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MEMORANDUM

To: Marty Spaulding
From: Art Gilman
Date: 11 December 2020
Re: Natural Resources investigations at the Burlington High School, Burlington, VT

In connection with the proposed rehabilitation of the Burlington High School campus, I have inspected the environs of the existing facilities north of the already developed area to the approximate BHS property line, to determine presence or absence of rare plants, and significant natural communities.

Two plant species are mapped on immediately adjacent properties: harsh sunflower and squarrose goldenrod. Harsh Sunflower (*Helianthus strumosus*) is listed in Vermont as Threatened, and has a rarity rank, assigned by the Vermont Natural Heritage Inventory of S2/S3, i.e., rare to uncommon. Squarrose goldenrod (*Solidago squarrosa*) has the same rarity rank (S2/S3) but is not listed as threatened or endangered. Additional rare species are mapped east of North Avenue, in habitats dissimilar to those on the BHS.

Two natural community types are mapped in the forest on the northern edge of the BHS property, these being “Dry Oak-Maple-Limestone Forest” and “Mesic Maple-Ash-Hickory-Oak Forest.” These several resources—rare plants and significant natural communities) are shown on the attached Figure 1, constructed using the Vermont Natural Resources Atlas online (note, species on parcels other than BHS are not discussed here).

With these considerations in mind, I visited the site on 31 August 2019. Weather was sunny, warm, and dry. This date would be optimal for observing Harsh Sunflower and Squarrose Goldenrod, both late summer bloomers. I started along the forest edge just west of North Avenue, and searched the entire parcel north of the existing facilities, noting all the plant species (Table 1) and the composition of the communities.

The site is characterized by a low limestone outcrops, and thin, stony soils. As such, the plant communities reflect dry, calcareous conditions and the native species that are present are mostly those found in similar situations throughout the Champlain Valley. I observed no rare or protected plants—in particular, neither Harsh Sunflower nor Squarrose Goldenrod were noted. A single plant of Large Yellow Lady’s-slipper (*Cypripedium parviflorum* var. *pubescens*), was located on the north-facing slope beyond the crest of the knoll. This an uncommon species (rank S3) in Vermont, where it occurs in several types of habitats, often swampy but also rich forests and limestone ledges. Because of its location, remote from the proposed redevelopment; there will be no impact to it.

The natural community “Dry Oak-Maple-Limestone Forest” is present, especially on the south-facing side of the knoll but is in a relatively degraded condition. There are a number of large trees, 16”–36” in diameter at breast height, including basswood, sugar maple, red oak, white oak, and white pine, as well as many smaller trees. It appears that the site was relatively open with only these large trees growing for some time, while the land surrounding them was invaded by common buckthorn. The buckthorn is now aged and is dying out after dominating the understory. The ground level flora is only moderately diverse and is relatively sparse, likely a consequence of several factors: the dryness, the site history (natural forest to open, back to shade, and heavy shading from the buckthorn), and the small size of the area (which limits plant movement into the area). Certain plants, e.g. Herb Robert (*Geranium robertianum*), which is known to be lime-loving, are found on the outcrops themselves. The forest is also somewhat impacted by formal and informal trails, associated with the school and the neighborhood. Thus, the community composition today does not reflect truly natural conditions which, given its small size, markedly reduces its significance. It is, in effect, a remnant patch.

The forest on the north side of the knoll, away from the proposed development, has a different composition, with many hemlock trees, and more rugged ledge outcrops. It has a limited understory and the ground layer is particularly sparsely occupied, in consequence of the shade cast by the hemlocks, which is too deep for most plants.

The proposed project, which has been modified from the plan of August 2019, will impact none of the Dry Oak-Maple-Limestone Forest except an extremely small area at the east end of the proposed Building B and the existing Building C, for installation of a water line. This area is shown on Site Plan Sheet C2.4, where the water line location is shown in blue near the right edge of the Plan. I recommend that the forest edge be avoided as much as possible, and that tree-cutting be minimized. The area of the existing Building C, which will be removed, will be regraded and returned to a vegetated condition. With these considerations, I believe the Project will not have an undue adverse impact on the natural community and its composition through the rest of the site.



Forest composition: a few large trees (white pine on left), and many small ones.



Interior: trails and end-stage buckthorn.



Herb Robert, a calciphile herb, restricted to limestone outcrops.



Trail leading North from the site; weedy vegetation along trail.



North-facing slope beyond crest; more rugged outcrops and very shaded conditions.

Table 1. Plants observed, north of the existing entrance, the lawns, and the buildings; to the approximate north property line; includes species around the parking lot north of the buildings. Date of observations, 31 Aug 2019.

Note: species listed in SMALL CAPS are non-native
 NNIS = Non-native Invasive Species

	Common Name	Notes
TREES, SHRUBS & WOODY VINES		
<i>Acer negundo</i>	Box-elder	Weed tree, edge of parking
<i>Acer saccharum</i>	Sugar maple	
<i>BERBERIS VULGARIS</i>	Common barberry	NNIS shrub
<i>Betula papyrifera</i>	Paper birch	
<i>Carpinus caroliniana</i>	Blue beech	
<i>Carya cordiformis</i>	Bitternut hickory	
<i>Celastrus americana</i>	Bittersweet	The NNIS Oriental bittersweet may occur
<i>Celtis occidentalis</i>	Hackberry	Grove of 11 trees to 12" dbh, knoll near North Avenue
<i>Fraxinus americana</i>	White ash	
<i>MALUS DOMESTICA</i>	Common apple	One tree
<i>MORUS ALBA</i>	White mulberry	One tree
<i>Ostrya virginiana</i>	Hop hornbeam	One tree, 13: dbh
<i>Parthenocissus quinquefolia</i>	Woodbine	
<i>Pinus resinosa</i>	Red pine	
<i>Pinus strobus</i>	White pine	Several large, to 18" dbh
<i>Populus deltoides</i>	Cottonwood	Weed trees, near parking
<i>Populus grandidentata</i>	Large-toothed aspen	Weed trees, near parking
<i>Prunus pensylvanica</i>	Pin cherry	
<i>Prunus virginica</i>	Choke cherry	
<i>Quercus alba</i>	White oak	Several large, 3 at 16" dbh, 1 at 36"
<i>Quercus rubra</i>	Red oak	
<i>RHAMNUS CATHARTICA</i>	Common buckthorn	NNIS shrub
<i>Rhus typhina</i>	Staghorn sumac	
<i>ROSA MULTIFLORA</i>	Multiflora rose	Somewhat invasive
<i>Rubus occidentalis</i>	Black raspberry	
<i>Sambucus nigra</i>	Elderberry	
<i>Tilia americana</i>	Basswood	
<i>Toxicodendron radicans</i>	Climbing poison ivy	
<i>Toxicodendron rydbergii</i>	Creeping poison ivy	
<i>Tsuga canadensis</i>	Hemlock	All hemlocks N side of hill
<i>Ulmus americana</i>	American elm	
<i>Viburnum trilobum</i>	Highbush cranberry	

<i>Vitis riparia</i>	Riverbank grape	
FERNS & ALLIES		
<i>Athyrium angustum</i>	Lady-fern	
<i>Dryopteris intermedia</i>	Intermediate woodfern	Shaded forest N of crest
<i>Dryopteris marginalis</i>	Marginal woodfern	Shaded forest N of crest
<i>Onoclea sensibilis</i>	Sensitive fern	Damp area, trail N of crest
<i>Matteuccia struthiopteris</i>	Ostrich fern	Damp area, trail N of crest
GRASSES/SEDGES		
<i>BROMUS INERMIS</i>	Hungarian brome	
<i>Carex eburnea</i>	Ivory sedge	Notably lime-loving, on outcrop
<i>Carex laxiflora</i>	Loose-flowered sedge	
<i>Carex rosea</i>	Rosy sedge	
<i>DACTYLIS GLOMERATA</i>	Orchard grass	
<i>DIGITARIA ISCHAMEUM</i>	Crabgrass	Weed of parking area
<i>Leersia virginica</i>	White grass	
<i>Muhlenbergia frondosa</i>	Muhly	
<i>Patis racemosa</i>	Black-seeded mountain rice	Notably a rich woods grass
<i>PHLEUM PRATENSE</i>	Timothy	
<i>SCHEDONORUS PRATENSIS</i>	Meadow fescue	
<i>SETARIA PUMILA</i>	Yellow foxtail	Weed of parking area
<i>Sporobolus vaginaeflorus</i>	Dropseed	Weed of parking area
HERBS		
<i>Actaea pachypoda</i>	Doll's-eyes	
<i>ALLIARIA PETIOLATA</i>	Garlic mustard	NNIS herb
<i>Ambrosia artemisiifolia</i>	Ragweed	
<i>Amphicarpaea bracteata</i>	Hog-peanut	
<i>Anemone virginiana</i>	Thimbleweed	
<i>ARENARIA SERPYLLIFOLIA</i>	Sandwort	
<i>Artemisia vulgaris</i>	Mugwort	Weed of parking area
<i>Asclepias syriaca</i>	Milkweed	
<i>BERTEROA INCANA</i>	Hoary alyssum	Weed of parking area
<i>CENTAUREA JACEA</i>	Brown knapweed	Weed of parking area
<i>CENTARIUM PULCHELLUM</i>	Centaury	Weed of parking area
<i>Chenopodium album</i>	Lamb's-quarter	
<i>CICHORIUM INTYBUS</i>	Chicory	Weed of parking area
<i>Circaea canadense</i>	Enchanter's nightshade	
<i>CONVALLARIA MAJALIS</i>	Lily-of-the-valley	In forest, but a horticultural introduction
<i>Cypripedium parviflorum</i> var. <i>pubescens</i>	Yellow lady's-slipper	Uncommon species, ledge outcrop, north of crest; one plant
<i>DAUCUS CAROTA</i>	Queen Anne's lace	Weed of parking area
<i>Erigeron pulchellus</i>	Robin's plantain	
<i>Erigeron strigosus</i>	Daisy fleabane	
<i>Eurybia macrophylla</i>	Large-leaved wood aster	
<i>Galium circaezans</i>	Wild licorice	Limestone outcrop species
<i>GALIUM MOLLUGO</i>	Bedstraw	

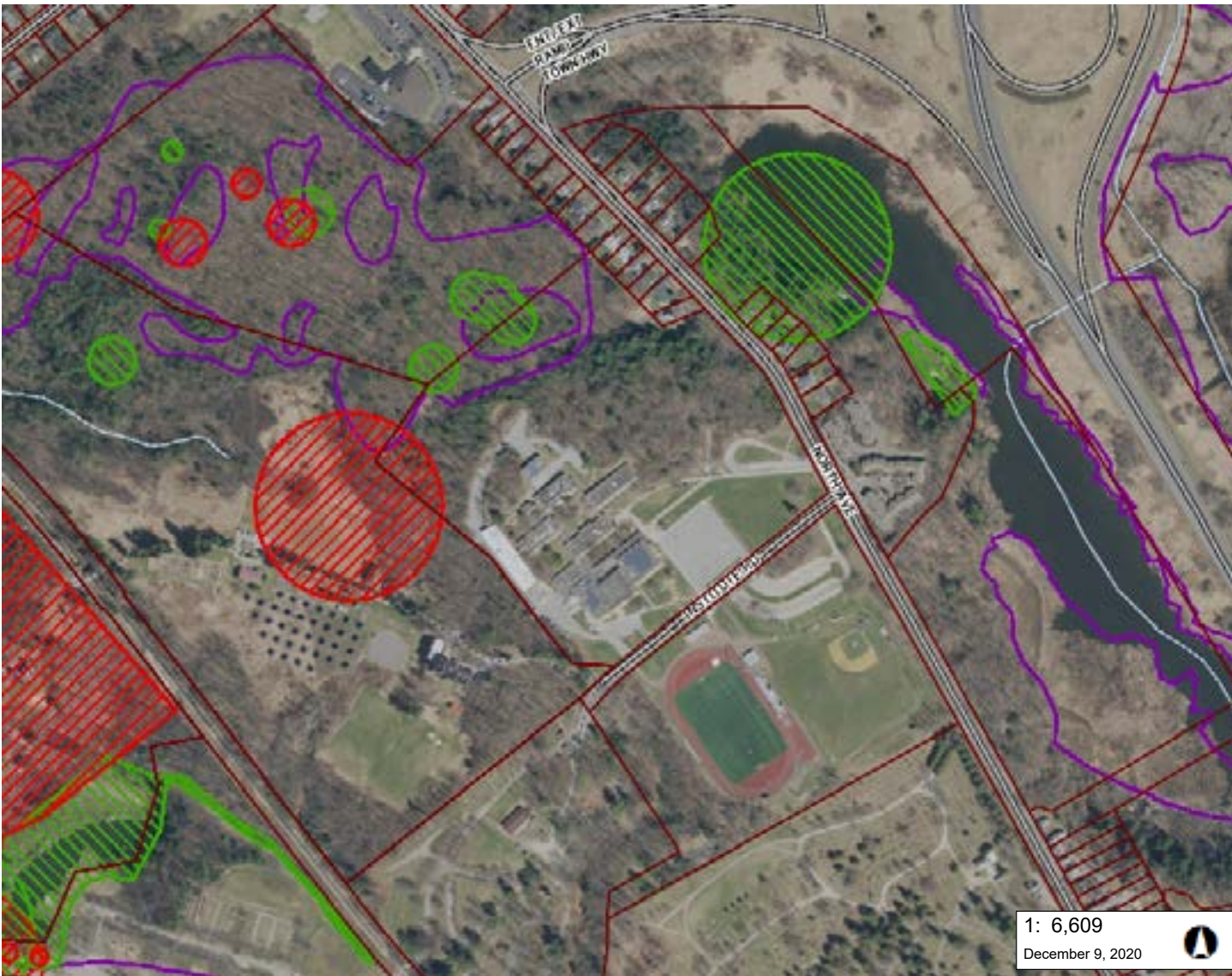
<i>Geranium robertianum</i>	Herb Robert	Lime-loving species
<i>Hackelia virginiana</i>	Virginia stickseed	
<i>Hylodesmum glutinosum</i>	Woodland tick-trefoil	
<i>HYPERICUM PERFORATUM</i>	Common St. John's-wort	
<i>LINARIA VULGARIS</i>	Butter-and-eggs	
<i>Maianthemum canadense</i>	False lily-of-the-valley	
<i>Maianthemum racemosum</i>	False Solomon's seal	
<i>MELILOTUS ALBUS</i>	TALL WHITE CLOVER	
<i>Nabalus altissimus</i>	Tall white lettuce	
<i>Oenothera biennis</i>	Biennial evening primrose	
<i>Oxalis stricta</i>	Yellow wood-sorrel	
<i>Persicaria virginiana</i>	Jumpseed	
<i>Phryma racemosa</i>	Lopseed	
<i>Polygonatum pubescens</i>	Solomon's-seal	
<i>RANUNCULUS ACRIS</i>	TALL BUTTERCUP	
<i>RUMEX CRISPUS</i>	CURLY DOCK	
<i>SAPONARIA OFFICINALIS</i>	SOAPWORT	
<i>SILENE LATIFOLIA</i>	WHITE CHAMPION	
<i>SILENE VULGARIS</i>	BLADDER CHAMPION	
<i>Solidago altissima</i>	Tall goldenrod	
<i>Solidago caesia</i>	Blue-stem goldenrod	
<i>Solidago canadensis</i>	Canada goldenrod	
<i>Solidago flexicaulis</i>	Zig-zag goldenrod	
<i>Solidago gigantea</i>	Giant goldenrod	
<i>Solidago juncea</i>	Early goldenrod	
<i>Symphyotrichum cordifolium</i>	Heart-leaved aster	
<i>Symphyotrichum lanceolatum</i>	Lance-leaved aster	
<i>Thalictrum dioicum</i>	Early meadow-rue	
<i>TRIFOLIUM PRATENSE</i>	RED CLOVER	
<i>TRIFOLIUM REPENS</i>	WHITE CLOVER	
<i>Urtica dioica</i> var. <i>gracilis</i>	Common nettle	
<i>Verbascum thapsus</i>	Mullein	
<i>Verbena urticifolia</i>	White vervain	
<i>VERONICA OFFICINALIS</i>	SPEEDWELL	
<i>VICIA CRACCA</i>	COW VETCH	
<i>Viola pubescens</i>	Downy yellow violet	



BHS Rare Species and Significant Natural Areas

Vermont Agency of Natural Resources

vermont.gov



1: 6,609
December 9, 2020

336.0 0 168.00 336.0 Meters
 WGS_1984_Web_Mercator_Auxiliary_Sphere 1" = 551 Ft. 1cm = 66 Meters
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LEGEND

- Rare Threatened Endangered
- Rare
- Significant Natural Community
- Parcels (standardized)

Roads

- Interstate
- US Highway; 1
- State Highway
- Town Highway (Class 1)
- Town Highway (Class 2,3)
- Town Highway (Class 4)
- State Forest Trail
- National Forest Trail
- Legal Trail
- Private Road/Driveway
- Proposed Roads

Stream/River

- Stream
- Intermittent Stream

- Town Boundary

NOTES

Map created using ANR's Natural Resources Atlas