PARKS, RECREATION
AND CULTURAL RESOURCES

Pre-Development Assessment Plan
Pearl Creek Property

4808 PEARL RD.
PIN: 1731261534
MARCH 2021

Raleigh

Executive Summary

The intent of the Pre-Development Assessment Plan (PDAP) is to document existing conditions, inventory natural resources, and provide an interim management plan prior to master planning and park development. The PDAP will provide recommendations for development potential based on opportunities and constraints of the site as shown in the suitability analysis.

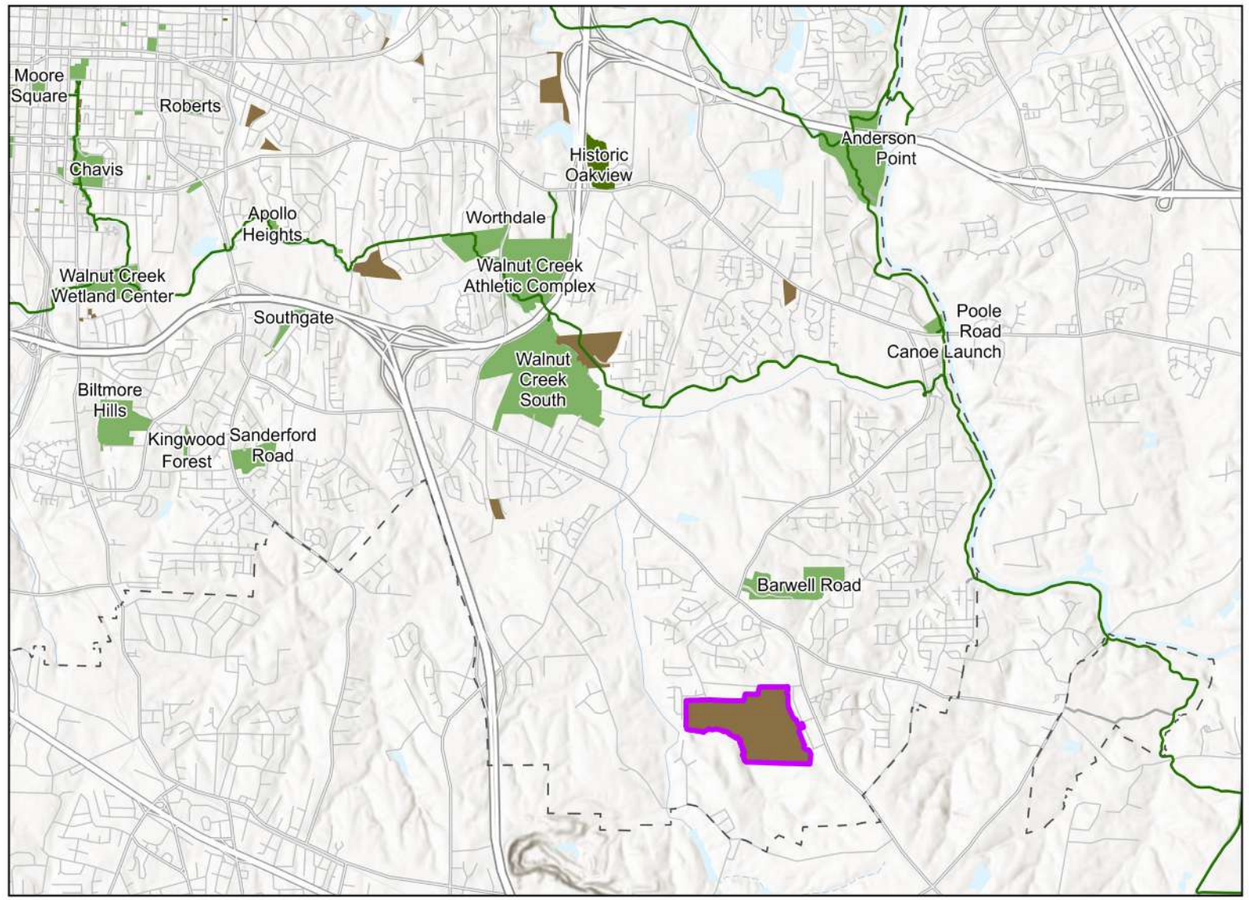
The Pearl Creek Property is located at 4808 Pearl Rd. south of the I-440 Beltline Loop, and northeast of the I-40 & US Hwy 70 intersection. The property is southwest of the Neuse River. The property consists of one parcel that is 155.07 acres.

The Pearl Creek Property is located along the south-eastern boundary of the Raleigh Extraterritorial Jurisdiction. There are several Community Associations and Homeowner Associations in the vicinity including a few that are immediately adjacent to the property, such as Camelot Village (209 lots) to the east and Emerald Village (62 lots) to the west. There are several elementary schools in the area, including Barwell Road Elementary School. There is also a fire station and recycling center nearby. The Wakemed Health center is also located nearby on US Hwy 70.

Southeast Raleigh is served by park properties that provide a range of experiences from wetland centers and community pools to athletic complexes and historic parks. However, Pearl Creek will provide park access to an area of the city that is currently under-served. The closest park to Pearl Creek is Barwell Road Park., approximately 1.25 miles away. Pearl Creek and Barwell Road Park are the only City of Raleigh park properties serving residents living southeast of Jones Sausage Rd / S New Hope Rd.

The Walnut Creek Big Branch Creek Tributary A Greenway Corridor runs east to west through the Pearl Creek Property. This corridor is planned as a riparian buffer and also as a proposed greenway trail. This greenway trail will connect to the Neuse River Greenway to the east of the property, and will also connect north to the Walnut Creek Greenway. This trail will also facilitate a greenway trail connection between the Pearl Creek Property and Barwell Rd. Park.

Parks Context Map



Site Suitability

Based on the analysis of the site suitability overlay, the following map delineates areas of the site that are recommended to have very limited, limited, or regular development.

Very Limited Development

- These areas are suitable for low impact uses such as natural surface trails, nature education, interpretive signage, invasive removal, and creek bank stabilization

Limited Development

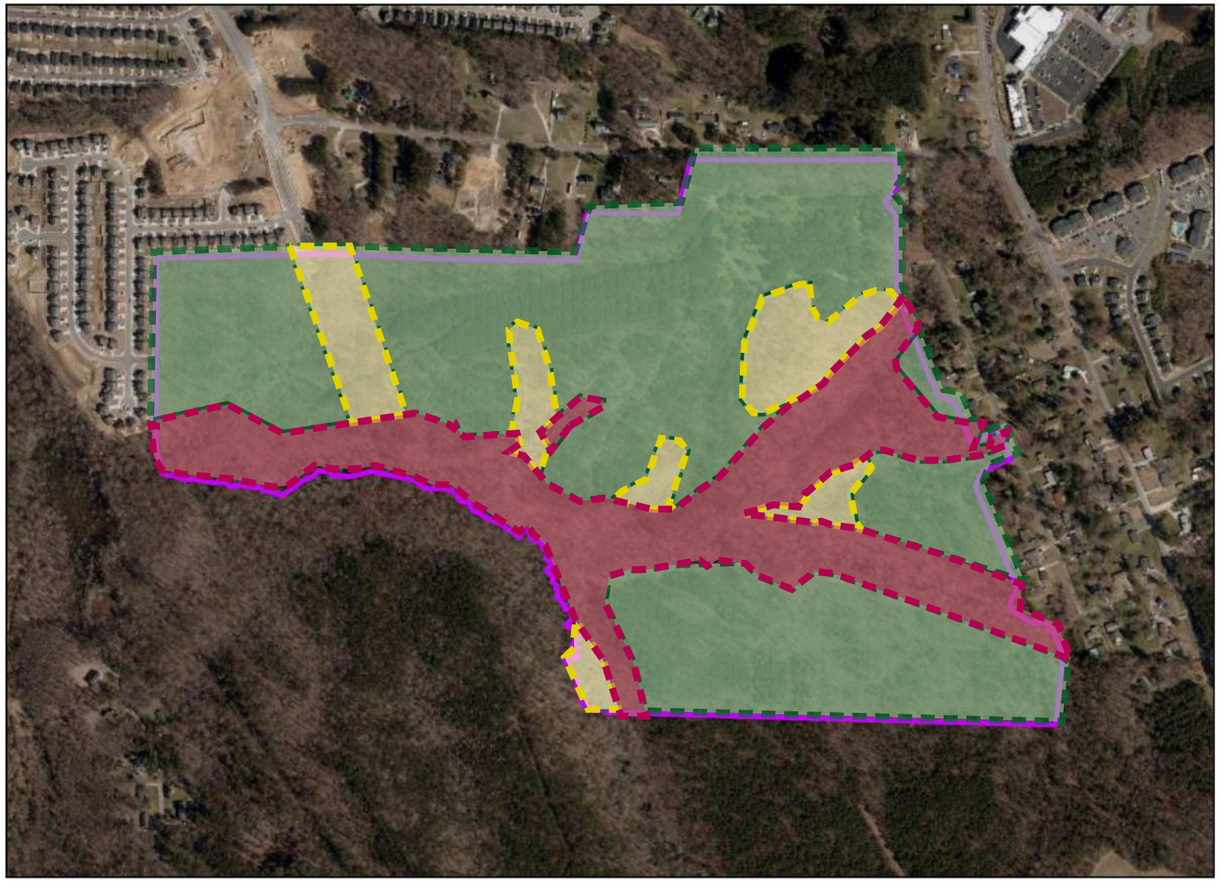
- Development within these areas will be restricted due to frequent inundation, the presence of existing habitat or notable species, or the planned development of non-park uses such as public roads.

Regular Development

- These areas have no significant limitations on development and are open to most design choices that will facilitate a versatile park property.

Site Suitability Analysis - Development Capacity	
Area Suitable for Very Limited Development	47 Acres
Area Suitable for Limited Development	14 Acres
Area Suitable for Regular Development	94 Acres
Total Park Area	155 Acres

Site Suitability Map



Interim Management Plan

The Pearl Creek Tract supports a diverse range of ecological features and the management of natural resources found on this site should be a high priority. The following section identifies important interim management recommendations to be implemented until the time that this Property has a fully developed natural resource management plan.

Primary short-term goals for natural resource management on this Property focus on quality land stewardship practices and the protection of significant ecological elements. To accomplish these goals, six specific management objectives have been identified by PRCR Natural Resources staff, developed to address the most pressing and practical natural resource management needs.

These interim management recommendations will incorporate accepted best management practices as they pertain to the biotic and abiotic elements found on the Pearl Creek Tract. The following recommendations are also intended to be flexible, with the goal of supporting adaptive management as additional site characteristics, responses to development, and management challenges are identified. Resource availability will be an additional consideration when implementing management recommendations, as equipment, staffing, and expertise may limit management capabilities.

Primary Short-term Goals Objectives

1. Implementation of coordinated monitoring and mapping efforts aiding in the development of biological inventories, identifying unauthorized uses, and potentially negative impacts to natural resources
2. Nature Preserve Criteria
3. Evaluation and control of invasive plant species
4. Reduction of unauthorized vehicular and foot traffic to prevent illegal hunting and the degradation of sensitive ecological resources
5. Protection of sensitive plant and wildlife species, and their habitats, from negative onsite and offsite impacts
6. Development of a resource management plan that details opportunities for active land management and ecological restoration, with an emphasis on building PRCR management skills, knowledge, and capabilities.

Long-term Goals

1. Implementation of additional ecological monitoring and mapping efforts
2. Retention and protection of documented significant plant and animal species
3. Improvement of wildlife habitat and natural plant communities through ecological restoration practices

Dry Oak-Hickory Habitat

Wetland

Japanese Stiltgrass (Microstegium vimineum)

Kudzu (Pueraria montana)

Illegal Dumping

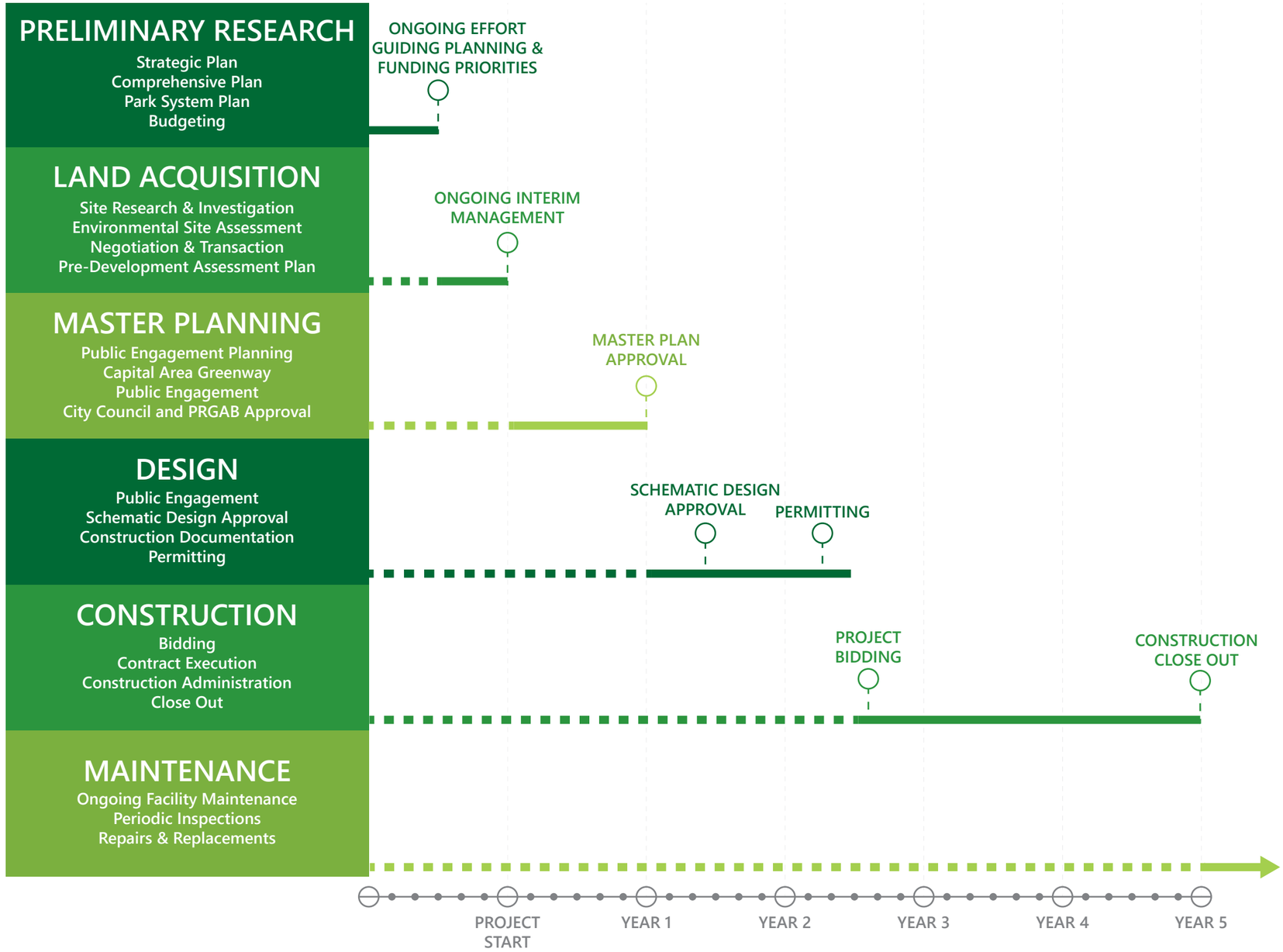
Unauthorized Vehicular Traffic

Table of Contents

Planning Process

A Pre-Development Assessment Plan (PDAP) is conducted on an undeveloped park property after the site has been acquired by the City of Raleigh and before any master planning for the site occurs.

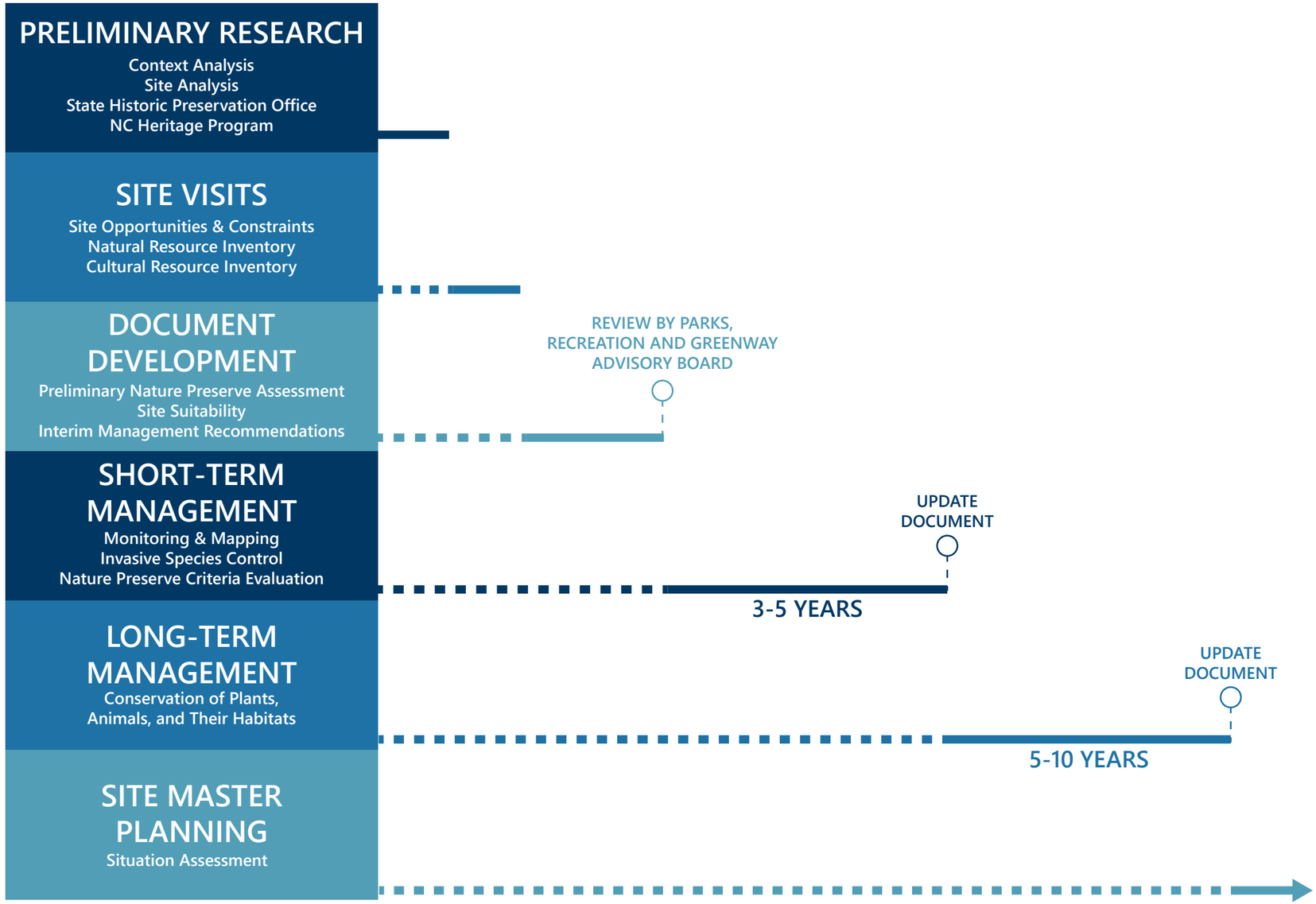
The intent of the Pre-Development Assessment Plan (PDAP) is to document existing conditions, inventory natural & cultural resources, and provide an interim management plan prior to master planning and park development. The PDAP will provide recommendations for development potential based on opportunities and constraints of the site as shown in the suitability analysis.



The Pre-Development Assessment Plan (PDAP) includes context and site analysis, as well as data acquired by the State Historic Preservation Office and the NC Heritage Program. Multiple site visits occur where City staff document site opportunities & constraints, and conduct natural & cultural resource inventory. While staff develop the PDAP document, they conduct a preliminary Nature Preserve assessment, as well as developing site suitability diagrams, and interim management recommendations.

Once the PDAP document is reviewed by the Parks, Recreation and Greenway Advisory Board (PRGAB), short-term management of the site begins. This includes but is not limited to monitoring & mapping, invasive species control, and a full Nature Preserve criteria evaluation. On average, short-term management takes 3-5 years after the PDAP document is reviewed by PRGAB. New information gathered during the short-term management, as well as the results of the Nature Preserve criteria evaluation are then updated in the PDAP document.

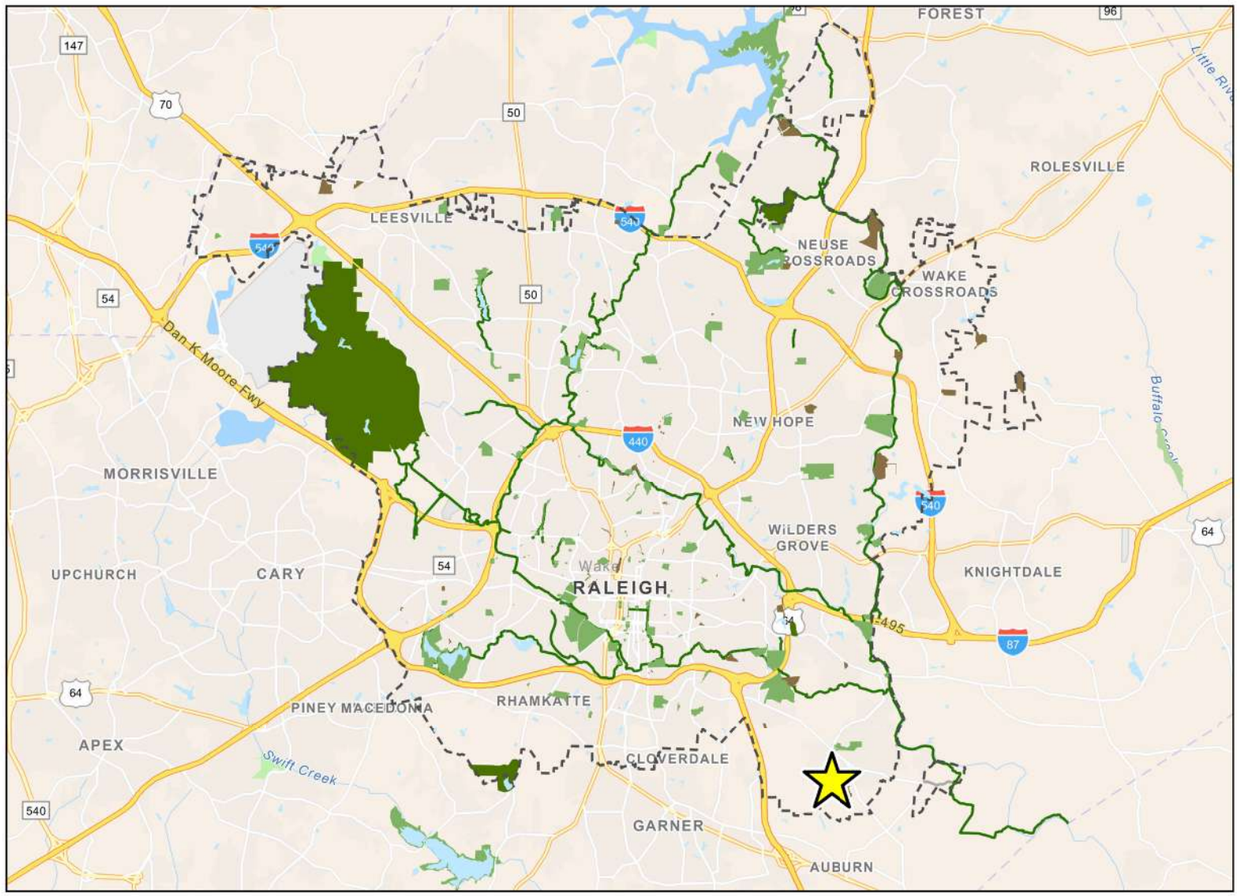
After short-term management is complete, the site moves into long-term management. This includes but is not limited to conservation of the site's plants, animals and their habitats. On average, long-term management takes place 5-10 years after the PDAP document is reviewed by PRGAB. New information gathered during the long-term management is then updated in the PDAP document. At this point the site usually moves onto site master planning, although some sites may remain in long-term management past the 5-10 year mark. When the site moves onto the master planning phase, information from the PDAP will be included in the Situation Assessment, that is the first step of the master planning process.



Introduction

Pearl Creek Property is located at 4808 Pearl Rd. south of the I-440 Beltline Loop, and northeast of the I-40 & US-70 intersection. The property is southwest of the Neuse River. The property consists of one parcel that is 155.07 acres The site is found in the Emerald Village community.

Context Map

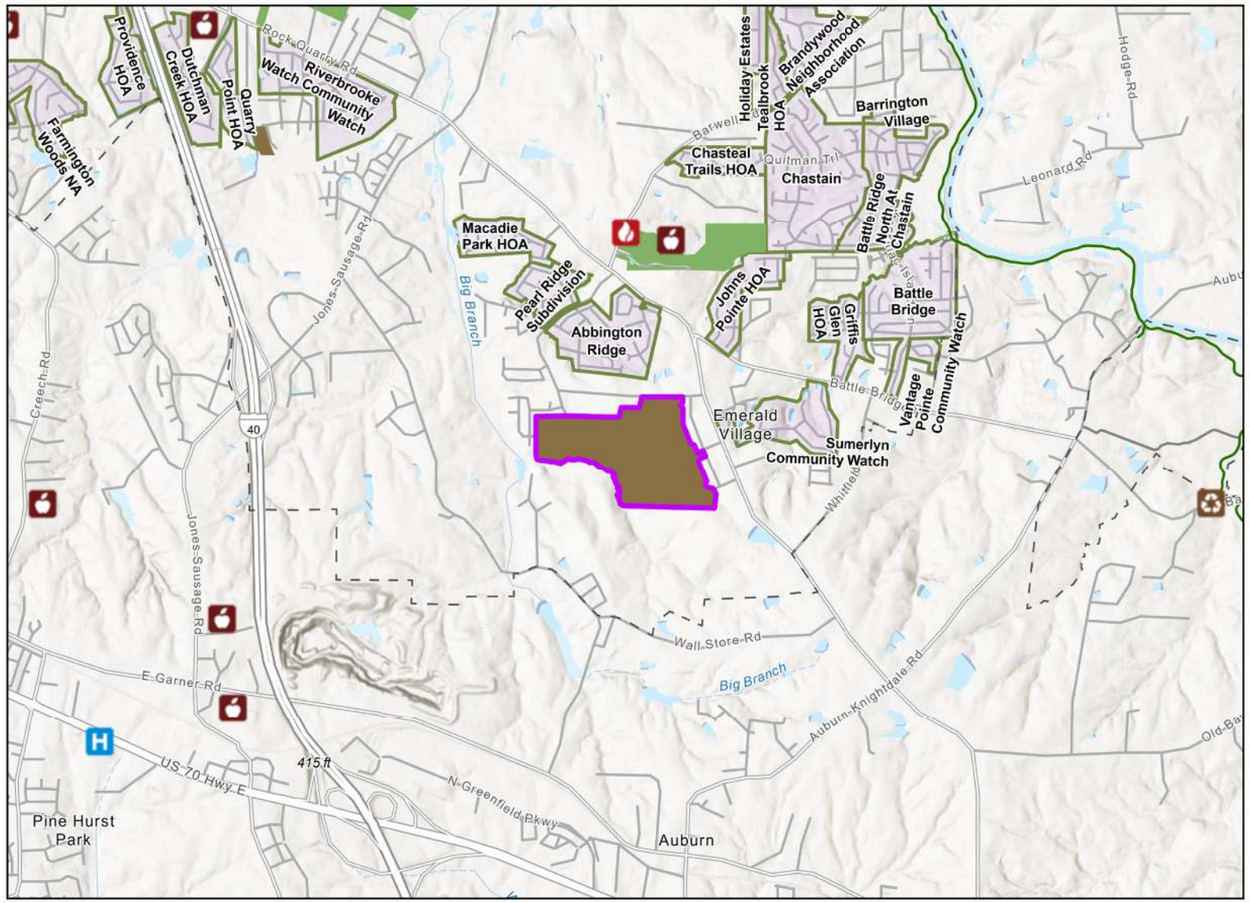


Context Analysis

The Pearl Creek Property is located along the south-eastern boundary of the Raleigh Extraterritorial Jurisdiction. There are several Community Associations and Homeowner Associations in the vicinity including a few that are immediately adjacent to the property. There are many elementary schools in the area, including Barwell Road Elementary School. There is also a fire station and recycling center nearby. The Wakemed Health center is also located nearby on US Hwy 70.

It is recommended that during a community engagement process for the development of the Pearl Creek Property that outreach is conduced through the Community & Homeowner Associations, as well as the nearby elementary schools including Barwell Rd. Elementary School.

Vicinity Map



LEGEND

- Raleigh Extraterritorial Jurisdiction
- Pearl Creek Property
- Raleigh Neighborhoods
- County & State Parks

Raleigh Parks

- Developed Parks
- Undeveloped Parks
- Greenway Trails
- Other Trails

Places of Interest

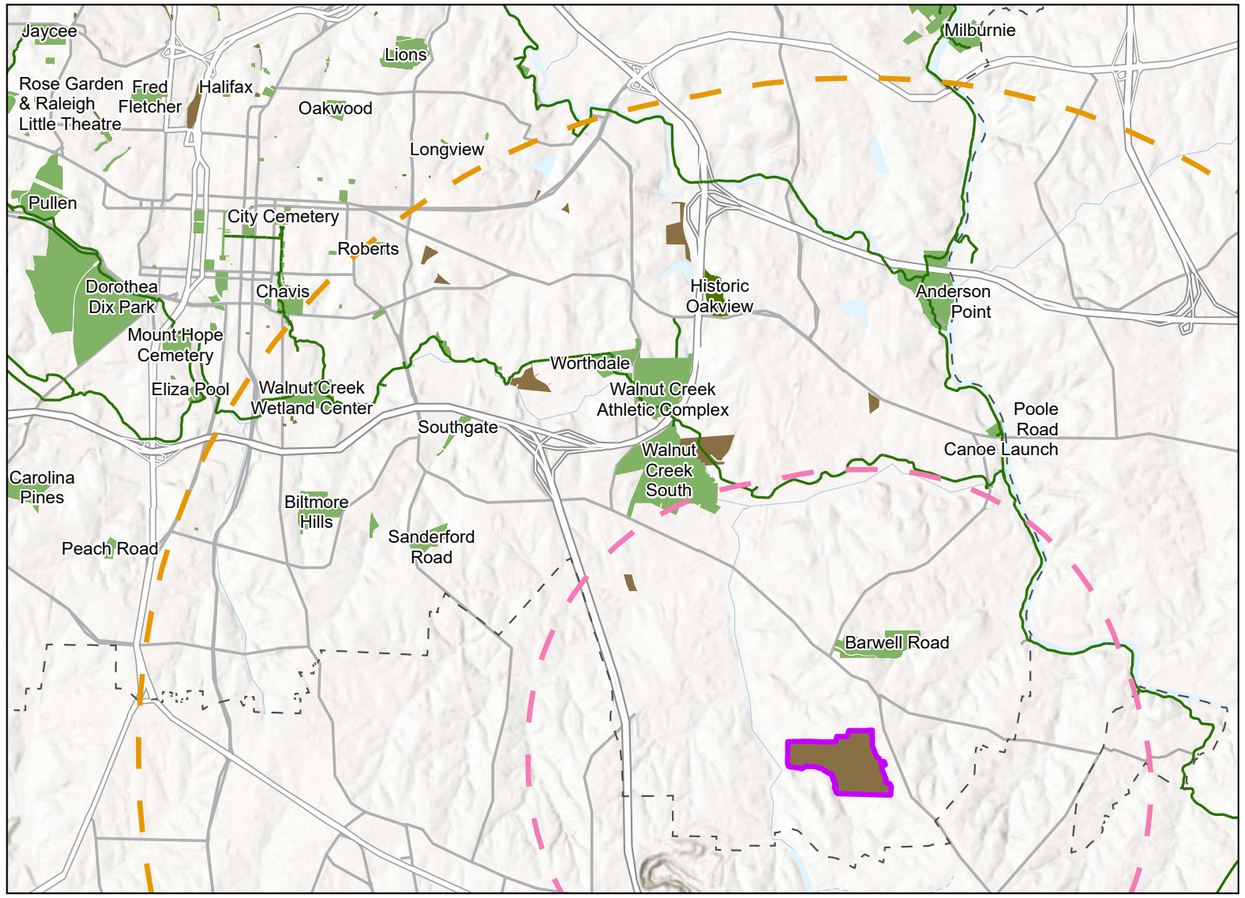
- Fire Departments
- Hospitals
- Recycling Centers
- Schools

Miles
0 0.35 0.7 1.4
N

There are many park properties near the Pearl Property that range in experiences from wetland centers and community pools to athletic complexes and historic parks. The closest park to Pearl Creek is Barwell Rd Park.

It is recommended that any future planning of the Pearl Creek Property consider how this property could compliment the system of parks already in this area, and the other undeveloped park properties.

Parks Context Map



The following tables provide information on which park experiences are currently provided by other parks in this area of the city and which park experiences are not currently available to residents in this vicinity. This information can be used to guide the future master planning of the Pearl Creek Property. Experiences included in the Pearl Creek Master Plan should be consistent with the vision and goals established for Pearl Creek Park, and should serve the needs of the immediate community while complementing the facilities and amenities provided by other units of the park system in this area.

The first table to the right provides a list of park experiences that are **not** currently provided by any City of Raleigh park locations within a 5-mile radius of the Pearl Creek Property. This list represents some of the potential experiences that are currently "missing" from the park and recreation opportunities provided in this area. The experiences in this list should be considered for inclusion in the master plan since they would provide new, unique opportunities for residents in this vicinity.

The second table to the right provides information on park experiences that are already provided within a 2-mile radius of this property. Barwell Road Park is the only public park within two miles of the Pearl Creek Property. When planning for development of Pearl Creek Park, it may not be necessary to replicate the community-scale facilities and amenities (such as a community center, dance studio, and weight room) already provided within a 2-mile radius of this site.

The third table, on the following page, lists all park experiences currently provided within a larger 5-mile radius of this site. This information can be used to further inform the future master plan of Pearl Creek Park.

It is recommended these lists be updated at the start of any future planning process.

Park Experiences Not Provided Within 5 Miles

Experience
Aquatic Center
Swimming Pool - Indoor
Active Adult Center
Arts Center
Indoor Stage
Bocce
Disc Golf
Handball
Outdoor Game Tables
Table Tennis - Outdoor
Throwing Pit - Discus/ Shotput
Community Garden
Sensory Garden
Constructed Wetland
Green Roof
Museum
Boat Rentals
Lake
Basketball - Outdoor (Half Court)
Batting Cage
Multipurpose Court
Pickleball Court - Outdoor
Tennis Center
Volleyball - Grass
Volleyball - Sand
Amusement Train
Dog Park
Kiddie Boat Ride
Pedal Boats
Rock Climbing/Bouldering
BMX Track
Inline Skating
Mountain Bike Trails
Skate Park

Park Experiences Within 2 Miles

Experience	Parks Providing the Experience
Community Center	Barwell Road
Dance Studio	Barwell Road
Fitness Center/ Weight Room	Barwell Road
Wetland	Barwell Road
Creek	Barwell Road
Basketball - Indoor (Half Court)	Barwell Road
Basketball - Indoor (Full Court)	Barwell Road
Open Play Field	Barwell Road
Volleyball - Indoor	Barwell Road

Park Experiences Within 5 Miles

Experience	Parks Providing the Experience
Bike Repair Station	Anderson Point, Walnut Creek Wetland Center
Car Charging Station	Walnut Creek Wetland Center
Comfort Station	8 Locations
Grill	10 Locations
Educational Signage	5 Locations
Outdoor Water Fountain - People	13 Locations
Outdoor Water Fountain - Dogs	Walnut Creek Wetland Center
Splashpad	Chavis
Swimming Pool - Outdoor	Biltmore Hills
Community Center	Barwell Road, Biltmore Hills, Chavis, Roberts, Worthdale
Environmental Education Center	Walnut Creek Wetland Center
Neighborhood Center	Apollo Heights, Sanderford Road, Southgate
Concessions	Walnut Creek Athletics Complex
Computer Lab	Apollo Heights, Chavis, Sanderford Road
Dance Studio	Barwell Road, Biltmore Hills, Chavis
Fitness Center/ Weight Room	Barwell Road, Biltmore Hills, Chavis, Roberts, Worthdale
Library Room	Walnut Creek Wetland Center
Rentable Building	Anderson Point, Chavis
Horseshoe	Kingwood Forest
Table Tennis - Indoor	Worthdale
Pollinator/ Native Garden	Walnut Creek Wetland Center
Bio-Retention Pond/Rain Garden	Chavis, Martin L King Jr Memorial, Walnut Creek Wetland Center
Cistern	Walnut Creek Wetland Center
Permeable Pavement	Apollo Heights
Historic Exhibit	Chavis, Martin L King Jr Memorial, Walnut Creek Wetland Center
Historic Signage	Chavis, Martin L King Jr Memorial
Historic Site	Chavis
Historic Structure	Anderson Point, Chavis
Visitor Center	Walnut Creek Wetland Center
Canoe & Kayak Launch	Anderson Point, Poole Road Canoe Launch
Fishing Access	Poole Road Canoe Launch
Wildlife Viewing	Poole Road Canoe Launch, Walnut Creek Wetland Center

Experience	Parks Providing the Experience
Nature Education	Walnut Creek Wetland Center
Nature-Oriented Exhibit	Walnut Creek Wetland Center
Nature-Oriented Educational Signage	Walnut Creek Wetland Center
River	Anderson Point, Poole Road Canoe Launch
Pond	Anderson Point
Wetland	11 Locations
Creek	13 Locations
Other Natural Water	Walnut Creek Wetland Center
Ballfields	7 Locations
Basketball - Indoor (Half Court)	Barwell Road, Chavis
Basketball - Indoor (Full Court)	6 Locations
Basketball - Outdoor (Full Court)	9 Locations
Multipurpose Field	Chavis, Southgate
Open Play Field	10 Locations
Pickleball Court - Indoor	Chavis
Tennis Courts	Biltmore Hills, Roberts, Sanderford Road, Worthdale
Volleyball - Indoor	Barwell Road, Chavis, Roberts
Carousel	Chavis
Fitness Station/Equipment - Outdoor	Chavis, Kingwood Forest
Ampitheatre	Anderson Point, Chavis
Park Bench	15 Locations
Picnic Table	15 Locations
Picnic Shelter	9 Locations
Playgrounds: 2-5	9 Locations
Playgrounds: 5-12	11 Locations
Playgrounds: Nature-Oriented	Chavis
Track - Non-Competitive/Lined	Chavis
Track - Competitive/Lined	Chavis
Trails - Paved	11 Locations
Trails - Natural Surface/Unpaved	Anderson Point, Walnut Creek Wetland Center
Trails - Loop	Anderson Point, Walnut Creek Athletics Complex, Worthdale
Walking Path	Chavis
Bleachers	Chavis, Roberts

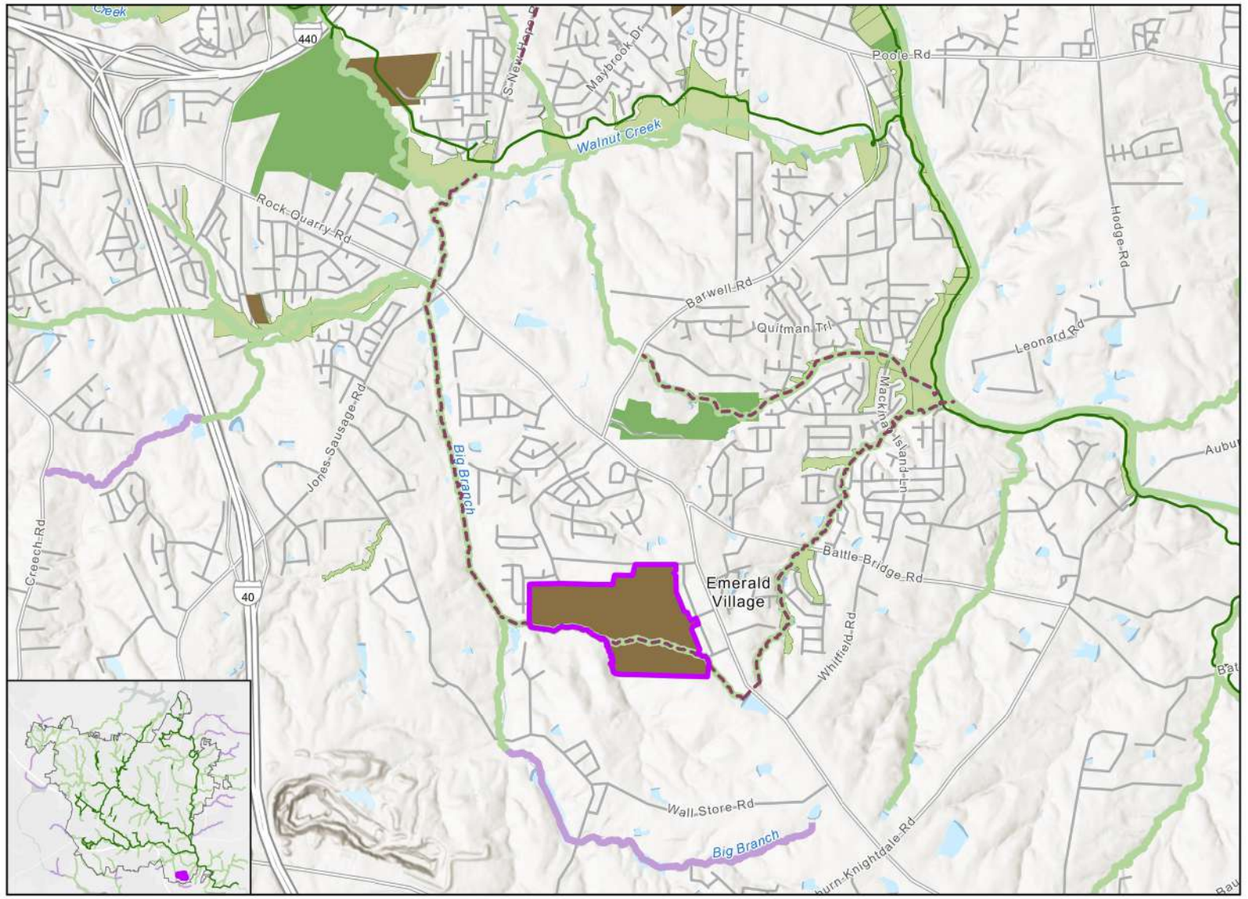
The greenway stream corridor that runs east to west through the Pearl Creek Property is known as "Walnut Creek – Big Branch Creek – Tributary A". This corridor is classified as a potential greenway trail in the Capital Area Greenway Planning and Design Guide. This section of greenway corridor forms part of a large 8 – 10 mile loop of greenway corridor that could provide connectivity between the Neuse River Trail and Walnut Creek Trail through southeast Raleigh.

The Big Branch Creek greenway corridor extends north approximately 2.5 miles to the Walnut Creek Trail. Very little greenway easement has so far been acquired along this corridor, so any opportunity for trail development would require substantial land acquisition and planning.
The Neuse River Tributary E greenway corridor extends northeast approximately 1.75 miles to the Neuse River Trail. Greenway easement has been acquired along approximately 50% of this corridor, but significant planning and land acquisition would be necessary before trail development.

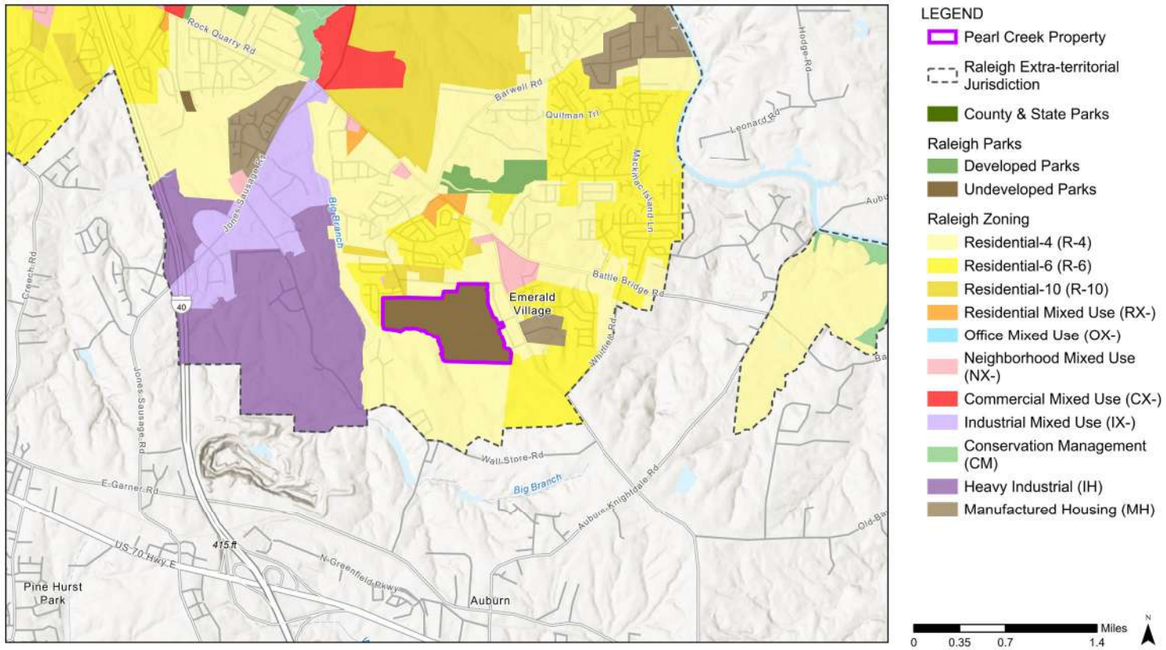
Rezoning case Z-2-18 (6700 Rock Quarry Rd) includes the following condition, which should be considered when planning any greenway trail development related to the Pearl Creek site or the Walnut Creek – Big Branch Creek – Tributary A greenway corridor:

Prior to the issuance of the first Certificate of Occupancy, the greenway easement dedicated along the Walnut Creek Big Branch Creek Tributary A shall be connected by a "Pedestrian Passage" in accordance with Street Design Manual 3.2.6 B to the sidewalk network within the development and the sidewalk network along Rock Quarry Road.

Greenway Context Map

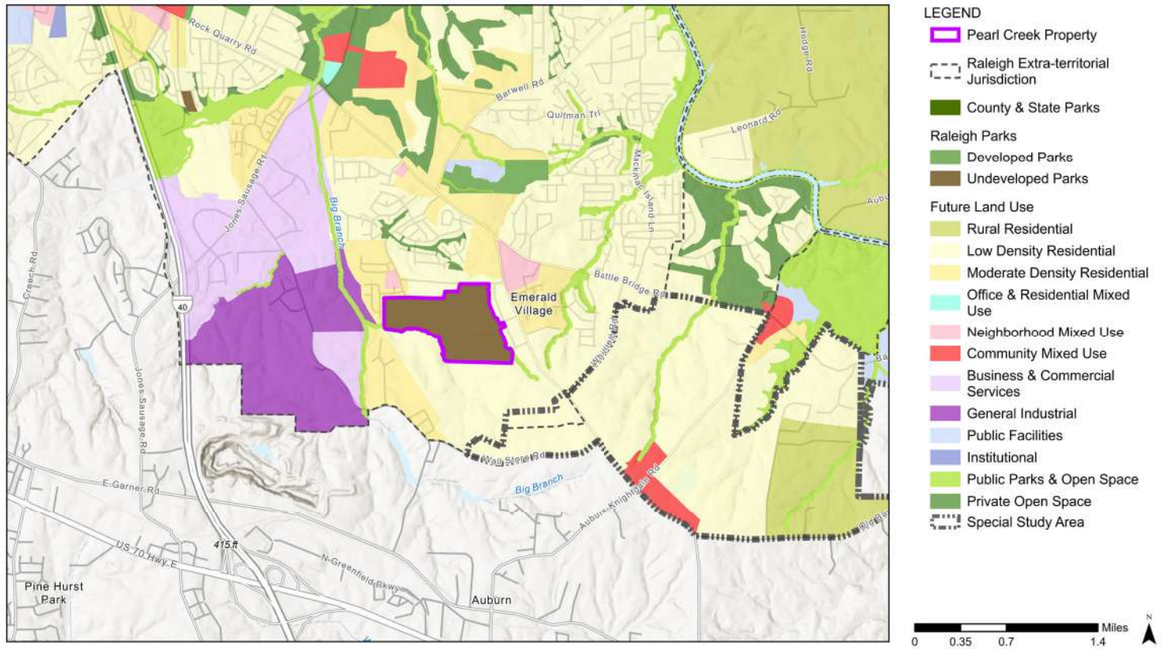


Current Zoning Map



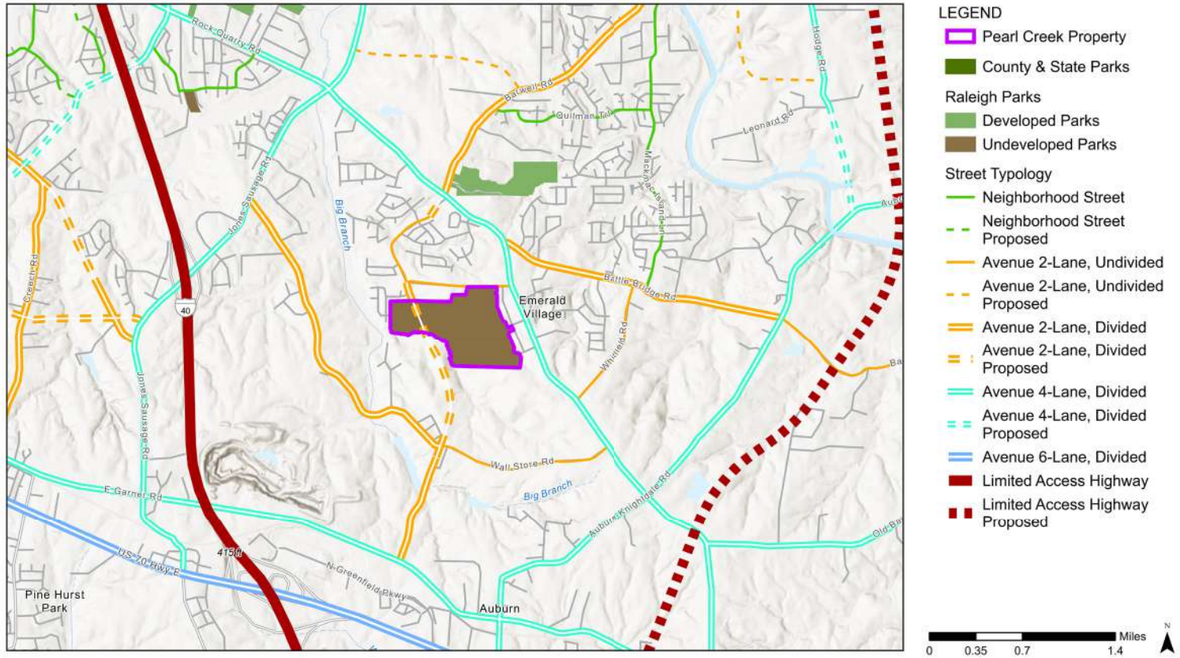
The current zoning surrounding the Pearl Creek Property is primarily residential with a mixture of densities, but there are several parcels zoned industrial to the west of the property. There are a parcels of manufactured housing, neighborhood mixed use, and commercial mixed use nearby as well.

Future Land Use Map



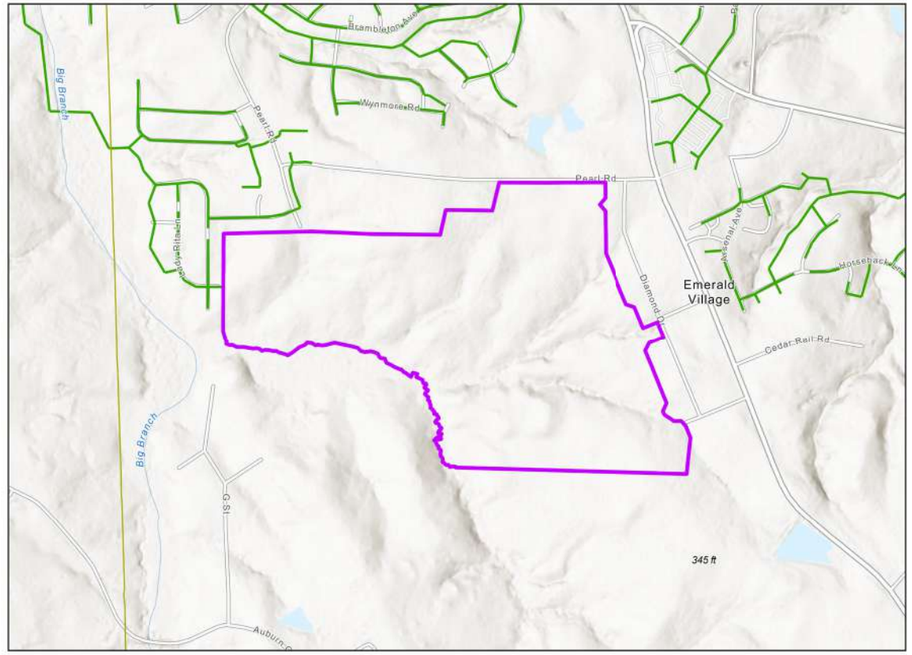
The future land use primarily reflects the current zoning. The future land use also designates a special study area located to the east of the Pearl Creek Property. Any development of the Pearl Creek Property should work in conjunction with the City of Raleigh Planning Dept. to incorporate any plans from the special study area.

Street Typology Map



The street typology map shows that there is a proposed 2-lane divided avenue that will traverse the western portion of the Pearl Creek Property. This avenue will connect Camelot Village Ave to Auburn Church Rd. Any development of the Pearl Creek Property should keep in mind this future use. The City of Raleigh Transportation Dept. will be working closely with the Parks, Recreation and Cultural Resources Dept. when this street project moves into the design phase. It should also be noted the proximity of the proposed limited access highway to the east of the property.

Utilities Map



There are currently no utilities on the Pearl Creek Property but there an electrical easement to the west of the property.

Site Analysis

There are entrances to the site from the north off Pearl Rd and from the east off Rock Quarry Rd. There is no current parking on site.

The landscape at the Pearl Creek Property is mostly forested with a few fields in the north and includes a wetland area on the western portion of the site.

Because of the past uses of the site, there are multiple old road beds that make the site fairly easy to traverse. Along the banks of the creeks on site there is rolling topography and several rock outcrops.

There are several opportunities on site ranging from interesting habitats & plant species, to potential access to neighboring communities. Site images on page 15 highlight these aspects:

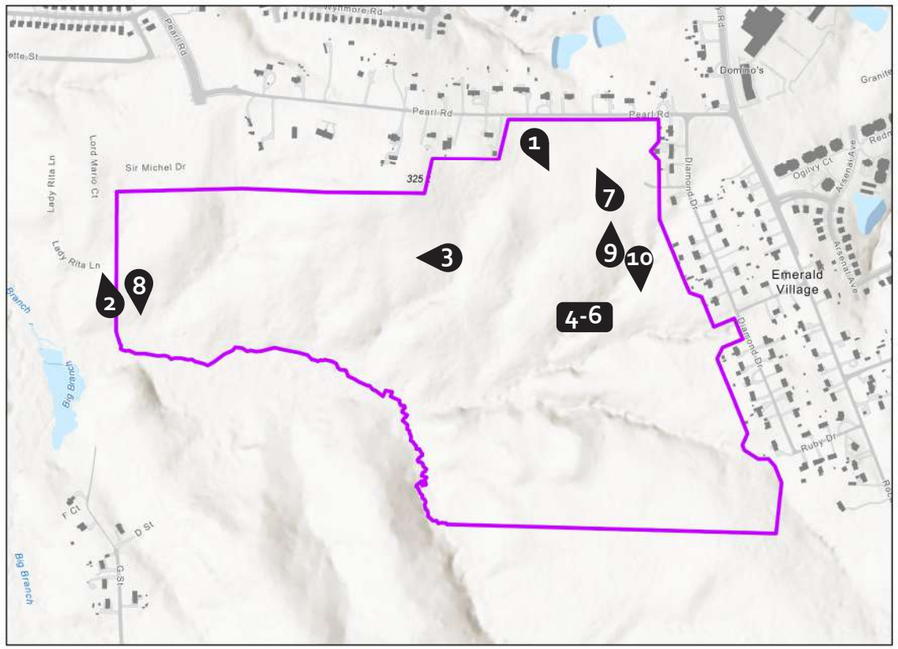
- Adjacent subdivision
- Dry oak-hickory habitat
- Early succession habitat
- Old roadbeds
- Rock outcrop
- Rolling topography
- Wetland area

There is also evidence of several site constraints including unsanctioned activities and invasive species that should be addressed in the interim management plan. Site images on page 16 show these constraints::

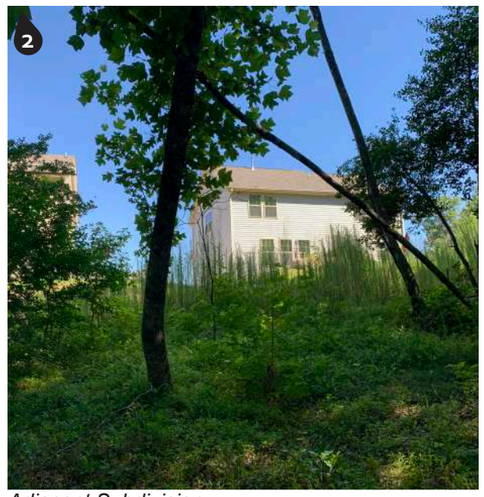
- Illegal dumping
- Evidence of 4-wheeler traffic
- Illegal target practice
- Erosion
- Invasive species

Existing Conditions

Site Opportunities - Images Key




1 Northern Entrance to Site


2 Adjacent Subdivision


3 Roadbed

Site Opportunities - Images


4 Rock Outcrop


5 Resurrection Fern (Pleopeltis polypodioides)


6 Rock Outcrop

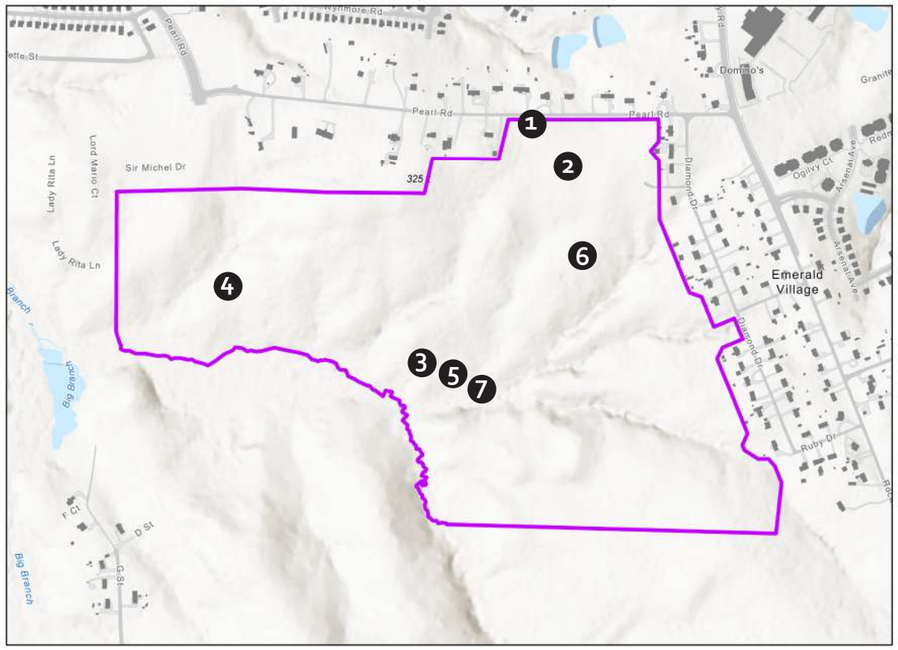

7 Early Succession Field


8 Wetland


9 Dry Oak-Hickory Habitat


10 Rolling Topography

Site Constraints - Images Key



LEGEND

Pearl Creek Property

Miles

0 0.05 0.1 0.2

N

Site Constraints - Images

Illegal Dumping

4-Wheeler Tracks

Kudzu (Pueraria montana)

Fire Ants (Solenopsis invicta Buren)

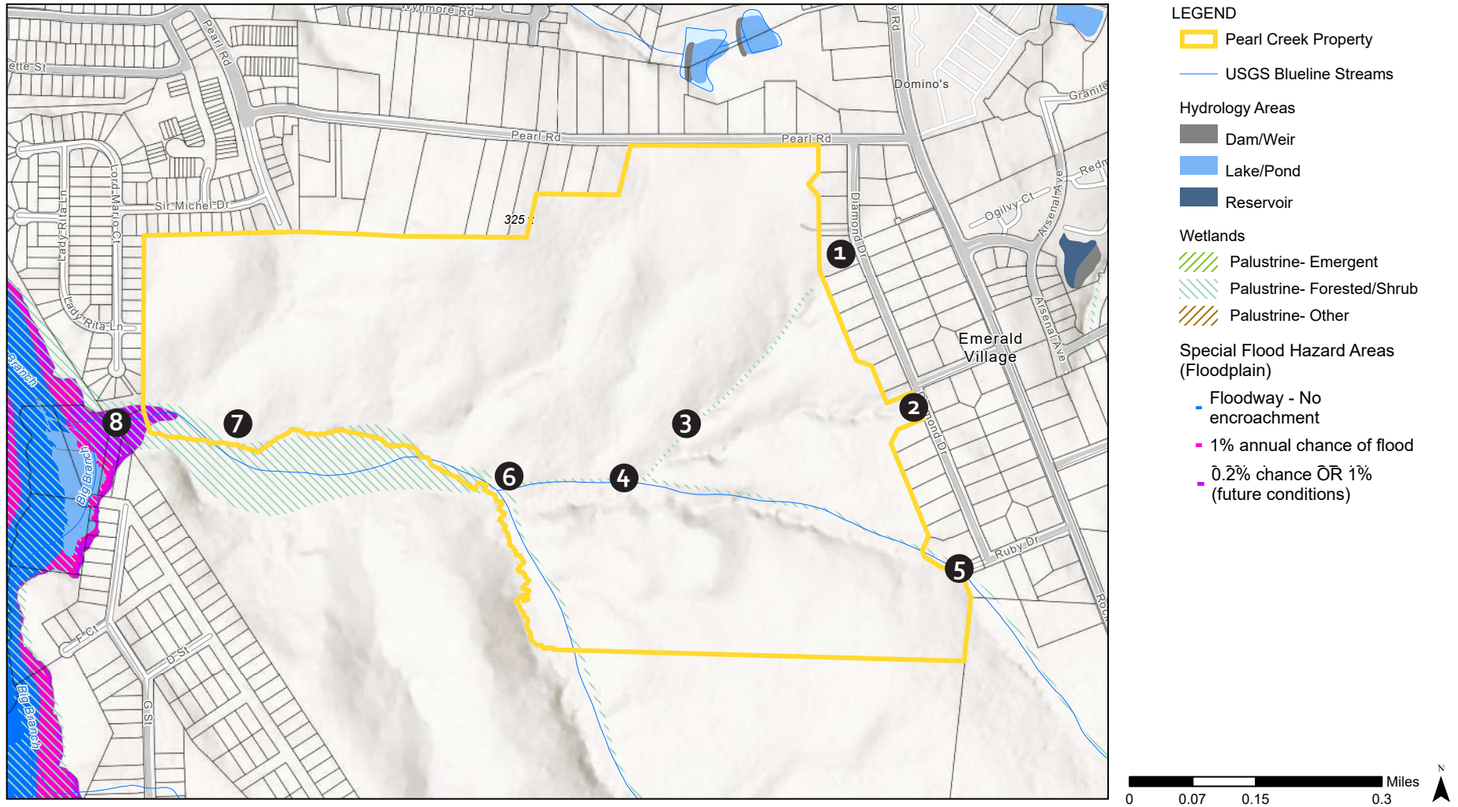
Erosion

Japanese Stiltgrass (Microstegium vimineum)

Target Practice

The Pearl Creek tract exhibits dynamic hydrological regimes driven primarily by stormwater events, including flooding and rapid runoff/diffusion from surrounding urban areas. The eastern boundary of the Tract represents the most upland portion and the impacts from stormwater runoff are most evident here. Two stormwater channels enter the property on the eastern boundary, with the largest channel [1] crossing the Tract boundary approximately 750-feet north of the second channel [2]. Both channels are fed by stormwater culverts that pass beneath Diamond Dr., the road that borders the Pearl Creek Tract to the east. These channels are characterized by incised streambeds, heavy rill erosion, and sedimentation – all resulting from frequent high-flow stormwater events and the steep topography found in this area. The two stormwater channels flow from east/northeast to west/southwest and converge at a point [3] near the center of the Tract to form a single channel. The single channel then flows southwest for a short distance before joining a blue-line stream [4] listed as an unnamed upper tributary of the Neuse River.

Hydrology Map



LEGEND

- Pearl Creek Property
- USGS Blueline Streams

Hydrology Areas

- Dam/Weir
- Lake/Pond
- Reservoir

Wetlands

- Palustrine- Emergent
- Palustrine- Forested/Shrub
- Palustrine- Other

Special Flood Hazard Areas (Floodplain)

- Floodway - No encroachment
- 1% annual chance of flood
- 0.2% chance OR 1% (future conditions)

0 0.07 0.15 0.3 Miles

N

The blue-line stream enters the Pearl Creek Tract on the eastern boundary [5] approximately 450-feet north of the southeastern property corner. This natural stream channel flows east to west and exhibits similar stormwater impacts such as bank/bed incision, erosion, and sedimentation in the upper reaches within the Tract boundaries. The blue-line stream flows through the lower-lying areas found in the center of the Tract and begins to exhibit more natural stream characteristics such as a definable floodplain, riparian vegetation, and fewer examples of sedimentation, erosion, and bank incision due to slower water velocities. This blue-line stream flows in a meandering fashion until it joins a second blue-line stream, also listed as an unnamed upper tributary of the Neuse River, at a point along the southwestern boundary line [6].

From this point, the two blue-line streams form a single unnamed upper tributary stream that defines the southwestern property line of the Pearl Creek Tract. This second-order stream then flows east to west before expanding into a wider floodplain characterized by braided streams, decreased channelization, increased surface flow, and jurisdictional wetlands [7]. Finally, the second-order blue-line stream exits the Pearl Creek Tract at the intersection point of the western and southwestern property lines before emptying into Big Branch Creek off-property [8].

Other significant hydrological features include numerous freshwater seeps that are found throughout the Tract in the topographical transitional areas between the upland and lowland sites. The proximity of granite bedrock and clay hardpans to the surface likely contribute to the high number of freshwater seeps on the Property. These freshwater seeps can provide valuable ecological habitats for wetland plants and associated wildlife, especially for reptile and amphibian species. Some of these seeps exhibit characteristics of Piedmont Boggy Streamhead communities, where the water emerging from the seep flows into an intermittent/perennial stream system. Other seeps create small upland pools, another distinct natural community and valuable habitat type. Lastly, some of the seeps located at the lowest elevations feed into wetland communities on the westernmost portions of the Pearl Creek Tract.

These wetlands are classified as by the USFWS NWI as “freshwater forested/shrub wetlands” and encompass roughly 3 acres of the Tract, extending westward approximately from the juncture of the two blue-line streams near the center of the Tract [6] to the western property line. The freshwater forested/shrub wetland also encompasses the riparian areas that lie within roughly twenty-feet (20’) of the blue-line streams and most of northern stormwater channel. These jurisdictional wetlands and the blue-line streams located onsite are protected by federal and state laws, and any impacts to these hydrological features should be considered during further site-development planning processes.

The majority of the soils located on the Pearl Creek Tract are considered well-drained to excessively well-drained, especially those in the upland and transitional topographical areas. These soils include loamy sand, sandy loam, fine sandy loam, and gravelly sandy loam soil textures that allow for increased permeability. These upland and transitional soils represent the most suitable sites for future facility development, although the gradual topography accented by the occasional erosional channel or gully may present development challenges.

The lower-lying portions of the Tract exhibit more poorly drained soils that also consist of a fine sandy-loam texture. These soils coincide with the broadening of the hydrological floodplain and the culmination of the water table indicated by perched wetlands and freshwater seeps. The only hydric soils found on the Tract are located in these lower-lying areas and include the predominantly non-hydric Mantachie fine sandy loam (less than 33% of the mapped soil unit classified as hydric), and the partially-hydric Wehadkee-Bibb fine sandy loam (between 33% and 66% of the mapped soil unit classified as hydric).

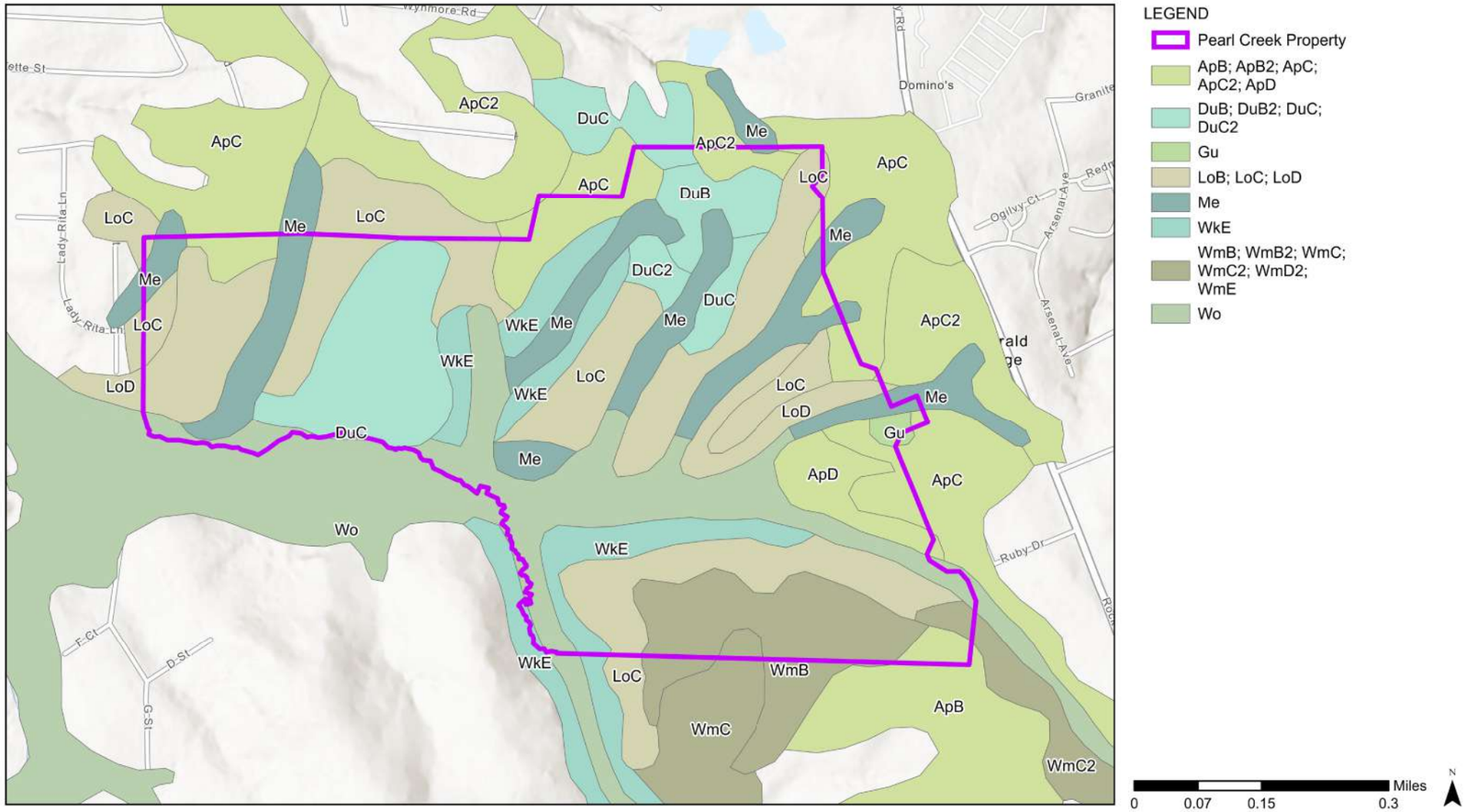
These soil types are the least suited for facility development given the poor drainage and texture. However, these soil types and their associated hydrological regimes support the alluvial floodplain and wetland habitat types which are ecologically valuable. Facilities such as natural-surface trails and interpretive signage may be appropriate for these sites.

Table of Soils Found Within or Adjacent to Pearl Creek Property Boundaries

Soil Abbreviation*	Soil Type Name	Drainage Class	Hydric Rating
Ap	Appling sandy loam	Well-drained	Non-hydric
Du	Durham loamy sand	Well-drained	Non-hydric
Lo	Louisburg gravelly sandy loam	Well-drained	Non-hydric
Me	Mantachie fine sandy loam	Somewhat poorly drained	Predominantly non-hydric
Wk	Wake loamy sand	Excessively drained	Non-hydric
Wm	Wedowee sandy loam	Well-drained	Non-hydric
Wo	Wehadkee-Bibb fine sandy loam	Very poorly drained	Partially hydric

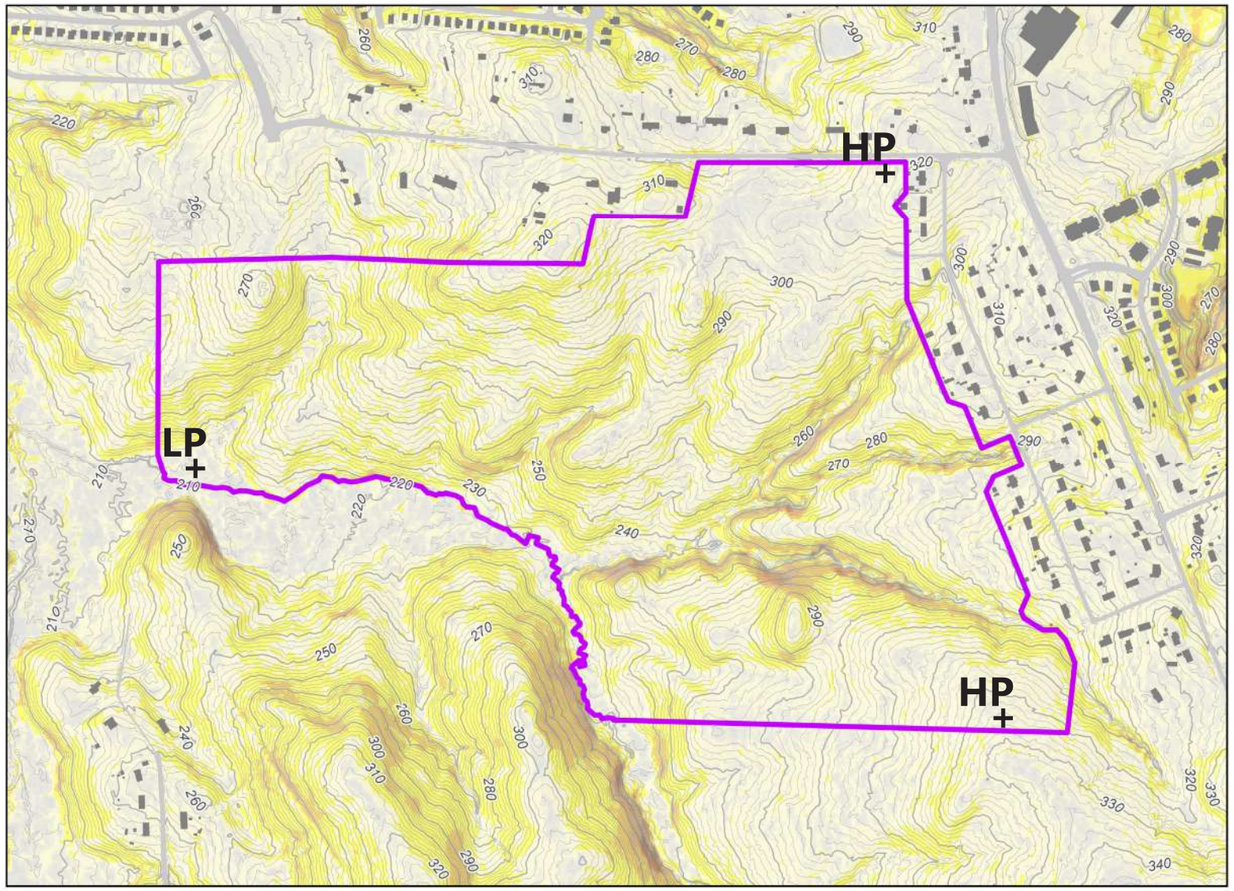
*Percent-slope indicated by A, B, and C ratings in increasing order. Soils that have been heavily eroded are denoted with “2” after the soil type abbreviation.

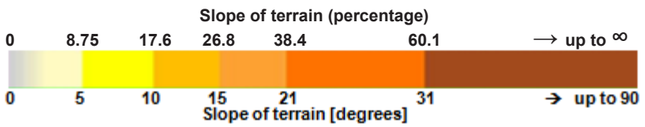
Soils Map



The terrain slopes from the northeast & southeast part of the Pearl Creek Property towards the Big Branch Creek to the west of the property. The high point (HP) is noted on northeast & southeast area of the property and the low point (LP) is found in the western area. Very steep slopes (>60%) are found near the creek banks within the site, but the majority of site is classified as nearly level to gently sloping (0-8.75%) or strongly sloping (8.75%-17.6%).

Slope & Topography Map





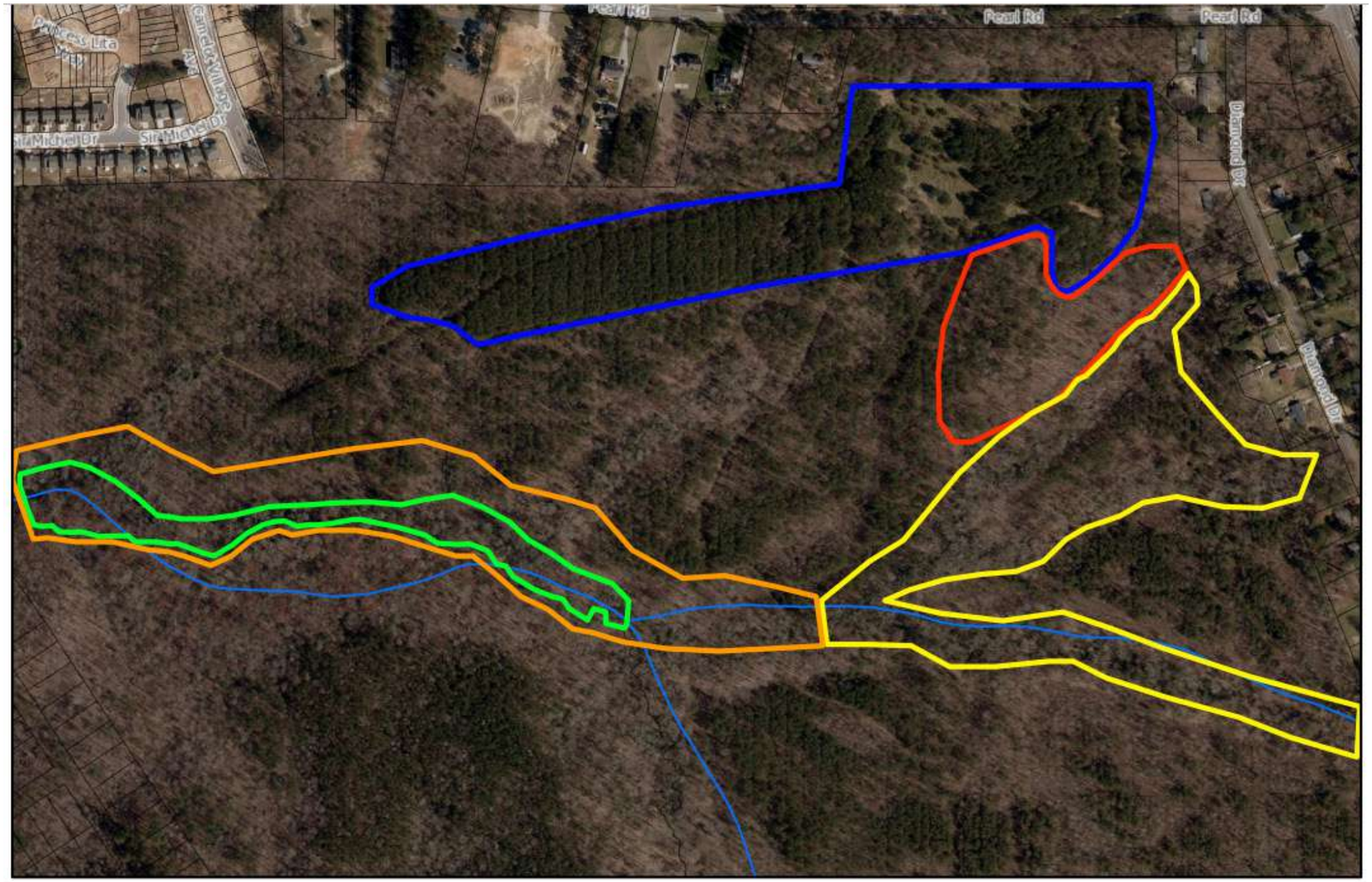
Natural Resource Inventory

The approximately 155-acre Pearl Creek Tract exhibits a wide range of natural resource features, including multiple plant communities and associated wildlife habitat types. The soils, hydrology, and rolling topography found onsite contribute to the level of habitat variability, resulting in a diverse collection of plants and wildlife species. The more upland areas, located in the northern and easternmost portions of the tract, exhibit plant species characteristic of the more well-drained soils found in these areas. The elevations gradually slope southward and westward toward lower-lying portions of the Tract, descending through transitional habitat zones that can exhibit both upland and lowland plant species. The lowest elevations on the Tract support unique communities and habitat types as well, including rock outcrops, freshwater seeps, and forested wetlands.

The following sections will detail the natural communities and habitat types observed onsite, as well as plant and wildlife species recorded during multiple site visits. The communities and habitats will be divided into three broad groups based on their topographical distributions: “Upland” communities and habitats, “Transitional” communities and habitats, and “Lowland” communities and habitats. These topographical designations are not official as they were developed for the purposes of simplifying this planning document and are only relevant to the Pearl Creek Tract itself. Additionally, many of the recorded plant and wildlife species listed below may occur across multiple habitat types, especially the more mobile and generalist species.

Color Key	Natural Community/Habitat Type*
	Early-successional habitat, former agricultural fields
	Oak-hickory forests
	Piedmont headwater stream forest
	Piedmont alluvial forests
	Freshwater forested/shrub wetland
Other	Mesic mixed-hardwood forests, or undefined**

* Further site assessment is needed to accurately map smaller natural community/habitat types, including freshwater seeps, freshwater boggy streamheads, and granite rock outcrops.
** Undefined natural community/habitat types lack the distinctive ecological characteristics needed to predict the appropriate historic communities/habitats. Most of these areas could be classified as mesic mixed-hardwood forests in their current state but may have represented distinct upland or lowland communities in the past.



Disclaimer
*iMaps makes every effort to produce and publish the most current and accurate information possible. However, the maps are produced for information purposes, and are **NOT** surveys. No warranties, expressed or implied ,are provided for the data therein, its use,or its interpretation.*

Upland Communities and Habitats

Early-successional habitat, former agricultural fields

One of the most distinguishable habitat types found in the upland areas of the Pearl Creek Tract is early-successional habitats resulting from past agricultural activities. These early-successional habitats include herbaceous-dominant and shrub/woody-dominant subtypes and encompass roughly 18.5 acres in the northern portion of the Tract. The footprint of these habitats aligns well with the agricultural footprint identified in historic aerial photographs, indicating that most of these areas are former agricultural fields that are currently in various stages of natural regeneration.

The most open-condition and herbaceous-dominant portions of this habitat type are found in the northern section of the Tract, characterized by native warms season grasses (Andropogon spp., Dicanthelium spp., Panicum spp., Tridens flavus), non-native cool and warm season grasses (Digitaria spp., Festuca sp., Paspalum spp., Microstegium vimineum, and Sorghum halepense), non-native legumes (Sericea lespedeza), native wildflowers (Eupatorium spp., Aster spp., Solidago spp.), immature loblolly pine (Pinus taeda), and various hardwood saplings. Non-native invasive plants are common occurrences on former agricultural sites in the NC Piedmont region and can be difficult to manage.

The herbaceous-dominant habitat type only occurs over a relatively small area and will continue to diminish as natural succession moves these grass and forb-dominant sites towards the shrub/woody habitat type. Shrub/woody early successional habitat types are readily identified by the crowding of young pines and woody vegetation, and the scarcity of herbaceous groundcover plants. On the Pearl Creek Tract, the shrub/woody early-successional habitat sites represent the former agricultural fields that have been out of production for the longest period of time, allowing natural succession to progress further into the current state.

While early-successional habitats can be valuable for wildlife, they do not represent a distinct natural community. These habitat types are the product of environmental manipulation by previous landowners, and many of the historic natural community characteristics are now absent. It is possible that the original natural community or communities within the ~18.5-acre former agricultural footprint would have resembled the adjacent upland and/or transitional natural communities identified onsite.

Broomsedge (Andropogon spp.)

Rosette Grass (Dicantheium spp.)

Crabgrass (Digitaria spp.)

Goldenrod (Solidago spp.)

Oak-hickory forests (Dry, Dry-mesic, Dry basic, Dry-mesic basic)

Oak-hickory forests represent another distinguishable habitat type found in the upland sections of the Pearl Creek Tract. Multiple natural communities are associated with oak-hickory forests. These communities are fundamentally differentiated by soil texture, soil pH, and soil moisture, and include distinct communities such as dry oak-hickory, dry-mesic oak-hickory, dry basic oak-hickory, and dry-mesic basic oak-hickory forests. Due to decades of ecological degradation attributed to past land-use, the suppression of natural fire disturbance, and the encroachment of site-inappropriate native and non-native plant species, the ecological characteristics needed to better define and delineate specific oak-hickory communities are reduced or absent.

Oak-hickory forests provide numerous wildlife resources, especially in the form of hard mast forage such as acorns from oak trees and hickory nuts. The most representative patch of contiguous oak-hickory forest on the Tract is located just south of the former agricultural field and north of the larger stormwater drainage. Here the topography ascends to a small plateau where the forest canopy is composed of mature, widely spaced oaks (Quercus alba, Quercus stellata, Quercus falcata, Quercus rubra) and hickories (Carya glabra, Carya tomentosa) with scattered shortleaf pine (Pinus echinata). Notable understory species observed onsite, and characteristic of this community type include wild blueberries (Vaccinium spp.) and white milkweed (Asclepias variegata).

In the past, oak-hickory forests were likely the most dominant forest type throughout the upland portions of the Tract, as well as throughout the uplands of the NC Piedmont region. The forest species composition and functional structure have shifted over time, and the areas at Pearl Creek where oak-hickory forests were likely once found now exhibit more transitional forest characteristics, such as those found in mesic mixed-hardwood forests.

White Oak (Quercus alba)

Pignut Hickory (Carya glabra)

Shortleaf Pine (Pinus echinata)

Transitional Communities and Habitats

Mesic mixed-hardwood forests

Large portions of the Pearl Creek Tract exhibit the elevation, slope, and topography that could be considered transitional between the upland and lowland areas and support distinct natural communities and habitat types. The most dominant forest type found in these transitional zones include mesic mixed-hardwood forests, characterized by dense canopies of mesophytic trees such as sweetgum (Liquidambar styraciflua), red maple (Acer rubrum), yellow poplar (Liriodendron tulipfera), and loblolly pine. Mesic mixed-hardwood forests also exhibit a relatively dense midstory tree layer comprised mostly of sourwood (Oxydendrum arboretum), American beech (Fagus grandifolia), eastern hornbeam (Carpinus caroliniana), eastern hophornbeam (Ostrya virginiana), winged elm (Ulmus alata), and southern hackberry (Celtis laevigata). Understory plant species include woody vines (Smilax spp., Vitis spp.), woody shrubs such as wax myrtle (Myrica cerifera) and Vaccinium spp., and scattered grasses (Chasmanthium spp., Dicanthelium spp.).

Piedmont headwater stream forest

Another distinct natural community found within the mid-elevation transitional areas of the Pearl Creek Tract is the Piedmont headwater stream forest. This forest community is found along the narrow floodplains of the stormwater channels and blue-line streams, characterized by a higher number of wetland plant species. Many of the tree species found in Piedmont headwater stream forests are similar to those found in mesic mixed-hardwood forest, with the addition of more lowland species such as river birch (Betula nigra), American elm (Ulmus americana), and American sycamore (Platanus occidentalis). Ground story species consistent with more poorly-drained soils and wetland communities become more abundant in this forest type, including Jack-in-the-pulpit (Arisaema triphyllum), Christmas fern (Polystichum acrostichoides), cinnamon fern (Osmundastrum cinnamomeum), sensitive fern (Onoclea sensibilis), and southern lady fern (Athyrium asplenioides). These forests can provide valuable wildlife habitat for freshwater fish, reptiles, amphibians, and insects while also serving as a riparian buffer along the upper stretches of small intermittent and perennial streams.

Low elevation seeps and piedmont boggy streamheads

The hydrological characteristics found on the Pearl Creek Tract can be spatially dynamic in both surface flow and sub-surface water table levels. Clay layers and/or bedrock located close to the ground surface can force sub-surface water flow up to the surface, resulting in distinct natural communities such as low elevation seeps and Piedmont boggy streamheads. Multiple examples of these wet-natured communities can be found throughout the Tract, primarily in the mid-elevation and lower elevation areas.

These seeps and streamheads provide valuable wetland habitat that can support numerous amphibian, reptile, insect, and plant species – some of which may be imperiled due to the loss of this habitat type. These seeps should be identified and mapped so that they may be protected during further site development efforts. The vegetation associated with these seeps and streamheads is similar to the vegetation found in the adjacent mesic mixed-hardwood forests and Piedmont headwater stream forests, likely because these seeps and streamheads are not large enough to significantly alter the canopy and midstory composition. However, there is a higher diversity of herbaceous groundcover plants located in these habitats, many of which are associated with wetland communities.

Sweet Gum (Liquidambar styraciflua)

Greenbriar (Smilax spp.)

River Birch (Betula nigra)

Jack-in-the-pulpit (Arisaema triphyllum)

American Hophornbeam (Ostrya virginiana)

Southern Lady Fern (Athyrium asplenioides)

Lowland Communities and Habitats

Piedmont alluvial forests

In the lowest elevations of the Pearl Creek Tract, the mesic-mixed hardwood forests and Piedmont headwater stream forests transition into Piedmont alluvial forests, differentiated by slightly broader floodplains and the absence of headwaters. Flooding in these areas may persist for longer periods that upstream sites but would still be of a shorter duration than in larger floodplain forests. The forest canopy and midstory is comprised of similar species found in the Piedmont headwater stream forests and mesic mixed-hardwood forests, with more abundant floodplain species such as green ash (Fraxinus pennsylvanica), overcup oak (Quercus lyrata), water oak (Quercus nigra), and swamp tupelo (Nyssa biflora). These forest types typically support a wide variety of plant and wildlife species, especially in those areas that can be delineated as jurisdictional wetlands and/or contain a greater percentage of hydric soils.

Freshwater forested/shrub wetland

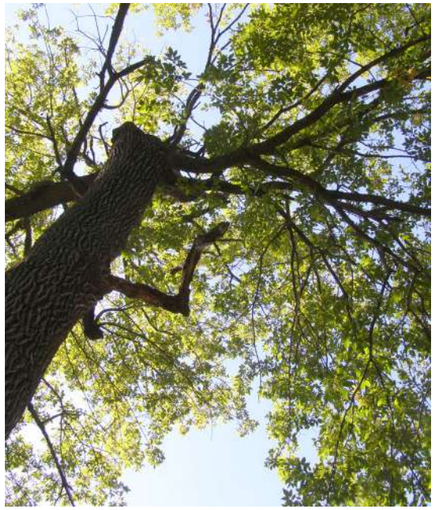
Jurisdictional wetlands do exist on the Pearl Creek Tract, classified by the US Fish & Wildlife National Wetland Index (NWI) as “freshwater forested/shrub wetlands”. These wetlands are located within lowest elevations of the Tract and encompass roughly 3 acres along the southwestern property line. These wetlands are characterized by a sparse forest canopy due to frequent soil saturation, and support a variety of small trees, woody shrubs, and abundant herbaceous vegetation. Rushes (Juncus spp.), sedges (Carex spp.), and green arrow arum (Peltandra virginica) are the dominant vegetation in the wettest areas, with other plants such as common jewelweed (Impatiens capensis), Jack-in-the-pulpit (Arisaema triphyllum), and lizard’s tail (Saururus cernuus) dominating the slightly drier borders.

The topography in this area is broad and flat enough to reduce the water velocities as well as the impacts from rapid stormwater runoff. Observations suggest that this area may be flooded under variable depths of surface water for most of the year. Adjacent residential developments on private property, primarily along the western property line, may threaten the current state of these wetlands and the valuable natural resources they provide. These wetlands areas should be monitored occasionally to detect and report any negative impacts resulting from this offsite development.

Rock outcrops

Granitic rock outcrops represent another unique natural community that type can be found scattered throughout the transitional and lowland areas of the Pearl Creek Tract. These communities are the results of bedrock intrusions and/or erosional exposure of small granite monoliths close to ground surface. These communities can support more xeric plant species that are uncharacteristic of other communities located within the Tract. Examples of these plant species may include grasses, lichens, mosses, or ferns that are associated with these outcrops due to drier soil conditions, such as the resurrection fern (Pleopeltis polypodioides) observed on several outcrops within the Tract.

More information, monitoring, and mapping of these sites is needed to ensure that these communities are properly managed. Encroaching hardwood species, invasive plant species, and the accumulation of leaf/pine litter can alter these communities, making them less distinct and less supportive of the naturally representative vegetation. These outcrops may also provide valuable wildlife habitat for reptile and amphibian species, as well as mammal species such as foxes and raccoons.



Green Ash (Fraxinus pennsylvanica)

Water Oak (Quercus nigra)

Rush (Juncus spp.)

Common Jewelweed (Impatiens capensis)

Rock Outcrops at Pearl Creek

Flora and Fauna

The Pearl Creek Tract supports a variety of plant and wildlife species, many of which may not be found as abundantly or at all on other Raleigh PRCR sites. This species richness is due in part to the biotic and abiotic characteristics of the Tract, as well as the distance from heavily urbanized areas. Below is a partial list of the plant and animal species that occur on the Tract. These lists are not meant to be exhaustive and only reflect observations made during multiple site visits by Raleigh PRCR staff. More species can undoubtedly be found within the Pearl Creek Tract, and more ecological monitoring and biological sampling is encouraged.

Some of the wildlife species identified onsite have been assigned a special conservation status based on their need for targeted conservation efforts, especially the retention and improvement of habitat. A bird species observed within the Tract, the yellow-throated warbler (Setophaga dominica), is listed by the NC Wildlife Resources Commission as a species of “greatest conservation need” in the 2015 Wildlife Action Plan. A reptile species observed onsite, the eastern box turtle (Terrapene carolina carolina), is also listed by the NC Wildlife Resources Commission as a species of “greatest conservation need” in the 2015 Wildlife Action Plan. A reptile species observed onsite, the eastern box turtle (Terrapene carolina carolina), is also listed by the NC Wildlife Resources Commission as a species of “greatest conservation need” in the 2015 Wildlife Action Plan.

The forested/shrub wetlands, freshwater seeps, and freshwater streams found on the Tract provide growing sites for numerous wetland-facultative and wetland-obligate plant species, and support wildlife species that prefer these wet-natured habitats. A juvenile mole salamander species (Ambystoma sp.) and multiple freshwater fish species were observed but were not identified to species. It is possible that there are amphibian, fish, and freshwater crayfish species occurring onsite that also have an associated conservations status. Additional biological monitoring and sampling will be needed to locate and identify these potentially significant species.

One notable freshwater fish species known to occur on the Pearl Creek Tract is the least brook lamprey (Lampetra aepyptera), a species listed as “imperiled” in the state of NC. This is a distinctive lamprey species that spawns in the headwaters of small freshwater streams, especially those with a gravelly substrate, and has only been documented from a few locations inside the Neuse and Tar River basins. The adult lampreys spawn in these headwater streams during the spring months and then die after spawning is complete. The eggs are attached to the substrate along the stream bed, eventually hatching and maturing into ammocoetes before drifting downstream to larger freshwater streams and rivers, where they will spend the next 3 to 7 years burrowed in the substrate before emerging as adults and moving upstream to begin the cycle again. Spawning habitat for the least brook lampreys is found on the Tract and can be vulnerable to erosion and sedimentation issues. Excessive sedimentation can alter the substrate of the headwater streams, making them unsuitable for lamprey nests and egg deposition. The freshwater streams, seeps, and wetlands need to be protected from development impacts to ensure that sensitive aquatic and wetland species are preserved.

Black-and-white warbler (Mniotilta varia)

White-eyed Vireo (Vireo griseus)

Yellow-throated warbler (Setophaga dominica)

Eastern Box Turtle (Terrapene carolina carolina) observed on site

Salamander species observed on site

Crayfish species observed on site

List of wildlife species observed at the Pearl Creek Tract

This list is not meant to be exhaustive and represents observations made during multiple site visits by Raleigh PRCR staff. More wildlife species will likely be found within the Pearl Creek Tract after additional ecological monitoring and biological sampling.

Common Name	Scientific Name	Native (Y/N)	Special Status*
Bird species			
American crow	*Corvus brachyrhynchos*	Y	-----
American robin	*Turdus migratorius*	Y	-----
black and white warbler	*Mniotilta varia*	Y	-----
blue jay	*Cyanocitta cristata*	Y	-----
Carolina chickadee	*Poecile carolinensis*	Y	-----
eastern towhee	*Pipilo erythrophthalmus*	Y	-----
hairy woodpecker	*Leuconotopicus villosus*	Y	-----
northern cardinal	*Cardinalis cardinalis*	Y	-----
summer tanager	*Piranga rubra*	Y	-----
white-eyed vireo	*Vireo griseus*	Y	Critically Imperiled (NC)
yellow-throated warbler	*Setophaga dominica*	Y	-----
Mammal species			
coyote (scat)	*Canis latrans*	Y	-----
racoon (scat)	*Procyon lotor*	Y	-----
white-tailed deer	*Odocoileus virginianus*	Y	-----
Reptile species			
eastern box turtle	*Terrapene carolina carolina*	Y	NC conservation need
black racer	*Coluber constrictor*	Y	-----
Amphibian species			
American toad	*Anaxyrus americanus*	Y	-----
mole salamander (juvenile)	*Ambystoma* sp.	Y	-----*
Fish/other aquatic species			
Assorted unidentified small freshwater fish	???	?	-----*
freshwater crayfish	*Cambarus* sp.	Y	-----*
least brook lamprey	*Lampetra aepyptera*	Y	Imperiled (NC)

** Some wildlife species were unable to be identified to species, therefore it may be possible that other wildlife species associated with a special conservation status exist onsite.*

List of plant species observed at the Pearl Creek Tract

This list is not meant to be exhaustive and represents observations made during multiple site visits by Raleigh PRCR staff. More wildlife species will likely be found within the Pearl Creek Tract after additional ecological monitoring and biological sampling.

Common Name	Scientific Name	Native (Y/N)	Special Status*
Grass species			
bluestem grasses	*Andropogon* spp.	Y	-----
crab grasses	*Digitaria spp.*	Y & N	-----
crown grasses	*Paspalum spp.*	Y & N	-----
fescue grasses	*Festuca spp.*	N	-----
giant cane	*Arundinaria gigantea*	Y	-----
Japanese stiltgrass	*Microstegium vimineum*	N	-----
Johnson grass	*Sorghum halepense*	N	-----
monkey grass	*Liriope muscari*	N	-----
panic grasses	*Panicum* spp.	Y	-----
purpletop grass	*Tridens flavus*	Y	-----
rosette panic grasses	*Dicanthelium* spp.	Y	-----
rushes	*Juncus* spp.	Y	-----*
sedges	*Carex* spp.	Y	-----*
wood oats	*Chasmanthium* spp.	Y	-----
Forb species			
green arrow arum	*Peltandra virginica*	Y	-----
asters	*Aster* spp.	Y	-----*
bedstraws	*Galium* spp.	Y	-----
beefsteak plant	*Perilla frutescens*	N	-----
black snakeroot	*Actaea racemosa*	Y	-----
bonesets	*Eupatorium* spp.	Y	-----*
Christmas fern	*Polystichum acrostichoides*	Y	-----
cinnamon fern	*Osmundastrum cinnamomeum*	Y	-----
common jewelweed	*Impatiens capensis*	Y	-----
common ragweed	*Ambrosia artemisiifolia*	Y	-----
crane-fly orchid	*Tipularia discolor*	Y	-----
false nettle	*Boehmeria cylindrica*	Y	-----
false Solomon's seal	*Maianthemum racemosum*	Y	-----
goldenrods	*Solidago* spp.	Y	-----

heartleaf	*Hexastylis* sp.	Y	-----
hemp dogbane	*Apocynum cannabinum*	Y	-----
Jack-in-the-pulpit	*Arisaema triphyllum*	Y	-----
lizard's tail	*Saururus cernuus*	Y	-----
partridge berry	*Mitchella repens*	Y	-----
peas - legumes	*Lespedeza* spp.	Y & N	-----
peas - legumes	*Desmodium* spp.	Y	-----
perfoliate bellwort	*Uvularia perfoliata*	Y	-----
resurrection fern	*Pleopeltis polypodioides*	Y	-----
sensitive fern	*Onoclea sensibilis*	Y	-----
shrub yellowroot	*Xanthorhiza simplicissima*	Y	-----
skullcaps	*Scutellaria spp.*	Y	-----→
smartweeds	*Polygonum spp.*	Y & N	-----
sneezeweed	*Helenium autumnale*	Y	-----
Solomon's seal	*Polygonatum biflorum*	Y	-----
southern lady fern	*Athyrium asplenioides*	Y	-----
spotted wintergreen	*Chimaphila maculata*	Y	-----
sweet everlasting	*Pseudognaphalium obtusifolium*	Y	-----
tall rattlesnake root	*Nabalus altissimus*	Y	-----
Virginia dayflower	*Commelina virginica*	Y	-----
white milkweed	*Asclepias variegata*	Y	-----
wingstem	*Verbesina alternifolia*	Y	-----
Shrub/vine species			
English ivy	*Hedera helix*	N	-----
greenbriers	*Smilax* spp.	Y	-----
groundsel tree	*Baccharis halimifolia*	Y	-----
Japanese honeysuckle	*Lonicera japonica*	N	-----
kudzu	*Pueraria montana*	N	-----
leatherleaf mahonia	*Mahonia bealei*	N	-----
multiflora rose	*Rosa multiflora*	N	-----
privets	*Ligustrum* spp.	N	-----

** Some plant species were unable to be identified to species, therefore it may be possible that other plant species associated with a special conservation status exist onsite.*

wax myrtle	*Myrica cerifera*	Y	-----
wild blueberries	*Vaccinium* spp.	Y	-----
wild grapes	*Vitis* spp.	Y	-----
wild olives	*Elaeagnus* spp.	N	-----
Tree species			
American beech	*Fagus grandifolia*	Y	-----
American elm	*Ulmus americana*	Y	-----
American sycamore	*Platanus occidentalis*	Y	-----
black walnut	*Juglans nigra*	Y	-----
black gum	*Nyssa sylvatica*	Y	-----
Callery pear	*Pyrus calleryana*	N	-----
eastern hophornbeam	*Ostrya virginiana*	Y	-----
eastern hornbeam	*Carpinus caroliniana*	Y	-----
green ash	*Fraxinus pennsylvanica*	Y	-----
loblolly pine	*Pinus taeda*	Y	-----
mockernut hickory	*Carya tomentosa*	Y	-----
northern red oak	*Quercus rubra*	Y	-----
overcup oak	*Quercus lyrata*	Y	-----
pignut hickory	*Carya glabra*	Y	-----
post oak	*Quercus stellata*	Y	-----
red maple	*Acer rubrum*	Y	-----
river birch	*Betula nigra*	Y	-----
shortleaf pine	*Pinus echinata*	Y	-----
sourwood	*Oxydendrum arboretum*	Y	-----
southern hackberry	*Celtis laevigata*	Y	-----
southern red oak	*Quercus falcata*	Y	-----
sugar maple	*Acer saccharum*	Y	-----
swamp tupelo	*Nyssa biflora*	Y	-----
sweetgum	*Liquidambar styraciflua*	Y	-----
water oak	*Quercus nigra*	Y	-----
white oak	*Quercus alba*	Y	-----
winged elm	*Ulmus alata*	Y	-----
American witch-hazel	*Hamamelis virginiana*	Y	-----
yellow poplar	*Liriodendron tulipfera*	Y	-----

NC Natural Heritage Program

NC DEPARTMENT OF
NATURAL AND CULTURAL RESOURCES

Roy Cooper, **Governor**
Susi Hamilton, **Secretary**
Walter Clark, **Director, Land and Water Stewardship**

NCNHDE-13207

October 29, 2020

Emma Liles
City of Raleigh
222 W Hargett St
Raleigh, NC 27602
RE: Pearl Creek Property

Dear Emma Liles:

The North Carolina Natural Heritage Program (NCNHP) appreciates the opportunity to provide information about natural heritage resources for the project referenced above.

A query of the NCNHP database indicates that there are records for rare species, important natural communities, natural areas, and/or conservation/managed areas within the proposed project boundary. These results are presented in the attached 'Documented Occurrences' tables and map.

The attached 'Potential Occurrences' table summarizes rare species and natural communities that have been documented within a one-mile radius of the property boundary. The proximity of these records suggests that these natural heritage elements may potentially be present in the project area if suitable habitat exists. Tables of natural areas and conservation/managed areas within a one-mile radius of the project area, if any, are also included in this report.

If a Federally-listed species is documented within the project area or indicated within a one-mile radius of the project area, the NCNHP recommends contacting the US Fish and Wildlife Service (USFWS) for guidance. Contact information for USFWS offices in North Carolina is found here: https://www.fws.gov/offices/Directory/ListOffices.cfm?statecode=37.

Please note that natural heritage element data are maintained for the purposes of conservation planning, project review, and scientific research, and are not intended for use as the primary criteria for regulatory decisions. Information provided by the NCNHP database may not be published without prior written notification to the NCNHP, and the NCNHP must be credited as an information source in these publications. Maps of NCNHP data may not be redistributed without permission.

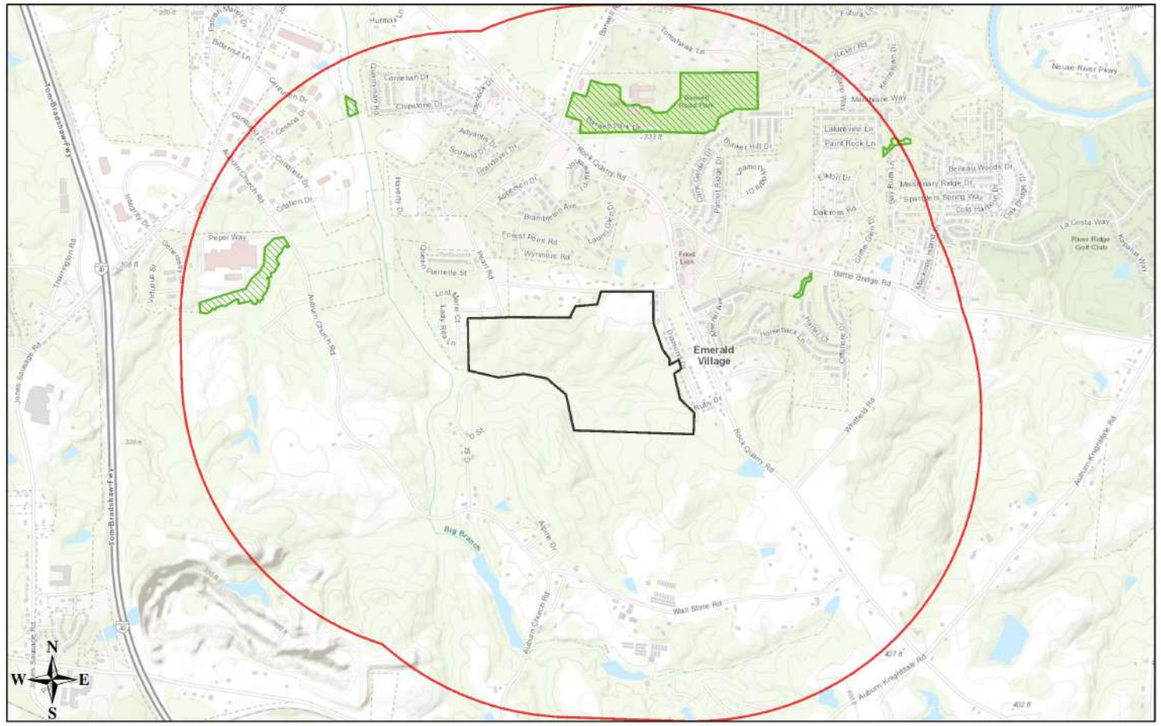
Also please note that the NC Natural Heritage Program may follow this letter with additional correspondence if a Dedicated Nature Preserve, Registered Heritage Area, Clean Water Management Trust Fund easement, or an occurrence of a Federally-listed species is documented near the project area.

If you have questions regarding the information provided in this letter or need additional assistance, please contact Rodney A. Butler at rodney.butler@ncdcr.gov or 919-707-8603.

Sincerely,
NC Natural Heritage Program

DEPARTMENT OF NATURAL AND CULTURAL RESOURCES
121 W. JONES STREET, RALEIGH, NC 27603 • 1651 MAIL SERVICE CENTER, RALEIGH, NC 27699
OFC 919.707.9120 • FAX 919.707.9121

NCNHDE-13207: Pearl Creek Property



October 29, 2020

Project Boundary
Buffered Project Boundary
Managed Area (MAREA)

1:25,321
0 0.2 0.4 0.8 mi
0 0.325 0.65 1.3 km

Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
Pearl Creek Property
October 29, 2020
NCNHDE-13207

Element Occurrences Documented Within Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Freshwater Fish	37168	Lampetra aepyptera	Least Brook Lamprey	2017-03-02	E	3-Medium	---	Threatened	G5	S2

No Natural Areas are Documented within the Project Area

No Managed Areas Documented within the Project Area

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/help. Data query generated on October 29, 2020; source: NCNHP, Q3 October 2020. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Within a One-mile Radius of the Project Area
Pearl Creek Property
October 29, 2020
NCNHDE-13207

Element Occurrences Documented Within a One-mile Radius of the Project Area

Taxonomic Group	EO ID	Scientific Name	Common Name	Last Observation Date	Element Occurrence Rank	Accuracy	Federal Status	State Status	Global Rank	State Rank
Dragonfly or Damselfly	32043	Coryphaeschna ingens	Regal Darner	2004-Pre	H?	5-Very Low	---	Significantly Rare	G5	S2?
Freshwater Fish	37168	Lampetra aepyptera	Least Brook Lamprey	2017-03-02	E	3-Medium	---	Threatened	G5	S2
Reptile	35529	Ophisaurus attenuatus	Slender Glass Lizard	1980-07-10	H	4-Low	---	Significantly Rare	G5	S1

No Natural Areas are Documented Within a One-mile Radius of the Project Area

Managed Areas Documented Within a One-mile Radius of the Project Area

Managed Area Name	Owner	Owner Type
City of Raleigh Open Space - Barwell Road Park	City of Raleigh	Local Government
City of Raleigh Greenway Easement	City of Raleigh	Local Government
City of Raleigh Easement	City of Raleigh	Local Government
City of Raleigh Easement	City of Raleigh	Local Government
City of Raleigh Greenway	City of Raleigh	Local Government

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/help. Data query generated on October 29, 2020; source: NCNHP, Q3 October 2020. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

Least Brook Lamprey (Lampetra aepyptera)

Regal Damer (Coryphaeschna ingens)

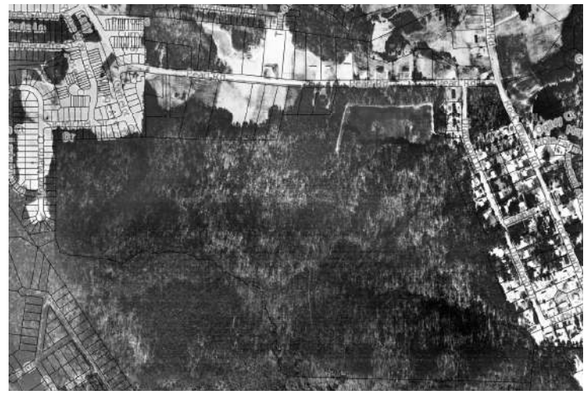
Slender Glass Lizard (Ophisaurus attenuatus)

Previous Land Use Maps

Significant areas of the Pearl Creek Tract were subject to agricultural land use in the past, primarily concentrated in the northernmost portions of the Tract. Historic aerial photographs show that roughly 10-acres of the Tract had been in agricultural productions since 1950 prior to acquisition by the City, but evidence suggest that onsite agricultural practices may predate those earliest photographs. It appears that the agricultural footprint was expanded in the early 1980's to include an additional 8-acres. The specific agricultural practices employed on the Tract are unclear, but debris piles in this area suggest that several storage barns and/or curing barns may have once been present onsite. There are additional debris piles located in these areas that appear to be the result of past community dumping, and include tires, household garbage, appliances, lumber, stone, and roofing shingles.

During the early-to-mid 2000's, there appears to be evidence of a selective-thinning timber harvest that occurred in some areas of the Tract. As a result, some of the larger and more mature timber located on the upland portions of the Tract was removed, and linear "aisles" were cut through much of the tract, especially in the pine-dominant areas. These aisles are roughly 20-feet wide and are oriented north-to-south approximately 50-feet apart. The purpose of these aisles is unclear; they may have been established to help promote the growth and value of the adjacent trees, or they may have been established as sightlines for hunting purposes.

1950



1981

1988

1999

2010

2019

State Historic Preservation Office

The NC State Historic Preservation Office (SHPO) was consulted during the pre-development site assessment to ensure no significant cultural or archaeological sites have been identified onsite, and the SHPO response is included below. The SHPO recommendations related to land-disturbing activities should be considered during any development planning processes.

SHPO response:
“There are no previously recorded archaeological sites located at the property submitted. However, portions of the property do contain areas of high potential for archaeological resources. For any ground disturbing activities planned in the project area in the future, please submit a description of the project to this office for review and comment. We may recommend that an archaeological survey be conducted by an experienced archaeologist prior to construction. We have determined that the project as proposed will not have an effect on any historic structures.”

North Carolina Department of Natural and Cultural Resources
State Historic Preservation Office
Ramona M. Bartos, Administrator

Governor Roy Cooper
Secretary Susi H. Hamilton

Office of Archives and History
Deputy Secretary Kevin Cherry

September 28, 2020

Emma Liles
Park Planner
City of Raleigh
222 W Hargett Street
Raleigh, NC 27601

Emma.Liles@raleighnc.gov

Re: Pearl Creek Property, Wake County, ER 20-1791

Dear Ms. Liles:

Thank you for your submission concerning the above-referenced project. We have reviewed the materials provided and offer the following comments.

There are no previously recorded archaeological sites located at the property submitted. However, portions of the property do contain areas of high potential for archaeological resources. For any ground disturbing activities are planned in the project area in the future, please submit a description of the project to this office for review and comment. We may recommend that an archaeological survey be conducted by an experienced archaeologist prior to construction.

We have determined that the project as proposed will not have an effect on any historic structures.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation’s Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, contact Renee Gledhill-Earley, Environmental Review Coordinator, at 919-814-6579 or environmental.review@ncdcr.gov. In all future communication concerning this project, please cite the above referenced tracking number.

Sincerely,

Renee Gledhill-Earley
for

Ramona M. Bartos
Deputy State Historic Preservation Officer

Location: 109 East Jones Street, Raleigh NC 27601 **Mailing Address**: 4617 Mail Service Center, Raleigh NC 27699-4617 **Telephone/Fax**: (919) 814-6570/814-6598

Park Access, Social Equity, & Demographic Analysis

Park Access Analysis

Park Access is a measure of how well different areas of the city are currently served by Raleigh's system of parks and greenway trails. Each census block in the city is assigned a Park Access grade based on four factors:

1. Distance to Nearest Park: How far residents need to travel to reach the nearest public park;

2. Distance to Nearest Greenway Trail: How far residents need to travel to reach the nearest greenway trail;

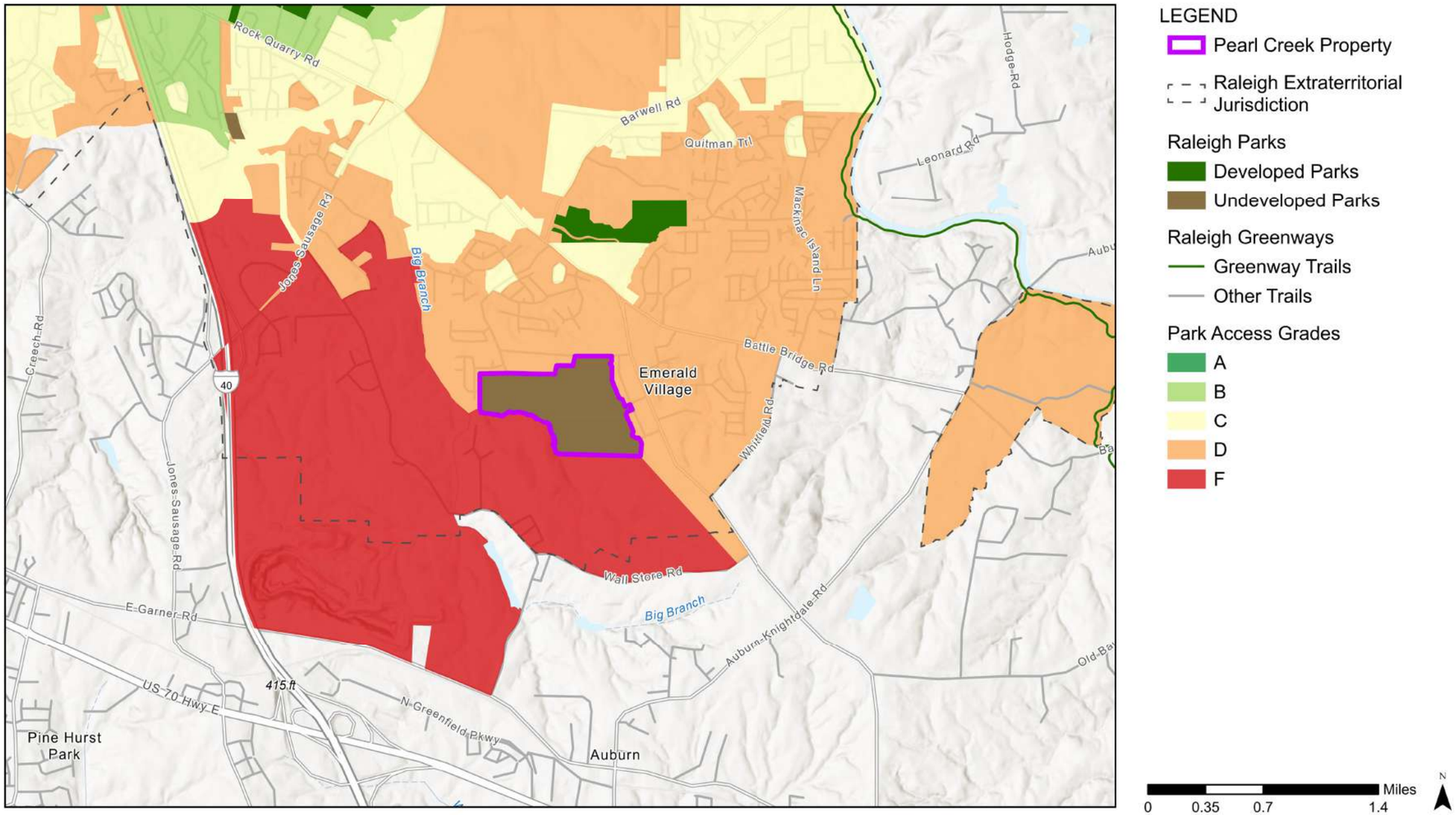
3. Acres of Open Space: How many acres of park land are accessible nearby;

4. Park Experiences: The number and variety of park experiences available nearby;

Communities with an "A" letter grade have very good park access relative to other areas of the city. These neighborhoods are likely located within a 10-minute walk of a park, have access to many acres of open space, and can enjoy a wide variety of park experiences within a short distance of home.

Communities with a "D" or "F" letter grade have poor access to parks relative to other areas of the city. Residents in these areas may have to travel several miles to reach the nearest public park, and may only have access to a limited variety of park experiences.

Prioritizing investments in communities with low Park Access scores helps to promote Raleigh's goal of providing every citizen with safe, convenient access to a park or greenway trail.



Equity Priority Analysis

Equity Priority can be determined by analyzing five key indicators of community health and well-being, as defined by Wake County Human Services' *Community Vulnerability Index*:

1. Unemployment: Population age 16 and over who are unemployed in the civilian labor force;

2. Low Educational Attainment: Population over age 25 who have less than a high school diploma;

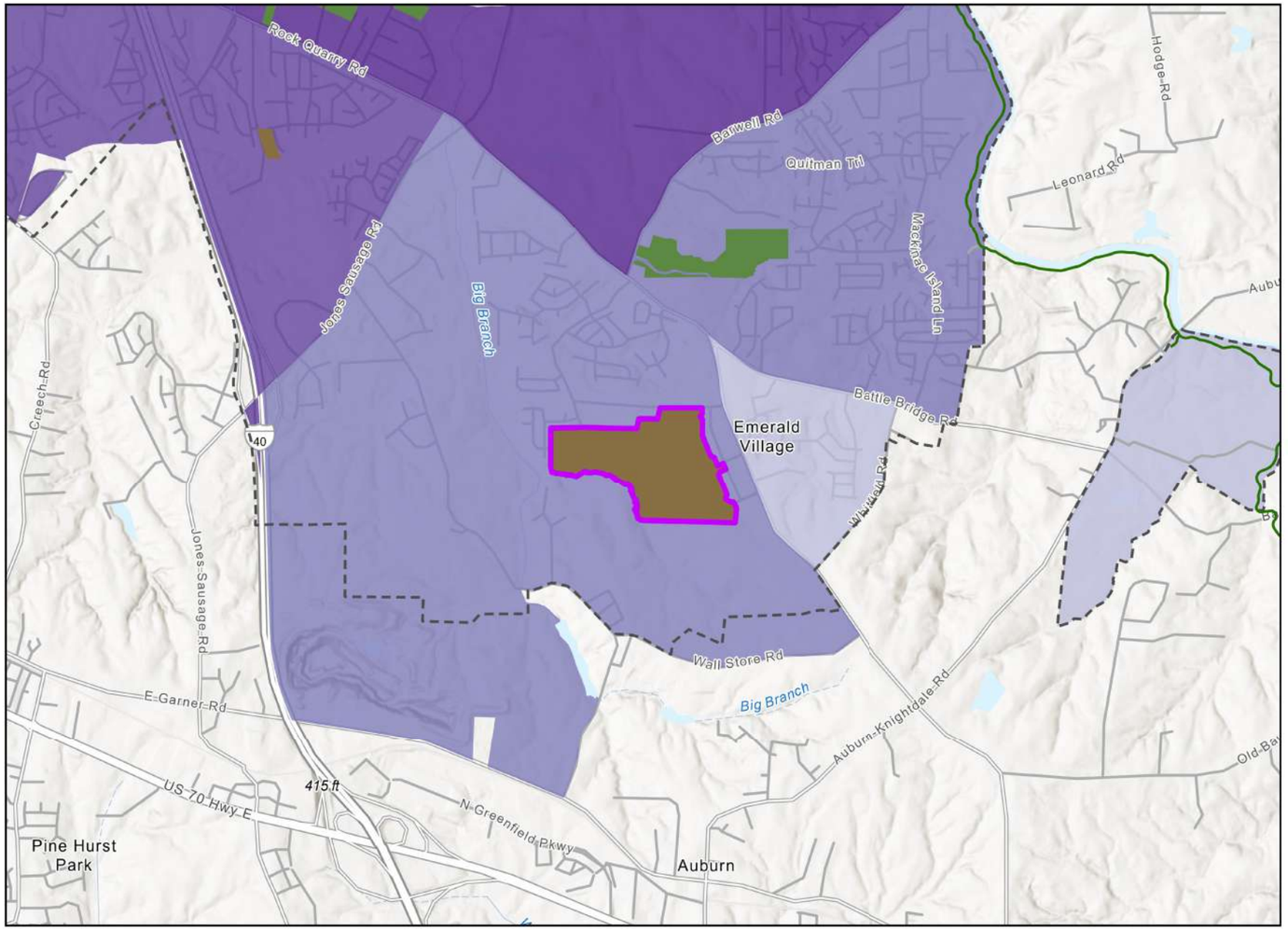
3. Age Dependency: Population under the age of 18 and over the age of 64 combined;

4. Housing Vacancy: The total number of vacant or unoccupied housing units in a block group;

5. Poverty Rate: The population living below the federal poverty threshold in Wake County;

Communities exhibiting a high concentration of these five demographic and socieconomic indicators are more likely to experience negative health outcomes such as heart disease, obesity, chronic stress, and depression—outcomes which can be mitigated with better access to high-quality open spaces, outdoor recreation, and safe places to play and exercise.

Prioritizing investments in these communities helps ensure that PRCR sites, facilities, and programs are more accessible to the communities that will benefit most from these public resources.



LEGEND

- Pearl Creek Property
- Raleigh Extra-territorial Jurisdiction

Raleigh Parks

- Developed Parks
- Undeveloped Parks

Raleigh Greenways

- Greenway Trails
- Other Trails

Equity Priority Levels

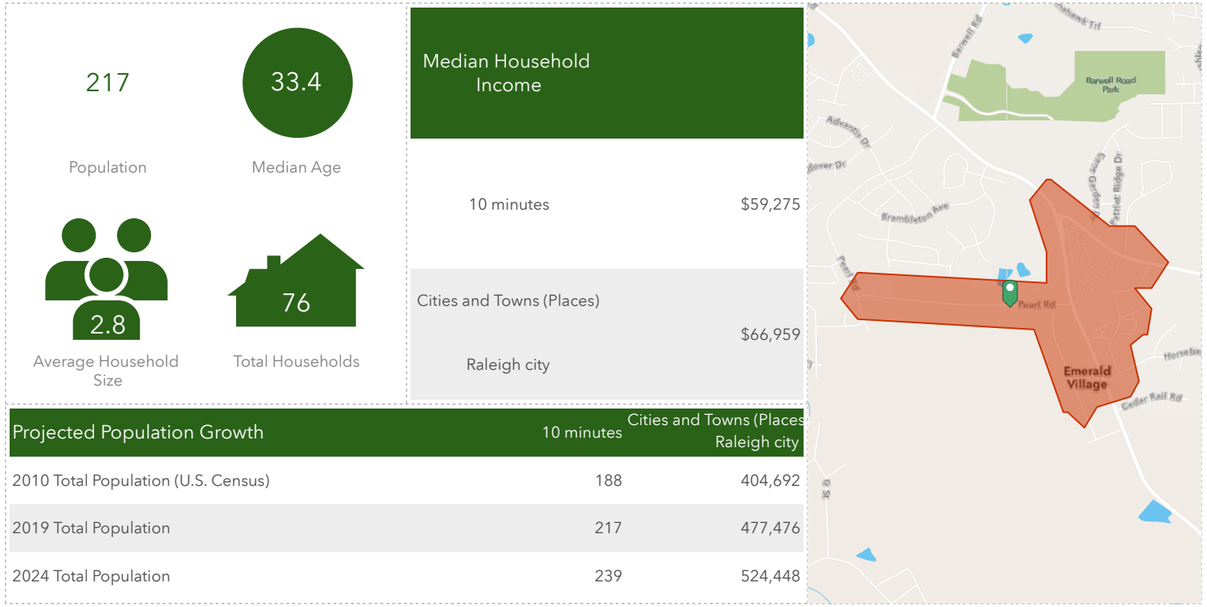
- High Priority
- Low Priority

0 0.35 0.7 1.4 Miles

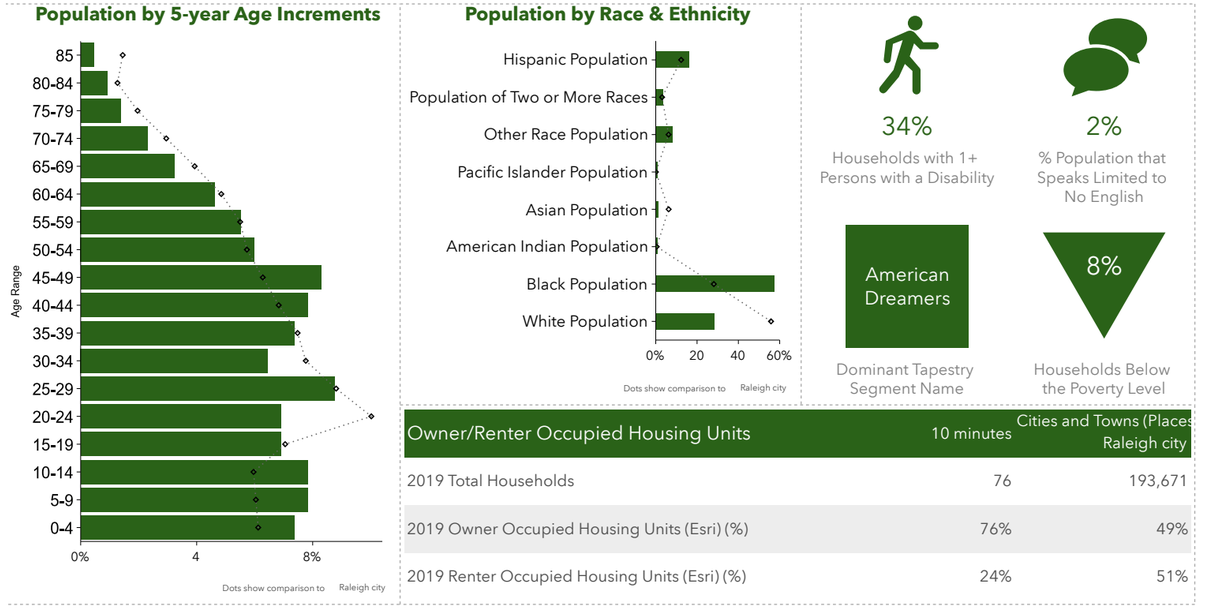
N

10-Minute Walk Demographics

There are only 217 people within a ten-minute walk from the northern access point of the Pearl Creek property. This population has a lower median household income, has more 40-50 year-olds & less 20-40 year olds, and has a larger black population than the average in the City of Raleigh. Within this population 76% of people own their home as opposed to renting, 34% of households have at least one person with a disability, 8% of households are below the poverty level, and 2% speak limited to no English.



Projected Population Growth	10 minutes	Cities and Towns (Places) Raleigh city
2010 Total Population (U.S. Census)	188	404,692
2019 Total Population	217	477,476
2024 Total Population	239	524,448



Owner/Renter Occupied Housing Units	10 minutes	Cities and Towns (Places) Raleigh city
2019 Total Households	76	193,671
2019 Owner Occupied Housing Units (Esri) (%)	76%	49%
2019 Renter Occupied Housing Units (Esri) (%)	24%	51%

Data Source: ESRI Community Analyst

5-Minute Drive Demographics

There are only 12,585 people within a five-minute drive from the northern access point of the Pearl Creek property. This population is similar to the ten-minute walk population in terms of median household income, age, and race. This population also has a high percentage of home owners, 29% of households have at least one person with a disability, 10% of households are below the poverty level, and 2% speak limited to no English.

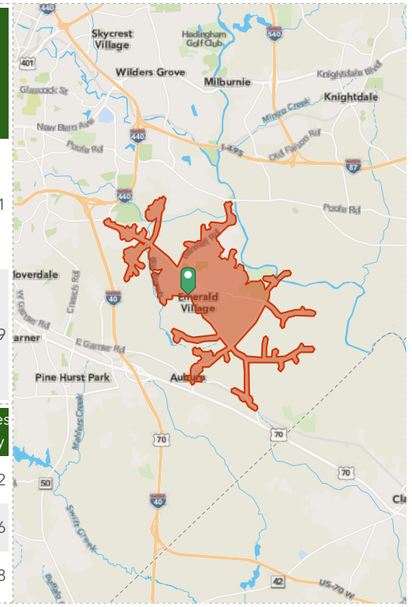
12,585
Population

33.0
Median Age

3.1
Average Household Size

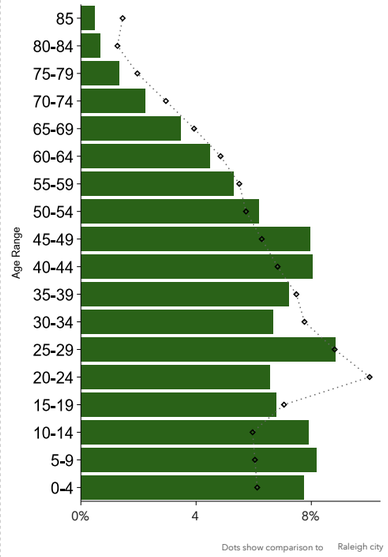
4,085
Total Households

Median Household Income	
5 minutes	$59,491
Cities and Towns (Places)	$66,959
Raleigh city	

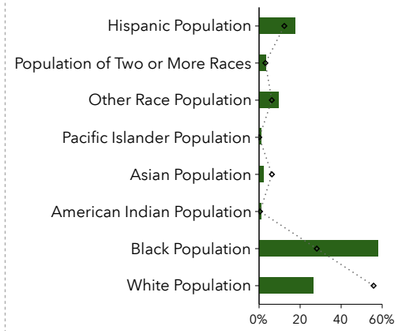


Projected Population Growth	5 minutes	Cities and Towns (Places) Raleigh city
2010 Total Population (U.S. Census)	10,082	404,692
2019 Total Population	12,585	477,476
2024 Total Population	13,919	524,448

Population by 5-year Age Increments



Population by Race & Ethnicity



29%
Households with 1+ Persons with a Disability

2%
% Population that Speaks Limited to No English

Up and Coming Families
Dominant Tapestry Segment Name

10%
Households Below the Poverty Level

Owner/Renter Occupied Housing Units	5 minutes	Cities and Towns (Places) Raleigh city
2019 Total Households	4,085	193,671
2019 Owner Occupied Housing Units (Esri) (%)	78%	49%
2019 Renter Occupied Housing Units (Esri) (%)	22%	51%

Data Source: ESRI Community Analyst

Suitability Analysis

Site & Context Analysis of the Pearl Creek Property yielded many results that should be considered when deciding where on the site it is appropriate for development. The findings of from this analysis are summarized below:

Natural Resources

- Habitats suited for regular development include the Early-successional habitats, former ag fields, & mesic mixed-hardwood forests
- Habitats suited for limited development include the Oak-Hickory forests. Habitats of the Least Brook Lamprey which is a threatened species identified by the NC Heritage Program are suited for very limited development and include the Piedmont Headwater stream forest, Piedmont alluvial forests, and Freshwater forested/shrub wetland

Greenway Context

- The greenway corridor that runs through the site should have very limited development to protect riparian buffers

Slope & Topography

- The steep slopes on site should have very limited disturbance to help prevent erosion issues on site

Street Typology

- Development of the site where the proposed 2-lane divided avenue should be limited until construction is finished and final alignment is decided.

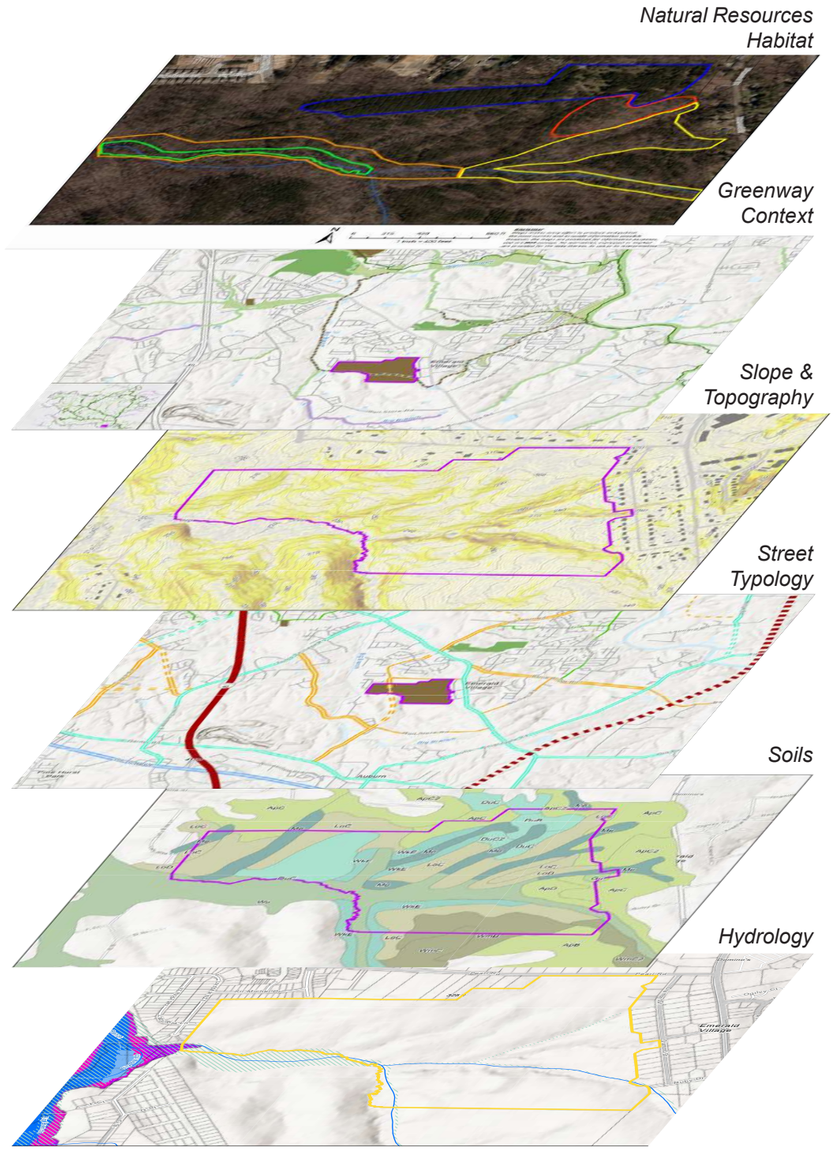
Soils

- Development in areas of the site with poorly drained & partially-hydric soils should be limited because of inundation issues

Hydrology

- Development within wetlands and streams should be very limited as these are the habitats of the Least Brook Lamprey which is a threatened species identified by the NC Heritage Program

Suitability Overlay Diagram



There are other results from the PDAP beyond just what affects site suitability. When public engagement begins with the start of the site development process, the project manager should keep the following in mind:

Site Vicinity

- The Pearl Creek Property has several Community & Homeowner Associations nearby as well as a few elementary schools and a university. Efforts should be made to include these communities in the park planning process.

Park & Greenway System Context

- The Pearl Creek Property should be planned within the larger context of the surrounding parks and greenways. When the site is developed, the experiences it provides should compliment the park & greenway system in the area to help provide a broad range of activities for the community.

Zoning & Future Land Use

- Any development of the Pearl Creek Property should work in conjunction with the City of Raleigh Planning Dept. to incorporate any plans from the nearby special study area.

Park Access, Equity, & Demographics

- The area surrounding the property has D & F grades for park access. The development of this site should help improve these grades.
- Public engagement should focus on outreach that recognizes the racial diversity of the area, as well as the populations who speak limited English, and the populations with disabilities.

Based on the analysis of the site suitability overlay, the following map delineates areas of the site that are recommended to have very limited, limited, or regular development.

Very Limited Development

- These areas are suitable for low impact uses such as natural surface trails, nature education, interpretive signage, invasive removal, and creek bank stabilization

Limited Development

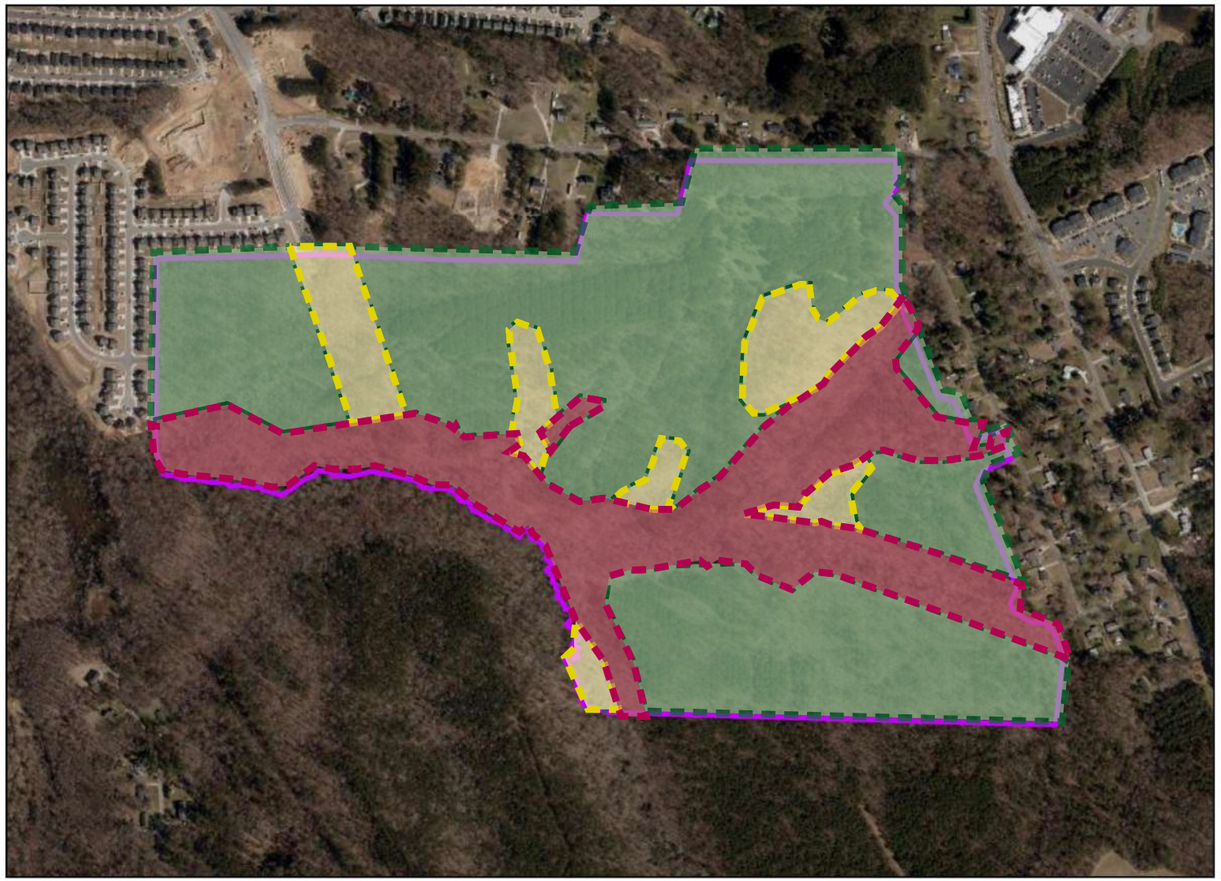
- Development within these areas will be restricted due to frequent inundation, the presence of existing habitat or notable species, or the planned development of non-park uses such as public roads.

Regular Development

- These areas have no significant limitations on development and are open to most design choices that will facilitate a versatile park property.

Site Suitability Analysis - Development Capacity	
Area Suitable for Very Limited Development	47 Acres
Area Suitable for Limited Development	14 Acres
Area Suitable for Regular Development	94 Acres
Total Park Area	155 Acres

Site Suitability Map



Interim Management Recommendations

The Pearl Creek Tract supports a diverse range of ecological features and the management of natural resources found on this site should be a high priority. The following section identifies important interim management recommendations to be implemented until the time that this Property has a fully developed natural resource management plan.

Primary short-term goals for natural resource management on this Property focus on quality land stewardship practices and the protection of significant ecological elements. To accomplish these goals, six specific management objectives have been identified by PRCR Natural Resources staff, developed to address the most pressing and practical natural resource management needs.

These interim management recommendations will incorporate accepted best management practices as they pertain to the biotic and abiotic elements found on the Pearl Creek Tract. The following recommendations are also intended to be flexible, with the goal of supporting adaptive management as additional site characteristics, responses to development, and management challenges are identified. Resource availability will be an additional consideration when implementing management recommendations, as equipment, staffing, and expertise may limit management capabilities.

Primary Short-term Goals Objectives

1. Implementation of coordinated monitoring and mapping efforts aiding in the development of biological inventories, identifying unauthorized uses, and potentially negative impacts to natural resources
2. Nature Preserve Criteria
3. Evaluation and control of invasive plant species
4. Reduction of unauthorized vehicular and foot traffic to prevent illegal hunting and the degradation of sensitive ecological resources
5. Protection of sensitive plant and wildlife species, and their habitats, from negative onsite and offsite impacts
6. Development of a resource management plan that details opportunities for active land management and ecological restoration, with an emphasis on building PRCR management skills, knowledge, and capabilities.

Long-term Goals

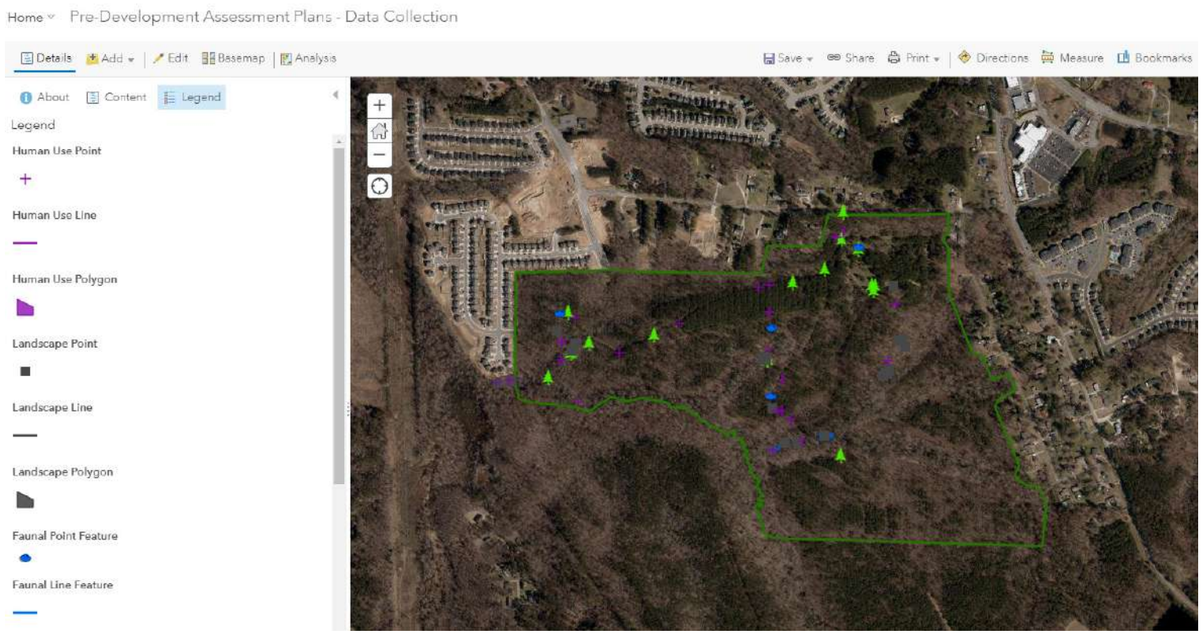
1. Implementation of additional ecological monitoring and mapping efforts
2. Retention and protection of documented significant plant and animal species
3. Improvement of wildlife habitat and natural plant communities through ecological restoration practices

Coordinated Monitoring and Mapping

The implementation of coordinated monitoring, sampling, and mapping techniques used to document the significant ecological features located on the Pearl Creek Tract is one of the most informative and beneficial short-term management activities PRCR can employ. Coordinated monitoring strategies can be used to address a variety of natural resource and land use concerns. For example, monitoring efforts will be needed to document the presence and distribution of rare plants and animals in order to ensure their protection. The control of invasive plant species will be included as a primary interim management recommendation, and the identification and mapping of invasive plant species will help inform control priorities, budgetary needs, and resource demands. Monitoring efforts can also be employed to gauge the extent of unauthorized access and illegal hunting occurring onsite.

Current Management

In February and March of 2017, coordinated monitoring efforts were led by NC State University faculty/students and PRCR staff. Additional plant and animal species have been observed and recorded by PRCR staff since 2017, including some species associated with a special conservation status. Further monitoring is needed to gain a better understanding of the native flora and fauna found onsite, the occurrence and prevalence of non-native invasive species, and the degree of unauthorized access and use. No current coordinated monitoring projects are being implemented, but PRCR staff are recording observations during site visits associated with the pre-development planning process.



Current ArcGIS Online Database with Site Visit Data

Recommended Management

Expansion of monitoring efforts and capabilities

• PRCR staff will monitor and manage for previously documented significant/rare/protected plant and wildlife species. Past monitoring has uncovered examples of unique plant and animal species, including some species listed as critically imperiled in the state of NC and species listed as those with the greatest conservation need. Specific management recommendations for significant species can be developed once the locations and prevalence are better understood.

• PRCR staff should document the occurrence of invasive plant species found onsite, along with the approximate locations and levels of infestation whenever possible. Maintaining invasive plant species records will help simplify information sharing and future planning efforts.

• PRCR staff should engage with state and local government agencies for monitoring assistance. Agencies such as the NC Forest Service, NC Wildlife Resources Commission, NC Natural Heritage Program, NC Dept. of Agriculture and Consumer Services, NC Dept. of Environmental Quality, and others may be able to provide input and expertise that could help bolster monitoring efforts.

• PRCR staff should engage with local volunteers through community outreach and education in order to encourage Citizen Science monitoring efforts. The organization of single-day or multi-day group monitoring events designed to address specific concerns may prove helpful. Some observations gained through volunteer efforts may need to be verified by qualified PRCR staff, depending on the level of expertise demonstrated by the participants.

Evaluate site characteristics and ecology using Raleigh PRCR Nature Preserves/ Protected Natural Areas criteria

Once more information is gathered through further site-assessment and ecological monitoring, the Pearl Creek Property can be better evaluated using established criteria to help gauge options for future use. The PRCR Nature Preserves/Protected Natural Areas criteria was defined in 2011 by the Nature Preserves Task Force. The Task Force was created to develop criteria that the City could use to determine which properties should be designated as Nature Parks, Nature Preserves, and Protected Natural Areas. A variety of biotic and abiotic elements were considered when developing these criteria with the goal of selecting the parks that possess high-quality habitat and natural communities, significant plant and animal species, and other natural resources that would merit a special designation. Once the Thornton Rd. Property has been adequately evaluated using these criteria, a formal recommendation for a special designation can be issued.

NATURE PRESERVE AND PROTECTED NATURAL AREA CRITERIA

This table should be used to evalute park units and parcels acquired for future parks. Each park unit/parcel should be evaluated in the larger context to the quality of the property's natural resources. Each park unit/parcel should be considered within the context of all 13 criteria. Source data may change as data evolves. The City of Raleigh will continue to seek and use the most current and respected available data.*

OBJECTIVE CRITERIA
Step 1: GIS Evaluation

	CRITERIA	CONSIDERATIONS	SOURCE
	Environmental and Open Space Features		
1	Parcel/Park Unit contains species or natural communities that are endangered, threatened or rare, identified by the NC Natural Heritage Program as Natural Heritage Element Occurrences (NHEO).	Natural Heritage Element Occurrences (NHEO) that have a status of Extant and a Priority of Medium or Higher.	Natural Heritage Element Occurences (NHEO) - NC Natural Heritage Program
2	Parcel/Park Unit contains existing areas or species identified by the NC Natural Heritage Program as Significant Natural Heritage Areas (SNHA).	All significance levels (National, State, Regional, Local Significance)	Significant Natural Heritage Areas (SNHA) - NC Natural Heritage Program
3	Parcel/Park Unit is in close proximity to or provides connection between other properties that are currently protected.	The property adjoins already protected open space or greenway corridor. Property includes land owned by City of Raleigh, Wake County, Army Corp, State, and non-profit oraganizations.	NCCGIA - State level data for lands managed for conservation and open space
4	Parcel/Park Unit contains appreciable water features in the landscape, such as wetlands, lakes, ponds, perennial stream systems, or floodplains.	Water resources, particularly bluelines, must be field verified	NWI, FEMA, planimetric hydrology data
5	Parcel/Park Unit contains hydric soils which may be indicative of wetlands and floodplains.	Wake County Hydric Soils: AfB, AuA, CmA, CnA, CoA, CpA, EnB, EnB2, GoA, HeB, HeB2, LyA, MeA, NoA, NoB, NoB2, OrB2, OrC2, PsA, RaA, RoA, WaA, WaB, WhA, WnA, WoA, WyA, WpA.	USDA NRCS Soils Map; NRCS Hydric Soils listing (http://soils.usda.gov/use/hydric/)
6	Parcel/Park Unit contains slopes near streams or river.	>8% slope	Parks & Recreation GIS-based Neighborhood Park Suitability Analysis model

Current Management

The results of the preliminary evaluation of Nature Preserve criteria show that criteria 1, 4, 5, 6, 7, 8, 10, and 12 could be met at the Pearl Creek Property.

Recommended Management

A more in-depth evaluation of the Pearl Creek Property and the Nature Preserve Criteria should occur once 1-2 more years of monitoring and mapping occurs.

ADDITIONAL CRITERIA
Step 2: Site Visit

	CRITERIA	CONSIDERATIONS	SOURCE
	Environmental & Open Space Features		
7	Parcel/Park Unit contains species that are uncommon as identified and mapped by staff.		internally collected data or data from cooperative agencies
8	Parcel/Park Unit contains outstanding geologic characteristics, such as cave, waterfall, cliffs, granite outcrop etc. as identified and mapped by staff.		internally collected data or data from cooperative agencies
	Stewardship & Management		
9	Expense of stewarding the Parcel/Park Unit due to location, maintenance of structures, resource management (invasives), liability, multiple owners, trespassing concerns, irreparable contamination, cost-prohibitive cleanup, or other factors outweighs the balance of benefits between designation as a Nature Preserve versus another park classification.	Percentage of parcel covered in invasives, Number of neighbors, Adjacent activities	orthophotographs; internally collected data; maintenance budget data
10	Parcel/Park Unit is of sufficient size and shape that its conservation resources are likely to remain intact, even if adjacent properties are developed; or sufficient neighboring property is either already protected or to be included as to achieve the same result.	Large blocks are preferred to long, linear tracts or tracts with lots of edges Appropriate size and shape are determined by species habitat requirements.	parcel data; aerial photograhs
11	The area can be sufficiently buffered.	Size of habitat and distribution of resource	
12	Compatibility of existing use or condition, in whole or part, is conducive to being a Nature Preserve		
13	The Nature Preserve classification for new properties should be considered within the larger context of system-wide park planning as outlined in the Raleigh Comprehensive Plan. Designation of Protected Natural Areas should be a function of individual site planning (System Integration and Master Planning processes).		Comprehensive Plan, Park Plan, Citywide Strategic Plans, Individual Site Planning

* Language added 1/3/14.

Evaluation and Control of Invasive Plant Species

A variety of problematic invasive plant species have been observed onsite at the Pearl Creek Tract, many of which are listed in the tables on pages 26-27. This list of invasive plant species is not comprehensive and was compiled only after limited field observations. There are undoubtedly additional invasive plants species currently occurring onsite. As previously mentioned, monitoring efforts focused on the documentation of invasive plant species will be needed to inform the most effective and appropriate management strategies. PRCR should prioritize invasive species control efforts to address those species that pose the greatest ecological threats.

Current Management

No invasive plant species control efforts are currently being conducted onsite.

Invasive Species on Site:
Japanese Stilt Grass (Microstegium vimineum)

Invasive Species on Site:
Kudzu (Pueraria montana)

Invasive Species on Site:
Fire Ants (Solenopsis invicta Buren)

Invasive Species on Site:
Johnson Grass (Sorghum halepense)

Recommended Management

Identification and prioritization of invasive species control

• PRCR staff should identify and prioritize invasive species control efforts based on the level of ecological threat posed by those species found on site. Resource allocation and the feasibility of control will need to be considered when developing plans for invasive species management.

• The kudzu located near the Property access point on Pearl Rd. is still at a level where eradication efforts may be successful. The kudzu is primarily confined to the road shoulder and forest edge but has started to encroach into the adjacent forested stands. Kudzu can pose a significant ecological threat and timely action is needed to keep the kudzu in this area at a manageable level.

• A patch of Johnson grass has been identified in the former agricultural field onsite. The impacted area is relatively small and isolated eradication efforts may still be feasible with timely herbicide treatments. Johnson grass can spread easily and may become established in other early-successional areas if the source population onsite is not promptly addressed.

• Japanese stiltgrass is pervasive and widespread on the Property. Treatment would only be feasible in areas where the stiltgrass presents an acute ecological threat, namely in areas around significant plant species. PRCR staff should explore the management of stiltgrass and other invasive plant species that may be impacting sensitive native vegetation.

• PRCR staff will use herbicides to control invasive plant species when necessary. All herbicide applications on PRCR properties should follow the City of Raleigh Pesticide Policy and be approved by appropriate PRCR staff.

• PRCR staff from the Natural Resources Section and from the Parks Division will work together closely to coordinate resources needed for invasive plant control.

• Invasive insects have also been observed onsite, including imported non-native invasive fire ants (Solenopsis invicta) and emerald ash borer (Agrilus planipennis). Non-native fire ants can severely impact reptile and amphibian populations, and the use of approved pesticides to control non-native fire ants should be explored. The emerald ash borer is pervasive throughout the region, and control efforts may not be feasible given the overwhelming prevalence of this non-native buprestid species. Green ash trees located along the headwater streams and the wetland borders on the Tract have been highly impacted. Pesticide injection treatments can be used to preserve specimen ash trees, heritage ash trees, or ash trees that provide unique aesthetic value.

Reduction of Unauthorized Traffic

Multiple examples of unauthorized access to the Pearl Rd. Tract have been observed, however the level of unauthorized use is unclear. Social trails connecting neighboring residential properties can be found along the northwestern boundary line, but there seems to be little ecological impact in these areas as a result of this activity. More troublesome is the evidence of unauthorized hunting and ATV use within the Tract. Deer stands, ground blinds, feeder stations, trail cameras, and deer licks have all been recently observed by PRCR staff during pre-development planning site visits. Also, there is evidence of additional firearms usage not associated with hunting, identified by the numerous appliances, beer cans, and scrap material found onsite that contain bullet holes. Levels of unauthorized access and use need to be further evaluated and deterrents should be put in place to prevent the most egregious examples.

Current Management

No efforts are currently being made to protect sensitive plant/wildlife species and natural communities/habitats onsite. Wetlands and streambank buffers are protected through state and federal legislation.

Recommended Management

Evaluation of unauthorized access level, access points, and potential damage

• PRCR staff should take steps to gauge the level of unauthorized access to the property and to identify the illegal points of entry. The impacts created by unauthorized vehicular and foot traffic should be evaluated, with a focus on the most environmentally sensitive areas or locations where significant plants or animals have been documented. Trail cameras may prove useful for monitoring unauthorized use. Once the prevalence and impacts from unauthorized access are better understood, PRCR can develop management strategies to address these issues.

• PRCR staff should address the most problematic access points first, with the addition of signage and physical barriers to discourage illegal access. The property boundaries should be marked with appropriate signage or purple paint that clearly indicates PRCR property lines, and explicitly prohibits trespassing and hunting. While signage and other indicators may prove to be minimally effective, the establishment of cable gates, iron gates, and even felled trees or debris piles may act as physical barriers to access.

4-Wheeler Tracks Found on Site

Illegal Dumping on Site

Additional Firearm Usage not associated with Hunting

Protection of Sensitive Plant and Wildlife Species

Significant plant and wildlife species that have been identified onsite should be protected to the greatest extent possible. Onsite pressures that could negatively impact plant and wildlife species include erosion and sedimentation, deer browse, and unauthorized access and use. Offsite pressures that could have detrimental impacts on the natural resources found on the Tract include improperly discharged stormwater and the perpetuation of non-native invasive plant species from offsite seed sources.

Current Management

No efforts are currently being made to protect sensitive plant/wildlife species and natural communities/habitats onsite.

Recommended Management

• PRCR staff should develop plans for coordinated monitoring efforts needed to locate and identify threats to sensitive natural resource features. Non-native invasive plant species and unauthorized uses and access points can be identified during monitoring practices, and potential impacts can be better understood if informed by complimentary monitoring of significant ecological elements.

• Sensitive plant species that are suffering from intensive deer browse can be protected by establishing a physical barrier (i.e. mesh cages, fencing) around individual plants or groups of plants.

• Some of the most ecologically sensitive sites on the Tract include the lower-lying freshwater streams and forested/shrub wetlands. These sites and the associated wildlife species can be vulnerable to erosion and sedimentation created by onsite and offsite stormwater discharge. Occasional monitoring of these features should be a priority, and any illegal discharge or non-functional water control structures should promptly be reported to the Stormwater Division housed within the City of Raleigh Department of Engineering Services.

Least Brook Lamprey (Lampetra aepyptera): Threatened Species found on Site - N.C. Heritage Program Elemental Occurrence

Development of a Resource Management Plan

The diversity of ecological features on the Pearl Creek Tract is impressive, but additional abiotic and biotic elements can be restored using active ecological management strategies. The location of the Tract promotes the use of certain management practices that may not be feasible on other PRCR sites, including the use of prescribed fire. This Tract may present a suitable venue for the implementation of land management strategies by PRCR staff, with the goal of increasing the skills, knowledge, and management capabilities of staff members. PRCR staff should develop a more detailed management plan that highlights the need for active land management and staff training opportunities.

Current Management

Currently, there are no plans to develop a natural resource-based management plan for this site.

Recommended Management

• Fire management combined with additional appropriate land management techniques can provide a significant ecological lift to the Tract, while also providing a venue for training PRCR staff on the use of various land management activities. Many of the prescribed management strategies needed to improve the natural resources on the Tract will also be implemented on other PRCR sites. The Pearl Creek Tract presents an opportunistic venue to implement some of these management strategies with the goal of bolstering the management capabilities of the Natural Resources Section and Parks Division staffs.

• The Pearl Creek Tract could also serve as an ecological demonstration site for the public, where visitors could observe the implementation and results of active land management practices. Interpretive signage can be incorporated onsite to inform the public, and PRCR-led programs can be conducted onsite to introduce various user groups to the benefits of ecological management and restoration. It is important to incorporate educational outreach opportunities into land management planning as it helps create transparency of actions, engages the community, and may help facilitate a broader public understanding of the related benefits.

• A comprehensive management plan that contains more detailed objectives and implementation logistics should be developed. The Pearl Creek Tract exhibits a high level of ecological potential, including the possibility of reestablishing more diverse and distinct plant and wildlife communities. Facility development plans are still in the conceptual phase, and it is unclear as to when the Tract may be targeted for further development. In the interim, the highest priority should be placed on managing the natural resources found onsite while ensuring that quality land stewardship practices are implemented.

Example of Fire Management - Prescribed Burn

Example of Onsite Environmental Education

Example of Interpretive Signage

Acknowledgments

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