



Memorandum

To: Jason Lisai and Preston Gregory,
GMP

Date: May 20, 2020

Project #: 57346.11

From: Ryan Scott and Adam Crary, PWS,
PWD

Re: KCW Level Spreader Relocation
Wetland and Waters Verification

On behalf of Green Mountain Power ("GMP"), following a preliminary walkover in mid-April 2020, VHB conducted a growing season review of existing wetlands and waters of the U.S. (e.g., streams) within six discrete Study Areas of the Kingdom Community Wind ("KCW") Site located in Lowell, Vermont. The review is to support the design and replacement of four existing stormwater level spreaders in the summer 2020 that must be re-located away from KCW mitigation parcels associated with the initial construction of the KCW Project. Wetland/water delineations and classifications were completed by VHB largely in 2009-2011 and reviewed by Vermont Agency of Natural Resources ("ANR") and the U.S. Army Corps of Engineers in order to issue original permits for the KCW project construction, most pertinent were the ANR's Vermont Wetland Permit (File #: 2008-364) and the USACE Individual Department of the Army Permit (Permit Number: NAE-2009-2408), and have since expired.

Wetland Delineation Review

The purpose of the 2020 delineation review was to document any changes to the boundaries of previously delineated wetlands resulting from ongoing natural processes or new normal circumstances following the construction of the KCW Project, which was largely completed in 2012. The wetland boundary review follows the USACE 2011 *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeastern Region (Version 2.0)* ("Regional Supplement"), which is the current manual required for wetland delineations in Vermont.

On May 14, 2020 (under early growing season conditions), VHB Senior Ecologists Adam Crary and Ryan Scott field reviewed the six (6) distinct study areas associated with the relocation of four (4) level spreaders; LS-A8, LS-A9, LS-A24 and LS-C16 (see the Wetland and Waters Level Spreader Relocation Map, Attachment 1). Study areas were determined by offsetting the potential ground disturbance limits from both removal of existing and construction of the relocated level spreaders by 50-feet. Due to space constraints, LS-A9 is proposed to be split into two smaller level spreaders on the opposite side of the Access Road, which therefore required investigation of three study areas (one existing and two new). At the remaining sites, the existing and proposed level spreader locations were in close proximity to one another and were each investigated as single study areas. Previously delineated wetlands and waters were converted into a GIS data file and uploaded to a tablet running a mobile mapping/data collection application using a real-time sub-meter GPS in order to accurately navigate along each existing feature boundary within each of the Study Areas. VHB documented current conditions, including any adjustments or additions to wetland and stream boundaries, with photographs (see Representative Site Photographs, Attachment 2) and USACE Wetland Determination Data Sheets (see Wetland Determination Data Forms, Attachment 3).

Results

Based on VHB's field review on May 14, 2020, VHB identified one new wetland and observed minor expansion in one previously delineated wetland within the Study Areas. The findings, which have not been field reviewed by the ANR or USACE, are reported in the section below, by the respective level spreader to be relocated:



Memorandum

LS-A8:

VHB identified one new wetland feature and one previously delineated wetland feature that required boundary modification within the LS-A8 Study Area. No streams were identified.

- Wetland 2020-100 is an approximately 6,520 square foot ("SF") new feature comprised of a palustrine forested ("PFO") and palustrine emergent wetland ("PEM") characteristics that is contained within the Study Area. The surrounding area was previously logged or used for a log landing (up until about 2012) and the wetland feature is positioned in a topographical depression created by being surrounded by existing or abandoned roads. It is apparent wetland hydrology has been increased through overland runoff and groundwater discharge likely from KCW access road construction. Dominant vegetation includes red maple (*Acer rubrum*), red spruce (*Picea rubens*), speckled alder (*Alnus incana*), cinnamon fern (*Osmunda cinnamomea*), and sensitive fern (*Onoclea sensibilis*). The wetland is a disconnected feature that lacks surface hydrologic connectivity to other features and does not meet any of the current Vermont Wetland Rules ("VWR") Section 4.6 presumptions so should be considered a Class III wetland under the VWR. VHB documented the new feature with representative photographs and USACE Wetland Determination Data form.
- Wetland 2009/20-B2 is a previously delineated Class III feature that required modification to expand the wetland boundary approximately 15 feet upgradient to the north and west to reflect current conditions including hydric soils, hydrophytic vegetation and evidence of direct hydrology (saturation). Although the wetland area has increased slightly in size from the prior delineation, overall conditions within the prior and current delineation area are the same as previously delineated and prior VWR Class III determination should be used. VHB documented the wetland and updated boundary with photographs.

LS-A9:

VHB confirmed the presence of two wetland features (2009/20-A1 and 2009/20-B1) and one stream feature (2009/20-TB-C3) within the Study Area associated with LS-A9. The previously delineated boundaries of all features are accurate and required no modification. VHB refreshed the delineation flagging and documented the Study Area and existing features with photographs.

LS-A24:

VHB confirmed the absence of wetland and stream features within the Study Area associated with LS-A24. The Study Area is documented with representative photographs and a USACE Wetland Determination Data form.

LS-C16:

VHB confirmed the absence of wetland and stream features within the Study Area associated with LS-C16. The Study Area is documented with representative photographs and a USACE Wetland Determination Data form.



Memorandum

Conclusions

Based on the May 14, 2020 field review, VHB ecologists identified one new wetland feature (2020-100) and one feature (2009/20-B2) requiring modification from the original 2009/2010 delineations. Both features are located within the LS-A8 Study Area.

It is VHB's judgement that there are no areas of level spreader removal or relocation disturbances within previous or new Class II wetlands or buffers and therefore would not require review under the VWR. This relocated level spreader LS-A8 will require grading to establish positive drainage within 50-feet of the Class III wetland 2009/20-B2, in which activities will consist of removing old fill associated with a prior logging road that is no longer used and allowed to naturally revegetate. The relocated LS-A8 design cannot avoid a portion of the newly delineated Class III wetland (2020-100), and the design has been minimized to reduce the footprint of grading and tree cutting in this wetland. Total disturbance in this Class III wetland will be 2,500-sf, largely within non-forested area formerly part of prior logging operations. Therefore, the relocation activities would not require a Vermont Wetland Permit.

The USACE administers Section 404 of the Clean Water Act ("CWA") authorizations for impacts relating to the placement of fill or other activities within a jurisdictional wetland or other Water of the U.S. In Vermont, generally, cumulative impacts of less than one-acre resulting from new fill, and which comply with general conditions, are authorized under the Vermont Programmatic General Permit ("GP", Permit No.: NAE-2017-02232) (USACE 2017). It is VHB's judgement that the level spreader relocation project, if constructed within the limits of disturbance shown on the Wetland and Waters Level Spreader Relocation Map, can meet the specific and general conditions of the USACE Vermont GP 17 (*New/expanded developments and recreational facilities*) as a self-verification activity.

Attachments

1. Wetland and Waters Level Spreader Relocation Map
2. Representative Site Photographs
3. Wetland Determination Data forms

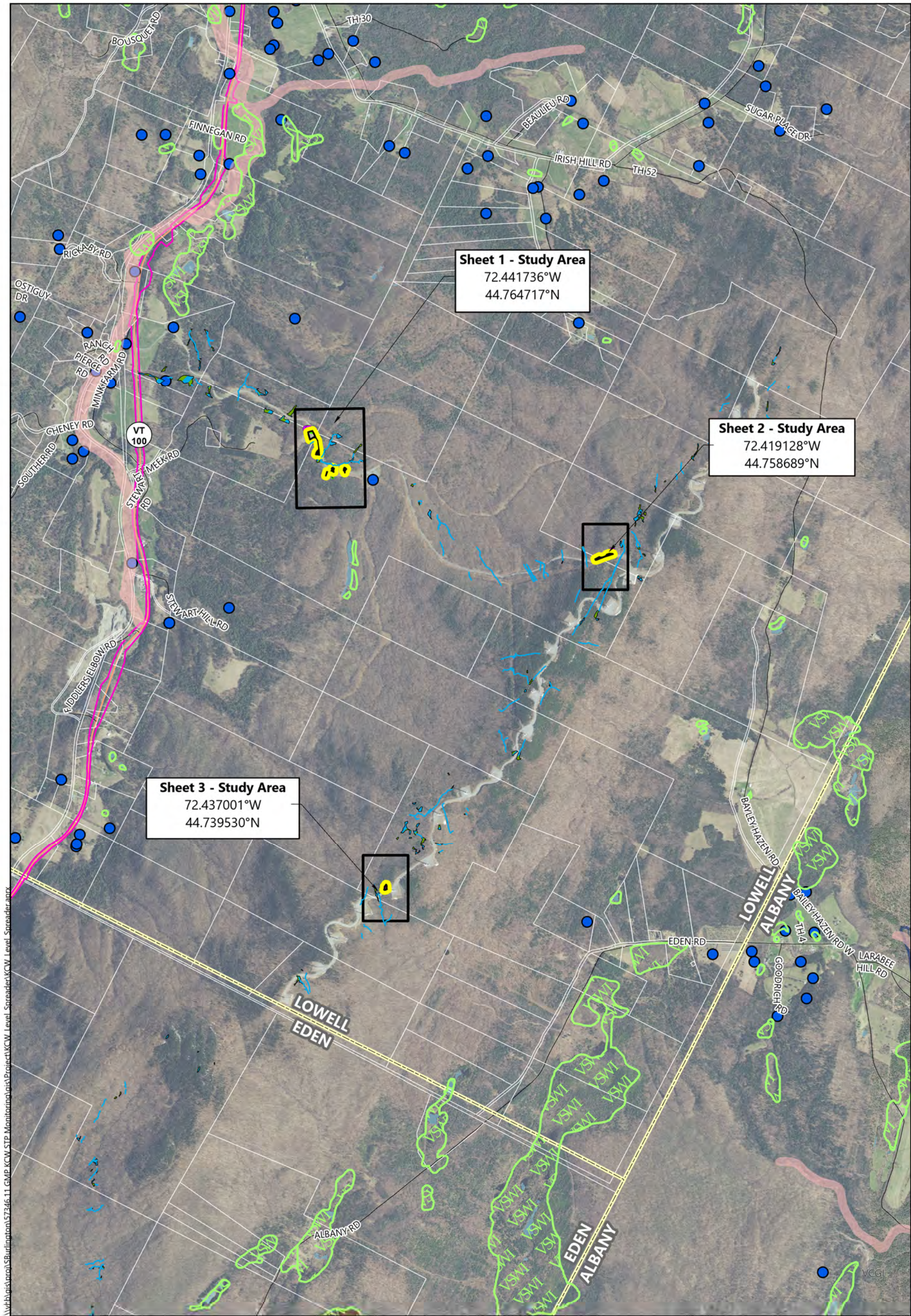
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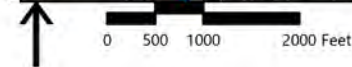
Building 100, Suite 200

South Burlington, VT 05403-7771

P 802.497.6100



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Kingdom Community Wind

Lowell, Vermont

Index Map (VHB) (3)	Wetland (4)	Wild Life (FWD)
Study Area (VHB) (5)	Water (ANR, FEMA, VHD)	NHI Element Occurrence (FWD) (2)
LOD (VHB) (6)	VSWI Wetland (ANR) (57)	Boundaries
Delineation Data Point (VHB) (4)	VHD Waterbody (VCGI) (57)	Town Boundary (VCGI) (3)
Delineated Wetland (VHB) (4)	River Corridor (ANR) (2)	Parcel Boundary (VCGI) (270)
Previously Delineated Wetland (VHB) (98)	Private Wells (ANR) (76)	Roads (VTrans)
Previously Delineated Streams (VHB) (107)	State Right Of Way (VTrans) (34)	State Highway (VTrans) (11)
Found Culvert (VHB) (1)	GW Protection Area (ANR) (1)	Town Road (VTrans) (56)

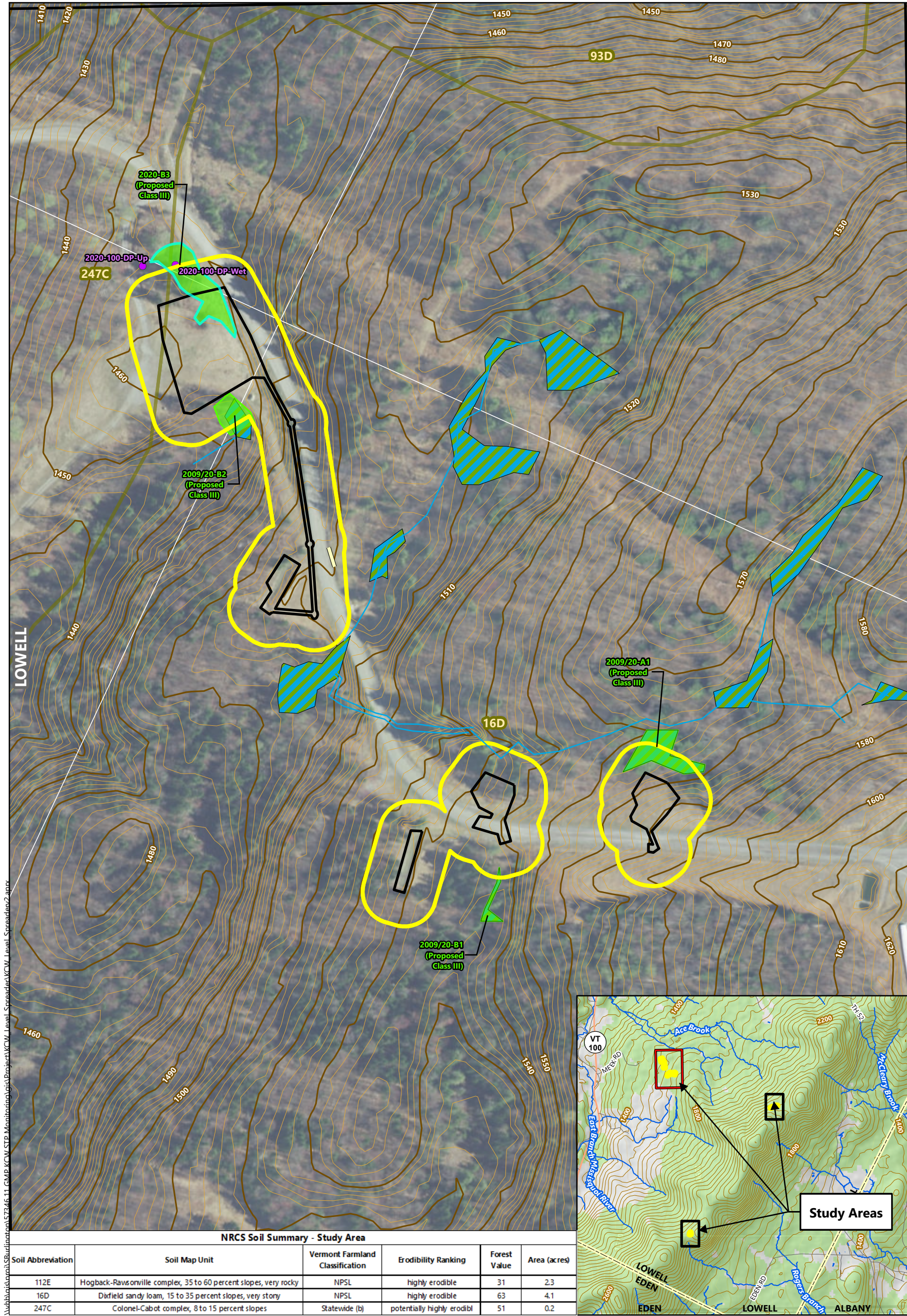
(#) Indicated number of feature located within map extent

**Digital FEMA Flood Zones not available for the map extent, a review of FEMA FIRM panel 50002 0025 B found no 100 year flood zones in the map extent.

Wetlands and Waters
Level Spreader Relocation Index

Sources:
Background Imagery by VCGI (Collected in 2017)
VCGI (Vermont Center for Geographic Information - Various Dates)
ANR (Vermont Agency of Natural Resources - Various Dates)
FEMA - Federal Emergency Management Agency
FWD (Vermont Fish and Wildlife Department - Various Dates)
VTrans (Vermont Agency of Transportation - 2017)
VHB - 2020

Wetlands/Waters conducted by M. Jackman, L. Keszey, A. Crary, and R. Scott April/May, 2020.



Kingdom Community Wind

Lowell, Vermont

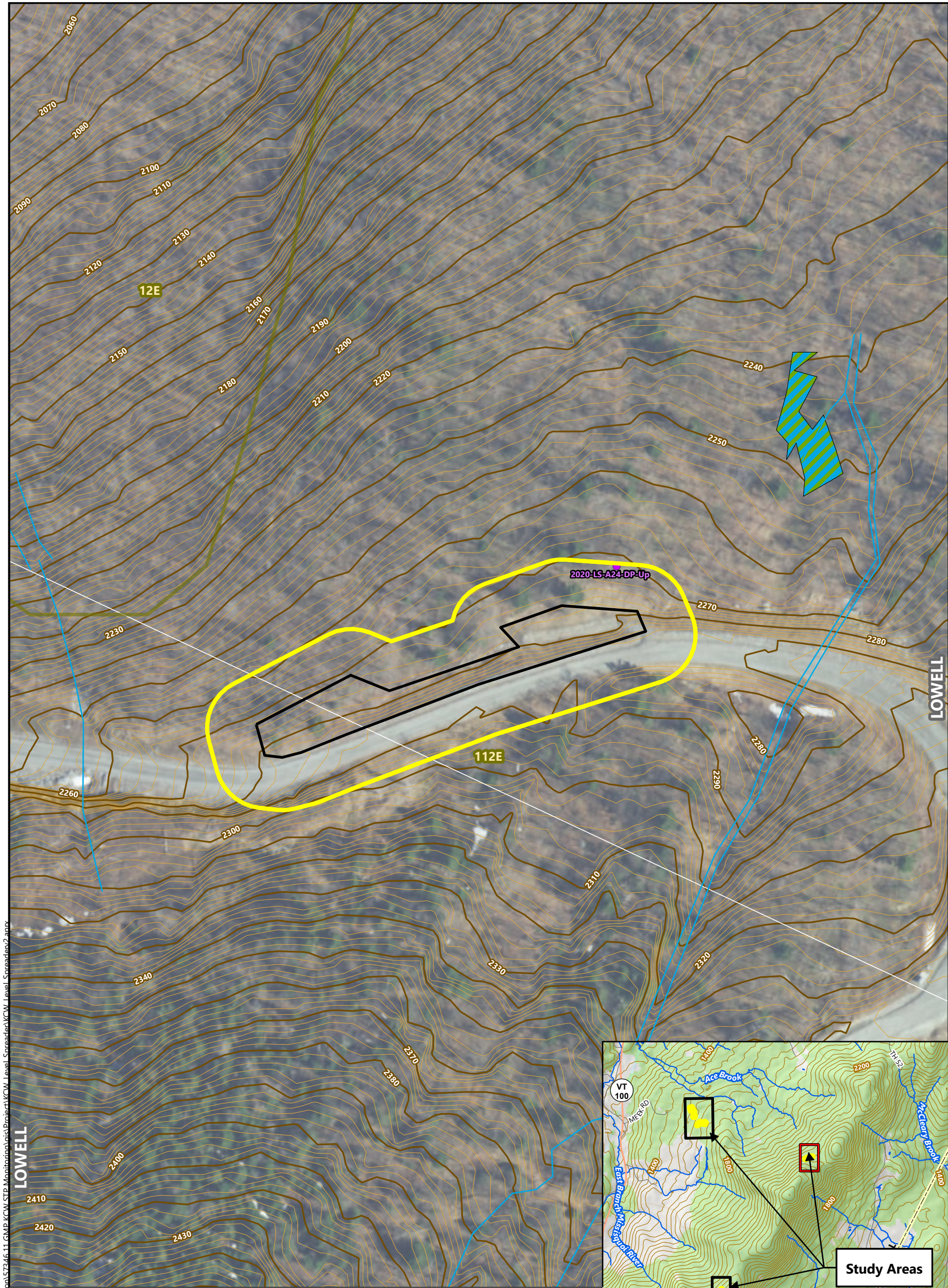
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VHB - 2020

Wetlands/Waters conducted by M. Jackman, L. Keszezy, A. Crary,
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- Study Area (VHB)(3)
- Delineated Wetland (VHB)(4)
- Delineated Stream or Ditch (VHB)(0)
- Delineation Data Point (VHB)(2)
- Found Culvert (VHB)(1)
- Previously Delineated Streams (VHB)
- Previously Delineated Wetland (VHB)
- Class II Wetland Buffer (VHB)(0)
- RTE Species Buffer (VHB)(0)
- Public Wells (ANR)(0)
- Private Wells (ANR)(0)
- GW Protection Area (ANR)(0)
- SW Protection Area (ANR)(0)
- VSWI Wetland (ANR)(0)
- River Corridor (ANR)(0)
- NHI Element Occurrence (FWD)(0)
- FEMA Floodway (VCGI)(0)
- FEMA 100 year Flood Zone (VCGI)(0)
- VHD Waterbody (VCGI)(0)
- NRCS Soil Boundary (VCGI)(3)
- Parcel Boundary (VCGI)(4)
- Town Boundary (VCGI)(1)
- State Right Of Way (VTrans)(0)
- 2 ft Contour (VCGI)(0)
- 10 ft Contour (VCGI)(0)

(#) Indicated number of feature located within map extent



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NRCS Soil Summary - Study Area					
Soil Abbreviation	Soil Map Unit	Vermont Farmland Classification	Erodibility Ranking	Forest Value	Area (acres)
112E	Hogback-Rawsonville complex, 35 to 60 percent slopes, very rocky	NPSL	highly erodible	31	2.3
16D	Dixfield sandy loam, 15 to 35 percent slopes, very stony	NPSL	highly erodible	63	4.1
247C	Colonel-Cabot complex, 8 to 15 percent slopes	Statewide (b)	potentially highly erodibl	51	0.2



Kingdom Community Wind

Lowell, Vermont

- Study Area (VHB)(1)

Delineated Wetland (VHB)(0)

Delineated Stream or Ditch (VHB)(0)

Delineation Data Point (VHB)(1)

Found Culvert (VHB)(0)

Previously Delineated Streams (VHB)

Previously Delineated Wetland (VHB)

Class II Wetland Buffer (VHB)(0)

RTE Species Buffer (VHB)(0)

Public Wells (ANR)(0)

Private Wells (ANR)(0)

GW Protection Area (ANR)(0)

SW Protection Area (ANR)(0)

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FEMA Floodway (VCGI)(0)

FEMA 100 year Flood Zone (VCGI)(0)

VHD Waterbody (VCGI)(0)

NRCS Soil Boundary (VCGI)(2)

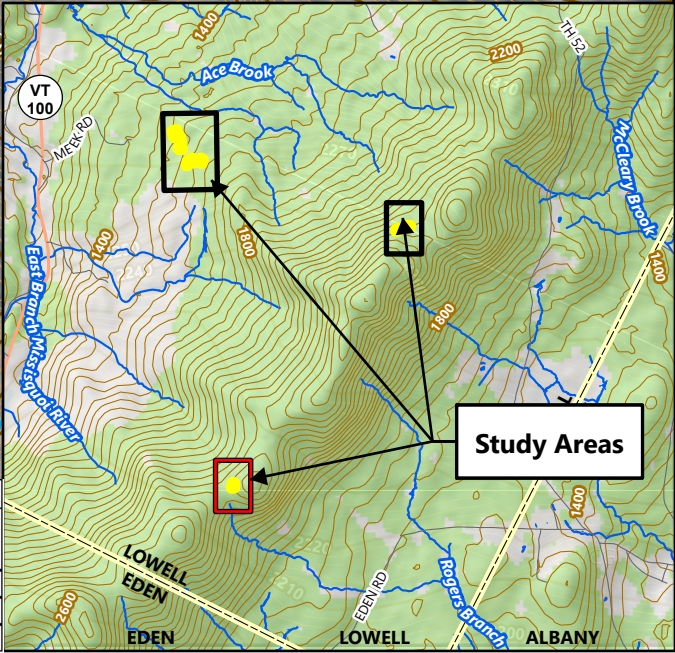
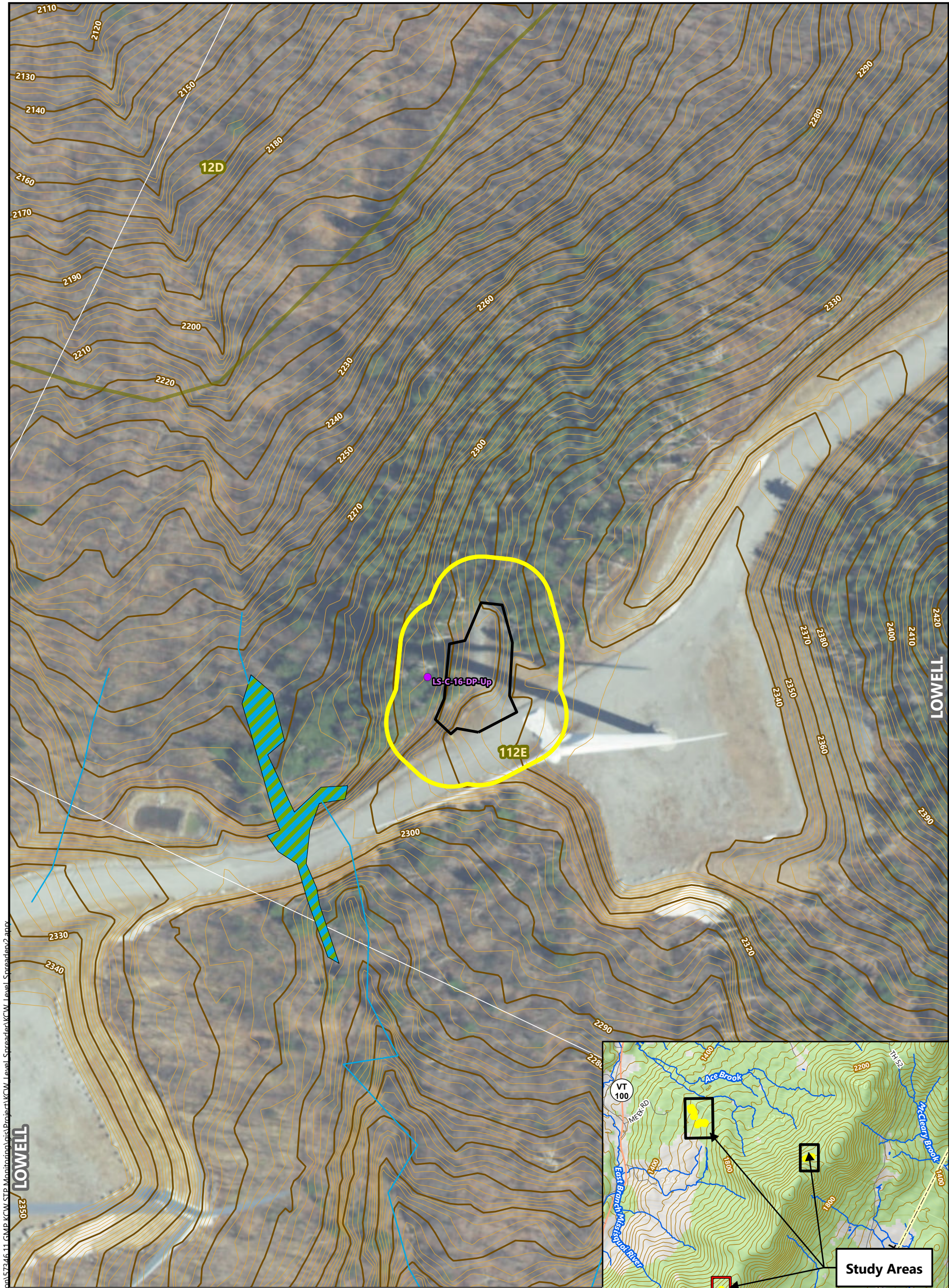
Parcel Boundary (VCGI)(2)

Town Boundary (VCGI)(1)

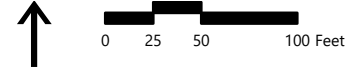
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Kingdom Community Wind

Lowell, Vermont

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Private Wells (ANR)(0)

GW Protection Area (ANR)(0)

SW Protection Area (ANR)(0)

VSWI Wetland (ANR)(0)

River Corridor (ANR)(0)

NHI Element Occurrence (FWD)(0)

FEMA Floodway (VCGI)(0)

FEMA 100 year Flood Zone (VCGI)(0)

VHD Waterbody (VCGI)(0)

NRCS Soil Boundary (VCGI)(4)

Parcel Boundary (VCGI)(3)

Town Boundary (VCGI)(1)

State Right Of Way (VTrans)(0)

2 ft Contour (VCGI)(202)

10 ft Contour (VCGI)(51)

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Level Spreader Relocation

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VHB - 2020

Wetlands/Waters conducted by M. Jackman, L. Keszezy, A. Crary, and R. Scott April/May, 2020.

(#) Indicated number of feature located within map extent

**Representative Site Photographs
KCW Level Spreader Relocation
Green Mountain Power Corp.
Lowell, Vermont**



Photograph 1. Representative view of proposed location LS-A8, view looking south along access road.



Photograph 2. Representative view of log landing and landing access road below LS-A8 view looking southwest.



Photograph 3. Representative view of upland in log landing below LS-A8.



Photograph 4. Representative view of proposed class III Wetland 2020-100. View looking north.



Photograph 5. Representative view of proposed class III Wetland 2009/2020-B2.



Photograph 6. Representative view of new proposed location of LS-A9. View looking north.

**Representative Site Photographs
KCW Level Spreader Relocation
Green Mountain Power Corp.
Lowell, Vermont**



Photograph 7. Representative view upland forest below proposed LS-A9 relocation area. View looking north



Photograph 8. Representative view of stream 2009-TB-C3 to the north of proposed LS- A9 location.



Photograph 9. Represent view of existing LS-A9.



Photograph 10. Representative view of proposed LS-A24 relocation area. View looking east.



Photograph 11. Representative view of upland woods below proposed LS-A24 relocation area. View looking east.



Photograph 12. Representative view of existing LS-C16.

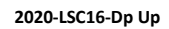
**Representative Site Photographs
KCW Level Spreader Relocation
Green Mountain Power Corp.
Lowell, Vermont**



Photograph 13. Representative view proposed relocation location of LS-C16.
View looking south.



Photograph 14. Representative view upland forest below LS-C16.



Tree Stratum (Plot size: <u>30' RAD</u>)	Absolute % Cover	Dom. Sp?	Indicator Status	
1. Betula cordifolia	63	X	FACU	Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>1</u> (A) # Dominants across all strata: <u>6</u> (B) % Dominants OBL, FACW, FAC: <u>17%</u> (A/B)
2. Picea rubens	15		FACU	
3. Acer saccharum	3		FACU	
4. _____				
5. _____				
6. _____				
7. _____				
81 = Total Cover				Prevalence Index Worksheet: Total % Cover of: _____ Multiply By: _____ OBL _____ x 1 = _____ FACW _____ x 2 = _____ FAC 21 x 3 = 63 FACU 170 x 4 = 680 UPL _____ x 5 = _____ Sum: 191 (A) 743 (B) Prevalence Index = B/A = 3.89
Sapling Stratum (Plot size: <u>15' RAD</u>)				
1. Picea rubens	38	X	FACU	
2. _____				
3. _____				
4. _____				
5. _____				
38 = Total Cover				
Shrub Stratum (Plot size: <u>15' RAD</u>)				Hydrophytic Vegetation Indicators: _____ Dominance Test is > 50% _____ Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. Viburnum lantanoides	15	X	FACU	
2. Picea rubens	15	X	FACU	
3. Abies balsamea	3		FAC	
4. _____				
5. _____				
6. _____				
33 = Total Cover				
Herb Stratum (Plot size: <u>5' RAD</u>)				Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height.
1. Cornus canadensis	15	X	FAC	
2. Dryopteris campyloptera	15	X	FACU	
3. Huperzia lucidula	3		FAC	
4. Erythronium americanum	3		FACU	
5. Dendrolycopodium obscurum	3		FACU	
6. _____				
7. _____				
8. _____				
9. _____				
10. _____				
11. _____				
12. _____				
39 = Total Cover				
Woody Vines (Plot size: <u>15' RAD</u>)				Hydrophytic Vegetation Present? <u>NO</u>
1. _____				
2. _____				
3. _____				
4. _____				
5. _____				
_____ = Total Cover				
Remarks: (If observed, list morphological adaptations below).				



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2020-LSA24-Dp Up

Project Site:	KCW 2020 Level Spreader Relocation	City/County:	Orleans	Samp. Date:	5/14/2020
Applicant/Owner:	Green Mountain Power	State:	VT	Sampling Point:	2020-LSA24-Dp Up
Investigator(s):	ARC, RMS	Section, Township, Range:	Lowell		
Landform (hillslope, terrace, etc.):	Flat	Local relief (concave, convex, none):	Flat	Slope (%):	35-60%
Subregion (LRR or MLRA):	LRR R	Lat:	44.758942,	Long:	
Soil Map Unit:	Hogback Rawsonville complex	Datum:	NAD 83	NWI Class:	UPL
Are climatic/hydrologic conditions on the site typical for this time of year? ☐ Yes (If no, explain in Remarks.)					
Are Vegetation, Soil, or Hydrology significantly disturbed? ☐ No Normal Circumstances? ☐ Yes					
Are Vegetation, Soil, or Hydrology naturally problematic? ☐ NO (If needed, explain any answers in Remarks.)					

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	☐ NO	Is This Sample Area Within a Wetland?	☐ NO
Hydric Soil Present?	☐ NO		
Wetland Hydrology Present?	☐ NO		
Remarks: Upland in flat bench down slope of existing LS			

HYDROLOGY

Wetland Hydrology Indicators:		Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)			
☐ Surface Water (A1)	☐ Water-Stained Leaves (B9)	☐ Surface Soil Cracks (B6)	
☐ High Water Table (A2)	☐ Aquatic Fauna (B13)	☐ Drainage Patterns (B10)	
☐ Saturation (A3)	☐ Marl Deposits (B13)	☐ Moss Trim Lines (B16)	
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)	☐ Dry-Season Water Table (C2)	
☐ Sediment Deposits (B2)	☐ Oxidized Rhizospheres on Living Roots (C3)	☐ Crayfish Burrows (C8)	
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)	☐ Saturation Visible on Aerial (C9)	
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)	☐ Stunted or Stressed Plants (D1)	
☐ Iron Deposits (B5)	☐ Thin Muck Surface (C7)	☐ Geomorphic Position (D2)	
☐ Inundation Visible on Aerial (B7)	☐ Other (Explain in Remarks)	☐ Shallow Aquitard (D3)	
☐ Sparsely Vegetated Concave Surface (B8)		☐ Microtopographic Relief (D4)	
		☐ FAC-Neutral Test (D5)	
Field Observations:		Wetland Hydrology Present?	
Surface Water Present?	Depth (inches):	☐ NO	
Water Table Present?	Depth (inches):		
Saturation Present?	Depth (inches):		
	X	13	
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 0.45" of rain in 7 days prior in Northeast region, VT (NWS 2020); PDSI 0.75 (Near Normal) for week ending 5/8/21			
Remarks:			

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth	Matrix		Redox Features			Texture	Remarks
(in)	Color (moist)	%	Color (moist)	%	Type ¹	Loc ²	
1-0							ORGANIC
0-12	10YR 3/3	98	10YR 3/4	2	C	M	SILT LOAM
12-16+	10YR 4/3	95	10YR 4/4	5	c	m	FINE SANDY LOAM
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.							
Hydric Soil Indicators:		Indicators for Problematic Hydric Soils ³ :					
☐ Histosol (A1)	☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)	☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)					
☐ Histic Epipedon (A2)	☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)	☐ Coast Prairie Redox (A16) (LRR K, L, R)					
☐ Black Histic (A3)	☐ Loamy Mucky Mineral (F1) (LRR K, L)	☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)					
☐ Hydrogen Sulfide (A4)	☐ Loamy Gleyed Matrix (F2)	☐ Dark Surface (S9) (LRR K, L, M)					
☐ Stratified Layers (A5)	☐ Depleted Matrix (F3)	☐ Polyvalue Below Surface (S8) (LRR K, L)					
☐ Depleted Below Dark Surface (A11)	☐ Redox Dark Surface (F6)	☐ Thin Dark Surface (S9) (LRR K, L)					
☐ Thick Dark Surface (A12)	☐ Depleted Dark Surface (F7)	☐ Iron-Manganese Masses (F12) (LRR K, L, R)					
☐ Sandy Mucky Mineral (S1)	☐ Redox Depressions (F8)	☐ Piedmont Floodplain Soils (F19) (MLRA 149B)					
☐ Sandy Gleyed Matrix (S4)		☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)					
☐ Sandy Redox (S5)		☐ Red Parent Material (F21)					
☐ Stripped Matrix (S6)		☐ Very Shallow Dark Surface (TF12)					
☐ Dark Surface (S7) (LRR R, MLRA 149B)		☐ Other (Explain in Remarks)					
³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.							
Restrictive Layer (if observed):		Hydric Soil Present?					
Type:		☐ NO					
Depth (inches):							
Remarks:							

Tree Stratum (Plot size: 30' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status	
1. Acer saccharum	63	X	FACU	Dominance Test Worksheet: # Dominants OBL, FACW, FAC: 2 (A) # Dominants across all strata: 8 (B) % Dominants OBL, FACW, FAC: 25% (A/B)
2. Betula alleghaniensis	15		FAC	
3.				
4.				
5.				
6.				
7.				
	78	= Total Cover		Prevalence Index Worksheet: Total % Cover of: _____ Multiply By: _____ OBL _____ x 1 = _____ FACW 15 x 2 = 30 FAC 30 x 3 = 90 FACU 173 x 4 = 692 UPL _____ x 5 = _____ Sum: 218 (A) 812 (B) Prevalence Index = B/A = 3.72
Sapling Stratum (Plot size: 15' RAD)				
1. Acer saccharum	38	X	FACU	
2. Fagus grandifolia	15	X	FACU	
3.				
4.				
5.				
6.				
7.				
	53	= Total Cover		
Shrub Stratum (Plot size: 15' RAD)				Hydrophytic Vegetation Indicators: _____ Dominance Test is > 50% _____ Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.
1. Fagus grandifolia	15	X	FACU	
2. Acer saccharum	3		FACU	
3. Viburnum lantanoides	3		FACU	
4. Sambucus racemosa	3		FACU	
5.				
6.				
7.				
	24	= Total Cover		
Herb Stratum (Plot size: 5' RAD)				Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height.
1. Claytonia caroliniana	15	X	FACU	
2. Erythronium americanum	15	X	FACU	
3. Dryopteris intermedia	15	X	FAC	
4. Veratrum viride	15	X	FACW	
5. Trillium erectum	3		FACU	
6.				
7.				
8.				
9.				
10.				
11.				
12.				
	63	= Total Cover		
Woody Vines (Plot size: 15' RAD)				
1.				
2.				
3.				
4.				
5.				
		= Total Cover		

Remarks: (If observed, list morphological adaptations below).



WETLAND DETERMINATION DATA FORM - Northcentral and Northeast Region

2020-100-Dp Wet

Project Site:	KCW 2020 Level Spreader Relocation		City/County:	Orleans	Samp. Date:	5/14/2020
Applicant/Owner:	Green Mountain Power		State:	VT	Sampling Point:	2020-100-Dp Wet
Investigator(s):	ARC, RMS		Section, Township, Range:	Lowell		
Landform (hillslope, terrace, etc.):	Flat	Local relief (concave, convex, none):	Concave			
Subregion (LRR or MLRA):	LRR R	Lat:	44.766262,	Long:		Slope (%): 2-10%
Soil Map Unit:	Colonel-Cabot Complex		Datum:	NAD 83		
			NWI Class:	PFO		
Are climatic/hydrologic conditions on the site typical for this time of year? Yes (If no, explain in Remarks.)						
Are Vegetation, Soil, or Hydrology significantly disturbed? No Normal Circumstances? Yes						
Are Vegetation, Soil, or Hydrology naturally problematic? NO (If needed, explain any answers in Remarks.)						

SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	YES	Is This Sample Area Within a Wetland?	YES
Hydric Soil Present?	YES		
Wetland Hydrology Present?	YES		
Remarks: PFO near wetland flag 2020-100-3			

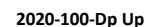
HYDROLOGY

Wetland Hydrology Indicators:			Secondary Indicators (minimum of two required)	
Primary Indicators (minimum of one is required; check all that apply)				
☐ Surface Water (A1)	☒ Water-Stained Leaves (B9)	☐ Surface Soil Cracks (B6)		
☐ High Water Table (A2)	☐ Aquatic Fauna (B13)	☐ Drainage Patterns (B10)		
☒ Saturation (A3)	☐ Marl Deposits (B13)	☐ Moss Trim Lines (B16)		
☐ Water Marks (B1)	☐ Hydrogen Sulfide Odor (C1)	☐ Dry-Season Water Table (C2)		
☐ Sediment Deposits (B2)	☒ Oxidized Rhizospheres on Living Roots (C4)	☐ Crayfish Burrows (C8)		
☐ Drift Deposits (B3)	☐ Presence of Reduced Iron (C4)	☐ Saturation Visible on Aerial (C9)		
☐ Algal Mat or Crust (B4)	☐ Recent Iron Reduction in Tilled Soils (C6)	☒ Stunted or Stressed Plants (D1)		
☐ Iron Deposits (B5)	☐ Thin Muck Surface (C7)	☐ Geomorphic Position (D2)		
☐ Inundation Visible on Aerial (B7)	☐ Other (Explain in Remarks)	☐ Shallow Aquitard (D3)		
☐ Sparsely Vegetated Concave Surface (B8)		☐ Microtopographic Relief (D4)		
		☐ FAC-Neutral Test (D5)		
Field Observations:				
Surface Water Present?	Depth (inches):	Wetland Hydrology Present? YES		
Water Table Present? X	Depth (inches): surface			
Saturation Present? X	Depth (inches): 1			
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available: 0.45" of rain in 7 days prior in Northeast region, VT (NWS 2020); PDSI 0.75 (Near Normal) for week ending 5/8/22				
Remarks: Wetland hydrology likely increased in area since prior delineation due to road construction. Area is a basin surrounded by existing and				

SOIL

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)							
Depth (in)	Matrix		Redox Features			Texture	Remarks
0-5	10YR 3/1	95	10YR 3/6	5	c	m	FINE SANDY LOAM
5-11	10YR 3/1	95	10YR 3/6	5	C	M	FINE SANDY LOAM
11-14	2.5y 5/1	100					SANDY LOAM
¹ Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ² Location: PL=Pore Lining, M=Matrix.							
Hydric Soil Indicators:			Indicators for Problematic Hydric Soils ³ :				
☐ Histosol (A1)			☐ Polyvalue Below Surface (S8) (LRR R, MLRA 149B)	☐ 2 cm Muck (A10) (LRR K, L, MLRA 149B)			
☐ Histic Epipedon (A2)			☐ Thin Dark Surface (S9) (LRR R, MLRA 149B)	☐ Coast Prairie Redox (A16) (LRR K, L, R)			
☐ Black Histic (A3)			☐ Loamy Mucky Mineral (F1) (LRR K, L)	☐ 5 cm Mucky Peat or Peat (S3) (LRR K, L, R)			
☐ Hydrogen Sulfide (A4)			☐ Loamy Gleyed Matrix (F2)	☐ Dark Surface (S9) (LRR K, L, M)			
☐ Stratified Layers (A5)			☐ Depleted Matrix (F3)	☐ Polyvalue Below Surface (S8) (LRR K, L)			
☒ Depleted Below Dark Surface (A11)			☒ Redox Dark Surface (F6)	☐ Thin Dark Surface (S9) (LRR K, L)			
☐ Thick Dark Surface (A12)			☐ Depleted Dark Surface (F7)	☐ Iron-Manganese Masses (F12) (LRR K, L, R)			
☐ Sandy Mucky Mineral (S1)			☐ Redox Depressions (F8)	☐ Piedmont Floodplain Soils (F19) (MLRA 149B)			
☐ Sandy Gleyed Matrix (S4)				☐ Mesic Spodic (TA6) (MLRA 144A, 145, 149B)			
☐ Sandy Redox (S5)				☐ Red Parent Material (F21)			
☐ Stripped Matrix (S6)				☐ Very Shallow Dark Surface (TF12)			
☐ Dark Surface (S7) (LRR R, MLRA 149B)				☐ Other (Explain in Remarks)			
³ Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.							
Restrictive Layer (if observed):			Hydric Soil Present? YES				
Type:							
Depth (inches):							
Remarks: Rock refusal @ 14"							

Tree Stratum (Plot size: <u>30' RAD</u>)	Absolute % Cover	Dom. Sp?	Indicator Status																						
1. Acer rubrum	38	X	FAC	Dominance Test Worksheet: # Dominants OBL, FACW, FAC: <u>5</u> (A) # Dominants across all strata: <u>6</u> (B) % Dominants OBL, FACW, FAC: <u>83%</u> (A/B)																					
2. Picea rubens	15	X	FACU																						
3. Betula alleghaniensis	3		FAC																						
4. Betula populifolia	3		FAC																						
5. _____																									
6. _____																									
7. _____																									
59 = Total Cover				Prevalence Index Worksheet: <table style="width: 100%;"> <tr> <th colspan="2">Total % Cover of:</th> <th>Multiply By:</th> </tr> <tr> <td>OBL <u>1</u></td> <td>x 1 =</td> <td><u>1</u></td> </tr> <tr> <td>FACW <u>132</u></td> <td>x 2 =</td> <td><u>264</u></td> </tr> <tr> <td>FAC <u>65</u></td> <td>x 3 =</td> <td><u>195</u></td> </tr> <tr> <td>FACU <u>23</u></td> <td>x 4 =</td> <td><u>92</u></td> </tr> <tr> <td>UPL _____</td> <td>x 5 =</td> <td>_____</td> </tr> <tr> <td>Sum: <u>221</u> (A)</td> <td></td> <td><u>552</u> (B)</td> </tr> </table> Prevalence Index = B/A = <u>2.50</u>	Total % Cover of:		Multiply By:	OBL <u>1</u>	x 1 =	<u>1</u>	FACW <u>132</u>	x 2 =	<u>264</u>	FAC <u>65</u>	x 3 =	<u>195</u>	FACU <u>23</u>	x 4 =	<u>92</u>	UPL _____	x 5 =	_____	Sum: <u>221</u> (A)		<u>552</u> (B)
Total % Cover of:		Multiply By:																							
OBL <u>1</u>	x 1 =	<u>1</u>																							
FACW <u>132</u>	x 2 =	<u>264</u>																							
FAC <u>65</u>	x 3 =	<u>195</u>																							
FACU <u>23</u>	x 4 =	<u>92</u>																							
UPL _____	x 5 =	_____																							
Sum: <u>221</u> (A)		<u>552</u> (B)																							
Sapling Stratum (Plot size: <u>15' RAD</u>)																									
1. Acer rubrum	15	X	FAC																						
2. Picea rubens	3		FACU																						
3. _____																									
4. _____																									
5. _____																									
6. _____																									
7. _____																									
18 = Total Cover																									
Shrub Stratum (Plot size: <u>15' RAD</u>)				Hydrophytic Vegetation Indicators: ☒ Dominance Test is > 50% ☒ Prevalence Index is <= 3.0 _____ Problematic Hydrophytic Vegetation ¹ (explain) _____ Rapid Test for Hydrophytic Vegetation _____ Morphological Adaptations ¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.																					
1. Alnus incana	38	X	FACW																						
2. Fraxinus nigra	3		FACW																						
3. Abies balsamea	3		FAC																						
4. Lonicera canadensis	1		FACU																						
5. _____																									
6. _____																									
7. _____																									
45 = Total Cover																									
Herb Stratum (Plot size: <u>5' RAD</u>)				Definitions of Vegetation Strata: Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH). Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH. Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height. Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height. Woody vine - All woody vines, regardless of height.																					
1. Osmunda cinnamomea	38	X	FACW																						
2. Onoclea sensibilis	38	X	FACW																						
3. Impatiens capensis	15		FACW																						
4. Tiarella cordifolia	3		FACU																						
5. Dryopteris intermedia	3		FAC																						
6. Symphotrichum puniceum	1		OBL																						
7. Erythronium americanum	1		FACU																						
8. _____																									
9. _____																									
10. _____																									
11. _____																									
12. _____																									
99 = Total Cover																									
Woody Vines (Plot size: <u>15' RAD</u>)				Hydrophytic Vegetation Present? <u>YES</u>																					
1. _____																									
2. _____																									
3. _____																									
4. _____																									
5. _____																									
_____ = Total Cover																									
Remarks: (If observed, list morphological adaptations below).																									



SUMMARY OF FINDINGS - Attach site map showing sample point locations, transects, important features, etc.

HYDROLOGY

Remarks: Questionable wetland hydrology with no other corroborative growing season indicators and prevalence index indicating non-hydrophytic

SOIL

¹Type: C=Concentration, D=Depletion, RM=Reduced Matrix, MS=Masked Sand Grains. ²Location: PL=Pore Lining, M=Matrix.

Remarks:	
----------	--

Tree Stratum	(Plot size: 30' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status
1.	Acer rubrum	38	X	FAC
2.	Abies balsamea	15	X	FAC
3.	Betula papyrifera	15	X	FACU
4.	Acer pensylvanicum	3		FACU
5.	Betula populifolia	3		FAC
6.	Picea rubens	3		FACU
7.				
		77	= Total Cover	

Sapling Stratum	(Plot size: 15' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status
1.	Acer rubrum	15	X	FAC
2.	Betula alleghaniensis	3		FAC
3.				
4.				
5.				
6.				
7.				
		18	= Total Cover	

Shrub Stratum	(Plot size: 15' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status
1.	Picea rubens	15	X	FACU
2.	Betula papyrifera	3		FACU
3.	Prunus pensylvanica	3		FACU
4.	Fraxinus americana	3		FACU
5.				
6.				
7.				
		24	= Total Cover	

Herb Stratum	(Plot size: 5' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status
1.	Pteridium aquilinum	38	X	FACU
2.	Osmunda cinnamomea	15	X	FACW
3.	Maianthemum canadense	3		FACU
4.	Onoclea sensibilis	3		FACW
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
		59	= Total Cover	

Woody Vines	(Plot size: 15' RAD)	Absolute % Cover	Dom. Sp?	Indicator Status
1.				
2.				
3.				
4.				
5.				
			= Total Cover	

Dominance Test Worksheet:

Dominants OBL, FACW, FAC: **4** (A)

Dominants across all strata: **7** (B)

% Dominants OBL, FACW, FAC: **57%** (A/B)

Prevalence Index Worksheet:

Total % Cover of:	Multiply By:
OBL	x 1 =
FACW 18	x 2 = 36
FAC 74	x 3 = 222
FACU 86	x 4 = 344
UPL	x 5 =
Sum: 178 (A)	602 (B)

Prevalence Index = B/A = **3.38**

Hydrophytic Vegetation Indicators:

X Dominance Test is > 50%

Prevalence Index is <= 3.0

Problematic Hydrophytic Vegetation¹ (explain)

Rapid Test for Hydrophytic Vegetation

Morphological Adaptations

¹Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Definitions of Vegetation Strata:

Tree - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and 3in (7.6cm) or larger in diameter at breast height (DBH).

Sapling - Woody plants, excluding woody vines, approximately 20ft (6m) or more in height and less than 3in (7.6cm) DBH.

Shrub - Woody plants, excluding woody vines, approximately 3 to 20ft (1 to 6m) in height.

Herb - All herbaceous (non-woody) plants, including herbaceous vines, regardless of size. Includes woody plants, except woody vines, less than approximately 3ft (1m) in height.

Woody vine - All woody vines, regardless of height.

Hydrophytic Vegetation Present? **YES**

Remarks: (If observed, list morphological adaptations below).