

Town of Middlebury

Flooding Concerns
July- August 2023

PDS-based point precipitation frequency estimates with 90% confidence intervals (in inches)¹

Duration	Average recurrence interval (years)									
	1	2	5	10	25	50	100	200	500	1000
5-min	0.289 (0.231-0.356)	0.343 (0.274-0.423)	0.431 (0.342-0.533)	0.504 (0.398-0.627)	0.604 (0.459-0.783)	0.681 (0.504-0.901)	0.759 (0.542-1.04)	0.840 (0.571-1.19)	0.949 (0.618-1.39)	1.03 (0.655-1.55)
10-min	0.410 (0.327-0.505)	0.486 (0.388-0.599)	0.610 (0.485-0.754)	0.714 (0.564-0.888)	0.856 (0.650-1.11)	0.965 (0.714-1.28)	1.08 (0.768-1.47)	1.19 (0.808-1.68)	1.34 (0.875-1.97)	1.46 (0.928-2.19)
15-min	0.482 (0.385-0.594)	0.572 (0.456-0.705)	0.719 (0.571-0.890)	0.840 (0.663-1.04)	1.01 (0.765-1.31)	1.14 (0.841-1.50)	1.26 (0.903-1.73)	1.40 (0.951-1.98)	1.58 (1.03-2.32)	1.72 (1.09-2.58)
30-min	0.652 (0.520-0.803)	0.774 (0.617-0.954)	0.973 (0.773-1.20)	1.14 (0.899-1.42)	1.37 (1.04-1.77)	1.54 (1.14-2.04)	1.72 (1.22-2.35)	1.90 (1.29-2.69)	2.15 (1.40-3.15)	2.34 (1.48-3.50)
60-min	0.821 (0.656-1.01)	0.976 (0.778-1.20)	1.23 (0.975-1.52)	1.44 (1.13-1.79)	1.72 (1.31-2.24)	1.95 (1.44-2.57)	2.17 (1.55-2.97)	2.40 (1.63-3.39)	2.72 (1.77-3.98)	2.96 (1.87-4.43)
2-hr	1.04 (0.836-1.27)	1.22 (0.977-1.49)	1.51 (1.21-1.85)	1.75 (1.39-2.16)	2.08 (1.59-2.68)	2.33 (1.74-3.07)	2.59 (1.87-3.53)	2.87 (1.96-4.03)	3.26 (2.13-4.75)	3.58 (2.28-5.31)
3-hr	1.18 (0.954-1.44)	1.38 (1.11-1.68)	1.69 (1.36-2.07)	1.95 (1.56-2.41)	2.32 (1.78-2.98)	2.59 (1.94-3.40)	2.87 (2.08-3.91)	3.19 (2.18-4.45)	3.63 (2.38-5.25)	3.99 (2.54-5.89)
6-hr	1.44 (1.18-1.75)	1.68 (1.36-2.04)	2.06 (1.67-2.51)	2.38 (1.91-2.91)	2.81 (2.18-3.58)	3.14 (2.37-4.09)	3.48 (2.54-4.70)	3.86 (2.66-5.34)	4.39 (2.89-6.30)	4.82 (3.09-7.06)
12-hr	1.73 (1.42-2.08)	2.02 (1.66-2.44)	2.50 (2.03-3.02)	2.89 (2.34-3.51)	3.43 (2.67-4.34)	3.84 (2.92-4.96)	4.27 (3.12-5.69)	4.72 (3.27-6.48)	5.34 (3.54-7.59)	5.84 (3.75-8.46)
24-hr	2.03 (1.68-2.43)	2.38 (1.96-2.85)	2.94 (2.42-3.53)	3.41 (2.78-4.12)	4.05 (3.17-5.08)	4.54 (3.46-5.81)	5.04 (3.70-6.66)	5.57 (3.87-7.57)	6.28 (4.18-8.84)	6.84 (4.42-9.83)



Figures 1 & 2: Shoulder/ Road Failure- Painter Rd.



Figure 1: Sinkhole at Maverick Gas Station



Figure 2: Seymour St- Culvert Failure



Figures 1 & 2: Landslide on High Street to 77 N. Pleasant.



Figures 1& 2: Landslide from High St to N. Pleasant.



Figures 1& 2: Dow Pond- Water Line Break and Rt. 116 Failure



Figure 1 & 2: 12 & 30 Grist Mill Rd



Figure 1 & 2: 12 & 30 Grist Mill Rd

468 E Main St



ACOE Wall Constructed after 1927 flood

2023 Bank Scour



468 E Main St



468 E Main St

Slope stabilized to prevent
further infrastructure
impacts

Flood Resiliency Project

- Wall below Grist Mill Bridge
- Armoring stone has been carried away
- Need to inspect for scour
- Flood level did not breach the wall



Photo- Saturday July 15, 2023



Flood Resiliency Project

Photo- Thursday July 20, 2023



Steel sheets designed to prevent scour at wall footing.

Sheets have pulled away from concrete- leaving flowable fill exposed.

Photo- Thursday August 2, 2023



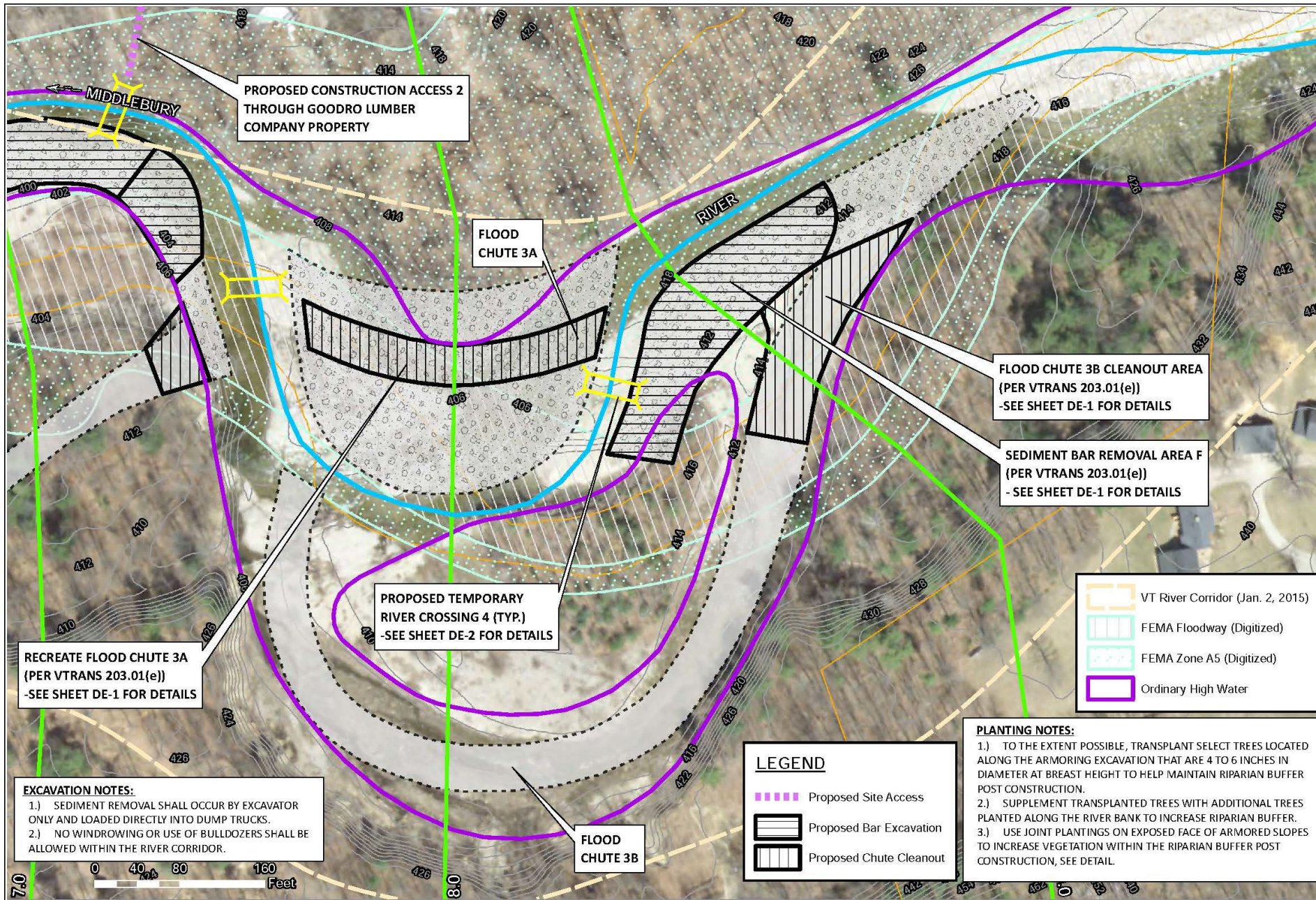
USGS High Water Marker

- Physical evidence of flood level.
- Useful in recreating location, depth, height, and extent of floodwaters.
- FEMA will potentially be using data to revise mapping.

Photo- Wednesday August 2, 2023

Areas of significant concern





PROPOSED CONSTRUCTION ACCESS 2 THROUGH GOODRO LUMBER COMPANY PROPERTY

FLOOD CHUTE 3A

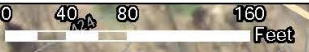
FLOOD CHUTE 3B CLEANOUT AREA (PER VTRANS 203.01(e)) -SEE SHEET DE-1 FOR DETAILS

SEDIMENT BAR REMOVAL AREA F (PER VTRANS 203.01(e)) - SEE SHEET DE-1 FOR DETAILS

PROPOSED TEMPORARY RIVER CROSSING 4 (TYP.) -SEE SHEET DE-2 FOR DETAILS

RECREATE FLOOD CHUTE 3A (PER VTRANS 203.01(e)) -SEE SHEET DE-1 FOR DETAILS

EXCAVATION NOTES:
 1.) SEDIMENT REMOVAL SHALL OCCUR BY EXCAVATOR ONLY AND LOADED DIRECTLY INTO DUMP TRUCKS.
 2.) NO WINDROWING OR USE OF BULLDOZERS SHALL BE ALLOWED WITHIN THE RIVER CORRIDOR.



LEGEND

- Proposed Site Access
- Proposed Bar Excavation
- Proposed Chute Cleanout

- VT River Corridor (Jan. 2, 2015)
- FEMA Floodway (Digitized)
- FEMA Zone A5 (Digitized)
- Ordinary High Water

PLANTING NOTES:
 1.) TO THE EXTENT POSSIBLE, TRANSPLANT SELECT TREES LOCATED ALONG THE ARMORING EXCAVATION THAT ARE 4 TO 6 INCHES IN DIAMETER AT BREAST HEIGHT TO HELP MAINTAIN RIPARIAN BUFFER POST CONSTRUCTION.
 2.) SUPPLEMENT TRANSPLANTED TREES WITH ADDITIONAL TREES PLANTED ALONG THE RIVER BANK TO INCREASE RIPARIAN BUFFER.
 3.) USE JOINT PLANTINGS ON EXPOSED FACE OF ARMORED SLOPES TO INCREASE VEGETATION WITHIN THE RIPARIAN BUFFER POST CONSTRUCTION, SEE DETAIL.

**SITE PLAN - PROPOSED CONDITIONS - CHUTE 3A / 3B
 MIDDLEBURY RIVER
 FLOOD MITIGATION PROJECT
 EAST MIDDLEBURY, VERMONT**

Map By: BMC
 MMA# 5032-02
 MXD: BMR-Prelim_SP7.mxd
 1st Version: Jan. 11, 2018
 Revision: Jan. 5, 2021
 Scale: 1" = 80'

SOURCE(S):
 Parcel Data - VCGI
 Aerial Photo - Bing Maps
 Contour Data - 2012, 1:500 LIDAR DEM

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SP-7

12 & 30 Grist Mill Rd



Photo- Wednesday August 2, 2023



Behind Goodrow Lumber

Significant debris and
stone blocking chutes and
floodways.

Photo- Tuesday July 25, 2023



Significant debris and stone is filling chutes designed to take excessive flow.

Photo- Tuesday July 25, 2023

52 Ossie Rd

ACOE Berm constructed ~1988



52 Ossie Rd

- Berm initially constructed after 1988 flood
- Stone Armoring was reinforced with recent efforts
- Significant scour occurred along berm.
- Flood chute does not appear to be active
- Flood level did not breach the berm but caused significant scour



Photo- Monday July 17, 2023

Ossie Rd Berm



Photo taken July 17, 2023



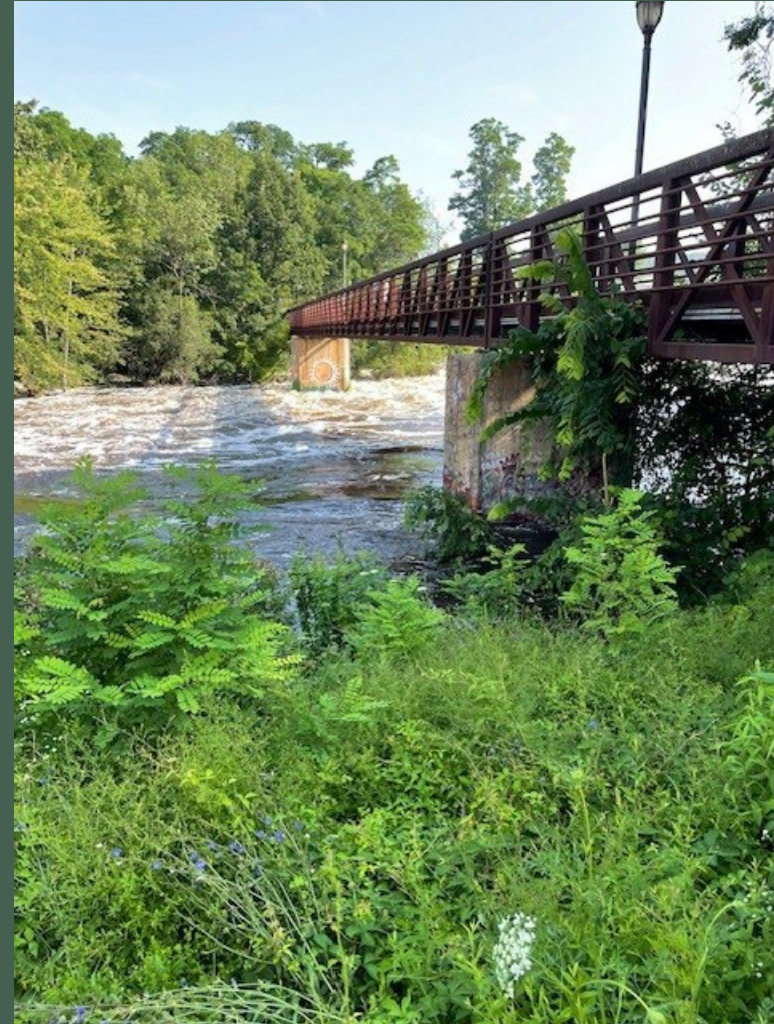
Photo taken August 8, 2023

Infrastructure Concerns Townwide



Infrastructure Concerns

- VHB inspected the bridge 8/2/2023
- Found no significant concerns
- Full bridge inspection is proposed for FY25 budget.



Pedestrian bridge- concerns for scour

Infrastructure Concerns

- Significant scour along bank .
- Provided stone armoring as emergency effort.
- Streambanks require further stabilization of soil and vegetation for long-term benefit.



Three Mile Bridge Rd- significant scour

Infrastructure Concerns



North Branch Rd- significant shoulder issues and undersized culverts