

# **APPENDIX 2**

GMP/Kingdom Community Wind (KCW)  
 Lowell, Westfield, and Jay, Vermont  
 Summary of Delineated Wetlands - Transmission Component  
 Prepared by VHB Pioneer  
 February 2010

Wetland ID	Approximate Total Delineated Area (Sq. Feet)	Cowardin Classification <sup>1</sup>	Principle Functions and Values <sup>2</sup>	VSWI Class <sup>3</sup>	Map (Appendix 6)	Comments
2009-C1	590	PEM1Y	STP	III	1	Small wetland feature on VT-Route 100; Depressional feature with distinct topographic break
2009-C2	7,970	PEM/SS1Y/FO	GW,W	II	1	Saturated to the surface, sulfidic odor; extends beyond investigation area; amphibian habitat; forested fringe
2009-C3	950	PEM1Y	GW, STP	III	2	Close proximity to Route 100; buffers drainage ditch in agricultural field; saturated to the surface; wetland extends beyond ROW
2009-C5	7,830	PEM1Y	GW, STP	II	1	Close proximity to Route 100; saturated to surface; wetland extends beyond ROW
2009-C6	4,340	PEM1Y	NUT,SS	III	2	Saturated to surface, drainage channels; located in field; wetland extends beyond ROW
2009-C7	2,710	PEM1Y	GW/STP	III	3	Located along field, saturated to surface, soils depleted with many prominent redoximorphic features
2009-C8	3,650	PEM/SS1Y	GW/STP	III	3	Saturated to the surface, drainage channels; close in proximity to Route 100; wetland extends beyond ROW
2009-C9A	3,680	PEM/SS1Y	GW,STP,NUT,SS	III	3	Along stream 2009-TB-C6; continues into agricultural field; drainage channels, along Route 100
2009-C9B	3,260	PEM1Y	GW, STP	III	3	Emergent wetland extends into field, drains into intermittent stream, 2009-SC-C8
2009-C10	1,400	PEM1Y	STP	III	3	Saturated to the surface, along Route 100; small feature
2009-C11	31,210	PEM/SS1Y	GW, STP, SS, W	III	3	Large feature, extends off ROW; saturated to surface with drainage channels; three large culverts drain to feature
2009-C12	7,890	PEM1Y	STP	III	3	Drains to drainage ditch; saturated to surface; wetland extends beyond ROW
2009-C13A	15,250	PEM1Y	STP, NUT,GW	III	3	Emergent wetland along road; saturated to surface; drainage swale within mowed field; hydrologically connected to wetland 2009-C13B; wetland extends beyond ROW
2009-C13B	3,690	PEM1Y	STP, NUT,GW	III	4	Emergent wetland along road; saturated to surface; drainage swale within mowed field; hydrologically connected to wetland 2009-C13A; wetland extends beyond ROW

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2009-C14A	2,090	PEM1Y	STP, NUT, GW	III	4	Emergent wetland feature in field; close in proximity to grazing activity; receives runoff from Route 100; hydrologically connected to wetland 2009-C14B; wetland extends beyond ROW
2009-C14B	7,040	PEM1Y	STP, NUT, GW	III	4	Emergent wetland feature in field; close in proximity to grazing activity; receives runoff from Route 100; hydrologically connected to wetland 2009-C14A
2009-C15	1,490	PEM/SS1Y	SS, STP	III	4	Stream 2009-SC-C13 drains into feature; receives runoff from Route 100
2009-C16	1,030	PEM1Y	GW	III	4	Drainage channels; saturated to the surface; small feature; stream 2009-SC-C14 drains along wetland feature
2009-C17	8,640	PEM1Y	GW, STP	II	4	Drainage channels; saturated to the surface; hydrologically connected to mapped Class II pond; drains under route 100 via 12" CMP culvert; wetland extends beyond ROW
2009-C18	40,730	PEM/SS/FO1Y	GW, W	III	4	Saturated to the surface; forested fringe; distinct topographic break; deer tracks at time of survey
2009-C19	100,770	PEM1Y	GW, SS, STP, NUT, W	III	4	Saturated to the surface, along perennial stream-2009-SC-C19; receives runoff from fields and road; amphibian habitat
2009-C20	6,340	PEM11Y	GW, NUT	III	4	Saturated to surface; receives hydrology from 24" CMP culvert; edge of field; extends off ROW
2009-C21	10,290	PSS1Y	GW, NUT, STP; W	II	4	Mapped Class II Wetland; saturated to surface; clear break in topography; stream feature 2009-SC-C22 abuts feature; wetland extends off-ROW
2009-C22	1,560	PEM1Y	GW, SS, NUT, STP	III	4	Within field, borders 2009-SC/TB-C24A; close in proximity to Route 100; distinct topo; drainage swale; wetland extends off ROW
2009-C23	44,080	PEM/SS1Y	NUT, SS, STP	III	5	Road splits features 2009-C22 and 2009-C-23; drains through culvert, gleyed soils; borders agricultural field, hydrologically connected to 2009-SC/TB-C24 and 2009-SC-C25A; wetland feature extends beyond ROW
2009-C24	3,260	PEM/SS1Y	GW	III	5	Small feature, saturated to the surface; wetland feature extends off-ROW
2009-C25	28,010	PEM/SS/FO1Y	GW, W	III	5	Large feature, extends off ROW with forested fringe; saturated to surface with network of drainage channels; dense shrub layer under utility line; hydrologically associated with stream 2009-SC-C27B
2009-C26	0	PEM/FO1Y	GW	III	5	Saturated to surface; extends off ROW forested fringe

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2009-C27	2,050	PEM1Y	SS, STP	III	5	Borders stream 2009-SC-C28B; stream bank stabilization; dense herbaceous layer
2009-C28	9,070	PEM1Y	STP,SS	III	6	Borders stream 2009-SC-C30; stream bank stabilization; receives runoff from North Hill Road; wetland feature extends off- ROW
2009-C29	1,970	PEM1Y	GW, STP	III	6	Saturated to surface, with drainage channels; close proximity to the road
2009-C30	8,040	PEM1Y	GW, STP, SS	III	6	Emergent feature, saturated to the surface, histic epipedon, stream feature 2009-TB/SC-C31 drains into wetland; extends off-ROW
2009-C31	3,470	PEM1Y	GW, STP	III	6	Narrow feature along road, along roadside drainage, saturated to surface
2009-C32	28,850	PEM1Y	GW, STP	III	6	Along Cross Road; receives runoff from road; saturated to surface, areas of standing water, extends off of ROW
2009-C33	2,220	PEM1Y	GW, W	III	6	Potential Vernal Pool; saturated to surface; standing water; frogs and minnows noted in pooled water
2009-C34	3,090	PEM1Y	GW	III	6	Saturated to surface, emergent vegetation; disturbed feature with compacted soils and minor ditch features
2009-C35	3,260	PEM1Y	GW	III	6	Saturated to surface, roadside wetland, minor feature disturbed
2009-C36	1,910	PEM1Y	GW	III	6	Small wetland feature in depression; saturated to surface
2009-C37	23,930	PEM/SS/FO1Y	GW, STP, SS, W	II	6	Large feature extends off ROW; receives runoff from road; saturated to surface with drainage channels; deer tracks noted at time of field visit
2009-D1	1,100	PEM1Y	GW	III	5	Drainage channels, saturated to surface, distinct topo break, 2009-TB/SC-D2 drains into feature
2009-D2	9,270	PEM/SS1Y	GW, SS	II	5	Saturated to surface, drains to 2009-TB/SC-D2; receives hydrology from pond; extends off-ROW
2009-D3	3,160	PEM1Y	GW, SS, STP	III	5	Hydrologically connected to Class II mapped pond; saturated to surface, located adjacent to packed dirt road; extends off-ROW
2009-D4	2,340	PEM1Y	GW, STP	III	5	Drainage channels; drains from man-made pond off the ROW; hydrologically connected via 12" culvert to feature 2009-D3; stream 2009-SC-C27A drains into feature; extends off ROW
2009-Z1	364,610	PEM/SS/FO1Y	GW, STP, W	II	7	Large feature; hydrologically connected to Class II feature off ROW; receives runoff from road; hydrologically connected to feature 2009-SC-Z1 extends off-ROW
2009-Z2	6,030	PEM1Y	GW	II	7	Saturated to surface, emergent feature; distinct topo break; extends off-ROW

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2009-Z3	43,510	PEM/SS1Y	GW, STP	II	7	Receives hydrology from stream 2009-SC-Z3; saturated to surface with a network of drainage channels; extends off ROW
2009-Z4	10,260	PEM/SS1Y	GW	II	7	Saturated to surface with network of drainage channels; hummock/hollow microtopography; mineral histic soils; extends off-ROW
2009-Z5	12,260	PEM1Y	GW	III	7	Hummock and hollow microtopography; saturated to the surface; network of drainage channels; extends off-ROW
2009-Z6	5,470	PEM/SS1Y	SS,STP	III	7	Borders stream 2009-SC-Z4, receives runoff from road; adjacent to field; extends off-ROW
2009-Z6B	20,880	PEM/SS/FO1Y	GW, STP, SS	III	7	Borders stream feature 2009-TB-Z5; saturated to surface with distinct topo break; forested fringe; receives runoff from road; extends off-ROW
2009-Z7	4,570	PEM/SS1Y	GW, STP	III	7	Saturated to the surface; scrub shrub fringe, emergent under existing utility line; receives hydrology from stream 2009-SC-Z7A extends off-ROW
2009-Z8	5,490	PEM1Y	GW	III	7	Saturated to surface; hummock and hollow microtopography; isolated feature; partially disturbed

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2009-Z9	2,600	PEM1Y	GW, SS	III	7	Saturated to surface; network of drainage channels; distinct topographical break; 2009-SC-Z7B drains into feature; extends off-ROW
2009-Z10	3,000	PEM1Y	STP	III	7	Saturated to surface; drainage patterns; mineral histic soils; receives runoff from Route 105
2009-Z11	17,240	PEM/SS1Y	STP, GW, W	II	7	Saturated to surface; beaver activity; standing water; network of drainage channels; receives runoff from Route 105; stream 2009-TB/SC-Z8 drains into feature; extends off-ROW
2009-Z12	8,450	PSS1Y	STP, GW	III	8	Saturated to surface with a network of drainage channels; hydrologically connected to stream 2009-SC-Z10; extends off-ROW
2009-Z13	10,280	PEM/SS1Y	STP	III	8	Saturated to surface drains two streams (2009-SC-Z12, 2009-SC-Z13); extends off-ROW
2009-Z14	2,510	PEM1Y	GW	III	8	Saturated to the surface with a network of drainage channels
2009-Z15	820	PEM1Y	SS	III	8	Saturated to the surface; borders stream 2009-TB-Z15; provides stream bank stabilization
2009-Z16	16,040	PEM1Y	GW, SS	III	8	Network of drainage channels; saturated to the surface; stream bank stabilization; side slope drainages; abuts stream 2009-TB-Z15; extends off-ROW
2009-Z17	32,220	PEM/SS1Y	GW, STP, W	III	8	Beaver influenced feature; separated by 4x4 trail; large feature; hydrologically connected to wetland 2009-Z18 via a 12" culvert with drainage 2009-SC-Z16; extends off-ROW
2009-Z18	27,340	PEM1/SS1Y	GW, STP	III	8	Beaver influenced feature; separated by 4x4 trail; large feature; hydrologically connected to wetland 2009-Z17 via a 12" culvert with drainage 2009-SC-Z16; extends off ROW

<sup>1</sup>Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of Wetlands and Deepwater Habitat of the United States. U.S. Fish and Wildlife Service. FWS/OBD-79/31. 103pp.

<sup>2</sup>U.S. Army Corps of Engineers (USACE) - New England District. 1999. The Highway Methodology Workbook: Supplement: Wetland Functions and

<sup>3</sup> As delineated, wetland resources on-site are considered Class II and III under the 2002 Vermont Wetland Rules, subject to review and approval by the Vermont ANR.

GMP/Kingdom Community Wind (KCW)  
 Lowell, Westfield, and Jay, Vermont  
 Summary of Delineated Streams - Transmission Component  
 Prepared by VHB Pioneer  
 February 2010

Stream ID	Associated Wetlands	Average Ordinary High Water Width (OHW) Feet	Flow Regime (Ephemeral Intermittent and Perennial) <sup>1</sup>	Map (Appendix 6)	Comments
2009-TB-C1	-	15	perennial	1	VHD mapped stream; East Branch Missisquoi River; this reach well defined banks; erosion minimal; substrate large boulder, gravel and cobble
2009-TB-C2	-	18	perennial	1	VHD mapped stream; East Branch Missisquoi River; erosion moderate; substrate large boulder, gravel and cobble
2009-TB-C4	-	25	perennial	1, 2	VHD mapped stream; two reaches of East Branch Missisquoi River, well defined banks; substrate large boulder gravel and cobble
2009-TB-C5	-	13	perennial	2	Unnamed mapped VHD stream; substrate mineral/gravel;
2009-TB-C6	2009-C9A	6	perennial	3	Unnamed mapped perennial; mineral substrate; box culvert under route 100; well defined banks; along wetland 2009-C9A
2009-SC-C6A	-	3	perennial	1	Unnamed mapped perennial stream; mineral substrate; well-vegetated banks
2009-TB-C7	-	12	perennial	3	VHD mapped stream; Leclair Brook; boulder/mineral substrate; travels under vast trail; minimal erosion
2009-SC-C8	2009-C9B	2	intermittent	3	Sandy muck substrate, through wetland 2009-C9B; amphibians observed in stream at time of delineation
2009-SC-C9	-	4	perennial	3	Rock/gravel and mineral clay substrate, within barbed wire fence, poorly defined banks signs of erosion (potentially due to grazing animals), low grass banks
2009-SC-C10	-	3	intermittent	3	Rock/gravel and mineral clay substrate, within barbed wire fence, low grass banks
2009-SC-C11	-	2	ephemeral	3	Drains from culvert to wet area in field; small feature, poorly defined banks
2009-TB-C12	-	50	perennial	3	VHD mapped stream; Missisquoi River; cobble boulder substrate; well defined banks

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2009-SC-C13	2009-C15	3	intermittent	4	Feature drains into wetland 2009-C15; mineral substrate; drains from off ROW
2009-SC-C14	2009-C16	3	intermittent	4	Small cobble and mineral substrate; drains across road bordered by wetland 2009-C16
2009-TB-C18		30	perennial	4	VHD mapped stream; Taft Brook; well defined banks, crosses road via 8' perched culvert; substrate boulder, rock, cobble
2009-SC-C19	2009-C19	4	perennial	4	VHD unnamed mapped stream; Rip-rap along banks; moderate erosion in pasture; boulder and small cobble substrate; amphibeans present at time of field visit
2009-SC-C20		3	perennial	4	Drains into 2009-SC-C19; drains under road via 20" CMP culvert; small cobble substrate
2009-TB-C21		40	perennial	7	VHD mapped stream; Jay Branch; well defined banks; cobble, small boulder substrate; minimal erosion
2009-SC-C21		2	intermittent	4	Drains from culvert under road to stream 2009-SC-C19; small cobble/boulder substrate
2009-SC-C22	2009-C21	3	perennial	4	Drains through a 36" CMP; cobble bottom; drains into wetland 2009-C21
2009-TB/SC-C23		8	perennial	4	VHD unnamed mapped stream; drains some iron seeps, 2-3' depth at time of field visit
2009-TB/SC-C24	2009-C22; 2009-C23	3	perennial	5	VHD unnamed mapped stream; drains along wetland features 2009-C22 and 2009-C24; at edge of field;
2009-SC-C25A	2009-C23	3	intermittent	5	Drains to stream feature 2009-TB/SC-C24; cobble fine mineral substrate; hydrologically connected to wetland 2009-C23
2009-SC-C27A	2009-D4	3	intermittent	5	Drainage within wetland 2009-D4; poorly defined banks; becomes diffues in wetland feature
2009-SC-C27B	2009-C25	3	intermittent	5	Drainage within wetland 2009-C25 becomes diffues in wetland; leaf and mineral substrate; poorly defined banks
2009-TB/SC-C28		10	perennial	5	Unnamed mapped VHD stream; substrate mineral/gravel; well defined banks
2009-SC-C28B	2009-C27	4	perennial	5	Unnamed mapped VHD stream; well defined banks; boulder cobble substrate; wetland feature 2009-C27 borders feature
2009-TB-C29		18	perennial	5	VHD mapped tributary; Coburn Brook; boulder and cobble substrate; well-defined banks

Stream ID	Associated Wetlands	Average Ordinary High Water Width (OHW) Feet	Flow Regime (Ephemeral Intermittent and Perennial) <sup>1</sup>	Map (Appendix 6)	Comments
2009-SC-C30	2009-C28	4	perennial	6	Drains through wetland 2009-C28; well defined banks; small cobble and mineral substrate
2009-TB/SC-C31	2009-C30	4	perennial	6	Boulder and cobble substrate drains through wetland 2009-C30
2009-SC-C32		2	intermittent	6	Boulder cobble, and clay substrate, poorly defined, low banks, with herbaceous vegetation
2009-TB-C33		5	perennial	6	VHD unnamed perennial mapped stream; moderate erosion; cobble substrate
2009-TB-D1		30	perennial	5	VHD named perennial stream; Mill Brook; with bedrock outcrops; large boulder substrate in this reach of stream; well defined banks
2009-TB/SC-D2	2009-D1; 2009-D2	4	perennial	5	Drains through wetland 2009-D2 and into feature 2009-D1; hydrologically connected to mapped pond; cobble; hydrophytes dominant stream banks
2009-SC-D2B		2	intermittent	5	Drains to perennial stream 2009-TB/SC-D2; small feature; cobble substrate; low banks
2009-SC-Z1	2009-Z1	3	perennial	7	Drains to wetland 2009-Z1; well-defined banks; drains from 12" culvert under road
2009-SC-Z2		2	ephemeral	7	Drains to stream 2009-SC-Z1; low banks; cobble substrate
2009-SC-Z3	2009-Z3	2	intermittent	7	Drains to wetland feature 2009-Z3; low banks; small boulder, cobble substrate
2009-SC-Z4	2009-Z6	3	perennial	7	Drains to wetland feature 2009-Z6; low banks; poorly defined; drains off ROW; becomes diffuse in wetland
2009-TB-Z5	2009-Z6B	25	perennial	7	Mapped named VHD stream; Crook Brook; boulder cobble substrate, well-vegetated banks; passes under road via 18' deformed culvert; surrounded by wetland feature 2009-Z6B
2009-SC-Z7A	2009-Z7	3	perennial	7	Sandy muck substrate, through wetland 2009-Z7; sandy, small cobble substrate
2009-SC-Z7B	2009-Z9	3	intermittent	7	Stream drains through wetland 2009-Z9 and off ROW; poorly defined banks with wetland feature; organic substrate
2009-TB/SC-Z8	2009-Z11	3	perennial	7	Well defined banks; drains to wetland feature 2009-Z11; boulder, cobble and organic substrate, drains along road
2009-TB-Z9		25	perennial	8	Mapped named VHD stream; Crook
2009-SC-Z10	2009-Z12	2	intermittent	8	Poorly defined banks; drains to wetland 2009-Z12

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2009-SC-Z11		3	perennial	8	Poorly defined banks; drains to stream 2009-SC-Z12, organic and cobble substrate
2009-SC-Z11a	2009-Z13	2	intermittent	8	Drains into stream 2009-SC-Z11; poorly defined banks; low banks; organic substrate
2009-SC-Z12	2009-Z13	2	intermittent	8	Drains through wetland 2009-Z13, poorly defined banks with wetland; organic and small cobble substrate
2009-SC-Z13	2009-Z13	4	perennial	8	Drains wetland 2009-Z13; well defined banks; well-vegetated stream banks; coarse-woody debris within stream
2009-SC-Z14	2009-Z14	3	perennial	8	Receives some hydrology from wetland 2009-Z14; continues off ROW; well defined banks; organic small boulder substrate
2009-TB-Z15	2009-Z15; 2009-Z16	8	perennial	8	Mapped VHD stream; well defined banks; boulder and cobble substrate; bordered by wetlands 2009-Z15 and 2009-Z16
2009-SC-Z16	2009-Z17; 2009-Z18	3	intermittent	8	Drainage between wetlands 2009-Z17 and Wetland 2009-Z18; drains via 12" culvert; small boulder and organic substrate

<sup>1</sup>Stream flow regime determined based on qualitative observations of instream hydrology indicators and geomorphic characteristic and are subject to professional judgment.