Appendix E-1

BIOLOGICAL STUDIES REPORT
TOURO COLLEGE SITE
Warwick, New York

Prepared for:

TOURO COLLEGE
c/o Lakeland Management LLC
Hauppauge, New York

OCTOBER 2007

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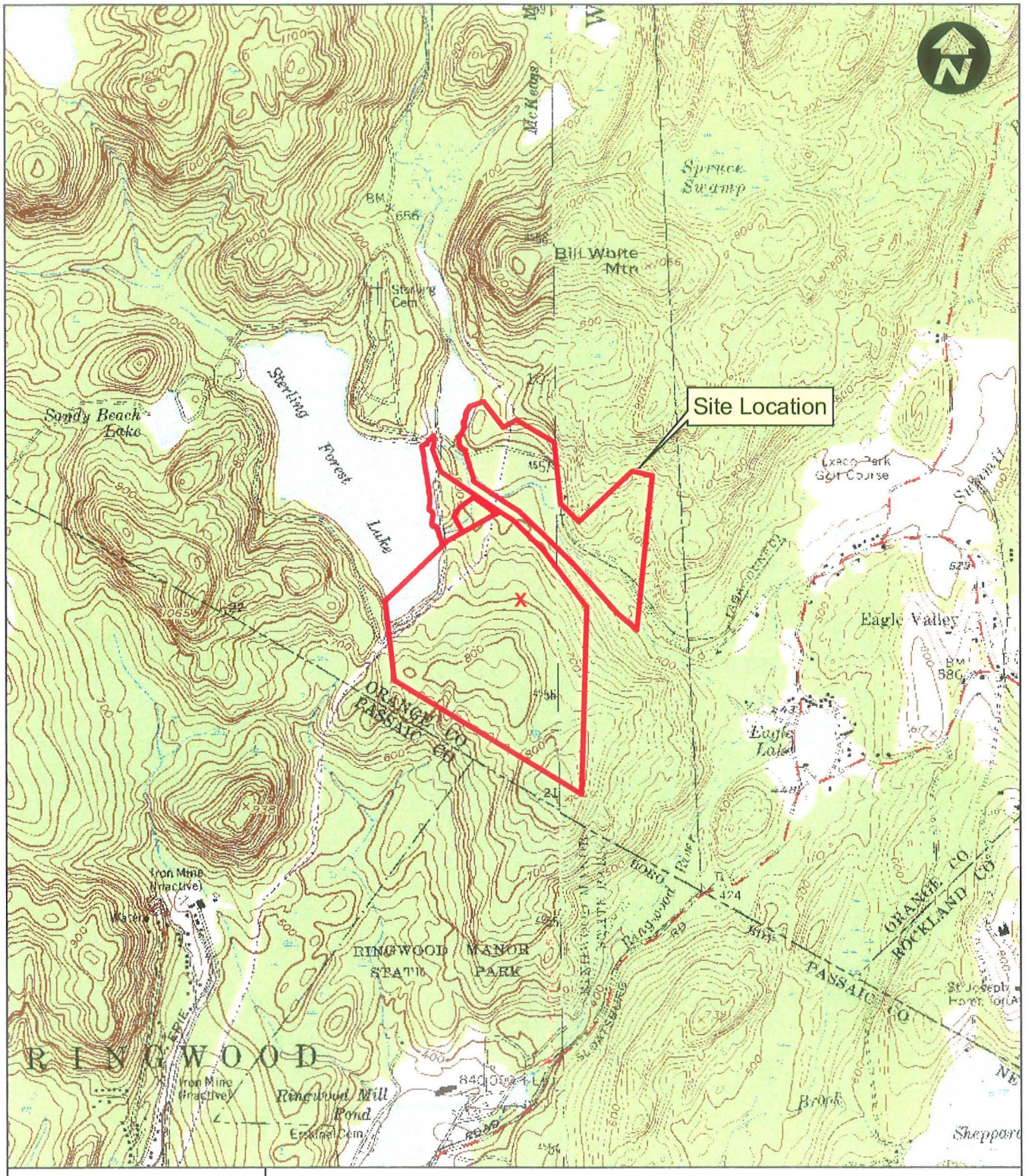
1.0 INTRODUCTION

This report has been prepared by Paulus Sokolowski and Sartor PC (PS&SPC) as supplemental information to support a township development plan and or State Environmental Quality Review Act (SEQRA) Environmental Assessment or Environmental Impact Statement. Field surveys were conducted by PS&SPC on the Project Site (Site) to inventory ecological resources and evaluate the Site for the presence or absence or Federal or State listed threatened, endangered, species of special concern and critical habitat for these species. Surveys were conducted from April through September and included a delineation of wetlands on the eastern portion of the property.

The Site is an 168 acre property located in Warwick Township, Orange County, New York (Figure 1). The Site is the location of the former Kings College, a 121,200 square foot building with approximately 3,500 linier feet of roadway. The former college is located adjacent to and over looks Sterling Forest Lake. The building is to be demolished.

The proposed Site development includes a residential community with two (2) elementary schools, athletic fields and courts, a place of worship and a private 4-year college. The proposed residential development of the property includes 200 single family houses and 70 townhouses. The townhouses will serve as student housing for the proposed 55,000 square foot college. The private college and residential community will have separate entrances. Each elementary school will be approximately 15,000 square feet. Adjacent to each school will be a swimming pool and tennis courts. The boy's school will also have a basketball court. A multi-purpose athletic field will serve both the boys and girls and is proposed to be located between the schools. The proposed 5,000 square foot synagogue will be located near the boy's elementary school. The community will be interconnected with a series of roadways throughout the site. The total proposed area of disturbance is approximately 61 acres.



Legend

Site Location

SOURCE:
Greenwood Lake Quadrangle
Sloatsburg Quadrangle
USGS Topographic Map
7.5 Minute Series

STATE PLANE COORDINATES
E 562764.071
N 4556356.187

USGS SITE LOCATION MAP

Touro Warwick College
Township of Warwick
Orange County, New York

PS&S
integrating design & engineering

Drawn By: RS	Scale: 1" = 2000'	Project No. 03171.004.010
Chk'd By: DG	Date: 08/17/07	Figure No. 1

Map Document: (P:\03171\004\Y\N\Maps\Fig1_USGS_081607_00.mxd)
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2.0 VEGETATION

Vegetation consists of the plant life or the total plant cover found in an area whether indigenous or introduced by man. The Site falls within the Highlands Physiographic Province of New York which includes upland valleys and slopes, upland ridges, rock outcrops and wetlands. There's a wide diversity of plant communities that can occur in a relatively small area that is characteristic of habitat conditions and plant communities occurring throughout the northeast.

Soil, slope, riparian corridors and exposure are important factors in the formation of the plant associations. A description of the soils is included in Section 6 and is shown on Figure 4. PS&S established vegetation sampling transects were designed to include each of these factors. This study included a two (2) part investigation; the first characterization of the general vegetation communities on the site and the second to an evaluation of the presence of threatened and endangered species on the site.

A series of 14 transects were run though the different habitats on the site. The locations of these transects are shown on Figure 2. A list of the plant species observed along each transect is included as Table 1. All plants within one (1) meter of the transect were identified and recorded. The transects were run to identify the vegetative species found on the site and to search for potential threatened and endangered species identified on the New York Natural Heritage database. Table 5 lists when the plant surveys were conducted and the number of hours invested in each survey.

The majority of Site's vegetation is characterized as a second growth upland eastern deciduous forest that likely established following historical logging operations. The dominant tree species on the Site are upland and mesic oak species, including red oak (*Quercus rubra*), white oak (*Quercus alba*), and chestnut oak (*Quercus prinus*). Co-dominant species include American beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), black birch (*Betula lenta*), red maple (*Acer rubrum*) and sugar maple (*A. saccharum*) and in some areas, hemlock (*Tsuga canadensis*). While the oaks can be found throughout the Site, the distribution of the co-dominant species help define the different vegetation communities. On the northern side of the Old Sterling Road along the slopes of the Ringwood River are two (2) areas of deciduous forest and south of the existing school there are an additional two (2) areas of deciduous forest which include a Canada hemlock (*Tsuga canadensis*) association. In addition, there is a forested wetland community along the river. Another distinct community is located at the southern end of the property. Soils in this area include Rock outcrop-Hollis Complex with moderate to steep slopes (ROC and ROD). These thin soils support the characteristic chestnut oak community which dominates these ridges.

There is a riparian corridor on the northern side of Old Sterling Road. This area contains a forested wetland dominated by red maple and white ash. Understory and herbaceous species in the wetland include American hornbeam (*Carpinus caroliniana*) skunk cabbage (*Symplocarpus foetidus*), sensitive fern (Onoclea sensibilis) and jewelweed (*Impatiens capensis*).

Wetlands were delineated on the portion of the property south of Old Sterling Road. Forested wetlands located north of Old Sterling Road were not delineated as no development is anticipated on this portion of the site.
Tree size range from seedlings and sapling, 1 - 4 inch diameter at breast height (dbh) to occasional trees 8 - 36 inches dbh. Most of the oaks on the Site have a dbh range of between 12 and 30 inches. Maples on the Site tended to have a slightly smaller dbh of 4 to 10 inches. Other trees on the Site fell within these ranges.

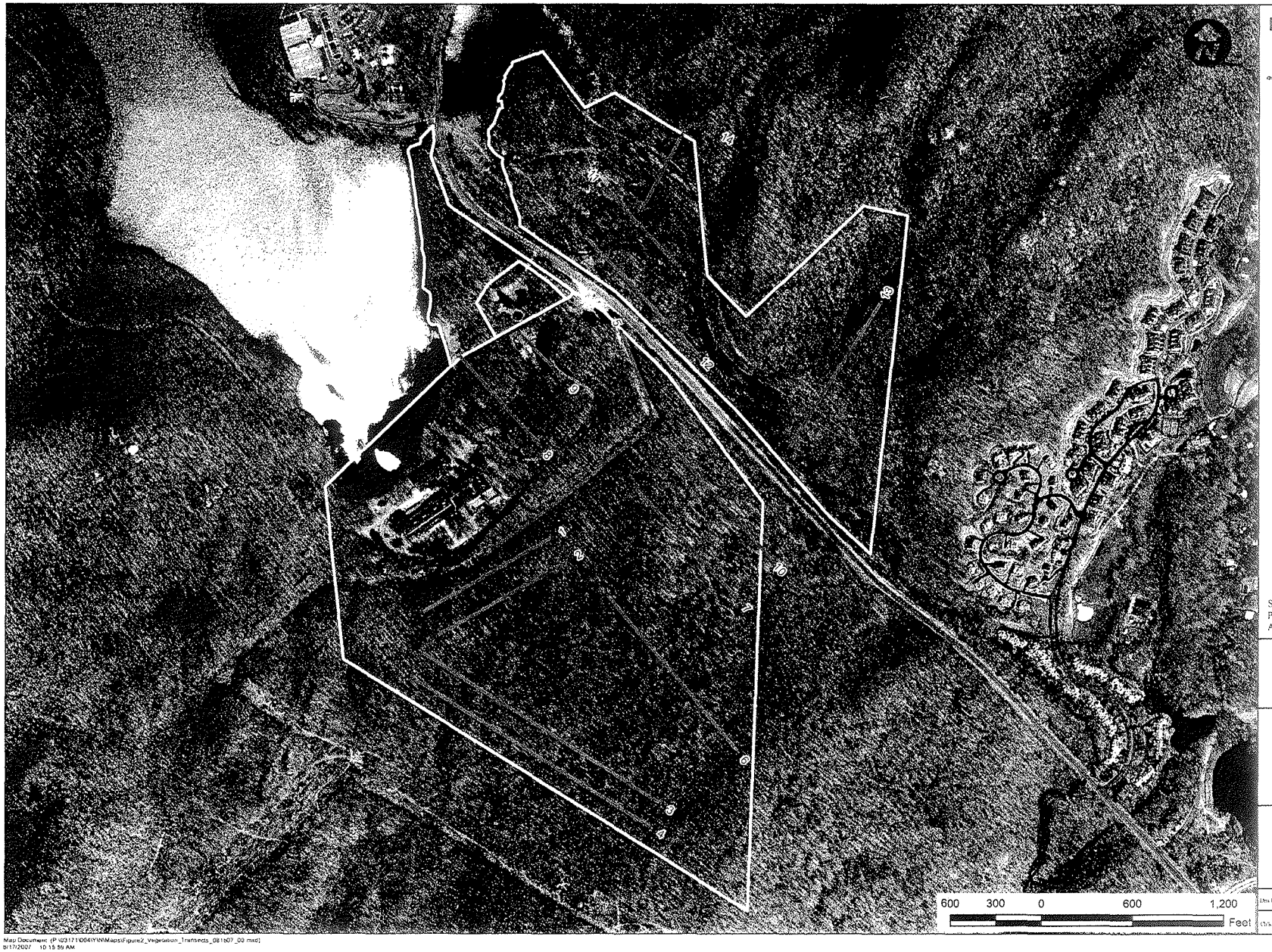
During the vegetation survey, one NYSDEC threatened plant species, Hyssop skullcap was observed.

Table 1
Vegetation Transects
Touro College Site

		Transects													
Common Name	Scientific Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Field horsetail	*Equisetum arvense*								x						
Cinnamon fern	*Osmunda cinnamomea*									x		x	x		x
Bracken fern	*Pteridium aquilinum*			x	x	x	x					x	x		x
Maidenhair fern	*Adiantun pedatum*						x	x							
Ebony spleenwort	*Asplenium platyneuron*	x													
New York fern	*Thelypteris noveboracensis*	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Christmas fern	*Polystichum acrostichoides*									x	x				
Sensitive fern	*Onoclea sensibilis*					x			x	x		x			
Hemlock	*Tsuga canadensis*	x	x											x	
White pine	*Pinus strobus*					x			x						
Tuilp popular	*Lirodendron tuilpifera*					x			x						
Sassafrass	*Sassafrass albidum*			x	x	x	x					x	x		
Spicebush	*Lindera benzoin*									x	x				x
Japanese barberry	*Berberis thunbergii*							x		x		x	x	x	x
Witch hazel	*Hamamelis virginiana*	x	x	x	x	x	x	x				x		x	x
Shagbark hickory	*Carya ovalis*	x								x			x	x	
Mockernut hickory	*Carya tomentosa*	x		x	x	x	x	x							
American beech	*Fagus grandifolia*	x	x	x	x	x	x	x		x	x	x	x	x	x
White oak	*Quercus alba*	x	x		x		x	x			x		x	x	
Chestnut oak	*Quercus prinus*	x	x	x	x	x	x						x	x	x
Red oak	*Quercus rubra*	x	x	x	x		x	x			x			x	
Black oak	*Quercus velutina*				x			x							
American hornbeam	*Carpinus caroliniana*		x	x	x			x				x			
Black birch	*Betula lenta*	x	x	x	x	x	x	x							
Gray birch	*Betula populifolia*					x									
Yellow birch	*Betula alleghaniensis*							x				x			x
Pensylvanna smartweed	*Polygonum penslvanicum*					x									
Japanese knotweed	*Polygonum cuspidatum*					x									
Cottonwood	*Populus deltoides*					x			x						
Garlic mustard	*Alliaria petiolata*					x			x	x			x		x
Mountain laurel	*Kalmia latifolia*					x									
Winter green	*Gaultheria procumbens*							x							
Low bush blueberry	*Vaccinium angustifolium*	x	x	x	x		x	x		x				x	x
Indian pipe	*Monotropa uniflora*											x			
Dwarf spirea	*Spiraea latifolia*					x									
Wild strawberry	*Fragaria virginiana*					x									
Dwarf cinquefoil	*Potentilla canadensis*					x									
Raspberry	*Rubus occidentalis*				x	x									
Multiflora rose	*Rosa multiflora*					x			x						x
Wild-black cherry	*Prunus serotina*			x											
Pin Cherry	*Prunus pensylvanica*									x					
Crabapple	*Pyrus coronaria*								x						
Birds foot trifoil	*Lotus corniculatus*					x				x					
Crown vetch	*Coronilla varia*								x						
Red clover	*Trifolium pratense*								x						
Sweet yellow clover	*Melilotus officinalis*								x						
Flowering dogwood	*Cornus florida*		x	x	x		x						x		
Black gum	*Nyssa sylvatica*												x		
Wahoo	*Euonymus atropurpureus*				x		x	x				x	x		
Bittersweet	*Celastrus orbiculatus*					x			x	x	x	x	x		x
Virginia creeper	*Parthenocissus quinquefolia*				x	x		x	x	x		x		x	
Fox grape	*Vitis labrusca*			x	x	x		x				x	x		
Red maple	*Acer rubrum*	x	x	x	x	x	x	x		x	x	x	x		x
Sugar maple	*Acer saccharum*				x	x	x	x		x	x		x	x	x
Poison ivy	*Toxicodendron radicans*			x		x	x		x	x	x	x	x		x
Tree-of-heaven	*Ailanthus altissima*								x						
Wood sorel	*Oxalis stricta*					x			x						
Jewelweed	*Impatiens capensis*									x		x	x		x
Queen Ann's lace	*Daucus carota*								x						
Spreading dogbane	*Apocynum androsaemifolium*					x									
Indian hemp	*Apocynum cannabinum*					x									
Common milkweed	*Asclepias syriaca*					x									
Morning glory	*Ipomoea purpurea*					x									
Scutellaria integrifolia	*Hyssop skullcap*					x									
Motherwort	*Leonurus cardiaca*					x									
Lance leaved plaintan	*Plantago lanceolata*								x						
Privet	*Ligustrum vulgare*					x			x						
White ash	*Fraxinus americana*				x	x	x	x		x	x	x	x		
Common mullein	*Verbascum thapsus*					x									
Mugwort	*Limosella aquatica*														x
Rough bedstraw	*Galium asprellum*					x			x						
Japanese honeysuckle	*Lonicera japonica*					x									
Maple-leaved viburnum	*Viburnum acerifolium*	x	x			x	x	x		x	x				
Elderberry	*Sambucus canadenis*					x									
Ragweed	*Ambrosia artemisiifolia*					x			x						x
Yarrow	*Achillea millefolium*					x									
Sweet goldenrod	*Solidago odora*					x									
Goldenrod spp	*Solidago spp.*					x			x						
White snakeroot	*Eupatorium rugosum*		x					x		x					
Burdock	*Arctium minus*														x
Field hawkweed	*Hieracium pratense*					x			x						
Skunk cabbage	*Symplocarpus foetidus*								x	x		x	x		x

Table 1
Vegetation Transects
Touro College Site

		Transects													
Common Name	Scientific Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Jack in a pulpet	*Arisaema triphyllum*						x	x				x			
Soft rush	*Juncus effusus*								x						
Nut sedge	*Cyperus esculentus*					x			x						
Rye spp	*Lolium spp.*					x									
Upland bentgrass	*Agrostis hyemalis*													x	
Common reed	*Phragmites australis*					x			x						
Poa spp	*Poa spp.*					x								x	
Deer-tongue grass	*Panicum cladestinum*			x		x									x
Crab grass	*Digitaria filiformis*											x			
Japanese stiltgrass	*Microstegium vimineum*											x		x	x
Cattail	*Typha latifolia*								x						
False Hellbore	*Veratrum viride*									x					
Large-flowered trillium	*Trillium grandiforum*										x				
Indian cucumber root	*Medeola virginiana*			x											
Nodding trillium	*Trillium cernuum*											x	x		
False Solomon's seal	*Smilacina racemosa*			x	x						x	x	x		x
Greenbrier	*Smilex rotundifolia*											x			



Legend

Site Location

Vegetation Transects

Source
PS&S Field Survey, August 2007
Aerials Express, 2006

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integrating design & engineering

Touro Warwick College
Township of Warwick
Orange County, New York

VEGETATION TRANSECTS

Drn By: RN	Scale: 1" = 600'	Project: 03171.004.010
Chkd By: DG	Date: 09/17/07	Figure No: 2

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3.0 WILDLIFE

An area's wildlife is dependent upon the quality of the habitat present. All organisms require food, water, cover and living space. The relative lack or abundance of each of these resources in relation to each species' life requisites help determine its presence or absence and if present, its distribution and the population dynamics for that species. Population dynamics and distribution are also dependent on the size, shape and complexity of the different vegetative communities and surrounding land use. Wildlife species tolerance of disturbance and human activity ranges from intolerant to dependent. Some species such as the white-tailed deer (*Odocoileus virginianus*) have demonstrated great adaptability and tolerance to human disturbance. A few species require disturbance in order to complete their lifecycle yet other species are intolerant of most human disturbance.

Wildlife studies were conducted to characterize the general wildlife species utilizing the Site and to evaluate the presence of threatened and endangered species on the site. As the identification of potential breeding and not population dynamics was the object of the study, counts of individual species observed were not included in the survey. Surveys included a review of existing reports, review of NJDEP and NYSDEC databases and field observations. Habitat characteristics observed during vegetation surveys, literature review and database review was used to generate a list of species likely to occur on the site and potentially suitable habitat. Field observations were used to supplement existing information. Wildlife species expected to be found and observed on the Site are listed in Tables 2 through 4. The potential for each species to be breeding on the Site is also listed in these tables. Field observations included the following:

Terrestrial Invertebrates

The NYSDEC lists a number of terrestrial invertebrate species as threatened, endangered or species of special concern. These include dragonflies, moths and butterfly species. These species are typically found in open areas like the power line right-of-way or with respect to the dragonflies and damselflies utilize Sterling Forest Lake and the Ringwood River for the nymph portion of their life cycle. As no activities are proposed in the lake or river, and the power line right-of-way will not be altered by project implementation. Therefore, a detailed assessment of the use of the Site by invertebrate species was not included in this survey.

Reptiles and Amphibians

The NYSDEC lists Timber rattlesnake (*Crotalus horridus*) as threatened in the State of New York. In addition the wood turtle (*Clemmys insculpta*), marbled salamander (*Ambystoma opacum*) and box turtle (*Terrapene carolina*) are listed as NYSDEC Species of Special Concern. In order to characterize the reptiles and amphibians utilizing the site and identify potential NYSDEC listed species usage of the site the following survey techniques were utilized:

- Slowly walking the transects and recording all species directly observed or heard calling;
- Using a snake hook, to examine suitable refugia (logs, boards, stumps, etc.);

- Conducting nocturnal road surveys of the roads with the use of headlights in the vicinity of the Site to intercept individuals crossing roadways;

- Listening for calling amphibians during evening and night hours;

Fortuitous observations of snakes and other amphibians and reptiles along the roads were recorded and referred to during the Site characterization and assessment of habitat quality. Table 5 lists the dates and times that the surveys were conducted.

Birds

For raptors, an assessment of the habitat on the Site was conducted to determine the potential for these species to be utilizing the Site. Calls of red-shouldered hawks and Cooper's hawk broadcast to illicit a response. Other species of bird were identified using transects across the Site. Surveys began approximately on half hour before sunrise and continued until early afternoon. Each transect was run once during each day of the survey. Birds were identified by both sight (Table 5) and by their individual calls. Evidence of breeding was recorded. Evidence of breeding on the Site included males calling during the nesting season, birds carrying nesting material and nests.

Raptor calling included playing taped recordings of red-shouldered hawks, red hailed hawks and Cooper's hawks to elicit a response. The calling sequence for the red-shouldered hawk consisted of consisted of three minutes of red-shouldered hawk calls, followed by three minutes of silence and 3 minutes of red-tailed hawk calls. The calling sequence was followed by five (5) minutes of silence. This was repeated twice at each calling station. The calling sequence for Cooper's hawk consisted of three minutes of Cooper's hawks calls, three minutes of silence and three additional minutes of Cooper's hawk calls. The calling sequence was followed by five (5) minutes of silence and was repeated twice at each calling station. The raptor calling locations and bird transects are depicted on Figure 3. Table 5 lists the dates and times that the surveys were conducted.

Mammals

No species specific survey was conducted for mammals on the Site. There were no records of threatened or endangered species identified on either the NYSDEC or NJDEP Natural Heritage database reports. Fortuitous observations of mammals or mammal sign observed during other survey activities were recorded in the field notes. Signs observed included calls, scat, tracks and hair.

Table 2
Amphibians and Reptiles
Observed on the Touro College Site

Musk Turtle	*Sternotherus odoratus*
Box turtle	*Terrapene carolina*
Painted turtle	*Chrysemys scripta*
Snapping turtle	*Chelydra serpentina*
Five-lined skink	*Eumeces fasciatus*
Northern water snake	*Nerodia sipedon*
Garter snake	*Thamnophis sirtalis*
Black racer	*Coluber constrictor*
Red-spotted newt	*Notophthalmus viridescens*
Redbacked salamander	*Plethodon cinereus*
Slimy salamander	*Plethodon glutinosus*
Two lined salamander	*Eurycea bislineata*
American toad	*Bufo americanus*
Spring peepers	*Pseudacris crucifer*
Gray treefrog	*Hyla versicolor*
Green frog	*Rana clamitans*
Bull frog	*Rana catesbeiana*
Leopard frog	*Rana pipiens*

Table 3
Birds
Observed on the Touro College Site

Common Name	Scientific Name	Breeding Status
Great cormorant	*Phalacrocarax carbo*	NOS
Canada goose	*Branta canadensis*	Confirmed
Mallard	*Anas platyrhynchos*	Confirmed
Wood duck	*Aix sponsa*	Suitable
Bufflehead	*Bucephala albeola*	NOS
Common merganser	*Mergus merganser*	Suitable
Hooded merganser	*Lophodytes cucullatus*	Suitable
Great blue heron	*Ardea herodias*	NOS
Wild turkey	*Megeagris gallopavo*	Confirmed
Red-tailed hawk	*Buteo jamaicensis*	Suitable
Osprey	*Pandion haliaetus*	Suitable
Turkey vulture	*Cathartes aura*	NOS
Red-shoulderd hawk	*Buteo lineatus*	South of site*
Morning dove	*Zenaida macroura*	Confirmed
Black-billed cuckoo	*Coccyzus erythropthalmus*	Confirmed
Yellow-billed cuckoo	*Coccyzus americanus*	Confirmed
Ruby-throated hummingbird	*Archilochus colubris*	Confirmed
Piliated woodpecker	*Dryocopus pileatus*	Confirmed
Red-bellied woodpecker	*Melanerpes carolinus*	Suitable
Yellow shafted flicker	*Colaptes auratus*	Confirmed
Hairy woodpecker	*Picoides villosus*	Confirmed
Great crested flycatcher	*Myiarchus crinitus*	Confirmed
Eastern kingbrid	*Tyrannus tyrannus*	Confirmed
Eastern peewee	*Contopus virens*	Confirmed
Eastern phoebe	*Sayornis phoebe*	Confirmed
American crow	*Corvus brachyrhynchos*	Suitable
Blue jay	*Cyanocitta cristata*	Confirmed
Black-capped chickadee	*Parus atricapillus*	Confirmed
Tufted titmouse	*Parus bicolar*	Confirmed
White-breasted nuthutch	*Sitta carolinensis*	Confirmed
House wren	*Troglodytes aedon*	Confirmed
Gray catbird	*Dumetella carolinesis*	Confirmed
Northern mockingbird	*Minus polyglottos*	Confirmed
American robin	*Turdus migratorius*	Confirmed
Eastern bluebird	*Sialia sialis*	Confirmed
Wood thrush	*Hylocichla mustelina*	Confirmed
Red-eyed vireo	*Vireo olivaceus*	Confirmed
Yellow-throated vireo	*Vireo flavifrons*	Confirmed
Yellow-throated warbler	*Dendroica dominica*	NOS
Blackpoll warbler	*Dendroica striata*	NOS
Black-throated blue warbler	*Dendroica caerulescens*	Suitable
Black and white warbler	*Mniotilta varia*	Confirmed
Yellow-rumped warbler	*Dendroica coronata*	NOS
Magnolia warbler	*Dendroica magnolia*	Suitable
American red start	*Setophaga ruticilla*	Confirmed
Blue-winged warbler	*Vermivora pinus*	Suitable
Yellow warbler	*Dendroica petechia*	Confirmed
Worm-eating warbler	*Helmitheros vermivorus*	Confirmed
Ovenbird	*Seiurus aurocapillus*	Confirmed
Brown-headed cowbird	*Molothrus ater*	Confirmed
Red-winged blackbird	*Agelaius phoeniceus*	Confirmed
Common grackle	*Quiscalus quiscula*	Confirmed
European starling	*Sturnus vulgaris*	Confirmed
Baltimore oriole	*Icterus galbulta*	Confirmed
Scarlet tanager	*Piranga olivacea*	Confirmed
Northern cardinal	*Cardinalis cardinalis*	Confirmed
Indigo bunting	*Passerina cyanea*	Confirmed
White-throated sparrow	*Zonotrichia albicollis*	Confirmed
Chipping sparrow	*Spizella passerina*	Confirmed
Song sparrow	*Melospiza melodia*	Confirmed

Confirmed - Calling during the nesting season, observed carrying nesting material or observed in nest

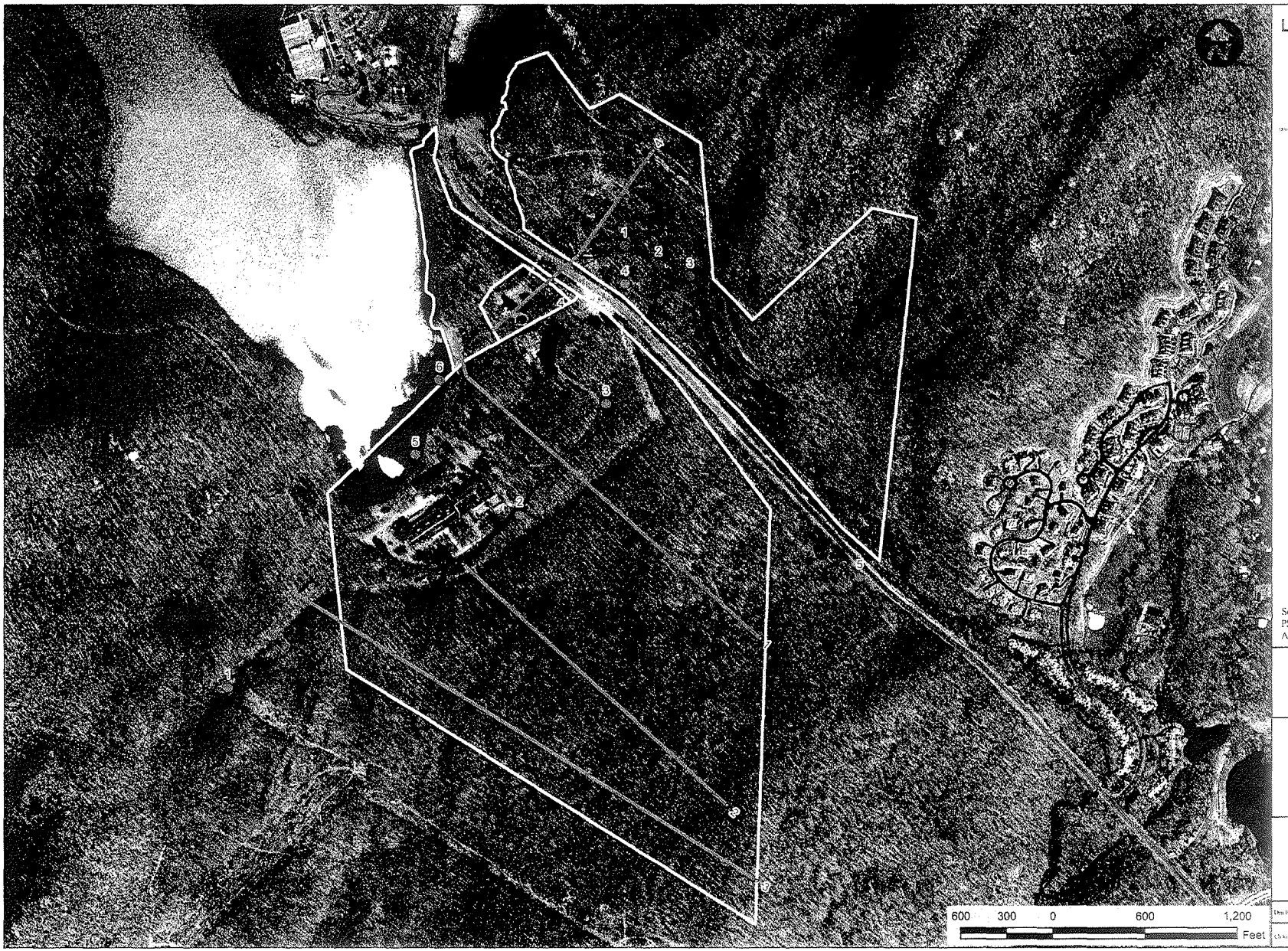
Suitable - Suitable habitat available on site but not comfirmed

* - observed carrying prey items to location south of site

NOS - Not on site - either migratory species, no suitable habitat on site or no evidance of this speices breeding on site

Table 4
Mammals
Observed on the Touro College Site

Common Name	Scientific Name
Opossum	*Didelphis marsupialis*
Short tailed shrew	*Blarina brevicauda*
Eastern mole	*Scalopus aquaticus*
Bear	*Ursus americanus*
Raccoon	*Procyon lotor*
Stripped skunk	*Mephitis mephitis*
Coyote	*Canis latrans*
Fox	*Vulpes fulva*
Woodchuck	*Marmota monax*
Chipmunk	*Tamias striatus*
Gray squirrel	*Sciurus carolinensis*
Beaver	*Castor canadensis*
Deer mouse	*Peromyscus maniculatus*
White-footed mouse	*Peromyscus leucopus*
Meadow vole	*Micotus pennsylvanicus*
Deer	*Odocoileus virginianus*



Legend

- Site Location
- Raptor Calling Stations
- Benthic Samples
- Avian Transects

Source:
PS&S Field Survey, August 2007
Aerials Express, 2006

PS&S
integrating design & engineering

Touro Warwick College
Township of Warwick
Orange County, New York

WILDLIFE SURVEY
OBSERVATION LOCATION

Drn By: RS	Scale: 1" = 600'	Project: 03171.004.000
Chkd By: DG	Date: 08/17/07	Figure No.: 3

Map Document: (P:\03171\004\YIN\Maps\Figure3_Wildlife_Survey_Obs_Loc_081607_00.mxd)
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4.0 THREATENED AND ENDANGERED SPECIES

The NYSDEC Natural Heritage Program was contacted for information concerning historic records of threatened and endangered species on and in the vicinity of the project Site. Due to the proximity of the Site to New Jersey and Ringwood Manor State Park, Natural Heritage Data was also requested from the New Jersey Natural Heritage Program. The US Fish and Wildlife Service was not contacted for a specific list of federally listed species on the site as federally listed species were included on both the NYSDCE and NJDEP lists.

Vegetation surveys followed standard transect methods as described in Miller-Dombois and Ellenberg, 1974. Specific habitat searches for threatened and endangered plant species utilized the same methodology on a site specific scale.

4.1 Plant Species

The New York Natural Heritage database lists the presence of the following threatened or endangered plant species in the vicinity of the Site:

- Terrestrial starwort (*Callitriche terrestris*);
- Green parrot's feather (*Myriophyllum pinnatum*);
- Hyssop skullcap (*Scutellaria integrifolia*); and
- Michaux's blue-eyed grass (*Sisyrinchium mucronatum*)

Terrestrial starwort is classified as threatened by the NYSDEC while green parrot's feather, hyssop skullcap and Michaux's blue-eyed grass are classified as endangered.

The following sections briefly discuss the habitat requirements of each species, potential habitat on site for each species and anticipated impacts to each species from the proposed project.

Terrestrial Starwort

The terrestrial starwort (*Callitriche terrestris*) is listed as a threatened plant species on the NYSDEC threatened and endangered species list. This species is typically found in damp shaded habitat. This is a small plant with tufted branches spreading along the ground or climbing nearby rocks or other objects. Potential habitat for this species on the Site includes along the edge of Sterling Forest Lake, the edge of Ringwood River and along the perennial stream located between the existing college and Sterling Forest Road. No terrestrial starworts were observed during this investigation. As there is no evidence that this species is on site, and there are no proposed activities anticipated along the edge of Sterling Forest Lake or in the vicinity of the Ringwood River, no impacts to this species is anticipated to result from the proposed project.

Green parrot's feather

Green parrot's feather (*Myriophillim pinnatum*) is a member of the aquatic milfoil family. It is listed by the NYSDEC as an endangered species in New York. This species is found primarily in ponds. Leaves are arranged in whorls of 3 to 5 leaves per whorl. Potential habitat for this species on the Site is generally limited to Sterling Forest Lake. Green parrot's feather milfoil was not observed during this investigation. As the project does not propose any activities in Sterling Forest Lake, no impact to this species are anticipated.

Hyssop skullcap

Hyssop skullcap (*Scutellaria integrifolia*) is a summer perennial with a terminal raceme of purple-blue flowers. It is listed as a NYSDEC threatened species. This species inhabits a wide range of habitats from pine-barrens to wet meadows. Typically, hyssop skullcap is found along the edge of roadsides, woodland borders, fields, and in wet meadows. Potential habitat for this species on the Site includes the edge of Sterling Forest Road, the Site access road and the power line right-of-ways. Vegetation transects were run down the length of the power line right-of-way, the most probable location for this species on Site. Small colonies of hyssop skullcap were observed along the right-of-way portion of the Site. The proposed project will not result in activities along the power line right-of-way. Prior to construction activities, those portions of the power line right-of-way inhabited by this species should be fenced to prevent accidental disturbance. With appropriate mitigative measures to prevent disturbance of the power line right-of-way, no impacts to this species are anticipated to occur from project implementation.

Michaux's blue-eyed grass

Michaux's blue-eyed grass (*Sisyrinchium mucronatum*) is in the iris family. The flowering season for this species is summer. The six (6) petal flower is blue with a yellow center. The petals of the flowers have distinctly pointed tips. It is found in fields, meadows, bogs and along forest edges. This species prefers areas of full sun through out the day. Potential habitat for this species on Site occurs along the power line right-of-way. Vegetation transects were completed for the length of the power line right-of-way and the wetlands south of the former treatment plant. Michaux's blue eyed grass was not observed. As proposed, the project will not impact habitat suitable for this species. Therefore, no impacts to this species are anticipated to result from project implementation.

4.2 Animal Species

In New York State, a Threatened Species is 1) any native species likely to become an Endangered Species (i.e. in imminent danger of extirpation or extinction) within the foreseeable future in New York State, or 2) any species listed as threatened by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11. Species of Special Concern are those species which are not recognized as

threatened or endangered, but for which documented concern exists for their continued welfare in New York. Species of Special Concern receive no additional legal protection under Environmental Conservation Law Section 11-0535.

The NYSDEC Natural Heritage Data Base has no records of endangered animals on the project Site. The NYSDEC data base has records of six species of special concern within one-quarter mile of the project Site (listed below). In addition, the New York data base has a record of timber rattlesnakes (*Crotalus horridus*), a New York State threatened species, within 1.5 miles of the Site.

The New Jersey Natural Heritage Program has identified the following species listed by the NYSDEC as endangered, threatened or a Species of Special Concern as occurring in New Jersey and within ¼ mile of the Site:

- Timber rattlesnake (*Crotalus horridus*) State Threatened;
- Red-shouldered hawk (*Buteo jamaicensis*) NYSDEC Listed Species of Special Concern;
- Wood turtle (*Clemmys insculpta*) NYSDEC Listed Species of Special Concern;
- Marbled salamander (*Ambystoma opacum*) NYSDEC Listed Species of Special Concern;
- Box Turtle (*Terrapene carolina*) NYSDEC Listed Species of Special Concern;
- Cooper's hawk (*Accipiter cooperii*) NYSDEC Listed Species of Special Concern
- Eastern bluebird (*Sialia sialis*) NYSDEC Listed Species of Special Concern

Between April 10 and September 6, 2007, PS&S conducted Site reconnaissance surveys to determine the presence or absence of State Threatened and Endangered Species and/or the presence of suitable habitat for these species.

Table 5 Sampling Effort		
ACTIVITY	DATE	HOURS/TIME OF DAY
Raptor Survey	10 April 2007	3hrs/Morning
Avian Survey	10 April 2007	2hrs/Morning
Vernal Pond Survey	10 April 2007	3hrs/Evening
Raptor Survey	18 April 2007	3hrs/Morning/Afternoon
Avian Survey	18 April 2007	1 hr/Afternoon
Vernal Pond Survey	18 April 2007	3hrs/Evening
Raptor Survey	25 April 2007	2hrs/Morning
Herpetological Survey	25 April 2007	4hrs/ Afternoon
Vernal Pond Survey	25 April 2007	2hr/Evening
Raptor Survey	3 May 2007	2.5hrs/Aternoon
Herpetological Survey	3 May 2007	4hrs/Afternoon
Avian Survey	3 May 2007	2hrs/Morning
Vernal Pond Survey	3 May 2007	2hrs/Afternoon
Avian Survey	11 May 2007	12hrs (2 surveyors)/Morning/afternoon
Herpetological Survey	11 May 2007	4 hrs (2 surveyors)/Afternoon
Raptor Survey	22 May 2007	2.5 hrs/Morning
Avian Survey	22 May 2007	2 hrs/Morning
Herpetological Survey	22 May 2007	4 hrs/Afternoon
Vernal Pond Survey	22 May 2007	1.5 hrs/Evening
Raptor Survey	1 June 2007	2 hrs (2 surveyors)/Morning
Avian Survey	1 June 2007	10 hrs (2 surveyors)/Morning/Afternoon
Herpetological Survey	1 June 2007	2 hrs (2 suveyors)/Afternoon
Vegetation Surveys	14 June 2007	10 hrs/Afternoon
Herpetological Survey	14 June 2007	2 hrs/Morning
Vegetation Surveys	25 July 2007	8 hrs/Afternoon
Herpetological Survey	25 July 2007	3 hrs/Morning
Vegetation Surveys	17 August 2007	4 hrs/Morning
Herpetological Survey	17 August 2007	4 hrs/Afternoon
Incidental Raptor observations	17 August 2007	1 hr/Afternoon
Vegetation Survey/Wetlands	6 September 2007	12 hrs (2 surveyors)/Morning/Afternoon
Incidental Raptor observations	6 September 2007	2 hrs (2 surveyors)/Afternoon
Herpetological Survey	6 September 2007	2 hrs/Afternoon

The following sections briefly discuss the habitat requirements of each species, habitat suitability for each species and potential impacts of project implementation on each species analysis.

Timber Rattlesnake

The timber rattlesnake (*Crotalus horridus*) is an ectothermic reptile which undergoes an annual cycle related to seasonal changes of temperature and its environment. Thermoregulation and winter survival require most populations to undergo a period of hibernation through the winter. The major phases of the seasonal cycle are listed in Table 6.

Table 6
Seasonal Cycle of Rattlesnakes in New York

Phase	Description	Dates
Earliest Emergence from dens	First appearance of snakes on surface of a den in the spring	April 8
General Emergence from den	Range of dates most snakes appear on surface in the spring	May 7 - May 21
General Ingress	Range of dates most snakes appear at dens in autumn	Sept. 14 - Oct. 1
Latest Ingress	Last appearance of snakes at den in autumn	October 16

* Source - Brown, 1992

A typical hibernaculum (den) is located in a rocky area where underground crevices provided retreats for overwintering. In northeastern New York, granitic escarpments and ledges with accumulations of talus are prominent features at and around favored den sites. Elevations of the dens range between 500 and 1300 ft. A typical den site is on the southerly slope of a hill or mountain which is ledgy. Because of the rockyness of the den sites, there is typically little vegetation around the entrance. Virginia creeper (*Parthenocissus quinquefolia*) and wild grape (*Vitus* spp.) are typically the only vegetation adjacent to the dens.

There are two outcrop areas in the southern portion of the Site with southerly exposures. These outcrop areas provide a south/southwestern exposure with steep rocky slopes and ledges, rock out crops, and grassy shelf clearings. Elevations of these ridges are between 780 and 800 feet which fall within the typical range utilized by this species. Canopy vegetation observed on Site contains red oak, chestnut oak, red maple, and black birch. The shrub layer consists of maple leaved viburnum, American hornbeam and witch hazel. Ground cover is dominated by low bush blueberry. There is heavy vegetation with a closed canopy over the outcrop areas. Because of the closed canopy there is virtually no basking habitat at the outcrops for this species. The closed canopy and lack of basking habitat excludes these outcrop areas as suitable rattlesnake den habitat.

The New York data base has a record of timber rattlesnakes within 1.5 miles of the Site. The New Jersey Natural Heritage Data Base has records of timber rattlesnakes sited within one-quarter mile of the Site. Aerial photographs of the surrounding areas, with the

exception of the power line right-of-way, do not show open canopy outcrops immediately adjacent to the Site. During this and other surveys (Klemens, Oct & Nov. 2005) conducted on the Site, no rattlesnakes, or evidence of snakes, such as scat or shed skins were observed on the Site. In addition an NYSDEC Conservation Officer indicated that he had not observed any rattlesnakes in the vicinity of the Site (NYSDEC, 2007).

While suitable foraging habitat is located on the Site into which snakes would disperse after leaving den sites, it does not appear to support this species. Any determination of the specific regulatory implementations of the suitability of the site will be made by the NYSDEC during the SEQRA review process. Prior to construction activities on the site, it is recommended that the construction area be fenced using silt fencing. Once the fencing is completed, the fenced area should be searched by a biologist for rattlesnakes to prevent accidentally harming any snakes that may have been using the site for foraging.

Red-Shouldered Hawk

The red-shouldered hawk is a striped, broad winged hawk. At the turn of the century, this species was the most common species of hawk in New England (Weidensaul, 1989, Terres, 1991). The logging of mature forests and pesticide contamination has contributed to the decline of this species. The red-shouldered hawks however tend to relatively tolerant of human disturbance.

The preferred nesting habitat for this species is mature moist woodlands (maple/hemlock forest), riparian corridors and forested wetlands (Peterson, 1980; Weidensaul, 1989; Terres, 1991). Nests of red-shouldered hawks in southwestern Quebec were located in mature, closed canopy, deciduous forest in close proximity to a natural clearing (88 feet) and to riparian or lakeshore habitat (distance to water body averaged 202 feet; Armstrong and Euler 1982). Red-shouldered hawks require large tracts of mature floodplain or riparian forests as nesting habitat (Bednarz and Dinsmore 1981); 550 acre area corresponded with 50% of maximum probability of occurrence, and 100 acre patches were the minimum used (Robbins et al. 1989). The red-shouldered hawk's nest is a large mass of sticks and twigs built close to the trunk of a tall deciduous tree.

Foraging habitat includes the wooded margins of marshes, often close to cultivated fields and forest natural openings (Bednarz and Dinsmore 1981, DeGraaf and Rappole 1995). Bednarz and Dinsmore (1981) found that marsh or wet meadow feeding areas interspersed within or adjacent to the forest typically were > 55 acres, and as small as 8 acres.

The majority of the Site is second growth upland forest habitat. Forested wetlands are present within riparian corridor are found in the northern portion of the Site. The riparian corridor parallels Sterling Lake Road through the Site and crosses the road to the south of the Site. These forested areas provide potential nesting habitat. No nests and no responses to call back tapes, however, were observed in these areas.

On July 25, 2007, a pair of red-shouldered hawks was observed along the power line right-of-way south of the Site. This pair was observed foraging along the power line right-of-way and one was carrying a prey item. The bird carrying the prey item flew south and was gone for approximately 30 minutes. When it returned it no longer was carrying anything. Based on this observation, the lack of observed nests and the lack of response to calls, this pair of red-shouldered hawks is likely nesting south of the Site and foraging along the power line right-of-ways on or in the vicinity of the Site.

The red-shouldered hawks are relatively tolerant of human disturbance. The Site is also bounded by two State Parks, Sterling Forest State Park and Ringwood Manor State Park, which provide suitable nesting and foraging habitat for this species. It is not anticipated that this species will be significantly impacted by the proposed development.

Wood Turtle

The wood turtle is a species requiring high quality free flowing streams for breeding and hibernating, and adjacent wetland and upland habitat for feeding (Herpetological Associates, 1981). This species is known to travel great distances while foraging making them susceptible to impacts associated with traffic, domestic pets and other human interactions (Conant, 1975).

Typical breeding and overwintering habitat for wood turtles is shallow (up to three feet deep), streams with good water quality. Outside of the breeding and overwintering periods, the wood turtle is one of the most terrestrial species. They can be found in a variety of habitats up to a mile from the stream.

The portion of the site adjacent to the Ringwood River includes areas of emergent or forested wetlands with adjacent upland fields and forest.

The Ringwood River also appears to have sufficient water and flow during the critical winter months to support hibernating turtles. Wetlands associated with the river range from broad to narrow. The wetland areas adjacent to the power line right-of-way are relatively broad while the areas along the southern and western portions of the stream are associated with upland areas dominated by steep slopes.

No wood turtles were observed on the Site during 2007 site investigations. Wood turtles have been previously reported to occur on the site and they may utilize the portion of the Site northeast of Sterling Forest Road. No development activities are proposed within the breeding and overwintering habitat. Prior to construction activities on the site, it is recommended that the construction area be fenced using silt fencing. Once the fencing is completed, the fenced area should be searched by a biologist for wood turtles to prevent accidentally harming any turtles. Through implementation of these measures, it is anticipated that this species will not be impacted by the proposed development.

Marbled Salamander

The marbled salamander is part of a group of salamanders known as the mole salamanders. These amphibians spend most of their life underground. However, they congregate adjacent to temporary ponds in the fall to breed. The distance that they migrate to the breeding ponds has not been established. Marbled salamanders lay eggs in low depressions which fill with water and form temporary ponds or pools. Breeding activities are typically completed in a few nights and these amphibians disappear for another year. Encounters with marbled salamanders at times other then the breeding season are typically chance encounters. They have been encountered during excavation for foundations at depths of greater than 4 feet (Conant, 1975).

Standing water was surveyed for the presence of larva of this species. This survey was conducted through the use of a dip net and careful search of the leaf litter in the pools. All organisms collected were returned to the pools unharmed. In addition, road cruising was conducted on rainy nights to observe frogs and salamanders crossing roadways and to listen for calling amphibians. No evidence of marbled salamanders was observed on the site.

The wetland area northeast of Sterling Forest Road and wetland area 8 contain small ephemeral ponds. These ponds were dry by May 11, 2007. The ponded areas were sampled using a dip net in April 2007. No marbled salamanders or past evidence of breeding in the ponds was observed. Amphibian breeding activity (spring peepers, green frogs and American toads) southwest of Sterling Forest Road was observed in emergent wetland areas. No evidence of Ambystoma salamander activity was observed in these emergent wetlands.

Box Turtle

Box turtles live in open woodlands, pastures and marshy meadows. They are often found near streams and ponds. They are omnivores feeding on snails, insects, berries, fungi, worms, slugs, flowers, fish, frogs, snakes and birds. The young are primarily carnivorous while adults tend to be herbivorous, although they do not eat green leaves.

Environmental temperature determines the box turtle's activity rates. In the summer, box turtles restrict their activities to mornings and after rain. They crawl into or under decaying logs, leaves, mammal borrows or mud to stay cool. In very hot weather, they will go into shady pools and puddles to cool off. Box turtles are diurnal and scoop out a shallow indentation in which to spend the night. They hibernate in the winter, borrowing up to two (2) feet deep into loose earth, mud, stream bottoms, old stump holes or mammal borrows.

The site provides suitable habitat for this species. On June 1, 2007 a female box turtle was observed in the vicinity of the existing building. Two additional box turtle shells were found in the vicinity of the existing building during Site investigations.

In addition to maintaining the habitat along the powder line right-of-way, the proposed project will result in additional open field habitat that would support this species. Prior to construction activities on the site, it is recommended that the construction area be fenced using silt fencing. Once the fencing is completed, the fenced area should be searched by a biologist for box turtles to prevent accidentally harming any turtles. Through implementation of these measures it is anticipated that this species will not be impacted by the proposed development.

Cooper's Hawk

This crow sized blue and russet hawk has a relatively long rounded tail which is cross barred with black bars, a buffy neck nape and dark gray crown (Terres, 1991). This bird belongs to the group of hawks known as Accipiters which are the short winged hawks. Deciduous woods are the preferred habitat for Cooper's hawks although they tend to seek out a tall conifer tree for nesting (Weidensaul, 1989). Nests consist of a large platform of sticks and large chips of bark. The Cooper's hawk does not tolerate the smaller, similar and competitive sharp shinned hawk (*Accipiter striatus*) within the same woodland area where it is nesting (Terres, 1991). Primary prey for this species consists of medium sized songbirds such as woodpeckers, grackles, starlings, robins, jays and doves. When abundant, small mammals such as chipmunks, red squirrels, mice and rats will also be taken. When nesting, Cooper's hawks rarely hunt in the vicinity of their nest, preferring to hunt in other habitats (Weidensaul, 1989).

This species tends to be tolerant of human activities. They are known to patrol bird feeders in the winter and have historically taken young chickens around farms (Weidensaul, 1989), and passerines from residential bird feeders (personal observation).

The deciduous upland habitat of the Site provides suitable potential habitat for both breeding and foraging. No Cooper's hawks were observed during the field surveys nor were any nests observed.

As discussed above the Site is bounded by two State Parks, which provide suitable nesting and foraging habitat for this species. Given the amount of preserved forested habitat in the vicinity of the Site, it is anticipated that this species will not be adversely impacted by the proposed development.

Eastern Bluebird

The eastern bluebird is a small blue/reddish brown colored bird typically found in open country, farms, cut-over woods, gardens, parks, fields, orchards, and along roadsides. They are commonly found perched on fences or utility wires. This species nests in cavities and has encountered serious competition from introduced cavity nesting species such as starlings (*Sturnus vulgaris*) and house sparrows (*Passer domesticus*).

The eastern bluebird feeds mostly on insects and often flies from a fence, wire or low tree to catch grasshoppers, crickets, katydids or beetles which make up the largest part of its diet (Terres, 1991). They are also known to eat spiders, millipedes, centipedes, sow bugs, snails, earthworms, lizards and tree frogs. Bluebirds will also eat blackberries, bayberries, fruit of honeysuckles, Virginia creeper, red cedar, wild grapes, pokeberries, and sumac seeds.

Nests are constructed primarily by the female in natural tree cavities, woodpecker holes, holes in stumps, fence rails and bird boxes, 3 to 20 feet above the ground. Nests are constructed using dried grasses, pine needles, weed stems, and fine twigs. Nests are lined with fine grasses, hairs and feathers.

The eastern bluebird is an open country species. The only open country habitat on the Site is along the power-line right-of-way, adjacent to the dike along the eastern edge of Sterling Forest Lake and the former Kings College campus. There are numerous tree cavities in the vicinity of these open county habitat areas to provide nesting habit for this species. During the field survey, numerous bluebirds were observed at each of these locations.

Under the proposed development plan, there are no anticipated disturbances associated with the power line right-of-way habitat currently being utilized by this species. Power line maintenance will continue to maintain this right-of-way as old field habitat suitable for this species. Installation of nesting boxes along the power line right-of-way can provide additional nesting opportunities for this species.

The area surrounding the former Kings College campus and the area along the dike will be disturbed by project implementation. These areas will no longer serve as suitable nesting habitat for this species. It is anticipated that the loss of these patches of habitat will not have an adverse impact due to additional off-site power line right-of-ways in the vicinity of the Site. In order to prevent potential impacts to individual nesting eastern blue bird; it is recommended that potential cavity trees in the vicinity of the former Kings College campus and along the dike be cut during the fall and winter.

It is anticipated that the power line right-of-way will continue to serve as eastern bluebird habitat subsequent to project implementation.

5.0 AQUATIC RESOURCES

Aquatic resources on the Site include a portion of Sterling Forest Lake, a reach of the Ringwood River and wetlands associated with the river and its tributaries. Sterling Forest Lake is a deep, (approximately 120 feet) oligothrophic natural lake which is deepened by a 20 foot high dam. The Lake is State owned and is part of Sterling Forest State Park.

Surveys conducted by the NYSDEC Bureau of Fisheries, Biological Survey Unit, conducted on May 31, 2000 indicate that the lake supports a breeding population of lake trout (*Salvelinus namaycush*). In addition, rainbow (*Salmo gairdneri*) and brown trout (*Salmo trutta*) were stocked in the lake while it was under private ownership. Alewife (Alusa pseudoharengus) had been the main forage base in the lake; however, they are, based on NYSDEC Bureau of Fisheries surveys conducted in 1998 and 2000, no longer present in the lake. The following species were collected by NYSDEC during their 2000 survey:

- Smallmouth bass (*Micropterus dolomieui*);
- Rock bass (*Ambloplites rupestris*);
- Largemouth bass (*Micropterus salmoides*);
- Bluegill (*Lepomis macrochirus*);
- Pumpkinseed (*Lepomis gibbosus*);
- Chain pickerel (*Esox niger*); and
- Yellow perch (*Perca fluviatilis*).

The Ringwood River flows through the northeastern portion of the Site. The reach of the stream which flows through the Site is identified as a Class C (T) freshwater. The NYSDEC defined best usage of Class C waters is fishing. These waters are suitable for fish propagation and survival. The water is also suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes. The (T) appearing after the standard designation indicates that the waters are suitable for supporting trout. In March, 2007 the NYSDEC stocked 290 8-9 inch brown trout in the Ringwood River. Immediately downstream of the Site, in New Jersey, the NJDEP stocks brown and rainbow trout in the river.

The proposed development is designed to avoid the aquatic habitat present on the site. Appropriate soil erosion and sediment control measures will be implemented to prevent the migration of sediment to Sterling Forest Lake and the Ringwood River during construction activities. Stormwater management controls should be implemented to reduce stormwater runoff into these water bodies subsequent to the development of the site. With appropriate soil erosion and sediment control measures and stormwater management facilities It is anticipated that the proposed project will have no significant negative impact on the aquatic resources in the project area.

6.0 WETLANDS

The entire portion of the Site east of Sterling Road was examined for the presence or absence of wetlands. Each wetland delineated within the project area was classified according to habitat type. A review of the NYS Department of Transportation, Greenwood Lake and Sloatsburg Freshwater Wetland Quadrangles shows the presence of NYSDEC Freshwater Wetland area GR-18, Gr-19 and GR-120 located north of the Site (Figure 5). The NYSDEC Freshwater Wetland maps do not indicate the presence of NYSDEC regulated wetlands within the project Site.

The National Wetlands Inventory Maps (NWI), Greenwood Lake and Sloatsburg Freshwater Wetland Quadrangles indicate palustrine forested (PF01), palustrine scrub/shrub (PSS1) wetlands and palustrine open waters (POW) associated with the Ringwood River. Sterling Forest Lake is identified as lacustrine, limnetic open waters (L1OW). No wetlands are delineated on the portion of the Site west of Sterling Road.

6.1 Wetland Regulations

A variety of federal and state regulations affect construction and other activities in wetlands and in areas immediately adjacent to wetlands. The principal federal laws that regulate activities in wetlands are Sections 404 and 401 of the Clean Water Act, and Section 10 of the Rivers and Harbors Act. Other federal laws that may apply include the National Environmental Policy Act, and the Swampbuster provision of the Food, Agriculture, Conservation and Trade Act of 1990.

The principal New York State regulation affecting development activities in and near freshwater wetlands is the Freshwater Wetlands Act (6NYCRR Part 663). Other state laws that may regulate activities in or near wetlands include the State Environmental Quality Review Act (SEQRA)(6NYCRR Part 617), and the Use and Protection of Waters Program (6NYCRR Part 608).

6.2 Definitions and Methodology

Jurisdictional Waters of the United States (WoUS) is a term used and defined by the US Army Corps of Engineers (USACE) in 33 Code of Federal Regulations 328. This term as defined in the federal regulations includes "wetlands." However, for the purposes of this report the different types of jurisdictional water systems are defined as either "WoUS" or "wetlands". WoUS will denote non-vegetated, contiguous watercourses or waterways with well defined banks, or intermittent streams as opposed to "wetlands" as defined below.

6.3 Wetlands are defined in the Code of Federal Regulations (40 CFR 230.3) as:

Those areas that are inundated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions.

Wetlands generally include swamps, marshes, bogs, and similar areas. Recognizing the potential for continued or accelerated degradation of the nation's water, including wetlands, the U.S. Congress enacted the Clean Water Act. Section 404 of the Act authorizes the Secretary of the Army, acting through the USACE, to regulate the filling of waters of the United States and disturbance of wetlands. USACE's Environmental Laboratory (EL), has prepared the Corps of Engineers Wetland Delineation Manual (EL, 1987). This manual describes technical guidelines and methods using a multi-parameter approach to identify and delineate wetlands as per Section 404 of the Clean Water Act.

PS&SPC's field methodology for the identification of Waters of the United States, including wetlands, followed procedures established in the Corps of Engineers Wetland Delineation Manual (EL, 1987) for routine on site inspections. In accordance with this methodology, the following three parameters are diagnostic of wetlands: (1) the vegetation is dominated by hydrophytes; (2) the substrate is undrained hydric soil; and (3) the substrate is saturated with groundwater or flooded for a significant part of the growing season each year. It is required that under normal conditions all three of these conditions be met for an area to be defined as a wetland. "Normal Conditions" refers to the soil and hydrology conditions that are normally present, without regard to whether the vegetation has been removed (EL, 1987).

Prior to field investigations, the following maps were referenced to determine the likely potential for the presence of wetlands at the Site:

- U.S. Geological Survey (USGS) 7.5 minute topographic map (Sloatsburg and Greenwood Lake New Jersey/New York)
- U.S. Fish and Wildlife Service (USFWS), National Wetlands Inventory (NWI) map (Sloatsburg and Greenwood Lake New Jersey/New York)
- U.S. Department of Agriculture (USDA) Soil County Survey (SCS) map for Orange County, New York
- New York State Department of Environmental Conservation (NYSDEC) Freshwater Wetland Mapping (Sloatsburg and Greenwood Lake New Jersey/New York)

6.4 Hydrophytic Vegetation

The initial step in the wetland delineation was to characterize the dominant vegetation in each vegetation layer. Dominant species are those that have the largest relative basal area, height, number of stems, or greatest areal cover (EL, 1987). The vegetation was then compared to the National List of Plant Species that Occur in Wetlands, Northeast (Region 1) (NWI, 1988) to determine if hydrophytic vegetation was present.

A "hydrophyte" is any plant "growing in water, soil, or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content" (EL, 1987). Since most species can tolerate a range of growing conditions, individual species are not solely restricted to either wetland or upland communities. The USFWS has developed a classification scheme that assigns species to wetland indicator classes as listed in Table 7 (NWI, 1988).

Table 7
Plant Indicator Status Categories

Indicator Category	Indicator Symbol	% Occurrence in Wetlands	Status Categories
Obligate Wetland Plants	OBL	>99	Plants that occur almost always in wetlands under natural conditions, but which may also occur rarely in nonwetlands.
Facultative Wetland Plants	FACW	67-99	Plants that occur usually in wetlands, but also occur (1% to 33%) in nonwetlands.
Facultative Plants	FAC	33-67	Plants with a similar likelihood of occurring in both wetlands and nonwetlands.
Facultative Upland Plants	FACU	1-33	Plants that occur sometimes in wetlands, but occur more often in nonwetlands.
Upland Plants	UPL	<1	Plants that occur rarely in wetlands, but occur almost always in nonwetlands under natural conditions.

Hydrophytic vegetation is present if greater than 50% of the dominant plant species from all strata are OBL, FACW, and/or FAC. When greater than or equal to 50% of the dominant species are FACU and/or UPL and hydric soils and wetland hydrology are present, the area is also considered to have hydrophytic vegetation. If hydric soils and wetland hydrology are lacking, and normal circumstances exist, then the area is considered to be upland.

6.5 Wetland Hydrology

The second step was to assess the wetland hydrology. Wetland hydrology encompasses the hydrologic characteristics of areas that are inundated or have saturated soils for sufficient duration to support hydrophytic vegetation. Hydrologic indicators are generally used to determine the presence or absence of a wetland. Of the three technical criteria, wetland hydrology is generally the least exact and most difficult to establish in the field due to annual, seasonal, and daily fluctuations (EL, 1987). An area has wetland hydrology if the soil is saturated to the surface by groundwater or ponded or flooded with

surface water for one week or more during the growing season. Saturation to the surface can occur when the water table is 0.5 to 1.5 feet below the surface depending upon soil permeability.

Indicators of wetland hydrology may be divided into recorded data and field data. Recorded data may be obtained from aerial photographs, soil surveys, historical data, flood plain delineations or tide/stream gauges. In the field, wetland hydrology may be evidenced by visual observation of saturation, inundation, or depth to standing water. However, it is not necessary to directly demonstrate the hydrology.

Other field indicators of wetland hydrology include drainage patterns, morphological plant adaptations, oxidized root channels, water marks, surface scouring, water-stained leaves, sediment deposits; drift lines, moss lines, and bare areas. Unless an area has been hydrologically modified, the hydrologic parameter may also be inferred from the soil profile.

6.6 Hydric Soils

The third step was to assess the presence of hydric soils. "Hydric soils" are soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and revegetation of hydrophytic vegetation (USDA-SCS, 1985). Soils are considered hydric when they are (1) somewhat poorly drained and have a seasonal high water table less than 0.5 feet from the surface; or (2) poorly drained or very poorly drained and have a seasonal high water table less than 1.0 or 1.5 feet from the surface. The high water table must be present for a week or more during the growing season (EL, 1987). Soils that are ponded or flooded for long or very long duration during the growing season are also classified as hydric. All organic soils (histosols) or mineral soils with a histic epipedon are considered hydric soils.

In the field, a hand auger was used for sampling the soil to examine indicators of hydric soils such as low chroma, colors, mottling, organic accumulation, and high water table. Soils were generally examined to a depth of approximately 20 inches. Hydric conditions for mineral soils with low to moderate organic content were most commonly demonstrated by gleying and mottling. Gleyed soils are a result of gleization which is manifested by the presence of neutral gray, bluish or greenish colors through the soil matrix or in mottles (spots or streaks). Mineral soils were compared to a Munsell soil chart (Kollmorgen Corp., 1975) to determine soil color. Soils were considered hydric if they were gleyed or if the top of the B horizon had a chroma of 1 or less if mottling was not present, or a chroma of 2 or less when mottling was present.

Low chroma colors are an index of the degree of soil reduction as a result of anaerobic conditions. Low chroma colors include black, various shades of grey, and the darker shades of brown and red. These criteria allow most soils to be classified as hydric or non-hydric. Hydric soils that have been effectively drained may still show low chroma colors, but are no longer considered to be hydric because they lack hydrology. Low chroma colors may not be used as an indicator of hydric soils in those soils that are sand,

are deeply colored as a result of their parent material, or have recently been formed (i.e., alluvial). These soils must be evaluated more carefully under the procedures outlined by the Corps of Engineers Wetland Delineation Manual (EL, 1987).

Sandy soils may be considered to be hydric if organic materials have accumulated above or in the surface horizon. Dark vertical streaking of subsurface horizons caused by downward movement of organic matter also indicates a hydric soil. This may be associated with a spodic horizon located at the average depth of the water table.

The Soil Conservation Service (SCS), in cooperation with the National Technical Committee for Hydric Soils (NTCHS), has prepared a list of the Nation's hydric soils (USDA SCS, 1987). In addition, the SCS publishes county soil surveys for areas where soil mapping has been completed. Unlisted soils are considered to be non-hydric. However, some phases of unlisted soils may contain hydric inclusions and thus be associated with wetlands. These cases must be verified in the field. Field soil characteristics are given precedence over how a site is mapped on a county soil survey. Alluvial soils may not show hydric characteristics due to their recent formation, but may be considered to be hydric for the purposes of wetland delineation.

Wetland Habitat Classification

Wetlands that were field identified within the project area were all determined to be freshwater palustrine system wetlands.

According to the vegetative succession of a wetland, a classification of habitat was assigned. These classifications include Palustrine emergent wetlands (PEM), Palustrine forested wetlands (PF01) or any combination of the two (Cowardin, 1979).

Results

Three areas of freshwater wetlands were identified within the project area (Figure 6). They are identified as follows:

Wetland Line 01 and 02 - Palustrine forested wetland (PF01) located south of the existing buildings. It is dominated by spice bush (*Lindera* benzoin), sensitive fern (*Onoclea sensibilis*) and red maple (*Acer rubrum*). This wetland originates from a storm sewer pipe under the parking area. The northern portion of this ditch which is relatively steep does not have hydric soils and is not identified as wetlands. As the terrain becomes more level, wetland vegetation and hydric soils define the narrow wetland channel which flows toward the abandoned treatment facility. This wetland area ends at a culvert under the access road to the existing wastewater treatment facility.

Immediately south of the access road wetland lines 03 and 04 originate. This area is a palustrine emergent wetland (PEM), which is dominated by jewel weed (*Impatiens capensis*), cattail (*Typha latifolia*), purple loosestrife (*Lythrum salicaria*), tear-thumb (*Polygonum sagittatum*) and nut sedge (*Cyperus esculentus*). Water from this wetland

area flows into a small basin dominated by common reed (*Phragmites australis*) and then flows east onto property owned by the water authority. Wetland line 05 connects the off property boundary of the wetland with wetland line 04 completing the wetland polygon.

Wetland lines 06 and 07 are a continuation of the off site wetlands. These are PF01 wetlands which follow the small stream bed to a culvert under Sterling Forest Road. Wetland area 08 is located between the water authority access road and the AT&T access road. This wetland area was ponded in the spring as is a vernal pond. Vegetation within the wetland area includes jewel weed, spicebush, skunk cabbage (*Symplocarpus foetidus*) and sensitive fern.

Wetland area 09 defines the edge of Sterling Forest Lake and is waters of the United States. Wetland areas 10 and 11 originate at the base of the earthen dam as a small creek and flow into the property owned by the water company. This small creek connects to wetland area 03 and 05 and 06 and 07 at property boundaries. Vegetation within these wetlands includes skunk cabbage, jewel weed and spicebush.

Hydrophytic Vegetation

Vegetation on the Site was evaluated during field investigations. Woody vegetation in the PF01 areas included red maple (FAC) and spicebush (FACW-). Herbaceous vegetation is dominated by skunk cabbage (OBL), jewel weed (FACW), common reed (FACW) and purple loosestrife (FACW+).

Wetland Hydrology

The hydrology of Wetland Areas 01 through 07 and areas 10 through 11 appear to be driven by three factors; stormwater flowing into catch basins, groundwater seeps discharging to the surface and Sterling Forest Lake discharging from below the earthen dam. Wetland Area 08 appears to be groundwater driven either through a seep or spring under the emergent portion of the wetland and stormwater runoff. Wetland area 09 is Sterling Forest Lake which is stream fed.

Hydric Soils

The Soil Conservation Service (SCS) publishes county soil surveys for areas where soil mapping is completed. The soils of Orange County have been mapped. None of the soils identified as occurring on the Site are listed on the Orange County List of Hydric Soils. The following soils have been mapped on the Site (Figure 4):

Erie extremely stony soils, gently sloping (ESB) – These soils are somewhat poorly drained, gently sloping soils which have a fragipan. They are formed in glacial till. The water table is perched above the fragipan during the spring months. Permeability in the surface layer is moderate and slow to very slow in the fragipan.

Rock outcrop-Hollis Complex, sloping (ROC) – This complex of exposed bedrock and shallow Hollis soils is found on hill crests, hill tops and ridges. The Hollis soil is formed

from a thin layer of glacial till over shist, gneiss and granite. Slopes range from 3 to 15 percent but are predominantly in the 8 to 15 percent range. No free water is perched above the bedrock except in areas where the rock is poorly jointed. Permeability is moderate to moderately rapid and depth to bedrock is typically 10 to 20 inches.

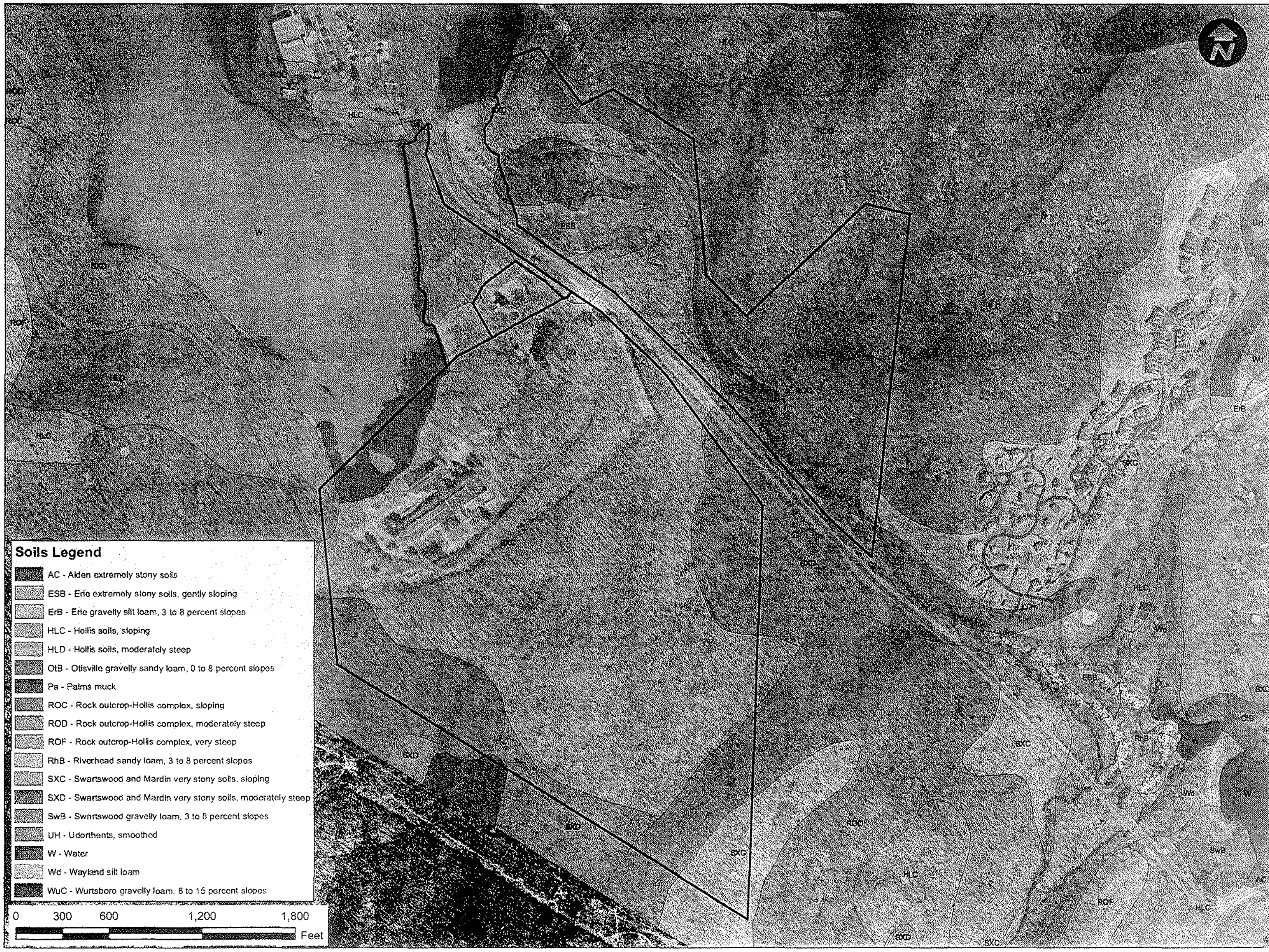
Rock outcrop-Hollis Complex, moderately steep (ROD) - This complex of exposed bedrock and shallow Hollis soils is found on hill crests, hill tops and ridges. The Hollis soil is formed from a thin layer of glacial till over shist, gneiss and granite. Slopes range from 15 to 35 percent but are predominantly in the 15 to 25 percent range. No free water is perched above the bedrock except in areas where the rock is poorly jointed. Permeability is moderate to moderately rapid and depth to bedrock is typically 10 to 20 inches.

Swartswood and Mardin very stony soils, sloping (SXC) – This mapping unit consists of well drained and moderately well drained Swartswood and moderately well drained Mardin soils. These soils have a deep fragipan. They are formed from glacial till on hill crests, hill tops and ridges. Slopes range from 3 to 15 percent but are predominantly in the 8 to 15 percent range. The water table is perched above the fragipan in the early spring. Permeability is moderate above the fragipan, slow to very slow through the fragipan and slow to moderately slow below the fragipan.

Swartswood and Mardin very stony soils, moderately sloping (SXD) – This mapping unit consists of well drained and moderately well drained Swartswood and moderately well drained Mardin soils. These soils have a deep fragipan. They are formed from glacial till on hill crests, hill tops and ridges. Slopes range from 15 to 35 percent but are predominantly in the 15 to 25 percent range. The water table is perched above the fragipan in the early spring. Permeability is moderate above the fragipan, slow to very slow through the fragipan and slow to moderately slow below the fragipan.

Udorthents, smoothed (UH) – These soils formed in man made cut and fill areas. They are generally near industrial sites, urban developments and other construction sites. They consist of excavated earth that has been stockpiled for eventual use as fill; soil and rock that has been trucked from other areas and leveled; or soil left in areas that have been excavated. These soils are excessively drained. Bedrock is typically at depths of five (5) feet. Depth to the seasonal high water table is shallow.

A review of the Site development plan indicates that less then one (1) acre of USACE wetlands will be impacted by the proposed development. It is anticipated that an Individual Section 404 Permit will be needed for project implementation. Wetlands impacted will require mitigation. The most likely location for this mitigation will be that portion of the Site west of Sterling Road. No development is proposed for this portion of the site. Site investigations conducted as part of the threatened and endangered species survey and the vegetation survey indicates both upland and wetland habitat on this portion of the site. Expansion of existing wetlands, associated with the Ringwood River will provide sufficient area to off-set wetland impacts east of Sterling Road.



Legend

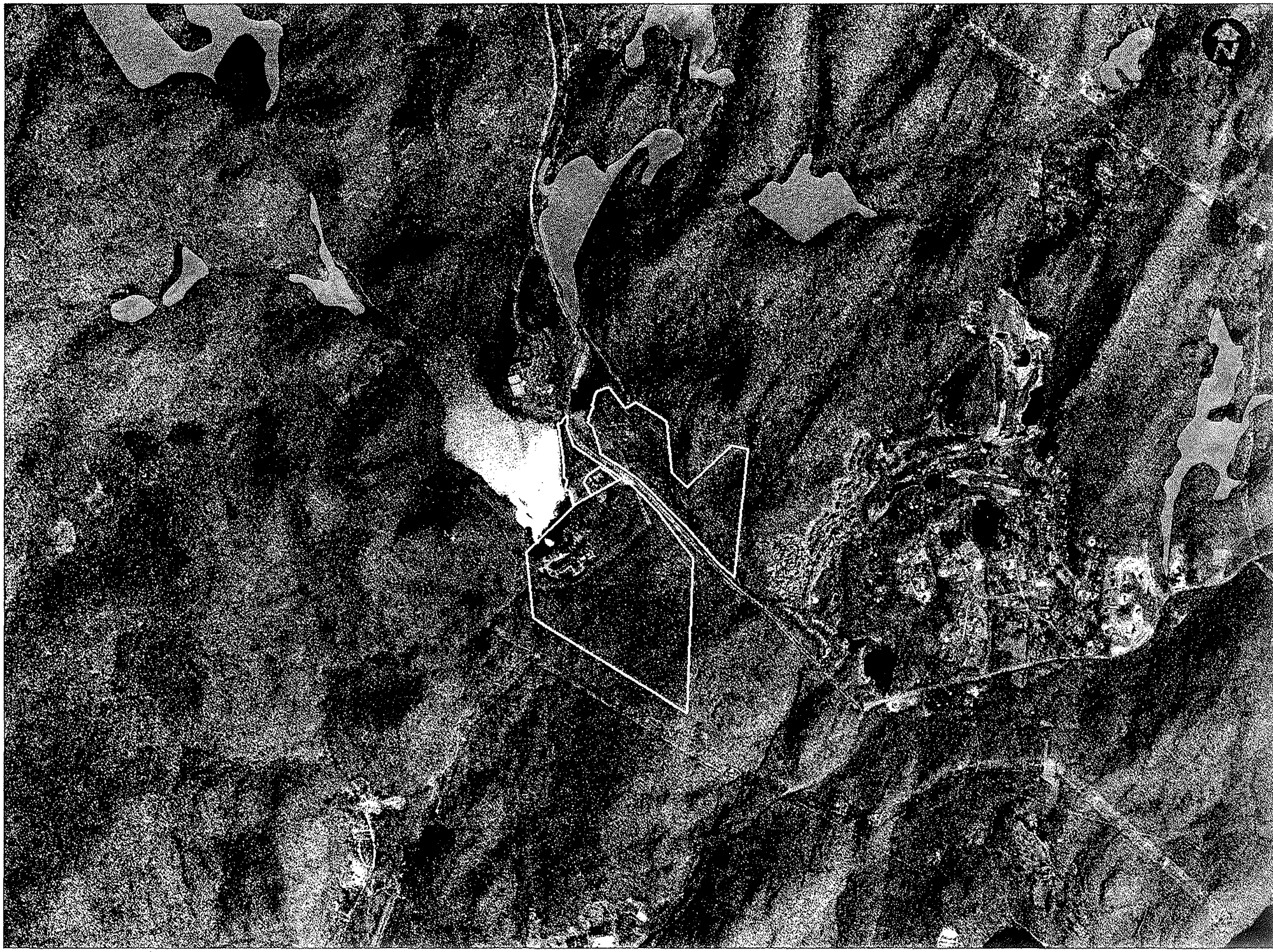
Site Location

Source
U.S. Department of Agriculture, Natural Resources Conservation Service, Soil Survey Geographic (SSURGO) database for Orange County, New York, 2006

PS&S

TOURO WARWICK COLLEGE
TOWNSHIP OF WARWICK
ORANGE COUNTY, NEW YORK

SOILS MAP



Legend

Wetlands

Site Location

Source
New York State DEC Freshwater Wetlands
1973 Quadrangle Maps Greenwood Lake
and Sloatsburg
Aerials Express, 2006

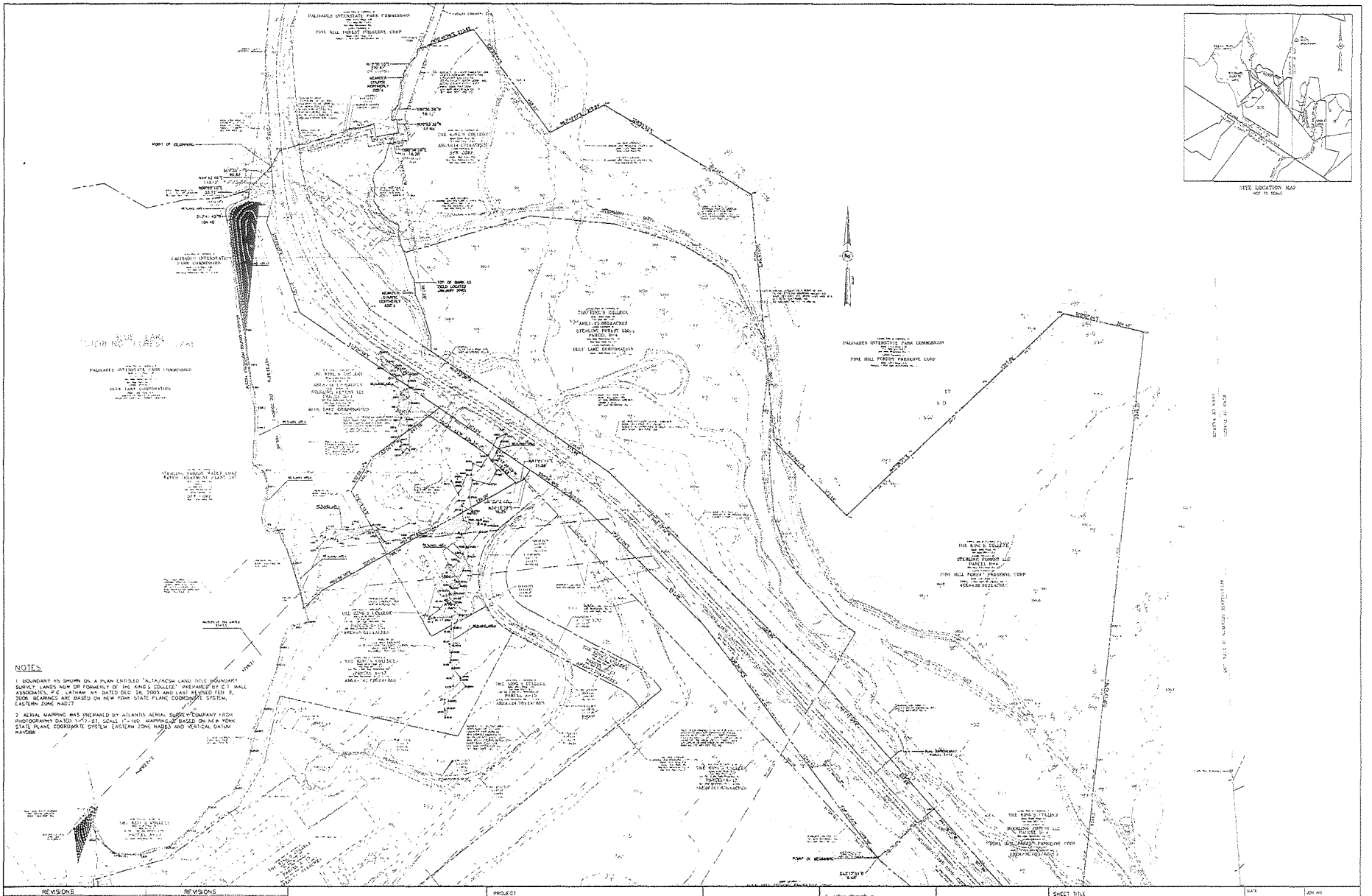
0 800 1,600
Feet

P S & S
integrating design & engineering

Touro Warwick College
Township of Warwick
Orange County, New York

NYS DEC WETLANDS MAP

Map Document (P:\03171\004\YWN\Maps\Figure5_DEC_Wetlands_102407_01.mxd)
10/24/2007 -- 10:00:42 AM



REVISIONS			REVISIONS		
NO.	DATE	DESCRIPTION	NO.	DATE	DESCRIPTION

LAKELAND MANAGEMENT, LLC.

PROJECT
TOURO WARWICK COMMUNITY DEVELOPMENT
TOWNSHIP OF WARWICK, ORANGE COUNTY, N.Y.

PAULUS SOKOLOWSKI and SARTOR PC
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CERTIFICATE AUTHORIZATION NO. 24GA28033700

JARDSLAVA VONDER
N.Y. LIC. NO. 50533-1
SIGNATURE _____ DATE _____
PROFESSIONAL LAND SURVEYOR

SHEET TITLE
WARWICK COLLEGE WETLAND SURVEY

DATE	9-13-07
JOB NO.	3771-051
SCALE	1" = 100'
DRAWN	JV
CHKD	TCH
SHEET NO.	1 of 2

7.0 CONCLUSIONS

Field surveys were conducted to inventory biological resources on the site and to evaluate the site for the presence or absence or Federal or State listed threatened, endangered, species of special concern and critical habitat for these species. Surveys were conducted from April through September and included a delineation of wetlands on the eastern portion of the property. Surveys included a survey of the birds potentially breeding on the site and a herpetological survey. A total of 121.5 hours of observations were conducted on the site from April to September.

New York Natural Heritage database list the presence of one threatened plant, Terrestrial starwort (*Callitriche terrestris*) and three endangered plants, Green parrot's feather (*Myriophyllum pinnatum*), Hyssop skullcap (*Scutellaria integrifolia*) and Michaux's blue-eyed grass (*Sisyrinchium mucronatum*) known to occur in the vicinity of the site. While the site contains suitable habitat for each of these species, only the Hyssop skullcap was observed on the site. These plants were observed outside of the limits of disturbance for the project.

The New York Natural Heritage database lists one threatened species, the timber rattlesnake, and six species of special concern in the vicinity of the site. The site does not contain suitable habitat to support a hibernaculum for timber rattlesnakes, a State listed threatened species. No rattlesnakes were observed on the site during these investigations. The site does provide suitable foraging habitat for snakes. Potential impacts to foraging snakes can be avoided by pre-construction fencing and monitoring during construction activities.

During the survey three (3) of the State species of special concerns, red-shouldered hawk, eastern bluebird and the box turtle, were observed on the site and a previous survey documented the wood turtle as occurring on site. Wood turtles may the portion of the Site northeast of Sterling Forest Road for breeding and hibernating. Given the terrestrial wandering tendencies of this species, the entire site may serve as suitable foraging habitat for this species. No development activities are proposed within the breeding and overwintering habitat likely utilized by wood turtles. Pre-construction fencing and monitoring is recommended to prevent impacts to these species during construction activities.

Box turtles utilize open old field habitat and wooded habitat on the site. The project will result in habitat loss for this species. Pre-construction fencing and monitoring is recommended to prevent impacts to these species during construction activities. It is anticipated that the surrounding State parks will continue to provide suitable habitat for this species in the vicinity of the Site.

The eastern bluebird is an open country species. The open habitat along the power-line right-of-way will be maintained subsequent to the proposed development. It is anticipated that this species will continue to utilize the existing habitat. Installation of nesting boxes could increases nesting opportunities for eastern bluebirds along the power line right-of-ways and open habitat on the site.

The red-shouldered hawks are foraging along the power line right-of-way on the site. This habitat will not be disturbed by the proposed construction. The Site is also bounded by two State Parks which provide suitable nesting and foraging habitat for this species. It is anticipated that this species will not be adversely impacted by the proposed development.

A wetland delineation was completed for the portion of the site east of Sterling Road. There are no New York State Department of Environmental Conservation (NYSDEC) mapped wetlands on this portion of the property. PS&S delineated US Corps of Engineers (USACE) regulated wetlands and waters of the United States. Based on the proposed development scenario, the project will impact less than one (1) acre of USACE regulated wetlands. No NYSDCE wetlands will be disturbed by the proposed project.

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Attachment A

Site Photographs

Photo 1: Bluebird habitat along the power line right-of-way.

Photo 2: Potential rattlesnake foraging habitat in hardwood forested portions of site.

Photo 3: Upland deciduous forested habitat in central portion of site.

Photo 4: Bluebird habitat along the power line right-of-way looking from Sterling Forest Park toward site.

Photo 5: Bluebird habitat along the power line right-of-way west of entrance road.

Photo 6: Wet meadow/Emergent wetland southwest of abandon treatment facility. Wetland lines 03 and 04.

Photo 7: Five-lined skink observed adjacent to existing buildings.

Photo 8: Palustrine forested wetlands southwest of Sterling Forest Road. This wetland area is suitable wood turtle habitat. Note stream in background.

Photo 9: Palustrine forested wetlands southwest of Sterling Forest Road. This wetland area is suitable wood turtle habitat.

Photo 10: Ringwood River, located south of Sterling Forest Road. Pool areas provide suitable breeding and over wintering habitat for wood turtles.

Photo 11: Wood turtle habitat adjacent to Ringwood River.

Photo 12: Ringwood River, located south of Sterling Forest Road. Run areas provide suitable breeding and over wintering habitat for wood turtles.

Photo 13: Ringwood River – In addition to wood turtle habitat the river provides habitat for snapping turtles, two lined salamanders, frogs and trout.

Photo 14: Vernal pond in August – Breeding habitat for grey tree frogs, spring peepers and American toads.

Legend

Site Location

Photo Location

Source: Aerials Express, 2006.

0 175 350 Feet

PS&S
integrating design & engineering

TOURO WARWICK COLLEGE
TOWNSHIP OF WARWICK
ORANGE COUNTY, NEW YORK

PHOTO LOCATION MAP

Drn By: ML	Scale: 1" = 350'	Project: 03171.004.010
Chkd By: DG	Date: 10-29-07	Figure No.

Map Document: (P:\03171\004\Y\N\Maps\Figure_PhotoLocation_102907_00.mxd)
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Appendix E-2

Michael W. Klemens, LLC
47 Florida Hill Road
Ridgefield, CT 06877

October 14, 2005

Touro College
c/o Jayne E. Daly, Esq.
110 Orange Avenue
Walden, New York 12586

Dear Attorney Daly:

At your request I have conducted an overall habitat assessment of several parcels of land currently owned by Kings College on the north and south sides of Sterling Lake Road (Orange County 84) in the Town of Warwick, New York. The site totals 253 acres. Portions of the site were previously owned by International Nickel (INCO) and used as a research facility. A subdivision of the site was proposed by the Blue Lake Corporation in 1989. In 1991 a four year Christian college was proposed by Kings College. The current assessment of the site was conducted on behalf of your client, Touro College, as part of their due diligence in assessing the suitability of the site for their proposed educational and residential facilities.

The review that I conducted on behalf of your client included examination of various selected materials from past applications and studies that you forwarded to me. This was augmented by two field visits to the site to familiarize myself with the site's topography and ecological communities and to gather biodiversity data. In total, I spent 30 person-hours in the field, accompanied by a field assistant. The goal of this reconnaissance was not to conduct detailed studies on any one taxa, group of organisms, or issue, but to describe the types of studies that ***may*** be necessary to move forward with Touro College's redevelopment of the INCO site and their plans to develop other portions of the site for a residential community.

The study prepared by Borko and Alford (Blue Lake Project Biological Survey prepared for Lynmark Development Associates, January 1989) provides a good description of the INCO portion of the site (on the southwest side of Sterling Lake Road/Orange County 84). I was able to find the vegetational communities that they described in 1989, including the xeric chestnut oak ridge community located on the southwestern boundary of the property, paralleling the powerline right of way. Fire is an important component of the ecological process in the chestnut oak community and a recent fire was evident in portions of the forest bordering the powerline right of way. The rocky, dry southwest facing ledges are potentially good habitat for snakes. I would anticipate that both the black racer (*Coluber constrictor)* and black rat snake (*Elaphe obsoleta*) may be found here. Neither of

these large black snakes are a listed species in New York state, and both are locally common in the Sterling Forest ecosystem.

There is discussion in the Borko and Alford report about the potential for two venomous snakes, copperheads (*Agkistrodon contortrix*) and timber rattlesnakes (*Crotalus horridus*), to occur on or near the INCO site. Although I concur with their report that there are no apparent den (over-wintering) sites for these snakes on the INCO site, the chestnut oak ridge community, with its under-story of low bush blueberry and open areas for sunning and foraging, may serve as seasonal summer habitat for these snakes. Of particular concern would be the timber rattlesnake, which is a NY state endangered species. I would recommend, as part of the more in depth scientific studies needed for this project, a fuller review of the potential for timber rattlesnake use of this portion of the site. Although past applications for activities on this site have requested data from the New York State Natural Heritage program concerning den sites and rare species occurrences (letters of July 8, 1988; November 25, 1992; May 22, 1992; and March 9, 1999) there have been no parallel requests to the State of New Jersey, which lies very close to the southern border of the site and near the chestnut oak ridge community.

Inquiries to New Jersey may be helpful in determining whether their Heritage Program has occurrence records of timber rattlesnakes near the site. This species is also New Jersey's list of endangered and threatened species. Given that timber rattlesnakes move several miles from their den sites along well-defined routes each season, it is quite likely that ***if*** rattlesnakes occur on the site, they may be originating from dens in adjacent portions of Passaic County. Apart from gaining information from New Jersey, by involving their Heritage Program in the review of endangered and threatened species data, one avoids a mid-review process challenge that the applicant has neglected to thoughtfully consider natural resource issues of an abutting jurisdiction. Given the fragility of the chestnut oak community, and its susceptibility to periodic fires, Touro College may wish to reconsider its conceptual design for residences in the southwest corner of the site and relocate six houses on the west side of the access road to a more central portion of the site.

The other major ecological constraint on the upland portions of the site occurs in the extreme southeastern corner of the property. There is a broad, rocky valley that is a large braided intermittent stream corridor. Although there does not appear to be any significant areas of wetlands in this area, including any vernal pools, there are ample evidences of water passage overland in a broad expanse of this valley, which drains in a northeasterly direction, down slope through the Sterling Forest Park Preserve, and into wetlands associated with the Ringwood River along Orange County 84. Apart from its hydrological functions, this valley serves as a wildlife corridor through the site between the Ringwood River valley

and the highlands. There are approximately six houses proposed around a small cul-de-sac that are probably located in too close proximity to this intermittent watercourse-rich valley. I would recommend that Touro College consider relocating these houses to a more central portion of the site. In summary, given the environmental constraints identified in the previous paragraphs, I would anticipate that there will be a need to redesign the proposed residential house layout along the southern boundary of the site in order to better protect these identified environmentally sensitive areas.

The abandoned sewage treatment plant is located in a wetland area. The wetlands appear to have been ditched and diverted and are dominated by invasive vegetation. As such, they are low to moderate quality habitat. Inside the old sewage treatment plant, bottles of chemicals remain, and the water-filled settling pools surrounding the plant are an attractive nuisance and potentially dangerous. This area needs to be secured and the discarded chemicals disposed of appropriately. The sludge drying fields associated with the plant are now used as nesting areas for turtles and snakes. Egg shells from hatched nests are scattered around the drying fields. One snake that may be nesting in these sandy, dry beds is the hognose (*Heterdon platirhinos*) a New York State special concern species. As part of the general herpetological survey of the site which should be conducted next year (see my summary recommendations) special attention should be given to searching for hognose snakes on site.

As described in the Borko and Alford report, Blue Lake is quite deep, with little, if any, fringing wetlands and a well-defined rocky shoreline. The primary concern with development of the INCO site will be the protection of the lake from run-off and pollution. A minimum 100-foot naturally vegetated buffer around Blue Lake is essential. The forest between the INCO building and the dam is quite high quality and mature, with a well-developed duff layer. I observed a young bullfrog (*Rana catesbeiana*) at the edge of Blue Lake and a snapping turtle (*Chelydra serpentina*) nest on the Blue Lake dam. Two redback salamanders (*Plethodon cinereus*) were found under logs in the mature woods between the INCO building and the dam. All three of these species are very common and widespread. The bullfrog and snapping turtle are among the few species of herpetofauna able to survive in open, un-vegetated lakes and impoundments. The INCO campus itself has limited biodiversity value. This pertains not only to the building site itself, which appears to be inhabited (based on scat and other sign) by a number of raccoons (*Procyon lotor*), as well as the grounds surrounding the building that are heavily browsed by whitetail deer.

The aesthetic value of the campus around the INCO building is important, as are the number of specimen trees, both native and planted, that are well shaped and cared for. Of special note is the weeping beech at the entrance to the INCO building. It is recommended that a tree preservation plan be considered and

efforts are made to protect and conserve the large specimen trees surrounding the INCO building. The weeping beech is currently threatened by oriental bittersweet that is establishing itself onto this tree. If not promptly removed, this invasive vine will shade out portions of this beautiful tree, disfiguring, and eventually killing it. Although not part of the native biodiversity, specimen trees such as this weeping beech are considered to be a valuable natural feature of a development/re-development site, and should be conserved if possible.

On the northern side of Orange County Rte. 84 is an additional parcel of land that is being acquired by Touro College. This parcel of land is bottomland and floodplain associated with the Ringwood River that flows in a southeasterly direction along the northern side of Orange County Rte. 84. This is a very distinctive portion of the site and is characterized by a diversity of wetland habitat types and has ecological values that are in many instances far greater than the INCO site. Unfortunately, during periods of low water, such as was the case during my site investigation, the water in the river was almost entirely dominated by treated sewage (grey water) from the upstream sewage treatment plant.

The terrestrial habitat on this parcel is quite disturbed and shows scars of surficial mining. Piles of cracked rock and slag tailings are scattered throughout the woodland, and one slag tailings pile sits in the edge of a sphagnum and red maple tussock swamp. This disturbed habitat is expected to be habitat for a variety of snakes. There is a brushy, cleared powerline area that crosses the stream corridor, opposite the entrance to Kings College. That area looks to be appropriate habitat for eastern box turtles (*Terrapene carolina*), a New York State special concern species. In this same general area are a series of woodland depressions that appear to hold water for extended periods of time. These may well be vernal pools, though an investigation in the springtime will be required to determine whether obligate species of vernal pool breeding amphibians, such as wood frogs (*Rana sylvatica*) or spotted salamanders (*Ambystoma maculatum*) are present. Despite the dry conditions, and suboptimal time of year, I was able to document the following species of amphibians and reptiles on this wetland parcel:

Eurycea bislineata	Two-lined Salamander
Plethodon cinereus	Redback Salamander
Pseudacris crucifer	Spring Peeper
Rana catesbeiana	Bullfrog
Rana clamitans	Green Frog
Rana palustris	Pickerel Frog
Clemmys insculpta	Wood Turtle

These are all widespread, common species except for the wood turtle. The two-lined salamander was found in the hillside seepage area above the river (between Orange County 84 and the Ringwood River). Searching the stream did not yield any salamanders. Possibly the water in the river is too polluted by sewage outflow to support stream salamanders such as the two-lined salamander. We noted freshwater mussel shells along the riverbank, and observed sunfish and small Cyprinids in the Ringwood River. The wood turtle is a State-listed Special Concern Species and its documentation here is a significant find that will be reported to the NY State Natural Heritage Program. The documentation is that of a young road-killed individual on the Ringwood River side of the shoulder of Orange County 84 opposite the entrance to Kings College, adjacent to the high quality wetland areas associated with and near the cleared, brushy, wet powerline right of way. The turtle remains were salvaged and will be deposited into the research collection of the American Museum of Natural History in New York City.

As the Ringwood River flows in a southeasterly direction, it drops through a very scenic gorge area. This area has a mature beech forest bordering the waterfall, and appears to be characterized by more circum-neutral soils than the rest of the parcel. Small light chips of limey rock are present in the seepage and the presence of maiden hair fern and horsetails are indicative of a richer woodland community above the waterfall. In summary, my very brief investigation of the parcel on the northern side of Orange County 84, bordering the Ringwood River, exhibited much higher habitat diversity than the INCO parcel on the opposite side of the road.

In conclusion, the INCO site appears suitable for redevelopment and some new development. In order to move into the DEIS preparation of the site I would recommend that the following studies be conducted on the entire parcel (including the Ringwood River piece) in order to evaluate the biodiversity of both parcels.

A herpetological inventory of the site would be required. This would entail sampling in the springtime for vernal pool species, and studying the property at key sampling times from mid-March through late June. It may also require some additional field work for rattlesnake use on the southwest corner of the INCO site, but this matter may be addressed in the manner I outlined earlier in this letter.

I would also suggest that a breeding bird survey of the site be conducted. This would take place at strategically located sampling points from mid-May through early July.

Some mammal field work could be contemplated, to be conducted in tandem with the other studies. Most, if not all of, the mammals expected on site would be common and widespread species, yet it would be helpful to include some data on species presence. Many of these species will be observed by having researchers on site conducting other work.

The characterization of the site by Borko and Alford seems to reflect present site conditions. However, it may be helpful to have a botanist quickly update their study as it is close to twenty years old. Again, it may also be helpful to have an ichthyologist sample the Ringwood River and update the Blue Lake fisheries data, either through sampling or via a consultation with the NY-DEC region three fisheries biologist.

Finally, it would be important to conduct a tree survey to identify and number the significant specimen trees on the INCO campus and then to develop a tree preservation plan to conserve those significant trees.

I hope that these data/observations are useful to you and your client, Touro College, in determining how to proceed on the potential development and redevelopment of this site.

Sincerely,

Michael W. Klemens, PhD

Appendix E-3

ECOLOGICAL RESOURCES REPORT

WARWICK, NY

Prepared for:

WATCHTOWER BIBLE AND TRACT SOCIETY OF NEW YORK, INC.

Warwick, NY

July 2010

Prepared by:

PS&S
integrating design & engineering

Warren (Somerset County), New Jersey 07059

TABLE OF CONTENTS

1.0 INTRODUCTION

This report has been prepared by Paulus, Sokolowski, and Sartor PC (PS&SPC) as supplemental information to support a township development plan and State Environmental Quality Review Act (SEQRA) Environmental Assessment or Environmental Impact Statement. Field surveys were conducted by PS&SPC on the Project Site (Site) to inventory ecological resources and evaluate the site for the presence or absence of Federal or State listed threatened, endangered, or species of special concern, and the critical habitat for these species. Surveys were conducted from April through September in 2007 and March through July 2010. The survey includes a delineation of wetlands, 230 acre, portion of the property and a bat survey (See Appendix 1) conducted in June 2010.

The Site is located in Warwick Township, Orange County, New York (Figure 1A). The site is approximately 257 acres that is located of the former Kings College property. On this property, there is a 121,200 square foot building with approximately 3,500 liner feet of roadway. The former INCO plant is located adjacent to and overlooks Sterling Forest Lake. The building is set to be demolished.

The existing site consists of approximately 11.3 acres of meadow/brushland; 195.4 acres of forest; 2.9 acres of wetland; 33.8 acres of surface water; 8.8 acres of roads, pavement, structures and other paved surfaces; and 4.8 acres of landscaped area. Although there are areas of Federal Jurisdictional wetlands on the project site, the majority are located on the portion of the tract northeast of Long Meadow Road which is proposed to remain undisturbed. Areas of wetland southeast of Long Meadow Road will remain largely undisturbed.

The project site is located on both sides of Long Meadow Road approximately one mile northwest of the intersection with Sterling Mine Road. However, disturbance is only proposed on the southwest side of Long Meadow Road. The site is also located along the south shore of Blue Lake (Sterling Forest Lake.

The project site is located within the Land Conservation (LC) zoning district and portions of the project are located within the Ridgeline Overlay (RL-O) district. Warwick's Zoning Law permits the remaining private lands within the LC District (i.e. those lands not under the ownership or control of the Palisades Interstate Park Commission) to be developed subject to the requirements of the Town's Office and Industrial Park (OI) and Conservation (CO) Zoning districts.

The Watchtower Bible and Tract Society of New York, Inc., proposes to develop a portion, roughly 30 acres, (referenced above) as their new World Headquarters. We understand the proposed development will be concentrated on those areas of the site that were previously developed and will include renovations and existing INCO building(s) will be demolished and replaced substantially with in the existing development footprint. There also will be new construction on the site giving way to several new green buildings. The project sponsor, Watchtower Bible and Tract Society of New York, Inc., is proposing a religious administrative campus comprised of approximately twelve buildings and 30 acres on the site.

The campus buildings would include: an approximately 195,000 square foot three- to four-story office building/place of worship; four five-story residential structures totaling approximately 400,000 square feet; an approximately 137,000 square foot three- to four-story service building including kitchen, laundry and support functions; a two-story 100,000 square

foot maintenance shop; and additional smaller buildings including a vehicle repair shop (for on-site vehicles only), heating/cooling/generator house, and a recreation building (see Figure 1B). The site is identified on the Orange County tax maps as parcels 85-1-2.22, 85-1-2.3, 85-1-4.1, 85-1-4.2, 85-1-5.1, 85-1-5.2, and 85-1-6.8.

The campus structures would be built to three Green Globe standards promulgated by the Green Building Initiative, comparable to the LEED (Leadership in Energy and Environmental Design), and the gold standard promulgated by the US Green Buildings Council.

The majority of the 780 parking spaces would be accommodated by the subsurface parking, with approximately 100 surface parking spaces, being provided for visitors and convenience. Stormwater will be treated to substantially comply with current NYSDEC stormwater management standards. On-site emergency and load reduction generators will be provided to supplement standard electrical service provided by Orange and Rockland Utilities. Community water supply and sewage treatment services are available on nearby parcels and usage will be reduced by utilization of sustainable practices such as low-flow and ultra-low-flow fixtures. Workers at the site will reside at the site, significantly reducing traffic generation associated with commuter traffic during peak hours.

Legend

Project Boundary

Source:
Project Boundary from plan by PS&S Survey entitled "Wetland Survey Parcel B4 and Part of Parcel A-13", dated 6/4/2010.
USGS Topographic Map
7.5 Minute Series
Greenwood Lake, 1961
Sloatsburg, 1961
STATE PLANE COORDINATES
E 559682
N 847414

SITE LOCATION MAP

World Headquarters for Jehova's Witnesses
Warwick Property
Township of Warwick, Orange County, New York

PS&S
integrating design & engineering

Drawn By: EB	Scale: 1" = 2,000'	Project No. 02400.244.010
Chk'd By: HL	Date: 7/30/2010	Figure No. 1A

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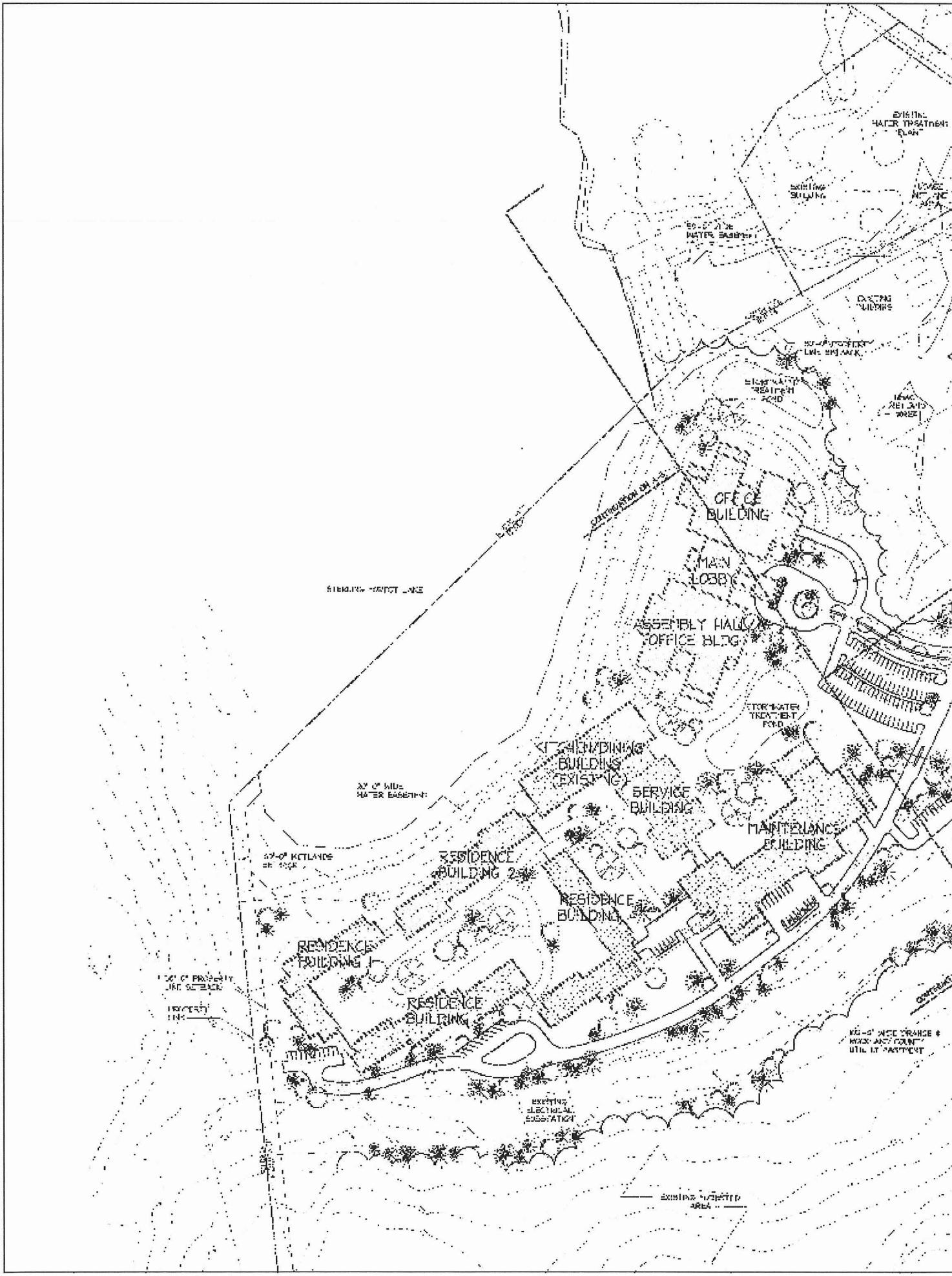

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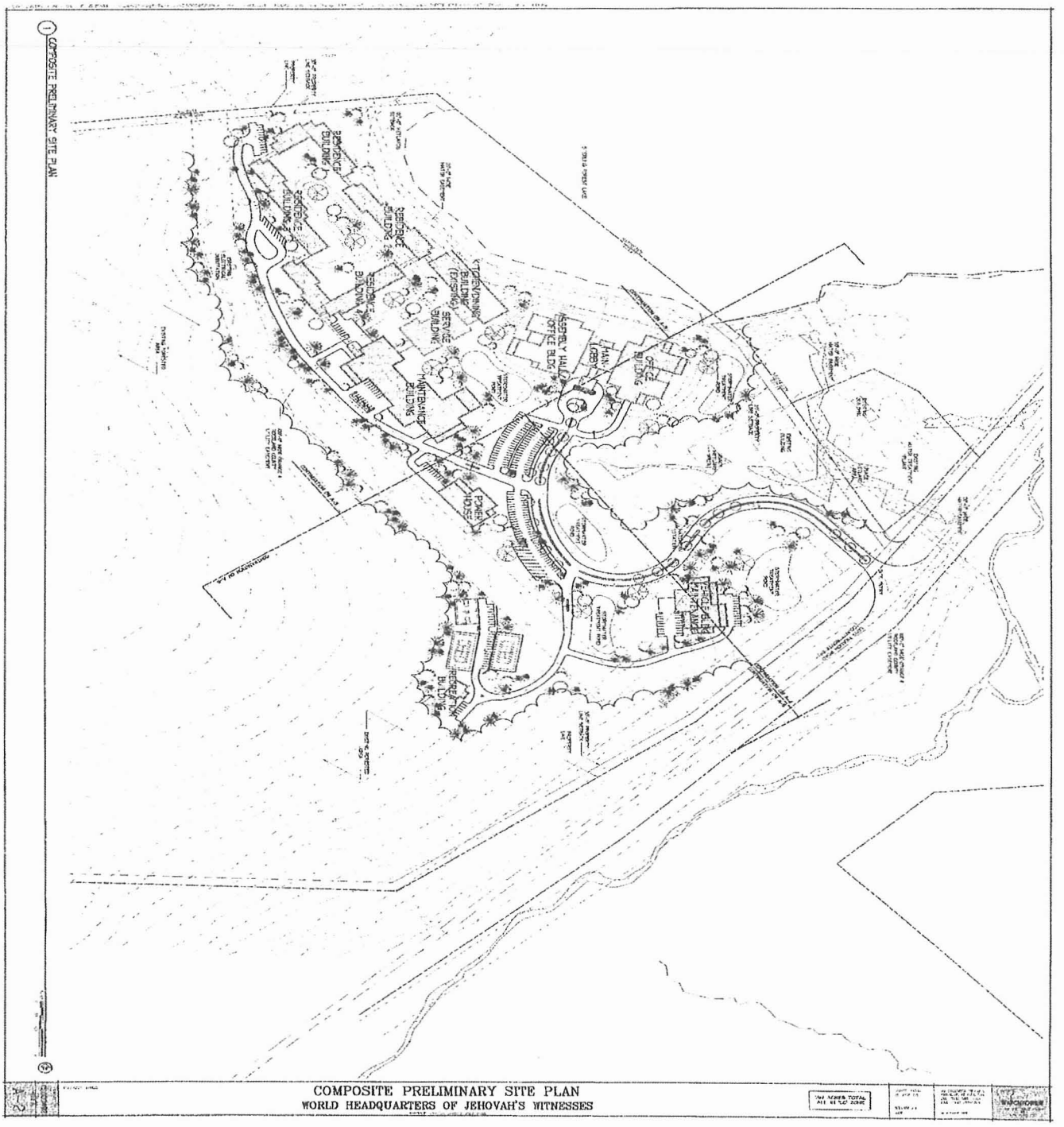
Figure 1B- Site Plan



2.0 VEGETATION

Vegetation consists of the plant life or the total plant cover, found in an area whether indigenous or introduced by man. The Site falls within the Highlands Physiographic Province of New York which includes upland valleys and slopes, upland ridges, rock outcrops, and wetlands. There's a wide diversity of plant communities that can occur in a relatively small area that is characteristic of habitat conditions and plant communities occurring throughout the northeast.

Soil, slope, drainage, and exposure are important factors in the formation of the plant associations. A description of the soils is included in Section 6 and is shown on Figure 4. The PS&S established vegetation sampling transects were designed to include each of these factors. This study includes a two (2) part investigation; the first characterization of the general vegetation communities on the site and the second to an evaluation of the presence of threatened and endangered species on the site.

A series of 14 transects were run though the different habitats on the site during 2007. The locations of these transects are shown on Figure 2. A list of the plant species observed along each transect is included as Table 1. All plants within one (1) meter of the transect were identified and recorded. The transects were run to identify the vegetative species found on the site and to search for potential threatened and endangered species identified on the New York Natural Heritage database. Table 5 lists when the plant surveys were conducted and the number of hours invested in each survey.

The majority of Site's vegetation is characterized as a second growth upland eastern deciduous forest that likely established following historical logging operations. The dominant tree species on the Site are upland and mesic oak species, including red oak (*Quercus rubra*), white oak (*Quercus alba*), and chestnut oak (*Quercus prinus*). Co-dominant species include American beech (*Fagus grandifolia*), white ash (*Fraxinus americana*), black birch (*Betula lenta*), red maple (*Acer rubrum*) and sugar maple (*A. saccharum*) and in some areas, hemlock (*Tsuga canadensis*). While the oaks can be found throughout the Site, the distribution of the co-dominant species help define the different vegetation communities. On the northern side of the Old Sterling Road along the slopes of the Ringwood River are two (2) areas of deciduous forest and south of the existing school there are an additional two (2) areas of deciduous forest which include a Canada hemlock (*Tsuga canadensis*) association. In addition, there is a forested wetland community along the river. Another distinct community is located at the southern end of the property. Soils in this area include Rock outcrop-Hollis Complex with moderate to steep slopes (ROC and ROD). These thin soils support the characteristic chestnut oak community which dominates these ridges.

There is a riparian corridor on the northern side of Old Sterling Road. This area contains a forested wetland dominated by red maple and white ash. Understory and herbaceous species in the wetland include American hornbeam (*Carpinus caroliniana*) skunk cabbage (*Symplocarpus foetidus*), sensitive fern (Onoclea sensibilis) and jewelweed (*Impatiens capensis*).

Wetlands were delineated on the portion of the property south of Old Sterling Road. Forested wetlands located north of Old Sterling Road were not delineated as no development is anticipated on this portion of the site.

Tree size range from seedlings and sapling, 1 - 4 inch diameter at breast height (dbh) to occasional trees 8 - 36 inches dbh. Most of the oaks on the Site have a dbh range of between 12

and 30 inches. Maples on the Site tended to have a slightly smaller dbh of 4 to 10 inches. Other trees on the Site fell within these ranges.

During the vegetation survey, one NYSDEC threatened plant species, Hyssop skullcap was observed on the site in 2007. During the 2010 survey of the site, this threatened plant species was not observed. This is possibly due to clearing operations carried out by Orange & Rockland in the right-of-way during the intervening period.

Legend

- Vegetation Transects
- Project Boundary

Source:
Transects from PS&S Field Survey, August 2007.
Aerial from ArcGIS Online - NAIP Imagery, 2008.
Project Boundary from plan by PS&S Survey entitled "Wetland Survey Parcel B4 and Part of Parcel A-13", dated 6/4/2010.

VEGETATION TRANSECT MAP

World Headquarters for Jehova's Witnesses
Warwick Property
Township of Warwick, Orange County, New York

PS&S
integrating design & engineering

Drawn By: EB	Scale: 1" = 600'	Project No. 03423.006.050
Chk'd By: HL	Date: 8/5/2010	Figure No. 2

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Table 1
Vegetation Transects
Touro College Site

		Transects													
Common Name	Scientific Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Field horsetail	*Equisetum arvense*								x						
Cinnamon fern	*Osmunda cinnamomea*									x		x	x		x
Bracken fern	*Pteridium aquilinum*			x	x	x	x					x	x		x
Maidenhair fern	*Adiantun pedatum*						x	x							
Ebony spleenwort	*Asplenium platyneuron*	x													
New York fern	*Tholypteris noveboracensis*	x	x	x	x	x	x	x	x	x	x	x	x	x	x
Christmas fern	*Polystichum acrostichoides*									x	x				
Sensitive fern	*Onoclea sensibilis*					x			x	x		x			
Hemlock	*Tsuga canadensis*	x	x											x	
White pine	*Pinus strobus*					x			x						
Tulip popular	*Lirodendron tulpifera*					x			x						
Sassafrass	*Sassafrass albidum*			x	x	x	x					x	x		
Spicebush	*Lindera benzoin*									x	x				x
Japanese barberry	*Berberis thunbergii*							x		x		x	x	x	x
Witch hazel	*Hamamelis virginiana*	x	x	x	x	x	x	x				x		x	x
Shagbark hickory	*Carya ovalis*	x								x			x	x	
Mockernut hickory	*Carya tomentosa*	x		x	x	x	x	x							
American beech	*Fagus grandifolia*	x	x	x	x	x	x	x		x	x	x	x	x	x
White oak	*Quercus alba*	x	x		x		x	x			x		x	x	
Chestnut oak	*Quercus prinus*	x	x	x	x	x	x						x	x	x
Red oak	*Quercus rubra*	x	x	x	x		x	x			x			x	
Black oak	*Quercus velutina*				x			x							
American hornbeam	*Carpinus caroliniana*		x	x	x			x				x			
Black birch	*Betula lenta*	x	x	x	x	x	x	x							
Gray birch	*Betula populifolia*					x									
Yellow birch	*Betula alleghaniensis*							x				x			x
Pensylvanna smartweed	*Polygonum pensivanicum*					x									
Japanese knotweed	*Polygonum cuspidatum*					x									
Cottonwood	*Populus deltoides*					x			x						
Garlic mustard	*Alliaria petiolata*					x			x	x			x		x
Mountain laurel	*Kalmia latifolia*					x									
Winter green	*Gaultheria procumbens*							x							
Low bush blueberry	*Vaccinium angustifolium*	x	x	x	x		x	x		x				x	x
Indian pipe	*Monotropa uniflora*											x			
Dwarf spirea	*Spiraea latifolia*					x									
Wild strawberry	*Fragaria virginiana*					x									
Dwarf cinquefoil	*Potentilla canadensis*					x									
Raspberry	*Rubus occidentalis*				x	x									
Multiflora rose	*Rosa multiflora*					x			x						x
Wild-black cherry	*Prunus serotina*			x											
Pin Cherry	*Prunus pensylvanica*									x					
Crabapple	*Pyrus coronaria*								x						
Birds foot trifoil	*Lotus corniculatus*					x				x					
Crown vetch	*Coronilla varia*								x						
Red clover	*Trifolium pratense*								x						
Sweet yellow clover	*Melilotus officinalis*								x						
Flowering dogwood	*Cornus florida*		x	x	x		x						x		
Black gum	*Nyssa sylvatica*												x		
Wahoo	*Euonymus atropurpureus*				x		x	x				x	x		
Bittersweet	*Celastrus orbiculatus*					x			x	x	x	x	x		x
Virginia creeper	*Parthenocissus quinquefolia*				x	x		x	x	x		x		x	
Fox grape	*Vitis labrusca*			x	x	x		x				x	x		
Red maple	*Acer rubrum*	x	x	x	x	x	x	x		x	x	x	x		x
Sugar maple	*Acer saccharum*				x	x	x	x		x	x		x	x	x
Poison ivy	*Toxicodendron radicans*			x		x	x		x	x	x	x	x		x
Tree-of-heaven	*Ailanthus altissima*								x						
Wood sorel	*Oxalis stricta*					x			x						
Jewelweed	*Impatiens capensis*									x		x	x		x
Queen Ann's lace	*Daucus carota*								x						
Spreading dogbane	*Apocynum androsaemifolium*					x									
Indian hemp	*Apocynum cannabinum*					x									
Common milkweed	*Asclepias syriaca*					x									
Morning glory	*Ipomoea purpurea*					x									
Scutellaria integrifolia	*Hyssop skullcap*					x									
Motherwort	*Leonurus cardiaca*					x									
Lance leaved plaintan	*Plantago lanceolata*								x						
Privet	*Ligustrum vulgare*					x			x						
White ash	*Fraxinus americana*				x	x	x	x		x	x	x	x		
Common mullein	*Verbascum thapsus*					x									
Mugwort	*Limosella aquatica*														x
Rough bedstraw	*Galium asprellum*					x			x						
Japanese honeysuckle	*Lonicera japonica*					x									
Maple-leaved viburnum	*Viburnum acerifolium*	x	x			x	x	x		x	x				
Elderberry	*Sambucus canadenis*					x									
Ragweed	*Ambrosia artemisiifolia*					x			x						x
Yarrow	*Achillea millefolium*					x									
Sweet goldenrod	*Solidago odora*					x									
Goldenrod spp	*Solidago spp.*					x			x						
White snakeroot	*Eupatorium rugosum*		x					x		x					
Burdock	*Arctium minus*														x
Field hawkweed	*Hieracium pratense*					x			x						
Skunk cabbage	*Symplocarpus foetidus*								x	x		x	x		x

Table 1
Vegetation Transects
Touro College Site

		Transects												
Common Name	Scientific Name	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Jack in a pulpet	*Arisaema triphyllum*						x	x				x			
Soft rush	*Juncus effusus*								x						
Nut sedge	*Cyperus esculentus*					x			x						
Rye spp	*Lolium spp.*					x									
Upland bentgrass	*Agrostis hyemalis*													x	
Common reed	*Phragmites australis*					x			x						
Poa spp	*Poa spp.*					x								x	
Deer-tongue grass	*Panicum cladestinum*			x		x									x
Crab grass	*Digitaria filiformis*											x			
Japanese stiltgrass	*Microstegium vimineum*											x		x	x
Cattail	*Typha latifolia*								x						
False Hellbore	*Veratrum viride*									x					
Large-flowered trillium	*Trillium grandiforum*										x				
Indian cucumber root	*Medeola virginiana*			x											
Nodding trillium	*Trillium cernuum*											x	x		
False Solomon's seal	*Smilacina racemosa*			x	x						x	x	x		x
Greenbrier	*Smilax rotundifolia*											x			

3.0 WILDLIFE

An area's wildlife is dependent upon the characteristics of the habitat present. All organisms require food, water, cover and living space. The relative lack or abundance of each of these resources in relation to each species' life requisites help determine its presence or absence and if present, its distribution and the population dynamics for that species. Population dynamics and distribution are also dependent on the size, shape and complexity of the different vegetative communities and surrounding land use. Wildlife species tolerance of disturbance and human activity ranges from intolerant to dependent. Some species such as the white-tailed deer (*Odocoileus virginianus*) have demonstrated great adaptability and tolerance to human disturbance. A few species require disturbance in order to complete their lifecycle yet other species are intolerant of most human disturbance.

Wildlife studies were conducted to characterize the general wildlife species utilizing the Site and to evaluate the presence of threatened and endangered species on the site. As the identification of potential breeding and not population dynamics was the object of the study, counts of individual species observed were not included in the survey. Surveys included a review of existing reports, review of NJDEP and NYSDEC databases and field observations. Habitat characteristics observed during vegetation surveys, literature review and database review was used to generate a list of species likely to occur on the site and potentially suitable habitat. Field observations were used to supplement existing information. Wildlife species expected to be found and observed on the Site are listed in Tables 2 through 4. The potential for each species to be breeding on the Site is also listed in these tables. Field observations and photo documentation (see Appendix 2) included the following:

Terrestrial Invertebrates

The NYSDEC lists a number of terrestrial invertebrate species as threatened, endangered, or species of special concern. These include dragonflies, moths and butterfly species. These species are typically found in open areas like the power line right-of-way or with respect to the dragonflies and damselflies utilize Sterling Forest Lake and the Ringwood River for the nymph portion of their life cycle. As no activities are proposed in the lake or river, and the power line right-of-way will not be altered by project implementation. Therefore, a detailed assessment of the use of the Site by invertebrate species was not included in this survey.

Reptiles and Amphibians

The NYSDEC lists Timber rattlesnake (*Crotalus horridus*) as threatened in the State of New York. In addition the wood turtle (*Clemmys insculpta*), marbled salamander (*Ambystoma opacum*) and box turtle (*Terrapene carolina*) are listed as NYSDEC Species of Special Concern. In order to characterize the reptiles and amphibians utilizing the site and identify potential NYSDEC listed species usage of the site the following survey techniques were utilized:

- Slowly walking the transects and recording all species directly observed or heard calling;
- Using a snake hook, to examine suitable refugia (logs, boards, stumps, etc.);
- Conducting nocturnal road surveys of the roads with the use of headlights in the vicinity of the Site to intercept individuals crossing roadways;
- Listening for calling amphibians during evening and night hours;

Fortuitous observations of snakes and other amphibians and reptiles along the roads were recorded and referred to during the Site characterization and assessment of habitat quality. Table 5 lists the dates and times that the surveys were conducted.

Birds

For raptors, an assessment of the habitat on the Site was conducted to determine the potential for these species to be utilizing the Site. Calls of red-shouldered hawks and Cooper's hawk broadcast to illicit a response. Other species of bird were identified using transects across the Site. Surveys began approximately on half hour before sunrise and continued until early afternoon. Each transect was run once during each day of the survey. Birds were identified by both sight (see Table 3) and by their individual calls. Evidence of breeding was recorded. Evidence of breeding on the Site included males calling during the nesting season, birds carrying nesting material and nests.

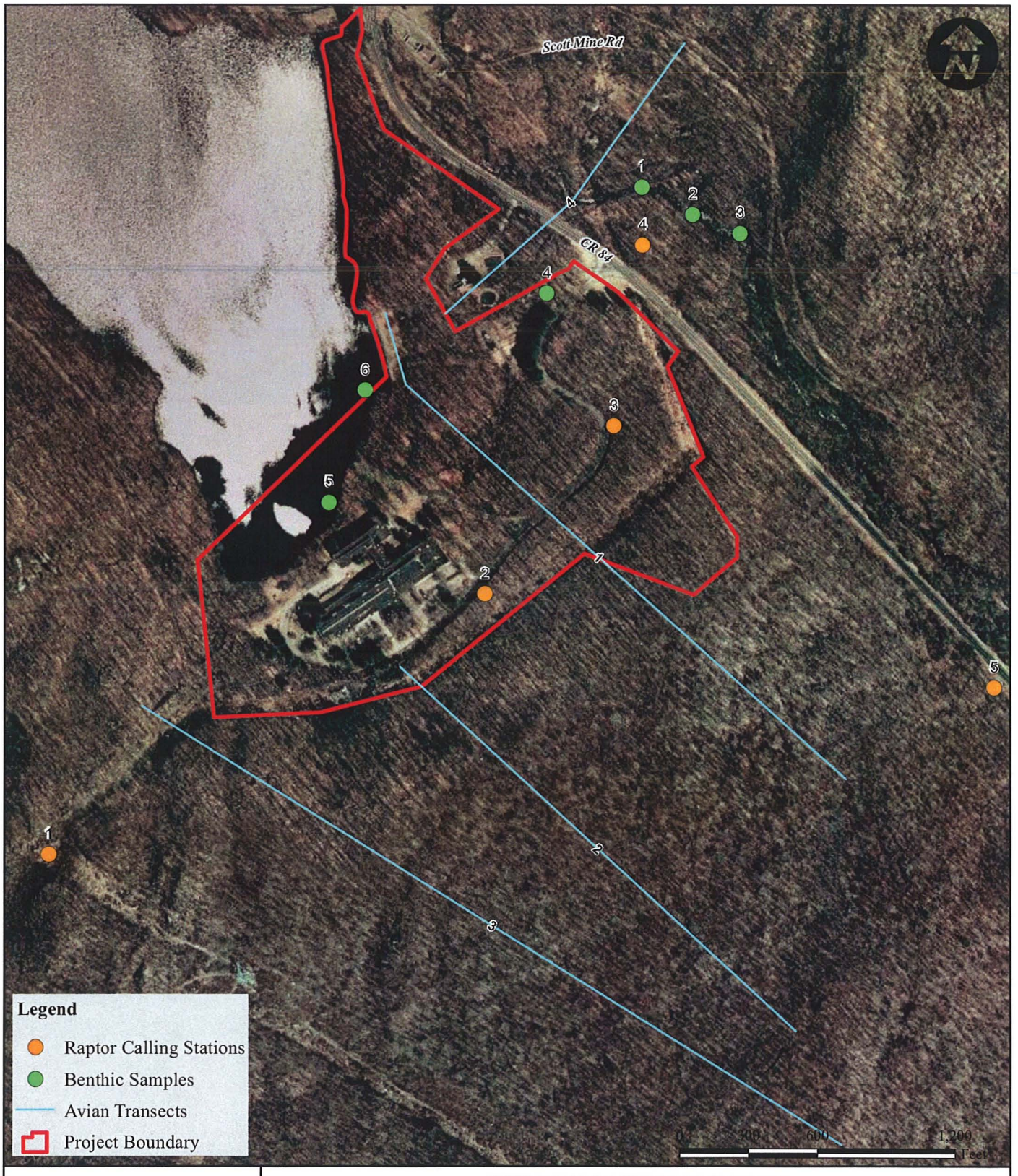
Raptor calling included playing taped recordings of red-shouldered hawks, red tailed hawks and Cooper's hawks to elicit a response. The calling sequence for the red-shouldered hawk consisted of consisted of three minutes of red-shouldered hawk calls, followed by three minutes of silence and 3 minutes of red-tailed hawk calls. The calling sequence was followed by five (5) minutes of silence. This was repeated twice at each calling station. The calling sequence for Cooper's hawk consisted of three minutes of Cooper's hawks calls, three minutes of silence and three additional minutes of Cooper's hawk calls. The calling sequence was followed by five (5) minutes of silence and was repeated twice at each calling station. The raptor calling locations and bird transects are depicted on Figure 3. Table 5 lists the dates and times that the surveys were conducted.

Mammals

There were no records of threatened or endangered species identified on either the NYSDEC or NJDEP Natural Heritage database reports. Fortuitous observations of mammals or mammal signs were observed during the other survey activities and were recorded in the field notes (see Table 4). Signs observed included calls, scat, tracks and hair. Additionally, as discussed in Appendix 1, mist nets were set up on the site on two nights in June 2010 to evaluate the bat population.

Table 2
Amphibians and Reptiles
Observed on the Touro College Site

Musk Turtle	*Sternotherus odoratus*
Box Turtle	*Terrapene carolina*
Painted Turtle	*Chrysemys scripta*
Snapping Turtle	*Chelydra serpentina*
Five-Lined Skink	*Eumeces fasciatus*
Northern Water Snake	*Nerodia sipedon*
Garter Snake	*Thamnophis sirtalis*
Black Racer	*Coluber constrictor*
Red-Spotted Newt	*Notophthalmus viridescens*
Redbacked Salamander	*Plethodon cinereus*
Slimy Salamander	*Plethodon glutinosus*
Two Lined Salamander	*Eurycea bislineata*
American Toad	*Bufo americanus*
Spring Peepers	*Pseudacris crucifer*
Gray Treefrog	*Hyla versicolor*
Green Frog	*Rana clamitans*
Bull Frog	*Rana catesbeiana*
Leopard Frog	*Rana pipiens*



WILDLIFE SURVEY MAP

World Headquarters for Jehova's Witnesses
Warwick Property
Township of Warwick, Orange County, New York

Source:
Stations, samples and transects from PS&S Field Survey, August 2007.
Aerial from ArcGIS Online - NAIP Imagery, 2008.
Project Boundary from plan by PS&S Survey entitled "Wetland Survey Parcel B4 and Part of Parcel A-13", dated 6/4/2010.

PS&S
integrating design & engineering

Drawn By: EB	Scale: 1" = 600'	Project No. 03423.006.050
Chk'd By: HL	Date: 8/5/2010	Figure No. 3

Path: P:\02400\244\Y\N\Maps\Fig3_WildlifeSurvey_080510_00.mxd

Table 3
Birds
Observed on the Touro College Site

Common Name	Scientific Name	Breeding Status
Great cormorant	*Phalacrocarax carbo*	NOS
Canada goose	*Branta canadensis*	Confirmed
Mallard	*Anas platyrhynchos*	Confirmed
Wood duck	*Aix sponsa*	Suitable
Bufflehead	*Bucephala albeola*	NOS
Common merganser	*Mergus merganser*	Suitable
Hooded merganser	*Lophodytes cucullatus*	Suitable
Great blue heron	*Ardea herodias*	NOS
Wild turkey	*Megeagris gallopavo*	Confirmed
Red-tailed hawk	*Buteo jamalcensis*	Suitable
Osprey	*Pandion haliaetus*	Suitable
Turkey vulture	*Cathartes aura*	NOS
Red-shoulderd hawk	*Buteo lineatus*	South of site*
Morning dove	*Zenaida macroura*	Confirmed
Black-billed cuckoo	*Coccyzus erythropthalmus*	Confirmed
Yellow-billed cuckoo	*Coccyzus americanus*	Confirmed
Ruby-throated hummingbird	*Archilochus colubris*	Confirmed
Piliated woodpecker	*Dryocopus pileatus*	Confirmed
Red-bellied woodpecker	*Melanerpes carolinus*	Suitable
Yellow shafted flicker	*Colaptes auratus*	Confirmed
Hairy woodpecker	*Picoides villosus*	Confirmed
Great crested flycatcher	*Myiarchus crinitus*	Confirmed
Eastern kingbrid	*Tyrannus tyrannus*	Confirmed
Eastern peewee	*Contopus virens*	Confirmed
Eastern phoebe	*Sayornis phoebe*	Confirmed
American crow	*Corvus brachyrhynchos*	Suitable
Blue jay	*Cyanocitta cristata*	Confirmed
Black-capped chickadee	*Parus atricapillus*	Confirmed
Tufted titmouse	*Parus bicolar*	Confirmed
White-breasted nuthutch	*Sitta carolinensis*	Confirmed
House wren	*Troglodytes aedon*	Confirmed
Gray catbird	*Dumetella carolinesis*	Confirmed
Northern mockingbird	*Minus polyglottos*	Confirmed
American robin	*Turdus migratorius*	Confirmed
Eastern bluebird	*Sialia sialis*	Confirmed
Wood thrush	*Hylocichla mustelina*	Confirmed
Red-eyed vireo	*Vireo olivaceus*	Confirmed
Yellow-throated vireo	*Vireo flavifrons*	Confirmed
Yellow-throated warbler	*Dendroica dominica*	NOS
Blackpoll warbler	*Dendroica striata*	NOS
Black-throated blue warbler	*Dendroica caerulescens*	Suitable
Black and white warbler	*Mniotilta varia*	Confirmed
Yellow-rumped warbler	*Dendroica coronata*	NOS
Magnolia warbler	*Dendroica magnolia*	Suitable
American red start	*Setophaga ruticilla*	Confirmed
Blue-winged warbler	*Vermivora pinus*	Suitable
Yellow warbler	*Dendroica petechia*	Confirmed
Worm-eating warbler	*Helmitheros vermivorus*	Confirmed
Ovenbird	*Seiurus aurocapillus*	Confirmed
Brown-headed cowbird	*Molothrus ater*	Confirmed
Red-winged blackbird	*Agelaius phoeniceus*	Confirmed
Common grackle	*Quiscalus quiscula*	Confirmed
European starling	*Sturnus vulgaris*	Confirmed
Baltimore oriole	*Icterus galbulta*	Confirmed
Scarlet tanager	*Piranga olivacea*	Confirmed
Northern cardinal	*Cardinalis cardinalis*	Confirmed
Indigo bunting	*Passerina cyanea*	Confirmed
White-throated sparrow	*Zonotrichia albicollis*	Confirmed
Chipping sparrow	*Spizella passerina*	Confirmed
Song sparrow	*Melospiza melodia*	Confirmed

Confirmed - Calling during the nesting season, observed carrying nesting material or observed in nest

Suitable - Suitable habitat available on site but not confirmed

* - observed carrying prey items to location south of site

NOS - Not on site - either migratory species, no suitable habitat on site or no evidance of this speices breeding on site

Table 4 Mammals Observed on the Touro College Site	
Common Names	**Scientific Name**
Opossum	*Didelphis marsupialis*
Short tailed shrew	*Blarina brevicauda*
Eastern Mole	*Scalopus aquaticus*
Bear	*Ursus americanus*
Raccoon	*Procyon lotor*
Stripped skunk	*Mephitis mephitis*
Coyote	*Canis latrans*
Fox	*Vulpes fulva*
Woodchuck	*Marmota monax*
Chipmunk	*Tamias striatus*
Grey Squirrel	*Sciurus carolinensis*
Beaver	*Castor Canadensis*
Deer mouse	*Peromyscus maniculatus*
White-footed mouse	*Peromyscus leucopus*
Meadow vole	*Micotus pennsylvanicus*
Deer	*Odocoileus virginianus*
Big Brown Bat	*Eptesicus fuscus*
Little Brown	*Lasiurus borealis*

4.0 THREATENED AND ENDANGERED SPECIES

The NYSDEC Natural Heritage Program was contacted for information concerning historic records of threatened and endangered species on and in the vicinity of the project Site. Due to the proximity of the Site to New Jersey and Ringwood Manor State Park, Natural Heritage Data was also requested from the New Jersey Natural Heritage Program. The US Fish and Wildlife Service was not contacted for a specific list of federally listed species on the site as federally listed species were included on both the NYSDCE and NJDEP lists.

Vegetation surveys followed standard transect methods as described in Miller-Dombois and Ellenberg, 1974. Specific habitat searches for threatened and endangered plant species utilized the same methodology on a site specific scale.

4.1 Plant Species

The New York Natural Heritage database lists the presence of the following threatened or endangered plant species in the vicinity of the Site:

- Terrestrial starwort (*Callitriche terrestris*);
- Green parrot's feather (*Myriophyllum pinnatum*);
- Hyssop skullcap (Scutellaria integrifolia); and
- Michaux's blue-eyed grass (*Sisyrinchium mucronatum*)

Terrestrial starwort is classified as threatened by the NYSDEC while green parrot's feather, hyssop skullcap, and Michaux's blue-eyed grass are classified as endangered.

The following sections briefly discuss the habitat requirements of each species, potential habitat on site for each species and anticipated impacts to each species from the proposed project.

Terrestrial Starwort

The terrestrial starwort (*Callitriche terrestris*) is listed as a threatened plant species on the NYSDEC threatened and endangered species list. This species is typically found in damp shaded habitat. This is a small plant with tufted branches spreading along the ground or climbing nearby rocks or other objects. Potential habitat for this species on the Site includes along the edge of Sterling Forest Lake, the edge of Ringwood River and along the perennial stream located between the existing college and Sterling Forest Road. No terrestrial starworts were observed during this investigation. As there is no evidence that this species is on site, and there are no proposed activities anticipated along the edge of Sterling Forest Lake or in the vicinity of the Ringwood River, no impacts to this species is anticipated to result from the proposed project.

Green parrot's feather

Green parrot's feather (*Myriophillim pinnatum*) is a member of the aquatic milfoil family. It is listed by the NYSDEC as an endangered species in New York. This species is found primarily in ponds. Leaves are arranged in whorls of 3 to 5 leaves per whorl. Potential habitat for this species on the Site is generally limited to Sterling Forest Lake. Green parrot's feather milfoil was not observed during this investigation. As the project does not propose any activities in Sterling Forest Lake, no impact to this species are anticipated.

Hyssop skullcap

Hyssop skullcap (*Scutellaria integrifolia*) is a summer perennial with a terminal raceme of purple-blue flowers. It is listed as a NYSDEC threatened species. This species inhabits a wide range of habitats from pine-barrens to wet meadows. Typically, hyssop skullcap is found along the edge of roadsides, woodland borders, fields, and in wet meadows. Potential habitat for this species on the Site includes the edge of Sterling Forest Road, the Site access road and the power line right-of-ways. Vegetation transects were run down the length of the power line right-of-way, the most probable location for this species on Site. Small colonies of hyssop skullcap were observed along the right-of-way portion of the Site in 2007. In the 2010 vegetation survey, this plant species was not observed possibly due to seasonal conditions. If Hyssop skullcap were to be re-observed in the power line right-of-way, mitigative action would be required to preserve this species. No impacts to this species are anticipated to occur from implementation of the proposed project.

Michaux's blue-eyed grass

Michaux's blue-eyed grass (*Sisyrinchium mucronatum*) is in the iris family. The flowering season for this species is summer. The six (6) petal flower is blue with a yellow center. The petals of the flowers have distinctly pointed tips. It is found in fields, meadows, bogs and along forest edges. This species prefers areas of full sun through out the day. Potential habitat for this species on Site occurs along the power line right-of-way. Vegetation transects were completed for the length of the power line right-of-way and the wetlands south of the former treatment plant. Michaux's blue eyed grass was not observed. As proposed, the project will not impact habitat suitable for this species. Therefore, no impacts to this species are anticipated to result from project implementation.

4.2 Animal Species

In New York State, a Threatened Species is 1) any native species likely to become an Endangered Species (i.e. in imminent danger of extirpation or extinction) within the foreseeable future in New York State, or 2) any species listed as threatened by the United States Department of the Interior, as enumerated in the Code of Federal Regulations 50 CFR 17.11. Species of Special Concern are those species which are not recognized as threatened or endangered, but for which documented concern exists for their continued welfare in New York. Species of Special Concern receive no additional legal protection under Environmental Conservation Law Section 11-0535.

The NYSDEC Natural Heritage Data Base has no records of endangered animals on the project Site. The NYSDEC data base has records of six species of special concern within one-quarter mile of the project Site (listed below). In addition, the New York data base has a record of timber rattlesnakes (*Crotalus horridus*), a New York State threatened species, within 1.5 miles of the Site.

The New Jersey Natural Heritage Program has identified the following species listed by the NYSDEC as endangered, threatened or a Species of Special Concern as occurring in New Jersey and within ¼ mile of the Site:

- Timber rattlesnake (*Crotalus horridus*) State Threatened;
- Red-shouldered hawk (*Buteo jamaicensis*) NYSDEC Listed Species of Special Concern;
- Wood turtle (*Clemmys insculpta*) NYSDEC Listed Species of Special Concern;

- Marbled salamander (*Ambystoma opacum*) NYSDEC Listed Species of Special Concern;
- Box Turtle (*Terrapene carolina*) NYSDEC Listed Species of Special Concern;
- Cooper's hawk (*Accipiter cooperii*) NYSDEC Listed Species of Special Concern
- Eastern bluebird (*Sialia sialis*) NYSDEC Listed Species of Special Concern

Between April 10 and September 6, 2007 and April 9 and July 15, 2010, PS&S conducted Site reconnaissance surveys to determine the presence or absence of State Threatened and Endangered Species and/or the presence of suitable habitat for these species.

Table 5
Sampling Effort

ACTIVITY	DATE	HOURS/TIME OF DAY
Raptor Survey	10 April 2007	3hrs/Morning
Avian Survey	10 April 2007	2hrs/Morning
Vernal Pond Survey	10 April 2007	3hrs/Evening
Raptor Survey	18 April 2007	3hrs/Morning/Afternoon
Avian Survey	18 April 2007	1 hr/Afternoon
Vernal Pond Survey	18 April 2007	3hrs/Evening
Raptor Survey	25 April 2007	2hrs/Morning
Herpetological Survey	25 April 2007	4hrs/ Afternoon
Vernal Pond Survey	25 April 2007	2hr/Evening
Raptor Survey	3 May 2007	2.5hrs/Aternoon
Herpetological Survey	3 May 2007	4hrs/Afternoon
Avian Survey	3 May 2007	2hrs/Morning
Vernal Pond Survey	3 May 2007	2hrs/Afternoon
Avian Survey	11 May 2007	12hrs (2 surveyors)/Morning/afternoon
Herpetological Survey	11 May 2007	4 hrs (2 surveyors)/Afternoon
Raptor Survey	22 May 2007	2.5 hrs/Morning
Avian Survey	22 May 2007	2 hrs/Morning
Herpetological Survey	22 May 2007	4 hrs/Afternoon
Vernal Pond Survey	22 May 2007	1.5 hrs/Evening
Raptor Survey	1 June 2007	2 hrs (2 surveyors)/Morning
Avian Survey	1 June 2007	10 hrs (2 surveyors)/Morning/Afternoon
Herpetological Survey	1 June 2007	2 hrs (2 surveyors)/Afternoon
Vegetation Surveys	14 June 2007	10 hrs/Afternoon
Herpetological Survey	14 June 2007	2 hrs/Morning
Vegetation Surveys	25 July 2007	8 hrs/Afternoon
Herpetological Survey	25 July 2007	3 hrs/Morning
Vegetation Surveys	17 August 2007	4 hrs/Morning
Herpetological Survey	17 August 2007	4 hrs/Afternoon
Incidental Raptor observations	17 August 2007	1 hr/Afternoon
Vegetation Survey/Wetlands	6 September 2007	12 hrs (2

		surveyors)/Morning/Afternoon
Incidental Raptor observations	6 September 2007	2 hrs (2 surveyors)/Afternoon
Herpetological Survey	6 September 2007	2 hrs/Afternoon
Vegetation survey, wetlands, vernal pond	25 March 2010	6 hrs. morning/ afternoon
Vegetation survey, wetlands, vernal pond	26 March 2010	6 hrs. morning/ afternoon
Vegetation survey, wetlands, herpetological, raptor, avian	9 April 2010	6 hrs. afternoon/ evening
Vegetation, avian, herpetological, mammal, raptor	7 June 2010	5hrs. evening
Vegetation, avian, herpetological, mammal, raptor, invertebrates	8 June 2010	5hrs. evening
Vegetation, avian, invertebrates	15 July 2010	4 hours afternoon

Timber Rattlesnake

The timber rattlesnake (*Crotalus horridus*) is an ectothermic reptile which undergoes an annual cycle related to seasonal changes of temperature and its environment. Thermoregulation and winter survival require most populations to undergo a period of hibernation through the winter. The major phases of the seasonal cycle are listed in Table 6.

Table 6
Seasonal Cycle of Rattlesnakes in New York

Phase	Description	Dates
Earliest Emergence from dens	First appearance of snakes on surface of a den in the spring	April 8
General Emergence from den	Range of dates most snakes appear on surface in the spring	May 7 - May 21
General Ingress	Range of dates most snakes appear at dens in autumn	Sept. 14 - Oct. 1
Latest Ingress	Last appearance of snakes at den in autumn	October 16

* Source - Brown, 1992

A typical hibernaculum (den) is located in a rocky area where underground crevices provided retreats for overwintering. In northeastern New York, granitic escarpments and ledges with accumulations of talus are prominent features at and around favored den sites.

Elevations of the dens range between 500 and 1300 ft. A typical den site is on the southerly slope of a hill or mountain which is ledgy. Because of the rockyness of the den sites, there is typically little vegetation around the entrance. Virginia creeper (*Parthenocissus quinquefolia*) and wild grape (*Vitus* spp.) are typically the only vegetation adjacent to the dens.

There are two outcrop areas in the southern portion of the Site with southerly exposures. These outcrop areas provide a south/southwestern exposure with steep rocky slopes and ledges, rock out crops, and grassy shelf clearings. Elevations of these ridges are between 780 and 800 feet which fall within the typical range utilized by this species. Canopy vegetation observed on Site contains red oak, chestnut oak, red maple, and black birch. The shrub layer consists of maple leaved viburnum, American hornbeam and witch hazel. Ground cover is dominated by low bush blueberry. There is heavy vegetation with a closed canopy over the outcrop areas. Because of the closed canopy there is virtually no basking habitat at the outcrops for this species. The closed canopy and lack of basking habitat excludes these outcrop areas as suitable rattlesnake den habitat.

The New York database has a record of timber rattlesnakes within 1.5 miles of the Site. The New Jersey Natural Heritage Data Base has records of timber rattlesnakes sited within one-quarter mile of the Site. Aerial photographs of the surrounding areas, with the exception of the power line right-of-way, do not show open canopy outcrops immediately adjacent to the Site. During this and other surveys (Klemens, Oct & Nov. 2005) conducted on the Site, no rattlesnakes, or evidence of snakes, such as scat or shed skins were observed on the Site. In addition an NYSDEC Conservation Officer indicated that he had not observed any rattlesnakes in the vicinity of the Site (NYSDEC, 2007).

While suitable foraging habitat is located on the Site into which snakes would disperse after leaving den sites, it does not appear to support this species. Any determination of the specific regulatory implementations of the suitability of the site will be made by the NYSDEC during the SEQRA review process. Prior to construction activities on the site, it is recommended that the construction area be fenced using silt fencing. Once the fencing is completed, the fenced area should be searched by a biologist for rattlesnakes to prevent accidentally harming any snakes that may have been using the site for foraging.

Conclusions drawn from the data collected during 2009 and 2010 rattlesnake study suggest that the proposed project would not have any negative effects on local timber rattlesnake populations. Although the Watchtower property is within the possible range (typically accepted as 2 miles) of at least five rattle snake dens. It is believed there is not any significant habitat on the property west of Long Meadow road and certainly not within the area of the proposed project. Rattlesnakes may use forested areas on the property to forage, as BL1 did, that are not proposed for disturbance. Rattlesnake utilization of the forested areas on the property would not be affected by Watchtower's use of the former industrial campus. Workers and security guards on the site grounds have not observed any rattlesnakes. If the proposed project is allowed to proceed, no rattlesnake habitat would be lost or degraded, nor would rattlesnakes be excluded from any habitat.

Watchtower does recognize that rattlesnakes are an integral part of the ecosystem and have no reservations about sharing their property with them. Just as New York State has an obligation to protect its indigenous species; Watchtower also recognizes their obligation to

protect those species on their land. In the event that a rattlesnake is found in a parking lot or near the buildings where it would be unsafe, Watchtower would call one of the NYS DEC listed Nuisance Rattlesnake Responder volunteers or have someone on staff trained in the protocols to safely move them.

We believe that Watchtower's proposed redevelopment of this former industrial site, while leaving the other forested areas of the property undisturbed, is the best possible use of the property from the perspective of timber rattlesnake conservation. Proposals of previous owners underscore this. Combining best use with the fact that the owners are "rattlesnake friendly" it makes sense to endorse their proposed project. When it comes to protecting timber rattlesnakes on private land there is no substitute for landowner stewardship." (Michele, K. 2009/2010 rattlesnake study)

Red-Shouldered Hawk

The red-shouldered hawk is a striped, broad winged hawk. At the turn of the century, this species was the most common species of hawk in New England (Weidensaul, 1989, Terres, 1991). The logging of mature forests and pesticide contamination has contributed to the decline of this species. The red-shouldered hawks however tend to relatively tolerant of human disturbance.

The preferred nesting habitat for this species is mature moist woodlands (maple/hemlock forest), riparian corridors and forested wetlands (Peterson, 1980; Weidensaul, 1989; Terres, 1991). Nests of red-shouldered hawks in southwestern Quebec were located in mature, closed canopy, deciduous forest in close proximity to a natural clearing (88 feet) and to riparian or lakeshore habitat (distance to water body averaged 202 feet; Armstrong and Euler 1982). Red-shouldered hawks require large tracts of mature floodplain or riparian forests as nesting habitat (Bednarz and Dinsmore 1981); 550 acre area corresponded with 50% of maximum probability of occurrence, and 100 acre patches were the minimum used (Robbins et al. 1989). The red-shouldered hawk's nest is a large mass of sticks and twigs built close to the trunk of a tall deciduous tree.

Foraging habitat includes the wooded margins of marshes, often close to cultivated fields and forest natural openings (Bednarz and Dinsmore 1981, DeGraaf and Rappole 1995). Bednarz and Dinsmore (1981) found that marsh or wet meadow feeding areas interspersed within or adjacent to the forest typically were > 55 acres, and as small as 8 acres.

The majority of the Site is second growth upland forest habitat. Forested wetlands are present within riparian corridor are found in the northern portion of the Site. The riparian corridor parallels Sterling Lake Road through the Site and crosses the road to the south of the Site. These forested areas provide potential nesting habitat. No nests and no responses to call back tapes, however, were observed in these areas.

On July 25, 2007, a pair of red-shouldered hawks was observed along the power line right-of-way south of the Site. This pair was observed foraging along the power line right-of-way and one was carrying a prey item. The bird carrying the prey item flew south and was gone for approximately 30 minutes. When it returned it no longer was carrying anything. Based on this observation, the lack of observed nests and the lack of response to calls, this pair of red-shouldered hawks is likely nested south of the Site and foraging along the power line

right-of-ways on or in the vicinity of the Site in 2007. Red shouldered hawk was not observed on the site in 2010.

The red-shouldered hawks are relatively tolerant of human disturbance. The Site is also bounded by two State Parks, Sterling Forest State Park and Ringwood Manor State Park, which provide suitable nesting and foraging habitat for this species. It is not anticipated that this species will be significantly impacted by the proposed development.

Wood Turtle

The wood turtle is a species requiring high quality free flowing streams for breeding and hibernating, and adjacent wetland and upland habitat for feeding (Herpetological Associates, 1981). This species is known to travel great distances while foraging making them susceptible to impacts associated with traffic, domestic pets and other human interactions (Conant, 1975).

Typical breeding and overwintering habitat for wood turtles is shallow (up to three feet deep), streams with good water quality. Outside of the breeding and overwintering periods, the wood turtle is one of the most terrestrial species. They can be found in a variety of habitats up to a mile from the stream.

The portion of the site adjacent to the Ringwood River includes areas of emergent or forested wetlands with adjacent upland fields and forest. The Ringwood River also appears to have sufficient water and flow during the critical winter months to support hibernating turtles. Wetlands associated with the river range from broad to narrow. The wetland areas adjacent to the power line right-of-way are relatively broad while the areas along the southern and western portions of the stream are associated with upland areas dominated by steep slopes.

No wood turtles were observed on the Site during 2007 or 2010 site investigations. Wood turtles have been previously reported to occur on the site and they may utilize the portion of the Site northeast of Sterling Forest Road. No development activities are proposed within the breeding and overwintering habitat. Prior to construction activities on the site, it is recommended that the construction area be fenced using silt fencing. Once the fencing is completed, the fenced area should be searched by a biologist for wood turtles to prevent accidentally harming any turtles. Through implementation of these measures, it is anticipated that this species will not be impacted by the proposed development.

Marbled Salamander

The marbled salamander is part of a group of salamanders known as the mole salamanders. These amphibians spend most of their life underground. However, they congregate adjacent to temporary ponds in the fall to breed. The distance that they migrate to the breeding ponds has not been established. Marbled salamanders lay eggs in low depressions which fill with water and form temporary ponds or pools. Breeding activities are typically completed in a few nights and these amphibians disappear for another year. Encounters with marbled salamanders at times other then the breeding season are typically chance encounters. They have been encountered during excavation for foundations at depths of greater than 4 feet (Conant, 1975).

Standing water was surveyed for the presence of larva of this species. This survey was conducted through the use of a dip net and careful search of the leaf litter in the pools. All

organisms collected were returned to the pools unharmed. In addition, road cruising was conducted on rainy nights to observe frogs and salamanders crossing roadways and to listen for calling amphibians. No evidence of marbled salamanders was observed on the site.

The wetland area northeast of Sterling Forest Road and wetland area 8 contain small ephemeral ponds. These ponds were dry by May 11, 2007 and June 8, 2010. The ponded areas were sampled using a dip net in April 2007 and April 9, 2010. No marbled salamanders or past evidence of breeding in the ponds was observed. Amphibian breeding activity (spring peepers, green frogs and American toads) southwest of Sterling Forest Road was observed in emergent wetland areas. No evidence of Ambystoma salamander activity was observed in these emergent wetlands.

Box Turtle

Box turtles live in open woodlands, pastures and marshy meadows. They are often found near streams and ponds. They are omnivores feeding on snails, insects, berries, fungi, worms, slugs, flowers, fish, frogs, snakes and birds. The young are primarily carnivorous while adults tend to be herbivorous, although they do not eat green leaves.

Environmental temperature determines the box turtle's activity rates. In the summer, box turtles restrict their activities to mornings and after rain. They crawl into or under decaying logs, leaves, mammal borrows or mud to stay cool. In very hot weather, they will go into shady pools and puddles to cool off. Box turtles are diurnal and scoop out a shallow indentation in which to spend the night. They hibernate in the winter, borrowing up to two (2) feet deep into loose earth, mud, stream bottoms, old stump holes or mammal borrows.

The site provides suitable habitat for this species. On June 1, 2007 a female box turtle was observed in the vicinity of the existing building. Two additional box turtle shells were found in the vicinity of the existing building during Site investigations. An immature (roughly 2 inches long) box turtle was observed in the powerline right of way on July 15, 2010.

In addition to maintaining the habitat along the powder line right-of-way, the proposed project will result in additional open field habitat that would support this species. Prior to construction activities on the site, it is recommended that the construction area be fenced using silt fencing. Once the fencing is completed, the fenced area should be searched by a biologist for box turtles to prevent accidentally harming any turtles. Through implementation of these measures it is anticipated that this species will not be impacted by the proposed development.

Cooper's Hawk

This crow sized blue and russet hawk has a relatively long rounded tail which is cross barred with black bars, a buffy neck nape and dark gray crown (Terres, 1991). This bird belongs to the group of hawks known as Accipiters which are the short winged hawks. Deciduous woods are the preferred habitat for Cooper's hawks although they tend to seek out a tall conifer tree for nesting (Weidensaul, 1989). Nests consist of a large platform of sticks and large chips of bark. The Cooper's hawk does not tolerate the smaller, similar and competitive sharp shinned hawk (*Accipiter striatus*) within the same woodland area where it is nesting (Terres, 1991). Primary prey for this species consists of medium sized songbirds such as woodpeckers, grackles, starlings, robins, jays and doves. When abundant, small mammals such as chipmunks, red squirrels, mice and rats will also be taken. When nesting,

Cooper's hawks rarely hunt in the vicinity of their nest, preferring to hunt in other habitats (Weidensaul, 1989).

This species tends to be tolerant of human activities. They are known to patrol bird feeders in the winter and have historically taken young chickens around farms (Weidensaul, 1989), and passerines from residential bird feeders (personal observation).

The deciduous upland habitat of the Site provides suitable potential habitat for both breeding and foraging. No Cooper's hawks were observed during the field surveys nor were any nests observed.

As discussed above the Site is bounded by two State Parks, which provide suitable nesting and foraging habitat for this species. Given the amount of preserved forested habitat in the vicinity of the Site, it is anticipated that this species will not be adversely impacted by the proposed development.

Eastern Bluebird

The eastern bluebird is a small blue/reddish brown colored bird typically found in open country, farms, cut-over woods, gardens, parks, fields, orchards, and along roadsides. They are commonly found perched on fences or utility wires. This species nests in cavities and has encountered serious competition from introduced cavity nesting species such as starlings (*Sturnus vulgaris*) and house sparrows (*Passer domesticus*).

The eastern bluebird feeds mostly on insects and often flies from a fence, wire or low tree to catch grasshoppers, crickets, katydids or beetles which make up the largest part of its diet (Terres, 1991). They are also known to eat spiders, millipedes, centipedes, sow bugs, snails, earthworms, lizards and tree frogs. Bluebirds will also eat blackberries, bayberries, fruit of honeysuckles, Virginia creeper, red cedar, wild grapes, pokeberries, and sumac seeds.

Nests are constructed primarily by the female in natural tree cavities, woodpecker holes, holes in stumps, fence rails and bird boxes, 3 to 20 feet above the ground. Nests are constructed using dried grasses, pine needles, weed stems, and fine twigs. Nests are lined with fine grasses, hairs and feathers.

The eastern bluebird is an open country species. The only open country habitat on the Site is along the power-line right-of-way, adjacent to the dike along the eastern edge of Sterling Forest Lake and the former Kings College campus. There are numerous tree cavities in the vicinity of these open county habitat areas to provide nesting habit for this species. During the field survey, numerous bluebirds were observed at each of these locations.

Under the proposed development plan, there are no anticipated disturbances associated with the power line right-of-way habitat currently being utilized by this species. Power line maintenance will continue to maintain this right-of-way as old field habitat suitable for this species. Installation of nesting boxes along the power line right-of-way can provide additional nesting opportunities for this species.

The area surrounding the former Kings College campus and the area along the dike will be disturbed by project implementation. These areas may be limited in serving as suitable nesting habitat for this species. It is anticipated that the loss of these patches of habitat will not have an adverse impact due to additional off-site power line right-of-ways in the vicinity of the Site. In order to prevent potential impacts to individual nesting eastern blue bird; it is recommended that potential cavity trees in the vicinity of the former Kings College campus

and along the dike be cut during the fall and winter. It is anticipated that the power line right-of-way will continue to serve as eastern bluebird habitat subsequent to project implementation.

5.0 AQUATIC RESOURCES

Aquatic resources on the Site include a portion of Sterling Forest Lake, a reach of the Ringwood River and wetlands associated with the river and its tributaries. Sterling Forest Lake is a deep, (approximately 120 feet) oligothrophic natural lake which is deepened by a 20 foot high dam. The Lake is State owned and is part of Sterling Forest State Park.

Surveys conducted by the NYSDEC Bureau of Fisheries, Biological Survey Unit, conducted on May 31, 2000 indicate that the lake supports a breeding population of lake trout (*Salvelinus namaycush*). In addition, rainbow (*Salmo gairdneri*) and brown trout (*Salmo trutta*) were stocked in the lake while it was under private ownership. Alewife (Alusa pseudoharengus) had been the main forage base in the lake; however, they are, based on NYSDEC Bureau of Fisheries surveys conducted in 1998 and 2000, no longer present in the lake. The following species were collected by NYSDEC during their 2000 survey:

- Smallmouth bass (Micropterus dolomieui);
- Rock bass (Ambloplites rupestris);
- Largemouth bass (Micropterus salmoides);
- Bluegill (Lepomis macrochirus);
- Pumpkinseed (Lepomis gibbosus);
- Chain pickerel (*Esox niger*); and
- Yellow perch (*Perca fluviatilis*).

The Ringwood River flows through the northeastern portion of the Site. The reach of the stream which flows through the Site is identified as a Class C (T) freshwater. The NYSDEC defined best usage of Class C waters is fishing. These waters are suitable for fish propagation and survival. The water is also suitable for primary and secondary contact recreation, although other factors may limit the use for these purposes. The (T) appearing after the standard designation indicates that the waters are suitable for supporting trout. In March, 2007 the NYSDEC stocked 290 8-9 inch brown trout in the Ringwood River. Immediately downstream of the Site, in New Jersey, the NJDEP stocks brown and rainbow trout in the river.

The proposed development is designed to avoid the aquatic habitat present on the site. Appropriate soil erosion and sediment control measures will be implemented to prevent the migration of sediment to Sterling Forest Lake and the Ringwood River during construction activities. Stormwater management controls should be implemented to reduce stormwater runoff into these water bodies subsequent to the development of the site. With appropriate soil erosion and sediment control measures and stormwater management facilities It is anticipated that the proposed project will have no significant negative impact on the aquatic resources in the project area.

6.0 WETLANDS

The entire portion of the Site east of Sterling Road was examined for the presence or absence of wetlands. Each wetland delineated within the project area was classified according to habitat type. A review of the NYS Department of Transportation, Greenwood Lake and Sloatsburg Freshwater Wetland Quadrangles shows the presence of NYSDEC Freshwater Wetland area GR-18, Gr-19 and GR-120 located north of the Site (Figure 5). The NYSDEC Freshwater Wetland maps do not indicate the presence of NYSDEC regulated wetlands within the project Site.

The National Wetlands Inventory Maps (NWI), Greenwood Lake and Sloatsburg Freshwater Wetland Quadrangles indicate palustrine forested (PF01), palustrine scrub/shrub (PSS1) wetlands and palustrine open waters (POW) associated with the Ringwood River. Sterling Forest Lake is identified as lacustrine, limnetic open waters (L1OW). No wetlands are delineated on the portion of the Site west of Sterling Road.

Legend

Project Boundary

Note:
There are no wetlands in the vicinity of project site.

Source:
New York State Department of Environmental Conservation (NYSDEC), 2009.
Project Boundary from plan by PS&S Survey entitled "Wetland Survey Parcel B4 and Part of Parcel A-13", dated 6/4/2010.
Aerial from ArcGIS Online - NAIP Imagery, 2008.

NYS DEC WETLANDS MAP

World Headquarters for Jehova's Witnesses
Warwick Property
Township of Warwick, Orange County, New York

PS&S
integrating design & engineering

Drawn By: EB	Scale: 1" = 600'	Project No. 02400.244.010
Chk'd By: HL	Date: 7/30/2010	Figure No. 5

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6.1 Wetland Regulations

A variety of federal and state regulations affect construction and other activities in wetlands and in areas immediately adjacent to wetlands. The principal federal laws that regulate activities in wetlands are Sections 404 and 401 of the Clean Water Act, and Section 10 of the Rivers and Harbors Act. Other federal laws that may apply include the National Environmental Policy Act, and the Swampbuster provision of the Food, Agriculture, Conservation and Trade Act of 1990.

The principal New York State regulation affecting development activities in and near freshwater wetlands is the Freshwater Wetlands Act (6NYCRR Part 663). Other state laws that may regulate activities in or near wetlands include the State Environmental Quality Review Act (SEQRA)(6NYCRR Part 617), and the Use and Protection of Waters Program (6NYCRR Part 608).

6.2 Definitions and Methodology

Jurisdictional Waters of the United States (WoUS) is a term used and defined by the US Army Corps of Engineers (USACE) in 33 Code of Federal Regulations 328. This term as defined in the federal regulations includes "wetlands." However, for the purposes of this report the different types of jurisdictional water systems are defined as either "WoUS" or "wetlands". WoUS will denote non-vegetated, contiguous watercourses or waterways with well defined banks, or intermittent streams as opposed to "wetlands" as defined below.

6.3 Hydrophytic Vegetation

The initial step in the wetland delineation was to characterize the dominant vegetation in each vegetation layer. Dominant species are those that have the largest relative basal area, height, number of stems, or greatest areal cover (EL, 1987). The vegetation was then compared to the National List of Plant Species that Occur in Wetlands, Northeast (Region 1) (NWI, 1988) to determine if hydrophytic vegetation was present.

A "hydrophyte" is any plant "growing in water, soil, or on a substrate that is at least periodically deficient in oxygen as a result of excessive water content" (EL, 1987). Since most species can tolerate a range of growing conditions, individual species are not solely restricted to either wetland or upland communities. The USFWS has developed a classification scheme that assigns species to wetland indicator classes as listed in Table 7 (NWI, 1988).

Table 7 Plant Indicator Status Categories			
Indicator Category	**Indicator Symbol**	**% Occurrence in Wetlands**	**Status Categories**
Obligate Wetland Plants	OBL	>99	Plants that occur almost always in wetlands under natural conditions, but which may also occur rarely in nonwetlands.
Facultative Wetland Plants	FACW	67-99	Plants that occur usually in wetlands, but also occur (1% to 33%) in nonwetlands.
Facultative Plants	FAC	33-67	Plants with a similar likelihood of occurring in both wetlands and nonwetlands.
Facultative Upland Plants	FACU	1-33	Plants that occur sometimes in wetlands, but occur more often in nonwetlands.
Upland Plants	UPL	<1	Plants that occur rarely in wetlands, but occur almost always in nonwetlands under natural conditions.

Hydrophytic vegetation is present if greater than 50% of the dominant plant species from all strata are OBL, FACW, and/or FAC. When greater than or equal to 50% of the dominant species are FACU and/or UPL and hydric soils and wetland hydrology are present, the area is also considered to have hydrophytic vegetation. If hydric soils and wetland hydrology are lacking, and normal circumstances exist, then the area is considered to be upland.

6.4 Wetland Hydrology

The second step was to assess the wetland hydrology. Wetland hydrology encompasses the hydrologic characteristics of areas that are inundated or have saturated soils for sufficient duration to support hydrophytic vegetation. Hydrologic indicators are generally used to determine the presence or absence of a wetland. Of the three technical criteria, wetland hydrology is generally the least exact and most difficult to establish in the field due to annual, seasonal, and daily fluctuations (EL, 1987). An area has wetland hydrology if the soil is saturated to the surface by groundwater or ponded or flooded with surface water for

one week or more during the growing season. Saturation to the surface can occur when the water table is 0.5 to 1.5 feet below the surface depending upon soil permeability.

Indicators of wetland hydrology may be divided into recorded data and field data. Recorded data may be obtained from aerial photographs, soil surveys, historical data, flood plain delineations or tide/stream gauges. In the field, wetland hydrology may be evidenced by visual observation of saturation, inundation, or depth to standing water. However, it is not necessary to directly demonstrate the hydrology.

Other field indicators of wetland hydrology include drainage patterns, morphological plant adaptations, oxidized root channels, water marks, surface scouring, water-stained leaves, sediment deposits; drift lines, moss lines, and bare areas. Unless an area has been hydrologically modified, the hydrologic parameter may also be inferred from the soil profile.

6.5 Hydric Soils

The third step was to assess the presence of hydric soils. "Hydric soils" are soils that are saturated, flooded, or ponded long enough during the growing season to develop anaerobic conditions that favor the growth and revegetation of hydrophytic vegetation (USDA-SCS, 1985). Soils are considered hydric when they are (1) somewhat poorly drained and have a seasonal high water table less than 0.5 feet from the surface; or (2) poorly drained or very poorly drained and have a seasonal high water table less than 1.0 or 1.5 feet from the surface. The high water table must be present for a week or more during the growing season (EL, 1987). Soils that are ponded or flooded for long or very long duration during the growing season are also classified as hydric. All organic soils (histosols) or mineral soils with a histic epipedon are considered hydric soils.

In the field, a hand auger was used for sampling the soil to examine indicators of hydric soils such as low chroma, colors, mottling, organic accumulation, and high water table. Soils were generally examined to a depth of approximately 16-20 inches. Hydric conditions for mineral soils with low to moderate organic content were most commonly demonstrated by gleying and mottling. Gleyed soils are a result of gleization which is manifested by the presence of neutral gray, bluish or greenish colors through the soil matrix or in mottles (spots or streaks). Mineral soils were compared to a Munsell soil chart (Kollmorgen Corp., 1975) to determine soil color. Soils were considered hydric if they were gleyed or if the top of the B horizon had a chroma of 1 or less if mottling was not present, or a chroma of 2 or less when mottling was present.

Low chroma colors are an index of the degree of soil reduction as a result of anaerobic conditions. Low chroma colors include black, various shades of grey, and the darker shades of brown and red. These criteria allow most soils to be classified as hydric or non-hydric. Hydric soils that have been effectively drained may still show low chroma colors, but are no longer considered to be hydric because they lack hydrology. Low chroma colors may not be used as an indicator of hydric soils in those soils that are sand, are deeply colored as a result of their parent material, or have recently been formed (i.e., alluvial). These soils must be evaluated more carefully under the procedures outlined by the Corps of Engineers Wetland Delineation Manual (EL, 1987).

Sandy soils may be considered to be hydric if organic materials have accumulated above or in the surface horizon. Dark vertical streaking of subsurface horizons caused by downward movement of organic matter also indicates a hydric soil. This may be associated with a spodic horizon located at the average depth of the water table.

The Soil Conservation Service (SCS), in cooperation with the National Technical Committee for Hydric Soils (NTCHS), has prepared a list of the Nation's hydric soils (USDA SCS, 1987). In addition, the SCS publishes county soil surveys for areas where soil mapping has been completed. Unlisted soils are considered to be non-hydric. However, some phases of unlisted soils may contain hydric inclusions and thus be associated with wetlands. These cases must be verified in the field. Field soil characteristics are given precedence over how a site is mapped on a county soil survey. Alluvial soils may not show hydric characteristics due to their recent formation, but may be considered to be hydric for the purposes of wetland delineation.

Wetland Habitat Classification

Wetlands that were field identified within the project area were all determined to be freshwater palustrine system wetlands.

According to the vegetative succession of a wetland, a classification of habitat was assigned. These classifications include Palustrine emergent wetlands (PEM), Palustrine forested wetlands (PF01) or any combination of the two (Cowardin, 1979).

Results

Three areas of freshwater wetlands were identified within the project area (Figure 5). They are identified as follows:

Wetland Line 01 and 02 - Palustrine forested wetland (PF01) located south of the existing buildings. It is dominated by spice bush (*Lindera* benzoin), sensitive fern (*Onoclea sensibilis*) and red maple (*Acer rubrum*). This wetland originates from a storm sewer pipe under the parking area. The northern portion of this ditch which is relatively steep does not have hydric soils and is not identified as wetlands. As the terrain becomes more level, wetland vegetation and hydric soils define the narrow wetland channel which flows toward the abandoned treatment facility. This wetland area ends at a culvert under the access road to the existing wastewater treatment facility.

Immediately south of the access road wetland lines 03 and 04 originate. This area is a palustrine emergent wetland (PEM), which is dominated by jewel weed (*Impatiens capensis*), cattail (*Typha latifolia*), purple loosestrife (*Lythrum salicaria*), tear-thumb (*Polygonum sagittatum*) and nut sedge (*Cyperus esculentus*). Water from this wetland area flows into a small basin dominated by common reed (*Phragmites australis*) and then flows east onto property owned by the water authority. Wetland line 05 connects the off property boundary of the wetland with wetland line 04 completing the wetland polygon.

Wetland lines 06 and 07 are PF01 wetlands which follow the small stream bed to a culvert under Sterling Forest Road. Wetland area 08 is located between the water authority access road and the AT&T access road. This wetland area was ponded in the spring as is a vernal pond. Vegetation within the wetland area includes jewel weed, spicebush, skunk cabbage (*Symplocarpus foetidus*) and sensitive fern.

Wetland area 09 defines the edge of Sterling Forest Lake and is waters of the United States. Wetland areas 10 and 11 originate at the base of the earthen dam as a small creek and flow into the property owned by the water company. This small creek connects to wetland area 03 and 05 and 06 and 07 at property boundaries. Vegetation within these wetlands includes skunk cabbage, jewel weed and spicebush.

Areas bounded by flags 1201-1216 and EWC-1 –EWC34 are of emphermal water courses supported primarily by runoff from existing roadway. While these areas may carry surface water early in the growing season and after precipitation and snowmelt the vegetation is similar to the adjacent uplands.

Hydrophytic Vegetation

Vegetation on the Site was evaluated during field investigations. Woody vegetation in the PF01 areas included red maple (FAC) and spicebush (FACW-). Herbaceous vegetation is dominated by skunk cabbage (OBL), jewel weed (FACW), common reed (FACW) and purple loosestrife (FACW+).

Wetland Hydrology

The hydrology of Wetland Areas 01 through 07 and areas 10 through 11 appear to be driven by three factors; stormwater flowing into catch basins, groundwater seeps discharging to the surface and Sterling Forest Lake discharging from below the earthen dam. Wetland Area 08 appears to be groundwater driven either through a seep or spring under the emergent portion of the wetland and stormwater runoff. Wetland area 09 is Sterling Forest Lake which is stream fed.

Hydric Soils

The Soil Conservation Service (SCS) publishes county soil surveys for areas where soil mapping is completed. The soils of Orange County have been mapped. None of the soils identified as occurring on the Site are listed on the Orange County List of Hydric Soils. The following soils have been mapped on the Site (Figure 4):

Erie extremely stony soils, gently sloping (ESB) – These soils are somewhat poorly drained, gently sloping soils which have a fragipan. They are formed in glacial till. The water table is perched above the fragipan during the spring months. Permeability in the surface layer is moderate and slow to very slow in the fragipan.

Rock outcrop-Hollis Complex, sloping (ROC) – This complex of exposed bedrock and shallow Hollis soils is found on hill crests, hill tops and ridges. The Hollis soil is formed from a thin layer of glacial till over shist, gneiss and granite. Slopes range from 3 to 15 percent but are predominantly in the 8 to 15 percent range. No free water is perched above the bedrock except in areas where the rock is poorly jointed. Permeability is moderate to moderately rapid and depth to bedrock is typically 10 to 20 inches.

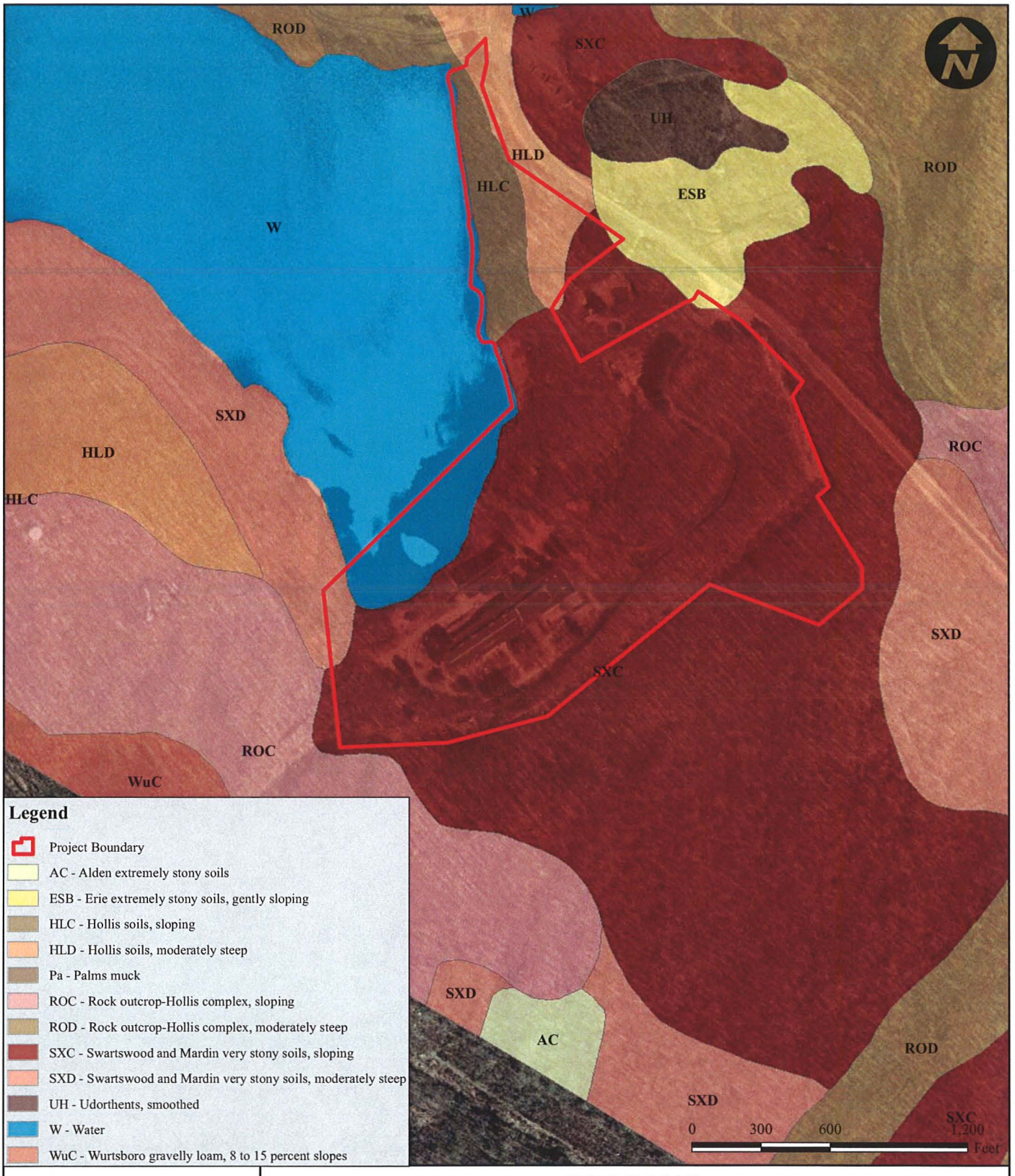
Rock outcrop-Hollis Complex, moderately steep (ROD) - This complex of exposed bedrock and shallow Hollis soils is found on hill crests, hill tops and ridges. The Hollis soil is formed from a thin layer of glacial till over shist, gneiss and granite. Slopes range from 15 to 35 percent but are predominantly in the 15 to 25 percent range. No free water is perched above the bedrock except in areas where the rock is poorly jointed. Permeability is moderate to moderately rapid and depth to bedrock is typically 10 to 20 inches.

Swartswood and Mardin very stony soils, sloping (SXC) – This mapping unit consists of well drained and moderately well drained Swartswood and moderately well drained Mardin soils. These soils have a deep fragipan. They are formed from glacial till on hill crests, hill tops and ridges. Slopes range from 3 to 15 percent but are predominantly in the 8 to 15 percent range. The water table is perched above the fragipan in the early spring. Permeability is moderate above the fragipan, slow to very slow through the fragipan and slow to moderately slow below the fragipan.

Swartswood and Mardin very stony soils, moderately sloping (SXD) – This mapping unit consists of well drained and moderately well drained Swartswood and moderately well drained Mardin soils. These soils have a deep fragipan. They are formed from glacial till on hill crests, hill tops and ridges. Slopes range from 15 to 35 percent but are predominantly in the 15 to 25 percent range. The water table is perched above the fragipan in the early spring. Permeability is moderate above the fragipan, slow to very slow through the fragipan and slow to moderately slow below the fragipan.

Udorthents, smoothed (UH) – These soils formed in man made cut and fill areas. They are generally near industrial sites, urban developments and other construction sites. They consist of excavated earth that has been stockpiled for eventual use as fill; soil and rock that has been trucked from other areas and leveled; or soil left in areas that have been excavated. These soils are excessively drained. Bedrock is typically at depths of five (5) feet. Depth to the seasonal high water table is shallow.

A review of the Site development plan indicates that less then one (1) acre of USACE wetlands will be impacted by the proposed development. It is anticipated that an Individual Section 404 Permit will be needed for project implementation. Wetlands impacted will require mitigation. The most likely location for this mitigation will be that portion of the Site west of Sterling Road. No development is proposed for this portion of the site. Site investigations conducted as part of the threatened and endangered species survey and the vegetation survey indicates both upland and wetland habitat on this portion of the site. Expansion of existing wetlands, associated with the Ringwood River will provide sufficient area to off-set wetland impacts east of Sterling Road.



SOILS MAP

World Headquarters for Jehova's Witnesses
Warwick Property
Township of Warwick, Orange County, New York

Source:
Project Boundary from plan by PS&S Survey entitled "Wetland Survey Parcel B4 and Part of Parcel A-13", dated 6/4/2010.
U.S. Department of Agriculture, Natural Resources Conservation Service, 2006.
Aerial from ArcGIS Online - NAIP Imagery, 2008.

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integrating design & engineering

Drawn By: EB	Scale: 1" = 600'	Project No. 02400.244.010
Chk'd By: HL	Date: 7/30/2010	Figure No. 4

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7.0 CONCLUSIONS

Field surveys were conducted to inventory biological resources on the site and to evaluate the site for the presence or absence or Federal or State listed threatened, endangered, species of special concern and critical habitat for these species. Surveys were conducted from April through September and included a delineation of wetlands on the eastern portion of the property. Surveys included a survey of the birds potentially breeding on the site and a herpetological survey. A total of 153.5 hours of observations were conducted on the site from between April and September.

New York Natural Heritage database list the presence of one threatened plant, Terrestrial starwort (*Callitriche terrestris*) and three endangered plants, Green parrot's feather (*Myriophyllum pinnatum*), Hyssop skullcap (*Scutellaria integrifolia*) and Michaux's blue-eyed grass (*Sisyrinchium mucronatum*) known to occur in the vicinity of the site. While the site contains suitable habitat for each of these species, only the Hyssop skullcap was observed on the site in 2007 and not in 2010. These plants were observed outside of the limits of disturbance for the project.

The New York Natural Heritage database lists one threatened species, the timber rattlesnake, and six species of special concern in the vicinity of the site. The site does not contain suitable habitat to support a hibernaculum for timber rattlesnakes, a State listed threatened species. No rattlesnakes were observed on the site during these investigations. The site does provide suitable foraging habitat for snakes. Potential impacts to foraging snakes can be avoided by pre-construction fencing and monitoring during construction activities.

During the survey three (3) of the State species of special concerns, red-shouldered hawk, eastern bluebird and the box turtle, were observed on the site and a previous survey documented the wood turtle as occurring on site. Wood turtles may the portion of the Site northeast of Sterling Forest Road for breeding and hibernating. Given the terrestrial wandering tendencies of this species, the entire site may serve as suitable foraging habitat for this species. No development activities are proposed within the breeding and overwintering habitat likely utilized by wood turtles. Pre-construction fencing and monitoring is recommended to prevent impacts to these species during construction activities.

Box turtles utilize open old field habitat and wooded habitat on the site. The project will result in habitat loss for this species. Pre-construction fencing and monitoring is recommended to prevent impacts to these species during construction activities. It is anticipated that the surrounding State parks will continue to provide suitable habitat for this species in the vicinity of the Site.

The eastern bluebird is an open country species. The open habitat along the power-line right-of-way will be maintained subsequent to the proposed development. It is anticipated that this species will continue to utilize the existing habitat. Installation of nesting boxes could increases nesting opportunities for eastern bluebirds along the power line right-of-ways and open habitat on the site.

The red-shouldered hawks will likely forage along the power line right-of-way on the site. This habitat will not be disturbed by the proposed construction. The Site is also bounded by two State Parks which provide suitable nesting and foraging habitat for this species. It is anticipated that this species will not be adversely impacted by the proposed development.

A wetland delineation was completed for the portion of the site east of Sterling Road. There are no New York State Department of Environmental Conservation (NYSDEC) mapped wetlands on this portion of the property. PS&S delineated US Corps of Engineers (USACE) regulated wetlands and waters of the United States. Based on the proposed development scenario, the project will impact less than one (1) acre of USACE regulated wetlands. No NYSDCE wetlands will be disturbed by the proposed project.

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APPENDIX 1

Summer Woodland Bat Survey

Orange County, New York

Summer Woodland Bat Survey
Watchtower Project

June 7 and 8, 2010

Bat Conservation and Management, Inc.
Carlisle, Pennsylvania

Summer Woodland Bat Survey
Watchtower Project

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Cover:
9m Triple-high mist net set B at Site 2

Summer Woodland Bat Survey
Watchtower Project

June 7 and 8, 2010

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John Chenger
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June 9, 2010

General Sampling Location

Figure 1. Watchtower Project, Orange County, New York

Executive Summary

The objective of this study was to provide an inventory of summer bat species occurring in the vicinity of the Watchtower Project in Orange County, New York. Bat Conservation and Management, Inc. (BCM) of Carlisle, Pennsylvania conducted a summer mist net survey meeting the protocols set forth in the United States Fish and Wildlife Service Indiana Bat Revised Recovery Plan. Based on the acreage of the project area with suitable bat roost habitat (less than 250 acres), two (2) sites were selected for summer mist net surveys.

Six (6) individuals of three (3) species were captured including the big brown bat (*Eptesicus fuscus*), eastern red bat (*Lasiurus borealis*), and little brown bat (*Myotis lucifugus*). No Indiana bats (*Myotis sodalis*) or eastern small-footed myotis (*Myotis leibii*) were captured.

Introduction

Background

The Watchtower Project is located in Orange County New York. The project area is considered to be within the summer range of the Indiana bat. To satisfy compliance requests by the US Fish and Wildlife Service (USFWS) a summer mist net survey was completed in accordance with USFWS approved protocols. This survey investigated the study area to determine the likelihood of a summer maternity colony of Indiana bats (*Myotis sodalis*) or eastern small-footed myotis (*Myotis leibii*) in the project area.

Objective

The objective of this study is to provide an inventory of summer bat species occurring in the vicinity of the Watchtower Project. BCM conducted mist net surveys meeting the protocols set forth in the United States Fish and Wildlife Service Indiana Bat Revised Recovery Plan.

Indiana Bat

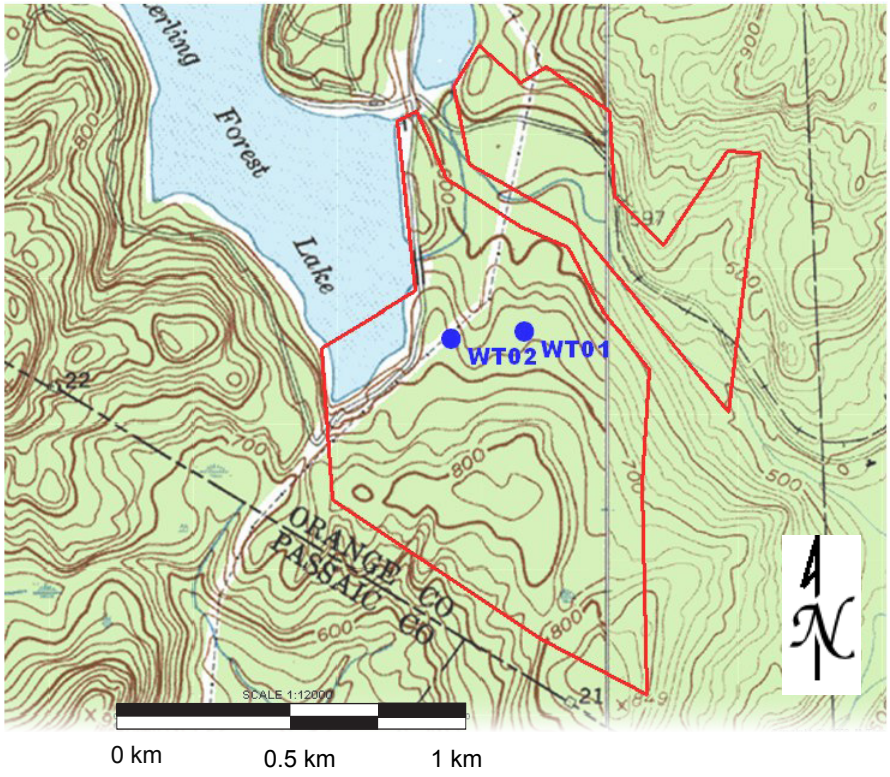
The Indiana bat (IBAT) is a rare woodland bat species with documented occurrences in Pennsylvania and all adjoining states; however, little survey data is available for this species. Indiana bats hibernate in caves and abandoned deep mines during the winter months (November-March), and use a variety of upland, wetland, and riparian habitats during the spring, summer, and fall. Female IBATs form nursery colonies under the exfoliating bark of a variety of tree species (Thomson 1982). Land clearing may adversely affect roosting bats or the quality of foraging habitat. In order to protect suitable habitat, periodic surveys for these individuals are needed. The United States Fish and Wildlife Service (USFWS) typically requests that the site developer conduct a summer Indiana bat survey between May 15 and August 15 (USFWS 2007).

Table 1: Site Co-ordinates

Trap Site	Latitude	Longitude
1	41° 09' 31.42"	74° 15' 09.78"
2	41° 09' 35.10"	74° 15' 20.30"

WGS 84 datum

Figure 2: Survey Locations



Survey site Watchtower 01 (WT01) and survey site Watchtower 02 (HC02)
For detailed, current property boundary maps, contact the developer.

Table 2: Net Night Level of Effort

Trap type	Site 1	Site 2	Totals
Triple-high	4	4	8
Totals	4	4	**8**

One net night is any size or stack of nets stretched between 2 poles.

Methods and Results

Summer sampling was conducted on June 7 and 8, 2010 and consisted of two (2) mistnet sites (Table 1) sampled for two nights each.

The sites were sampled using traditional mist netting techniques. Mist nets were manufactured by Avinet, Inc. (Dryden, NY; 38mm mesh - nylon, reduced bag, 50/2, 38mm mesh, 2.6m high, 4 shelves). Nets were set according to habitat structure at each site. “Triple-high” nets consist of three 2.6 meter high nets stacked between two poles. The net lengths utilized were determined by the physical characteristics of the site and ranged in length between 9 and 12 meters. Nets were placed over existing roads in an effort to catch bats that utilized these features as flight corridors to move through the habitat.

A net-night was defined as any configuration of mist net length and height between two poles set up for one night. Net-night level of effort totaled eight (8) net-nights (Table 2) consisting of four triple-high mist nets. The recommended level of effort for two sites as described by the Indiana Bat Revised Recovery Plan is eight (8) net-nights (Appendix C). Based on the project area being less than 250 acres, two (2) mist net sites were determined to sufficiently sample the area for Indiana bats.

Site one contained two 12m long triple-high mist nets. Site two contained two 9m long triple-high mist nets. The total survey effort at this site met the recommendations outlined by the United States Fish and Wildlife Service Indiana Bat Revised Recovery Plan (Appendix C).

The two mist net sites were selected by BCM based on existing habitat structure serving as flight corridors such as roads and streams (Figure 2). Data were collected at each mist netting site, as shown on the Bat Conservation and Management, Inc. "Bat Survey Data Form" (Appendix A). Recorded information included detailed net setup, weather conditions during sampling, and general habitat information. Data recorded on captured bats included time of capture, species, age (Brunet-Rossinni and Wilkinson 2009), sex, reproductive condition (Racey 2009), weight, forearm length, and wing score (Reichard 2008). The reproductive condition of female bats can be used to determine which species have maternity colonies in the general vicinity of the capture site during summer months.

Six (6) individuals of three (3) species were captured including two (2) big brown bats (*Eptesicus fuscus*), two (2) eastern red bats (*Lasiurus borealis*), and one (1) little brown bat (*Myotis lucifugus*). Three (50%) of the captured bats were male, two (33%) were female, and one individual escaped the mistnet before sex could be determined. Of the two (2) females, one was lactating and one was non-reproductive. High numbers of pregnant, lactating, or post lactating bats suggests that a maternity colony of these species may be nearby.

Table 3: Capture Summary

Sample Site		Total Species	Total Captures
Name	Nights		
Site 1	2	3	**6**
Site 2	2	0	**0**
Project Totals	**4**	**3**	**6**

Table 4: Mist Net Site Totals

Species		Site 1	Site 2	Totals M	F	Unk
Eptesicus fuscus	M	1	-	**1**		
	F	1	-		**1**	
	Unk	-	-			**0**
Lasiurus borealis	M	2	-	**2**		
	F	-	-		**0**	
	Unk	1	-			**1**
Myotis lucifugus	M	-	-	**0**		
	F	1	-		**1**	
	Unk	-	-			**0**
Totals		**6**	**0**	**3**	**2**	**1**
		6		**6**		

Table 5: Reproductive Condition of Female Bats

Species		Site 1	Site 2	Totals				
				NR	PG	L	PL	
Eptesicus fuscus	NR	-	-	**0**				**1**
	PG	-	-		**0**			
	L	1	-			**1**		
	PL	-	-				**0**	
Lasiurus borealis	NR	-	-	**0**				**0**
	PG	-	-		**0**			
	L	-	-			**0**		
	PL	-	-				**0**	
Myotis lucifugus	NR	1	-	**1**				**1**
	PG	-	-		**0**			
	L	-	-			**0**		
	PL	-	-				**0**	

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Appendix A

Mist Net Data Sheets

Notes and key to abbreviations used on data sheets

Instructions

All information must be completed each night. Partially complete forms will not be accepted. Completed forms are to be turned in to the Team Leader each morning.

PROJECT: Name of the entire survey project.
SITE#: The number given to every trap site in a seperate geographic location. Site # remains the same regardless of how many nights are spent at the same location.
DATE: Pre-midnight date which trapping began.
LONGITUDE/LATITUDE: Coordinates from a GPS receiver.
I.D. BY: USFWS qualified person identifying bats at this site.
MOON AFFECT: Was moon present during survey? If so what phase? Was moonlight illuminating nets? Note times.
NUMBER OF NETS/TRAPS: Description of nets, e.g. A: 3Hx9m, B: 2Hx6m, C: 1Hx9mx12m "L" configuration.
SKY CONDITIONS: General weather conditions and temperature in °F, at start, middle, and end of sampling times.
WIND CONDITIONS: Use Beauford scale and note time.
SITE DESCRIPTION: A general overview of the site, e.g. "Shallow stream with long pools surrounded by deciduous forest with maple, oak, and beech. A small clearing and residence is nearby."
ANDERSON III CODE: Use Level III codes and percentages within 1KM of site. Percentages should total 100%.
DISTURBANCE CODE: List up to three of the most significant disturbances within 500 meters. Include distance to disturbance.

Disturbance Codes and Key

PROXIMITY	TYPE		
1 Disturbance on site	**A** Dumping	**H** Unimproved roads	
	B Party spot	**I** Recreation area	
2 Disturbance within 100 meters of site	**C** Buildings	**J** Mining	
	D Agriculture	**K** Fire	
	E Utility rights-of-way	**L** Clearcut	
3 Disturbance 100-500 meters of site	**F** Railroad rights-of-way	**M** Insect defoliation	
	G Improved roads	**N** No disturbance	

Beuford Wind Scale Codes and Key

Code	Speed(m/sa)	Description	Land Condition	Comfort
0	0 - 0.5	Calm	Smoke rises	No noticeable wind
1	0.5 - 1.5	Light air	Smoke drifts vertically	
2	1.6 - 3.3	Light breeze	Leaves rustle	Wind felt on face
3	3.4 - 5.4	Gentle breeze	Wind extends	Hair disturbed, clothing flaps
4	5.5 - 7.9	Moderate breeze	Small branches in motion	Hair disarranged, raises dust & loose
5	8.0 - 10.7	Fresh breeze	Small trees w/leaf begin to sway	Force of wind felt on body
6	10.8 - 13.8	Strong breeze	Whistling in telegraph wires large branches in motion	Umbrellas used with difficulty
7	13.9 - 17.1	Near gale	Whole trees in motion	Inconvenience in walking
8	17.2 - 20.7	Gale	Twigs broken from trees	Progress impeded/difficult in gusts

Common name:	Species:
Little brown	*Myotis lucifugus*
Big brown	*Eptesicus fuscus*
Pipistrelle	*Pipistrellus subflavus*
Northern longear	*Myotis septentrionalis*
Smallfooted	*Myotis leibii*
Indiana	*Myotis sodalis*
Red	*Lasiurus borealis*
Hoary	*Lasiurus cinereus*
Silver haired	*Lasionycteris noctivagans*
Townsend's Big-eared	*Corynorhinus townsendii*
Rafinesque's Big-eared	*Corynorhinus rafinesquii*
Evening	*Nyctuceius humeralis*

Reproductive condition:	***Age:***
NR= Non Reproductive	A: Adult
PG= Pregnant	J: Juvenile
L= Lactating	
PL= Post Lactating	
SCR= Scrotal	

DO NOT WRITE IN MARGINS OF DATA SHEETS

Anderson Classification Codes first and second level categories

1	**Urban or Built-Up Land**
11	Residential
12	Commercial Services
13	Industrial
14	Transportation, Communications
15	Industrial and Commercial
16	Mixed Urban or Built-Up Land
17	Other Urban or Built-Up Land
2	**Agricultural Land**
21	Cropland and Pasture
22	Orchards, Groves, Vineyards, Nurseries
23	Confined Feeding Operations
24	Other Agricultural Land
3	**Rangeland**
31	Herbaceous Rangeland
32	Shrub and Brush Rangeland
33	Mixed Rangeland
4	**Forest Land**
41	Deciduous Forest Land
42	Evergreen Forest Land
43	Mixed Forest Land
5	**Water**
51	Streams and Canals
52	Lakes
53	Reservoirs
54	Bays and Estuaries
6	**Wetland**
61	Forested Wetlands
62	Non forested Wetlands
7	**Barren Land**
72	Beaches
73	Sandy Areas Other than Beaches
74	Bare Exposed Rock
75	Strip Mines, Quarries, and Gravel Pits
76	Transitional Areas
77	Mixed Barren Land

Bat Survey Data Form

Bat Conservation and Management, Inc. • 814-442-4246

Project: Watchtower	County: Orange	Site #: 1	Night #: 1	Site Name: WT01	Date: 6/7/2010
Latitude: 41 09 31.42	Longitude: 74 15 09.78			Datum: WGS 84	Elevation: 206 circle: feet meters	ID By: Kevin Rhome
Observers: Risa Wright John Peaden				Actual net open time: 20:40	Actual net close time: 01:40

Sky Conditions:	dusk, note time+temp+description: 20:40 62.7°F Partly Cloudy	mid-sample, note time+temp+description: 2354, 56.1°F, clear	end, note time+temp+description: 0140, 55.7°F, clear
Wind Description:	0	0	0

Moon effect: (specify net and effect length if any) Start: Stop:

Camera:

Photos:

Number of nets/traps: (label and include size and configuration) A=3h×12m B=3h×12m

Site Description: (net placement, stream data, cover composition, surrounding habitat, dominant species) Nets A & B are set over an improved road surrounded by deciduous forest

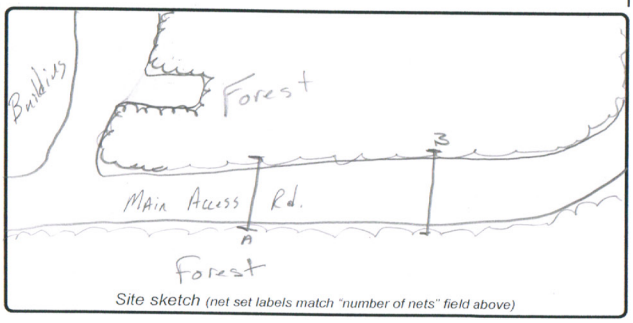
Over Water? Y (N)

Pool size: WxL (m)

Swoop zone: WxL (m)

	most common+distance	2nd common+distance	3rd common+distance
Anderson Level II:	41 | 70%	52 | 20%	15 | 10%
Disturbance codes:	G | 1	C | 2	E | 3

Remarks: (note rain event time and length, other wildlife, etc.)



Site sketch (net set labels match "number of nets" field above)

Bat Survey Data Form

Bat Conservation and Management, Inc. • 814-442-4246 Page 1 of 1

Project: Watchtower County: Orange Site #: 1 Night #: 1 Site Name: WT01 Date: 6-7-10

Time	Species	Age (A/JV)	Sex (M/F)	Reproductive Condition	Weight (grams)	Forearm Length	Above ground	Net Set	Band/Wing Score	Comments/Photo #
2115	Lasiurus borealis	A	M	NR	12.4	36	4m	A	0	Hair sample WT01-01 1
2118	Lasiurus borealis	A	M	NR	13.4	37	3.5m	B	0	Hair sample WT01-02 2
2130	Eptesicus fuscus	A	M	NR	16.6	44	4m	B	1	3
2130	Eptesicus fuscus	A	F	L	20.9	44	4.5m	B	0	4
0015	Lasiurus borealis						3m	A		escaped net 5
0057	Myotis lucifugus	A	F	NR	9.3	36	7m	A	0	6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
										18
										19
										20

Bat Survey Data Form

Bat Conservation and Management, Inc. • 814-442-4246

Project: Watchtower	County: Orange	Site #: 1	Night #: 2	Site Name: WT01		Date: 6-8-10
Latitude: 41 09 31.42	Longitude: 74 15 09.78			Datum: WGS84	Elevation: 206 circle: feet (meters)	ID By: Kevin Thome
Observers: Lisa Wright, John Peaden				Actual net open time: 2040	Actual net close time: 0140	

	dusk, note time+temp+description	mid-sample, note time+temp+description	end, note time+temp+description
Sky Conditions:	2040, 59.1°F Partly Cloudy	2315, 54.6°F, Clear	0140, 50.7°F, Clear
Wind Description:	0	0	0

Moon effect: (specify net and effect length if any)

Start:

Stop:

Camera:

Photos:

Number of nets/traps: (label and include size and configuration) A = 3h x 12m B = 3h x 12m

Site Description: (net placement, stream data, cover composition, surrounding habitat, dominant species) Nets A + B are placed over an improved road surrounded by deciduous forest.

Over Water? Y (N)

Pool size: WxL (m)

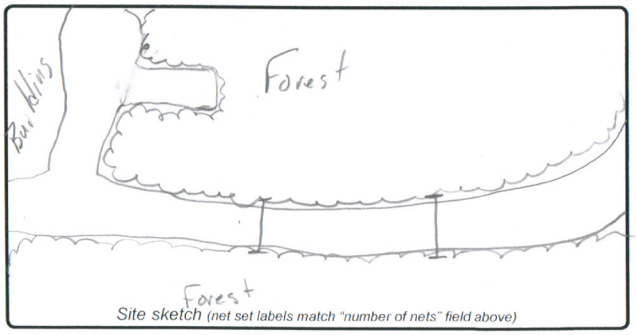
Swoop zone: WxL (m)

Maple, Oak, Beech

	most common+distance	2nd common+distance	3rd common+distance
Anderson Level II:	41 | 70%	52 | 20%	15 | 10%
Disturbance codes:	G | 1	C | 2	E | 3

Remarks: (note rain event time and length, other wildlife, etc.)

NO BATS Captured



Site sketch (net set labels match "number of nets" field above)

Bat Survey Data Form

Bat Conservation and Management, Inc. • 814-442-4246 Page 1 of 1

Project: Watchtower County: Orange Site #: 1 Night #: 2 Site Name: WT01 Date: 6-8-10

Time	Species	Age (A/JV)	Sex (M/F)	Reproductive Condition	Weight (grams)	Forearm Length	Above ground	Net Set	Band/Wing Score	Comments/Photo #
	NO BATS Captured									1
										2
										3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
										18
										19
										20

Bat Survey Data Form

Bat Conservation and Management, Inc. • 814-442-4246

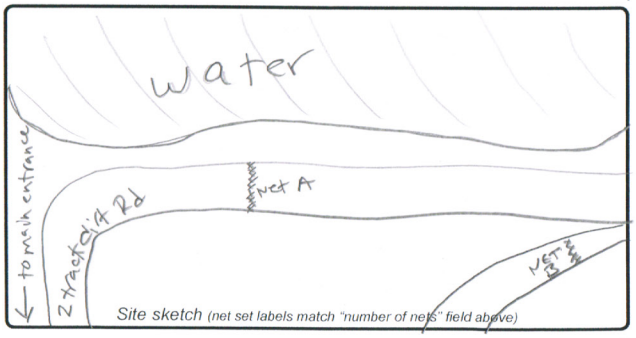
Project: Watchtower	County: Orange	Site #: 02	Night #: 1	Site Name: WT02		Date: 6/7/10
Latitude: 41° 09' 35.1"	Longitude: 74° 15' 20.3"			Datum: WGS 84	Elevation: 702 (circle: feet / meters)	ID By: Kevin Rhome
Observers: Crystal Prussick, Aimee Haskew				Actual net open time: 2040		Actual net close time: 0144

	dusk, note time+temp+description	mid-sample, note time+temp+description	end, note time+temp+description
Sky Conditions:	clear, 61.5°F, 2040	clear, 2303 57.3°F	clear, 0136, 55.2°F
Wind Description:	calm (0)	calm - 0	calm - 0

Moon effect: (specify net and effect length if any)	Start: / Stop:	Camera:	Photos:
Number of nets/traps: (label and include size and configuration)	A: 3H×9m B: 3H×9m		
Site Description: (net placement, stream data, cover composition, surrounding habitat, dominant species)	Nets A stacked over jeep trail, Nets B stacked over smaller trail; dominant spp. include oak+maple; nets are lakeside; sparse understory	Over Water? Y (N)	Pool size: WxL (m) / Swoop zone: WxL (m)

	most common+distance	2nd common+distance	3rd common+distance
Anderson Level II:	52 | 75%	41 | 20%	12 | 5%
Disturbance codes:	G | 1	C | 3	N | 3

Remarks: (note rain event time and length, other wildlife, etc.)



Bat Survey Data Form

Bat Conservation and Management, Inc. • 814-442-4246 Page 1 of 1

Project: Watchtower County: Orange Site #: 2 Night #: 1 Site Name: WT02 Date: 7 June 2010

Time	Species	Age (A/J/V)	Sex (M/F)	Reproductive Condition	Weight (grams)	Forearm Length	Above ground	Net Set	Band/Wing Score	Comments/Photo #
	0 captures									1
										2
										3
										4
										5
										6
										7
										8
										9
										10
										11
										12
										13
										14
										15
										16
										17
										18
										19
										20

Bat Survey Data Form

Bat Conservation and Management, Inc. • 814-442-4246

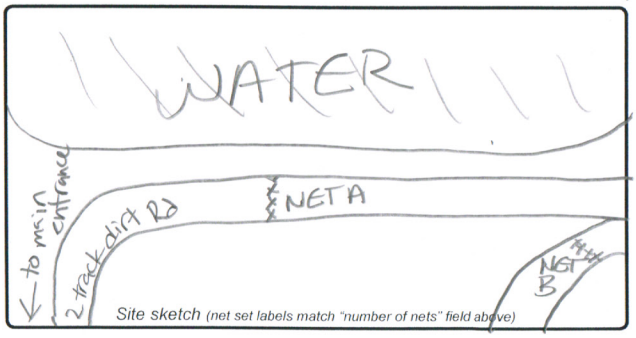
Project: Watchtower	County: Orange	Site #: 02	Night #: 2	Site Name: WT02	Date: 6/8/10
Latitude: 41° 09' 35.1"	Longitude: 74°15' 20.3"			Datum: WGS84	Elevation: circle: (feet) 702 meters
ID By: Kevin Rhome					
Observers: Crystal Prussick, Aimee Hasken				Actual net open time: 2040	Actual net close time:

	dusk, note time+temp+description	mid-sample, note time+temp+description	end, note time+temp+description
Sky Conditions:	2045, 59.0°F, clear	2304, 54.1°F, clear	0139, 50.1 °F, clear
Wind Description:	calm Ø	calm Ø	calm Ø

Moon effect: (specify net and effect length if any)	Start: Stop:	Camera:	Photos:
Number of nets/traps: (label and include size and configuration)	A: 3H×9m B: 3H×9m		
Site Description: (net placement, stream data, cover composition, surrounding habitat, dominant species)	Nets A stacked over jeep trail, Nets B stacked over smaller trail; dominant spp include oak + maple; not near lakeside; sparse understory	Over Water? Y (N)	Pool size: WxL (m) / Swoop zone: WxL (m)

	most common+distance	2nd common+distance	3rd common+distance
Anderson Level II:	52 | 75%	41 | 20%	12 | 5%
Disturbance codes:	G | 1	C | 3	N | 3

Remarks: (note rain event time and length, other wildlife, etc.)



Site sketch (net set labels match "number of nets" field above)

Bat Survey Data Form

Bat Conservation and Management, Inc. • 814-442-4246 Page 1 of 1

Project: Watchtower County: Orange Site #: 2 Night #: 2 Site Name: WT02 Date: 8 June 2010

Time	Species	Age (A/JV)	Sex (M/F)	Reproductive Condition	Weight (grams)	Forearm Length	Above ground	Net Set	Band/Wing Score	Comments/Photo #
	Ø captures									1–20

Appendix B

Representative Site Photographs

Net Site 1 - Triple-high mist net set A

Net Site 1 - Triple-high mist net set B

Net Site 2 - Triple-high mist net set A

Net Site 2 - Triple-high mist net set B

Appendix C

Indiana Bat Sampling Protocol

Note: These Guidelines are extracted from the April 2007 Draft Revised Indiana Bat Recovery Plan.

RATIONALE

A typical mist-net survey is an attempt to determine presence or probable absence of the species; it does not provide sufficient data to determine population size or structure. Following these guidelines will standardize procedures for mist netting. It will help maximize the potential for capture of Indiana bats at a minimum acceptable level of effort. Although capture of bats confirms their presence, failure to catch bats does not absolutely confirm their absence. Netting effort as extensive as outlined below usually is sufficient to capture Indiana bats if they are present. However, there have been instances in which additional effort yielded detection when the standard effort did not.

Some mist-netting projects will require modification (or clarification) of these guidelines; these situations should be resolved through coordination with the Service Field Office responsible for the state in which your project occurs. Consultation with the Field Office is always recommended, particularly for large-scale netting efforts.

The Service accepts the results of these surveys to determine presence for the purposes of Section 7 consultation. Survey results are valid for at least two years.

NETTING SEASON: May 15 - August 15

May 15-August 15 are acceptable limits for documenting the presence of summer populations of Indiana bats, especially maternity colonies. (However, see Kiser and MacGregor 2005 for precautions regarding early-season surveys between May 15 and June 1, as well as late-season surveys between August 1 and August 15). Capture of reproductive adult females (i.e., pregnant; lactating, or post-lactating) and/or young of the year during May 15-August 15 indicates that a nursery colony is active in the area. Outside these dates, data cannot be used to document the presence or probable absence of summer populations.

EQUIPMENT

Mist nets to be used for Indiana bat surveys should be the finest, lowest visibility mesh commercially available: 1) In the past, this was 1 ply, 40 denier monofilament—denoted 40/1; 2) Currently, monofilament is not available, and the finest on the market is 2 ply, 50 denier nylon denoted 50/2; 3). The finest mesh size available is approximately 38 mm (—1 1/2 in).

No specific hardware is required. There are many suitable systems of ropes and/or poles to hold nets. The system of Gardner et al. (1989) has been widely used. See NET PLACEMENT below for minimum net heights, habitats, and other netting requirements that affect the choice of hardware.

NET PLACEMENT

Potential travel corridors such as streams or logging trails typically are the most effective places to net. Place nets approximately perpendicular across the corridor. Nets should fill the corridor from side to side and from stream (or ground) level up to the overhanging canopy. A typical set is 7 m high consisting of three or more nets stacked on top one another and up to 20 m wide. (Nets of different width may be used as the situation dictates).

Occasionally it may be desirable to net where there is no good corridor. Take caution to get nets up into the canopy. The typical equipment described in the section above may be inadequate for these situations, requiring innovation on the part of the researchers.

Exercise safety precautions when placing nets. Poles and nets should be clear of overhead wires. See Kiser and MacGregor (2005) for additional discussion of net placement.

RECOMMENDED NET SITE SPACING

Stream and other linear corridors — one net site per km (0.6 mi) of stream or corridor.

Non-corridor study areas — two net sites per square km of habitat (equivalent to one net site per 123 acres).

The Service Field Office responsible for the state in which your project occurs should be consulted during survey design to resolve issues related to net site spacing for specific projects.

MINIMUM LEVEL OF EFFORT

Netting at each site should include at least four net nights, consisting of: 1) a minimum of two net locations at each site (at least 30 m apart, especially in linear habitat such as a stream . corridor); and 2) a minimum of two nights of netting (i.e., two net locations for two nights = four net nights per site). A "net night" is defined as one net set up for one night. The sample period should begin at sunset and continue for at least 5 hours (longer sample periods may improve success). For purposes of determining presence or probable absence of Indiana bats, four net nights at a site are not required if Indiana bats are caught sooner (i.e., if Indiana bats are caught on the first night of netting, a second night is not required for purposes of documenting presence).

CHECKING NETS

Each net should be checked approximately every 10 minutes. Some researchers prefer continuous monitoring (with or without an electronic bat detector); care should be taken to avoid noise and movement near the nets if this technique is used. When monitoring the site continuously with a bat detector, bats can be detected immediately when they are captured in the net. Prompt removal from the net decreases stress on the bat and potential for the bat to escape (MacCarthy et al. 2006).

APPENDIX 2

Site Photographs

Legend

Site Location

Photo Location

Source: Aerials Express, 2006.

0 175 350 Feet

PS&S
integrating design & engineering

TOURO WARWICK COLLEGE
TOWNSHIP OF WARWICK
ORANGE COUNTY, NEW YORK

PHOTO LOCATION MAP

Drn By: ML	Scale: 1" = 350'	Project: 03171.004-010
Ch'kd By: DG	Date: 10-29-07	Figure No.:

Map Document: (P:\03171\004\YIN\Maps\Figure_PhotoLocation_102907_00.mxd)
10/29/2007 -- 11:37:04 AM

Photo 1: Bluebird habitat along the power line right-of-way.

Photo 2: Potential rattlesnake foraging habitat in hardwood forested portions of site.

Photo 3: Upland deciduous forested habitat in central portion of site.

Photo 4: Bluebird habitat along the power line right-of-way looking from Sterling Forest Park toward site.

Photo 5: Bluebird habitat along the power line right-of-way west of entrance road.

Photo 6: Wet meadow/Emergent wetland southwest of abandon treatment facility. Wetland lines 03 and 04.

Photo 7: Five-lined skink observed adjacent to existing buildings.

Photo 8: Palustrine forested wetlands southwest of Sterling Forest Road. This wetland area is suitable wood turtle habitat. Note stream in background.

Photo 9: Palustrine forested wetlands southwest of Sterling Forest Road. This wetland area is suitable wood turtle habitat.

Photo 10: Ringwood River, located south of Sterling Forest Road. Pool areas provide suitable breeding and over wintering habitat for wood turtles.

Photo 11: Wood turtle habitat adjacent to Ringwood River.

Photo 12: Ringwood River, located south of Sterling Forest Road. Run areas provide suitable breeding and over wintering habitat for wood turtles.

Photo 13: Ringwood River – In addition to wood turtle habitat the river provides habitat for snapping turtles, two lined salamanders, frogs and trout.

Photo 14: Vernal pond in August – Breeding habitat for grey tree frogs, spring peepers and American toads.

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67B Mountain Boulevard Extension
P.O. Box 4039
Warren, NJ 07059
Tel 732.560.9700

March 8, 2011
3171-004-010

Robert S. May
Watchtower Bible and Tract Society of New York, Inc.
900 Red Mills Road
Wallkill, New York 12589-3223

Re: Response to Town of Warwick Planner
Preliminary Draft Environmental Impact Statement
Section 85, Block 1, Lots 4.1, 4.2, 5.1 and 5.2
Town of Warwick, Orange County, New York

Dear Mr. May:

As requested, Paulus Sokolowski and Sartor, LLC (PS&S) has reviewed comments to the Preliminary Draft Environmental Impact Statement provided by Ted Fink (the Warwick Town Planner) as described in your March 6, 2011 email. PS&S offers the following responses to the comments:

Comment 1 (Point 6)

Provide a habitat map for the entire site (including the Ringwood River parcel north of Long Meadow Road). Indicate the location of bat roosting tree areas. Identify the location of the snake/turtle nesting area referred to by Dr. Klemens. Identify the location of the "unnamed tributary".

Response

The property is approximately 257 acres in size and includes approximately 198 acres of forest, 34 acres of surface water, 11 acres of meadow and brushland, 9 acres of impervious surfaces and 5 acres of landscaped areas. There are approximately 3 acres of wetlands regulated by the United States Corps of Engineers within the project area. A map showing the locations of these land covers/land uses is provided as Attachment A.

Three bat species were captured on the site: big brown bat (*Eptesicus fuscus*); eastern red bat (*Lasiurus borealis*) and little brown bat (*Myotis lucifugus*). Big brown bats roost in buildings and tree cavities. Eastern red bats roost in the foliage of trees, typically, near water. Little brown bats typically roost in buildings (barns, outbuildings and attics). Nearly all of the forested area on the site provides suitable roosting habitat for eastern red bat. Trees with potentially suitable cavities for big brown bat are

scattered throughout the site. No roosting bats were observed within the proposed limits of disturbance for the project during 2007 or 2010.

In an October 14, 2005 letter to Touro College, Dr. Michael Klemens identified the "sludge drying fields" associated with an abandoned sewer treatment plant as nesting habitat for turtles and snakes. This sewer treatment plant is located outside the limits of disturbance for the project.

The unnamed tributary of the Ringwood River is contained entirely within delineated wetlands and other waters of the United States on the west side of the existing entrance road. The limits of these areas are currently under review by the United States Army Corps of Engineers (USACE). Project implementation is not anticipated to require disturbance or these wetlands/waters.

Comment 2 (Point 7)

Will there be impacts associated with any increase in invasive species?

Response

Non indigenous potentially invasive plant species exist on the site. Provided all areas disturbed are promptly revegetated with appropriate species and care is taken not to track plant propagules (e.g. root fragments) into undisturbed areas, project implementation should not result in any increase in invasive plant species.

Comment 3 (Point 8)

Describe Species of Greatest Conservation Need (SGCN) as listed in New York's Comprehensive Wildlife Conservation Strategy (CWCS) that are present on the site, their habitat and impacts to their habitat.

Response

New York currently lists some 537 SGCN. The basic criteria for listing a particular species as a SGCN include: 1) appears on federal list of threatened or endangered species; 2) appears on New York's list of threatened, endangered or species of special concern; 3) 20 or fewer elemental occurrences on the New York Natural Heritage Program Database; or 4) "best professional judgment" of New York Department of Environmental Conservation staff experts.

Habitat assessment and impacts analysis for state listed threatened and endangered species and state listed species of special concern (there are no federally listed species on the site) is provided in Section 4.0 of the *Ecological Resources Report* prepared by PS&S and dated July 2010. Other SGCN reported on the site include eastern red bat, black throated blue warbler (*Dendroica caerulescens*), scarlet tanager (*Piranga olivacea*), worm eating warbler (*Helmitheros vermivorus*), five lined skink (*Eumeces fasciatus*), northern black racer (*Coluber constrictor*) and snapping turtle (*Chelydra serptina*). Eastern

red bat, black throated blue warbler, scarlet tanager and worm eating warbler, to varying degrees, require forest for their habitat. Five lined skink and northern black racer will also use forested areas but also frequently use fields and developed areas for foraging and nesting. Snapping turtles are an aquatic species that use uplands for nesting.

Project implementation is not anticipated to have any significant long term impacts on five lined skink, northern black racer or snapping turtle habitat. Losses to some individuals may occur as a result of land clearing operations and additional motor vehicle activity on the site. These losses, however, are not anticipated to have any significant adverse impact on the species overall population.

Construction of the project will result in the direct loss of approximately 16-17 acres of the approximately 198 acres forested habitat suitable for eastern red bat, black throated blue warbler, scarlet tanager and worm eating warbler. The forested areas disturbed are not particularly unique in character in comparison to the remaining forested areas. Direct impacts to individuals of these could occur if tree clearing occurs during the nesting season (spring/summer). Given the extensive areas of other suitable habitat, the relatively small area of forest lost to project implementation should have no significant impact on these species overall population. Much of the loss of existing habitat can likely be mitigated by enhancing the remaining forested areas through appropriate forest management activities.

Comment 4 (Point 9)

How many acres of existing wildlife habitat (excluding existing developed/landscaped areas) will be developed? What species were found in the vernal habitat surveys? What amphibian species were observed in the road surveys? Was a hognose snake survey completed? Are there habitat needs for waterfowl on the lake?

Response

Project implementation will require the disturbance of approximately 16-17 acres of forested habitats. The remaining areas disturbed by the project have been previously disturbed or developed.

Spring peeper, gray tree frog and American toad tadpoles were found in the vernal habitats. There is no vernal habitat within the project's limit of disturbance. American toad was observed in the road surveys.

Between 2007 and 2010 approximately 30-40 hours were spent searching for reptiles (including hognose snake) and amphibians and examining their potential habitat and no hognose snakes were found on the site.

Project implementation will have no effect on the waterfowl habitat on the lake.

PS&S appreciates the opportunity to assist you with this project. If you have any additional questions or comments, please contact me.

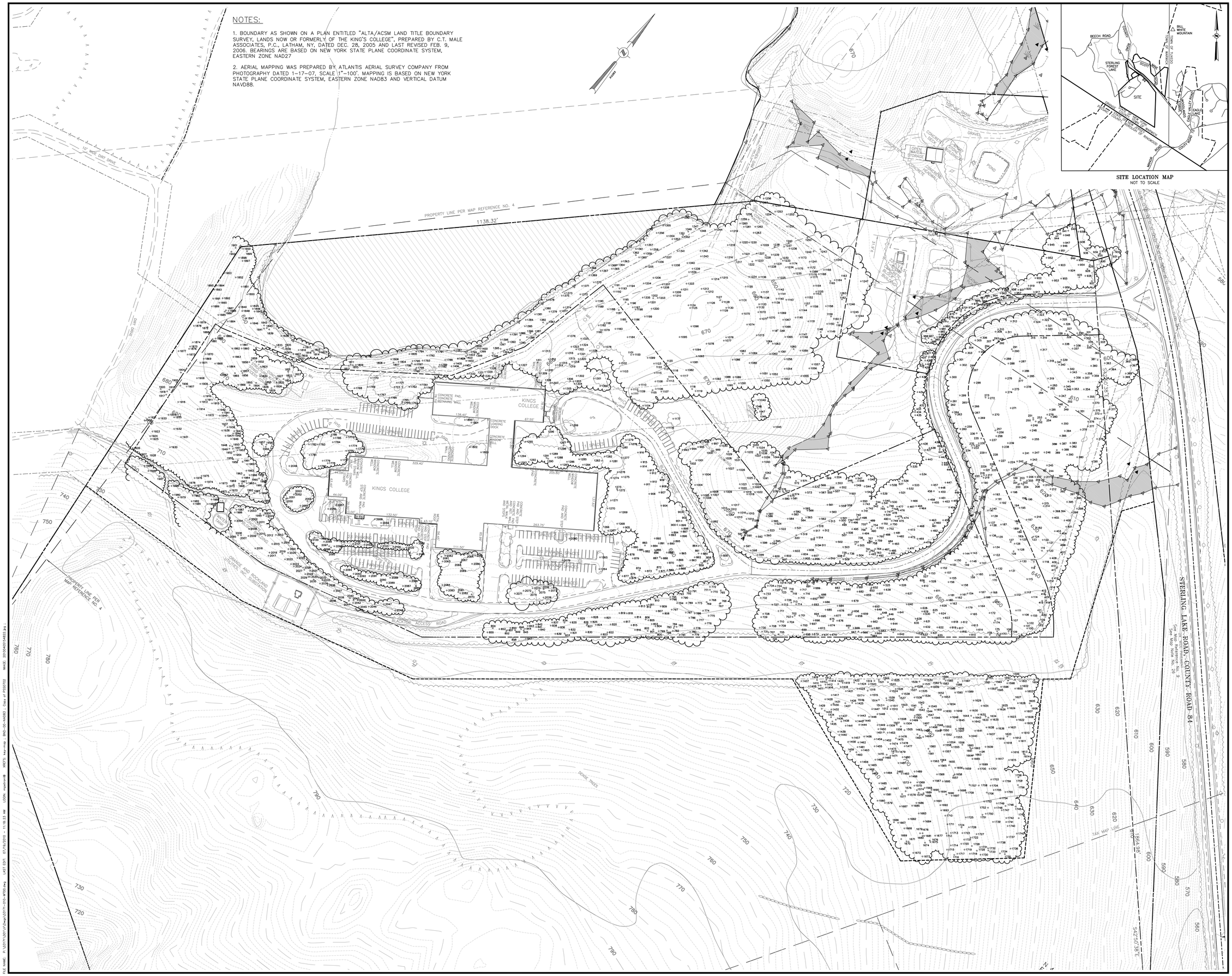
Very truly yours,

PAULUS SOKOLOWSKI AND SARTOR, LLC

Brian Kirkpatrick
Senior Associate

/bk

Appendix E-4



NOTES:

1. BOUNDARY AS SHOWN ON A PLAN ENTITLED "ALTA/ACSM LAND TITLE BOUNDARY SURVEY, LANDS NOW OR FORMERLY OF THE KING'S COLLEGE", PREPARED BY C.T. MALE ASSOCIATES, P.C., LATHAM, NY, DATED DEC. 28, 2005 AND LAST REVISED FEB. 9, 2006. BEARINGS ARE BASED ON NEW YORK STATE PLANE COORDINATE SYSTEM, EASTERN ZONE NAD27

2. AERIAL MAPPING WAS PREPARED BY ATLANTIS AERIAL SURVEY COMPANY FROM PHOTOGRAPHY DATED 1-17-07, SCALE 1"-100'. MAPPING IS BASED ON NEW YORK STATE PLANE COORDINATE SYSTEM, EASTERN ZONE NAD83 AND VERTICAL DATUM NAVD88.

SITE LOCATION MAP
NOT TO SCALE

REV. / ISSUE	DATE	BY	CHK	DESCRIPTION

CONSULTANT

CONSULTANT

ORIENTATION / KEY PLAN

PS&S
integrating design & engineering
PAULUS, SOKOLOWSKI AND SARTOR, PC
67A MOUNTAIN BOULEVARD EXTENSION
P.O. BOX 4039
WARREN, NEW JERSEY 07059
PHONE: (732) 560-9700
FAX: (732) 560-9768

CERTIFICATE OF AUTHORIZATION NO. 24GA28032700

JAROSLAVA VONDER
N.Y. LIC. NO. 50533-1

SIGNATURE DATE
PROFESSIONAL LAND SURVEYOR

CLIENT

WATCHTOWER
BIBLE AND TRACT
SOCIETY OF
NEW YORK

PROJECT

WORLD HEADQUARTERS
FOR
JEHOVAH'S WITNESSES,
WARWICK PROPERTY
TOWNSHIP OF WARWICK, ORANGE COUNTY, N.Y.

SHEET TITLE

TREE LOCATION SURVEY
PARCEL B4 AND PART OF
PARCEL A-13

JOB NO: 03171-001
DATE: 6/04/2010
DRAWN: MPP
CHECK: JV
SCALE: 1"=80'

BINDING ORDER:
SHEET 1 OF 3
SHEET NO.
TR-1

FILE NAME: P:\03171\001\V\Dwgs\03171-010-WT00.dwg LAST EDIT: 07/19/2010 - 11:18:23 AM LOGIN: mpetroni@ XREFS: key-map ; BND-00-NAD83 ; Copy of PSS0702 IMAGE: 20100405154822.jpg ;

NUMBER	DIAMETER	BOTANICAL NAME	COMMON NAME
100	13	Quercus prinus	Chestnut oak
101	15	Fagus grandifolia	American beech
102	13	Fagus grandifolia	American beech
103	36	Quercus prinus	Chestnut oak
104	12	Fagus grandifolia	American beech
105	21	Fagus grandifolia	American beech
106	20	Fagus grandifolia	American beech
107	25	Quercus velutina	Black oak
108	17	Fagus grandifolia	American beech
109	22	Quercus palustris	Pin oak
110	36	Quercus palustris	Pin oak
111	13	Fagus grandifolia	American beech
112	21	Fagus grandifolia	American beech
113	28	Fagus grandifolia	American beech
114	12	Quercus prinus	Chestnut oak
115	18	Quercus rubra	Red oak
116	21	Fagus grandifolia	American beech
117	20	Fagus grandifolia	American beech
118	21	Quercus alba	White oak
119	20	Fagus grandifolia	American beech
120	16	Quercus alba	White oak
121	14	Fagus grandifolia	American beech
122	13	Fagus grandifolia	American beech
123	20	Quercus alba	White oak
124	19	Fagus grandifolia	American beech
125	23	Quercus alba	White oak
126	13	Carpinus caroliniana	American hornbeam
127	12	Carpinus caroliniana	American hornbeam
128	14	Quercus alba	White oak
129	19	Quercus rubra	Red oak
130	20	Quercus rubra	Red oak
131	24	Fagus grandifolia	American beech
132	19	Quercus alba	White oak
133	15	Fagus grandifolia	American beech
134	24	Fagus grandifolia	American beech
135	15	Fagus grandifolia	American beech
136	17	Quercus rubra	Red oak
137	19	Quercus alba	White oak
138	35 Dbl.	Fagus grandifolia	American beech
139	33	Quercus alba	White oak
140	19	Fagus grandifolia	American beech
141	15	Quercus coccinea	Scarlet oak
142	18	Fagus grandifolia	American beech
143	15	Quercus coccinea	Scarlet oak
144	26	Quercus alba	White oak
145	18	Acer rubrum	Red maple
146	14	Fagus grandifolia	American beech
147	13	Fagus grandifolia	American beech
148	12	Fagus grandifolia	American beech
149	18	Quercus alba	White oak
150	29	Fagus grandifolia	American beech
151	14	Quercus alba	White oak
152	21	Quercus alba	White oak
153	15	Quercus alba	White oak
154	19	Fagus grandifolia	American beech
155	18	Quercus rubra	Red oak
156	16	Quercus rubra	Red oak
157	19	Fagus grandifolia	American beech
158	17	Fagus grandifolia	American beech
159	21	Fagus grandifolia	American beech
160	26	Fagus grandifolia	American beech
161	17	Fagus grandifolia	American beech
162	27	Quercus alba	White oak
163	15	Quercus bicolor	Swamp white oak
164	23	Fagus grandifolia	American beech
165	18	Acer rubrum	Red maple
166	12	Quercus bicolor	Swamp white oak
167	21	Fagus grandifolia	American beech
168	27	Quercus alba	White oak
169	15	Fagus grandifolia	American beech
170	24	Quercus bicolor	Swamp white oak
171	13	Fagus grandifolia	American beech
172	19	Fagus grandifolia	American beech
173	19	Quercus prinus	Chestnut oak
174	20	Fagus grandifolia	American beech
175	16	Quercus rubra	Red oak
176	22	Quercus rubra	Red oak
177	24 Dbl.	Carpinus caroliniana	American hornbeam
178	17	Quercus bicolor	Swamp white oak
179	19	Fagus grandifolia	American beech
180	26	Quercus alba	White oak
181	22	Fagus grandifolia	American beech
182	24	Quercus velutina	Black oak
183	15 Dbl.	Carpinus caroliniana	American hornbeam
184	27	Quercus alba	White oak
185	13	Fagus grandifolia	American beech
186	20	Fagus grandifolia	American beech
187	15	Quercus alba	White oak
188	15	Carya glabra	Pignut hickory
189	12	Fagus grandifolia	American beech
190	12	Betula nigra	River birch
191	23	Fagus grandifolia	American beech
192	22	Betula nigra	River birch
193	20	Betula nigra	River birch
194	16	Fraxinus americana	White ash
195	26	Quercus alba	White oak
196	16	Fagus grandifolia	American beech
197	21	Quercus bicolor	Swamp white oak
198	23	Populus deltoides	Eastern cottonwood
199	21	Quercus alba	White oak
200	19	Fagus grandifolia	American beech
201	14	Fagus grandifolia	American beech
202	12	Fagus grandifolia	American beech
203	20	Fagus grandifolia	American beech
204	15	Quercus prinus	Chestnut oak
205	19	Betula nigra	River birch
206	13	Betula nigra	River birch
207	12	Carya ovata	Shagbark hickory
208	15	Carya glabra	Pignut hickory
209	12	Quercus prinus	Chestnut oak
210	20	Quercus bicolor	Swamp white oak
211	23	Liriodendron tulipifera	Tuliptree
212	19	Liriodendron tulipifera	Tuliptree
213	23	Liriodendron tulipifera	Tuliptree
214	13	Quercus alba	White oak
215	16	Liriodendron tulipifera	Tuliptree
216	19	Quercus alba	White oak
217	14	Populus deltoides	Eastern cottonwood
218	15	Populus deltoides	Eastern cottonwood
219	15	Populus deltoides	Eastern cottonwood
220	15	Populus deltoides	Eastern cottonwood
221	16	Populus deltoides	Eastern cottonwood
222	12	Populus deltoides	Eastern cottonwood
223	14	Quercus prinus	Chestnut oak
224	21	Quercus alba	White oak
225	14	Acer rubrum	Red maple
226	20	Acer rubrum	Red maple
227	12	Fagus grandifolia	American beech
228	23	Fagus grandifolia	American beech
229	22	Fraxinus americana	White ash
230	17	Quercus velutina	Black oak
231	13	Fagus grandifolia	American beech
232	13	Populus deltoides	Eastern cottonwood
233	14	Populus deltoides	Eastern cottonwood
234	22	Quercus alba	White oak
235	17	Quercus rubra	Red oak
236	18	Quercus rubra	Red oak
237	24	Fraxinus nigra	Black ash
238	14	Fagus grandifolia	American beech
239	25	Acer rubrum	Red maple
240	20	Fraxinus nigra	Black ash
241	17	Acer rubrum	Red maple
242	27	Acer rubrum	Red maple
243	27	Liriodendron tulipifera	Tuliptree
244	15	Carya glabra	Pignut hickory
245	31	Liriodendron tulipifera	Tuliptree
246	15	Fagus grandifolia	American beech
247	18	Quercus palustris	Pin oak
248	27	Quercus velutina	Black oak
249	16	Robinia pseudoacacia	Black locust
250	18	Robinia pseudoacacia	Black locust
251	20	Robinia pseudoacacia	Black locust
252	13	Quercus prinus	Chestnut oak
253	30	Liriodendron tulipifera	Tuliptree
254	20	Populus deltoides	Eastern cottonwood
255	17	Quercus alba	White oak
256	17	Quercus alba	White oak
257	16	Quercus prinus	Chestnut oak
258	18	Quercus alba	White oak
259	15	Quercus velutina	Black oak
260	21	Populus deltoides	Eastern cottonwood
261	14	Quercus rubra	Red oak
262	14	Quercus rubra	Red oak
263	17	Populus deltoides	Eastern cottonwood
264	23	Populus deltoides	Eastern cottonwood
265	32	Quercus alba	White oak
266	21	Quercus prinus	Chestnut oak
267	26	Quercus alba	White oak
268	19	Populus deltoides	Eastern cottonwood
269	25	Populus deltoides	Eastern cottonwood
270	42	Quercus rubra	Red oak
271	23	Quercus prinus	Chestnut oak
272	17	Fagus grandifolia	American beech
273	17	Fraxinus nigra	Black ash
274	39	Quercus rubra	Red oak
275	20	Fraxinus nigra	Black ash
276	22 Dbl.	Fraxinus nigra	Black ash
277	20	Quercus prinus	Chestnut oak
278	22	Quercus prinus	Chestnut oak
279	35	Liriodendron tulipifera	Tuliptree
280	17	Quercus prinus	Chestnut oak
281	18	Quercus prinus	Chestnut oak
282	40	Quercus prinus	Chestnut oak
283	20	Quercus alba	White oak
284	21	Quercus rubra	Red oak
285	34 Dbl.	Prunus serotina	Black cherry
286	23	Fraxinus nigra	Black ash
287	15	Quercus rubra	Red oak
288	32	Quercus rubra	Red oak
289	12	Fraxinus nigra	Black ash
290	23	Quercus palustris	Pin oak
291	15	Fraxinus nigra	Black ash
292	32	Quercus prinus	Chestnut oak
293	20	Acer rubrum	Red maple
294	20	Quercus bicolor	Swamp white oak
295	31	Quercus bicolor	Swamp white oak
296	28	Acer platanoides	Norway maple
297	19	Fraxinus americana	White ash
298	24	Fraxinus americana	White ash
299	17	Fraxinus americana	White ash
300	16	Acer platanoides	Norway maple
301	25 Dbl.	Quercus bicolor	Swamp white oak
302	13	Quercus bicolor	Swamp white oak
303	17	Fagus grandifolia	American beech
304	14	Quercus rubra	Red oak
305	14	Quercus rubra	Red oak
306	16	Quercus alba	White oak
307	20	Acer saccharinum	Silver maple
308	30	Quercus prinus	Chestnut oak
309	23	Quercus prinus	Chestnut oak
310	18	Fagus grandifolia	American beech
311	20	Fagus grandifolia	American beech
312	20	Fagus grandifolia	American beech
313	23	Fagus grandifolia	American beech
314	20	Acer saccharinum	Silver maple
315	13	Fagus grandifolia	American beech
316	46	Quercus velutina	Black Oak
317	16	Fagus grandifolia	American beech
318	27	Acer saccharinum	Silver maple
319	35	Quercus velutina	Black Oak
320	15	Fagus grandifolia	American beech
321	14	Fagus grandifolia	American beech
322	20	Fagus grandifolia	American beech
323	23	Fagus grandifolia	American beech
324	14	Carpinus caroliniana	American hornbeam
325	37 Dbl.	Acer saccharum	Sugar maple
326	21	Acer saccharum	Sugar maple
327	19	Acer saccharum	Sugar maple
328	15	Quercus palustris	Pin oak
329	24	Acer rubrum	Red maple
330	27	Betula nigra	River birch
331	27	Fraxinus nigra	Black ash
332	12	Pinus strobus	White pine
333	23	Pinus strobus	White pine
334	17	Pinus strobus	White pine
335	14	Pinus strobus	White pine
336	23	Acer rubrum	Red maple
337	28	Acer rubrum	Red maple
338	19	Acer rubrum	Red maple
339	21	Acer rubrum	Red maple
340	14	Acer rubrum	Red maple
341	19	Fraxinus nigra	Black ash
342	22	Robinia pseudoacacia	Black locust
343	16	Betula populifolia	Gray birch
344	13	Fraxinus nigra	Black ash
345	17	Betula populifolia	Gray birch
346	12	Fraxinus nigra	Black ash
347	24	Acer saccharinum	Silver maple
348	27	Acer saccharum	Sugar maple
349	14	Acer saccharum	Sugar maple
350	33	Robinia pseudoacacia	Black locust
351	13	Quercus alba	White oak
352	14	Quercus alba	White oak
353	16	Quercus alba	White oak
354	41	Acer rubrum	Red maple
355	24	Fraxinus nigra	Black ash
356	23	Fraxinus nigra	Black ash
357	25	Acer platanoides	Norway maple
358	19	Acer platanoides	Norway maple
359	35	Acer platanoides	Norway maple
360	33	Acer platanoides	Norway maple
361	29	Acer platanoides	Norway maple
362	39	Liriodendron tulipifera	Tuliptree
363	24	Acer platanoides	Norway maple
364	22	Fraxinus nigra	Black ash
365	31	Pinus strobus	White pine
366	22	Pinus strobus	White pine
367	18	Pinus strobus	White pine
368	16	Robinia pseudoacacia	Black locust
369	13	Robinia pseudoacacia	Black locust
370	29	Acer rubrum	Red maple
371	19	Robinia pseudoacacia	Black locust
372	23	Robinia pseudoacacia	Black locust
373	19	Fraxinus nigra	Black ash
374	17	Robinia pseudoacacia	Black locust
375	19	Robinia pseudoacacia	Black locust
376	20	Robinia pseudoacacia	Black locust
377	26	Acer saccharum	Sugar maple
378	19	Robinia pseudoacacia	Black locust
379	17	Robinia pseudoacacia	Black locust
380	33	Liriodendron tulipifera	Tuliptree
381	17	Acer rubrum	Red maple
382	30	Acer rubrum	Red maple
383	20	Robinia pseudoacacia	Black locust
384	14	Carpinus caroliniana	American hornbeam
385	32	Quercus rubra	Red oak
386	13	Quercus rubra	Red oak
387	26	Quercus rubra	Red oak
388	22	Quercus rubra	Red oak
389	25	Quercus palustris	Pin oak
390	23	Quercus rubra	Red oak
391	26	Quercus alba	White oak
392	27	Quercus alba	White oak
393	26	Quercus alba	White oak
394	29	Quercus alba	White oak
395	34	Quercus rubra	Red oak
396	26	Acer rubrum	Red maple
397	19	Acer rubrum	Red maple
398	12	Betula lenta	Sweet birch
399	28	Quercus rubra	Red oak
400	25	Quercus rubra	Red oak
401	29	Quercus alba	White oak
402	30	Fraxinus nigra	Black ash
403	15	Fagus grandifolia	American beech
404	28	Fagus grandifolia	American beech
405	21	Quercus alba	White oak
406	24	Fagus grandifolia	American beech
407	23	Fagus grandifolia	American beech
408	25	Fagus grandifolia	American beech
409	20	Fraxinus nigra	Black ash
410	19	Fagus grandifolia	American beech
411	18	Fraxinus nigra	Black ash
412	26	Quercus prinus	Chestnut oak
413	15	Fagus grandifolia	American beech
414	19	Quercus prinus	Chestnut oak
415	13	Quercus prinus	Chestnut oak
416	14	Quercus bicolor	Swamp white oak
417	20	Quercus bicolor	Swamp white oak
418	20	Fagus grandifolia	American beech
419	20	Fagus grandifolia	American beech
420	16	Fagus grandifolia	American beech
421	21	Quercus rubra	Red oak
422	16	Pinus strobus	White pine
423	23	Pinus strobus	White pine
424	26	Pinus strobus	White pine
425	24	Pinus strobus	White pine
426	18	Pinus strobus	White pine
427	23	Pinus strobus	White pine
428	28	Pinus strobus	White pine
429	22 Dbl.	Pinus strobus	White pine
430	25	Quercus rubra	Red oak
431	25	Quercus rubra	Red oak
432	28	Quercus rubra	Red oak
433	20	Fraxinus nigra	Black ash
434	20	Fraxinus nigra	Black ash
435	18	Acer rubrum	Red maple
436	26	Quercus alba	White oak
437	26	Quercus alba	White oak
438	19	Quercus alba	White oak
439	38	Fagus grandifolia	American beech
440	28	Carya glabra	Pignut hickory
441	13	Carya glabra	Pignut hickory
442	13	Fagus grandifolia	American beech
443	36	Fagus grandifolia	American beech
444	20	Betula populifolia	Gray birch
445	18	Fagus grandifolia	American beech
446	20	Quercus alba	White oak
447	18	Fagus grandifolia	American beech
448	28	Quercus alba	White oak
449	28	Quercus alba	White oak
450	24	Quercus alba	White oak
451	12	Betula populifolia	Gray birch
452	15	Betula populifolia	Gray birch
453	15	Betula populifolia	Gray birch
454	25	Quercus alba	White oak
455	25	Quercus alba	White oak
456	23	Quercus alba	White oak
457	24	Quercus alba	White oak
458	18	Quercus alba	White oak
459	16	Fagus grandifolia	American beech
460	19	Quercus alba	White oak
461	14	Quercus alba	White oak
462	34	Quercus velutina	Black Oak
463	16	Quercus alba	White oak
464	23	Quercus alba	White oak
465	22	Fagus grandifolia	American beech
466	23	Quercus alba	White oak
467	19	Fraxinus nigra	Black ash
468	25	Quercus alba	White oak
469	28	Fagus grandifolia	American beech
470	15	Acer rubrum	Red maple
471	24	Betula populifolia	Gray birch
472	15	Fagus grandifolia	American beech
473	41	Quercus rubra	Red oak
474	20	Quercus alba	White oak
475	12	Fagus grandifolia	American beech
476	14	Carpinus caroliniana	American hornbeam
477	14	Carpinus caroliniana	American hornbeam
478	16	Fagus grandifolia	American beech
479	12	Fagus grandifolia	American beech
480	46	Quercus alba	White oak
481	36	Quercus alba	White oak
482	15	Quercus alba	White oak
483	12	Carya glabra	Pignut hickory
484	19	Quercus alba	White oak
485	25	Quercus alba	White oak
486	14	Quercus alba	White oak
487	22	Quercus alba	White oak
488	19	Quercus alba	White oak
489	42	Acer rubrum	Red maple
490	19	Quercus bicolor	Swamp white oak
491	24	Carya glabra	Pignut hickory
492	15	Quercus alba	White oak
493	12	Fagus grandifolia	American beech
494	25	Quercus bicolor	Swamp white oak
495	12	Quercus alba	White oak
496	23	Quercus alba	White oak
497	24	Quercus alba	White oak
498	19	Quercus alba	White oak
499	19	Quercus alba	White oak
500	19	Quercus velutina	Black Oak
501	24	Quercus alba	White oak
502	18	Quercus alba	White oak
503	24	Fagus grandifolia	American beech
504	19	Fagus grandifolia	American beech
505	18	Carya glabra	Pignut hickory
506	16	Quercus alba	White oak
507	16	Fraxinus nigra	Black ash
508	15	Fagus grandifolia	American beech
509	15	Fagus grandifolia	American beech
510	24	Quercus alba	White oak
511	32	Quercus alba	White oak
512	36	Quercus alba	White oak
513	18	Quercus pinus	Chestnut oak
514	43 Dbl.	Quercus pinus	Chestnut oak
515	32	Quercus alba	White oak
516	25	Quercus prinus	Chestnut oak
517	15	Betula populifolia	Gray birch
518	24	Quercus alba	White oak
519	16	Quercus prinus	Chestnut oak
520	23	Fagus grandifolia	American beech
521	30	Quercus alba	White oak
522	17	Fagus grandifolia	American beech
523	21	Fraxinus nigra	Black ash
524	28	Quercus alba	White oak
525	14	Carpinus caroliniana	American hornbeam
526	16	Carpinus caroliniana	American hornbeam
527	15	Quercus alba	White oak
528	24	Quercus alba	White oak
529	13	Quercus alba	White oak
530	19	Quercus alba	White oak
531	22	Fagus grandifolia	American beech
532	18	Quercus alba	White oak
533	15	Acer rubrum	Red maple
534	24	Quercus velutina	Black Oak
535	19	Acer rubrum	Red maple
536	26	Fagus grandifolia	American beech
537	22	Fagus grandifolia	American beech
538	25	Fagus grandifolia	American beech
539	12	Quercus velutina	Black Oak
540	18	Fagus grandifolia	American beech
541	14	Fagus grandifolia	American beech
542	24	Quercus alba	White oak
543	23	Quercus alba	White oak
544	14	Quercus alba	White oak
545	42	Quercus bicolor	Swamp white oak
546	20	Betula populifolia	Gray birch
547	20	Fagus grandifolia	American beech
548	15	Betula populifolia	Gray birch
549	13	Quercus prinus	Chestnut oak
550	25	Quercus alba	White oak
551	36 Dbl.	Quercus rubra	Red oak
552	15	Quercus palustris	Pin oak
553	48	Quercus velutina	Black Oak
554	13	Quercus palustris	Pin oak
555	16	Quercus alba	White oak
556	16	Fraxinus nigra	Black ash
557	30 Dbl.	Quercus alba	White oak
558	18	Quercus alba	White oak
559	26	Quercus alba	White oak
560	24	Quercus alba	White oak
561	24	Quercus muehlenbergii	Chinkapin oak
562	19	Quercus muehlenbergii	Chinkapin oak
563	28	Betula populifolia	Gray birch
564	14	Fagus grandifolia	American beech
565	28	Quercus muehlenbergii	Chinkapin oak
566	27	Quercus muehlenbergii	Chinkapin oak
567	26	Quercus muehlenbergii	Chinkapin oak
568	18	Fraxinus nigra	Black ash
569	15	Quercus velutina	Black Oak
570	23	Quercus prinus	Chestnut oak
571	19	Quercus muehlenbergii	Chinkapin oak
572	19 Dbl.	Betula populifolia	Gray birch
573	24	Betula populifolia	Gray birch
574	16	Fagus grandifolia	American beech
575	15 Dbl.	Fagus grandifolia	American beech
576	24	Fagus grandifolia	American beech
577	15	Fagus grandifolia	American beech
578	17	Fagus grandifolia	American beech
579	27	Fagus grandifolia	American beech
580	24	Carya glabra	Pignut hickory
581	19	Quercus velutina	Black Oak
582	14	Fagus grandifolia	American beech
583	17	Fagus grandifolia	American beech
584	41 Triple	Betula populifolia	Gray birch
585	21	Quercus alba	White oak
586	18	Carya ovata	Shagbark hickory
587	26	Fagus grandifolia	American beech
588	25	Fraxinus nigra	Black ash
589	24	Quercus pinus	Chestnut oak
590	22	Quercus velutina	Black Oak
591	14	Quercus prinus	Chestnut oak
592	25	Quercus prinus	Chestnut oak
593	14	Betula populifolia	Gray birch
594	26	Quercus alba	White oak
595	12	Fagus grandifolia	American beech
596	35 Dbl.	Quercus alba	White oak
597	26	Quercus prinus	Chestnut oak
598	25	Quercus alba	White oak
599	20	Fagus grandifolia	American beech
600	18	Fagus grandifolia	American beech
601	27	Quercus alba	White oak
602	14	Fagus grandifolia	American beech
603	36	Quercus alba	White oak
604	18 Dbl.	Betula populifolia	Gray birch
605	14	Quercus prinus	Chestnut oak
606	18	Fagus grandifolia	American beech
607	16	Quercus alba	White oak
608	18	Quercus palustris	Pin oak
609	26	Quercus alba	White oak
610	28	Quercus alba	White oak
611	32	Quercus alba	White oak
612	20	Fagus grandifolia	American beech
613	25	Fagus grandifolia	American beech
614	26	Fraxinus nigra	Black ash
615	23	Fagus grandifolia	American beech
616	15	Fagus grandifolia	American beech
617	17	Fagus grandifolia	American beech
618	16	Fagus grandifolia	American beech
619	26	Fagus grandifolia	American beech
620	18	Liriodendron tulipifera	Tuliptree
621	18	Liriodendron tulipifera	Tuliptree
622	13	Quercus velutina	Black Oak
623	14	Fagus grandifolia	American beech
624	16	Acer rubrum	Red maple
625	18	Fagus grandifolia	American beech
626	12	Quercus rubra	Red oak
627	24	Quercus bicolor	Swamp white oak
628	27	Fraxinus nigra	Black ash
629	32 Dbl.	Fagus grandifolia	American beech
630	24	Quercus velutina	Black Oak
631	23 Dbl.	Quercus prinus	Chestnut oak
632	22 Dbl.	Acer rubrum	Red maple
633	20	Robinia pseudoacacia	Black locust
634	15	Fagus grandifolia	American beech
635	26	Quercus alba	White oak
636	26	Quercus alba	White oak
637	44	Quercus velutina	Black Oak
638	24	Quercus alba	White oak
639	36	Quercus alba	White oak
640	12	Carpinus caroliniana	American hornbeam
641	12	Quercus alba	White oak
642	28	Quercus alba	White oak
643	24	Acer rubrum	Red maple
644	32 Dbl.	Quercus alba	White oak
645	33	Quercus alba	White oak
646	19	Acer rubrum	Red maple
647	30 Dbl.	Quercus prinus	Chestnut oak
648	19	Quercus prinus	Chestnut oak
649	16	Fagus grandifolia	American beech
650	15	Carya glabra	Pignut hickory
651	15	Quercus prinus	Chestnut oak
652	17	Quercus alba	White oak
653	17	Quercus velutina	Black Oak
654	12	Quercus prinus	Chestnut oak
655	24 Dbl.	Fagus grandifolia	American beech
656	12	Quercus alba	White oak
657	12	Quercus alba	White oak
658	24	Quercus prinus	Chestnut oak
659	36 Triple	Quercus prinus	Chestnut oak
660	22	Quercus alba	White oak
661	12	Quercus alba	White oak
662	12	Fagus grandifolia	American beech
663	33	Quercus alba	White oak
664	20	Quercus prinus	Chestnut oak
665	21	Quercus alba	White oak
666	36	Quercus alba	White oak
667	14	Fagus grandifolia	American beech
668	24	Quercus alba	White oak
669	27	Quercus alba	White oak
670	12	Quercus prinus	Chestnut oak
671	18	Quercus alba	White oak
672	17	Quercus prinus	Chestnut oak
673	20	Fagus grandifolia	American beech
674	15	Quercus muehlenbergii	Chinkapin oak
675	16	Quercus muehlenbergii	Chinkapin oak
676	18	Quercus muehlenbergii	Chinkapin oak
677	24	Quercus muehlenbergii	Chinkapin oak
678	35	Quercus muehlenbergii	Chinkapin oak
679	17	Fagus grandifolia	American beech
680	13	Fagus grandifolia	American beech
681	13	Carya ovata	Shagbark hickory
682	14	Fagus grandifolia	American beech
683	26	Quercus muehlenbergii	Chinkapin oak
684	17 Dbl.	Fagus grandifolia	American beech
685	14	Quercus alba	White oak
686	26 Dbl.	Quercus alba	White oak
687	42	Quercus prinus	Chestnut oak
688	12	Quercus alba	White oak
689	24	Quercus alba	White oak
690	19 Dbl.	Quercus prinus	Chestnut oak
691	40 Dbl.	Quercus prinus	Chestnut oak
692	36	Quercus alba	White oak
693	12	Quercus velutina	Black Oak
694	15	Fagus grandifolia	American beech
695	35	Quercus alba	White oak
696	12	Quercus prinus	Chestnut oak
697	16	Quercus alba	White oak
698	13	Quercus velutina	Black Oak
699	15	Fagus grandifolia	American beech
700	27	Quercus velutina	Black Oak
701	15	Quercus prinus	Chestnut oak
702	15	Quercus velutina	Black Oak
703	37 Dbl.	Quercus prinus	Chestnut oak
704	30	Quercus rubra	Red oak
705	18	Carya glabra	Pignut hickory
706	14	Quercus alba	White oak
707	20	Quercus bicolor	Swamp white oak
708	12	Quercus bicolor	Swamp white oak
709	24	Quercus bicolor	Swamp white oak
710	12	Quercus bicolor	Swamp white oak
711	28	Quercus bicolor	Swamp white oak
712	13	Quercus muehlenbergii	Chinkapin oak
713	25	Quercus muehlenbergii	Chinkapin oak
714	14	Carya glabra	Pignut hickory
715	13	Quercus velutina	Black Oak
716	21	Quercus alba	White oak
717	17	Quercus rubra	Red oak
718	26	Quercus prinus	Chestnut oak
719	14	Quercus prinus	Chestnut oak
720	18	Quercus bicolor	Swamp white oak
721	14	Acer rubrum	Red maple
722	19	Quercus prinus	Chestnut oak
723	14	Quercus prinus	Chestnut oak
724	22	Fagus grandifolia	American beech
725	12	Quercus prinus	Chestnut oak
726	14	Quercus bicolor	Swamp white oak
727	15	Quercus alba	White oak
728	36	Quercus rubra	Red oak
729	22	Quercus prinus	Chestnut oak
730	40	Quercus rubra	Red oak
731	15	Quercus prinus	Chestnut oak
732	20	Fagus grandifolia	American beech
733	18 Dbl.	Quercus palustris	Pin oak
734	20	Fagus grandifolia	American beech
735	14	Betula lenta	Sweet birch
736	18 Dbl.	Fagus grandifolia	American beech
737	36	Quercus velutina	Black Oak
738	18	Quercus prinus	Chestnut oak
739	18 Dbl.	Quercus bicolor	Swamp white oak
740	14	Quercus prinus	Chestnut oak
741	12	Quercus velutina	Black Oak
742	34	Quercus alba	White oak
743	16	Fagus grandifolia	American beech
744	18	Quercus muehlenbergii	Chinkapin oak
745	20	Quercus rubra	Red oak
746	14	Quercus prinus	Chestnut oak
747	48 Dbl.	Quercus prinus	Chestnut oak
748	14	Quercus muehlenbergii	Chinkapin oak
749	14	Quercus muehlenbergii	Chinkapin oak
750	15	Quercus prinus	Chestnut oak
751	12	Fagus grandifolia	American beech
752	14	Quercus palustris	Pin oak
753	14	Quercus muehlenbergii	Chinkapin oak
754	12	Carpinus caroliniana	American hornbeam
755	18	Quercus prinus	Chestnut oak
756	36	Quercus velutina	Black Oak
757	12	Quercus alba	White oak
758	12	Quercus alba	White oak
759	12	Quercus alba	White oak
760	14	Quercus muehlenbergii	Chinkapin oak
761	18	Fagus grandifolia	American beech
762	12	Quercus muehlenbergii	Chinkapin oak
763	14	Quercus prinus	Chestnut oak
764	18	Quercus prinus	Chestnut oak
765	12	Quercus prinus	Chestnut oak
766	18	Fagus grandifolia	American beech
767	16	Quercus muehlenbergii	Chinkapin oak
768	14	Quercus bicolor	Swamp white oak
769	16	Fagus grandifolia	American beech
770	42	Acer saccharum	Sugar maple
771	18	Quercus bicolor	Swamp white oak
772	15	Quercus rubra	Red oak
773	20	Acer saccharum	Sugar maple
774	16	Quercus bicolor	Swamp white oak
775	15	Quercus prinus	Chestnut oak
776	115	Carya glabra	Pignut hickory
777	42	Quercus bicolor	Swamp white oak
778	15	Quercus muehlenbergii	Chinkapin oak
779	18	Quercus prinus	Chestnut oak
780	14	Quercus muehlenbergii	Chinkapin oak
781	14	Quercus muehlenbergii	Chinkapin oak
782	15	Fagus grandifolia	American beech
783	12	Quercus palustris	Pin oak
784	18	Acer saccharinum	Silver maple
785	12	Quercus bicolor	Swamp white oak
786	12	Quercus alba	White oak
787	14	Quercus velutina	Black Oak
788	14	Fagus grandifolia	American beech
789	14	Quercus bicolor	Swamp white oak
790	18	Acer saccharinum	Silver maple
791	18	Quercus alba	White oak
792	16	Quercus velutina	Black oak
793	12	Fagus grandifolia	American beech
794	21	Quercus alba	White oak
795	14	Quercus prinus	Chestnut oak
796	16	Fagus grandifolia	American beech
797	24	Fagus grandifolia	American beech
798	24	Quercus velutina	Black Oak
799	12	Carya glabra	Pignut hickory
800	12	Quercus velutina	Black Oak
801	12	Fagus grandifolia	American beech
802	24	Quercus alba	White oak
803	14	Fraxinus nigra	Black ash
804	13	Acer saccharinum	Silver maple
805	20	Quercus prinus	Chestnut oak
806	46	Acer saccharinum	Silver maple
807	18	Quercus velutina	Black Oak
808	22	Quercus alba	White oak
809	12	Quercus palustris	Pin oak
810	12	Acer saccharum	Sugar maple
811	32	Quercus velutina	Black Oak
812	12	Fagus grandifolia	American beech
813	14	Betula lenta	Sweet birch
814	18	Acer rubrum	Red maple
815	24	Acer saccharinum	Silver maple
816	22	Quercus alba	White oak
817	22	Quercus alba	White oak
818	24	Quercus alba	White oak
819	18 Dbl.	Carpinus caroliniana	American hornbeam
820	16	Quercus bicolor	Swamp white oak
821	20	Fagus grandifolia	American beech
822	14	Fagus grandifolia	American beech
823	28 Dbl.	Betula lenta	Sweet birch
824	24 Dbl.	Betula lenta	Sweet birch
825	18	Betula lenta	Sweet birch
826	18	Betula lenta	Sweet birch
827	18	Fagus grandifolia	American beech
828	24	Quercus alba	White oak
829	28	Quercus rubra	Red oak
830	24 Dbl.	Fagus grandifolia	American beech
831	28	Fagus grandifolia	American beech
832	25	Fagus grandifolia	American beech
833	12	Fagus grandifolia	American beech
834	18	Quercus alba	White oak
835	14	Betula populifolia	Gray birch
836	18	Betula populifolia	Gray birch
837	48 Mulit.	Quercus rubra	Red oak
838	14	Quercus rubra	Red oak
839	14	Fagus grandifolia	American beech
840	30	Fagus grandifolia	American beech
841	18 Triple	Tilia americana	American linden
842	18	Tilia americana	American linden
843	12	Acer saccharinum	Silver maple
844	14	Acer saccharinum	Silver maple
845	12	Populus grandidentata	Bigtooth aspen
846	18	Populus grandidentata	Bigtooth aspen
847	14	Acer rubrum	Red maple
848	20	Acer saccharinum	Silver maple
849	12	Quercus rubra	Red oak
850	16	Quercus alba	White oak
851	16	Quercus muehlenbergii	Chinkapin oak
852	24	Fraxinus nigra	Black ash
853	16	Betula populifolia	Gray birch
854	18 Triple	Carpinus caroliniana	American hornbeam
855	32	Fraxinus nigra	Black ash
856	14	Malus pink	Pink crabapple
857	32	Quercus prinus	Chestnut oak
858	14	Tsuga canadensis	Eastern hemlock
859	18	Quercus alba	White oak
860	28	Quercus prinus	Chestnut oak
861	22	Quercus alba	White oak
862	18	Quercus palustris	Pin
863	24	Quercus rubra	Red oak
864	20	Betula lenta	Sweet birch
865	20	Quercus alba	White oak
866	20	Betula populifolia	Gray birch
867	24	Quercus alba	White oak
868	18	Carya ovata	Shagbark hickory
869	15	Fraxinus nigra	Black ash
870	18	Quercus alba	White oak
871	18	Quercus muehlenbergii	Chinkapin oak
872	24	Quercus alba	White oak
873	18	Quercus prinus	Chestnut oak
874	24	Acer saccharinum	Silver maple
875	14	Fagus grandifolia	American beech
876	26	Quercus alba	White oak
877	28	Acer saccharinum	Silver maple
878	22	Fraxinus americana	White ash
879	22	Acer saccharinum	Silver maple
880	26	Quercus alba	White oak
881	12	Fraxinus americana	White ash
882	16	Carya glabra	Pignut hickory
883	22	Carya glabra	Pignut hickory
884	18	Carya ovata	Shagbark hickory
885	19	Betula populifolia	Gray birch
886	26	Quercus rubra	Red oak
887	20	Quercus alba	White oak
888	14	Acer saccharinum	Silver maple
889	16	Liriodendron tulipifera	Tuliptree
890	48	Quercus rubra	Red oak
891	16	Fagus grandifolia	American beech
892	15	Carya glabra	Pignut hickory
893	22	Betula nigra	River birch
894	14	Fagus grandifolia	American beech
895	22	Quercus alba	White oak
896	22	Betula nigra	River birch
897	14	Fagus grandifolia	American beech
898	24	Fagus grandifolia	American beech
899	23	Fagus grandifolia	American beech
900	20	Betula nigra	River birch
901	24	Quercus alba	White oak
902	48	Quercus alba	White oak
903	36	Quercus rubra	Red oak
904	36	Quercus rubra	Red oak
905	36	Liriodendron tulipifera	Tuliptree
906	15	Fraxinus nigra	Black ash
907	18	Fraxinus nigra	Black ash
908	32	Quercus velutina	Black Oak
909	26	Fraxinus americana	White ash
910	24	Prunus serotina	Black cherry
911	48	Quercus velutina	Black Oak
912	14	Fagus grandifolia	American beech
913	20	Quercus alba	White oak
914	15	Fagus grandifolia	American beech
915	28	Quercus velutina	Black Oak
916	36	Quercus rubra	Red oak
917	16	Quercus rubra	Red oak
918	32	Acer saccharinum	Silver maple
919	15	Betula lenta	Sweet birch
920	26	Quercus rubra	Red oak
921	14	Pinus strobus	White pine
922	19	Quercus rubra	Red oak
923	27	Acer saccharinum	Silver maple
924	24	Acer saccharinum	Silver maple
925	12	Pinus strobus	White pine
926	36	Fraxinus americana	White ash
927	34	Acer saccharinum	Silver maple
928	12	Acer saccharinum	Silver maple
929	24	Acer saccharinum	Silver maple
930	17	Acer saccharinum	Silver maple
931	38	Quercus rubra	Red oak
932	18	Quercus rubra	Red oak
933	22	Acer saccharinum	Silver maple
934	18	Acer saccharinum	Silver maple
935	16	Acer saccharinum	Silver maple
936	16	Acer saccharinum	Silver maple
937	20	Acer saccharinum	Silver maple
938	20	Fraxinus americana	White ash
939	25 Dbl.	Fraxinus americana	White ash
940	12	Quercus alba	White oak
941	47 Dbl.	Fraxinus americana	White ash
942	27	Robinia pseudoacacia	Black locust
943	12	Quercus rubra	Red oak
944	24 Dbl.	Quercus velutina	Black oak
945	14 Dbl.	Quercus palustris	Pin oak
946	14	Quercus palustris	Pin oak
947	15	Fraxinus americana	White ash
948	17	Fraxinus nigra	Black ash
949	31	Carya glabra	Pignut hickory
950	19	Acer saccharinum	Silver maple
951	22	Quercus palustris	Pin oak
952	46	Quercus palustris	Pin oak
953	29	Fagus grandifolia	American beech
954	20	Quercus palustris	Pin oak
955	28	Acer saccharinum	Silver maple
956	38	Acer saccharinum	Silver maple
957	23 Dbl.	Pinus strobus	White pine
958	22	Pinus strobus	White pine
959	20	Pinus strobus	White pine
960	18	Pinus strobus	White pine
961	17	Quercus rubra	Red oak
962	15	Pinus strobus	White pine
963	20	Pinus strobus	White pine
964	14 Dbl.	Pinus strobus	White pine
965	32	Pinus strobus	White pine
966	19	Pinus strobus	White pine
967	16	Pinus strobus	White pine
968	19	Pinus strobus	White pine
969	14	Pinus strobus	White pine
970	16	Pinus strobus	White pine
971	17	Pinus strobus	White pine
972	14	Pinus strobus	White pine
973	20	Pinus strobus	White pine
974	20	Pinus strobus	White pine
975	14	Pinus strobus	White pine
976	17	Pinus strobus	White pine
977	20	Pinus strobus	White pine
978	25	Pinus strobus	White pine
979	17	Pinus strobus	White pine
980	14	Pinus strobus	White pine
981	12	Pinus strobus	White pine
982	16	Pinus strobus	White pine
983	24	Pinus strobus	White pine
984	15	Pinus strobus	White pine
985	24 Dbl.	Pinus strobus	White pine
986	16	Pinus strobus	White pine
987	17	Pinus strobus	White pine
988	26	Pinus strobus	White pine
989	17	Quercus rubra	Red oak
990	21	Pinus strobus	White pine
991	23	Quercus rubra	Red oak
992	29	Fagus grandifolia	American beech
993	22	Fraxinus americana	White ash
994	27	Quercus alba	White oak
995	14	Fraxinus americana	White ash
996	21	Fraxinus americana	White ash
997	22	Fraxinus americana	White ash
998	17	Fraxinus americana	White ash
999	23	Fraxinus americana	White ash
1000	22	Quercus rubra	Red oak
1001	21	Liriodendron tulipifera	Tuliptree
1002	38	Quercus rubra	Red oak
1003	42	Quercus rubra	Red oak
1004	21 Dbl.	Betula nigra	River birch
1005	32	Liriodendron tulipifera	Tuliptree
1006	25	Liriodendron tulipifera	Tuliptree
1007	14	Liriodendron tulipifera	Tuliptree
1008	16	Liriodendron tulipifera	Tuliptree
1009	35	Liriodendron tulipifera	Tuliptree
1010	28	Quercus rubra	Red oak
1011	21	Quercus palustris	Pin oak
1012	14	Fagus grandifolia	American beech
1013	47	Quercus rubra	Red oak
1014	22	Quercus alba	White oak
1015	16	Quercus alba	White oak
1016	16	Quercus palustris	Pin oak
1017	24	Quercus alba	White oak
1018	21	Liriodendron tulipifera	Tuliptree
1019	21	Liriodendron tulipifera	Tuliptree
1020	18	Liriodendron tulipifera	Tuliptree
1021	15	Betula nigra	River birch
1022	26	Liriodendron tulipifera	tuliptree
1023	32	Liriodendron tulipifera	tuliptree
1024	40	Liriodendron tulipifera	tuliptree
1025	22	Liriodendron tulipifera	tuliptree
1026	36	Quercus rubra	Red oak
1027	20	Fraxinus americana	White ash
1028	42	Quercus rubra	Red oak
1029	20	Fraxinus americana	White ash
1030	13	Fagus grandifolia	American beech
1031	22	Fraxinus americana	White ash
1032	18	Betula nigra	River birch
1033	15	Betula nigra	River birch
1034	14	Fraxinus americana	White ash
1035	27	Betula nigra	River birch
1036	26	Betula nigra	River birch
1037	19	Betula nigra	River birch
1038	19	Fraxinus americana	White ash
1039	18	Betula nigra	River birch
1040	18	Fraxinus americana	White ash
1041	35 Dbl.	Fraxinus americana	White ash
1042	20	Fraxinus americana	White ash
1043	24	Betula nigra	River birch
1044	15	Betula nigra	River birch
1045	15	Betula nigra	River birch
1046	18 Dbl.	Betula nigra	River birch
1047	14 Dbl.	Betula nigra	River birch
1048	16 Dbl.	Betula nigra	River birch
1049	14	Betula nigra	River birch
1050	14	Acer rubrum	Red maple
1051	24 Dbl.	Liriodendron tulipifera	Tuliptree
1052	36	Liriodendron tulipifera	Tuliptree
1053	15	Fagus grandifolia	American beech
1054	38	Acer rubrum	Red maple
1055	39	Liriodendron tulipifera	Tuliptree
1056	28	Liriodendron tulipifera	Tuliptree
1057	15	Liriodendron tulipifera	Tuliptree
1058	17	Quercus alba	White oak
1059	17	Robinia pseudoacacia	Black locust
1060	20	Quercus alba	White oak
1061	25	Quercus rubra	Red oak
1062	14	Quercus palustris	Pin oak
1063	21	Quercus rubra	Red oak
1064	20	Carya glabra	Pignut hickory
1065	22	Carya glabra	Pignut hickory
1066	23	Quercus alba	White oak
1067	22	Quercus alba	White oak
1068	18	Quercus rubra	Red oak
1069	15	Fagus grandifolia	American beech
1070	15	Quercus rubra	Red oak
1071	17	Quercus rubra	Red oak
1072	15	Fagus grandifolia	American beech
1073	27	Fagus grandifolia	American beech
1074	54	Quercus alba	White oak
1075	29	Fagus grandifolia	American beech
1076	38 Dbl.	Quercus alba	White oak
1077	42	Quercus alba	White oak
1078	22	Quercus alba	White oak
1079	24	Acer saccharinum	Silver maple
1080	31	Liriodendron tulipifera	Tuliptree
1081	17	Robinia pseudoacacia	Black locust
1082	15	Quercus alba	White oak
1083	45	Quercus velutina	Black oak
1084	19	Fraxinus americana	White ash
1085	18	Fagus grandifolia	American beech
1086	27	Liriodendron tulipifera	Tuliptree
1087	15	Fraxinus americana	White ash
1088	17	Fraxinus americana	White ash
1089	17	Fraxinus americana	White ash
1090	20	Fraxinus americana	White ash
1091	19	Fagus grandifolia	American beech
1092	21	Fraxinus americana	White ash
1093	20	Quercus rubra	Red oak
1094	17	Quercus muehlenbergii	Chinkapin oak
1095	16	Fagus grandifolia	American beech
1096	17	Fraxinus americana	White ash
1097	16	Fraxinus americana	White ash
1098	14	Fraxinus americana	White ash
1099	14	Carya glabra	Pignut hickory
1100	30	Carya glabra	Pignut hickory
1101	18	Acer rubrum	Red maple
1102	20	Quercus alba	White oak
1103	17	Acer rubrum	Red maple
1104	25	Quercus palustris	Pin oak
1105	25	Quercus rubra	Red oak
1106	17	Acer rubrum	Red maple
1107	26 Dbl.	Quercus rubra	Red oak
1108	17	Carya glabra	Pignut hickory
1109	26	Acer saccharinum	Silver maple
1110	28	Quercus alba	White oak
1111	20	Quercus alba	White oak
1112	17 Triple	Carpinus caroliniana	American hornbeam
1113	14	Quercus alba	White oak
1114	17	Quercus alba	White oak
1115	27	Quercus palustris	Pin oak
1116	34	Quercus palustris	Pin oak
1117	26	Quercus palustris	Pin oak
1118	15	Liriodendron tulipifera	Tuliptree
1119	30	Liriodendron tulipifera	Tuliptree
1120	17	Quercus rubra	Red oak
1121	14	Quercus rubra	Red oak
1122	30	Quercus rubra	Red oak
1123	29	Quercus alba	White oak
1124	22	Liriodendron tulipifera	Tuliptree
1125	37	Liriodendron tulipifera	Tuliptree
1126	27	Quercus velutina	Black oak
1127	19	Quercus alba	White oak
1128	15	Acer saccharinum	Silver maple
1129	14	Fagus grandifolia	American beech
1130	40	Quercus rubra	Red oak
1131	22	Betula populifolia	Gray birch
1132	22	Quercus alba	White oak
1133	14	Betula nigra	River birch
1134	16	Carya glabra	Pignut hickory
1135	31	Quercus velutina	Black oak
1136	30	Quercus alba	White oak
1137	14	Carya glabra	Pignut hickory
1138	15	Fagus grandifolia	American beech
1139	17	Carya glabra	Pignut hickory
1140	20	Quercus alba	White oak
1141	27	Quercus rubra	Red oak
1142	26	Fagus grandifolia	American beech
1143	17	Fagus grandifolia	American beech
1144	21	Quercus prinus	Chestnut oak
1145	20	Fagus grandifolia	American beech
1146	36	Quercus prinus	Chestnut oak
1147	18	Fagus grandifolia	American beech
1148	27	Quercus alba	White oak
1149	14	Carya glabra	Pignut hickory
1150	19	Quercus bicolor	Swamp white oak
1151	17	Carya glabra	Pignut hickory
1152	40	Quercus alba	White oak
1153	20	Quercus prinus	Chestnut oak
1154	15	Quercus prinus	Chestnut oak
1155	20	Quercus prinus	Chestnut oak
1156	42	Quercus alba	White oak
1157	15	Fagus grandifolia	American beech
1158	42	Quercus alba	White oak
1159	20	Acer rubrum	Red maple
1160	19	Quercus prinus	Chestnut oak
1161	26	Carya glabra	Pignut hickory
1162	26	Fagus grandifolia	American beech
1163	29	Quercus alba	White oak
1164	48 Dbl.	Fagus grandifolia	American beech
1165	15	Fagus grandifolia	American beech
1166	34	Quercus velutina	Black oak
1167	22	Acer saccharinum	Silver maple
1168	20	Quercus velutina	Black oak
1169	20	Quercus alba	White oak
1170	17	Quercus velutina	Black oak
1171	19	Quercus muehlenbergii	Chinkapin oak
1172	14	Fagus grandifolia	American beech
1173	25	Quercus rubra	Red oak
1174	20	Fagus grandifolia	American beech
1175	15	Quercus muehlenbergii	Chinkapin oak
1176	21	Quercus palustris	Pin oak
1177	20	Quercus palustris	Pin oak
1178	42	Quercus alba	White oak
1179	14	Carya glabra	Pignut hickory
1180	23	Quercus rubra	Red oak
1181	42	Quercus rubra	Red oak
1182	14	Carya glabra	Pignut hickory
1183	16	Quercus velutina	Black oak
1184	48	Quercus alba	White oak
1185	37	Quercus alba	White oak
1186	15	Quercus velutina	Black oak
1187	21	Quercus alba	White oak
1188	28	Quercus alba	White oak
1189	19	Fagus grandifolia	American beech
1190	35	Quercus muehlenbergii	Chinkapin oak
1191	25	Quercus rubra	Red oak
1192	15	Fagus grandifolia	American beech
1193	21	Fagus grandifolia	American beech
1194	24	Quercus prinus	Chestnut oak
1195	16	Fagus grandifolia	American beech
1196	30	Fagus grandifolia	American beech
1197	18	Quercus alba	White oak
1198	24	Quercus alba	White oak
1199	48	Liriodendron tulipifera	Tuliptree
1200	21	Carya glabra	Pignut hickory
1201	15	Quercus velutina	Black oak
1202	14	Quercus muehlenbergii	Chinkapin oak
1203	18	Quercus alba	White oak
1204	24	Quercus alba	White oak
1205	21	Quercus prinus	Chestnut oak
1206	31	Quercus alba	White oak
1207	24 Dbl.	Carya ovata	Shagbark hickory
1208	14	Quercus muehlenbergii	Chinkapin oak
1209	25	Quercus alba	White oak
1210	14	Carpinus caroliniana	American hornbeam
1211	17 Dbl.	Carpinus caroliniana	American hornbeam
1212	38	Quercus alba	White oak
1213	20	Quercus alba	White oak
1214	27	Quercus alba	White oak
1215	29	Quercus alba	White oak
1216	47	Quercus prinus	Chestnut oak
1217	20	Fagus grandifolia	American beech
1218	16	Quercus muehlenbergii	Chinkapin oak
1219	15	Acer rubrum	Red maple
1220	27	Quercus alba	White oak
1221	34	American beech	White oak
1222	26	Fagus grandifolia	American beech
1223	27	Quercus alba	White oak
1224	18	Quercus alba	White oak
1225	37	Quercus rubra	Red oak
1226	18	Quercus rubra	Red oak

REV. / ISSUE	DATE	BY	CHK	DESCRIPTION

CONSULTANT

CONSULTANT

ORIENTATION / KEY PLAN

PS&S
integrating design & engineering

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CERTIFICATE OF AUTHORIZATION NO. 24GA28032700

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JAROSLAVA VONDER
N.Y. LIC. NO. 50533–1

SIGNATURE DATE
PROFESSIONAL LAND SURVEYOR

CLIENT

WATCHTOWER
BIBLE AND TRACT
SOCIETY OF
NEW YORK

PROJECT

WORLD HEADQUARTERS
FOR
JEHOVAH'S WITNESSES,
WARWICK PROPERTY
TOWNSHIP OF WARWICK, ORANGE COUNTY, N.Y.

SHEET TITLE

TREE LOCATION SURVEY
PARCEL B4 AND PART OF
PARCEL A-13

JOB NO: 03171–001
DATE: 6/04/2010
DRAWN: MPP
CHECK: JV
SCALE: N.T.S.

BINDING ORDER:
SHEET 2 OF 3
SHEET NO.
TR-2

NUMBER	DIAMETER	BOTANICAL NAME	COMMON NAME
1227	16	Quercus alba	White oak
1228	15	Quercus alba	White oak
1229	20	Quercus alba	White oak
1230	29	Fagus grandifolia	American beech
1231	18	Quercus muehlenbergii	Chinkapin oak
1232	17	Quercus muehlenbergii	Chinkapin oak
1233	15	Quercus prinus	Chestnut oak
1234	16	Quercus alba	White oak
1235	20	Quercus alba	White oak
1236	24	Betula populifolia	Gray birch
1237	21	Quercus alba	White oak
1238	14	Quercus alba	White oak
1239	14	Quercus palustris	Pin oak
1240	16	Fagus grandifolia	American beech
1241	23	Quercus rubra	Red oak
1242	17	Fagus grandifolia	American beech
1243	17	Fagus grandifolia	American beech
1244	16	Quercus palustris	Pin oak
1245	14	Betula populifolia	Gray birch
1246	48	Quercus rubra	Red oak
1247	15	Quercus alba	White oak
1248	14	Quercus bicolor	Swamp white oak
1249	35	Fagus grandifolia	American beech
1250	29	Quercus velutina	Black oak
1251	30	Fagus grandifolia	American beech
1252	18	Fagus grandifolia	American beech
1253	17	Quercus bicolor	Swamp white oak
1254	18	Quercus bicolor	Swamp white oak
1255	14	Quercus bicolor	Swamp white oak
1256	34	Quercus alba	White oak
1257	20	Quercus prinus	Chestnut oak
1258	16	Carpinus caroliniana	American hornbeam
1259	20	Quercus muehlenbergii	Chinkapin oak
1260	20	Quercus rubra	Red oak
1261	14	Quercus muehlenbergii	Chinkapin oak
1262	25	Quercus velutina	Black oak
1263	15	Fraxinus americana	White ash
1264	20	Quercus alba	White oak
1265	18	Quercus velutina	Black oak
1266	24	Fraxinus americana	White ash
1267	14	Acer rubrum	Red maple
1268	14	Quercus velutina	Black oak
1269	18	Quercus alba	White oak
1270	19	Prunus serotina	Black cherry
1271	14	Acer rubrum	Red maple
1272	27	Quercus velutina	Black oak
1273	21	Fraxinus americana	White ash
1274	32	Quercus rubra	Red oak
1275	37	Quercus rubra	Red oak
1276	20	Fraxinus americana	White ash
1277	24	Pinus strobus	White pine
1278	14	Malus pink	Ornamental crabapple
1279	14	Malus pink	Ornamental crabapple
1280	14	Malus pink	Ornamental crabapple
1281	20	Acer saccharinum	Silver maple
1282	48	Pinus strobus	White pine
1283	43	Quercus rubra	Red oak
1284	25	Pinus strobus	White pine
1285	26	Pinus strobus	White pine
1286	34	Acer rubrum	Red maple
1287	29	Quercus velutina	Black oak
1288	14	Pinus strobus	White pine
1289	28	Pinus strobus	White pine
1290	19	Quercus alba	White oak
1291	19	Fraxinus americana	White ash
1292	18	Pinus strobus	White pine
1293	25	Pinus strobus	White pine
1294	25	Pinus strobus	White pine
1295	25	Quercus rubra	Red oak
1296	14	Malus red	Ornamental crabapple
1297	14	Malus red	Ornamental crabapple
1298	13	Malus red	Ornamental crabapple
1299	21	Fagus sylvatica pendula	Weeping European beech
1300	25	Acer saccharinum	Silver maple
1301	41	Quercus alba	White oak
1302	21	Quercus rubra	Red oak
1303	20	Fraxinus americana	White ash
1304	36	Acer saccharinum	Silver maple
1305	34	Quercus alba	White oak
1306	16	Carya ovata	Shagbark hickory
1307	17	Pinus strobus	White pine
1308	17 Dbl.	Pinus strobus	White pine
1309	26	Fagus grandifolia	American beech
1310	22	Quercus alba	White oak
1311	18	Quercus alba	White oak
1312	31	Quercus rubra	Red oak
1313	26	Quercus alba	White oak
1314	14	Quercus alba	White oak
1315	34	Quercus rubra	Red oak
1316	14	Quercus palustris	Pin oak
1317	14	Quercus alba	White oak
1318	14	Quercus palustris	Pin oak
1319	18	Quercus alba	White oak
1320	28 Dbl.	Quercus alba	White oak
1321	31	Quercus alba	White oak
1322	25	Quercus alba	White oak
1323	19	Quercus palustris	Pin oak
1324	19	Quercus alba	White oak
1325	23	Quercus rubra	Red oak
1326	40	Quercus velutina	Black oak
1327	13	Acer palmatum	Japanese maple
1328	17	Acer rubrum	Red maple
1329	17	Quercus alba	White oak
1330	16	Fraxinus americana	White ash
1331	15	Acer saccharinum	Silver maple
1332	23	Quercus rubra	Red oak
1333	17 Dbl.	Betula populifolia	Gray birch
1334	24	Quercus alba	White oak
1335	20	Quercus alba	White oak
1336	24	Betula populifolia	Gray birch
1337	20	Quercus alba	White oak
1338	24	Acer rubrum	Red maple
1339	20	Quercus alba	White oak
1340	14	Quercus velutina	Black oak
1341	36	Quercus rubra	Red oak
1342	17	Betula populifolia	Gray birch
1343	24	Acer saccharinum	Silver maple
1344	23	Quercus alba	White oak
1345	18	Betula populifolia	Gray birch
1346	17	Betula populifolia	Gray birch
1347	18	Quercus prinus	Chestnut oak
1348	17	Quercus rubra	Red oak
1349	16	Quercus prinus	Chestnut oak
1350	20	Quercus rubra	Red oak
1351	19 Multi.	Betula populifolia	Gray birch
1352	17	Betula populifolia	Gray birch
1353	20	Quercus rubra	Red oak
1354	25	Quercus alba	White oak
1355	25	Liriodendron tulipifera	Tuliptree
1356	30	Fagus grandifolia	American beech
1357	16	Quercus alba	White oak
1358	16	Quercus alba	White oak
1359	18	Fagus grandifolia	American beech
1360	20	Fagus grandifolia	American beech
1361	19	Quercus alba	White oak
1362	28	Quercus velutina	Black oak
1363	20	Fagus grandifolia	American beech
1364	17	Quercus palustris	Pin oak
1365	22	Quercus rubra	Red oak
1366	21	Quercus rubra	Red oak
1367	22	Quercus rubra	Red oak
1368	24	Quercus rubra	Red oak
1369	16	Fagus grandifolia	American beech
1370	26	Quercus alba	White oak
1371	28	Fagus grandifolia	American beech
1372	37	Fagus grandifolia	American beech
1373	28	Acer rubrum	Red maple
1374	15	Quercus alba	White oak
1375	22	Quercus alba	White oak
1376	30	Quercus rubra	Red oak
1377	30	Acer saccharinum	Silver maple
1378	15	Carya glabra	Pignut hickory
1379	17	Fraxinus americana	American ash
1380	16	Acer rubrum	Red maple
1381	38	Quercus rubra	Red oak
1382	19	Quercus rubra	Red oak
1383	30	Fraxinus americana	American ash
1384	31	Quercus alba	White oak
1385	24	Acer saccharinum	Silver maple
1386	15	Acer saccharinum	Silver maple
1387	17	Acer saccharinum	Silver maple
1388	19	Quercus alba	White oak
1389	14	Quercus alba	White oak
1390	19	Quercus coccinea	Scarlet oak
1391	21	Fagus grandifolia	American beech
1392	18	Carya glabra	Pignut hickory
1393	17	Quercus velutina	Black oak
1394	18	Quercus rubra	Red oak
1395	24	Quercus rubra	Red oak
1396	23	Fagus grandifolia	American beech
1397	16	Carya glabra	Pignut hickory
1398	14	Acer rubrum	Red maple
1399	22	Carya glabra	Pignut hickory
1400	15	Fagus grandifolia	American beech
1401	26	Quercus prinus	Chestnut oak
1402	14	Quercus rubra	Red oak
1403	14	Quercus velutina	Black oak
1404	18	Quercus rubra	Red oak
1405	15	Quercus rubra	Red oak
1406	18	Quercus prinus	Chestnut oak
1407	34	Quercus prinus	Chestnut oak
1408	14	Quercus alba	White oak
1409	16	Quercus velutina	Black oak
1410	21	Acer saccharinum	Silver maple
1411	14	Carpinus caroliniana	American hornbeam
1412	14	Carpinus caroliniana	American hornbeam
1413	24	Quercus prinus	Chestnut oak
1414	15	Quercus alba	White oak
1415	15	Quercus prinus	Chestnut oak
1416	14	Carpinus caroliniana	American hornbeam
1417	24	Quercus prinus	Chestnut oak
1418	16	Quercus prinus	Chestnut oak
1419	26 Dbl.	Quercus prinus	Chestnut oak
1420	14	Quercus velutina	Black oak
1421	19	Quercus muehlenbergii	Chinkapin oak
1422	27	Fagus grandifolia	American beech
1423	17	Quercus prinus	Chestnut oak
1424	14	Acer rubrum	Red maple
1425	26	Quercus rubra	Red oak
1426	24	Quercus velutina	Black oak
1427	17	Betula populifolia	Gray birch
1428	18	Quercus velutina	Black oak
1429	25	Quercus alba	White oak
1430	14	Quercus alba	White oak
1431	15	Fagus grandifolia	American beech
1432	14	Quercus alba	White oak
1433	16	Quercus prinus	Chestnut oak
1434	13	Quercus rubra	Red oak
1435	32	Quercus velutina	Black oak
1436	14	Quercus prinus	Chestnut oak
1437	14	Fagus grandifolia	American beech
1438	18	Quercus alba	White oak
1439	16	Fagus grandifolia	American beech
1440	16	Quercus prinus	Chestnut oak
1441	14	Quercus alba	White oak
1442	22	Acer rubrum	Red maple
1443	29	Quercus rubra	Red oak
1444	16	Quercus prinus	Chestnut oak
1445	17	Fagus grandifolia	American beech
1446	14	Betula populifolia	Gray birch
1447	36 Dbl.	Quercus prinus	Chestnut oak
1448	15	Fagus grandifolia	American beech
1449	23	Fagus grandifolia	American beech
1450	14	Quercus palustris	Pin oak
1451	18	Quercus velutina	Black oak
1452	20	Quercus velutina	Black oak
1453	17	Quercus prinus	Chestnut oak
1454	23	Quercus rubra	Red oak
1455	26	Fagus grandifolia	American beech
1456	21	Fagus grandifolia	American beech
1457	27	Acer rubrum	Red maple
1458	19	Quercus bicolor	Swamp white oak
1459	20	Quercus alba	White oak
1460	15	Quercus velutina	Black oak
1461	13	Quercus muehlenbergii	Chinkapin oak
1462	24	Quercus prinus	Chestnut oak
1463	20	Quercus velutina	Black oak
1464	26	Fagus grandifolia	American beech
1465	15	Fagus grandifolia	American beech
1466	14	Betula populifolia	Gray birch
1467	13	Carya glabra	Pignut hickory
1468	15	Quercus bicolor	Swamp white oak
1469	24	Quercus prinus	Chestnut oak
1470	24	Quercus prinus	Chestnut oak
1471	14	Fagus grandifolia	American beech
1472	14	Quercus palustris	Pin oak
1473	18	Quercus bicolor	Swamp white oak
1474	14	Quercus velutina	Black oak
1475	19	Betula populifolia	Gray birch
1476	14	Quercus prinus	Chestnut oak
1477	33	Quercus velutina	Black oak
1478	14	Fagus grandifolia	American beech
1479	24	Quercus prinus	Chestnut oak
1480	14	Betula populifolia	Gray birch
1481	21	Fagus grandifolia	American beech
1482	24	Carya glabra	Pignut hickory
1483	14	Fagus grandifolia	American beech
1484	16	Quercus bicolor	Swamp white oak
1485	17	Quercus bicolor	Swamp white oak
1486	28	Fagus grandifolia	American beech
1487	17	Quercus prinus	Chestnut oak
1488	24	Quercus alba	White oak
1489	16	Quercus bicolor	Swamp white oak
1490	16	Carya glabra	Pignut hickory
1491	23	Quercus velutina	Black oak
1492	24	Quercus bicolor	Swamp white oak
1493	13	Betula populifolia	Gray birch
1494	14	Betula populifolia	Gray birch
1495	14	Quercus prinus	Chestnut oak
1496	16	Betula populifolia	Gray birch
1497	26	Fagus grandifolia	American beech
1498	14	Quercus bicolor	Swamp white oak
1499	24	Fagus grandifolia	American beech
1500	16	Quercus prinus	Chestnut oak
1501	16	Betula populifolia	Gray birch
1502	25	Quercus alba	White oak
1503	28	Quercus alba	White oak
1504	24	Quercus rubra	Red oak
1505	16	Quercus bicolor	Swamp white oak
1506	14	Betula populifolia	Gray birch
1507	15	Quercus prinus	Chestnut oak
1508	14	Betula populifolia	Gray birch
1509	14	Betula populifolia	Gray birch
1510	16	Fagus grandifolia	American beech
1511	20	Quercus muehlenbergii	Chinkapin oak
1512	15	Acer rubrum	Red maple
1513	24	Quercus bicolor	Swamp white oak
1514	13	Quercus bicolor	Swamp white oak
1515	24	Tsuga canadensis	Eastern hemlock
1516	40	Quercus rubra	Red oak
1517	14	Quercus bicolor	Swamp white oak
1518	22	Quercus bicolor	Swamp white oak
1519	20	Quercus bicolor	Swamp white oak
1520	15	Betula populifolia	Gray birch
1521	21	Quercus bicolor	Swamp white oak
1522	30	Quercus alba	White oak
1523	13	Acer rubrum	Red maple
1524	16	Quercus rubra	Red oak
1525	15 Dbl.	Fagus grandifolia	American beech
1526	23	Quercus rubra	Red oak
1527	14	Quercus alba	White oak
1528	20	Quercus alba	White oak
1529	17	Fagus grandifolia	American beech
1530	16	Fagus grandifolia	American beech
1531	14	Acer rubrum	Red maple
1532	23	Fagus grandifolia	American beech
1533	17	Fagus grandifolia	American beech
1534	24	Quercus rubra	Red oak
1535	13	Fagus grandifolia	American beech
1536	22	Quercus alba	White oak
1537	13	Fagus grandifolia	American beech
1538	14	Quercus bicolor	Swamp white oak
1539	16	Fagus grandifolia	American beech
1540	18	Quercus rubra	Red oak
1541	36	Quercus alba	White oak
1542	22	Betula populifolia	Gray birch
1543	14	Quercus bicolor	Swamp white oak
1544	15	Fagus grandifolia	American beech
1545	21	Fagus grandifolia	American beech
1546	40	Fagus grandifolia	American beech
1547	22	Quercus bicolor	Swamp white oak
1548	14	Fagus grandifolia	American beech
1549	26	Fagus grandifolia	American beech
1550	15	Quercus velutina	Black oak
1551	15	Fagus grandifolia	American beech
1552	15	Fagus grandifolia	American beech
1553	18	Fagus grandifolia	American beech
1554	24	Fagus grandifolia	American beech
1555	20	Fagus grandifolia	American beech
1556	16	Fagus grandifolia	American beech
1557	29	Quercus rubra	Red oak
1558	14	Acer rubrum	Red maple
1559	26	Quercus rubra	Red oak
1560	21	Quercus rubra	Red oak
1561	24	Quercus bicolor	Swamp white oak
1562	21	Quercus rubra	Red oak
1563	38	Quercus alba	White oak
1564	14	Quercus coccinea	Scarlet oak
1565	33	Quercus velutina	Black oak
1566	17	Quercus coccinea	Scarlet oak
1567	18	Fagus grandifolia	American beech
1568	24	Acer rubrum	Red maple
1569	24	Quercus rubra	Red oak
1570	14	Quercus velutina	Black oak
1571	18	Fagus grandifolia	American beech
1572	22	Acer rubrum	Red maple
1573	18	Fraxinus americana	White ash
1574	16	Betula populifolia	Gray birch
1575	17	Fagus grandifolia	American beech
1576	39	Quercus rubra	Red oak
1577	20	Fagus grandifolia	American beech
1578	24	Quercus rubra	Red oak
1579	27	Fagus grandifolia	American beech
1580	16	Betula populifolia	Gray birch
1581	19	Quercus rubra	Red oak
1582	14	Quercus velutina	Black oak
1583	27	Tsuga canadensis	Eastern hemlock
1584	17	Quercus bicolor	Swamp white oak
1585	15	Fagus grandifolia	American beech
1586	14	Quercus bicolor	Swamp white oak
1587	16	Fagus grandifolia	American beech
1588	16	Quercus muehlenbergii	Chinkapin oak
1589	34	Fagus grandifolia	American beech
1590	18	Fagus grandifolia	American beech
1591	14	Fagus grandifolia	American beech
1592	21	Fagus grandifolia	American beech
1593	19	Fagus grandifolia	American beech
1594	20	Fagus grandifolia	American beech
1595	14	Quercus bicolor	Swamp white oak
1596	20	Fagus grandifolia	American beech
1597	24	Acer saccharinum	Silver maple
1598	24	Fagus grandifolia	American beech
1599	17	Fagus grandifolia	American beech
1600	14	Fagus grandifolia	American beech
1601	15	Fagus grandifolia	American beech
1602	16	Fagus grandifolia	American beech
1603	25	Fagus grandifolia	American beech
1604	23	Fagus grandifolia	American beech
1605	19	Fagus grandifolia	American beech
1606	18	Fagus grandifolia	American beech
1607	17	Quercus bicolor	Swamp white oak
1608	14	Quercus bicolor	Swamp white oak
1609	23	Fagus grandifolia	American beech
1610	16	Quercus bicolor	Swamp white oak
1611	17	Fagus grandifolia	American beech
1612	31	Quercus alba	White oak
1613	17	Quercus bicolor	Swamp white oak
1614	15	Fagus grandifolia	American beech
1615	37	Quercus rubra	Red oak
1616	15	Quercus coccinea	Scarlet oak
1617	32	Quercus alba	White oak
1618	38	Quercus alba	White oak
1619	20	Quercus coccinea	Scarlet oak
1620	14	Fagus grandifolia	American beech
1621	17	Fagus grandifolia	American beech
1622	17	Fraxinus americana	White ash
1623	33	Quercus rubra	Red oak
1624	16	Fagus grandifolia	American beech
1625	22	Fagus grandifolia	American beech
1626	23	Quercus bicolor	Swamp white oak
1627	31	Quercus velutina	Black oak
1628	17	Quercus bicolor	Swamp white oak
1629	34	Quercus bicolor	Swamp white oak
1630	22	Fagus grandifolia	American beech
1631	32	Fagus grandifolia	American beech
1632	16	Fagus grandifolia	American beech
1633	19	Fagus grandifolia	American beech
1634	19	Fagus grandifolia	American beech
1635	32	Fagus grandifolia	American beech
1636	19	Quercus bicolor	Swamp white oak
1637	21	Quercus alba	White oak
1638	14	Fagus grandifolia	American beech
1639	32	Quercus bicolor	Swamp white oak
1640	22	Quercus bicolor	Swamp white oak
1641	22	Fagus grandifolia	American beech
1642	13	Fagus grandifolia	American beech
1643	30	Fagus grandifolia	American beech
1644	24	Fagus grandifolia	American beech
1645	19	Fagus grandifolia	American beech
1646	13	Fagus grandifolia	American beech
1647	25	Quercus prinus	Chestnut oak
1648	29	Betula populifolia	Gray birch
1649	18	Quercus bicolor	Swamp white oak
1650	14	Betula populifolia	Gray birch
1651	13	Fagus grandifolia	American beech
1652	29	Fagus grandifolia	American beech
1653	22	Fagus grandifolia	American beech
1654	15	Betula populifolia	Gray birch
1655	38	Quercus rubra	Red oak
1656	14	Fagus grandifolia	American beech
1657	19	Fraxinus americana	White ash
1658	14	Carya glabra	Pignut hickory
1659	25	Quercus rubra	Red oak
1660	19	Fagus grandifolia	American beech
1661	13	Quercus bicolor	Swamp white oak
1662	14	Betula populifolia	Gray birch
1663	22	Fagus grandifolia	American beech
1664	18	Quercus bicolor	Swamp white oak
1665	19	Quercus bicolor	Swamp white oak
1666	14	Acer saccharinum	Silver maple
1667	14	Quercus bicolor	Swamp white oak
1668	14	Fraxinus americana	White ash
1669	17	Quercus rubra	Red oak
1670	13	Carya ovata	Shagbark hickory
1671	21	Quercus rubra	Red oak
1672	19	Quercus bicolor	Swamp white oak
1673	26	Quercus prinus	Chestnut oak
1674	14	Quercus coccinea	Scarlet oak
1675	14	Quercus bicolor	Swamp white oak
1676	19	Robinia pseudoacacia	Black locust
1677	20	Fagus grandifolia	American beech
1678	25	Quercus velutina	Black oak
1679	26	Quercus rubra	Red oak
1680	16	Fagus grandifolia	American beech
1681	32	Fagus grandifolia	American beech
1682	29	Quercus alba	White oak
1683	18	Quercus bicolor	Swamp white oak
1684	36 Dbl.	Quercus rubra	Red oak
1685	16	Quercus velutina	Black oak
1686	19	Quercus velutina	Black oak
1687	24	Fagus grandifolia	American beech
1688	15	Quercus velutina	Black oak
1689	24	Betula populifolia	Gray birch
1690	23	Betula populifolia	Gray birch
1691	24	Fagus grandifolia	American beech
1692	26	Fagus grandifolia	American beech
1693	18	Quercus alba	White oak
1694	26	Fagus grandifolia	American beech
1695	17	Quercus alba	White oak
1696	48	Quercus alba	White oak
1697	14	Fagus grandifolia	American beech
1698	36	Carya ovata	Shagbark hickory
1699	16	Fagus grandifolia	American beech
1700	18	Fagus grandifolia	American beech
1701	18	Fagus grandifolia	American beech
1702	14	Fagus grandifolia	American beech
1703	13	Quercus rubra	Red oak
1704	16	Quercus coccinea	Scarlet oak
1705	23 Dbl.	Fagus grandifolia	American beech
1706	25	Fagus grandifolia	American beech
1707	24	Fagus grandifolia	American beech
1708	24	Fagus grandifolia	American beech
1709	13	Quercus bicolor	Swamp white oak
1710	21	Acer rubrum	Red maple
1711	24	Quercus rubra	Red oak
1712	19	Quercus alba	White oak
1713	16	Fagus grandifolia	American beech
1714	14	Fagus grandifolia	American beech
1715	19	Quercus alba	White oak
1716	13	Quercus coccinea	Scarlet oak
1717	16	Quercus coccinea	Scarlet oak
1718	24	Quercus rubra	Red oak
1719	20	Carya glabra	Pignut hickory
1720	22	Quercus rubra	Red oak
1721	18	Fraxinus americana	White ash
1722	20	Quercus velutina	Black oak
1723	17	Fagus grandifolia	American beech
1724	13	Quercus velutina	Black oak
1725	26	Fagus grandifolia	American beech
1726	20	Quercus alba	White oak
1727	16	Fraxinus americana	White ash
1728	16	Fagus grandifolia	American beech
1729	15	Fagus grandifolia	American beech
1730	15	Fagus grandifolia	American beech
1731	15	Quercus alba	White oak
1732	19	Fagus grandifolia	American beech
1733	19	Fagus grandifolia	American beech
1734	15	Quercus velutina	Black oak
1735	15	Betula populifolia	Gray birch
1736	16	Fagus grandifolia	American beech
1737	24	Quercus velutina	Black oak
1738	19	Fagus grandifolia	American beech
1739	21	Quercus alba	White oak
1740	15	Fagus grandifolia	American beech
1741	16	Quercus coccinea	Scarlet oak
1742	17	Fagus grandifolia	American beech
1743	17	Fagus grandifolia	American beech
1744	17	Fagus grandifolia	American beech
1745	13	Fagus grandifolia	American beech
1746	15	Fagus grandifolia	American beech
1747	17	Acer saccharinum	Silver maple
1748	20	Quercus velutina	Black oak
1749	19	Fagus grandifolia	American beech
1750	20	Quercus velutina	Black oak
1751	35	Quercus rubra	Red oak
1752	16	Quercus bicolor	Swamp white oak
1753	20	Carya glabra	Pignut hickory
1754	17	Fagus grandifolia	American beech
1755	17 Dbl.	Robinia pseudoacacia	Black locust
1756	15	Fagus grandifolia	American beech
1757	20	Fagus grandifolia	American beech
1758	23	Fagus grandifolia	American beech
1759	22	Acer saccharinum	Silver maple
1760	30	Acer saccharinum	Silver maple
1761	31	Quercus prinus	Chestnut oak
1762	23	Quercus prinus	Chestnut oak
1763	33 Multi.	Betula populifolia	Gray birch
1764	21 Dbl.	Betula populifolia	Gray birch
1765	17	Acer rubrum	Red maple
1766	26	Acer saccharum	Sugar maple
1767	27	Quercus prinus	Chestnut oak
1768	31	Quercus prinus	Chestnut oak
1769	40	Quercus alba	White oak
1770	38	Quercus rubra	Red oak
1771	35	Quercus alba	White oak
1772	23	Quercus rubra	Red oak
1773	23	Quercus rubra	Red oak
1774	29	Pinus strobus	White pine
1775	23	Pinus strobus	White pine
1776	38	Pinus strobus	White pine
1777	22	Quercus palustris	Pin oak
1778	27	Pinus strobus	White pine
1779	25	Pinus strobus	White pine
1780	37	Pinus strobus	White pine
1781	24	Betula populifolia	Gray birch
1782	30	Betula populifolia	Gray birch
1783	23	Betula populifolia	Gray birch
1784	21	Acer rubrum	Red maple
1785	25 Triple	Betula populifolia	Gray birch
1786	15	Quercus rubra	Red oak
1787	24	Quercus alba	White oak
1788	21	Quercus bicolor	Swamp white oak
1789	16	Quercus rubra	Red oak
1790	23	Quercus rubra	Red oak
1791	33	Quercus alba	White oak
1792	22	Quercus rubra	Red oak
1793	18	Acer saccharinum	Silver maple
1794	23	Acer rubrum	Red maple
1795	15	Quercus prinus	Chestnut oak
1796	18	Quercus bicolor	Swamp white oak
1797	14	Betula populifolia	Gray birch
1798	22	Quercus bicolor	Swamp white oak
1799	18	Quercus bicolor	Swamp white oak
1800	19	Betula lenta	Sweet birch
1801	16	Pinus strobus	White pine
1802	19	Pinus strobus	White pine
1803	19	Quercus rubra	Red oak
1804	24	Quercus rubra	Red oak
1805	14	Quercus bicolor	Swamp white oak
1806	20	Quercus palustris	Pin oak
1807	27	Quercus rubra	Red oak
1808	20	Acer saccharum	Sugar maple
1809	24	Fagus grandifolia	American beech
1810	15	Fagus grandifolia	American beech
1811	14	Quercus prinus	Chestnut oak
1812	25	Fagus grandifolia	American beech
1813	22	Quercus rubra	Red oak
1814	18 Dbl.	Acer rubrum	Red maple
1815	18 Dbl.	Quercus rubra	Red oak
1816	14	Quercus muehlenbergii	Chinkapin oak
1817	29 Triple	Betula populifolia	Gray birch
1818	13	Betula populifolia	Gray birch
1819	14	Betula populifolia	Gray birch
1820	15	Carya glabra	Pignut hickory
1821	14	Fraxinus americana	White ash
1822	26 Dbl.	Quercus rubra	Red oak
1823	14	Tilia americana	American basswood
1824	39	Quercus rubra	Red oak
1825	38	Quercus rubra	Red oak
1826	20 Dbl.	Acer platanoides	Norway maple
1827	31	Quercus rubra	Red oak
1828	26 Dbl.	Acer platanoides	Norway maple
1829	24	Acer platanoides	Norway maple
1830	15	Quercus coccinea	Scarlet oak
1831	42	Quercus rubra	Red oak
1832	16	Carpinus caroliniana	American hornbeam
1833	24	Tilia americana	American basswood
1834	20	Tilia americana	American basswood
1835	18	Tilia americana	American basswood
1836	20 Dbl.	Carpinus caroliniana	American hornbeam
1837	20 Dbl.	Carpinus caroliniana	American hornbeam
1838	13	Betula populifolia	Gray birch
1839	15	Quercus prinus	Chestnut oak
1840	18	Betula populifolia	Gray birch
1841	17	Quercus prinus	Chestnut oak
1842	17	Quercus prinus	Chestnut oak
1843	38 Dbl.	Fagus grandifolia	American beech
1844	16	Fagus grandifolia	American beech
1845	16	Fagus grandifolia	American beech
1846	12	Fagus grandifolia	American beech
1847	40	Quercus rubra	Red oak
1848	19	Quercus rubra	Red oak
1849	20	Acer saccharinum	Silver maple
1850	33	Fagus grandifolia	American beech
1851	14	Fagus grandifolia	American beech
1852	22	Quercus prinus	Chestnut oak
1853	30 Dbl.	Acer platanoides	Norway maple
1854	13	Betula populifolia	Gray birch
1855	13	Tilia americana	American basswood
1856	40 Dbl.	Quercus rubra/Betula populif.	Red oak/gray birch
1857	40 Dbl.	Acer rubrum/Quercus alba	Red maple/white oak
1858	36	Quercus alba	White oak
1859	13	Quercus alba	White oak
1860	24	Quercus alba	White oak
1861	20	Quercus prinus	Chestnut oak
1862	23	Quercus bicolor	Swamp white oak
1863	14	Fagus grandifolia	American beech
1864	22	Acer saccharinum	Silver maple
1865	38 Dbl.	Quercus rubra	Red oak
1866	12	Quercus rubra	Red oak
1867	12	Quercus rubra	Red oak
1868	18	Quercus rubra	Red oak
1869	21	Quercus prinus	Chestnut oak
1870	24	Quercus prinus	Chestnut oak
1871	21	Quercus prinus	Chestnut oak
1872	29	Quercus rubra	Red oak
1873	21	Quercus bicolor	Swamp white oak
1874	22	Quercus muehlenbergii	Chinkapin oak
1875	38	Quercus velutina	Black oak
1876	32	Quercus velutina	Black oak
1877	19	Quercus alba	White oak
1878	17	Acer saccharinum	Silver maple
1879	19	Acer saccharinum	Silver maple
1880	17	Acer saccharinum	Silver maple
1881	25	Quercus bicolor	Swamp white oak
1882	17	Acer saccharinum	Silver maple
1883	33	Fagus grandifolia	American beech
1884	21	Acer platanoides	Norway maple
1885	21	Acer platanoides	Norway maple
1886	24	Quercus velutina	Black oak
1887	19	Quercus prinus	Chestnut oak
1888	18	Quercus prinus	Chestnut oak
1889	18	Acer saccharinum	Silver maple
1890	19	Quercus prinus	Chestnut oak
1891	15	Acer saccharinum	Silver maple
1892	26 Dbl.	Acer platanoides	Norway maple
1893	49 Triple	Quercus velutina/F. grand.	Black oak/Am.beech
1894	14	Fagus grandifolia	American beech
1895	23	Quercus bicolor	Swamp white oak
1896	19	Tsuga canadensis	Eastern hemlock
1897	22 Dbl.	Acer platanoides	Norway maple
1898	14	Acer platanoides	Norway maple
1899	24	Acer platanoides	Norway maple
1900	33	Quercus alba	White oak
1901	18	Quercus velutina	Black oak
1902	32 Triple	Fagus grandifolia	American beech
1903	29	Quercus velutina	Black oak
1904	22	Quercus prinus	Chestnut oak
1905	23	Quercus prinus	Chestnut oak
1906	14	Betula populifolia	Gray birch
1907	24	Quercus prinus	Chestnut oak
1908	20	Quercus prinus	Chestnut oak
1909	17	Fraxinus americana	White ash
1910	20	Quercus bicolor	Swamp white oak
1911	24	Quercus rubra	Red oak
1912	18	Quercus prinus	Chestnut oak
1913	30	Quercus velutina	Black oak
1914	24	Quercus prinus	Chestnut oak
1915	34	Quercus rubra	Red oak
1916	24	Quercus bicolor	Swamp white oak
1917	32	Quercus velutina	Black oak
1918	14	Betula populifolia	Gray birch
1919	19	Quercus bicolor	Swamp white oak
1920	47 Dbl.	Quercus velutina	Black oak
1921	17	Quercus bicolor	Swamp white oak
1922	23 Multi	Quercus bicolor	Swamp white oak
1923	26	Liriodendron tulipifera	tuliptree
1924	12	Quercus rubra	Red oak
1925	19	Acer platanoides	Norway maple
1926	13	Populus tremuloides	Quaking aspen
1927	14	Quercus velutina	Black oak
1928	15	Quercus velutina	Black oak
1929	14	Betula lenta	Sweet birch
1930	19	Quercus velutina	Black oak
1931	12	Quercus bicolor	Swamp white oak
1932	15	Quercus bicolor	Swamp white oak
1933	18 Dbl.	Betula populifolia	Gray birch
1934	24	Quercus bicolor	Swamp white oak
1935	12	Quercus prinus	Chestnut oak
1936	14	Quercus prinus	Chestnut oak
1937	15	Betula populifolia	Gray birch
1938	26 Triple	Acer platanoides	Norway maple
1939	12	Betula populifolia	Gray birch
1940	18	Betula lenta	Sweet birch
1941	12	Betula lenta	Sweet birch
1942	15 Dbl.	Betula lenta	Sweet birch
1943	21	Populus deltoides	Eastern cottonwood
1944	19	Populus deltoides	Eastern cottonwood
1945	14	Populus deltoides	Eastern cottonwood
1946	19	Acer platanoides	Norway maple
1947	16	Quercus velutina	Black oak
1948	15	Pinus strobus	White pine
1949	16	Pinus strobus	White pine
1950	13	Pinus strobus	White pine
1951	14	Pinus strobus	White pine
1952	17	Pinus strobus	White pine
1953	24	Pinus strobus	White pine
1954	12	Pinus strobus	White pine
1955	13	Populus deltoides	Eastern cottonwood
1956	12	Quercus prinus	Chestnut oak
1957	30	Pinus strobus	White pine
1958	33	Pinus strobus	White pine
1959	30	Pinus strobus	White pine
1960	19 Dbl.	Betula populifolia	Gray birch
1961	18 Dbl.	Betula populifolia	Gray birch
1962	24	Quercus bicolor	Swamp white oak
1963	19	Quercus bicolor	Swamp white oak
1964	15	Quercus prinus	Chestnut oak
1965	19	Quercus velutina	Black oak
1966	15	Acer platanoides	Norway maple
1967	25	Quercus prinus	Chestnut oak
1968	42	Quercus prinus	Chestnut oak
1969	15	Quercus muehlenbergii	Chinkapin oak
1970	14	Betula populifolia	Gray birch
1971	34	Quercus rubra	Red oak
1972	20	Betula populifolia	Gray birch
1973	42	Quercus velutina	Black oak
1974	25	Quercus velutina	Black oak
1975	35	Quercus rubra	Red oak
1976	30	Quercus rubra	Red oak
1977	30	Quercus rubra	Red oak
1978	34	Quercus prinus	Chestnut oak
1979	20	Quercus prinus	Chestnut oak
1980	21 Dbl.	Quercus prinus	Chestnut oak
1981	24	Quercus alba	White oak
1982	20	Quercus prinus	Chestnut oak
1983	25	Quercus prinus	Chestnut oak
1984	35 Dbl.	Quercus prinus	Chestnut oak
1985	19	Quercus rubra	Red oak
1986	36	Quercus velutina	Black oak
1987	14	Betula populifolia	Gray birch
1988	28	Pinus strobus	White pine
1989	24	Pinus strobus	White pine
1990	22	Pinus strobus	White pine
1991	14 Dbl.	Pinus strobus	White pine
1992	30	Quercus rubra	Red oak
1993	13	Betula lenta	Sweet birch
1994	13	Pinus strobus	White pine
1995	23	Pinus strobus	White pine
1996	29	Quercus muehlenbergii	Chinkapin oak
1997	26	Quercus bicolor	Swamp white oak
1998	14	Quercus velutina	Black oak
1999	41 Dbl.	Quercus prinus	Chestnut oak
2000	16	Quercus prinus	Chestnut oak
2001	15	Pinus strobus	White pine
2002	15 Triple	Betula lenta	Sweet birch
2003	15	Carpinus caroliniana	American hornbeam
2004	17	Quercus bicolor	Swamp white oak
2005	12	Betula lenta	Sweet birch
2006	22	Quercus rubra	Red oak
2007	26 Triple	Betula populifolia	Gray birch
2008	17	Quercus prinus	Chestnut oak
2009	29	Quercus rubra	Red oak
2010	14	Quercus velutina	Black oak
2011	18 Dbl.	Betula lenta	Sweet birch
2012	18	Quercus rubra	Red oak
2013	19	Quercus rubra	Red oak
2014	28	Quercus rubra	Red oak
2015	27	Quercus prinus	Chestnut oak
2016	31	Quercus rubra	Red oak
2017	27	Quercus prinus	Chestnut oak
2018	19	Quercus prinus	Chestnut oak
2019	49 Triple	Quercus muehlenbergii	Chinkapin oak
2020	14	Quercus muehlenbergii	Chinkapin oak
2021	40 Triple	Quercus muehlenbergii	Chinkapin oak
2022	34 Multi	Acer platanoides	Norway maple
2023	13	Carpinus caroliniana	American hornbeam
2024	50	Acer platanoides	Norway maple
2025	12	Fraxinus americana	White ash
2026	15	Betula populifolia	Gray birch
2027	12	Acer saccharinum	Silver maple
2028	15	Quercus rubra	Red oak
2029	14	Quercus rubra	Red oak
2030	14	Quercus rubra	Red oak
2031	13	Tsuga canadensis	Eastern hemlock
2032	19	Tsuga canadensis	Eastern hemlock
2033	21	Quercus prinus	Chestnut oak
2034	14	Betula nigra	River birch
2035	16 Dbl.	Betula nigra	River birch
2036	19	Quercus prinus	Chestnut oak
2037	22	Betula nigra	River birch
2038	19 Triple	Betula nigra	River birch
2039	12	Carpinus caroliniana	American hornbeam
2040	15	Carpinus caroliniana	American hornbeam
2041	17	Quercus prinus	Chestnut oak
2042	16	Quercus prinus	Chestnut oak
2043	30	Quercus prinus	Chestnut oak
2044	17	Tsuga canadensis	Eastern hemlock
2045	14	Tsuga canadensis	Eastern hemlock
2046	19	Betula lenta	Sweet birch
2047	19	Acer platanoides	Norway maple
2048	15	Juniperus virginiana	Eastern cedar
2049	14	Malus pink	Ornamental crabapple
2050	20	Quercus rubra	Red oak
2051	25	Quercus alba	White oak
2052	13	Betula populifolia	Gray birch
2053	21	Quercus alba	White oak
2054	24	Quercus rubra	Red oak
2055	34 Dbl.	Quercus alba	White oak
2056	27	Quercus palustris	Pin oak
2057	17	Quercus palustris	Pin oak
2058	15	Malus pink	Ornamental crabapple
2059	12	Malus pink	Ornamental crabapple
2060	15	Quercus palustris	Pin oak
2061	17	Acer saccharinum	Sugar maple
2062	25	Quercus alba	White oak
2063	12	Quercus palustris	Pin oak
2064	30	Quercus alba	White oak
2065	25	Quercus alba	White oak
2066	16	Populus tremuloides	Quaking aspen
2067	28	Quercus rubra	Red oak
2068	19	Acer platanoides	Norway maple
2069	19	Acer saccharinum	Silver maple
2070	25	Acer saccharum	Sugar maple
2071	15	Acer saccharinum	Silver maple
2072	29	Quercus muehlenbergii	Chinkapin oak
2073	24	Quercus muehlenbergii	Chinkapin oak
2074	22	Quercus bicolor	Swamp white oak
2075	27	Acer rubrum	Red maple
2076	12	Pinus strobus	White pine
2077	40	Pinus strobus	White pine
2078	19	Pinus strobus	White pine
2079	36	Acer saccharinum	Silver maple
2080	22	Acer saccharinum	Silver maple
2081	33	Quercus prinus	Chestnut oak
2082	13	Betula populifolia	Gray birch
2083	18 Triple	Carpinus caroliniana	American hornbeam
2084	12	Cornus florida	American dogwood
2085	14	Malus white	Ornamental crabapple
2086	23	Acer saccharinum	Silver maple
2087	19	Acer saccharinum	Silver maple
2088	26	Pinus strobus	White pine
2089	27	Pinus strobus	White pine
2090	30	Pinus strobus	White pine
2091	34	Pinus strobus	White pine
2092	19	Pinus strobus	White pine
2093	22	Pinus strobus	White pine
2094	20	Quercus rubra	Red oak
2095	20	Quercus rubra	Red oak
2096	19	Quercus rubra	Red oak
2097	19	Quercus rubra	Red oak
2098	22	Quercus rubra	Red oak
2099	16	Betula populifolia	Gray birch
2100	15	Acer saccharinum	Silver maple
2101	17	Quercus rubra	Red oak
2102	17	Quercus rubra	Red oak
2103	17	Quercus rubra	Red oak
2104	17	Quercus rubra	Red oak
2105	17	Quercus palustris	Pin oak
2106	17	Quercus palustris	Pin oak

FILE NAME: P:\03171\001\V\Dwgs\03171-010-WT00.dwg LAST EDIT: 07/19/2010 – 11:15:57 AM LOGIN: mpetroni@ XREFS: key-map ; BND-00-NAD83 ; Copy of PSS0702 IMAGE: 20100405154822.jpg ;

REV./ ISSUE	DATE	BY	CHK	DESCRIPTION

CONSULTANT

CONSULTANT

ORIENTATION / KEY PLAN

PS&S
integrating design & engineering

PAULUS, SOKOLOWSKI AND SARTOR, PC
67A MOUNTAIN BOULEVARD EXTENSION
P.O. BOX 4039
WARREN, NEW JERSEY 07059
PHONE: (732) 560-9700
FAX: (732) 560-9768

CERTIFICATE OF AUTHORIZATION NO. 24GA28032700

ALL DIMENSIONS MUST BE VERIFIED BY THE CONTRACTOR. NOTIFY PAULUS, SOKOLOWSKI AND SARTOR, LLC. OF ANY CONFLICTS, ERRORS, AMBIGUITIES OR DISCREPANCIES IN THE CONTRACT DRAWINGS OR SPECIFICATIONS BEFORE PROCEEDING WITH CONSTRUCTION.

ALL DIMENSIONS SHALL BE AS NOTED IN WORDS OR NUMBERS ON THE CONTRACT DRAWINGS. DO NOT SCALE THE DRAWINGS TO DETERMINE DIMENSIONS.

THESE CONTRACT DRAWINGS CONTAIN DATA INTENDED SPECIFICALLY FOR THE NOTED PROJECT AND CLIENT. THEY ARE NOT INTENDED FOR USE ON EXTENSIONS OF THIS PROJECT OR FOR REUSE ON ANY OTHER PROJECT.

THE COPYING AND/OR MODIFICATION OF THIS DOCUMENT OR ANY PORTION THEREOF WITHOUT THE WRITTEN PERMISSION OF PAULUS, SOKOLOWSKI AND SARTOR, LLC. IS PROHIBITED.

UNLESS THESE DRAWINGS ARE SPECIFICALLY DESIGNATED AS "CONSTRUCTION ISSUE", THESE DRAWINGS SHALL NOT BE USED FOR CONSTRUCTION OR IMPROVEMENTS DEPICTED HEREIN, CONTRACTORS SHALL NOTIFY THE DESIGN ENGINEER TO OBTAIN CONSTRUCTION DOCUMENTS.

JAROSLAVA VONDER
N.Y. LIC. NO. 50533–1

SIGNATURE DATE
PROFESSIONAL LAND SURVEYOR

CLIENT

WATCHTOWER BIBLE AND TRACT SOCIETY OF NEW YORK

PROJECT

WORLD HEADQUARTERS FOR JEHOVAH'S WITNESSES, WARWICK PROPERTY
TOWNSHIP OF WARWICK, ORANGE COUNTY, N.Y.

SHEET TITLE

TREE LOCATION SURVEY PARCEL B4 AND PART OF PARCEL A-13

JOB NO: 03171–001
DATE: 6/04/2010
DRAWN: MPP
CHECK: JV
SCALE: N.T.S.

BINDING ORDER:
SHEET 3 OF 3
SHEET NO.
TR-3

Appendix E-5

New York State Department of Environmental Conservation
Division of Fish, Wildlife & Marine Resources
New York Natural Heritage Program
625 Broadway, 5th floor, Albany, New York 12233-4757
Phone: (518) 402-8935 • FAX: (518) 402-8925
Website: www.dec.state.ny.

Erin M. Crotty
Commissioner

October 19, 2005

James Morrison
EP Engineering Properties
110 Orange Ave.
Walden, NY 12586

Dear Mr. Morrison:

In response to your recent request, we have reviewed the New York Natural Heritage Program database with respect to an Environmental Assessment for the proposed Touro College Project, #140.01, area as indicated on the map you provided, located at Kings Drive and Sterling Lake Rd, Town of Warwick, Orange County.

Enclosed is a report of rare or state-listed animals and plants, significant natural communities, and other significant habitats, which our databases indicate occur, or may occur, on your site or in the immediate vicinity of your site. The information contained in this report is considered sensitive and may not be released to the public without permission from the New York Natural Heritage Program.

The presence of rare species may result in this project requiring additional permits, permit conditions, or review. For further guidance, and for information regarding other permits that may be required under state law for regulated areas or activities (e.g., regulated wetlands), please contact the appropriate NYS DEC Regional Office, Division of Environmental Permits, at the enclosed address.

For most sites, comprehensive field surveys have not been conducted; the enclosed report only includes records from our databases. We cannot provide a definitive statement on the presence or absence of all rare or state-listed species or significant natural communities. This information should not be substituted for on-site surveys that may be required for environmental impact assessment.

Our databases are continually growing as records are added and updated. If this proposed project is still under development one year from now, we recommend that you contact us again so that we may update this response with the most current information

Sincerely,

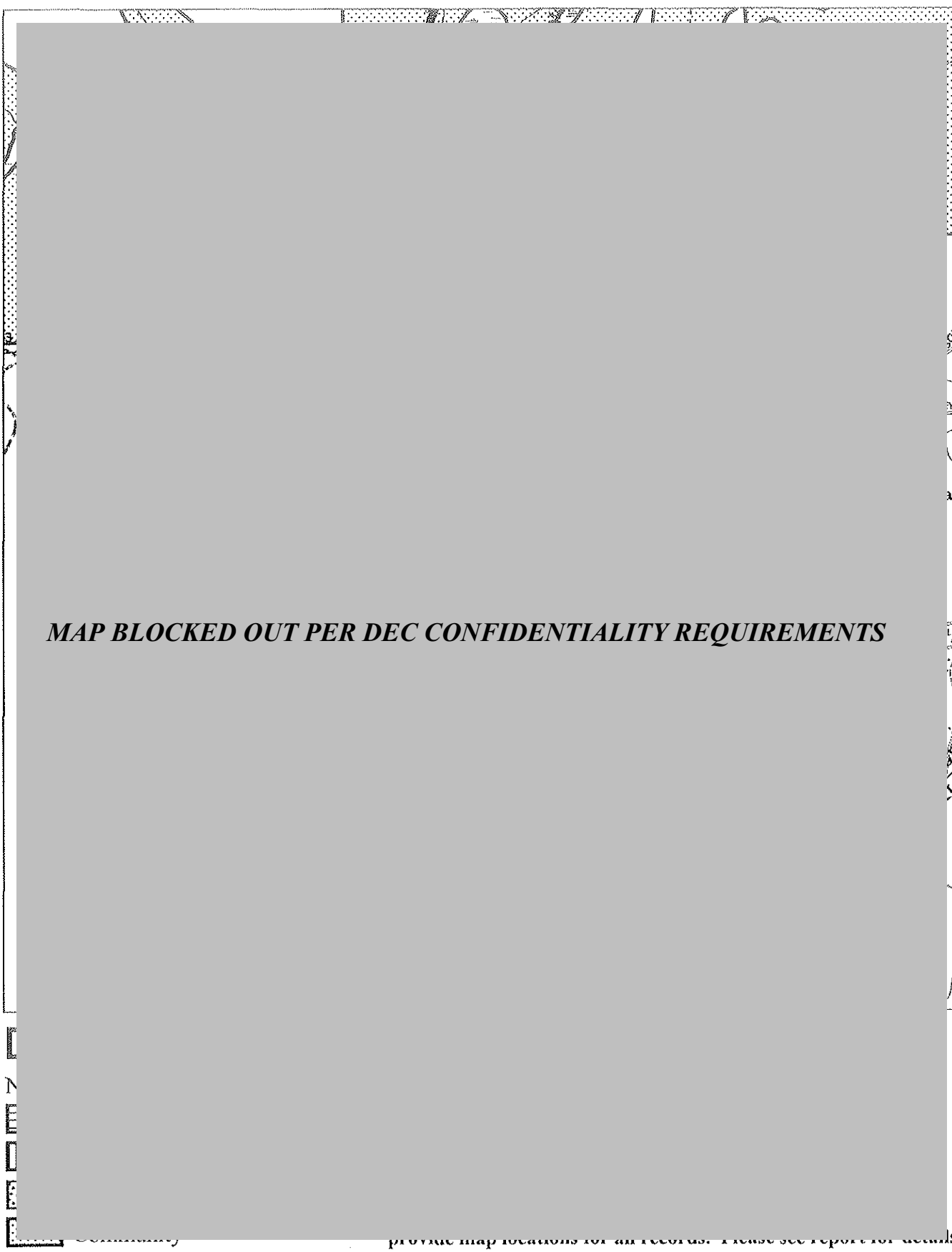
Heidi Krahling jpo

Heidi J. Krahling, Information Services
NY Natural Heritage Program

cc: Reg. 3, Wildlife Mgr.
Reg. 3, Fisheries Mgr.
Peter Nye, Endangered Species Unit, 5th floor, Albany
NYS OPR & HP, Tom Lyons, Agency Bldg 1, Albany, NY 12238

Natural Heritage Map of Rare Species and Ecological Communities

Prepared October 17, 2005 by NY Natural Heritage Program, NYS DEC, Albany, New York



provide map locations for all records. Please see report for details.

Natural Heritage Report on Rare Species

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

~This report contains SENSITIVE information that may not be released to the public without permission from the NY Natural Heritage Program.
~See the User's Guide for explanations of codes, ranks and fields.
~We do not provide maps for species most vulnerable to disturbance.

REPTILES

Crotalus horridus

Timber Rattlesnake

				Office Use
NY Legal Status:	Threatened	NYS Rank:	Vulnerable	6510
Federal Listing:		Global Rank:	Apparently secure	
County:	Orange			ESU
Town:				
Location:	SENSITIVE INFORMATION BLACKED OUT PER DEC INSTRUCTIONS			

1 Records Processed

COMMUNITIES

Appalachian oak-hickory forest

Office Use

This occurrence of Appalachian Oak-Hickory Forest is considered significant from a statewide perspective by the NY Natural Heritage Program. It is either an occurrence of a community type that is rare in the state or a high quality example of a more common community type. By meeting specific, documented significance criteria, the NY Natural Heritage Program considers this occurrence to have high ecological and conservation value.

NY Legal Status: Unlisted

NYS Rank: S4;

Global Rank: G4G5;

9714

Last Report: 1999-09-15

County: Orange

Town: Monroe, Tuxedo, Warwick

Location:

Directions:

General Quality and Habitat:

SENSITIVE INFORMATION BLACKED OUT PER DEC INSTRUCTIONS

7 Records Processed

Natural Heritage Report on Rare Species and Ecological Communities

NY Natural Heritage Program, NYS DEC, 625 Broadway, 5th Floor,
Albany, NY 12233-4757
(518) 402-8935

* Location displayed on map

~This report contains SENSITIVE information that may not be released to the public without permission from the NY Natural Heritage Program.
~) the User's Guide for explanations of codes, ranks and fields.
~L n maps for certain species and communities may not be provided if 1) the species is vulnerable to disturbance, 2) the location and/or extent is not precisely known, and/or 3) the location and/or extent is too large to display.

DRAGONFLIES
and
DAMSELFLIES

Cordulegaster obliqua

Office Use

Arrowhead Spiketail

NY Legal Status: Unlisted

NYS Rank: S2S3; Imperiled

Global Rank: G4; Apparently secure

3667

Last Report: 1989-06-26
County: Orange
Town: Warwick
Location:
Directions:
General Quality and Habitat:

SENSITIVE INFORMATION BLACKED OUT PER DEC INSTRUCTIONS

Gomphus rogersi

Office Use

Sable Clubtail

NY Legal Status: Unlisted

NYS Rank: S1; Critically imperiled

Global Rank: G4; Apparently secure

9948

Last Report: 1989-06-26
County: Orange
Town: Warwick
Location:
Directions:
General Quality and Habitat:

SENSITIVE INFORMATION BLACKED OUT PER DEC INSTRUCTIONS

VASCULAR
PLANTS

Callitriche terrestris

Office Use

Terrestrial Starwort

NY Legal Status: Threatened

NYS Rank: S2S3; Imperiled

Global Rank: G5; Demonstrably secure

638

Last Report: 1999-06-02
County: Orange
Town: Warwick
Location:
Directions:
General Quality and Habitat:

SENSITIVE INFORMATION BLACKED OUT PER DEC INSTRUCTIONS

VASCULAR
PLANTS

Myriophyllum pinnatum

Office Use

n Parrot's-feather | NY Legal Status: Endangered | NYS Rank: S1; Critically imperiled | 4938

Global Rank: G5; Demonstrably secure

Last Report: 1998-09-16
EO Rank: Good or Fair
County: Orange
Town: Warwick
Location:
Directions:
General Quality and Habitat: SENSITIVE INFORMATION BLACKED OUT PER DEC INSTRUCTIONS

Scutellaria integrifolia

Office Use

Hyssop-skullcap | NY Legal Status: Endangered | NYS Rank: S1; Critically imperiled | 7207

Global Rank: G5; Demonstrably secure

Last Report: 1998-08-25
EO Rank: Fair or Poor
County: Orange
Town: Tuxedo
Location:
Directions:
General Quality and Habitat: SENSITIVE INFORMATION BLACKED OUT PER DEC INSTRUCTIONS

Sisyrinchium mucronatum

Office Use

Michaux's Blue-eyed-grass | NY Legal Status: Endangered | NYS Rank: S1; Critically imperiled | 6015

Global Rank: G5; Demonstrably secure

Last Report: 1999
EO Rank: Extant
County: Orange
Town: Warwick
Location:
Directions:
General Quality and Habitat: SENSITIVE INFORMATION BLACKED OUT PER DEC INSTRUCTIONS

COMMUNITIES

Michael W. Klemens, LLC
47 Florida Hill Road
Ridgefield, CT 06877

November 2, 2005

Touro College
c/o Jayne E. Daly, Esq.
110 Orange Avenue
Walden, New York 12586

Dear Attorney Daly:

At your request I have reviewed letters that you obtained at my request from the New York Natural Heritage Program and the New Jersey Natural Heritage Program. These letters substantiate the recommendations in my letter of October 14th, 2005 as follows:

1. The client should anticipate conducting a site assessment and survey for the timber rattlesnake. Although I believe that the development site is not near a den, these snakes move extensively and portions of the site may serve as transient and summer foraging habitat.

2. I identified the importance of the chestnut oak community on the site. This xeric oak and hickory community is recognized as important by both states and we have already discussed some conceptual site redesign to conserve that area.

3. The listed vascular plants identified by the NY State Heritage Program do not occur on the site, nor are there habitats suitable for these species on site.

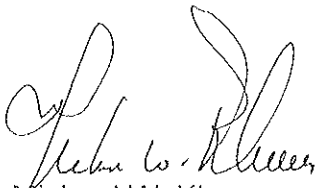
4. The presence of breeding locations for the various birds identified in the New Jersey report -- barred owl, Cooper's hawk, great blue heron, and veery will be addressed in the breeding bird survey that I recommended needed to be done as part of the environmental study conducted during the spring and early summer.

5. Eastern box turtles (see NJ report) may occur on site, especially in the low lying areas along Ringwood River (as indicated in my earlier report). Conducting the herpetological survey that I recommended to you should be able to detect their presence and location.

6. I found no evidence of vernal pool habitat on the parcel proposed for development, therefore the presence of vernal pool obligate species such as the marbled salamander (see NJ report) on the development site is unlikely. I did identify potential vernal pool habitat on the portion of the site bordering the Ringwood River. The proposed herpetological survey will address these issues.

In conclusion, the inquiries to the Heritage Programs of New York and New Jersey did not yield any unexpected findings and the studies that I proposed to you in my report of October 14th should constitute due diligence for these species, as well as for many of the more generic biodiversity concerns that may be raised in the application process.

Sincerely,



Michael W. Klemens, PhD

Appendix E-6

State of New Jersey

Richard J. Codey
Acting Governor

Department of Environmental Protection
Division of Parks and Forestry
Office of Natural Lands Management
Natural Heritage Program
P.O. Box 404
Trenton, NJ 08625-0404
Tel. #609-984-1339
Fax. #609-984-1427

Bradley M. Campbell
Commissioner

October 27, 2005

James Morrison
Engineering Properties, PC
110 Orange Avenue
Walden, NY 12586

Re: Kings College / Touro College

Dear Mr. Morrison:

Thank you for your data request regarding rare species information for the above referenced project site in Warwick Town, Orange County, New York.

Searches of the New Jersey Natural Heritage Database and the Landscape Project (Version 2) are based on a representation of the boundaries of your project site in our Geographic Information System (GIS). We make every effort to accurately transfer your project bounds from the topographic map(s) submitted with the Request for Data into our Geographic Information System. We do not typically verify that your project bounds are accurate, or check them against other sources.

Neither the New Jersey Natural Heritage Database nor the Landscape Project has records for any rare wildlife species on the referenced site.

We have also checked the New Jersey Natural Heritage Database and the Landscape Project habitat mapping for occurrences of any rare wildlife species or wildlife habitat within 1/4 mile of the referenced site. Please see the table below for species list and conservation status.

Species within 1/4 mile of referenced site.

Common Name	Scientific Name	Federal Status	State Status	Grank	Srank
barred owl	*Strix varia*		T/T	G5	S3B
Cooper's hawk	*Accipiter cooperii*		T/T	G5	S3B,S4N
eastern box turtle	*Terrapene carolina*		Special Concern	G5	S5B
great blue heron	*Ardea herodias*		S/S	G5	S2B,S4N
marbled salamander	*Ambystoma opacum*		D	G5	S3
timber rattlesnake	*Crotalus h. horridus*		E	G4T4	S2
veery	*Catharus fuscescens*		Special Concern	G5	S3B

We have also checked the New Jersey Natural Heritage Database for occurrences of rare plant species or natural communities. The Natural Heritage Database does not have any records for rare plants or natural communities on or within 1/4 mile of the site.

Attached is a list of rare species and natural communities that have been documented from Passaic County, New Jersey. If suitable habitat is present at the project site, these species have potential to be present.

Status and rank codes used in the tables and lists are defined in the attached EXPLANATION OF CODES USED IN NATURAL HERITAGE REPORTS.

The New Jersey Natural Heritage Program reviews its data periodically to identify priority sites for natural diversity in the State. Included as priority sites are some of the State's best habitats for rare and endangered species and natural communities. One of these sites is located within or near the areas you have outlined. Please refer to the enclosed Natural

Heritage Priority Site Map for the location and boundary of this site. On the back of each Priority Site Map is a report describing the significance of the site.

If you have questions concerning the wildlife records or wildlife species mentioned in this response, we recommend that you visit the interactive I-Map-NJ website at the following URL, http://www.state.nj.us/dep/gis/depsplash.htm or contact the Division of Fish and Wildlife, Endangered and Nongame Species Program.

PLEASE SEE THE ATTACHED 'CAUTIONS AND RESTRICTIONS ON NHP DATA'.

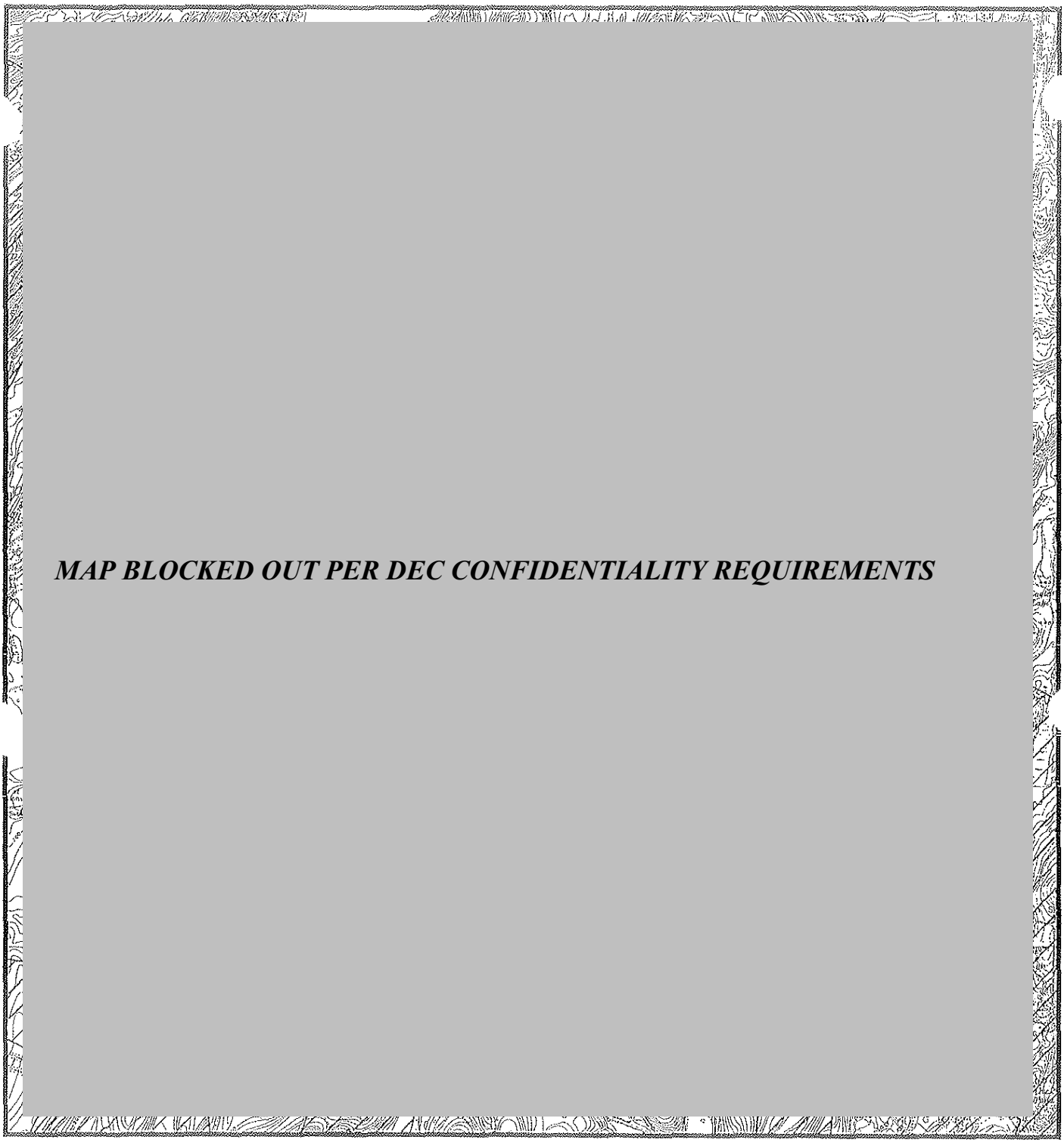
Thank you for consulting the Natural Heritage Program. The attached invoice details the payment due for processing this data request. Feel free to contact us again regarding any future data requests.

Sincerely,

Herbert A. Lord

Herbert A. Lord
Data Request Specialist

cc: Robert J. Cartica
Lawrence Niles
NHP File No. 05-4107423



Natural Heritage Priority Site

Beech Road Ridge

Passaic County

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

0.6 0 0.6 Miles

Priority Site
Public Land

N
W E

Natural Heritage Priority Site
Beech Road Ridge

Locational Information

Quad Name:	SENSITIVE INFORMATION BLOCKED OUT PER DEC INSTRUCTIONS
County:	
Municipality	

Description of Site

SENSITIVE INFORMATION BLOCKED OUT PER DEC INSTRUCTIONS

Boundary Justification

Primary boundary includes extensive contiguous forested habitat for State-listed Endangered and Threatened Animal Species as identified through the Landscape Project mapping. Secondary boundary follows the outer edge of the forested habitat.

Biodiversity Rank B5

Contains populations of State-listed Endangered and Threatened Animal Species.

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

July, 2001
Site Code: S.USNJHP1*108

EXPLANATIONS OF CODES USED IN NATURAL HERITAGE REPORTS

FEDERAL STATUS CODES

The following U.S. Fish and Wildlife Service categories and their definitions of endangered and threatened plants and animals have been modified from the U.S. Fish and Wildlife Service (F.R. Vol. 50 No. 188; Vol. 61, No. 40; F.R. 50 CFR Part 17). Federal Status codes reported for species follow the most recent listing.

LE	Taxa formally listed as endangered.
LT	Taxa formally listed as threatened.
PE	Taxa already proposed to be formally listed as endangered.
PT	Taxa already proposed to be formally listed as threatened.
C	Taxa for which the Service currently has on file sufficient information on biological vulnerability and threat(s) to support proposals to list them as endangered or threatened species.
S/A	Similarity of appearance species.

STATE STATUS CODES

Two animal lists provide state status codes after the Endangered and Nongame Species Conservation Act of 1973 (NSSA 23:2A-13 et. seq.): the list of ngered species (N.J.A.C. 7:25-4.13) and the list defining status of indigenous, nongame wildlife species of New Jersey (N.J.A.C. 7:25-4.17(a)). The status of animal species is determined by the Nongame and Endangered Species Program (ENSP). The state status codes and definitions provided reflect the most recent lists that were revised in the New Jersey Register, Monday, June 3, 1991.

D	Declining species-a species which has exhibited a continued decline in population numbers over the years.
E	Endangered species-an endangered species is one whose prospects for survival within the state are in immediate danger due to one or many factors - a loss of habitat, over exploitation, predation, competition, disease. An endangered species requires immediate assistance or extinction will probably follow.
EX	Extirpated species-a species that formerly occurred in New Jersey, but is not now known to exist within the state.
I	Introduced species-a species not native to New Jersey that could not have established itself here without the assistance of man.
INC	Increasing species-a species whose population has exhibited a significant increase, beyond the normal range of its life cycle, over a long term period.
T	Threatened species-a species that may become endangered if conditions surrounding the species begin to or continue to deteriorate.
P	Peripheral species-a species whose occurrence in New Jersey is at the extreme edge of its present natural range.
S	Stable species-a species whose population is not undergoing any long-term increase/decrease within its natural cycle.
U	Undetermined species-a species about which there is not enough information available to determine the status.

Status for animals separated by a slash(/) indicate a duel status. First status refers to the state breeding population, and the second status refers to the migratory or winter population.

STATE ELEMENT RANKS

S1 Critically imperiled in New Jersey because of extreme rarity (5 or fewer occurrences or very few remaining individuals or acres). Elements so ranked are often restricted to very specialized conditions or habitats and/or restricted to an extremely small geographical area of the state. Also included are elements which were formerly more abundant, but because of habitat destruction or some other critical factor of its biology, they have been demonstrably reduced in abundance. In essence, these are elements for which, even with intensive searching, sizable additional occurrences are unlikely to be discovered.

S2 Imperiled in New Jersey because of rarity (6 to 20 occurrences). Historically many of these elements may have been more frequent but are now known from very few extant occurrences, primarily because of habitat destruction. Diligent searching may yield additional occurrences.

S3 Rare in state with 21 to 100 occurrences (plant species and ecological communities in this category have only 21 to 50 occurrences). Includes elements which are widely distributed in the state but with small populations/acreage or elements with restricted distribution, but locally abundant. Not yet imperiled in state but may soon be if current trends continue. Searching often yields additional occurrences.

S4 Apparently secure in state, with many occurrences.

S5 Demonstrably secure in state and essentially ineradicable under present conditions.

SA Accidental in state, including species (usually birds or butterflies) recorded once or twice or only at very great intervals, hundreds or even thousands of miles outside their usual range; a few of these species may even have bred on the one or two occasions they were recorded; examples include European strays or western birds on the East Coast and vice-versa.

SE Elements that are clearly exotic in New Jersey including those taxa not native to North America (introduced taxa) or taxa deliberately or accidentally introduced into the State from other parts of North America (adventive taxa). Taxa ranked SE are not a conservation priority (viable introduced occurrences of G1 or G2 elements may be exceptions).

SH Elements of historical occurrence in New Jersey. Despite some searching of historical occurrences and/or potential habitat, no extant occurrences are known. Since not all of the historical occurrences have been field surveyed, and unsearched potential habitat remains, historically ranked taxa are considered possibly extant, and remain a conservation priority for continued field work.

SP Element has potential to occur in New Jersey, but no occurrences have been reported.

SR Elements reported from New Jersey, but without persuasive documentation which would provide a basis for either accepting or rejecting the report. In some instances documentation may exist, but as of yet, its source or location has not been determined.

SRF Elements erroneously reported from New Jersey, but this error persists in the literature.

SU Elements believed to be in peril but the degree of rarity uncertain. Also included are rare taxa of uncertain taxonomical standing. More information is needed to resolve rank.

SX Elements that have been determined or are presumed to be extirpated from New Jersey. All historical occurrences have been searched and a reasonable search of potential habitat has been completed. Extirpated taxa are not a current conservation priority.

SXC Elements presumed extirpated from New Jersey, but native populations collected from the wild exist in cultivation.

PASSAIC COUNTY
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

	NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
*** Vertebrates							
	ACCIPITER COOPERII	COOPER'S HAWK		T/T		G5	S3B,S4N
	ACCIPITER GENTILIS	NORTHERN GOSHAWK		E/E		G5	S1B,S4N
	ACRIS CREPITANS CREPITANS	NORTHERN CRICKET FROG		U		G5T5	S3
	AMBYSTOMA MACULATUM	SPOTTED SALAMANDER		D		G5	S3
	AMBYSTOMA OPACUM	MARBLED SALAMANDER		D		G5	S3
	BUTEO LINEATUS	RED-SHOULDERED HAWK		E/T		G5	S1B,S2N
	CLEMMYS INSCULPTA	WOOD TURTLE		T		G4	S3
	CLEMMYS MUHLENBERGII	BOG TURTLE	LT	E		G3	S2
	CROTALUS HORRIDUS HORRIDUS	TIMBER RATTLESNAKE		E		G4T4	S2
	FALCO PEREGRINUS	PEREGRINE FALCON		E		G4	S1B,S?N
	HALIAEETUS LEUCOCEPHALUS	BALD EAGLE	LT	E		G4	S1B,S2N
	LYNX RUFUS	BOBCAT		E		G5	S3
	MYOTIS LEIBII	EASTERN SMALL-FOOTED MYOTIS		U		G3	S1
	NEOTOMA MAGISTER	ALLEGHENY WOODRAT		E		G3G4	S1
	PETROCHELIDON PYRRHONOTA	CLIFF SWALLOW		S/S		G5	S2B
	PODILYMBUS PODICEPS	PIED-BILLED GREBE		E/S		G5	S1B,S3N
	STRIX VARIA	BARRED OWL		T/T		G5	S3B
	SYNAPTOMYS COOPERI	SOUTHERN BOG LEMMING		U		G5	S2
*** Ecosystems							
	GLACIAL BOG	GLACIAL BOG				G4?	S1
	TRAPROCK GLADE/ROCK OUTCROP COMMUNITY	TRAPROCK GLADE/ROCK OUTCROP COMMUNITY				G2	S1
*** Invertebrates							
	ALASMIDONTA UNDULATA	TRIANGLE FLOATER		T		G4	S3
	BATTUS PHILENOR	PIPEVINE SWALLOWTAIL				G5	SU
	BOLORIA SELENE MYRINA	A SILVER-BORDERED FRITILLARY		T		G5T5	S2
	CALLOPHRYS HENRICI	HENRY'S ELFIN				G5	S3S4

3

30 AUG 2004

PASSAIC COUNTY

RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN

THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
ARABIS HIRSUTA VAR PYCNOCARPA	WESTERN HAIRY ROCKCRESS				G5T5	S2
ASCLEPIAS VERTICILLATA	WHORLED MILKWEED				G5	S2
CALLITRICHE PALUSTRIS	MARSH WATER-STARWORT				G5	S2
CARDAMINE LONGII	LONG'S BITTERCRESS		E		G3	SH
CAREX BRUNNESCENS	ROUND-SPIKE BROWNISH SEDGE		E		G5T5	S1
CAREX DEWEYANA	DEWEY'S SEDGE		E		G5T5	S1
CAREX LIMOSA	MUD SEDGE		E		G5	S1
CAREX SICCATA	HILLSIDE SEDGE		E		G5	S1
CAREX UTRICULATA	BOTTLE-SHAPED SEDGE				G5	S2
CAREX WILLDENOWII VAR WILLDENOWII	WILLDENOW'S SEDGE				G5T5	S2
CASTILLEJA COCCINEA	SCARLET INDIAN-PAINTBRUSH				G5	S2
CLEMATIS OCCIDENTALIS VAR OCCIDENTALIS	PURPLE CLEMATIS				G5T5	S2
DOELLINGERIA INFIRMA	CORNEL-LEAF ASTER				G5	S2
ELYMUS TRACHYCAULUS	SLENDER WHEATGRASS		E		G5	S1
EQUISETUM PRATENSE	MEADOW HORSETAIL		E		G5	S1
EQUISETUM VARIEGATUM	VARIEGATED HORSETAIL		E		G5T5	S1
GAULTHERIA HISPIDULA	CREEPING-SNOWBERRY		E		G5	S1
GENTIANA LINEARIS	NARROW-LEAF GENTIAN		E		G4G5	SH
HEMICARPHA MICRANTHA	SMALL-FLOWER HALFCHAFF SEDGE		E		G4	S1
ILEX MONTANA	LARGE-LEAF HOLLY		E		G5	S1
ISOTRIA MEDEOLOIDES	SMALL WHORLED POGONIA	LT	E		G2	S1
LECHEA TENUIFOLIA	NARROW-LEAF PINWEED		E		G5	S1
LEMNA PERPUSILLA	MINUTE DUCKWEED		E		G5	S1
LEMNA VALDIVIANA	PALE DUCKWEED		E		G5	S1
LIMOSELLA SUBULATA	AWL-LEAF MUDWORT		E		G4G5	S1
LONICERA CANADENSIS	AMERICAN FLY-HONEYSUCKLE		E		G5	S1
MONARDA CLINOPODIA	BASIL BEEBALM		E		G5	SH
MUHLENBERGIA CAPILLARIS	LONG-AWN SMOKE GRASS		E		G5T?	S1

PASSAIC COUNTY
RARE SPECIES AND NATURAL COMMUNITIES PRESENTLY RECORDED IN
THE NEW JERSEY NATURAL HERITAGE DATABASE

NAME	COMMON NAME	FEDERAL STATUS	STATE STATUS	REGIONAL STATUS	GRANK	SRANK
TROLLIUS LAXUS SSP LAXUS	SPREADING GLOBE FLOWER		E		G4T3	S1
VACCINIUM OXYCOCCOS	SMALL CRANBERRY				G5	S2
VERBENA SIMPLEX	NARROW-LEAF VERVAIN		E		G5	S1
VIBURNUM ALNIFOLIUM	WITCH-HOBBLE		E		G5	S1
VIOLA SEPTENTRIONALIS	NORTHERN BLUE VIOLET		E		G5	S1
WOLFFIELLA FLORIDANA	SWORD BOGMAT		E		G5	S1
XYRIS MONTANA	NORTHERN YELLOW-EYED-GRASS		E		G4	S1.1

111 Records Processed

CAUTIONS AND RESTRICTIONS ON NATURAL HERITAGE DATA

The quantity and quality of data collected by the Natural Heritage Program is dependent on the research and observations of many individuals and organizations. Not all of this information is the result of comprehensive or site-specific field surveys. Some natural areas in New Jersey have never been thoroughly surveyed. As a result, new locations for plant and animal species are continuously added to the database. Since data acquisition is a dynamic, ongoing process, the Natural Heritage Program cannot provide a definitive statement on the presence, absence, or condition of biological elements in any part of New Jersey. Information supplied by the Natural Heritage Program summarizes existing data known to the program at the time of the request regarding the biological elements or locations in question. They should never be regarded as final statements on the elements or areas being considered, nor should they be substituted for on-site surveys required for environmental assessments. The attached data is provided as one source of information to assist others in the preservation of natural diversity.

This office cannot provide a letter of interpretation or a statement addressing the classification of wetlands as defined by the Freshwater Wetlands Act. Requests for such determination should be sent to the DEP Land Use Regulation Program, P.O. Box 401, Trenton, NJ 08625-0401.

The Landscape Project was developed by the Division of Fish & Wildlife, Endangered and Nongame Species Program in order to map critical habitat for rare animal species. Natural Heritage Database response letters will also list all species (if any) found during a search of the Landscape Project. However, this office cannot answer any inquiries about the Landscape Project. All questions should be directed to the DEP Division of Fish and Wildlife, Endangered and Nongame Species Program, P.O. Box 400, Trenton, NJ 08625-0400.

This cautions and restrictions notice must be included whenever information provided by the Natural Heritage Database is published.

NJ Department of Environmental Protection
Division of Parks and Forestry
Natural Lands Management

Frequently Asked Questions About Natural Heritage Priority Sites

What are Natural Heritage Priority Sites?

Through its Natural Heritage Database, the Office of Natural Lands Management (ONLM) identifies critically important areas to conserve New Jersey's biological diversity. The database provides detailed, up-to-date information on rare species and natural communities to planners, developers, and conservation agencies for use in resource management, environmental impact assessment, and both public and private land protection efforts.

Using the database, ONLM has identified Natural Heritage Priority Sites that represent some of the best remaining habitat for rare species and exemplary natural communities in the state. These areas should be considered to be top priorities for the preservation of biological diversity in New Jersey. If these sites become degraded or destroyed, we may lose some of the unique components of our natural heritage.

ONLM has identified 410 priority sites over the course of more than 10 years. We have received assistance from many partner individuals and agencies over this time. The Nature Conservancy and the DEP Endangered and Nongame Species Program have provided key information or assisted with the delineation of a number of the sites.

How are Natural Heritage Priority Site maps used in conservation of biological diversity?

Natural Heritage Priority Site maps are used by individuals and agencies concerned with the protection and management of land. The maps have been used by municipalities preparing natural resource inventories; public and private conservation organizations preparing open space acquisition goals; land developers and consultants identifying environmentally sensitive lands; and public and private landowners developing land management plans.

Natural Heritage Priority Sites contain some of the best and most viable occurrences of endangered and threatened species and natural communities, but they do not cover all known habitat for endangered and threatened species in New Jersey. If information is needed on whether or not endangered or threatened species have been documented from a particular piece of land, a Natural Heritage Database search can be requested by contacting the Office of Natural Lands Management at the address below.

What do the boundaries of the sites contain?

The boundaries of each Natural Heritage Priority Site are drawn to encompass critical habitat for the rare species or natural communities. Often the boundaries extend to include additional buffer lands that should be managed to protect the habitat. A justification for the boundary is provided for each site. The term "primary bounds" is sometimes used to refer to boundaries enclosing critical habitat. The term "secondary bounds" is sometimes used to refer to boundaries enclosing additional buffer. In maps where both primary and secondary boundaries are described, only the outermost boundary is provided in the mapping.

What is the background map that the sites are drawn upon?

The sites are portrayed on background maps produced from a digital copy of the U.S. Geological Survey 7.5 minute topographic maps. The background maps contain topographic lines as well as streams, lakes, roads, towns and place names. These background maps do not always reflect recent changes in land development. Some may be more than 20 years old. Some sites appear to be shifted in position against this topo map. This shift is due to the fact that most sites have been digitized against a background of rectified aerial photography, and some of the digitized USGS topo maps do not align with this photography.

What do "public lands" depict on the maps?

The "public lands" shaded on these maps are state-owned open space lands that have been digitized as a GIS coverage by the state Green Acres Program. This information is provided to show patterns of State land ownership in the vicinity of the Priority Site. The public lands are areas such as State Parks and Forests, Wildlife Management Areas, and Natural Lands Trust preserves. They do not currently include lands owned by other state agencies, federal, county or municipal governments