

**Hopewell Valley Community Stewardship Plan
Friends of Hopewell Valley Open Space**

**Appendix 2.
Arena Preserve**

Acreage: 28.225

Block and Lot: B26, L4.01

Ownership: FoHVOS (100%)

Year(s) Purchased: 2005

Location & Access: Preserve is located on the west side of Harbourton-Rocktown Road/Route 579, 0.25 mile north of Route 518. Preserve access on the gravel driveway of Hopewell Township parcel currently being redeveloped. Just north of the gravel drive is a narrow and over grown break in the guardrail. Nearest street address: 1615 Harbourton-Rocktown Road, Lambertville 08530 (actual Preserve address).

Structures: One corn crib - an open-ended farm structure is on the Preserve adjacent to the Hopewell parcel.

Additional property information is summarized in Appendix W. The following Preserve maps are provided at the end of this document:

- Map 1 2007 Aerial Photography
- Map 2 1930 Aerial Photography
- Map 3 Topography
- Map 4 Bedrock Geology
- Map 5 Soils
- Map 6 Land Cover Types (2007)
- Map 7 Protected Lands
- Map 8 Deer Management
- Map 9 Invasive Plant Cover (Relative Infestation Severity for all species)

Website Description:

Arena Preserve, surrounded by equal parts farmland and forest, is located at the Hopewell Township's northern border. Much of the preserve's 10 acre forest was wooded in the 1930s and features red oak, shagbark hickory, and black birch. The remaining portions of the preserve are formerly hayfields, now reverting to a mix of native—New York ironweed and swamp milkweed—and invasive—multiflora rose and Callery pear—species.

BROAD PROPERTY DESCRIPTION

The Arena Preserve (see Map 1) is located at the north-central section of the Hopewell Valley. The topography (see Map 3) is primarily flat at 110 feet above sea level. The Preserve is surrounded by equal parts agricultural lands and forest. Single home dwellings and commercial development are scattered along Routes 579 and 518.

Based upon analysis of NJDEP's 2007 Land Use/Land Cover dataset, the preserve contains three broad plant communities: upland deciduous forest (> 50% canopy), upland shrubland (< 10% canopy, > 25% shrub cover), and agricultural lands. Land Use/Land Cover is summarized in Appendix X and illustrated in Map 6.

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Though designated as agricultural land, Fields 1 and 3 have not been mowed for hay since 2009. Field 2 contains a significant amount of woody invasive species, and was most likely abandoned at an earlier date. The fields are part of a contiguous patch of 139 acres of agricultural land, which includes the preserve acreage. The adjacent landowner permits hunting for deer and gamebird species.

The easternmost field has a strong component of native species including swamp milkweed, New York ironweed, goldenrods, dogbane, sensitive fern, jewelweed, mountain mint, soft rush, and sedges. Invasive and adventive species include small carp grass, *Bidens* sp. (2 distinct populations), autumn olive, and Callery pear. Fields 1 and 3 contain yarrow, dogbane, sensitive fern, jewelweed, mountain mint, soft rush, and sedges. Reed canary grass is found throughout the Fields 1 and 3, and is especially dense at the eastern edge of Field 3. The fields are enclosed by hedgerows consisting of pin oak, blackhaw, ash, shagbark hickory, black walnut, autumn olive, and multiflora rose.

The forest lacks a significant herb, shrub and subcanopy layer. The canopy is dominated by red oak, shagbark hickory, red maple, and black birch. Arrowwood and mapleleaf viburnums, spicebush, multiflora rose, Japanese honeysuckle, and Japanese barberry are sporadic. Herbs, sedges and grasses include jack-in-the-pulpit, mayapple, spring beauty, hayscented fern, wild yam root, partridgeberry, true and false Solomon's seals, Japanese stiltgrass, periwinkle, and various sedges.

The preserve has two types of bedrock geology--the Lockatong and Passaic formations. See Map 4.

The preserve has 3 soil types (see Map 5) with Chalfont silt loam, 0 to 2 percent slopes being the most common type. Chalfont silt loam, 2 to 6 percent slopes and Chalfont silt loam, 2 to 6 percent slopes, eroded make up the remaining soil types. The preserve's soils are described in Appendix Y.

CONSERVATION VALUES

Based on Natural Heritage data, ENSP data, Landscape Project, 1930s forest presence/absence et al. the Preserve has the highest weighted Ecological Value at >75%. See Appendix A for a description of ranking factors.

Forest and Woodland Communities: The preserve is on the outer edge of the RHWHP Crossroads Forest Focal Area. The forest patch found on the Preserve and surrounding area is an important stop-over habitat (spring and fall resting and feeding) for migratory species. Numerous forest interior dwelling birds were observed in the spring of 2009; however, the presence of cowbirds and the lack of a shrub layer reduces the chance of nesting and successful breeding. However, avian life is abundant on the preserve and has been enhanced by kestrel and bluebird nest boxes in the meadows.

The meadows are adjacent to the Weidel farm which is managed for upland gamebird hunting, bringing the total contiguous meadow acres to 71.

Old forest: Based upon analysis of 1930 aerial photography, the preserve is part of a 54 acre block that has been forested since at least the 1930s. This is reflected in the presence of a relatively conservative native plant community and lack of dense invasive species cover. See Map 2.

Early Successional Communities:

Shrublands: The shrubland is composed of invasive species.

Meadows/Grasslands: Fields 1 and 3 seem to have been mowed annually in spring, preventing the establishment of native forbs and grasses. Field 2 has a rich variety of native forbs and grasses, but is significantly invaded by non-native woody species.

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Waterbodies: None.

Rare Species:

Rare Plants: None documented on the Preserve. Natural Heritage grid data shows Wildenow's Sedge.

Rare Animals: The Landscape Project has identified the meadow areas of the Preserve as Suitable Habitat. Forested areas of the Preserve are identified as habitat for State Threatened species. See Appendix L for a list of species.

THREATS

Deer: White-tailed deer have suppressed much of the native community, leaving only canopy trees and an extremely sparse herb and shrub layer. Native herbs and shrubs are so severely browsed they are unable to flower and set fruit. Forest health monitoring was performed in 2007/2008 (See main plan, Table 9).

Invasive species: In 2008 staff began walk-through surveys for emerging invasive species on all preserves. Mapping documented each species and its population size. Callery pear, Seibold's crabapple, and Japanese aralia (eradicated) were detected. See www.njisst.org for the current status of emerging invasive species at the Preserve.

In 2011 staff completed surveys for invasive plant species on all preserves (see Map 9). Mapping documented each species found and its population size (See Table 1 below). The five species with the highest infestation scores include: Multiflora Rose, Autumn Olive, Non-native Cool Season grass, Reed Canary Grass, and Callery Pear.

The core of the forest is largely free of invasive plants, and is invaded only very sporadically by Japanese stiltgrass and Japanese barberry. The southern edge of the forest is invaded by periwinkle, stiltgrass, Japanese honeysuckle, and multiflora rose (here, the preserve boundary meets a younger forest).

Woody invasive species—autumn olive, multiflora rose, Callery pear, and crabapple—are a significant threat all fields.

Other: N/A

STRATEGIES and ACTIONS:

Forest and Woodland Habitat Stewardship: Because of the Preserve's high Ecological Value, the stewardship efforts at the preserve are a high priority. The forest offers an opportunity to restore the rich native plant communities still present, but diminished, in the preserve's forest. Forest Health data collected in 2008 found a browse rate on planted seedling plots of 58% with native woody cover < 2% and no non-native woody cover.

In addition, biannual surveys for and eradication of emerging invasive species should continue.

No action is recommended for widespread invasive species, except all Asiatic bittersweet should be cut from trees and all fruiting winged euonymus should receive basal bark treatment. Reduced deer density will allow the native plant communities to recover and compete with the widespread invasive species.

Early Successional Habitat Stewardship: The variety of native species in Field 2 reveals the restoration potential of the remaining fields. A biannual winter mowing or burning regime is recommended to maintain early successional habitat and remove invasive woody plants.

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Burning and mowing may improve the species composition in the western meadows. Meadow restoration should be considered for Fields 1 and 3, leaving the local eco-types in the eastern meadow intact.

Basal bark treatment of woody plants in Field 2 is required. Cover is too dense for typical mowing machinery. Subsequent eradication of woody invasive species will occur through regular meadow maintenance. In addition, foliar spray of mugwort and hand pulling of teasel is required.

For habitat goals and maintenance schedule see Appendix T & U.

Deer Management: The preserve is enrolled in the DMP with bow and gun hunting.

The 450' safety zone allows hunting in the forest and portions of Field 1. The parcel to the north is posted as "Semi-Wild" by a hunting group on lands owned by a neighboring landowner (Weidel). See Map 8 for delineations of the 150' and 450' safety zones and hunting status.

Rare Species Management: Survey for Wildenow's sedge (currently low priority).

Neighboring Lands: Large blocks of preserved farmland are located to the north and west of the Preserve. See Map 7.

Waterbodies Management: No waterbodies occur on the preserve.

Undesirable Activities Management: The neighboring property owner to the west appears to have improperly posted their boundary signs – these should be checked via GPS and landowner should be contacted.

ATV trail had been marked on the Nayfield Preserve and continued through several private parcels, across Route 579, into the Hopewell Township parcel and Arena Preserve. Hopewell Township police were contacted and Preserve hunters erected a sign. All neighbors, including suspected offenders, were sent letters. ATV activity has ceased.

Scientific Research Assessment: The Preserve is available for scientific research.

Recreational Opportunities Assessment: This property was considered for a loop trail, but vehicular access is difficult. Current access requires using township land, which is being redeveloped.

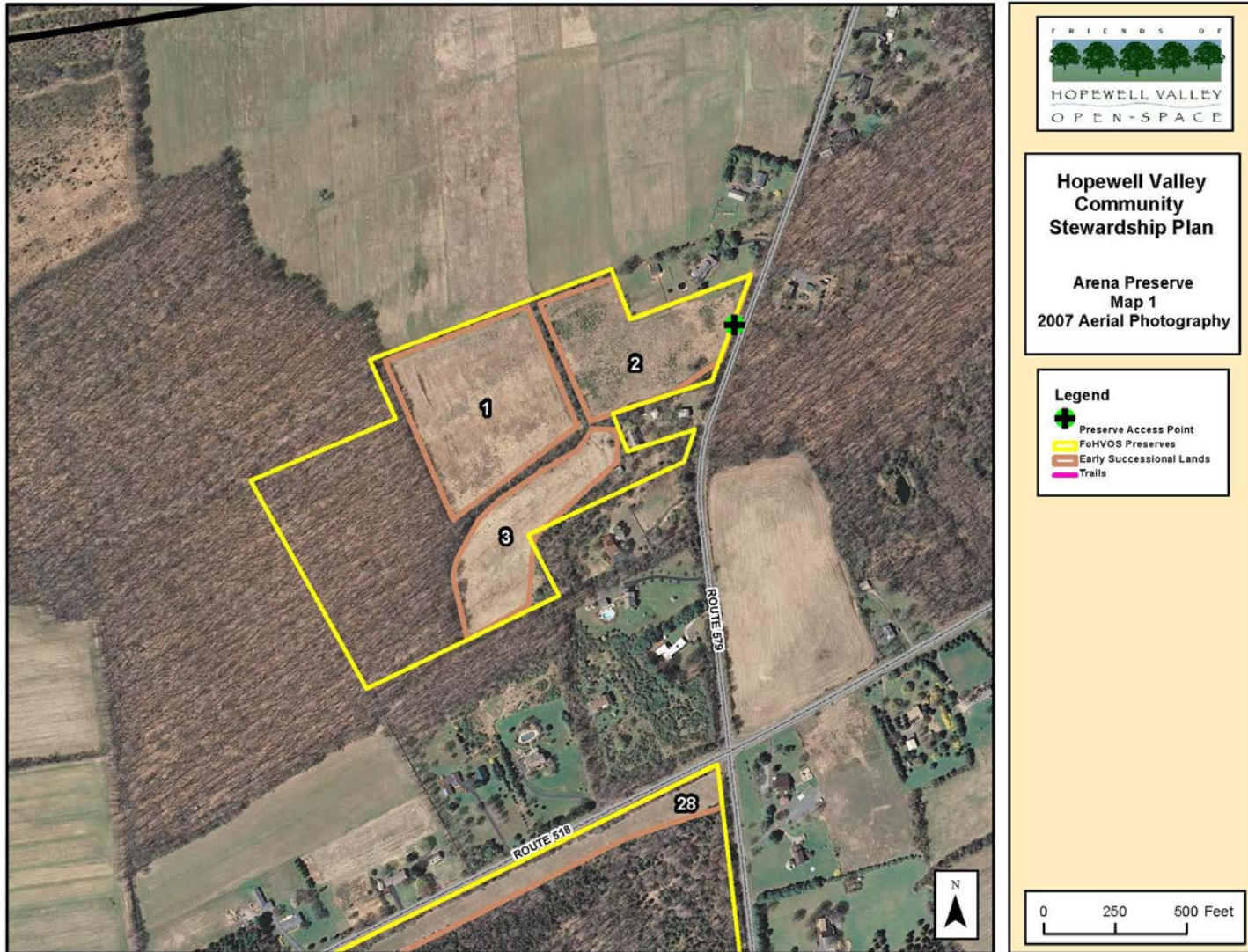
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Table 1. Invasive Plants – Species Abundance and Treatment Recommendations

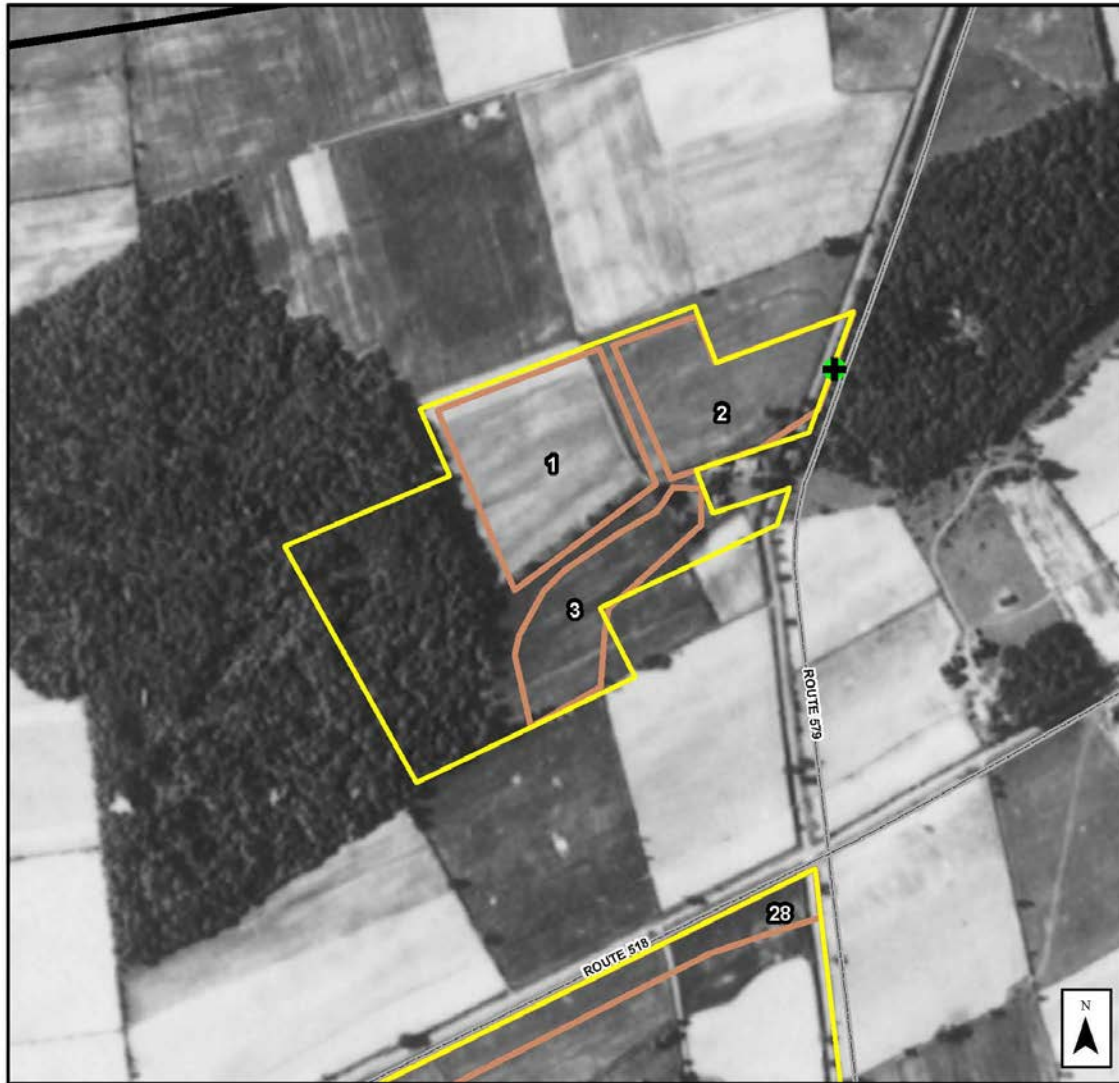
Scientific Name	Common Name	Infestation Index Score ¹	Total Acres Present	Percent of Preserve Area Present	Treatment Recommendation	LOE Estimate (Hours)	Acreage by Percent Ground Cover Categories						
							Category 0: 0%	Category: Trace	Category 1: 1-10%	Category 2: 10-25%	Category 3: 25-50%	Category 4: 50-75%	Category 5: 75-100%
<i>Acer palmatum</i>	Japanese Maple	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Acer platanoides</i>	Norway Maple	0.4	0.4	1.3	None		27.74	0.0	0.3	0.03	0.0	0.01	0.0
<i>Ailanthus altissima</i>	Tree-of-Heaven	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Alliaria petiolata</i>	Garlic Mustard	0.4	0.6	2.2	None		27.49	0.2	0.4	0.0	0.0	0.0	0.0
<i>Artemisia vulgaris</i>	Common Mugwort	0.2	0.2	0.6	Eradicate	2	27.95	0.0	0.2	0.0	0.0	0.0	0.0
<i>Arthraxon hispidus</i>	Small Carpgrass	12.1	10.6	37.5	None		17.56	0.0	9.9	0.2	0.1	0.2	0.1
<i>Berberis thunbergii</i>	Japanese Barberry	1.7	8.9	31.5	None		19.26	7.1	1.7	0.0	0.0	0.0	0.0
<i>Cardamine impatiens</i>	Narrow-leaved Bittercress	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Catalpa bignonioides</i>	Northern Catalpa	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Celastrus orbiculatus</i>	Asiatic Bittersweet	0.8	2.3	8.3	Control - Treat Fruiting Plants	5	25.78	1.6	0.7	0.0	0.02	0.0	0.0
<i>Centaurea sp.</i>	Knawweed sp.	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Cirsium arvense</i>	Canada Thistle	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Dipsacus sylvestris</i>	Teasel	0.0	0.0	0.1	Control - PU	3	28.07	0.0	0.04	0.0	0.0	0.0	0.0
<i>Eleaegnus umbellata</i>	Autumn Olive	59.5	13.1	46.5	Control - Field Maintenance	Strategy 3B	15.05	0.2	0.5	0.3	0.5	1.1	10.5
<i>Euonymus alata</i>	Winged Burning Bush	1.3	1.1	3.9	Control - Treat Fruiting Plants	10	27.00	0.2	0.6	0.3	0.0	0.0	0.01
<i>Iris pseudoacris</i>	Yellow Iris	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Lespedeza cuneata</i>	Chinese Bushclover	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Ligustrum obtusifolium</i>	Border Privet	0.0	0.0	0.0	N/A		28.10	0.0	0.01	0.0	0.0	0.0	0.0
<i>Lonicera japonica</i>	Japanese Honeysuckle	15.3	12.9	46.0	None		15.17	0.0	10.7	2.1	0.2	0.0	0.0
<i>Lonicera maackii</i>	Amur Honeysuckle	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Lonicera morrowii</i>	Morrow's Honeysuckle	4.2	3.1	11.0	None		25.02	0.2	1.7	1.2	0.02	0.0	0.0
<i>Lysimachia nummularia</i>	Moneywort	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Lythrum salicaria</i>	Purple Loosestrife	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Malus toringo</i>	Toringo Crabapple	31.9	12.1	42.9	Control - Field Maintenance	Strategy 3B	16.05	0.0	1.5	1.3	9.2	0.0	0.0
<i>Microstegium vimineum</i>	Japanese Stiltgrass	29.6	20.9	74.2	None		7.26	0.0	17.2	0.9	0.6	2.0	0.1
N/A	Non-native, cool season grass	46.9	12.5	44.6	None		15.57	0.0	0.0	0.0	3.3	9.3	0.0
<i>Phalaris arundinacea</i>	Reed Canary Grass	44.6	15.9	56.5	Control - Field Maintenance	Strategy 3B	12.22	0.2	0.9	9.5	0.1	1.2	3.9
<i>Phragmites australis</i>	Common Reed	0.4	0.1	0.2	None		28.04	0.0	0.0	0.0	0.0	0.0	0.1
<i>Polygonum cuspidatum</i>	Japanese Knotweed	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Polygonum perfoliatum</i>	Mile-a-Minute	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Pyrus calleryana</i>	Callery Pear	35.5	14.8	52.5	Control - Field Maintenance	Strategy 3B	13.34	0.0	4.3	0.1	10.3	0.0	0.0
<i>Ranunculus ficaria</i>	Lesser Celandine	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Robinia pseudoacacia</i>	Black Locust	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Rosa multiflora</i>	Multiflora Rose	67.1	20.8	74.1	Control - Field Maintenance	Strategy 3B	7.29	0.3	5.6	0.4	0.6	10.8	3.2
<i>Rubus pheonculasius</i>	Wineberry	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Securigera varia</i>	Crown vetch	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Viburnum dilatatum</i>	Linden Viburnum	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Viburnum sieboldii</i>	Siebold's Viburnum	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
<i>Wisteria floribunda</i>	Japanese Wisteria	0.0	0.0	0.0	N/A		28.11	0.0	0.0	0.0	0.0	0.0	0.0
Total LOE						20							

¹ The Infestation Index Score combines the extent of acreage infested and the intensity of the infestation. It was derived by multiplying the cover class number by the number of acres within each cover class.

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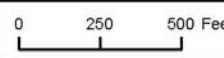


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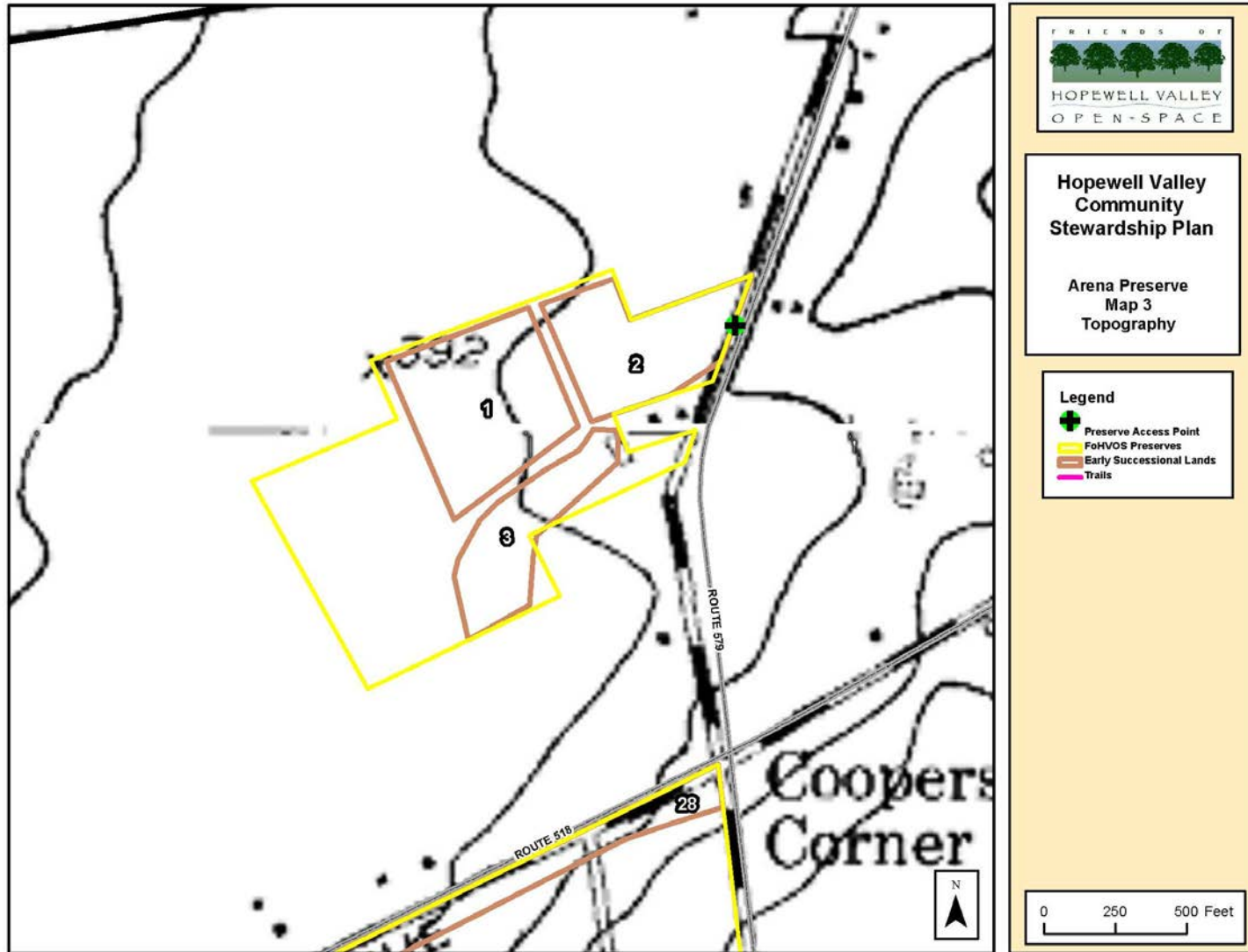
Arena Preserve
Map 2
1930 Aerial Photography

Legend

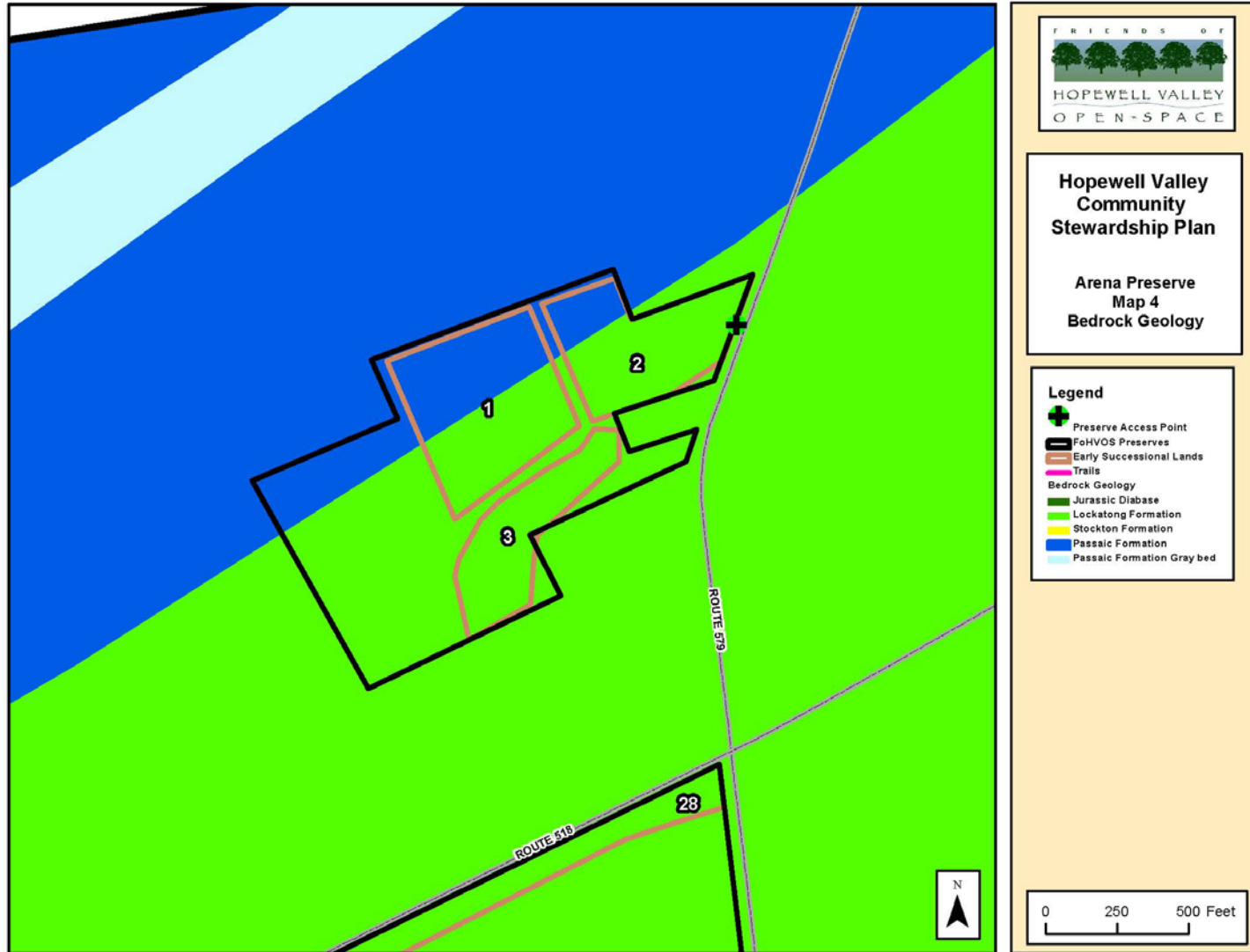
- Preserve Access Point (Green cross symbol)
- FoHVOS Preserves (Yellow outline)
- Early Successional Lands (Orange outline)
- Trails (Pink line)



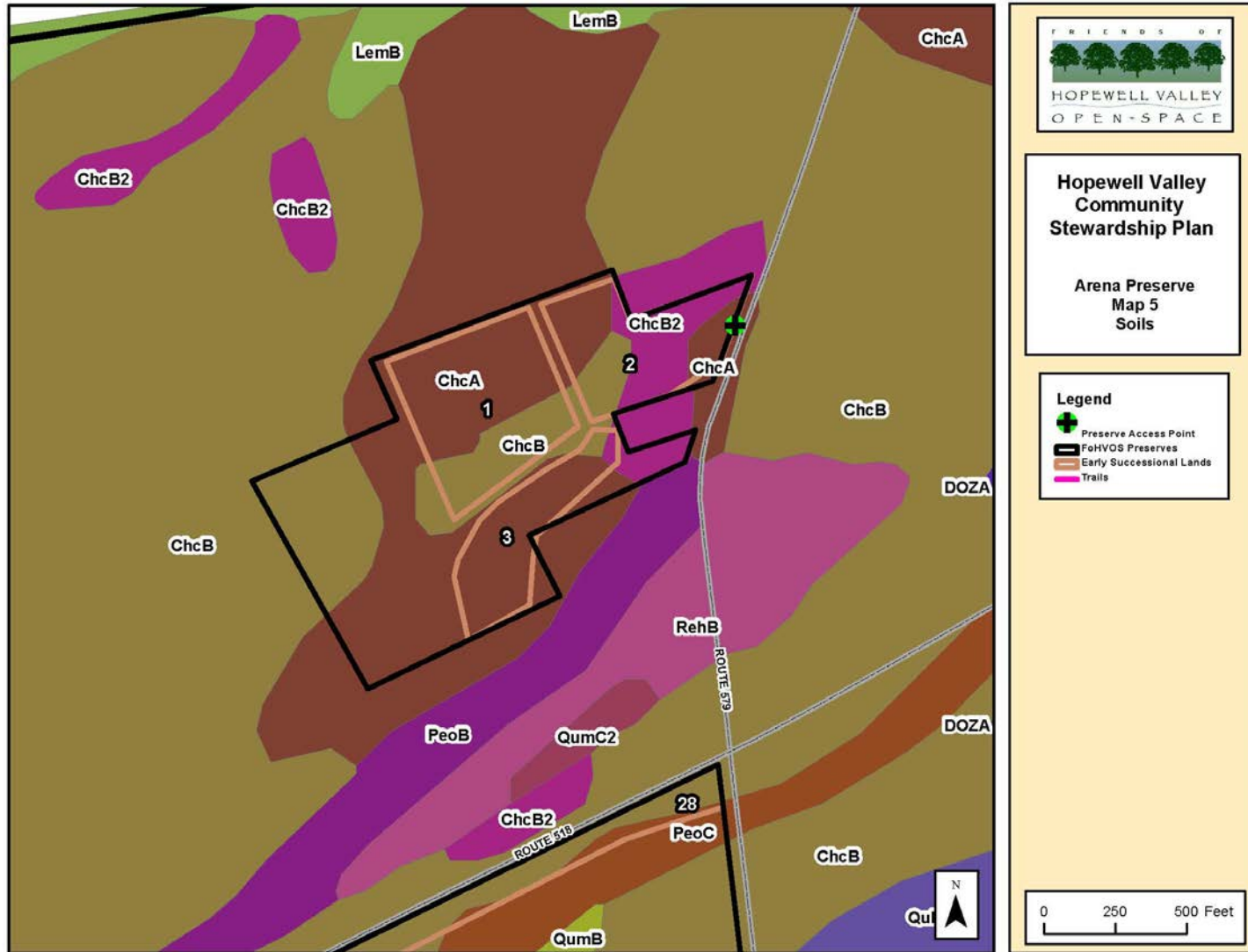
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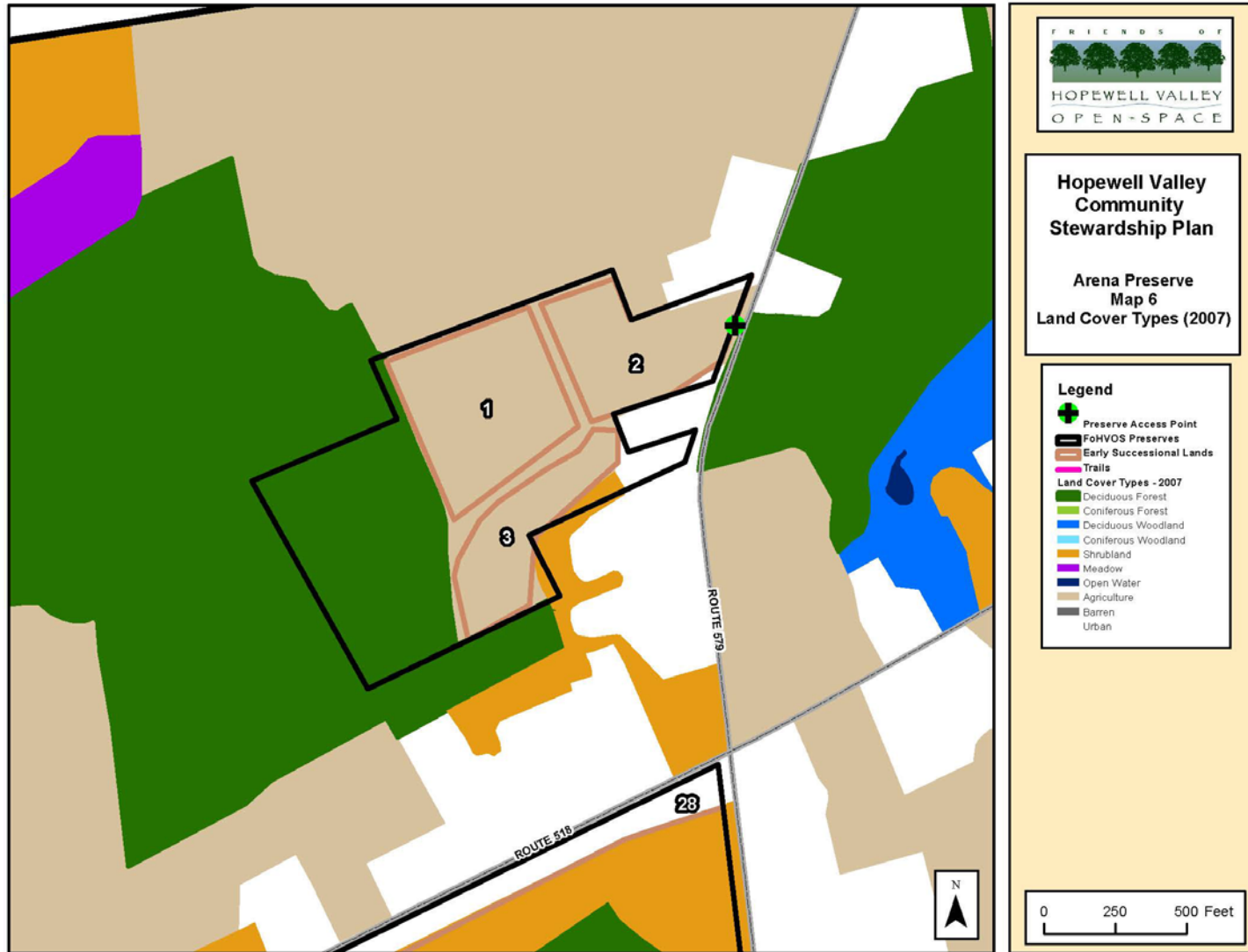
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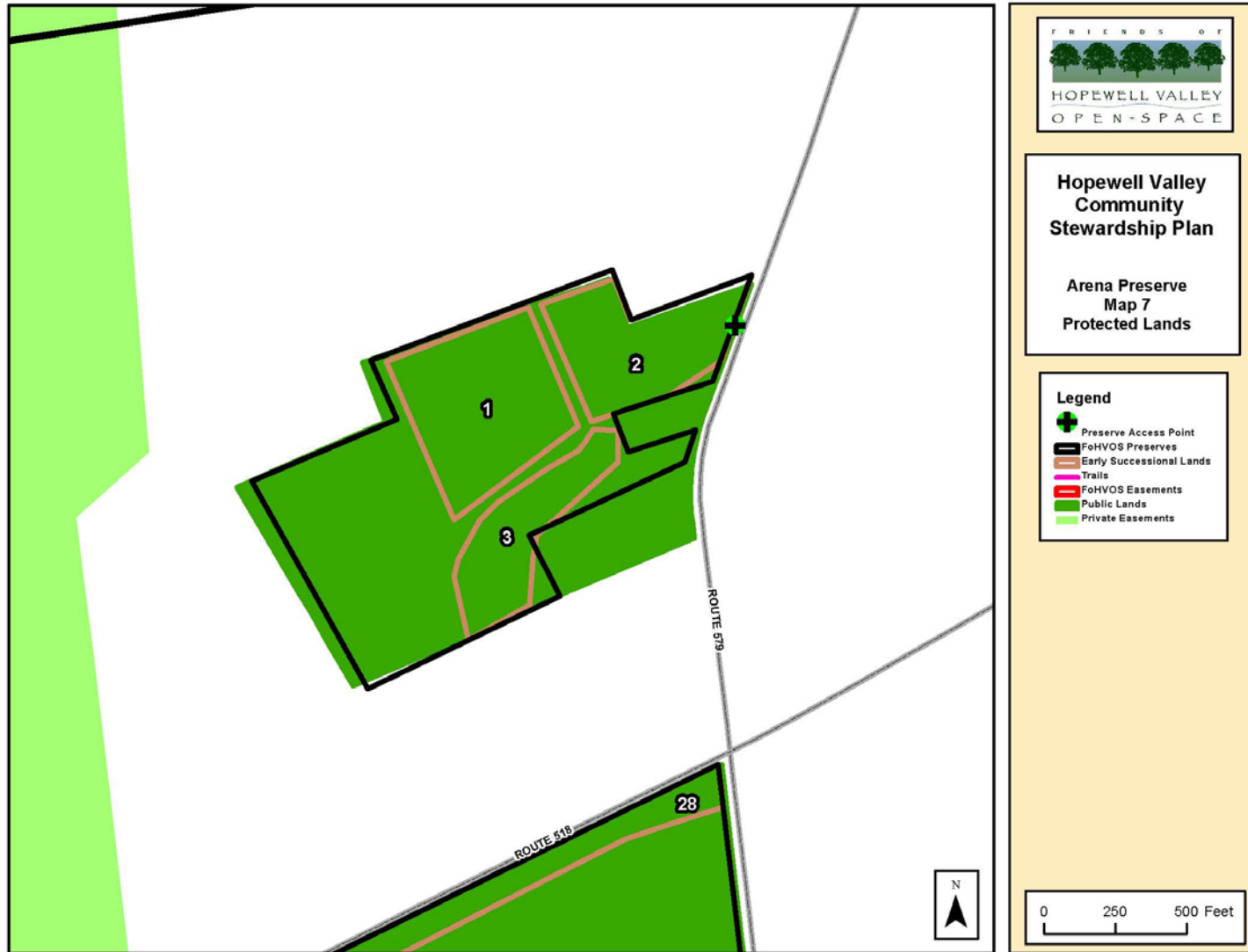
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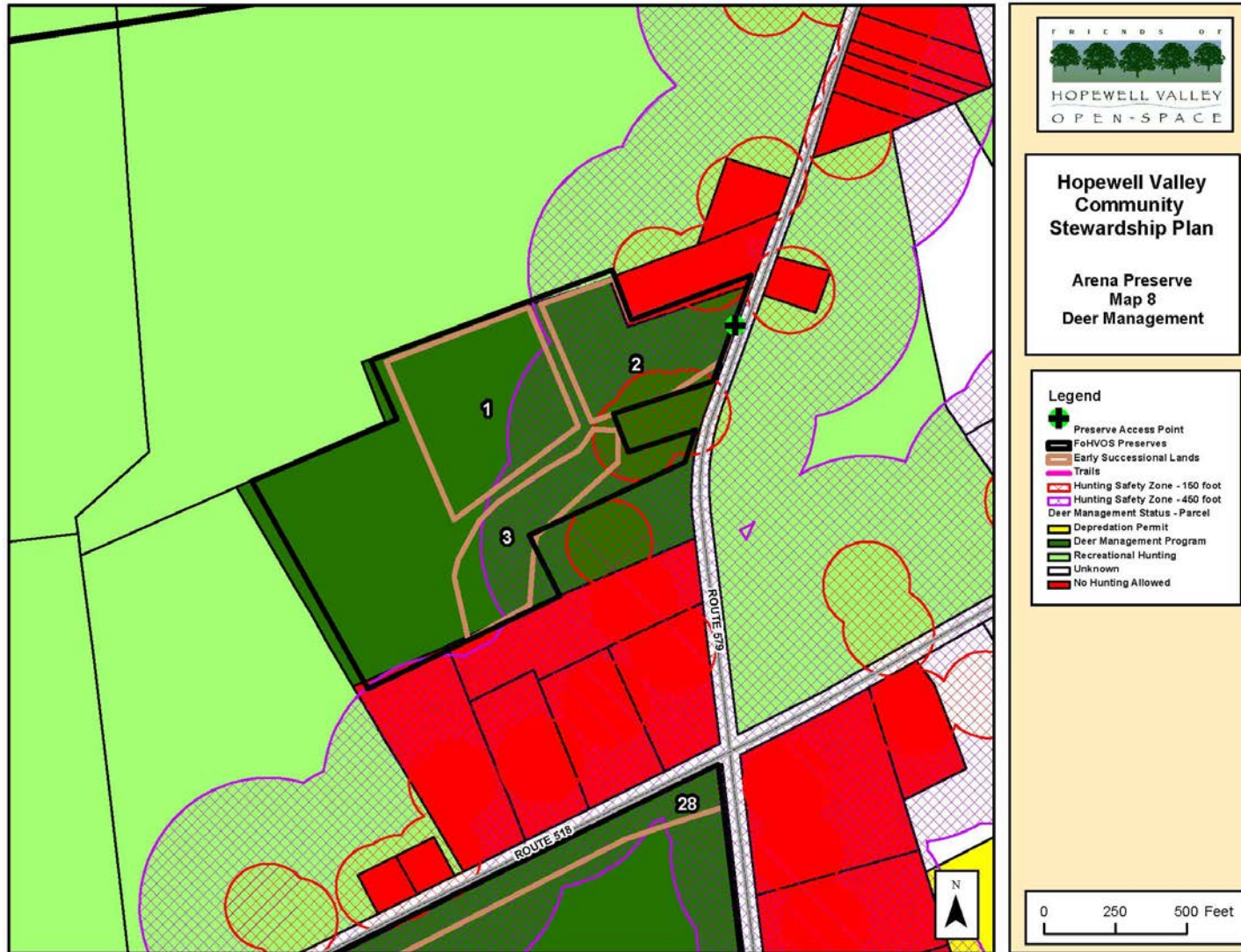
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