

December 3, 2014

Ms. Caroline Ehrlich
Chief of Staff, Woodbridge Township
Executive Director
Woodbridge Township Redevelopment Agency
1 Main Street
Woodbridge, NJ 07095

Re: Ecosystem Assessment – Block 71, Lots 1, 2, & 7

Dear Ms. Ehrlich,

This letter report summarizes field activities from our November 13th visit to the property along Mac Lane in Keasbey (Block 71, Lots 1, 2, and 7) to evaluate it as a potential outlier of the New Jersey Pine Barrens. Per our approved scope of work, we characterized the vegetation, soils and hydrology of the site. Further, we discussed our observations with the NJ Pinelands Preservation Alliance (PPA) and consulted historical maps, and soil and hydrological surveys. It is our opinion that the property fits the criteria of a Pine Barrens outlier. The site lacks a natural fire regime, critical for regeneration of pitch pine, (*Pinus rigida*); therefore, there are only a few individual pitch pine trees remaining with no sign of reproduction. There is significant potential to bring back the true character of the Pine Barrens on this property through restoration activities. We have detailed our findings below and provided some recommendations for future management of the site.

General Site Location

Keasbey is located north of the Raritan River and is not officially considered a part of the Pines Barrens geographical extent. The most referenced Pine Barrens outline map (Forman 1998) indicates a portion of Spotswood as the northernmost outlier of the Pine Barrens. In addition, the site lies well outside the Kirkwood-Cohansey Aquifer, which feeds approximately 90% of Pinelands surface waters. However, a map created in 1910 demarcates a small area north of the Raritan River as being ecologically similar to the Pine Barrens (Boyd 1991).

Vegetation Survey

We assessed the vegetation along five linear east-west transects throughout the three lots. We found only seven mature pitch pines, the most notable plant species of the Pine Barrens ecosystem. The wooded lots are oak-dominated, consisting largely of white oak

(*Quercus alba*) and black oak (*Q. velutina*), with willow oak (*Q. phellos*), red oak (*Q. rubra*), and pin oak (*Q. palustris*) also represented. Note that where fire is suppressed, Pine Barrens habitats transition to oak-dominated woodlands. We also documented other trees typical of the Pine Barrens, including sweetgum (*Liquidambar styraciflua*) and red maple (*Acer rubrum*). The dominant shrubby species included sweet pepperbush (*Clethra alnifolia*), highbush blueberry (*Vaccinium corymbosum*), and swamp azalea (*Rhododendron viscosum*), and we observed a small patch of black huckleberry (*Gaylussacia baccata*).

While much of the shorelines of both ponds are covered in the invasive common reed (*Phragmites australis*), we were able to access a small area along the northern pond edge in Lot 1. We documented a patch of seedbox (*Ludwigia alternifolia*), which is considered common in the Pine Barrens.

Soils

Soils on-site are classified as Atsion Sand, which is a very common soil type in the Pine Barrens, and our soil survey confirmed this designation. We dug two test pits to approximately 22 inches and collected seven soil cores (to approximately 15 inches) throughout the site (see photo log). The organic layer varied in depth from 1.5 to 11 inches, depending primarily on proximity to the manmade ponds. Beneath this organic layer, we consistently found grey sands to a depth of approximately 10" and brown, sandy soil below. A pH test of two soil cores indicated acidic soils with a pH range of 3.3-3.8.

Hydrology

The majority of the site is either emergent or forested wetland habitat. Some areas have highly saturated soils with a deep layer of organic soils. In other locations, soils can be classified as moist but not saturated. We did not identify the depth to groundwater in our 20-inch test pits (located away from the ponds).

Conclusions/Recommendations

As indicated above, it is our opinion that the Keasbey property fits the criteria of a Pine Barrens outlier, based on an assessment of the vegetation, soils and hydrology. The site is located outside the official NJ Pinelands delineation and *is not subject to any regulatory requirements beyond existing laws for wetland protection*. The isolation of the site severely inhibits the natural dispersal of plants and animals; therefore, it is highly unlikely that the area supports rare or threatened Pine Barrens plants or animals. The site is in surprisingly good ecological health, considering the highly disturbed nature of the surrounding properties. We did observe evidence of deer presence; however, deer herbivory does not appear to be negatively impacting the vegetation. The understory shrub layers are quite dense (note that this late in the season we cannot evaluate the condition of the herbaceous layer). Aside from the dense monoculture of *Phragmites* surrounding the ponds, we observed little evidence of invasive plant species. We do note the presence of Japanese stilt grass (*Microstegium vimineum*); while not currently extensive, this herbaceous plant has the potential to spread rapidly and outcompete native vegetation.

Given the remediation activities occurring to the north, there is great potential to restore the full character of a pine-dominated habitat in this location. Although the natural fire regime of the Pine Barrens does not occur here, the presence of seven mature pitch pines confirms the suitability of the soils for this Pine Barrens indicator species. Restoration plantings of pitch pine and potentially Virginia pine (*Pinus virginiana*) are likely to succeed. In addition, removal and subsequent management of *Phragmites*, combined with native plantings of emergent wetland species can add value to the landscape and improve habitat quality for several species, including amphibians, waterfowl, and passerine birds. We are uncertain of the plans for the site as a potential greenway, but adding ecological complexity and restoring the character of the Pine Barrens may offer a unique destination for eco-enthusiasts in New Jersey.

The attached vegetation species inventory and photo logs include further documentation of our observations. Thank you again for including us in this project, and please contact me with any questions or for further clarification of any information reported here.

Sincerely,

A handwritten signature in cursive script that reads "Brooke Maslo". The signature is written in dark ink and is positioned above the printed name.

Brooke Maslo, Ph.D.

PHOTO LOG
BLOCK 71, LOTS 1, 2 & 7, KEASBEY, NJ
NOVEMBER 13, 2014



Photo 1: Oak-dominated woods typical of the site. Mature pitch pines (*Pinus rigida*) in the background.



Photo 2: Crown of mature pitch pine with several pine cones. No regeneration was observed.



Photo 3: Soil core #6 (northwestern portion of Lot 2), depicting 10" of organic material.



Photo 4: Soil core #2 (northeastern portion of Lot 2), depicting 1.4" of organic soils covering gray sands.



Photo 5: Patch of cinnamon ferns (*Osmunda cinnamomea*) located in Lot 7.



Photo 6: Test pit #2 (southern portion of Lot 2), depicting 18" of gray sands overlain on brown, sandy soils.



Photo 7: Black huckleberry (*Gaylussacia baccata*) in Lot 2, along Mac Lane.

VEGETATIVE SPECIES INVENTORY
 BLOCK 71, LOTS 1, 2 & 7, KEASBEY, NJ
 NOVEMBER 13, 2014

Common Name	Latin Name
aster	<i>Aster</i> sp.
black huckleberry	<i>Gaylussacia baccata</i>
black locust	<i>Robinia pseudoacacia</i>
black oak	<i>Quercus velutina</i>
cinnamon fern	<i>Osmunda cinnamomea</i>
common reed	<i>Phragmites australis</i>
goldenrod	<i>Solidago</i> sp.
greenbriar	<i>Smilax rotundifolia</i>
groundsel tree	<i>Baccharis halmifolia</i>
highbush blueberry	<i>Vaccinium corymbosum</i>
Japanese stiltgrass	<i>Microstegium vimineum</i>
large toothed poplar	<i>Populus grandidentata</i>
netted chain fern	<i>Woodwardia areolata</i>
pin oak	<i>Quercus palustris</i>
pitch pine	<i>Pinus rigida</i>
red maple	<i>Acer rubrum</i>
red oak	<i>Quercus alba</i>
royal fern	<i>Osmunda regalis</i>
Rubus	<i>Rubus</i> sp.
seedbox	<i>Ludwigia alternifolia</i>
swamp azalea	<i>Rhododendron viscosum</i>
sweetbay magnolia	<i>Magnolia virginiana</i>
sweet gum	<i>Liquidambar styraciflua</i>
sweet pepperbush	<i>Clethra alnifolia</i>
tree of heaven	<i>Ailanthus altissima</i>
white oak	<i>Quercus alba</i>
willow oak	<i>Quercus phellos</i>

(represents species observed during our site visit)

Literature Cited

Boyd, H.P. 1991. *A Field Guide to the Pine Barrens of New Jersey, Its Flora, Fauna, Ecology and Historic Sites*. Medford NJ: Plexus Publishing, Inc.

Forman, R.T.T. (ed.). 1998. *Pine Barrens Ecosystem and Landscape*. New Brunswick, NJ: Rutgers University Press.