MANAGEMENT PLAN
DOT ACQUISITION
BLOCK 46, LOT 13.02

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Harding Open Space Trust

April 28, 2024

Setting, Historic and Current Land Use

The Harding Township property located at Block 46, Lot 13.03 with the physical address listed as Rear Mt. Kemble Avenue, does not have direct street frontage. This 21.96 acre property is positioned on the southern boundary of the Township of Harding, along the waterbody known as the Passaic River Headwaters. To the north is Primrose Preserve, the preserved 97.5 acre Harding Land Trust property. Interstate 287 is located just west of the property and, across the River, Verizon corporate complex is located to the south. An unnamed tributary of the Passaic River is adjacent to I-287 and joins the main branch of the Passaic River Headwaters just before it enters the subject property.

Geology and Soils

The property is situated within the New Jersey Piedmont Physiographic Province, where it is underlain by the Alluvium formation which includes sand, gravel, silt, minor clay and peat with variable amounts of organic matter, typically deposited in modern floodplains and channels (NJDEP, GeoWeb).

According to the USDA NRCS Web Soil Survey, there are two soil types are found on this property. The majority of the property (78%) is dominated by Parsippany Silt loam, 0 to 3 percent slopes (PbpAt). This soil dominates the northern portion of the property, bordering the Harding Land Trust's Primrose Preserve. PbpAt is defined as a hydric soil, frequently flooded, poorly drained with 0 – 6" to the water table. Deep, nearly level, poorly drained soils that have a moderately fine textured subsoil. The water table is at or near the surface during much of winter, early in spring and after heavy rains.

The portion of the property that is adjacent to the Passaic River is underlain by Hatboro-Codorus complex, 1-3 percent slopes. It is also a hydric soil, frequently flooded, poorly drained with 0 – 6" to the water table. HcuAt encompasses approximately 22% of the property.

Passaic River Headwaters

The Passaic River Headwaters form the southern boundary of the property. These headwaters originate as two tributaries in Mendham Township, Mendham Borough and Bernardsville. The tributaries flow through the Morris Area Girl Scouts Camp, then through a section of the Morristown National Historical Park's Jockey Hollow, then the two tributaries join near the New Jersey Audubon Society's Scherman-Hoffman Sanctuary. Leaving the Sanctuary, the Passaic River Headwaters flow through areas of rural residential development and low-density commercial development before traversing under I-287, and onto the subject property. Leaving the property, the Headwaters continue to flow through residential sections in Bernards and Harding Townships into Osborne Pond and then into the Basking Ridge Golf Club. The third tributary joins the main stem inside the Golf Club, and the three flow as one between the Great Swamp National Wildlife Refuge to the east and Somerset County's Lord Stirling Environmental Education Center to the west.

Because it originates in a relatively undeveloped portion of the watershed, the first few miles of the headwaters face fewer threats from pollution and development than other streams in the Great Swamp Watershed. As such, The Passaic River Headwaters are assigned to the C1-trout producing waters designation above Osborne Pond in Bernards Township (NJDEP Water Monitoring Standards). The C1-trout producing waters is the highest water quality rating that can be assigned by the state.

Habitat

The subject property is composed of forested bottomlands that include floodplain and riparian habitats. Dominant tree types include green ash, red maple, pin oak, and some swamp white oak. This forest also includes the presence of mesic forest dominated by white oak, red oak and American beech. These habitats contain a variety of high priority bird species, presence of federally listed species (i.e., Indiana bat), and several State-listed species (i.e., barred owl, and red-shouldered hawk). Bottomland forests are of particular importance to fall migrating songbirds and raptors (GSNWR, CCP).

The oldest available historic record of this property is an aerial photo from the 1930's (NJDEP GeoWeb). According to this record, this particular parcel appears to have been undisturbed even though neighboring forestlands properties were cleared for agricultural use. The bottomland forest on the subject property can be confirmed to be undisturbed for nearly a century. The protection of bottomland forests such as these are one of the most impactful and cost-effective ways to mitigate flood impacts to downstream communities. Forestland protection preserves the land's ability to slow and store flood waters, directs development away from flood-prone areas, and helps to avert future damage. They provide habitat for biodiversity and ecosystem services like carbon storage.

Forest Canopy Composition	
Red Maple	Acer rubrum
Pin Oak	Quercus palustris
Swamp White Oak	Quercus bicolor
Sweet Gum	Liquidambar styraciflua
American Beech	Fagus grandifolia
Green Ash	Fraxinus pennsylvanica
Understory Species	
Tussock Sedge	Carex stricta
Swamp Cabbage	Symplocarpus foetidus
Sweet Pepperbush	Clethra alnifolia
Lizard's Tail	Saururus cernuus
Virginia Knotweed	Polygonum virginianum
Northern Spicebush	Lindera benzoin

Wildlife

The property is home to a variety of wildlife throughout the year, from breeding songbirds in the spring, reptiles and amphibians in the summer months, migratory birds in the fall and is host to an array of mammals throughout the year. Common mammalian species in the region include white-tailed deer, red fox, raccoon, opossum, skunk, gray squirrel, coyote, river otter, and muskrat. Transient black bears have also been observed on adjacent properties. Common amphibian species in the area include the spring peeper, green frog, gray treefrog, bull frog, painted turtle, and snapping turtle.

The New Jersey Landscape Project was designed to guide strategic wildlife habitat conservation. Started in 1994 by the N.J. Division of Fish and Wildlife's Endangered and Nongame Species Program (ESPN). Its goal is to protect New Jersey's biological diversity by maintaining and enhancing imperiled wildlife populations within healthy functioning ecosystems. The Landscape Project is a proactive, ecosystem-level approach for the long-term protection of imperiled species and their important habitats in New Jersey. The data is available on the NJDEP NJ-GeoWeb application and is the primary source for the sightings and habitat use of the species described below.

New Jersey Species of Special Concern

Veery (*Catharus fuscescens*), Breeding Sighting
The Veery is a migratory medium size thrush that is a Species of Special Concern in New Jersey. Veery prefer wooded habitats usually favoring wetter areas. The Veery winters in Central and South America and is uncommon to see in New Jersey after October.

Great Blue Heron (*Ardea Herodias*), Foraging
Although fairly commonly observed along shorelines, river banks, and the edges of marshes, estuaries, and ponds, the breeding population of these wading birds is actually listed as a Species of Special Concern in New Jersey. Wetland destruction in New Jersey has caused a decrease in heron populations from their historic numbers. Since the 1950s, habitat loss has occurred at an alarming rate in New Jersey, destroying wetlands critical to breeding herons. The subject property is located at the southern edge of Great Blue Heron breeding habitat in New Jersey (Conserve Wildlife Foundation).

Great blue herons can hunt during the day and night, thanks to a high percentage of rod-type photoreceptors in their eyes that improve night vision. They eat nearly anything within striking distance, including fish, amphibians, reptiles, small mammals, insects, and other birds. Herons nest in colonies or "rookeries" in tall trees near bodies of water (Cornell Lab).

Wood Thrush (*Hylocichla mustelina*), Breeding Sighting
The wood thrush, a migratory songbird of moderate size measuring approximately 8 inches, bears resemblance in body form to the American robin albeit smaller. It has a rusty-colored crown, rusty-brown back, and large, round black spots on a white belly. It is plumper than the other brown thrushes and both sexes look alike.

This avian species favors breeding grounds within deciduous or mixed forests, particularly those boasting a dense tree canopy and a thriving understory, often adjacent to or nestled within wetlands (Conserve Wildlife Foundation). Come winter, their habitat shifts to encompass a range of forested areas and woodlands.

The wood thrush is considered to be common throughout much of the eastern U.S. However, the species has undergone population declines in some portions of its range, most likely due to habitat loss and forest fragmentation within its breeding range. This species prefers large areas of forest with intact, closed tree canopies.

State Threatened Species

Wood Turtle (*Glyptemys insculpta*), Occupied Habitat

The Wood Turtle is a State Threatened Species in New Jersey. Unlike other turtle species that favor either land or water, the wood turtle resides in both aquatic and terrestrial environments. Aquatic habitats are required for mating, feeding, and hibernation, while terrestrial habitats are used for egg laying and foraging. Freshwater streams, brooks, creeks, or rivers that are relatively remote provide the habitat needed by these turtles. Consequently, wood turtles are often found within streams containing native brook trout. These tributaries are characteristically clean, free of litter and pollutants, and occur within undisturbed uplands such as fields, meadows, or forests (Schwartz, V and D.M. Golden 2002).

State Endangered Species

Bald Eagle (*Haliaeetus leucocephalus)*, Foraging

The Bald Eagle is an Endangered Species Act success story. Habitat protection afforded by the Endangered Species Act, the federal government's banning of DDT, and conservation actions taken by the American public have helped bald eagles make a remarkable recovery. Bald eagle sightings are now a common occurrence in many parts of the country. The US Fish & Wildlife Service removed the bald eagle from the federal list of endangered species in 2007, but the species remains listed as endangered (breeding season) and threatened (non-breeding season) in New Jersey (NJDEP, ENSP).

Bald eagles are opportunistic feeders, with fish being a staple food. They will also feed on waterfowl, shorebirds, water birds, turtles, rabbits, snakes, small animals and carrion. Because eagles are visual hunters, they typically locate prey from a conspicuous perch, or soaring flight, and then swoop down and strike. They are known to scavenge on dead fish and animals, and are also notorious food thieves, stealing the caught prey from other eagles, mammals and other birds of prey.

Federally Protected Species

Bog Turtle (*Glyptemys muhlenbergii*), Occupied Habitat

The bog turtle is a federally listed threatened species and listed as Endangered in the State of New Jersey. The decline of bog turtles is caused by habitat destruction due to development; illegal collection; wetland ditching, flooding and filling; water quality degradation; and forest succession or invasive species encroachment (Beans and Niles 2003). Bog turtles require open

wetlands, generally with a scrub- shrub component, with perennial groundwater seepage and typically several inches of mucky substrate (generally greater than 4”). The subject property may have canopy gaps that serve as suitable habitat for the bog turtle.

The bog turtle is the smallest turtle in North America, reaching only 4-inches at maturity. The diet of the bog turtle generally consists of insect larvae, crayfish, mollusks, worms, snails, slugs, seeds, berries, and shoots, as well as amphibians and carrion (Conserve Wildlife Foundation). Cold temperatures during late October to late November cause bog turtles to retreat to their wintering sites. Bog turtles hibernate within underground burrows where springs ensure that water will flow during the winter, preventing the turtles from freezing. Bog turtles may excavate their own burrows, utilize old muskrat holes, or enlarge existing tunnels of small mammals.

Eggs are deposited on raised hummocks in open areas from mid-June to early July; incubation occurs for 48 to 58 days (Beans and Niles 2003). Eggs and young bog turtles are highly susceptible to predation by a number of animals, including raccoons, opossums, foxes, mink, skunks, muskrats, shrews, large birds (i.e., egrets, herons, crows, birds of prey), bull frogs, snapping turtles, and water snakes.

Indiana Bat (*Myotis sodalist*), Roost Site, Maternity Colony and Active Season Sighting
This State and Federally-listed Endangered species, utilizes riparian corridors near and within the Great Swamp National Wildlife Refuge for foraging and warm season roosting. Indiana Bat populations have been impacted throughout their range from White Nose Syndrome (WNS), a devastating fungal disease. This disease disrupts the bats' hibernation patterns, causing them to wake up more frequently and deplete their fat reserves, ultimately leading to starvation and death (Blehert et al., 2009). In New Jersey, WNS has had a profound impact on bat populations, including the endangered Indiana bat (Frick et al., 2010). The spread of WNS has led to significant declines in Indiana bat populations throughout the state, exacerbating existing conservation concerns (Frick et al., 2010). Efforts to mitigate the impacts of WNS on Indiana bats in New Jersey include habitat protection, monitoring, and research into potential treatments or management strategies to support their recovery.

The subject property has been characterized as active season sighting, maternity colonies and roost sites for the Indiana Bat by The New Jersey Natural Heritage Database (NJDEP). Primary roost sites may be found within a variety of forested habitats, including wetlands and riparian areas, and primarily include snags with nearly dead trees with peeling or exfoliating bark. They are typically large trees, of a size greater than 22” diameter at breast height, in open areas with high exposure to sunlight. Alternative roost sites typically are found within the forest interior in trees of similar sizes. (Kitchell 2008). Maternal roosts are typically established in agricultural areas with fragmented forests. The subject property, with riparian forest, stream corridor, and nearby open fields provides suitable conditions for roost sites and foraging.

Foraging for the Indiana Bat can occur in and around upland and wetland mixed oak forested habitats (Butchkoski and Hassinger 2002; Gardner et al., 1991; Humphrey et al., 1977; Murray and Kurta 2004; Romme et al., 2002, Sparks et al., 2005). Pregnant or lactating bats primarily forage within wooded or riparian corridors, streams and floodplain forests, and impounded

waterways. They will also use hedgerows, upland forest, early successional field and along cropland. (Kitchell 2008).

Northern Long-Eared Bat (*Northern Myotis*), Active Season Sighting
The northern long-eared bat is a wide-ranging, bat species that was added to the Federal Endangered Species List in 2022. The species typically overwinters in caves or mines and spends the remainder of the year in forested habitats. As its name suggests, the northern long-eared bat is distinguished by its long ears, particularly as compared to other bats in the genus Myotis. The predominant threat by far is white-nose syndrome, as well as habitat loss and disturbance.

Management Recommendations

Active management of open space properties is needed to ensure that these resources will be available for the multitude of species that depend upon them well into the future. In this case there are very few recommendations for active management activities. This is due, in part, to the remoteness and difficulty in accessing the property. Any decision to move equipment onto the property, would have to be balanced against the potential for damage in the form of soil compaction, introduction of non-native species and disturbance to protected wildlife. In addition, the age of the forest on the property, which is well buffered by surrounding forestland, has produced a mature, multi-age stand of bottomland forest habitat. One component of this habitat that has value to many of the wildlife species that depend upon it (including the bog turtle and Indiana bat) are forest canopy gaps. As such, there are few improvements to be made, unless public access becomes a management goal. With the development of public access to the Passaic River Headwaters, there are increased opportunities for disturbance to the pristine nature of this property.

Management Goal 1: Control Invasive Species
Prevent the spread of invasive species from adjacent properties. Japanese Barberry (*Berberis thunbergii*) is abundant in the portions of Primrose Preserve are adjacent subject property. It is an aggressive invasive that can tolerate a range of site and soil conditions. However, it may not thrive in droughty or prolonged wet conditions (Wenning 2012). Given the saturated state of the soils on the subject property, it may slow and possibly minimize the spread of Japanese Barberry to the property.

Strategy 1: Work with Harding Land Trust to control the spread of Japanese Barberry. Monitor and visually inspect the property and the surrounding environs in June and September. Mechanical controls (pulling, cutting, digging) is most beneficial before flowering and seed production and should be done before April 1 due to the presence of the Indiana Bat. Plants that prove to be too difficult to remove by way of pulling or digging can be handcut down to one-inch stumps then immediately treated with glyphosate herbicide to the freshly cut stumps using a paint brush or sponge applicator. Stump application is very effective during July, August, and up to mid-September (Wenning 2012).

Ward and Williams (2011) used propane torches directed at the crowns of Japanese barberry plants in Connecticut. They mention that their earlier work using directed heating via propane torches controlled Japanese barberry for approximately two years on small scale

research plots. They recommend that two torch treatments on targeted plants are most effective; initial torch treatment in early spring before Japanese barberry leaf-out (or any time from March through June) and a follow-up treatment from July through August was effective at controlling the growth and spread of Japanese barberry in areas where chemical control options were restricted (Ward and Williams, 2011).

Management Goal #2 Improve habitat conditions for State and Federally Listed Wildlife
Improved habitat for Indiana bats will also benefit many other bat species and wildlife. Mature uneven-aged forests that exhibit structural diversity and occasional gap openings provide high quality roosting and foraging habitat (Lacki et al, 2007). Roost trees provide individual bats with cover from predators and harsh weather conditions while also providing a microclimate of optimal temperatures.

Strategy 1: Given the age of the floodplain forest on the subject property, there is likely substantial diversity in canopy tree age and composition to continue to meet the needs of foraging and roosting Mytosis species. Typically, the recommendations to maintain and enhance habitat include insuring an availability of roost trees with a goal of providing at least 16 "roost trees" be present for every acre of forest. These include live shagbark hickory, standing dead trees of any species with a dbh of 9" or greater, and dead or dying trees with flaking, peeling bark. Habitat enhancement can include the creation of artificial roosts using shingles and or bat boxes. Due to the sensitivity of this species, any mechanical activities should be avoided between April 1 – November 15.

Strategy 2: Ensure adequate canopy gaps to improve habitat for the bog turtle and foraging habitat for the Indiana Bat and Brown Long-Eared Bat. Gaps are naturally occurring conditions in a mature forest, caused by blowdowns, lightening or disease. They can change the physical and biological attributes of the forest by altering temperature and light, creating conditions that are very different in composition and structure from a closed canopy forest. These conditions have important implications for wildlife. Remote sensing (aerial photography or satellite imagery) are useful tools to view and measure canopy gaps. There are currently several gaps between 25-50' in diameter, clustered in the northern-central portion of the property (Google Maps, 2024). These gaps can be viewed remotely, measured and tracked to ensure these conditions continue to be met.

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Harding Township B46, L13.03
Project Location Map

4/29/2024, 10:55:29 AM

Override 1

Parcels Data (Block and Lot)

County Boundaries

1:9,028

0 0.05 0.1 0.2 mi

0 0.07 0.15 0.3 km

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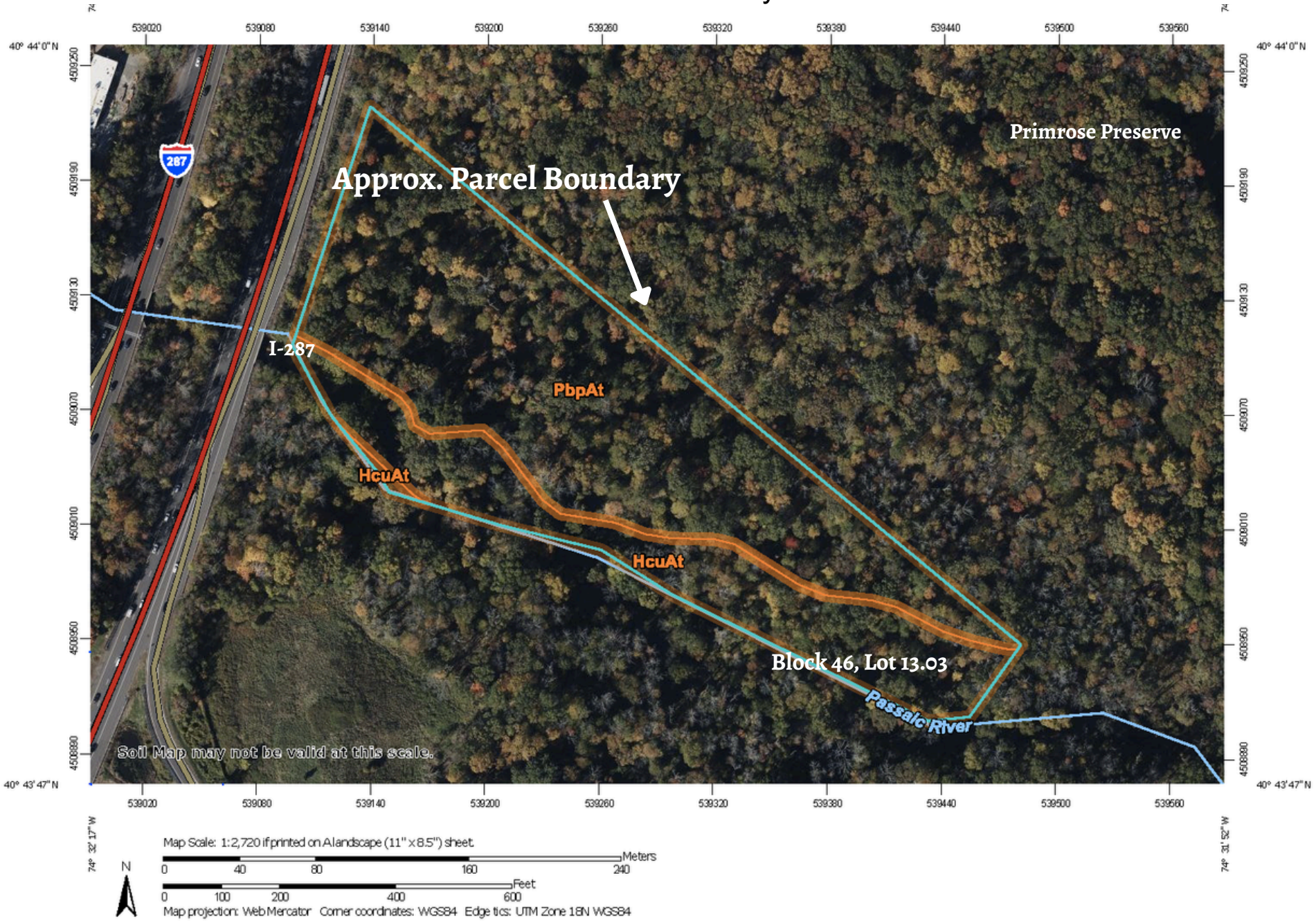
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