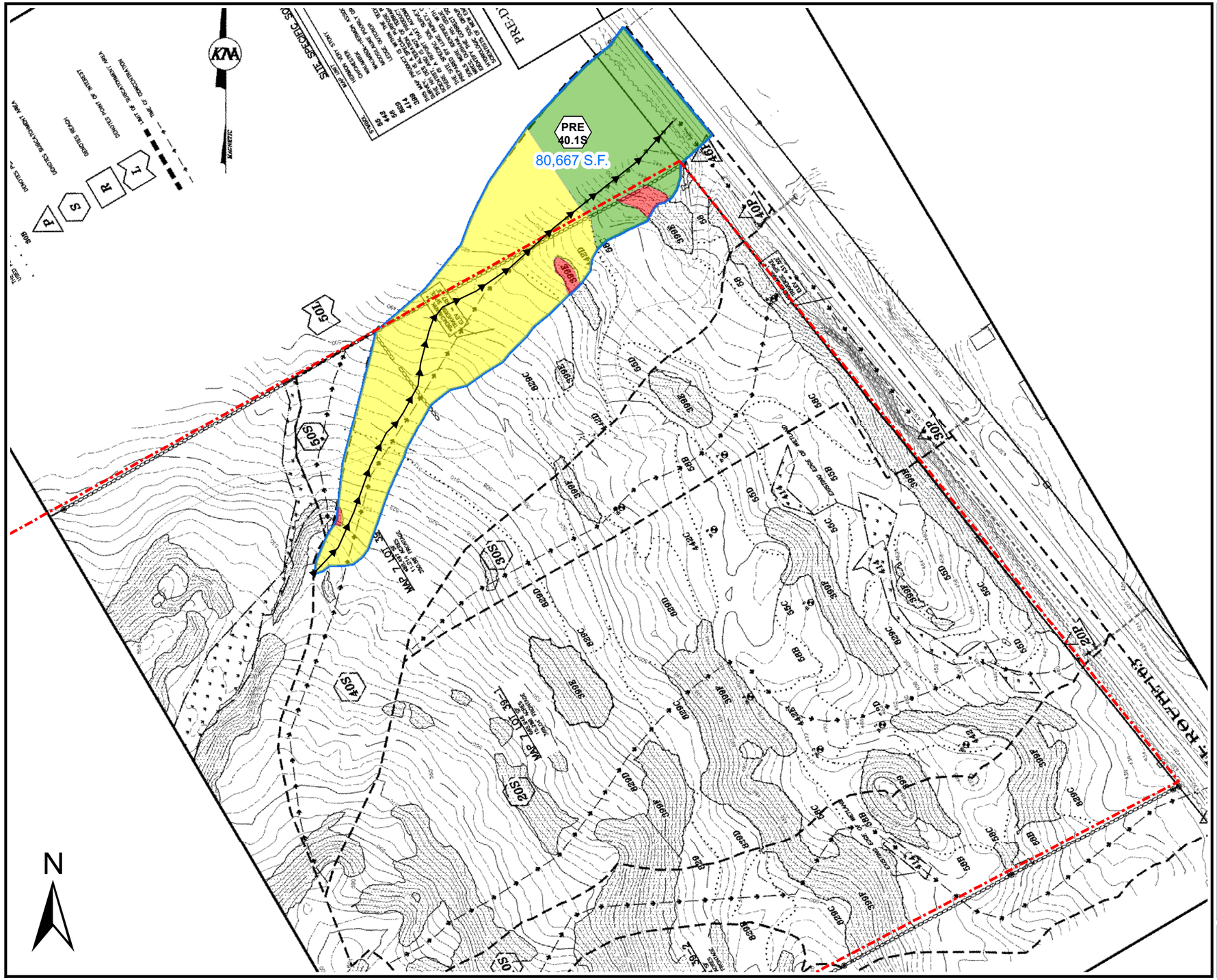
MAP 7, LOTS 39 & 39-1
WARNER, NEW HAMPSHIRE

DRAINAGE PLAN OVERLAYS

NOVEMBER 2025 FIGURE 1



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APPROXIMATE DRAINAGE AREAS TO NORTHERLY ABUTTING PROPERTY

PRE-DEVELOPMENT = 80,667 S.F. +/-

Legend

- Time Of Concentration Flow Path
- Surveyed Site Boundary

Soil Drainage Class

- A
- B
- D
- Pre-Subcatchment

0 60 120 240 360 480 Feet

Aries Project # 2025-085
File # 2025-085(2)11.25.MXD

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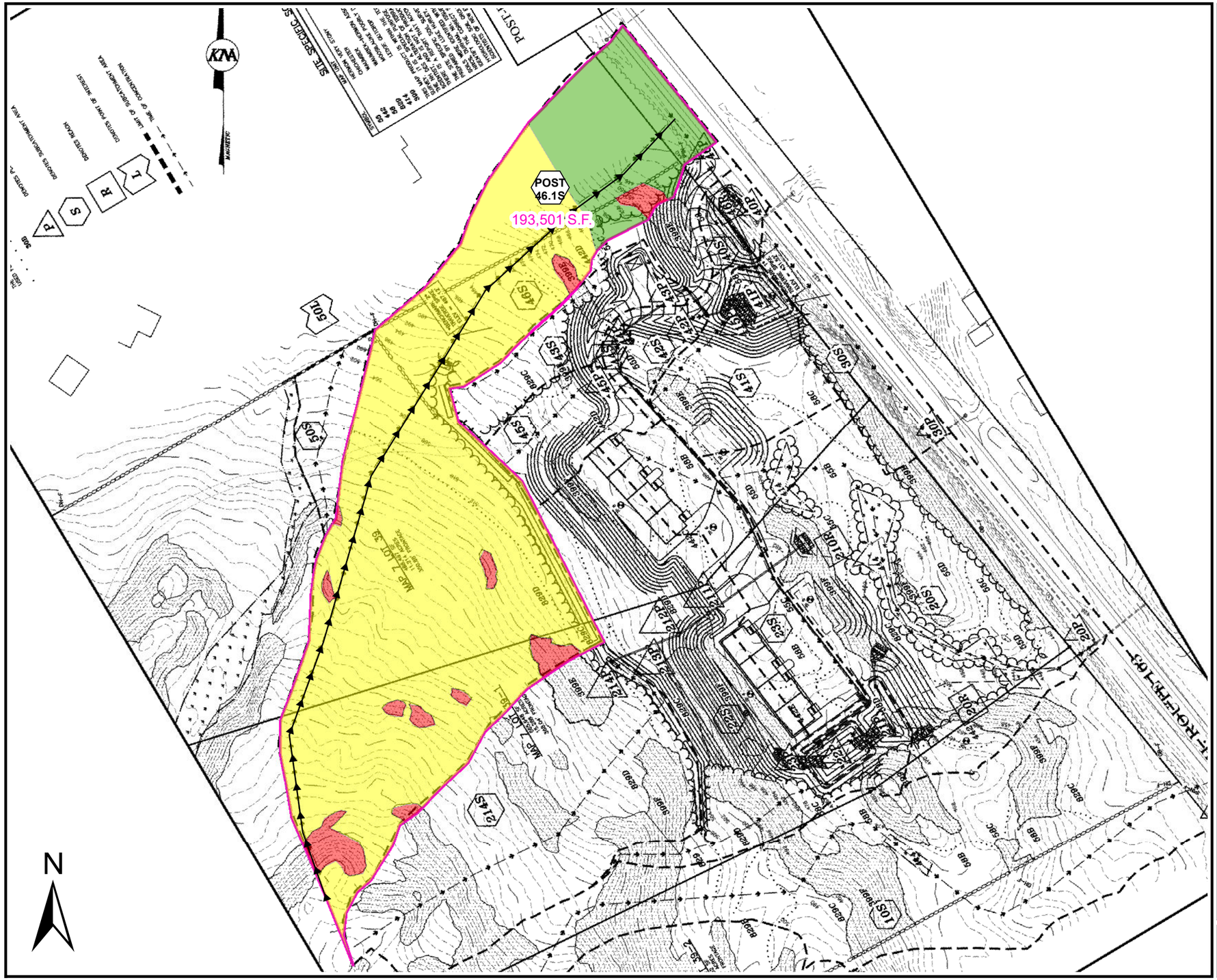
PRE-DEVELOPMENT DRAINAGE PLAN

NOVEMBER 2025 FIGURE 2



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APPROXIMATE DRAINAGE AREAS TO NORTHERLY ABUTTING PROPERTY

POST-DEVELOPMENT = 193,501 S.F. +/-

Legend

Time Of Concentration Flow Path

drnclass

- A
- B
- D
- Post-Subcatchment

0 60 120 240 360 480 Feet

Aries Project # 2025-085
File # 2025-085(3)11.25.MXD

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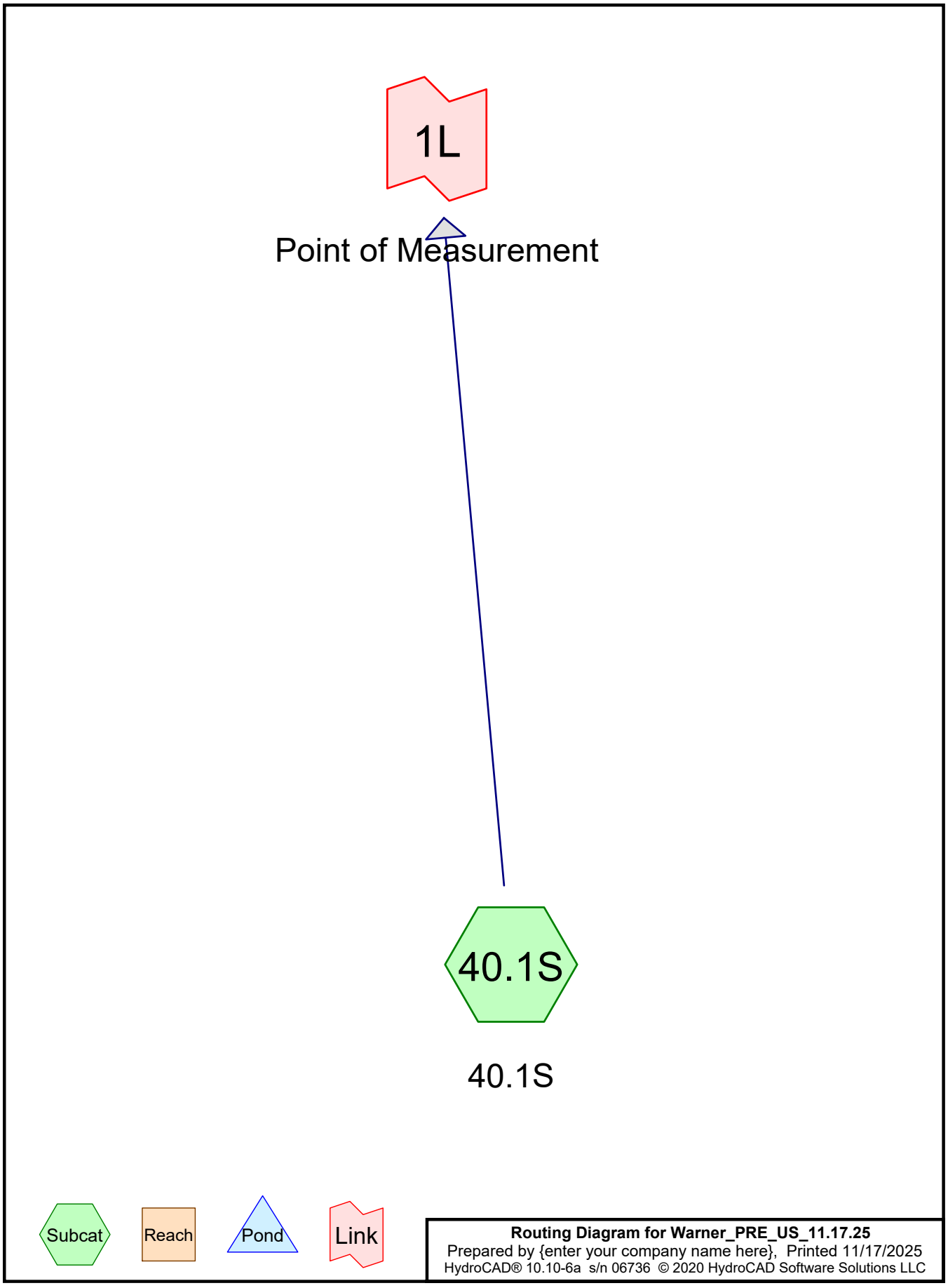
POST-DEVELOPMENT DRAINAGE PLAN

NOVEMBER 2025 FIGURE 3



Routing Diagram for Warner_PRE_US_11.17.25
Prepared by {enter your company name here}, Printed 11/17/2025

Project Notes

Point precipitation frequency estimates (inches)
NOAA Atlas 14 Volume 10 Version 3
Data type: Precipitation depth
Time series type: Partial duration
Project area: Northeastern States
Location name (ESRI Maps): Warner, NH
Station Name: -
Latitude: 43.2564 Degree
Longitude: -71.7651 Degree
Elevation (USGS): 433 ft

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.624	30	Woods, Good, HSG A (40.1S)
1.185	55	Woods, Good, HSG B (40.1S)
0.043	77	Woods, Good, HSG D (40.1S)
1.852	**47**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.624	HSG A	40.1S
1.185	HSG B	40.1S
0.000	HSG C	
0.043	HSG D	40.1S
0.000	Other	
1.852		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.624	1.185	0.000	0.043	0.000	1.852	Woods, Good	40.1S
0.624	**1.185**	**0.000**	**0.043**	**0.000**	**1.852**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 40.1S: 40.1S Runoff Area=80,667 sf 0.00% Impervious Runoff Depth=1.09"
Flow Length=693' Slope=0.1573 '/' Tc=5.8 min CN=47 Runoff=2.10 cfs 0.168 af

Link 1L: Point of Measurement Inflow=2.10 cfs 0.168 af
Primary=2.10 cfs 0.168 af

Total Runoff Area = 1.852 ac Runoff Volume = 0.168 af Average Runoff Depth = 1.09"
100.00% Pervious = 1.852 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 40.1S: 40.1S

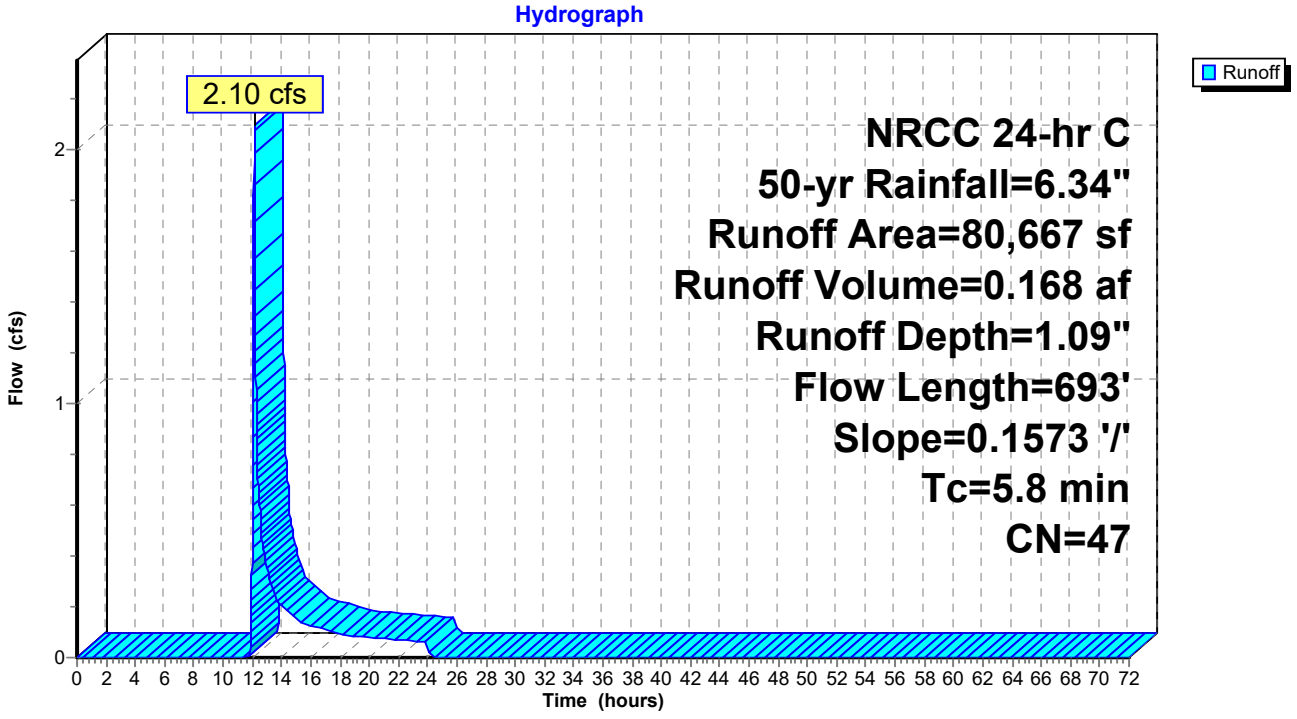
Runoff = 2.10 cfs @ 12.14 hrs, Volume= 0.168 af, Depth= 1.09"
Routed to Link 1L : Point of Measurement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 50-yr Rainfall=6.34"

Area (sf)	CN	Description
27,176	30	Woods, Good, HSG A
51,597	55	Woods, Good, HSG B
1,894	77	Woods, Good, HSG D
80,667	47	Weighted Average
80,667		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
5.8	693	0.1573	1.98		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps

Subcatchment 40.1S: 40.1S

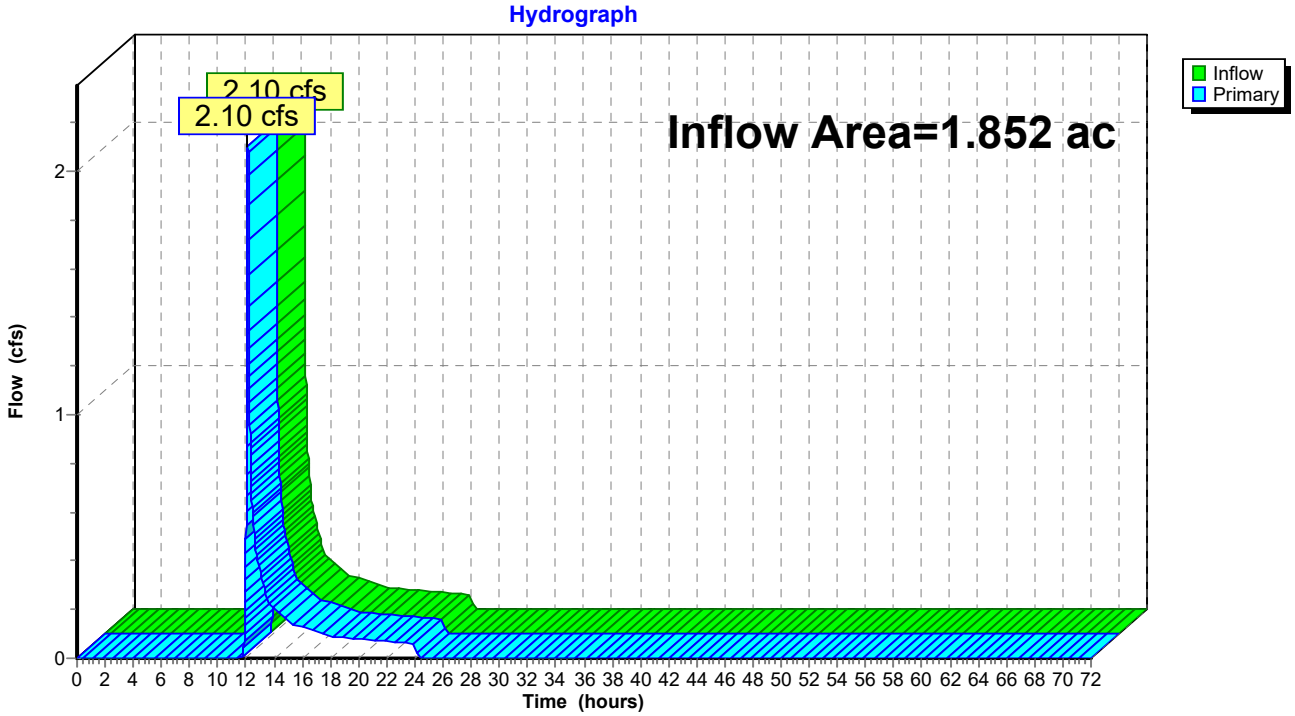


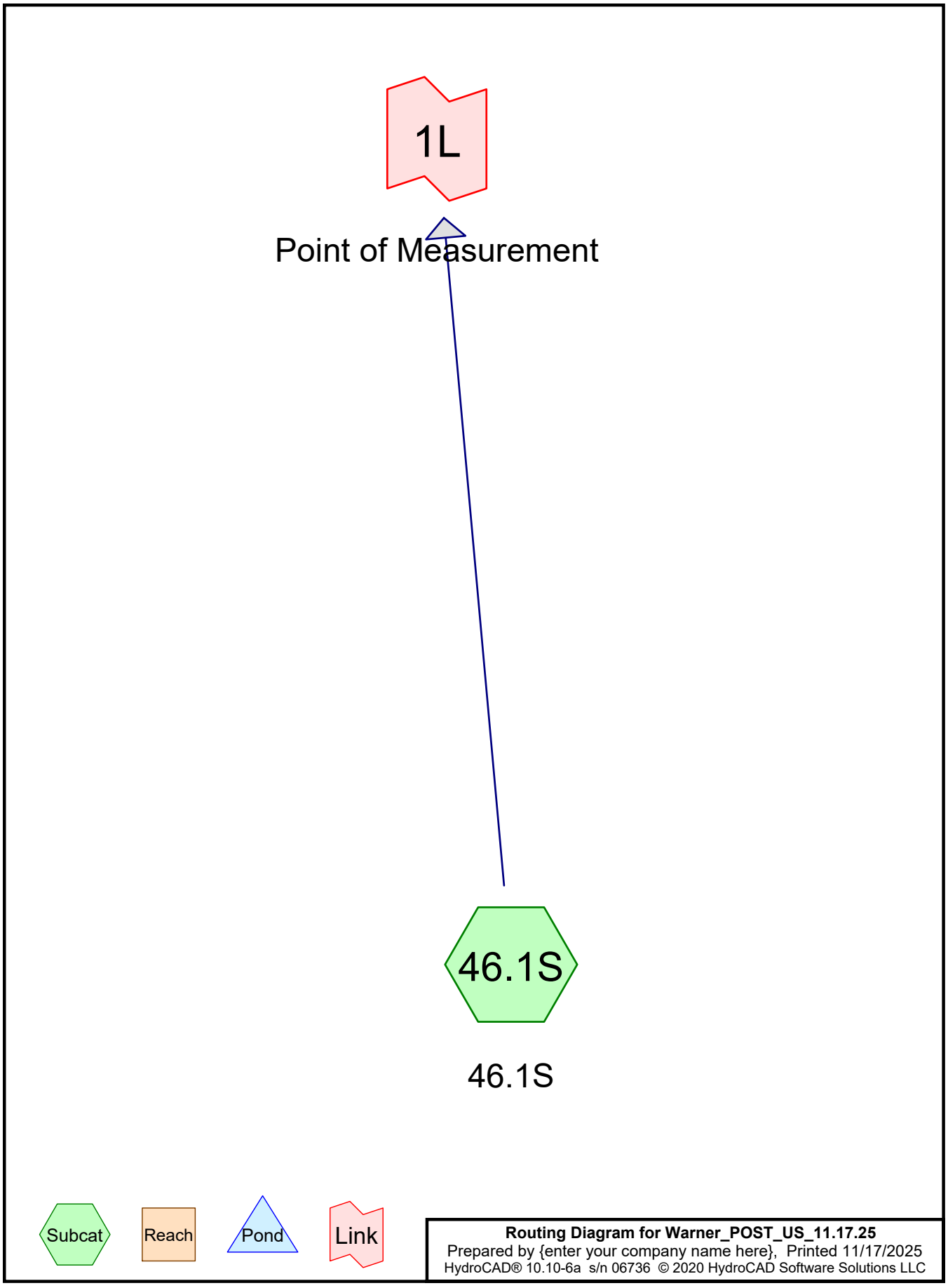
Summary for Link 1L: Point of Measurement

Inflow Area = 1.852 ac, 0.00% Impervious, Inflow Depth = 1.09" for 50-yr event
Inflow = 2.10 cfs @ 12.14 hrs, Volume= 0.168 af
Primary = 2.10 cfs @ 12.14 hrs, Volume= 0.168 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 6L

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 1L: Point of Measurement





Routing Diagram for Warner_POST_US_11.17.25
Prepared by {enter your company name here}, Printed 11/17/2025
HydroCAD® 10.10-6a s/n 06736 © 2020 HydroCAD Software Solutions LLC

Project Notes

Point precipitation frequency estimates (inches)
NOAA Atlas 14 Volume 10 Version 3
Data type: Precipitation depth
Time series type: Partial duration
Project area: Northeastern States
Location name (ESRI Maps): Warner, NH
Station Name: -
Latitude: 43.2564 Degree
Longitude: -71.7651 Degree
Elevation (USGS): 433 ft

Area Listing (all nodes)

Area (acres)	CN	Description (subcatchment-numbers)
0.631	30	Woods, Good, HSG A (46.1S)
3.597	55	Woods, Good, HSG B (46.1S)
0.214	77	Woods, Good, HSG D (46.1S)
4.442	**53**	**TOTAL AREA**

Soil Listing (all nodes)

Area (acres)	Soil Group	Subcatchment Numbers
0.631	HSG A	46.1S
3.597	HSG B	46.1S
0.000	HSG C	
0.214	HSG D	46.1S
0.000	Other	
4.442		**TOTAL AREA**

Ground Covers (all nodes)

HSG-A (acres)	HSG-B (acres)	HSG-C (acres)	HSG-D (acres)	Other (acres)	Total (acres)	Ground Cover	Subcatchment Numbers
0.631	3.597	0.000	0.214	0.000	4.442	Woods, Good	46.1S
0.631	**3.597**	**0.000**	**0.214**	**0.000**	**4.442**	**TOTAL AREA**	

Time span=0.00-72.00 hrs, dt=0.01 hrs, 7201 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 46.1S: 46.1S Runoff Area=193,501 sf 0.00% Impervious Runoff Depth=1.55"
Flow Length=1,059' Slope=0.1539 '/' Tc=9.0 min CN=53 Runoff=7.09 cfs 0.575 af

Link 1L: Point of Measurement Inflow=7.09 cfs 0.575 af
Primary=7.09 cfs 0.575 af

Total Runoff Area = 4.442 ac Runoff Volume = 0.575 af Average Runoff Depth = 1.55"
100.00% Pervious = 4.442 ac 0.00% Impervious = 0.000 ac

Summary for Subcatchment 46.1S: 46.1S

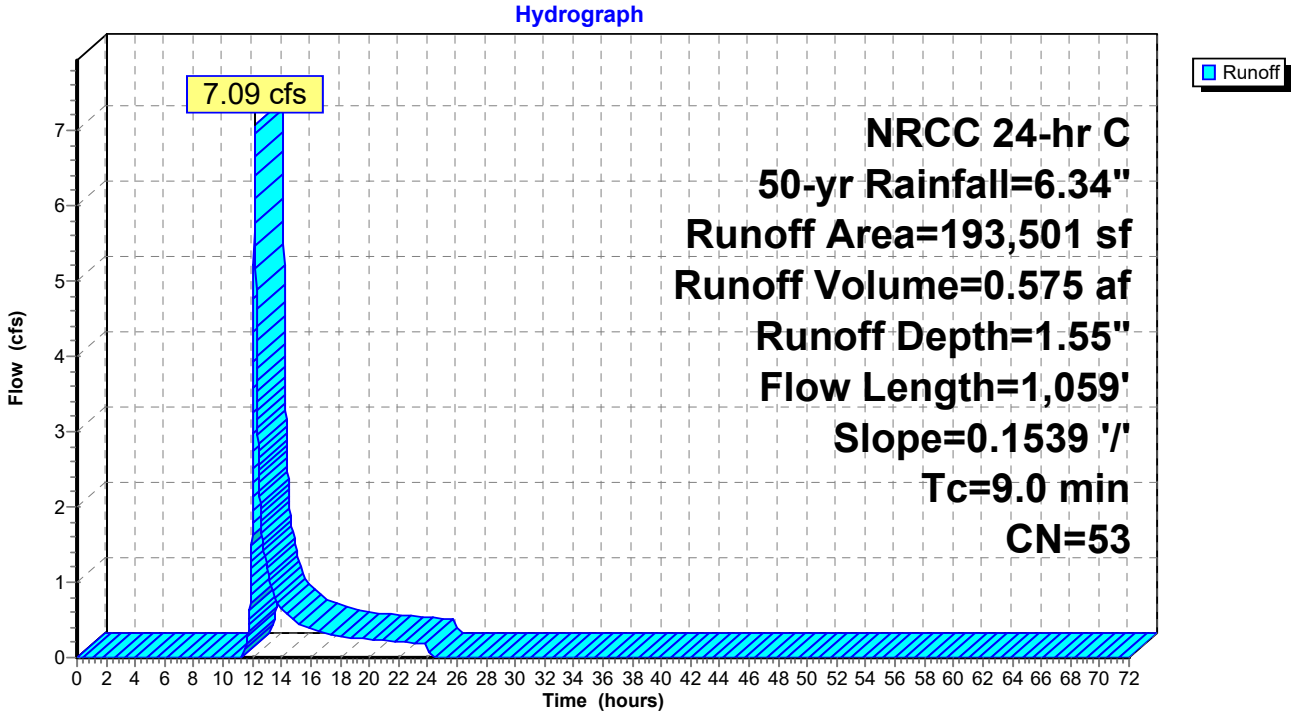
Runoff = 7.09 cfs @ 12.17 hrs, Volume= 0.575 af, Depth= 1.55"
Routed to Link 1L : Point of Measurement

Runoff by SCS TR-20 method, UH=SCS, Weighted-CN, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs
NRCC 24-hr C 50-yr Rainfall=6.34"

Area (sf)	CN	Description
27,486	30	Woods, Good, HSG A
156,686	55	Woods, Good, HSG B
9,329	77	Woods, Good, HSG D
193,501	53	Weighted Average
193,501		100.00% Pervious Area

Tc (min)	Length (feet)	Slope (ft/ft)	Velocity (ft/sec)	Capacity (cfs)	Description
9.0	1,059	0.1539	1.96		**Shallow Concentrated Flow,** Woodland Kv= 5.0 fps

Subcatchment 46.1S: 46.1S



Summary for Link 1L: Point of Measurement

Inflow Area = 4.442 ac, 0.00% Impervious, Inflow Depth = 1.55" for 50-yr event
Inflow = 7.09 cfs @ 12.17 hrs, Volume= 0.575 af
Primary = 7.09 cfs @ 12.17 hrs, Volume= 0.575 af, Atten= 0%, Lag= 0.0 min
Routed to nonexistent node 6L

Primary outflow = Inflow, Time Span= 0.00-72.00 hrs, dt= 0.01 hrs

Link 1L: Point of Measurement