

Ref: 57886.00

Mr. Ned Swanberg, CFM
Vermont Department of Environmental Conservation
Watershed Management Division
Main Building - 2nd Floor
One National Life Drive
Montpelier, VT 05620

Via Electronic Mail Only

Re: Green Mountain Power, Inc. ("GMP")

Barre South End Substation

Barre City, Vermont

Flood Hazard Area and River Corridor Registration Application

Dear Ned:

On behalf of Green Mountain Power, Inc. ("GMP"), VHB has prepared the enclosed Flood Hazard Area and River Corridor Individual Permit ("Permit") application and supporting documentation associated with the proposed improvements to the Barre South End Substation in Barre City, Vermont ("Project"). The Project entails a plan to rebuild the substation by raising the elevation of the substation and improving its infrastructure. The goal of the upgrades would be to improve the reliability and resiliency of the substation.

The Project will increase the grade at the substation by approximately three feet, raising the ground surface within the substation from elevation 616 to elevation 619 feet (all elevations NAVD 88). Additionally, the Project will include relocating the substation fence to the top of the proposed fill slope, installing rip-rap on the fill slopes (outside of the proposed substation fence), removing seven existing poles that are adjacent to the substation, replacing one existing pole east of the substation, and installing three new poles on the north side of the substation. These pole relocations and replacements will allow an existing utility line along the south of the substation to be shifted to the north, on the opposite side of the substation from Jail Branch. An existing gravel access driveway on the west side of the substation will be extended and widened to maintain access to the existing poles that are located near Stevens Branch.

Field Investigation and Site Visit

VHB conducted a Natural Resource Assessment of the Study Area on June 28, 2016. Portions of Jail Branch within the Study Area were delineated by VHB as 2016-OHW-JB-1 and 2016-TB-JB-1, and portions of Stevens Branch were delineated as 2016-TB-SB-1. Natural Resources mapping for the Study Area is shown on page 1 of the Attachment. The Project was reviewed in the field by Shannon Morrison of the Vermont Department of Environmental Conservation ("DEC") Wetlands Program and by Rebecca Pfeiffer of the DEC Rivers Program ("Rivers Program") in 2015. This application is being submitted to the Rivers Program because the Project is located within the FEMA-mapped Special Flood Hazard Area ("SFHA") and the

Engineers | Scientists | Planners | Designers

40 IDX Drive, Building 100

Suite 200

South Burlington, Vermont 05403

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Vermont Agency of Natural Resources ("ANR") mapped River Corridor associated with Jail Branch and Stevens Branch.

Flood Hazard Area

The FEMA flood data was reviewed for Washington County in order to determine if any portions of the Study Area are situated within designated floodways or floodway fringes, as shown on Flood Insurance Rate Maps ("FIRMs") 50023C0434E and 50023C0453E (FEMA, Effective Date March 19, 2013). The Project location was found to be adjacent to the confluence of Jail Branch and Stevens Branch streams; however, VHB determined that the Project would not occur within any designated floodways. Per the applicable Flood Insurance Study ("FIS") and FIRM, the base flood elevation ("BFE") at the site is 616 feet (NAVD88). A copy of the FIRMs that show the Project Area and excerpts from the FIS are included on pages 2 to 5 of the Attachment.

As can be seen on the site plan included on page 6 of the Attachment, the majority of proposed fill would occur within the footprint of the existing substation, in an area where the ground surface is above the BFE. Furthermore, the overall substation footprint has been decreased by reducing the area within the substation fence and steepening the side slopes to 3H:1V, thereby minimizing the volume of fill required. The only exception where new fill would be placed outside of the existing footprint is the gravel access driveway/apron that would be extended below the BFE on the west side of the substation and would be located within Zone AE floodplain (also referred to as "floodway fringe" or "special flood hazard area"). This fill is necessary once the site grade is raised; otherwise, the driveway slope would be too steep to provide vehicle access to the existing pole structures located west of the substation. The amount of fill below the BFE that is required to provide a functional driveway would be approximately 52 cubic yards. This material would create a ramp approximately 40 feet long and 16 feet wide that is tapered on the sides. Based on the existing ground surface elevations, the ramp would be located at the upper edge of the floodway fringe and would be more than 160 feet from the edge of the floodway. The proposed volume of fill would be negligible relative to the overall floodplain storage at the site between elevations 614 and 616, which was estimated to be approximately 1,000 cubic yards. Supporting calculations are included on page 7 of the Attachment. The estimated floodplain storage volume does not include other portions of the floodplain that are hydraulically connected and adjacent to the site. As a result, the estimate of proposed fill representing 5-percent of the floodplain volume is likely to be conservative.

In addition to the placement of fill for the driveway ramp, utility poles that are proposed to be removed from the south side of the substation will be replaced by poles that will be located on the north side of the substation. The base of these poles is at or slightly below the BFE under existing conditions and would continue to be at the same approximate elevation but would be in a less hazardous location within the floodway fringe, in accordance with Section VI(b)(2)(A)(iii) of the Permit. The poles would have a negligible impact on floodwaters. Three other existing poles that are located closer to Stevens Branch are not proposed to be altered. Poles to be retained, removed, replaced, or relocated are shown on the Flood Hazard Area and River Corridor Map, page 1 of the Attachment.

In accordance with Section VII of the Permit, "An individual flood hazard area & river corridor permit shall be required for any activity that" does not qualify for coverage under the General Permit because it is not an Exempt Activity listed in Section IV and is not otherwise authorized in Section V. Authorization under an Individual Permit is being requested under the exception to the No Adverse Impact ("NAI") Standard provided in Section VI(b)(2)(A)(i). The Project would have a minimal effect on floodwater storage and would

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not divert floodwaters onto adjacent properties. The Project meets the requirements of Section VI(b)(1), would not adversely affect public safety by increasing flood elevations, flood velocities, or decreasing flood storage volume, and will not be in violation of the NFIP Floodplain Management Criteria.

River Corridor

VHB reviewed the DEC River Corridor data published to the ANR Natural Resources Atlas (ANR 2017) for streams in the Study Area and found, with the exception of the small area in the northeastern part of the site, the Study Area is located entirely in the DEC-mapped River Corridors for Jail Branch and Stevens Branch. All proposed activities would be located no closer to the stream than the existing structures. Specifically, with respect to the substation fencing and the utility poles that will be relocated or replaced, the proposed replacement structures would be located farther from the channel than the existing structures and would therefore reduce the potential need for future channel management. VHB understands that DEC Floodplain Coordinator Rebecca Pfeiffer concurred with the Project approach when she visited the site in 2015. The Project is therefore believed to comply with Section VI(a)(1)(A) of the Permit because it would be located no closer than the immediate adjacent existing development, would not cause the river to further depart from natural channel conditions, and would not result in an immediate or anticipated future need for channel management.

Summary

The Project requires coverage under the Flood Hazard Area and River Corridor Permit because it involves placement of fill below the base flood elevation and within the River Corridor. However, none of the proposed activities would increase the elevation or velocity of the base flood and nor would they require the need for additional management of the floodway in the future. Coverage under the Individual Permit is required because compensatory storage cannot be provided for the proposed fill volume due to site constraints. We believe this requirement can be waived due to the negligible volume of fill relative to the overall floodplain capacity at this site and the overall improvement in flood resiliency that the Project would provide. The Project has been designed to increase the reliability of the utility system and the structures have been located to avoid and minimize impacts within the floodplain and River Corridor. The proposed fill would not restrict or divert the flow of flood waters (floodway or floodway fringe), or endanger the health, safety, and welfare of the public, riparian, or downstream landowners during flooding or from potential erosion.

This application package has been developed based on consultation with DEC and the Applicant's understanding of the requirements of the Floodplain Permit.

The following materials are being provided:

- Flood Hazard Area and River Corridor Registration Form
- Flood Hazard Area and River Corridor Map
- FEMA Flood Insurance Rate Maps and Flood Insurance Study excerpt
- Site plan showing substation grading and pole locations within floodway fringe and River Corridor
- Calculations of approximate floodway fringe and proposed fill volumes
- Contact information for adjoining landowners

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Please let us know if you have any questions or need additional information.

Sincerely,

Robert Wildey, CPESC

Water Resources Consultant

RAW/jkw Enclosures

cc: Scott Lehman, GMP (electronic copy only)

Tim Upton, GMP (electronic copy only)

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FLOOD HAZARD AREA & RIVER CORRIDOR RULE

Individual Permit Application

10 V.S.A. § 754

A. Applicant				
1. Applicant Name: Green Mountain Power Corporation				
2. Mailing Address: 2152 Post Road				
3. Town: Rutland	4. State: Vermont	5. Zip: 05701		
6. Phone: (802) 770-3215	7. Cell Phone:			
8. Email Address: tim.upton@greenmountainpower.com				
B. Landowner (if different than applicant)				
1. Landowner Name:				
2. Landowner Address:				
3. Town:	4. State:	5. Zip:		
6. Phone:	7. Email Address:			
C. Consultant or Designer				
1. Consultant Company Name: VHB				
2. Consultant or Designer Name: Robert Wildey, CPESC				
3. Phone: (802) 497-6164	4. Email: rwildey@vhb.com			
5. Contractor Name (if known): TBD				
D. Project Information				
1. Project Location Address: GMP Barre South End Substation	n - 121 Main Street			
2. Project Location SPAN (School Parcel Account Number) 11 digit nu	ımber:	- <u> </u>		
3. Project Location Town: Barre, VT				
4. Flooding Source: Jail Branch and Stevens Branch Rivers				
5a. Latitude: 44.19034 N	5b. Longitude: 72.49967 V	V		
6. Category of Development Exempt from Municipal Regulation:				
State owned or operated institution or facility	Accepted Agricultural or S	ilvicultural Practice		
Power generating, transmission or telecommunication fac	cility subject to Section 248/24	8a		
E. Type of Development				
Roadway or Stream Crossing Construction Description:				
New structure				
Replacement structure				
Fill, Please list volume to be placed: 52 Cubic Yards, stone fill for driveway ramp				
Excavation, Please list volume to be removed:				

√	Utility/Infrastructure Work Description: Substation improvements
	Above Ground
	Below Ground
	Replacement utility line
	New utility line
	Re-alignment of existing utility line
	Other (describe): Pole replacements
	Buildings (walled/roofed building)
	Structure type/use:
	New Structure
	Replacement Structure
	Relocation of existing structure
	Addition of existing structure
	Alteration on existing structure
	Repair of a substantially damaged structure
	Other:
	The new substantially improved structure will be:
	Elevated
	Dry Flood proofed
	Wet Flood proofed
	Fair Market Value of existing structure
	Source of Building Value
	Tax Assessment
	Appraisal by Licensed Real Estate Appraiser
	Other:
	Estimated cost of improvements or repairs (materials and labor):

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F. Maps				
1. FEMA Flood Insurance Rate Map: Community/ Panel #: 50023C0434E Panel Date: 03/19/2013				
2. Flood Zone: AE Within Floodway? Yes No				
3. Located in ANR River Corridor? Yes No For reference to the ANR Atlas Map click here: http://anr.vermont.gov/maps				
G. Submittal requirements (as appropriate to the proposed development)				
<u>Included</u>				
Site Location Map - either an overview map of the site location generated from an internet application (i.e. Google or Bing) or a Vermont Natural Resource Atlas map				
List of adjoining landowners with names and mailing addresses				
Site plan(s) and schematics showing the following:				
Existing and proposed contours/elevations on the property in the same elevation datum as the most recent and effective NFIP Flood Insurance Rate Map (FIRM);				
Location and extent of any proposed fill and/or excavation for the project;				
NFIP Floodway delineation; NFIP Flood Fringe delineation boundary, Base Flood Elevation, ANR River Corridor Boundary;				
A scale bar, elevation datum conversions (where appropriate), and north arrow;				
Clearly labeled features including relevant landmarks, roadway names, stream names, and existing and/or proposed: buildings, utility/water infrastructure, and roads or driveways;				
For Buildings located in the FEMA Special Flood Hazard Area				
Note: elevation data must be certified by a registered engineer or licensed land surveyor				
Included N/A				
Foundation and anchoring details, including extent of foundation walls and footings below grade, anchoring design specifications, and size and location of flood openings/vents;				
A FEMA Elevation Certificate for proposals involving new or substantially improved structures;				
A FEMA Flood proofing Certificate for proposals involving dry-flood proofing in lieu of elevation;				
Mechanical, Electrical, and Plumbing details (elevation above base flood elevation or design specifications to be watertight below base flood elevation).				

		ed floodway encroachment:
Included	N/A ✓	Hydraulic calculations demonstrating no rise in base flood elevation or velocity, certified by a registered professional engineer, including electronic input/output files and mapping showing cross section locations.
	\checkmark	Hydraulic calculations demonstrating no rise in base flood elevation or velocity, certified by a registered professional engineer, including electronic input/output files and mapping showing cross section locations.
	•	ed fill in the flood fringe:
Included	N/A	Compensatory storage volumetric analysis and computations demonstrating no loss of flood storage volume, certified by a registered professional engineer.
	-	ed river corridor encroachment outside of designated centers and not meeting the examples in Appendices A or Flood Hazard Area & River Corridor Protection Procedure:
<u>Included</u>	N/A	Stream geomorphic assessment data and analysis by a qualified consultant.
Included	Proposa N/A	Il within an Approximate Zone A Flood Hazard Area:
	✓	Base flood elevation and floodway hydrologic and hydraulic calculations and supporting documentation, certified by a registered professional engineer.
H. Certif	fication	
		APPLICANT MUST FILE COPY OF THIS APPLICATION WITH TOWN CLERK AND ADJOINERS
that I ha regional Rule. I r	nve provious planning ecognize pose of p	hereby certify that the information on this application is, to the best of my knowledge, true and accurate and ded a copy of this application to the Clerk of the municipality in which this activity is located, the local and g commissions, and to each adjoining landowner as required in the Vermont Flood Hazard Area and River Corridor that by signing this application I am giving consent to employees of the State to enter the subject property for processing this application and for ensuring compliance with subsequent agency decisions relating to the
Print Fu	ll Name _	Timothy O. Upton
Applicar	nt Signatı	Timothy O. Upton Digitally signed by Tim Upton ON: cn-Tim Upton ON: cn-Ti

Please submit this form to the appropriate Regional Floodplain manager.

To see the current Floodplain Manager regions, please refer to:

http://dec.vermont.gov/watershed/rivers/river-corridor-and-floodplain-protection/floodplain-managers

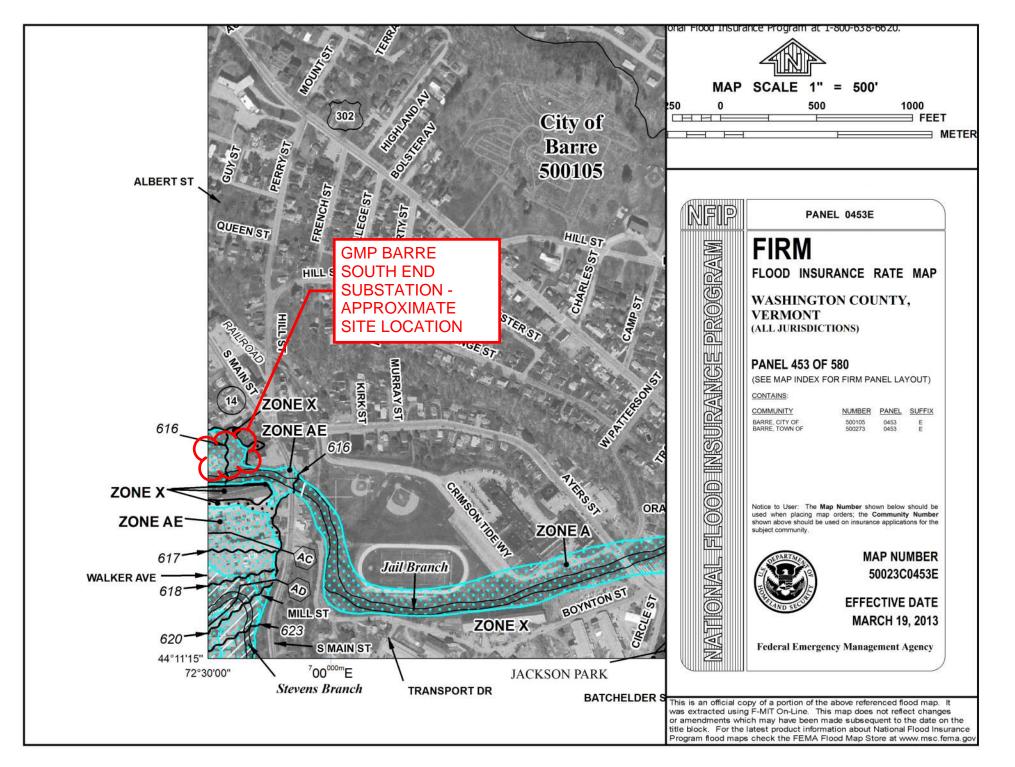
Direct all correspondence or questions to the appropriate Regional Floodplain Manager or to the Rivers Program general inbox at: <u>ANR.WSMDRivers@vermont.gov</u>

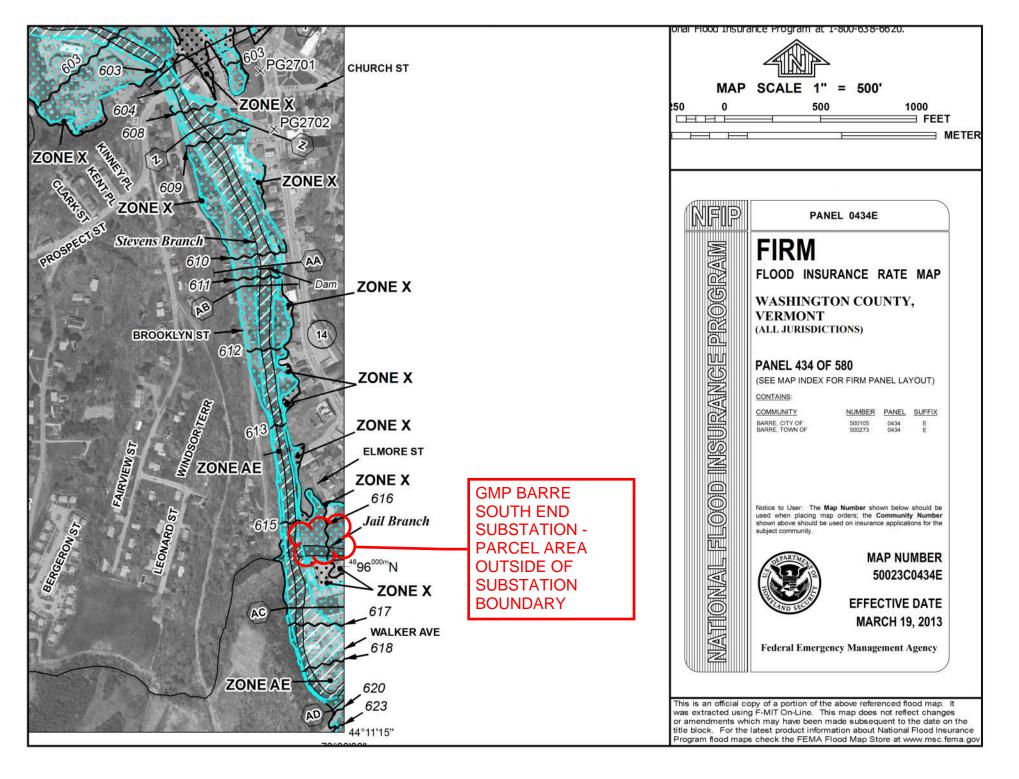
For additional information visit: http://dec.vermont.gov/watershed

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ATTACHMENT

DRAFT: August 29, 2017





FLOODING SOURCE		FLOODWAY		BASE FLOOD WATER-SURFACE ELEVATION (FEET NAVD)				
CROSS SECTION	DISTANCE ¹	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
Stevens Branch (continued)			,	,				
S	22,315	334	2,007	6.3	591.5	591.5	592.2	0.7
Т	22,612	268	2,096	5.9	592.6	592.6	593.4	0.8
U	23,141	312	1,199	10.3	593.2	593.2	593.2	0.0
V	23,960	441	2,060	5.0	596.2	596.2	596.3	0.1
W	25,152	373	1,544	6.7	598.4	598.4	598.7	0.3
X	26,462	213	2,030	5.1	603.4	603.4	604.1	0.7
Y	27,392	47	652	15.9	603.4	603.4	604.3	0.9
Z	27,740	192	2,013	5.1	609.3	609.3	610.3	1.0
AA	28,552	114	1,736	6.0	610.0	610.0	610.9	0.9
AB	28,653	116	1,172	8.8	611.3	611.3	612.1	0.8
AC	30,351	134	1,088	8.9	617.2	617.2	617.5	0.3
AD	31,146	231	1,047	7.8	619.6	619.6	620.6	1.0
AE	31,839	70	625	13.0	624.4	624.4	624.4	0.0
AF	32,217	153	821	9.9	645.2	645.2	645.3	0.1
AG	32,378	193	976	8.3	655.8	655.8	655.8	0.0
AH	33,239	149	1,461	5.6	660.7	660.7	660.7	0.0
Al	33,433	125	1,128	7.2	661.7	661.7	661.7	0.0
AJ	34,195	101	842	9.6	661.8	661.8	661.9	0.1
AK	34,461	166	1,881	4.3	665.1	665.1	665.1	0.0
AL	35,489	152	1,880	4.3	665.5	665.5	665.6	0.1
AM	35,854	52	556	14.6	665.7	665.7	666.6	0.9
AN	36,117	99	591	13.7	682.8	682.8	682.9	0.1
AO	36,727	38	426	19.0	702.4	702.4	702.6	0.2
AP	36,923	44	463	17.5	710.1	710.1	710.1	0.0
AQ	37,622	188	1,952	4.2	718.6	718.6	719.1	0.5
AR	38,863	47	712	11.5	718.6	718.6	719.6	1.0
AS	39,212	307	5,750	1.3	730.0	730.0	731.0	1.0
AT	40,760	202	3,424	2.2	730.1	730.1	731.1	1.0

¹Feet above confluence with Winooski River

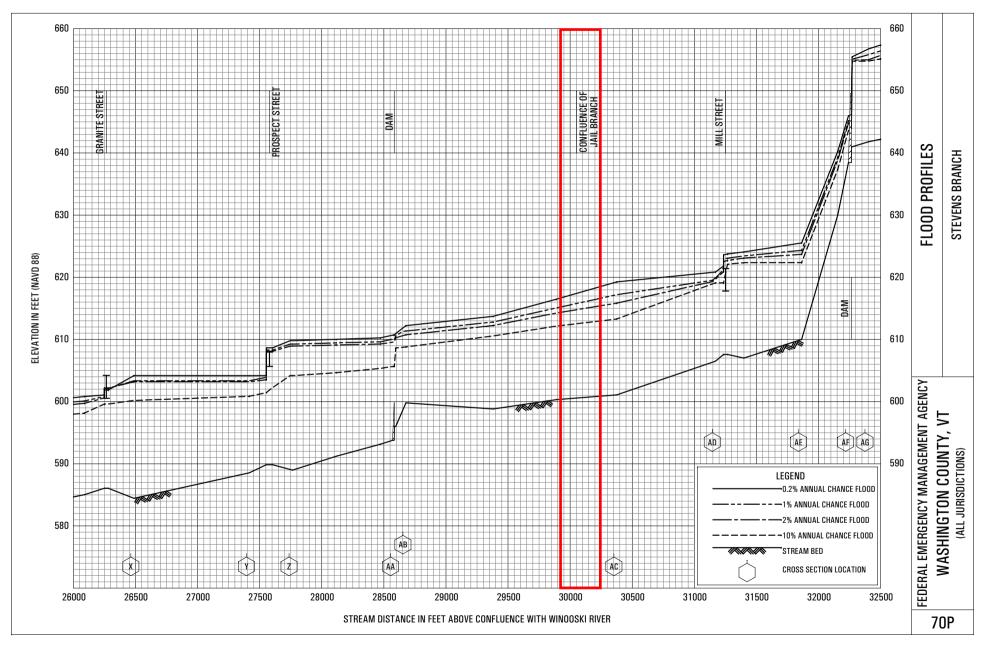
TABLE

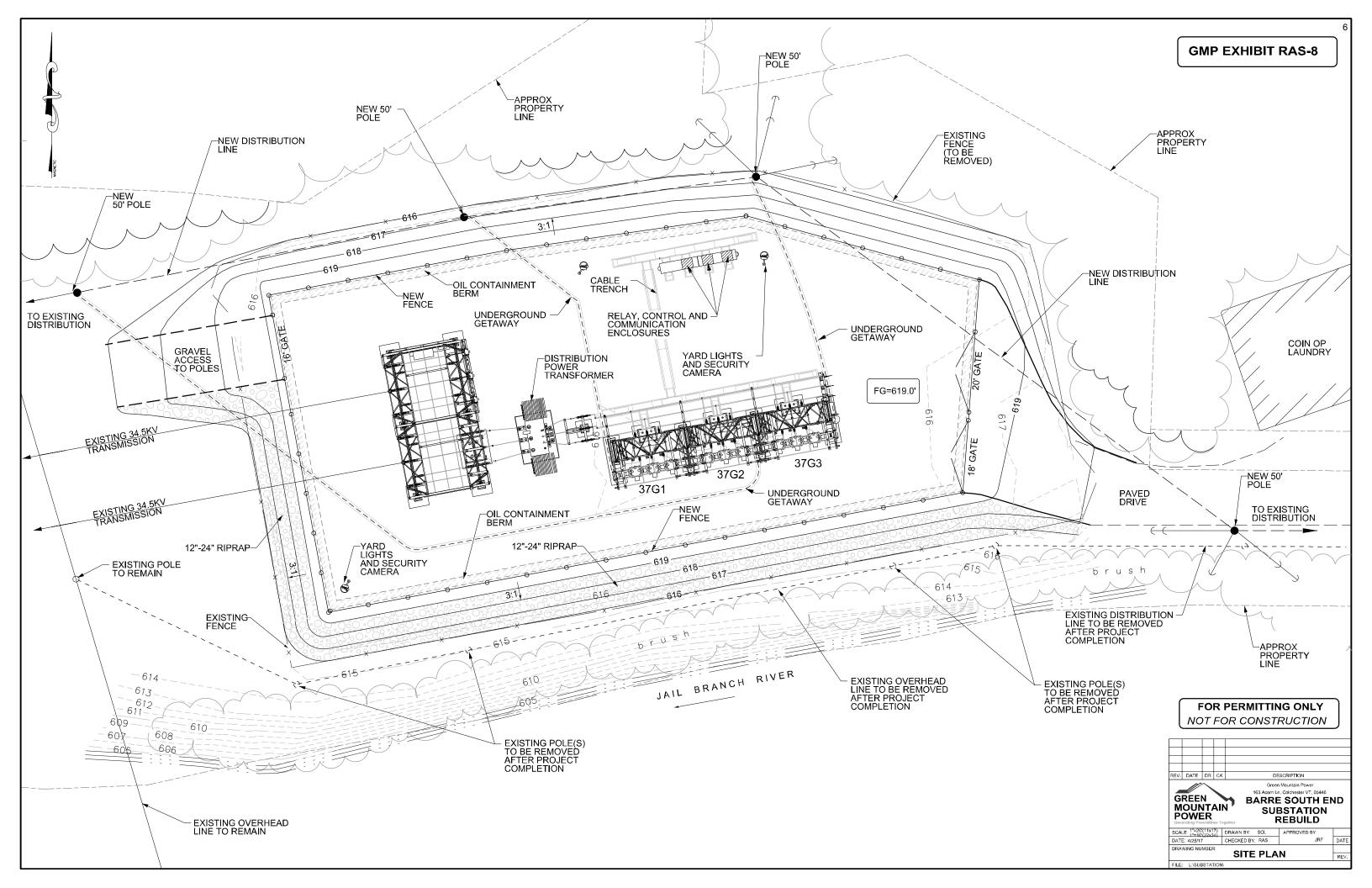
FEDERAL EMERGENCY MANAGEMENT AGENCY

WASHINGTON COUNTY, VT (ALL JURISDICTIONS)

FLOODWAY DATA

STEVENS BRANCH







Computations

Project:	GMP Barre South End Substation	Project #:	57886.00
Location:	Barre, Vermont	Sheet:	1 of 1
Calculated by:	RAW	Date:	8/16/17
Checked by:		Date:	
Title:	Floodplain Fill Analysis Calculations	•	

1. Approximate Floodplain Volume Between Elevation 614 and 616 (Base Flood Elevation)

Elevation (ft)	Area (sf)	Vol (cf)
614	0 *	
615	14,000	7,000
616	24,000	19,000
	Volume (cf)	26,000
	Volume (cy)	963

^{*} The ground surface of the portion of the parcel located west of the substation is at or below elevation 614. The volume of these areas is not calculated because no fill is proposed below this elevation.

2. Proposed Volume of Fill Between Elevation 614 and 616 (Driveway Ramp)

Elevation (ft)	Area (sf)	Vol (cf)
614	0	
615	1,093	547
616	642	868
	Volume (cf)	1,414
	Volume (cy)	52

3. Proposed Fill vs. Floodplain within Parcel Boundaries

Fill Volume (cy) 52
Floodplain Volume (cy) 963
Proposed Fill as a % of Floodplain **5%**

Green Mountain Power Corporation - Barre South End Substation Rebuild Project Barre City, VT List of Project Landowners / Abutters Prepared by VHB

Date: August 8, 2017

Property Owner	Street Address	Town	Status
Merton A. Supernault and Judy A. Romero	107 South Main Street	Barre, VT 05641	Abutter / Landowner
107 South Main Street LLC	109 South Main Street	Barre, VT 05641	Abutter / Landowner
Thomas J. & Karen C. Lauzon	111 South Main Street	Barre, VT 05641	Abutter / Landowner
Siu Hap Kung & Wai Fan Pau	119 South Main Street	Barre, VT 05641	Abutter / Landowner
F&M Bashara LLC	114 South Main Street	Barre, VT 05641	Abutter / Landowner
John H. & Joyce E. LaRose	131 South Main Street	Barre, VT 05641	Abutter / Landowner
Wall Street Investments	Brooklyn Street (vacant land)	Barre, VT 05641	Abutter / Landowner
Ernest & Linda Labrie	125 Brooklyn Street	Barre, VT 05641	Abutter / Landowner
Marcel J. Lafond Estate	121 Brooklyn Street	Barre, VT 05641	Abutter / Landowner
Monsignor Raymond R. Crosier Revocable Trust	Brooklyn Street	Barre, VT 05641	Abutter / Landowner
City of Barre	(vacant land)	Barre, VT 05641	Abutter / Landowner
Lyle Remick II	14 Elmore Street	Barre, VT 05641	Abutter / Landowner
George H. Wilson, IV; David R. Copping; & William C.	8 Elmore Street	Barre, VT 05641	Abutter / Landowner
Green Mountain Power	121 South Main Street	Barre, VT 05641	Abutter / Proponent

Additional Notices Required per Flood Hazard Area and River Corridor Permit

Entity Name	Street Address	Town	Status
Barre City - Clerk	6 North Main St, Ste 6	Barre, VT 05641	Town
Barre City - Planning Director	6 North Main St. Ste 7	Barre, VT 05641	Town
Central Vermont Regional Planning Commission	29 Main Street, Suite 4	Montpelier, VT 05602	RPC