05-24-2023 Town Council Meeting
Responses to Council Questions

ITEM #17: Close the Legislative Hearing and Consider a Conditional Zoning Application for UNC Health Eastowne

Council Question:
Would the applicant be willing to stipulate that the parking deck on the "North 20" could not be constructed until everything else approved in this conditional zoning has been constructed?

***Staff Response**:*
The applicant is willing to stipulate that the parking deck on the Northern 20 not to be constructed until the last phase of the project. As the parking structure would be supporting the final phase, it would need to be constructed as part of the final phase of construction unless the Town Manager determines that there is sufficient capacity within the existing parking structures.

Council Question:
Can the staff provide us with a rough estimate of what it will cost the Town to provide police, fire, and other essential services on the Eastowne site after full build-out (2023 dollars are fine)?

Council Question:
Will we be seeing a cost of town service estimates (police, fire, road maintenance, stormwater monitoring, etc.), so we can consider that as part of the community benefit package? How would we adjust that amount over the years for inflation?

***Staff Response**:*
Staff has prepared a conservative estimate of cost of essential services (see attached Financial Impact Analysis) for UNC Health. UNC Health will continue to provide police protection for the UNC Health properties.

Amount paid by parcel to Orange County

PIN	***Description***	***Amount to Orange County (total)***	***Amount to Chapel Hill***
9890-80-0195	*MOB1*	*$143,651.17*	*$45,993.13*
9890-80-0643	*600 Eastowne Dr*	*$59,782.16*	*$19,561.61*
9890-80-7564	*Parking lot*	*$42,055.64*	*$13,090.32*
9890-91-1209	*Northern 20*	*$38,834.52*	*$13,094.01*
		$284,323.49	***$91,739.07***

05-24-2023 Town Council Meeting
Responses to Council Questions

Council Question:
The affordable housing revolving loan fund contemplates a significant contribution by the Town. If the Town is unable or unwilling to make this contribution, would the fund still be viable?

***Staff Response**:*
The loan fund has been contemplated as a partnership between the Town and UNC Health, with both partners jointly contributing the seed funding to establish the loan fund. The Town will need to provide a financial contribution to establish the fund. This would allow the Town to conduct a 3rd party fund administrator solicitation and selection to support the creation and administration of the fund. The higher the Town's financial contribution, the more private capital will be leveraged, the larger the fund will be, and the greater the opportunity for impact the fund will have. The Town could choose to allocate existing Affordable Housing Fund and Affordable Housing Development Reserve money or identify resources through the FY24 Budget or other Town source to provide its contribution to the fund.

Council Question:
The green building stipulation refers explicitly to ASHRAE 2016. Can this be changed to require standard this or whatever successor standard is in effect at the time of construction of every building? Do these standards apply to the parking decks as well as the MOBs?
Council Question:
Would UNC-Health agree to meet the more stringent of (1) ASHRAE standards in place at the time they're seeking a zoning permit or (2) 20% better than 2016 ASHRAE standards? The long timeframe of this project may well see 2016 ASHRAE becoming obsolete?

***Staff Response**:*
We believe Condition #68 addresses this concern (copied below). The condition references the NC energy code as a way of allowing for increased energy efficiency over time.

Similar to traffic and other conditions that are helpful to revisit over time, UNC Health has also agreed to revisit the question of whether 20% better than 90.1-2016 (or the latest NC energy code) upholds the goal of building the most energy efficient buildings practical for healthcare delivery. This is the intention behind the following element of the same draft condition: "UNC Health agrees to review with Staff the current standards and adjust criteria if mutually agreeable. The spirit of the projects is to build the most energy efficient buildings that are practical considering the mission of UNCH which is to provide the best possible medical care to its patients."

05-24-2023 Town Council Meeting
Responses to Council Questions

The ASHRAE standard <u>does</u> apply to parking garages, including:

- *LED lighting with controls and sensors that reduce energy consumption by lowering lighting levels when parking spaces are vacant or benefit from natural light*
- *demand control ventilation that saves energy by adjusting the rate of ventilation according to carbon monoxide readings instead of "running the fan" 24/7 (for enclosed areas that require mechanical ventilation)*
- *commissioning by a 3rd party to make sure the buildings and parking garages have systems that are operating properly and optimized for performance*

Condition #68. <u>Energy Efficiency</u>: All buildings shall either be designed to be 20 percent better than the 2016 version of ASHRAE 90.1 or in accordance with the current NC energy code, whichever is more stringent. For each building, the property owner will submit an energy model with the building permit plans to demonstrate that the building is designed to perform to the aforementioned standard. For purposes of ASHRAE 90.1-2016 energy modeling and calculations, the following applies:

a. *Loads associated with specialty medical equipment shall be excluded from the energy models (baseline and proposed/design). Specialty equipment such as but not limited to linear accelerators, imaging equipment (CT scanners, MRI, etc), specialty pharmacy equipment, etc.*
b. *Town staff shall allow a lower proposed/design improvement over baseline if applicant demonstrates that there is no commercially practical method to achieve a 20% reduction. Factors could consist of but not limited to equipment technology availability, material shortages, laws/regulations prohibiting manufacturing of certain materials, new codes, etc.*

LEED building standard shall be reviewed for approach to energy conservation, indoor air quality, sustainability and building commissioning. The following LEED design goals shall be followed where practical in a facility designed for patient care:

a. *Third party building commissioning to ensure performance of energy conservation measures at completion of project.*
b. *Strive to provide the highest indoor air quality design and eliminate or limit use of any materials that off gas to the indoor environment.*
c. *Meet Energy efficiency measures as outlined in either ASHRAE 90.1 -2016 or NC energy code, whichever is more stringent.*

05-24-2023 Town Council Meeting
Responses to Council Questions

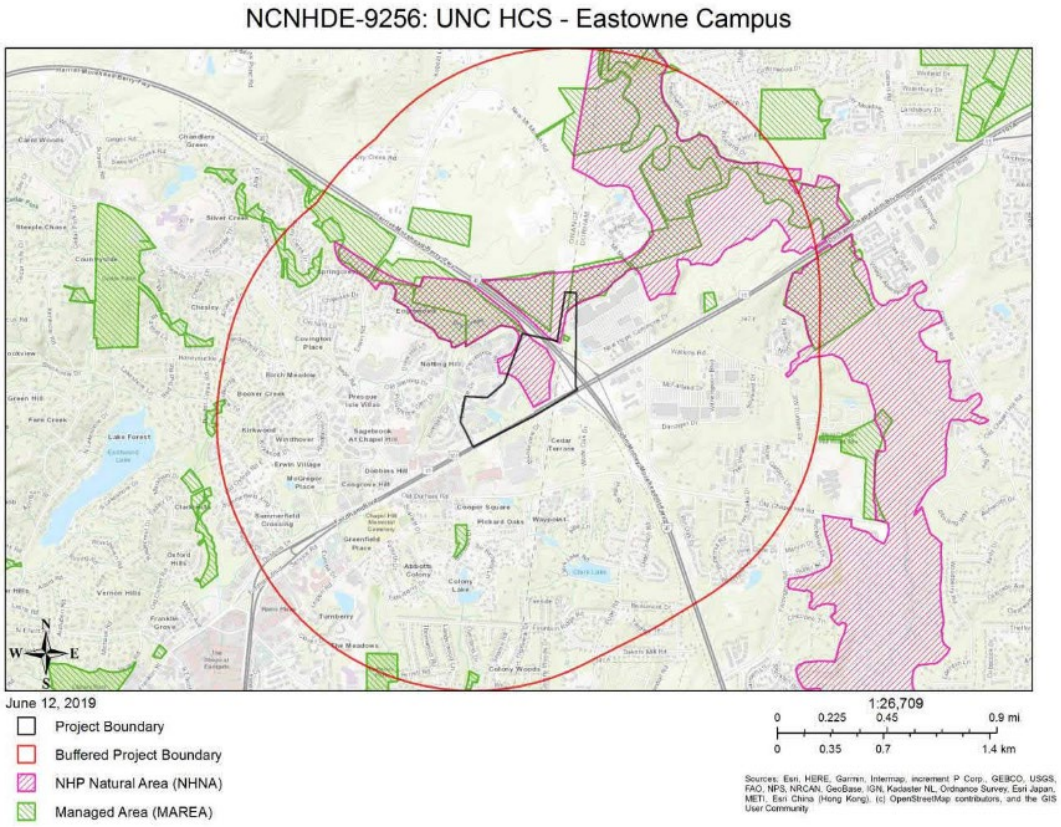
d. *Where practical, specify materials made from sustainable and renewable resources.*

e. *Provide on-site renewable energy production (i.e. photovoltaics)*

UNC Health agrees to review with Staff the current standards and adjust criteria if mutually agreeable. The spirit of the projects is to build the most energy efficient buildings that are practical considering the mission of UNCH which is to provide the best possible medical care to its patients.

Council Question:
Council has expressed an interest in preserving land on the North 20; UNC-Health is currently offering a minimum of 10 acres preserved on the site. At the last session, we requested that before we vote we see a map of the exact boundaries of proposed preservation land, keyed to important site features and the boundaries of the natural heritage area. Will that be forthcoming and a stipulation of the resolution?

***Staff Response**:*
We have attached a Site Survey Report (August 2019) as well as the Natural Resources Report and Preliminary Assessment (July 2019). The inserted map below indicates the Natural area boundary which includes all of the Northern 20.



Prepared by the Town of Chapel Hill
05/23/2023

05-24-2023 Town Council Meeting
Responses to Council Questions

Council Question:
One option for preserving more of the N20 is to move the final parking deck closer to 15-501, which might mean more incursion into the RCD near the road. Would UNC-Health be willing to present and commit to such a plan as part of their approval?

***Applicant Response**:*
UNC Health has committed to exploring the feasibility of moving the parking deck closer to US 15-501 as indicated in Condition #34:

<u>Parking Structure on Northern 20</u>: The property owner shall investigate the option of moving the proposed parking structure closer to US 15-501 on the Northern 20. This location will require impacts to the Jordan Buffer, Resource Conservation District and intermittent stream. Access to the deck off from Eastowne Drive will be reviewed and approved by NCDOT and the Town. Current permitting requirements, at a minimum, include approvals from the Town of Chapel Hill (Jordan Buffer & RCD), US Army Corp of Engineers (wetlands), NCDENR-DWR (stream) and NCDOT (access). Any RCD encroachment reasonably associated with relocating the parking structure is permitted as part of this Conditional Zoning. If the permits can be obtained, the property owner will construct the parking deck as close as reasonably possible to US 15-501 and Eastowne Drive.

Council Question:
A new stipulation has the parking structure on the N20 authorized only after UNC can demonstrate that they're exceeding 80% parking capacity at peak. Given that this parking serves only the UNC Eastowne facility, with well-defined growth limits, would UNC agree to a 90% level for approval of the final deck?

***Applicant Response**:*
An 80% utilization rate was selected because mathematically, the number of empty spaces in all of the decks built before impacting the N20 would accommodate full buildout at current parking demand and based on total square footage. If 90% is the threshold, the balance of available parking stalls would be far less than what was required for the balance of the project buildout. Effectively reducing the build out by 175,000 square feet.

05-24-2023 Town Council Meeting
Responses to Council Questions

Council Question:
Currently, UNC-Health is asking for approval of 4.5 parking spaces/1000SF of building. While this is appropriate for outpatient office, it is high for many other uses (like administrative space). Would UNC-Health agree to lower parking ratios if subsequent buildings change use away from medical office?

***Applicant Response**:*
UNC Health will review parking demands for administrative uses as those needs are identified. If appropriate, we would reduce the amount of parking built to accommodate the use. That said, our administrative areas could be renovated into medical office use in the future if the demand is present in the community. Therefore, we would like the right to retain the 4.5 / 1,000 RSF parking ratio if the current or future demand is present at time of construction.

Council Question:
At the last meeting, we requested visuals of the signage program – has UNC provided it?

***Applicant Response**:*
See attached slides (in the appendix).

Council Question:
Just making sure that the Town employs the same strategy of holding any partner that we loan money to responsible for making the full payment back in return. i.e., the Town is listed as the recipient of the UNC Healthcare Revolving Loan Fund and is on the hook for making the fund whole at the end of 20 years, that the Town also holds any party that it loans money to - to also make whole the amount to be returned. Thinking this is standard practice but wanted to make sure we have this policy in place

***Staff Response**:*
The proposed structure of the Revolving Loan Fund has UNC Health providing a $5 million non-recourse loan, meaning UNC Health's loan is not guaranteed to be paid back in full by the Town or its selected fund administrator. However, as stated in the latest version of the Eastowne conditions (attached), if there are any losses to the Revolving Loan Fund at the end of the 20-year loan period, UNC Health's loan will be repaid to the extent possible before funds the Town contributes are repaid.

The Town will work with the fund administrator, the Town Attorney's Office, Business Management, and our outside legal counsel to establish the parameters that will guide the release of funds, including the proper security instruments to secure the loans made by the fund administrator. The Town and the fund administrator will seek projects that are expected to carry out the stated purpose of the fund (i.e., to support the acquisition, preservation, provision, and

creation of affordable housing within the Town) and have demonstrated the ability to repay the funds awarded from the Revolving Loan Fund.

***Staff Note on Community Benefits**:*
Town staff and UNC Health have continued revising Condition #13 and will provide an updated Revised Ordinance A with the following condition:

13. Community Benefits: The Property owner or its successors or assigns (the "Owner") will provide a loan to the Town of Chapel Hill (the "Town") in a principal amount of five (5) million dollars (the "Loan") to be allocated into a fund (the "Fund") designed to accommodate multiple financial sources in order to support the acquisition, preservation, provision, and creation of affordable housing within the Town (the "Fund Purpose") created at the direction of the Town and administered by a third party selected by the Town. A final promissory note (the "Note") containing the terms reflected in and subject to this Section will be executed by the Town prior to its issuance of the first Zoning Compliance Permit or the establishment of the Fund, whichever occurs sooner. The Note will include, among other customary and necessary provisions reasonably acceptable to the parties, the following terms, which are considered material aspects of this zoning condition:

- *The Loan is an unsecured loan at 0% interest and proceeds will be made available from Owner to the Town, or the Town's selected third-party Fund administrator within forty-five (45) days following the Town's execution of the Note.*
- *The Loan will mature on the date that is 20 years (the "Loan Term") from the date the Note is executed, extendable at the sole discretion of the Owner. The Note will be repayable in one (1) balloon payment upon expiration of the Loan Term.*
- *The Town expects that the Fund Purpose will be successful, and that projects created with the Fund in furtherance of the Fund Purpose will generate revenue and proceeds sufficient to repay the Loan in all aspects. To that end, the Town through its fund administrator shall utilize commercially reasonable efforts to effectuate the Fund Purpose in the selection of initiatives and projects.*
- *If the Fund experiences losses such that the principal balance remaining after repayment of the Fund's investors other than the Town and Owner is not adequate to repay the Loan to Owner at the end of the Loan Term, then the existing Fund balance upon the expiration of the Loan Term will automatically accrue and be payable to the Owner pro rata with other loans made to the Town for the Fund before any distributions or other payments are paid to the Town.*

- *To the extent following the application of the foregoing, and the remaining Fund proceeds are not sufficient to fully repay the Loan, then neither the Town nor the Fund administrator shall be liable thereafter for the payment of any resulting deficiency to the Owner.*

In the event that, through no fault of Owner, the Town should decline or fail to create the Fund or similar affordable housing finance product, or should the Fund not continue in operation for the period of the Loan, this conditional zoning approval shall remain valid and enforceable and not be adversely affected thereby.

Nothing in this condition or zoning approval is intended to affect the existing agreements between Health System Properties, LLC and Orange County related to the Eastowne parcels, each of which is entitled "Memorandum of Understanding for Health System Properties Acquisitions."

Natural Resources Report and Preliminary Assessment

UNC HCS – Eastowne Campus / July 2019 / EMA-17000

McAdams

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

APPENDICES

A. Introduction and Purpose

UNC Healthcare Systems (UNC-HCS) plans to redevelop and expand their Eastowne Campus located within the Town of Chapel Hill's (Town) zoning jurisdiction. After an initial site investigation and as part of a preliminary master planning effort, UNC-HCS is taking steps to develop conceptual master plans and engage the Town and community to negotiate a Development Agreement for full build-out of the property. Town staff recommended submitting a natural resource report/preliminary assessment to provide stakeholders a baseline of the existing conditions and to inform the conceptual master plan development and development agreement process. Additional analysis will be necessary to assess the possible impacts and opportunities once one or more conceptual master plan scenarios are advanced.

B. Site Description

The Eastowne Campus site is located on the north side of U.S. 15-501, southwest of the I-40 interchange in Chapel Hill, North Carolina (**Figure 1**). The project area consists of five parcels that have a combined area of approximately 48-acres bounded by Eastowne Drive, U.S. 15-501, and I-40. These parcels are identified by the following parcel identification numbers (PINs): 9890911209, 9890807564, 9890802764, 9890800643 and 9890800195.

An aerial map (**Figure 2**) of the project area shows that four of the five parcels that compose the overall project area are currently developed with seven medical office buildings, along with associated parking and utility infrastructure. The largest parcel of the five, located at the northeast corner of the intersection of Eastowne Drive and U.S. 15-501, is currently undeveloped and forested.

C. Topography

The site lies within the Piedmont physiographic province of North Carolina. Elevations on the property range from approximately 262 to 338 feet above mean sea level. Site topography is characterized by broad ridges dissected by minor drainageways with relatively broad valley bottoms, as shown in **Figure 3**.

The Town's Land Use Management Ordinance (LUMO) Section 5.3.1 –Erosion and Sedimentation Control aims to protect water bodies and wetlands from erosion, protect the plant and animal habitat of steep slopes, and preserve the natural beauty and economic value of the town's hillsides by restricting land disturbance on steep slopes (defined as being equal to or steeper than 15 percent). Development of sites with slopes steeper than 15 percent require an application to the Town providing information regarding topography, slope categories, streams and stormwater drainage, land use cover, soils and proposed conditions and a slope limit on new cut and fill slopes. Additionally, no more than 25 percent of the total combined area of 25 percent (or steeper) slopes may be disturbed. Steep slope categories within the project area that are subject to these requirements are provided on the Site Topography & Steep Slopes Map (**Figure 3**). This information is overlaid on aerial imagery to reflect the land use cover and areas of steep slope from roads, parking lots and driveways that are manmade not subject to this section of the LUMO.

D. Soils

Soil series mapped by the Natural Resource Conservation Service (NRCS) on the property are Chewacla, Goldston, and White Store. Chewacla soils have formed from recent alluvium and occur in long flat areas parallel to major streams. Goldston soils have formed in residuum weathered from fine grained felsic slates and occur on narrow interstream ridges and sides of ridges between streams. White Store soils have formed in weathered shale, mudstone and sandstone. **Figure 4** shows the subject property overlaid with the most recently published Orange County and Web soil survey showing the soil map units that occur with the project area (NRCS 1977, NRCS 2019). The information provided for the map units within the project area was obtained from the NRCS Web Soil Survey. Erosion hazard ratings provided below indicate the hazard of erosion based on slope and soil erosion factor K. Soil loss occurs by sheet or rill erosion where 50 to 75 percent of the surface has been exposed by disturbance (NRCS 2019).

Chewacla loam, 0 to 2 percent slopes, frequently flooded (Ch) – This nonhydric, floodplain soil is typically found on slopes ranging from zero to two percent. It is classified as somewhat poorly drained soil with a moderately high to high permeability, moderately high to high available water capacity and a water table about six to 24 inches below the soil surface. This map unit has a surface runoff classification of low and a slight erosion hazard rating.

Goldston channery silt loam, 15 to 45 percent slopes (GIF) – This upland soil is typically found on slopes ranging from 15 to 45 percent. It is classified as well drained soil with a very low to high permeability, very low available water capacity and a water table of more than 80 inches below the soil surface. This map unit has a surface runoff classification of high and a moderate erosion hazard rating.

White Store loam, 2 to 6 percent slopes (WsB) – This upland soil is typically found on slopes ranging from two to six percent. It is classified as moderately well drained soil with a very low to high permeability, moderate available water capacity and a water table of about six to 18 inches below the soil surface. This map unit has a surface runoff classification of very high and a slight erosion hazard rating.

White Store clay loam, 6 to 15 percent slopes, moderately eroded (WtC2) - This upland soil is typically found on slopes ranging from six to 15 percent. It is classified as moderately well drained soil with a very low to moderately low permeability, moderate available water capacity and a water table of about six to 18 inches below the soil surface. This map unit has a surface runoff classification of very high and a slight erosion hazard rating.

Project area soils have a slight erosion hazard rating except for Goldston soils, which have a moderate rating. Natural Resource Conservation Service states that a rating of slight indicates that erosion is likely under ordinary climatic conditions, and moderate indicates that some erosion is likely and erosion control measures may be needed (2019).

E. Protected Species + Natural Heritage Areas

On June 13, 2019, McAdams used the US Fish and Wildlife (USFWS) Information for Planning and Consultation (IPaC) website to obtain a list of threatened and endangered species that may occur in the project area and/or may be affected by the proposed project. This process generates an Official Species List that is shown in Table 1 below and provided in Appendix A. No critical habitats were identified within or within the vicinity of the project area.

Table 1. Federally Protected Species for the Project Area (6/13/2019)		
Scientific Name	**Common Name**	**Federal Status**
Clams		
Fusconaia masoni	Atlantic pigtoe	Proposed Threatened
Flowering Plants		
Echinacea laevigata	Smooth Coneflower	Endangered
Rhus michauxii	Michaux's Sumac	Endangered

A map and list of natural heritage resources was obtained from the NC Natural Heritage Program (NHP) on June 12, 2019 (Appendix B). These results are shown on an annotated Natural Heritage Map provided as **Figure 5**. Conservation/managed areas identified outside of the project area and along Dry Creek include Town of Chapel Hill Open Space and Durham County Open Space. An occurrence of Piedmont Swamp Forest is approximately 925 feet northwest of the project area along Dry Creek. Occurrences of Piedmont Bottomland and Levee Forest are designated within the Dry Creek/Mount Moriah and New Hope Creek Bottomland Forest Natural Areas.

A portion of the Dry Creek/Mount Moriah Bottomland Natural Area occurs on the forested parcel of the project area located between Eastowne Drive and Interstate 40. This natural area has an overall rating of moderate based on the higher of the representational and collective ratings (general and moderate, respectively) assigned to this natural area. Within this parcel, field observations of dominant or co-dominant overstory tree species in order of abundance, dominant species of mid-story, shrub and herbaceous layers and size range of overstory trees [diameter at breast height (dbh)] were collected to classify and map natural communities as provided in **Appendix C**. Natural communities on this parcel include Dry-Mesic Oak Hickory Forest (Piedmont Subtype) on ridges and side slopes, Piedmont Bottomland Forest (High Subtype) within the lower section of the stream valley and Mesic Mixed Hardwood Forest (Piedmont Subtype) in the upper section of the stream valley as shown in **Figure 6**. Photographs representative of each of these communities are provided in **Appendix D**. Although included as part of the Dry Creek/Mt. Moriah Bottomland natural area, most of the parcel between Eastowne Drive and I-40 is classified Dry-Mesic Oak Hickory Forest (Piedmont Subtype). A review of aerial imagery back to 1938 shows the forest on this parcel has been largely undisturbed for over 80 years except for two roads and a two-acre field on the ridge near the eastern parcel boundary. The maturity of this forest is reflected its species diversity and in the presence of individual trees with a dbh in excess of 30 inches.

Shallow seeps where gray petaltail dragonfly (*Tachopteryx thoreyi*) breed are found in this natural area according to the Inventory of Natural Areas and Wildlife Habitats for Orange County, North Carolina (2005). Stephen Hall, one of the authors of this publication, was contacted and explained that the gray petaltail was considered to be a very rare species when the Orange County inventory was first conducted during the 1980s. Populations have since been found over most of the state. The Natural Heritage Program no longer tracks this species as a Significantly Rare Species but does consider it to be a habitat specialist (Hall 2019). McAdams observed one seep within the project area located on the west side of Stream X approximately 525 feet upstream of where this feature joins the parcel boundary. The location of this seep is shown on **Figure 6**.

The NHP report did not identify element occurrences of state or federally listed species within the project area. Occurrences of federally protected species located within one mile of the project area are discussed below. Occurrences of state protected species located within one mile of the project area are shown in Table 2 below.

Table 2. State Protected Species for the Project Area (6/13/2019)

Scientific Name	Common Name	State Status
Butterfly		
Erynnis martialis	Mottled Duskywing	Significantly Rare
Dragon or Dameselfly		
Somatochlora georgiana	Coppery Emerald	Significantly Rare
Vascular Plant		
Liatris squarrulosa	Earle's Blazing-star	Significantly Rare Peripheral
Orbexilum pedunculatum	Sampson's Snakeroot	Significantly Rare Peripheral
Parthenium auriculatum	Glade Wild Quinine	Significantly Rare Throughout
Scutellaria leonardii	Shale-barren Skullcap	Endangered
Tridens chapmanii	Chapman's Redtop	Threatened

McAdams staff compiled information regarding the appearance and habitat for each federally protected plant species identified by IPaC. Before beginning a field survey for the protected species that may occur within the project area, McAdams staff observed the listed plant species at the NC Botanical Garden to help establish the most appropriate search image for these species. On June 14, 2019, a McAdams staff member walked a transect through each area of the site that includes suitable habitat for protected plant species; these areas include a powerline easement, a sanitary sewer easement and other open areas lacking a tree canopy. Photographs taken during the field survey are provided in **Appendix E**. Common plants within the survey area included Virginia creeper (*Parthenocissus quinquefolia*), woodland sunflower (*Helianthus divaricatus),* Muscadine (*Vitis rotundifolia*), Japanese stiltgrass (*Mictrostegium vimineum*) and common greenbrier (*Smilax rotundifolia*).

Atlantic Pigtoe (*Fusconaia masoni*) – Proposed Threatened
Biological Opinion: Not likely to adversely affect
"Appearance: The shell of the Atlantic pigtoe is a chunky, rhombus shape, like that of a pig's hoof/toe. There is a distinct posterior ridge. The outer surface of the shell is yellow to dark brown and parchment-like, while the inner layer is iridescent blue to salmon, white, or orange. Although larger specimens exist, the Atlantic pigtoe rarely exceeds 2 inches in length. Young individuals may have greenish rays across the entire shell surface. When collected fresh, the interior surface (nacre) in the shell tends to be salmon colored and sometimes iridescent. Atlantic pigtoe has interlocking hinge 'teeth' on the inside of the shell to help keep the two valves in proper alignment.

"The preferred habitat of the Atlantic pigtoe is coarse sand and gravel, and rarely in silt and detritus. Historically, the best populations existed in small creeks to larger rivers with excellent water quality, where flows were sufficient to maintain clean, silt-free substrates." (USFWS 2018)

McAdams checked the USFWS's MaxentAquatics predictive habitat GIS maps and found Dry Creek identified as potentially suitable for Atlantic pigtoe. Dry Creek runs along the northeastern property boundary of the forested parcel between Eastowne Drive and Interstate 40. During our June field visit, Dry Creek in this area was observed to be turbid with a clayey substrate. Lenat reported Upper Dry Creek, upstream of project area, had very high conductivity at 288-320 umho/cm (2014). Near the project area Dry Creek also receives stormwater runoff from Interstate 40. This portion of Dry Creek is not likely to be suitable habitat for Atlantic pigtoe due to clayey substrate and poor water quality. Atlantic pigtoe would not likely be adversely affected by development within the project area.

Smooth Coneflower (*Echinacea laevigata*) – Endangered
Biological Opinion: Not likely to adversely affect
"Description: Smooth coneflower is a perennial herb in the Aster family (Asteraceae) that grows up to 3.3 feet tall from a vertical root stock. The large elliptical to broadly lanceolate basal leaves may reach eight inches in length and three inches in width and taper into long petioles toward the base. They are smooth to slightly rough in texture. The stems are smooth, with few leaves. The mid-stem leaves are smaller than the basal leaves and have shorter petioles. Flower heads are usually solitary. The rays of the flowers (petal-like structures) are light pink to purplish in color, usually drooping, and 2 to 3.2 inches long. Flowering occurs from late May through mid-July and fruits develop from late June to September. The fruiting structures often persist through the fall. Reproduction is accomplished both sexually (by seed) and asexually (by rhizome)."

"Habitat: Smooth coneflower is typically found in open woods, glades, cedar barrens, roadsides, clearcuts, dry limestone bluffs, and power line rights-of-way, usually on magnesium and calcium rich soils associated with amphibolite, dolomite or limestone (in Virginia), gabbro (in North Carolina and Virginia), diabase (in North Carolina and South Carolina), and marble (in South Carolina and Georgia). Smooth coneflower occurs in plant communities that have been described as xeric hardpan forests, diabase glades or dolomite woodlands. Optimal sites are characterized by abundant sunlight and little

competition in the herbaceous layer. Natural fires, as well as large herbivores, historically influenced the vegetation in this species' range. Many of the herbs associated with Smooth coneflower are also sun-loving species that depend on periodic disturbances to reduce the shade and competition of woody plants." (USFWS 2017b)

Powerline and sanitary sewer easements, roadsides and maintained areas around parking lots within the project area contain suitable habitat for smooth coneflower, as shown on the Aerial Imagery Map (**Figure 2**). NCNHP data from June 2019 indicates one documented occurrence of smooth coneflower within one mile of the project study area that has since been destroyed. The optimal survey window for this species is late May to October. McAdams staff conducted a field survey of the suitable habitat as described above during the optimal survey window for this species and did not observe smooth coneflower.

Michaux's Sumac (*Rhus michauxii*) – Endangered
Biological Opinion: Not likely to adversely affect
"Description: Michaux's sumac is a rhizomatous, densely hairy shrub, with erect stems from one to three feet in height. The compound leaves contain evenly serrated, oblong to lanceolate, acuminate leaflets. Most plants are unisexual; however, more recent observations have revealed plants with both male and female flowers on one plant. The flowers are small, borne in a terminal, erect, dense cluster, and colored greenish yellow to white. Flowering usually occurs from June to July, while the fruit, a red drupe, is produced through the months of August to October." (USFWS 2017a)

"Habitat: Michaux's sumac grows in sandy or rocky open woods in association with basic soils. Apparently, this plant survives best in areas where some form of disturbance has provided an open area" (USFWS 2017a). Although the USFWS website states that Michaux's sumac grows in open woods in association with basic soils, the species recovery plan states that the species grows in "open woods on acidic soils with low cation exchange capacity" (USFWS 1993).

Powerline and sanitary sewer easements, roadsides and maintained areas around parking lots within the project area contain suitable habitat for Michaux's sumac, as shown on the Aerial Imagery Map (**Figure 2**). NCNHP data from June 2019 indicates no documented occurrences of Michaux's sumac within one mile of the project study area. The optimal survey window for this species is May to October. McAdams staff conducted a field survey of the suitable habitat as described above during the optimal survey window for this species and did not observe Michaux's sumac.

Bald and Golden Eagle Protection Act
The bald eagle is protected under the Bald and Golden Eagle Protection Act, which is enforced by the USFWS. Foraging habitat for the bald eagle primarily consists of mature forests in proximity to large bodies of open water. Large dominant trees are utilized for nesting sites, typically within 1.0 mile of open water.

A review of the NHP database on June 12, 2019 revealed no known occurrences of this species within 1.0 mile of the project study area. A desktop GIS assessment of the project area, as well as the area within a 1.0-mile radius of the project limits, was performed on June 12, 2019 using 2017 color aerial imagery. Three ponds approximately two acres or larger are located within a 1.0-mile radius, south of the project limits. A survey to identify bald eagle nests in the project area and within 660 feet of the project area should be conducted with binoculars in the fall or winter after the trees have lost their leaves to ensure nests would not be disturbed by the project.

F. Forest Resources + Wildlife Habitat

Mature, mixed hardwood/pine forest covers over half of the project area (29 acres), including the approximately 20-acre parcel between Eastowne Drive and Interstate 40 that is part of the Dry Creek/Mt. Moriah Bottomland discussed previously. The remaining portion of the property is developed with medical office buildings and parking lots interspersed with patches of mature, mixed pine/hardwood. Although not visible in the aerial imagery used for this report, redevelopment of the southwestern parcel is currently under construction (MOB1). The project area and the surrounding landscape are considerably fragmented by existing development.

NC Wildlife Resource Commission prioritizes conservation of high-quality forests to benefit terrestrial wildlife species—especially "area sensitive" species that are highly sensitive to conversion of large areas of habitat into smaller patches (NCWRC 2012). Large trees mixed with standing snags and large woody debris are reliable indicators of high-quality forests. As shown in the Forest Stand Age Map (**Figure 7**), McAdams used historical aerial photographs from 1938, 1955 and 1975 to delineate forested stands outside of the previously developed portion of the project area into the following three age classes:

- 44-64-years,
- 64-80 years and
- >80 years.

The forested area immediately west of Eastowne Drive's northern intersection with US Highway 15-501 and most of the forested parcel to the east of Eastowne Drive, included in the Dry Creek/Mt. Moriah Bottomland natural area, is over 80 years old. Approximately 20 acres of the project area appears to have remained undisturbed through much of the last century.

A high degree of diversity was observed in the tree species present in these areas. McAdams observed a mature hardwood forest, including many trees measuring upwards of 25 inches in diameter and several above 30 inches. Standing snags and large woody debris were common throughout these forested areas.

Forest fragmentation occurs when an area of contiguous forest is broken into isolated patches surrounded by non-forest ecosystems, usually as a byproduct of urbanization or agricultural land use (Kimmins 2004). The fragmentation of forested land results in a reduction of forest interior habitat and an increase in the total amount of forest edge habitat. According to Kimmins (2004) and Burgess and

Sharpe (1981), the reduction of the total area of the interior forest condition exposes organisms within to a range of influences including non-forest microclimates, increased solar radiation, increased evapotranspiration, more xeric soils, reduced connectivity between patches and populations, edge predators, and infiltration by species of the surrounding habitat types. Many plant, mammal and bird species have evolved to become specialists on the forest interior habitat and cannot tolerate more open habitat types. Generally, these forest interior specialists are negatively affected by forest fragmentation and the encroachment of forest edge into the interior of the forest.

Collinge (2009) hypothesizes that "habitat fragments connected by corridors should support larger populations, and perhaps a higher number of species, than completely isolated fragments of equal size" because natural corridors offer increased connectivity between patches of forest and allow animals to disperse from one patch to another more easily. This also allows for the intermingling of populations of a species which can lead to an increase in genetic diversity. The forested parcel between Eastowne Drive and I-40 is part of and connected to the Dry Creek/Mt. Moriah Bottomland; the narrowest part of the connection is about 150 feet wide. The Dry Creek/Mt. Moriah Bottomland is in turn connected to the New Hope Bottomland Forest. This extensive connectivity increases the importance of the forested parcel to wildlife habitat.

Forest edges have primarily been thought of as ecotones, or transition zones between habitat types. However, forest edges create gradients in microclimate, vegetation and wildlife, resulting in a physical environment that differs from the urban, field and interior forest habitats (Burgess and Sharpe 1981). Like other habitats, some species are adapted to thrive in the forest edge. When fragmentation occurs, forest edge specialists, as well as generalist species, increase in numbers. While the forest interior represents a diversity of plants and animals that have adapted to specialize on that habitat, the forest edge is also seen as an area of heavy use by wildlife and high tree cover density (Burgess and Sharpe 1981). Where shade-tolerant and generalist plant species thrive in the forest interior, many shade-intolerant trees and herbs find a foothold in edges.

McAdams utilized National Agriculture Imagery Program (NAIP) derived tree cover for North Carolina to map the forest cover within a two-mile radius of the project area. The Conservation Recommendations for Priority Terrestrial and Wildlife Species and Habitats in North Carolina (2012) estimates that "edge effects" extend 350 feet from a forest's edge into the interior. Smaller forest patches may also lack the structural characteristics of the forest interior and may be considered entirely "edge" (Burgess and Sharpe 1981). Because the forest within the Eastowne Drive loop consists of small patches, the tree cover data was used to analyze the interior and edge habitat of the forest parcel located between Eastowne Drive and I-40, as shown on the Forest Interior/Edge Map (**Figure 8**). The areas within this forested parcel shown as not forested are a result of pine stands being misclassified, which is a limitation of the NAIP tree cover dataset. This parcel consists mostly of edge habitat with approximately 1.7 acres of interior habitat in the center of the parcel. Although not connected to other interior forest, together the mature interior and the forest's edge support a wide array of plant species, indicating the wildlife that this forest supports is diverse.

Limited forest interior was reflected in the wildlife observed during a field visit completed on June 6, 2019. Of the ten bird species observed, two species—the scarlet tanager (*Piranga olivaea*) and northern parula (*Setophaga americana*)—were interior specialists while the remaining eight species were either edge specialists or habitat generalists. One species previously reported in the area of the study site but known to be intolerant to forest fragmentation, the hooded warbler (*Setophaga citrina*), was not observed. These observations are in line with other animal signs observed. White-tailed deer tracks and bones were observed, as were wild turkey scratch spots and one box turtle shell. Each of these species is a habitat generalist which thrives in the forest edge. The absence of mesic soils through large portions of the site also indicates a predominately forest edge condition. In general, edges appear to act as "terminators for specialist species, but refugia for generalist species" (Sanderson and Harris 2000). The abundance of edge and generalist species observed by McAdams relative to forest interior specialists corroborates this finding.

G. Water Resources

The project area lies within the Cape Fear Basin in the Headwaters New Hope Creek subwatershed (12-digit HUC 030300020601). Stream features within the study area are Dry Creek and its tributaries (DWR Stream Index Number 16-41-1-(0.5)) and have a stream classification of Class WS-V and Nutrient Sensitive Waters (NSW). Waters designated WS-V waters are protected as water supplies, which are generally upstream and draining to Class WS-IV waters (water supply for drinking, culinary or food processing purposes where a WS-I, II or III classification is not feasible) or waters used by industry to supply their employees with drinking water or waters formerly used as a water supply. There is a FEMA floodplain mapped along Dry Creek and its tributary located on the undeveloped, forested parcel between Eastowne Drive and I-40 (FIRM Map Numbers 3710989000M, effective 10/19/2018).

Surface waters (i.e. streams and a pond) and wetlands under Clean Water Act jurisdiction (jurisdictional) were delineated by McAdams and verified by the U.S. Army Corps of Engineers (USACE) in 2016. The USACE issued a preliminary jurisdictional determination for the project area on May 19, 2017 (**Appendix F**). A determination of the stream channels subject to the Town's LUMO Section 5.18 Jordan Watershed Riparian Buffer Protection and Section 3.6.3 Resource Conservation District (RCD) was issued for the parcels within the Eastowne Drive loop on December 18, 2017, and the undeveloped, forested parcel located between Eastowne Drive and Interstate 40 on May 3, 2019 (**Appendix G**). These features and the FEMA floodplain are shown on the Jurisdictional Waters, Wetlands and Riparian Buffers Map provided as **Figure 9**. In June 2019, McAdams completed assessments of the wetlands and Streams C and X in accordance with North Carolina Wetland and Stream Assessment Methods (NCWAM & NCSAM), respectively. Table 3 provides the hydrology, water quality and habitat assessment ratings for each resource, as well as the overall quality rating. Photographs of streams and wetlands assessed are provided in Appendix H. NCSAM field forms and results are provided in **Appendix I**. NCWAM field forms and results are provided in **Appendix J**.

Table 3. Quality Assessment Results				
Name	**Hydrology**	**Water Quality**	**Habitat**	**Overall**
Streams				
C - upstream	medium	medium	low	medium
C - downstream	medium	low	low	low
X - upstream	high	medium	medium	medium
X - downstream	high	medium	high	high
Wetlands				
A - bottomland	medium	medium	low	medium
C1 - headwater	high	high	low	high
C2 - emergent	high	high	medium	high

1. Streams

There are four jurisdictional stream channels within or immediately adjacent to the project area. Two were verified by the USACE as intermittent streams exhibiting no more than minimal aquatic function, and two were verified as perennial streams exhibiting important aquatic function. The USACE does not require mitigation for permanent impacts to streams exhibiting no more than minimal aquatic function. Impacts to streams must be avoided and minimized to the maximum extent practicable regardless of their aquatic function.

Stream C begins at the toe of the dam of Pond A and flows generally west into a culvert under Eastowne Drive. The bed and bank of this stream is moderately developed, has a clayey to silty substrate with some coarse sand deposits and ranges from two to six feet in width. This stream lacks a forested buffer adjacent to the parking area. Strong water flow and weak to moderate presence of macrobenthos have been observed during winter months, but the lower section has been observed to be dry in summer months. Because the character of the upper section of this stream had a stronger bed and bank, contained water and had a forested riparian buffer along both sides of the channel, the upper section was assessed separately from the lower section. The overall quality of Stream C is low in the lower section and medium in the upper section.

Stream X, located on the undeveloped, forested parcel east of Eastowne Drive, begins approximately 370 feet northwest of US Highway 15-501 and runs northwest before turning north towards Interstate 40. This stream is characterized by alternating sections of well-developed bed and bed with sandy substrate and weakly developed bed and bank with a loamy substrate and regular deposits of sand. The valley of this stream becomes broader downstream, with increasingly longer sections of poorly developed bed and bank. Jurisdiction of this stream stops near the project boundary in the area where the stream divides into several channels above the bottom of a former pond with a breeched dam. Stream X was assessed above the point of jurisdiction separately from the jurisdictional section of this channel. The overall quality of Stream X is high in the lower section and medium in the upper section.

Stream A (Dry Creek) and B have been classified as perennial streams by both the USACE and Town staff. These streams are outside the project area except where they run along the northern property boundary. Because impacts to these streams are not anticipated due to the presence of a 150-foot RCD, assessments were not completed.

2. Wetlands

Wetland A is a bottomland hardwood forest wetland along two perennial streams (Dry Creek – A & Stream B) located in the northern corner of the undeveloped parcel. This seasonally flooded wetland has mostly medium to large sweet gum, green ash and tulip poplar trees with a sparse shrub and mid-story layer. The dense herbaceous layer consists of Japanese stiltgrass, poison ivy, Virginia creeper, an unidentified grass and jewelweed with a few patches of lizard tail. The overall quality of Wetland A is rated as medium.

Wetland B is a freshwater marsh wetland at the head of Pond A. The surrounding upland canopy shades this semi-permanently flooded wetland area, resulting in less than 25 percent herbaceous cover of false nettle, an unidentified grass and Japanese stiltgrass. Because Wetland B is similar in type, character and landscape position to the emergent portion of Wetland C, the rating result for Wetland B can be used to approximately describe Wetland C, as well.

Wetland C grades from headwater forest to a freshwater marsh wetland at the head of Pond A. The saturated to temporarily flooded headwater forest portion of this wetland consists of a sweet gum, red maple and green ash canopy and mid-story. Autumn olive and multiflora rose dominate the shrub layer and Japanese stiltgrass and multiflora rose dominate the herbaceous layer. The semipermanently flooded freshwater marsh portion of this wetland has a few black willows but consists primarily of Japanese stiltgrass, false nettle and an unidentified grass with a few scattered saplings of green ash and black willow. The overall quality of the emergent and headwater forest portions of Wetland C is rated as high.

H. Conclusions

Steep slopes and Goldston soils with a moderate erosion hazard rating will require development restrictions and extra consideration for developing a sediment and erosion control plan for the project. No federally protected plant species were found within the project area. The proposed project is not anticipated to affect Atlantic pigtoe due to a lack of suitable habitat. A survey is necessary to ensure the project would not affect bald eagle nests. The parcel between Eastowne Drive and I-40 is included with the Dry Creek/Mt. Moriah Bottomland natural area, but contains Piedmont Bottomland Forest only within one minor drainageway; Dry-Mesic Oak Hickory forest covers most of the rest of the parcel. However, this parcel contains high-quality forest habitat that provides a connection to other designated natural areas. A small portion of this parcel includes interior forest important to area specialists, but this important habitat is isolated from other interior forest habitat by surrounding development, major roadways and edge habitat. Most of the wetlands and streams within the project area have overall quality ratings of medium to high. The exception is the lower portion of Stream C within the existing development that received a low overall quality rating.

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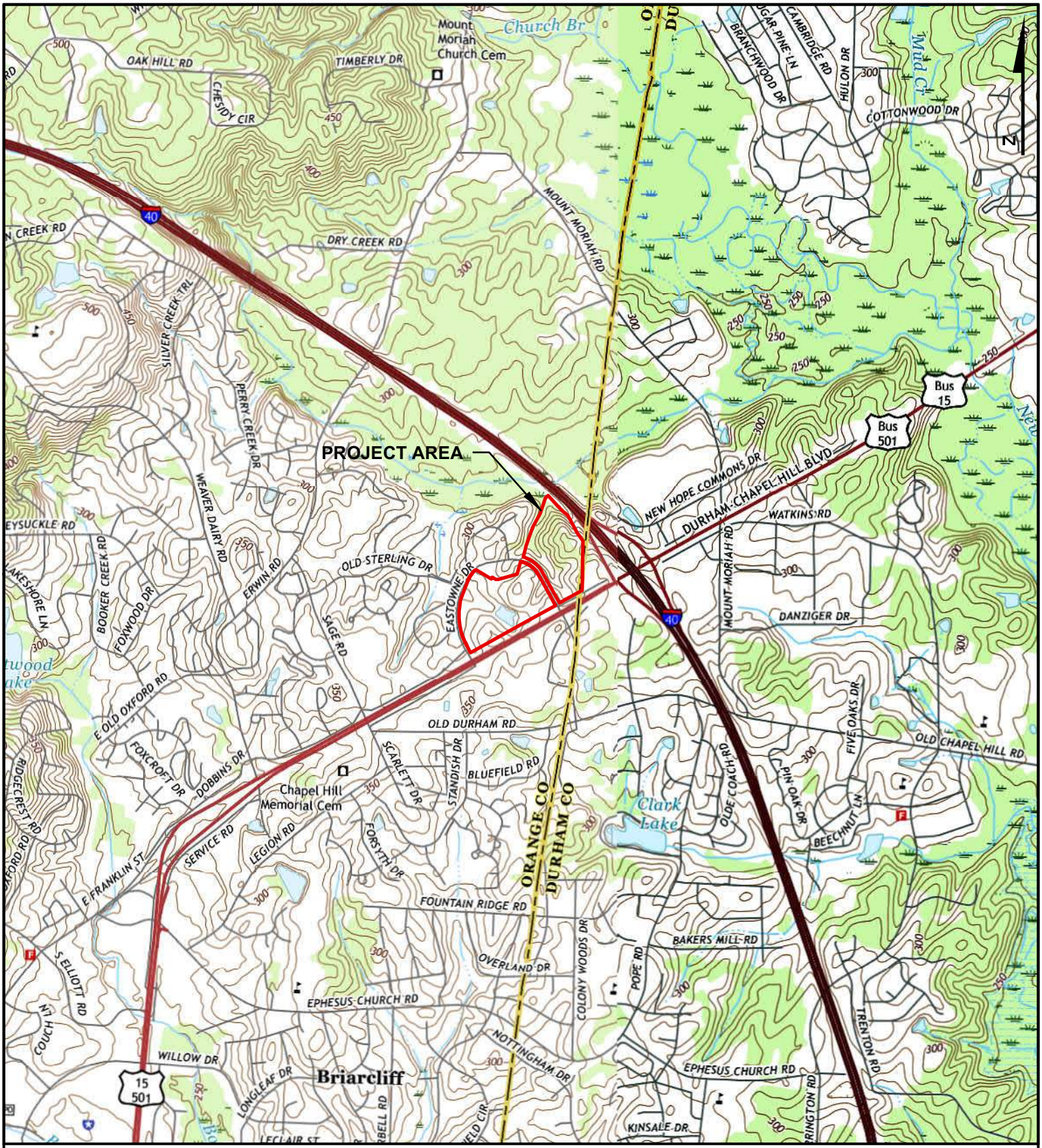
U.S. Fish and Wildlife Service/Raleigh Ecological Services Field Office. 2017b. Smooth Coneflower | Species Information, www.fws.gov/raleigh/species/es_smooth_coneflower.html.

U.S. Fish and Wildlife Service/Southeast Region. 2018. Atlantic pigtoe | Species Information, https://www.fws.gov/southeast/wildlife/mussels/atlantic-pigtoe/.



NOTES:
1. USGS; 7.5 MINUTE, QUAD, "CHAPEL HILL", NORTH CAROLINA; 2016
2. LAT: 35.950231, LONG: -79.004279

McADAMS

FIGURE 1. USGS TOPOGRAPHIC VICINITY MAP
UNC HCS - EASTOWNE CAMPUS
CHAPEL HILL, ORANGE COUNTY, NC

0 1,000 2,000 Feet
1 inch = 2,000 feet

VERSION:	1
DATE:	6/13/2019
JOB NO:	EMA-17000
DRAWN BY:	roth

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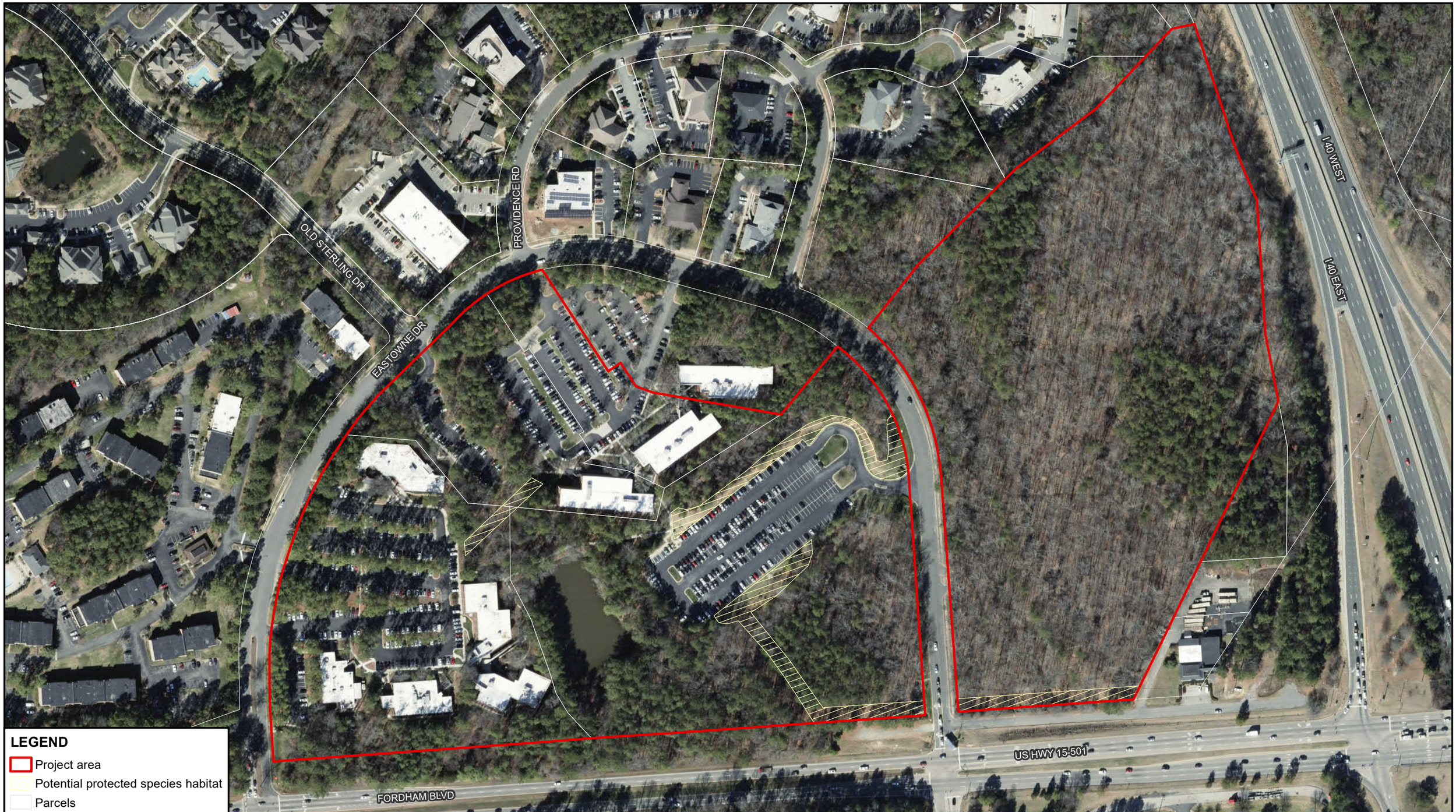

MCADAMS

FIGURE 2. AERIAL IMAGERY MAP
UNC HCS - EASTOWNE CAMPUS
CHAPEL HILL, ORANGE COUNTY, NC

Aerial Imagery: 2017 NC OneMap Orthoimagery

N

0 100 200 Feet
1 inch = 200 feet

VERSION: 1
DATE: 6/13/2019
JOB NO: EMA-17000
DRAWN BY: roth

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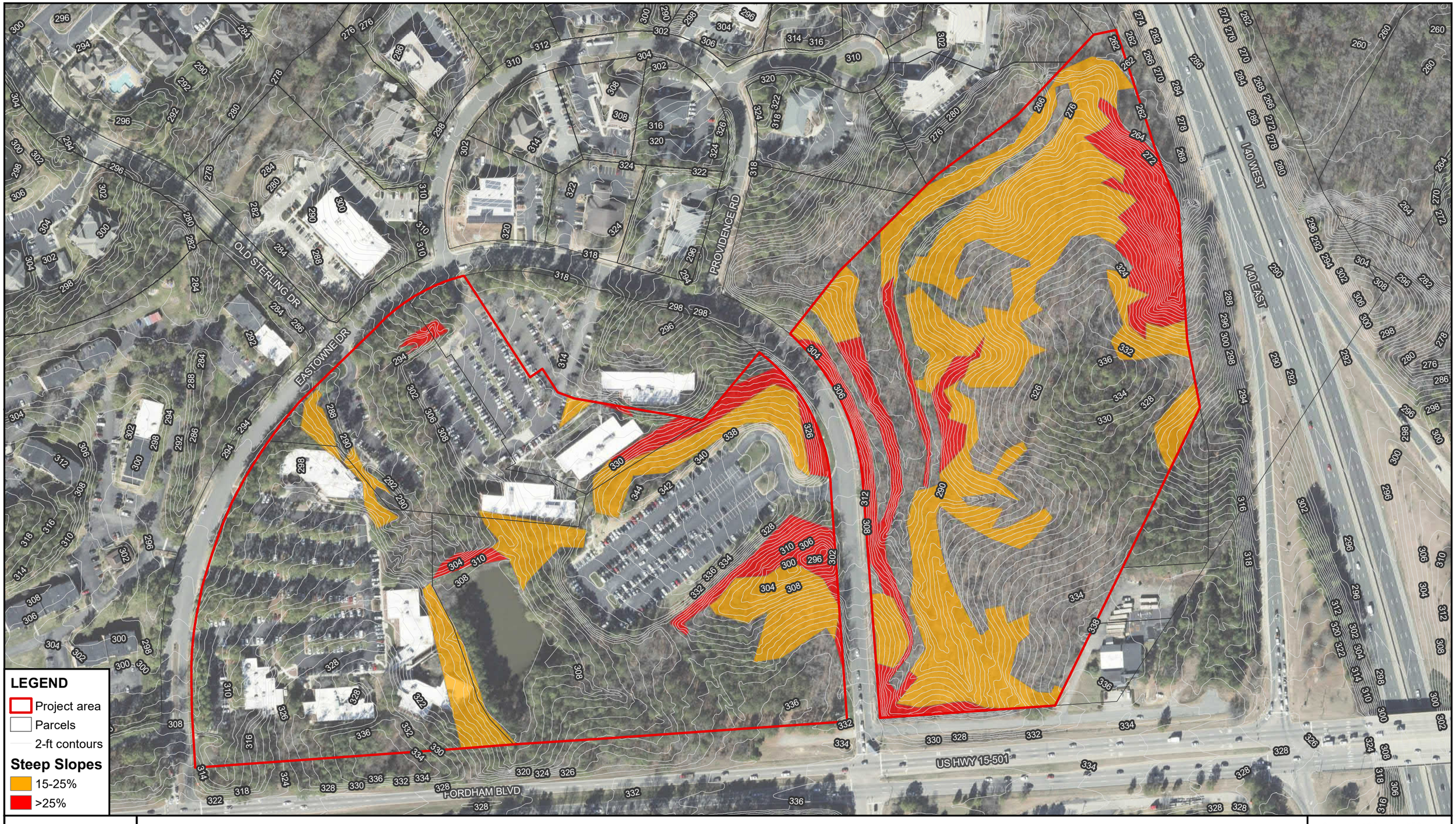

McADAMS

FIGURE 3. SITE TOPOGRAPHY & STEEP SLOPES MAP
UNC HCS - EASTOWNE CAMPUS
CHAPEL HILL, ORANGE COUNTY, NC

Aerial Imagery: 2017 NC OneMap Orthoimagery

N

0 100 200 Feet
1 inch = 200 feet

VERSION:	1
DATE:	6/18/2019
JOB NO:	EMA-17000
DRAWN BY:	roth

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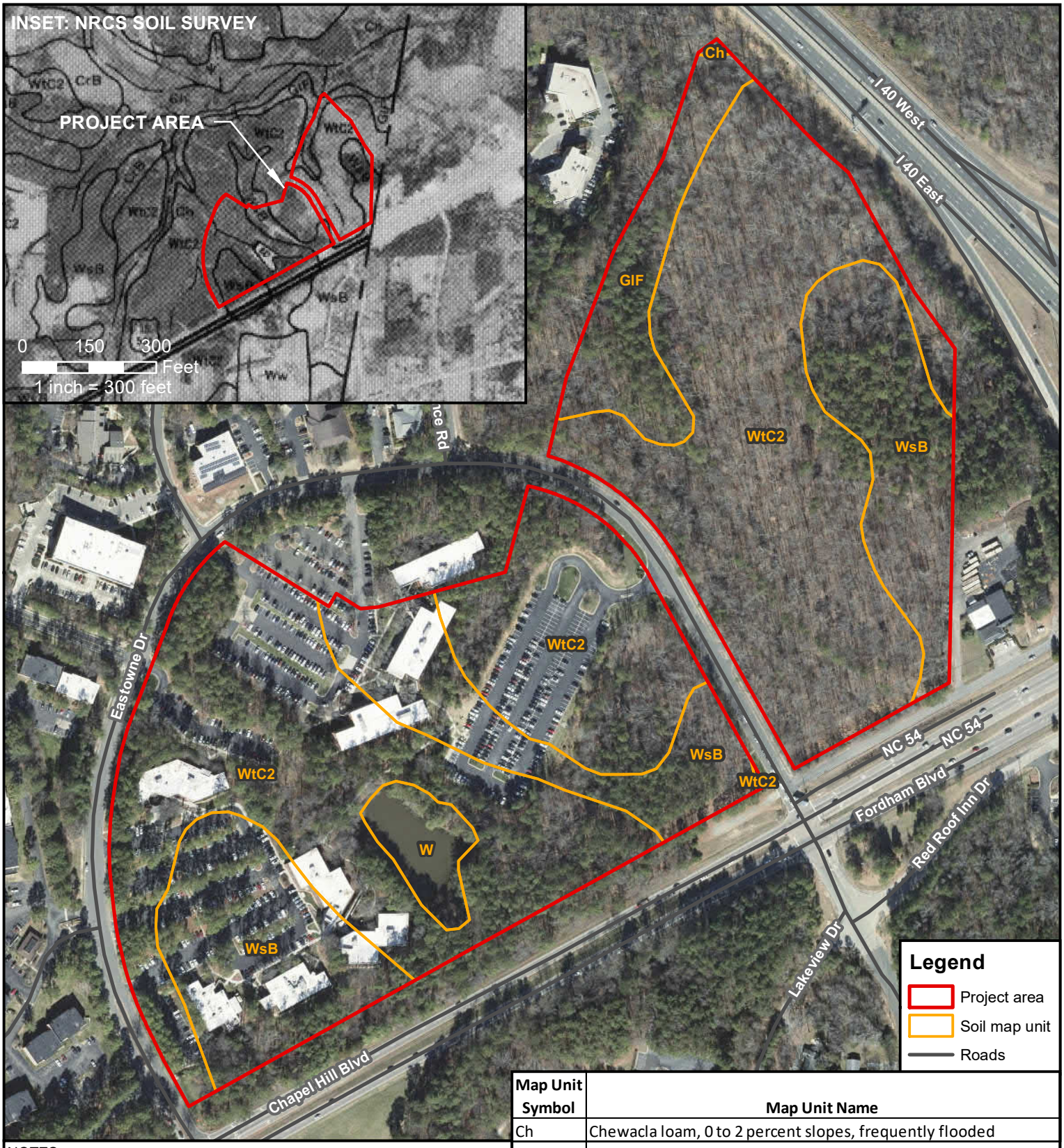

Map Unit Symbol	Map Unit Name
Ch	Chewacla loam, 0 to 2 percent slopes, frequently flooded
GIF	Goldston channery silt loam, 15 to 45 percent slopes
W	Water
WsB	White Store loam, 2 to 6 percent slopes
WtC2	White Store clay loam, 6 to 15 percent slopes, moderately eroded

NOTES:
1. NRCS WEB SOIL SURVEY; ORANGE COUNTY, NC (NC135); SPATIAL VERSION 4, DEC 21, 2013
2. INSET: NRCS; SOIL SURVEY SHEET 27, ORANGE COUNTY, NC (1977)

McAdams

FIGURE 4. SOIL SURVEY MAPS - WEB SOIL SURVEY & ORANGE COUNTY (1977) UNC HCS - EASTOWNE CAMPUS CHAPEL HILL, ORANGE COUNTY, NC

0 750 1,500
Feet
1 inch = 1,500 feet

VERSION: 1
DATE: 6/13/2019
JOB NO: EMA-17000
DRAWN BY: roth

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New Hope Creek Slopes
CPF/New Hope Creek Aquatic Habitat

Henry J. Oosting
Natural Area

I-40

US 15-501

New Hope Creek
Bottomland Forest

Dry Creek/Mount
Moriah Bottomland

NC-751

NC-86

ORANGE

DURHAM

US 15-501

I-40

NC-54

NC Center for Geographic Information & Analysis

Legend

- Stream
- Waterbodies
- Project area
- Chapel Hill jurisdictional limits
- County boundary
- Major roads

NHP Natural Areas

Top Rating

- Exceptional
- Very High
- High
- Moderate
- General

NHP Managed Areas

- Conservation Easement
- Registered Heritage Area

Owner type

- Federal
- Local Government
- Private
- State

McADAMS

FIGURE 5. NATURAL HERITAGE AREAS MAP
UNC HCS - EASTOWNE CAMPUS
CHAPEL HILL, ORANGE COUNTY, NC

Aerial Imagery: 2017 NC OneMap Orthoimagery

N

0 0.25 0.5 Miles

1 in = 0.5 miles

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DATE:	6/14/2019
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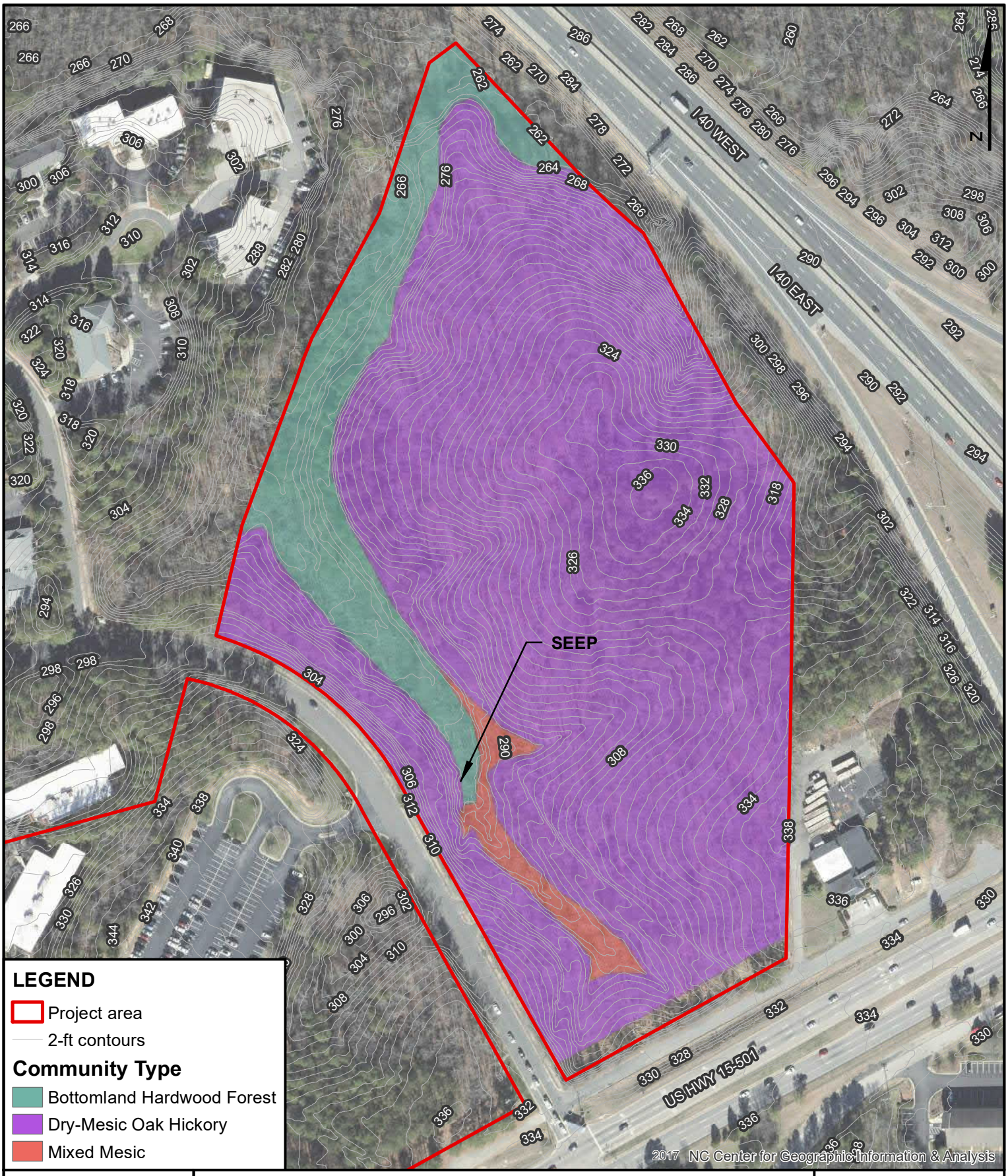

McADAMS

FIGURE 6. NATURAL COMMUNITIES MAP
UNC HCS - EASTOWNE CAMPUS
CHAPEL HILL, ORANGE COUNTY, NC

0 100 200 Feet
1 inch = 200 feet

VERSION: 1
DATE: 6/18/2019
JOB NO: EMA-17000
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McADAMS

FIGURE 7. FOREST STAND AGE MAP
UNC HCS - EASTOWNE CAMPUS
CHAPEL HILL, ORANGE COUNTY, NC

Aerial Imagery: 2017 NC OneMap Orthoimagery

0 100 200 Feet
1 inch = 200 feet

VERSION:	1
DATE:	6/14/2019
JOB NO:	EMA-17000
DRAWN BY:	roth

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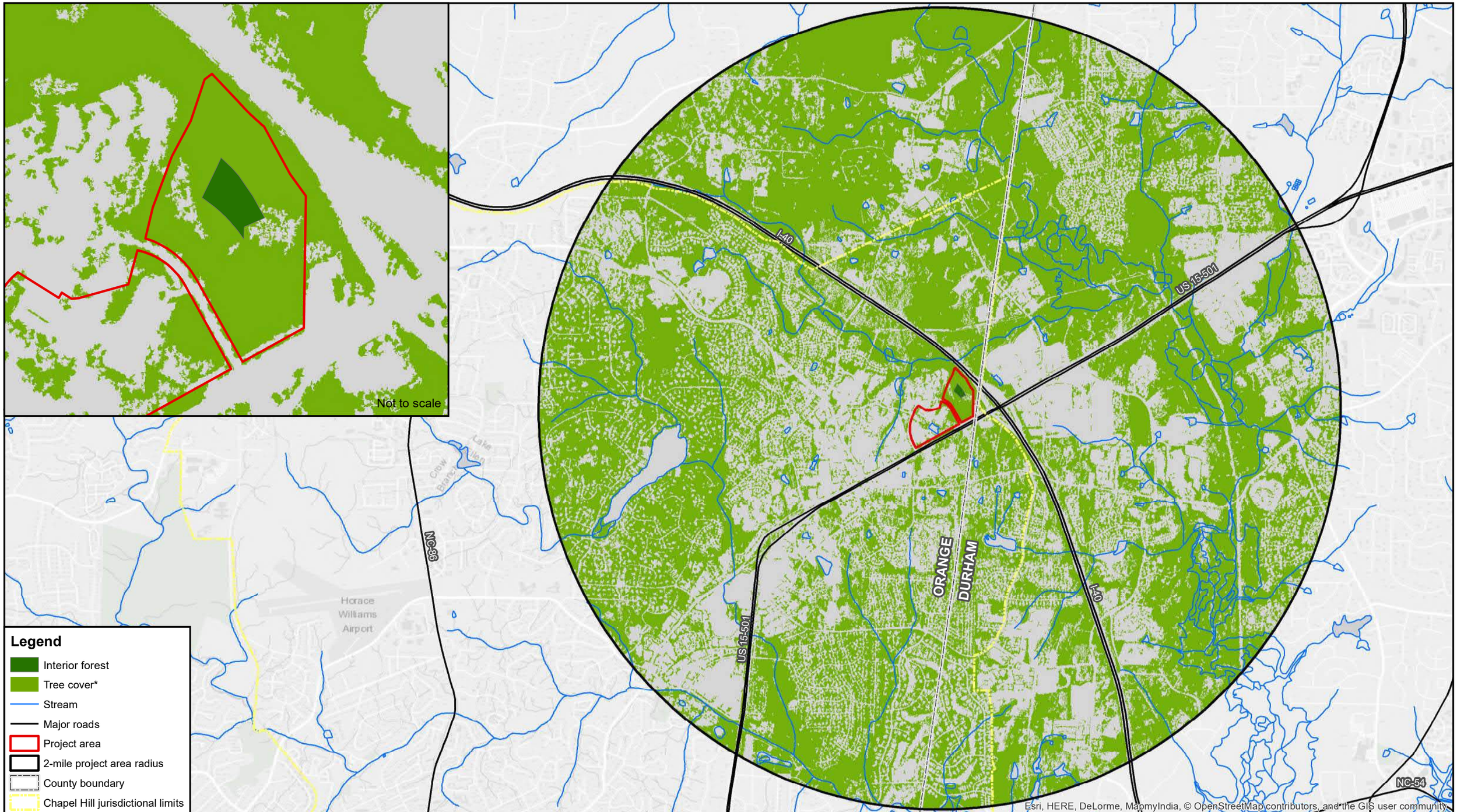

McADAMS

FIGURE 8. FOREST INTERIOR/EDGE MAP
UNC HCS - EASTOWNE CAMPUS
CHAPEL HILL, ORANGE COUNTY, NC

*Tree Cover Data: NAIP-Derived Tree Cover for North Carolina, NC OneMap 2017, NC Department of Agriculture and Consumer Services

N

0 0.25 0.5 Miles
1 in = 0.5 miles

VERSION:	1
DATE:	6/14/2019
JOB NO:	EMA-17000
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Jurisdictional Feature A
(Dry Creek) - Perennial
+/- 315 lf

Wetland A
Bottomland Hardwood Forest
+/- 0.509 ac.

FEMA Floodplain

End Jurisdictional
Feature B

End Jurisdictional
Feature A

Start Jurisdictional
Feature B - Perennial
+/- 295 lf

End Jurisdictional
Feature X

End Jurisdictional
Feature C

Start Jurisdictional
Feature C - Intermittent
+/- 550 lf

Start Jurisdictional
Feature X - Intermittent
+/- 950 lf

Pond A
+/- 1.031 ac.

Wetland B
Freshwater Marsh
+/- 0.033 ac.

Wetland C1
Freshwater Marsh
+/- 0.077 ac.

Wetland C2
Headwater Forest
+/- 0.152 ac.

Pinegate
Apartments

MOB1

PROVIDENCE RD

OLD STERLING DR

I 40 WEST

I 40 EAST

EASTOWNE DR

US HWY 15-501

FORDHAM BLVD

ORANGE COUNTY

DURHAM COUNTY

LEGEND

- Jurisdictional channel
- Jurisdictional pond
- Jurisdictional wetland
- Jordan buffer
- Chapel Hill RCD
- 100-year floodplain
- Project area
- County boundary
- Parcels
- 2-ft contours

McADAMS

FIGURE 9. JURISDICTIONAL WATERS, WETLANDS AND RIPARIAN BUFFERS MAP
UNC HCS - EASTOWNE CAMPUS
CHAPEL HILL, ORANGE COUNTY, NC

N

0 100 200 Feet
1 inch = 200 feet

VERSION: 1
DATE: 6/17/2019
JOB NO: EMA-17000
DRAWN BY: roth

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Appendix A: US Fish and Wildlife Service Official Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
Phone: (919) 856-4520 Fax: (919) 856-4556

In Reply Refer To: June 13, 2019
Consultation Code: 04EN2000-2019-SLI-1036
Event Code: 04EN2000-2019-E-02370
Project Name: Eastowne

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The species list generated pursuant to the information you provided identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

Section 7 of the Act requires that all federal agencies (or their designated non-federal representative), in consultation with the Service, insure that any action federally authorized, funded, or carried out by such agencies is not likely to jeopardize the continued existence of any federally-listed endangered or threatened species. A biological assessment or evaluation may be prepared to fulfill that requirement and in determining whether additional consultation with the Service is necessary. In addition to the federally-protected species list, information on the species' life histories and habitats and information on completing a biological assessment or

evaluation and can be found on our web page at http://www.fws.gov/raleigh. Please check the web site often for updated information or changes

If your project contains suitable habitat for any of the federally-listed species known to be present within the county where your project occurs, the proposed action has the potential to adversely affect those species. As such, we recommend that surveys be conducted to determine the species' presence or absence within the project area. The use of North Carolina Natural Heritage program data should not be substituted for actual field surveys.

If you determine that the proposed action may affect (i.e., likely to adversely affect or not likely to adversely affect) a federally-protected species, you should notify this office with your determination, the results of your surveys, survey methodologies, and an analysis of the effects of the action on listed species, including consideration of direct, indirect, and cumulative effects, before conducting any activities that might affect the species. If you determine that the proposed action will have no effect (i.e., no beneficial or adverse, direct or indirect effect) on federally listed species, then you are not required to contact our office for concurrence (unless an Environmental Impact Statement is prepared). However, you should maintain a complete record of the assessment, including steps leading to your determination of effect, the qualified personnel conducting the assessment, habitat conditions, site photographs, and any other related articles.

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

Not all Threatened and Endangered Species that occur in North Carolina are subject to section 7 consultation with the U.S Fish and Wildlife Service. Atlantic and shortnose sturgeon, sea turtles,when in the water, and certain marine mammals are under purview of the National Marine Fisheries Service. If your project occurs in marine, estuarine, or coastal river systems you should also contact the National Marine Fisheries Service, http://www.nmfs.noaa.gov/

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office. If you have any questions or comments, please contact John Ellis of this office at john_ellis@fws.gov.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Raleigh Ecological Services Field Office
Post Office Box 33726
Raleigh, NC 27636-3726
(919) 856-4520

Project Summary

Consultation Code: 04EN2000-2019-SLI-1036

Event Code: 04EN2000-2019-E-02370

Project Name: Eastowne

Project Type: ** OTHER **

Project Description: The Eastowne Campus site is on the north side of U.S. 15-501, just southwest of the I-40 interchange in Chapel Hill, North Carolina. The project area consists of five parcels that have a combined area of approximately 48-acres bounded by Eastowne Drive, U.S. 15-501, and I-40. Four of the five parcels that compose the overall project area are currently developed with seven medical office buildings, along with associated parking and utility infrastructure. The largest parcel of the five, located at the northeast corner of the intersection of Eastowne Drive and U.S. 15-501, is currently un-developed and is in a wooded condition. After an initial site investigation and preliminary master planning effort, UNC HCS desires to further refine the conceptual master plan and engage the Town and the public to negotiate a Development Agreement for the full build out of the property.

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/35.949416192182596N79.0054916174457W

Counties: Durham, NC | Orange, NC

Endangered Species Act Species

There is a total of 3 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries[1], as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

---

1. NOAA Fisheries, also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Clams

NAME	STATUS
Atlantic Pigtoe *Fusconaia masoni* There is **proposed** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5164	Proposed Threatened

Flowering Plants

NAME	STATUS
Michaux's Sumac *Rhus michauxii* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/5217	Endangered
Smooth Coneflower *Echinacea laevigata* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/3473	Endangered

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

Appendix B: NC Natural Heritage Program Report

NC DEPARTMENT OF
NATURAL AND CULTURAL RESOURCES

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

NCNHDE-9256

June 12, 2019

Alec Pierzga
The John R. McAdams Company
2905 Meridian Pkwy
Durham, NC 27713
RE: UNC HCS - Eastowne Campus; EMA-17000

Dear Alec Pierzga:

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

Natural Heritage Element Occurrences, Natural Areas, and Managed Areas Intersecting the Project Area
UNC HCS - Eastowne Campus
Project No. EMA-17000
June 12, 2019
NCNHDE-9256

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
Natural Community	29173	Piedmont Swamp Forest	---	2010	CD	3-Medium	---	---	G3G4	S2

Natural Areas Documented Within Project Area

Site Name	Representational Rating	Collective Rating
Dry Creek/Mount Moriah Bottomland	R5 (General)	C4 (Moderate)

Managed Areas Documented Within Project Area*

Managed Area Name	Owner	Owner Type
Durham County Open Space	Durham County: multiple local government	Local Government
Town of Chapel Hill Open Space	Town of Chapel Hill	Local Government

*NOTE: If the proposed project intersects with a conservation/managed area, please contact the landowner directly for additional information. If the project intersects with a Dedicated Nature Preserve (DNP), Registered Natural Heritage Area (RHA), or Federally-listed species, NCNHP staff may provide additional correspondence regarding the project.

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on June 12, 2019; source: NCNHP, Q2 Apr 2019. 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
UNC HCS - Eastowne Campus
Project No. EMA-17000
June 12, 2019
NCNHDE-9256

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
Butterfly	34564	Erynnis martialis	Mottled Duskywing	1952-07-01	H	5-Very Low	---	Significantly Rare	G3	S2
Dragonfly or Damselfly	33764	Somatochlora georgiana	Coppery Emerald	2004-Pre	H?	5-Very Low	---	Significantly Rare	G3G4	S2?
Natural Community	28797	Piedmont Bottomland Forest (High Subtype)	---	2010	BC	3-Medium	---	---	G3G4	S2
Natural Community	14132	Piedmont Bottomland Forest (Typic Low Subtype)	---	2017-09-22	A	2-High	---	---	G2?	S2
Natural Community	30519	Piedmont Bottomland Forest (Typic Low Subtype)	---	2010	BC	3-Medium	---	---	G2?	S2
Natural Community	30518	Piedmont Levee Forest (Beech Subtype)	---	2010	A	4-Low	---	---	G3?	S2
Natural Community	29173	Piedmont Swamp Forest	---	2010	CD	3-Medium	---	---	G3G4	S2
Vascular Plant	3598	Echinacea laevigata	Smooth Coneflower	1922-05-27	X	3-Medium	Endangered	Endangered	G2G3	S1S2
Vascular Plant	3221	Liatris squarrulosa	Earle's Blazing-star	1944-10-07	H	4-Low	---	Significantly Rare Peripheral	G4G5	S2
Vascular Plant	36779	Orbexilum pedunculatum	Sampson's Snakeroot	1898-07	H	5-Very Low	---	Significantly Rare Peripheral	G5	S1
Vascular Plant	5981	Parthenium auriculatum	Glade Wild Quinine	1949-05-08	X?	4-Low	---	Significantly Rare Throughout	G3G4	S3
Vascular Plant	1157	Scutellaria leonardii	Shale-barren Skullcap	1988-06-14	E	4-Low	---	Endangered	G4T4	S2
Vascular Plant	22304	Tridens chapmanii	Chapman's Redtop	1894-08-21	H	5-Very Low	---	Threatened	G5T3	S1S2

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

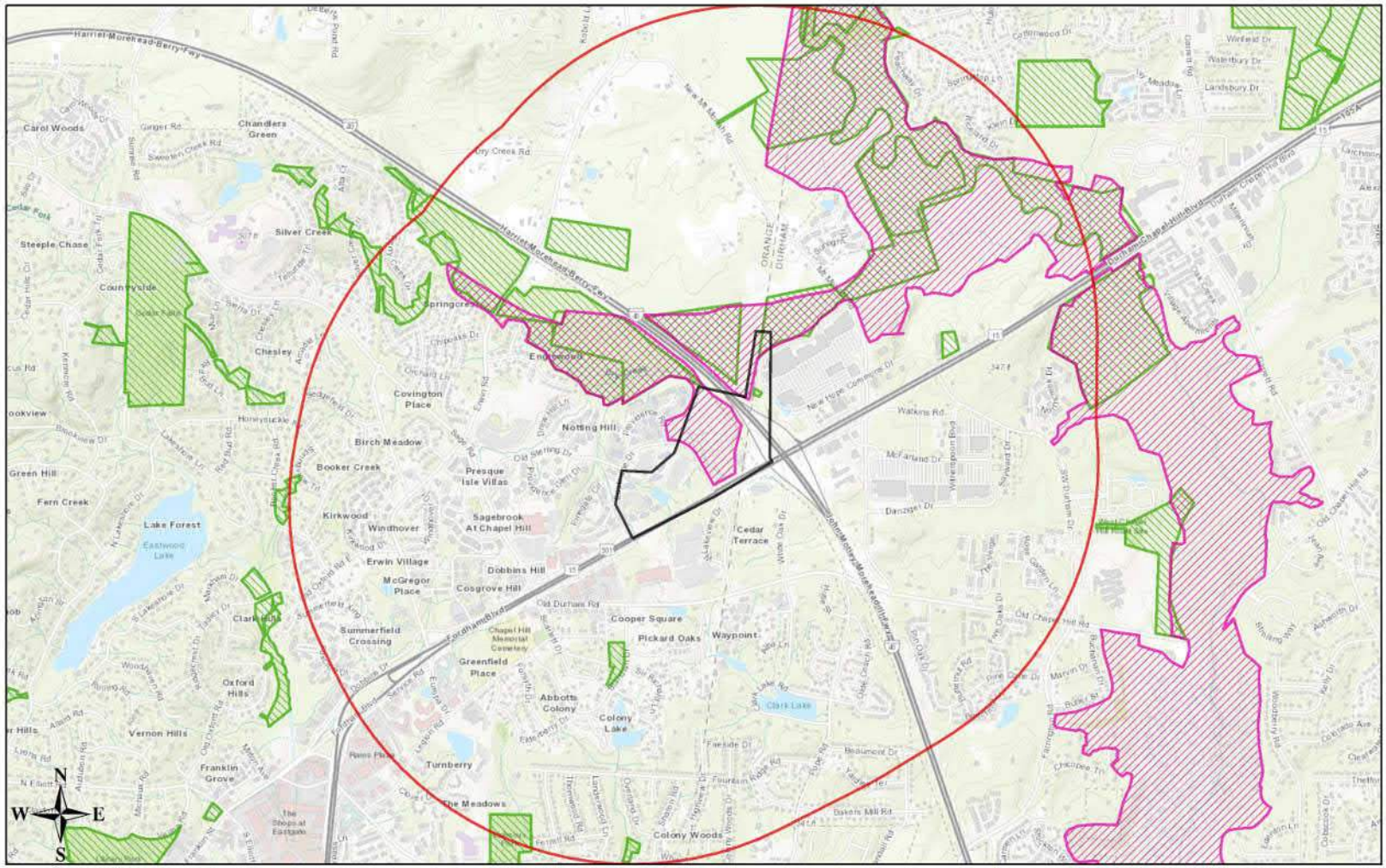
Site Name	Representational Rating	Collective Rating
Dry Creek/Mount Moriah Bottomland	R5 (General)	C4 (Moderate)
New Hope Creek Bottomland Forest	R1 (Exceptional)	C3 (High)

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

Managed Area Name	Owner	Owner Type
NC Clean Water Management Trust Fund Easement	NC DNCR, Clean Water Management Trust Fund	State
NC Division of Mitigation Services Easement	NC DEQ, Division of Mitigation Services	State
Durham County Open Space	Durham County: multiple local government	Local Government
Orange County Open Space	Orange County: multiple local government	Local Government
Town of Chapel Hill Open Space	Town of Chapel Hill	Local Government

Definitions and an explanation of status designations and codes can be found at https://ncnhde.natureserve.org/content/help. Data query generated on June 12, 2019; source: NCNHP, Q2 Apr 2019. Please resubmit your information request if more than one year elapses before project initiation as new information is continually added to the NCNHP database.

NCNHDE-9256: UNC HCS - Eastowne Campus



June 12, 2019

- Project Boundary
- Buffered Project Boundary
- NHP Natural Area (NHNA)
- Managed Area (MAREA)

1:26,709

0 0.225 0.45 0.9 mi

0 0.35 0.7 1.4 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

Appendix C: Species Data

Trees			
Species	**Size Range (inches dbh)**	**Mid-story/ Shrub Species**	**Herb Species**
Dry Mesic Oak-Hickory Forest			
White oak (*Quercus alba*)	8-27	Green ash (*Fraxinus pennsylvanica*) American beech (*Fagus grandifolia*) Mockernut hickory (*Carya tomentosa*) Red maple (*Acer rubrum*) Flowering dogwood (Cornus florida) Winged elm (*Ulmus alata*) Sweet gum (*Liquidambar styraciflua*) Ironwood (*Carpinus caroliniana*)	*Hexastylus* spp. Muscadine (*Vitis rotundifolia*) Mockernut hickory (*Carya tomentosa*) Maple leaf viburnum (*Viburnum acerifolium*) Lowbush blueberry (*Vaccinium angustifolium*) Blackhaw (*Viburnum prunifolium*) Virginia creeper (*Parthenocissus quinquefolia*) Deertongue (*Dichanthelium clandestinum*) Black oak (*Quercus velutina*)
Loblolly pine (*Pinus taeda*)	7-25		
Mockernut hickory (*Carya tomentosa*)	4-6		
Black oak (*Quercus velutina*)	8-13		
Green ash (*Fraxinus pennsylvanica*)	6-15		
American beech (*Fagus grandifolia*)	7-28		
Piedmont Bottomland Forest (High Subtype)			
Tulip poplar (*Liriodendron tulipifera*)	10-32	Ironwood (*Carpinus caroliniana*) American elm (*Ulmus americana*) Green ash (*Fraxinus pennsylvanica*) Pawpaw (*Asimina triloba*) Red maple (*Acer rubrum*) Spicebush (*Lindera benzoin*) Flowering dogwood (*Cornus florida*) Deciduous holly (*Ilex decidua*) Mockernut hickory (*Carya tomentosa*)	Virginia creeper (*Parthenocissus quinquefolia*) Japanese stiltgrass (*Microstegium vimineum*) Christmas fern (*Polystichum acrostichoides*) *Carex* spp. Poison ivy (*Toxicodendrons radicans*) Deertongue (*Dichanthelium clandestinum*) Multiflora rose (*Rosa multiflora*) Common greenbrier (*Smilax rotundifolia*)
Sycamore (*Platanus occidentalis*)	8-32		
Sweet gum (*Liquidambar styraciflua*)	10-34		
Green ash (*Fraxinus pennsylvanica*)	8-17		
American elm (*Ulmus americana*)	6-11		
Loblolly pine (*Pinus taeda*)	28-35		
Black oak (*Quercus velutina*)	6-10		
Overcup oak (*Quercus lyrata)*	31		
Swamp oak (*Quercus michaxii*)	32		
Mixed Mesic Forest			
Tulip poplar (*Liriodendron tulipifera*)	11-27	Ironwood (*Carpinus caroliniana*) Deciduous holly (*Ilex decidua*) Pawpaw (*Asimina triloba*) Blackhaw (*Viburnum prunifolium*)	Muscadine (*V. rotundifolia*) Japanese honeysuckle (*Lonicera japonica*) Virginia creeper (*Parthenocissus quinquefolia*) Multiflora rose (*Rosa multiflora*) Redbud (*Cercis canadensis*) Deertongue (*Dichanthelium clandestinum*) Christmas fern (*Polystichum acrostichoides*)
Mockernut hickory (*Carya tomentosa*)	6-20		
Sweet gum (*Liquidambar styraciflua*)	5-15		
White oak (*Quercus alba*)	10-32		
American beech (*Fagus grandifolia*)	5-10		
Red oak (*Quercus falcata*)	9-22		

Appendix D: Natural Community Photographs

Photo 1: Dry-Mesic Oak-Hickory Community

Photo 2: Bottomland Hardwood Forest Community

Photo 3: Mixed Mesic Community

Appendix E: Protected Species Survey Photographs

Photo 1: Suitable habitat at south end of forested parcel facing NE with US Hwy 15-501 to the right

Photo 2: Suitable habitat at south end of parcel facing SW with US Hwy 15-501 to the left

Photo 3: Suitable habitat facing away from parking lot on Eastowne Drive

Photo 4: Suitable habitat on southeastern corner of eastern parcel facing SW with US Hwy 15-501 on the left

Appendix F: Preliminary Jurisdictional Determination

U.S. ARMY CORPS OF ENGINEERS
WILMINGTON DISTRICT

Action Id. **SAW-2016-02109** County: **Orange** U.S.G.S. Quad: **Chapel Hill**

NOTIFICATION OF JURISDICTIONAL DETERMINATION

Property Owner: **Health System Properties, LLC**
Mr. W.L. Roper
Address: **3rd Floor Med Wing 3, Campus Box 7600**
Chapel Hill, North Carolina 27514

Authorized Agent: **The John R. McAdams Company, Inc.**
Mr. George Buchholtz
Address: **2905 Meridian Parkway**
Durham, North Carolina 27713

Size (acres)	**48**	Nearest Town	**Chapel Hill**
Nearest Waterway	**New Hope Creek**	River Basin	**Cape Fear**
USGS HUC	**03030002**	Coordinates	Latitude: **35.94943**
			Longitude: **-79.0051**

Location description: **The UNC Hospitals – Eastowne Campus project area is identified as an approximate 48 acre tract of land, located on Orange County, North Carolina Parcels 9890911209, 9890807564, 9890802764, 9890800643, and 9890800195. These parcels are located near the intersection of Eastowne Drive and Durham Chapel Hill Blvd, Chapel Hill, Orange County, North Carolina. Waters on-site drain into New Hope Creek of the**

Indicate Which of the Following Apply:

A. Preliminary Determination

X There are waters, including wetlands, on the above described project area, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). The waters, including wetlands, have been delineated, and the delineation has been verified by the Corps to be sufficiently accurate and reliable. Therefore this preliminary jurisdiction determination may be used in the permit evaluation process, including determining compensatory mitigation. For purposes of computation of impacts, compensatory mitigation requirements, and other resource protection measures, a permit decision made on the basis of a preliminary JD will treat all waters and wetlands that would be affected in any way by the permitted activity on the site as if they are jurisdictional waters of the U.S. This preliminary determination is not an appealable action under the Regulatory Program Administrative Appeal Process (Reference 33 CFR Part 331). However, you may request an approved JD, which is an appealable action, by contacting the Corps district for further instruction.

_ There are wetlands on the above described property, that may be subject to Section 404 of the Clean Water Act (CWA)(33 USC § 1344) and/or Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403). However, since the waters, including wetlands, have not been properly delineated, this preliminary jurisdiction determination may not be used in the permit evaluation process. Without a verified wetland delineation, this preliminary determination is merely an effective presumption of CWA/RHA jurisdiction over all of the waters, including wetlands, at the project area, which is not sufficiently accurate and reliable to support an enforceable permit decision. We recommend that you have the waters of the U.S. on your property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.

B. Approved Determination

_ There are Navigable Waters of the United States within the above described property subject to the permit requirements of Section 10 of the Rivers and Harbors Act (RHA) (33 USC § 403) and Section 404 of the Clean Water Act (CWA)(33 USC § 1344). Unless there is a change in law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are waters of the U.S., including wetlands, on the above described project area subject to the permit requirements of Section 404 of the Clean Water Act (CWA) (33 USC § 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ We recommend you have the waters of the U.S. on your property delineated. As the Corps may not be able to accomplish this wetland delineation in a timely manner, you may wish to obtain a consultant to conduct a delineation that can be verified by the Corps.

_ The waters of the U.S., including wetlands, on your project area have been delineated and the delineation has been verified by the Corps. If you wish to have the delineation surveyed, the Corps can review and verify the survey upon completion. Once verified, this survey will provide an accurate depiction of all areas subject to CWA and/or RHA jurisdiction on your property which, provided there is no change in the law or our published regulations, may be relied upon for a period not to exceed five years.

_ The waters of the U.S., including wetlands, have been delineated and surveyed and are accurately depicted on the plat signed by the Corps Regulatory Official identified below on _____. Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ There are no waters of the U.S., to include wetlands, present on the above described project area which are subject to the permit requirements of Section 404 of the Clean Water Act (33 USC 1344). Unless there is a change in the law or our published regulations, this determination may be relied upon for a period not to exceed five years from the date of this notification.

_ The property is located in one of the 20 Coastal Counties subject to regulation under the Coastal Area Management Act (CAMA). You should contact the Division of Coastal Management in Morehead City, NC, at (252) 808-2808 to determine their requirements.

Placement of dredged or fill material within waters of the US, including wetlands, without a Department of the Army permit may constitute a violation of Section 301 of the Clean Water Act (33 USC § 1311). Placement of dredged or fill material, construction or placement of structures, or work within navigable waters of the United States without a Department of the Army permit may constitute a violation of Sections 9 and/or 10 of the Rivers and Harbors Act (33 USC § 401 and/or 403). If you have any questions regarding this determination and/or the Corps regulatory program, please contact **Ms. Samantha Dailey at (919) 554-4884, ext. 22 or Samantha.J.Dailey@usace.army.mil.**

C. Basis For Determination: **Refer to the enclosed Preliminary Jurisdictional Determination Form and Figure 3. Existing Conditions.**

D. Remarks:

E. Attention USDA Program Participants

This delineation/determination has been conducted to identify the limits of Corps' Clean Water Act jurisdiction for the particular site identified in this request. The delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985. If you or your tenant are USDA Program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service, prior to starting work.

F. Appeals Information **(This information applies only to approved jurisdictional determinations as indicated in B. above)**

This correspondence constitutes an approved jurisdictional determination for the above described site. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed you will find a Notification of Appeal Process (NAP) fact sheet and request for appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the following address:

US Army Corps of Engineers
South Atlantic Division
Attn: Jason Steele, Review Officer
60 Forsyth Street SW, Room 10M15
Atlanta, Georgia 30303-8801

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR part 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by _____.
It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this correspondence.

Corps Regulatory Official: DAILEY.SAMANTHA.J.1387567948 Digitally signed by DAILEY.SAMANTHA.J.1387567948 DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=DAILEY.SAMANTHA.J.1387567948 Date: 2017.05.19 11:35:35 -04'00'

Date: **May 19, 2017** Expiration Date: **N/A**

The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete our Customer Satisfaction Survey, located online at http://corpsmapu.usace.army.mil/cm_apex/f?p=136:4:0.

APPENDIX 2

PRELIMINARY JURISDICTIONAL DETERMINATION FORM

BACKGROUND INFORMATION

A. REPORT COMPLETION DATE FOR PRELIMINARY JURISDICTIONAL DETERMINATION (JD): May 19, 2017

B. NAME AND ADDRESS OF PERSON REQUESTING PRELIMINARY JD:

Property Owner: **Health System Properties, LLC**
Mr. W.L. Roper
Address: **3rd Floor Med Wing 3, Campus Box 7600**
Chapel Hill, North Carolina 27514

Authorized Agent: **The John R. McAdams Company, Inc.**
Mr. George Buchholtz
Address: **2905 Meridian Parkway**
Durham, North Carolina 27713

C. DISTRICT OFFICE, FILE NAME, AND NUMBER: Wilmington, UNC Hospitals – Eastowne Campus, Health System Properties, LLC, Orange County, SAW-2016-02109

D. PROJECT LOCATION(S) AND BACKGROUND INFORMATION:
(USE THE ATTACHED TABLE TO DOCUMENT MULTIPLE WATERBODIES AT DIFFERENT SITES)
State: **NC** County/parish/borough: **Orange** City: **Chapel Hill**
Center coordinates of site (lat/long in degree decimal format): Lat. **35.94943°N**, Long. **79.0051° W**.
Universal Transverse Mercator:
Name of nearest water body: **New Hope Creek**

E. REVIEW PERFORMED FOR SITE EVALUATION (CHECK ALL THAT APPLIES):
☒ Office (Desk) Determination. Date: **May 19, 2017**
☒ Field Determination. Date(s): **November 17, 2016**

TABLE OF AQUATIC RESOURCES IN REVIEW AREA WHICH "MAY BE" SUBJECT TO REGULATORY JURISDICTION

Site Number	Latitude (°N)	Latitude (°W)	Estimated Amount of Aquatic Resources in Review Area		Type of aquatic resource (i.e. wetland vs. non-wetland)	Geographic authority to which the aquatic resource "may be" subject (i.e. Section 404 or Section 10/404)
			Linear Feet	Acres		
Wetland A	35.959723	-79.002904		0.51	PFO Wetland	Section 404
Wetland B	35.949054	-79.005070		0.03	PFO Wetland	Section 404
Wetland C	35.948631	-79.005333		0.23	PFO Wetland	Section 404
Stream A	35.954034	-79.003305	272		Perennial Stream	Section 404
Stream B	35.953574	-79.002634	108		Intermittent Stream	Section 404
Stream C	35.949699	-79.006447	559		Intermittent Stream	Section 404
Stream X	35.95143	-79.00250	877		Intermittent Stream	Section 404
Pond A	35.949085	-79.005628		1.03	Open Water	Section 404

1. The Corps of Engineers believes that there may be jurisdictional aquatic resources in the review area, and the requestor of this PJD is hereby advised of his or her option to request and obtain an approved JD (AJD) for that review area based on an informed decision after having discussed the various types of JDs and their characteristics and circumstances when they may be appropriate.

2. In any circumstance where a permit applicant obtains an individual permit, or a Nationwide General Permit (NWP) or other general permit verification requiring "pre-construction notification" (PCN), or requests verification for a non-reporting NWP or other general permit, and the permit applicant has not requested an AJD for the activity, the permit applicant is hereby made aware that: (1) the permit applicant has elected to seek a permit authorization based on a PJD, which does not make an official determination of jurisdictional aquatic resources; (2) the applicant has the option to request an AJD before accepting the terms and conditions of the permit authorization, and that basing a permit authorization on an AJD could possibly result in less compensatory mitigation being required or different special conditions; (3) the applicant has the right to request an individual permit rather than accepting the terms and conditions of the NWP or other general permit authorization; (4) the applicant can accept a permit authorization and thereby agree to comply with all the terms and conditions of that permit, including whatever mitigation requirements the Corps has determined to be necessary; (5) undertaking any activity in reliance upon the subject permit authorization without requesting an AJD constitutes the applicant's acceptance of the use of the PJD; (6) accepting a permit authorization (e.g., signing a proffered individual permit) or undertaking any activity in reliance on any form of Corps permit authorization based on a PJD constitutes agreement that all aquatic resources in the review area affected in any way by that activity will be treated as jurisdictional, and waives any challenge to such jurisdiction in any administrative or judicial compliance or enforcement action, or in any administrative appeal or in any Federal court; and (7)whether the applicant elects to use either an AJD or a PJD, the JD will be processed as soon as practicable. Further, an AJD, a proffered individual permit (and all terms and conditions contained therein), or individual permit denial can be administratively appealed pursuant to 33 C.F.R. Part 331. If, during an administrative appeal, it becomes appropriate to make an official determination whether geographic jurisdiction exists over aquatic resources in the review area, or to provide an official delineation of jurisdictional aquatic resources in the review area, the Corps will provide an AJD to accomplish that result, as soon as is practicable. This PJD finds that there *"may be"* waters of the U.S. and/or that there *"may be"* navigable waters of the U.S. on the subject review area, and identifies all aquatic features in the review area that could be affected by the proposed activity, based on the following information:

SUPPORTING DATA. Data reviewed for preliminary JD (check all that apply): Checked items should be included in subject file. Appropriately reference sources below where indicated for all checked items:

☒ Maps, plans, plots or plat submitted by or on behalf of the PJD requestor: **The John R. McAdams Company, Inc., submitted a Jurisdictional Determination Request on October 7, 2016, with revisions received on February 10, 2017.**
☒ Data sheets prepared/submitted by or on behalf of the PJD requestor.
  ☒ Office concurs with data sheets/delineation report.
  ☐ Office does not concur with data sheets/delineation report.
☐ Data sheets prepared by the Corps: .
☐ Corps navigable waters' study: .
☐ U.S. Geological Survey Hydrologic Atlas: .
  ☐ USGS NHD data.
  ☐ USGS 8 and 12 digit HUC maps.
☒ U.S. Geological Survey map(s). Cite scale & quad name: **1:24K, NC-Chapel Hill**
☒ USDA Natural Resources Conservation Service Soil Survey. Citation: **Web Soil Survey: November 2016**.
☒ National wetlands inventory map(s). Cite name: **Corps of Engineers SimSuite – November 2016**.
☐ State/Local wetland inventory map(s): .
☐ FEMA/FIRM maps: .
☐ 100-year Floodplain Elevation is: (National Geodetic Vertical Datum of 1929)
☒ Photographs: ☒ Aerial (Name & Date): .
  or ☐ Other (Name & Date): .
☐ Previous determination(s). File no. and date of response letter: .
☐ Other information (please specify): .

1 Districts may establish timeframes for requestor to return signed PJD forms. If the requestor does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.

IMPORTANT NOTE: The information recorded on this form has not necessarily been verified by the Corps and should not be relied upon for later jurisdictional determinations.

Aquatic Resource feature Stream X exhibits a surface hydrological surface connection to Wetland A and Stream A. Approximately 397 linear feet separate the features. A defined bed and bank and ordinary high water mark was not observed through the 397 linear feet.

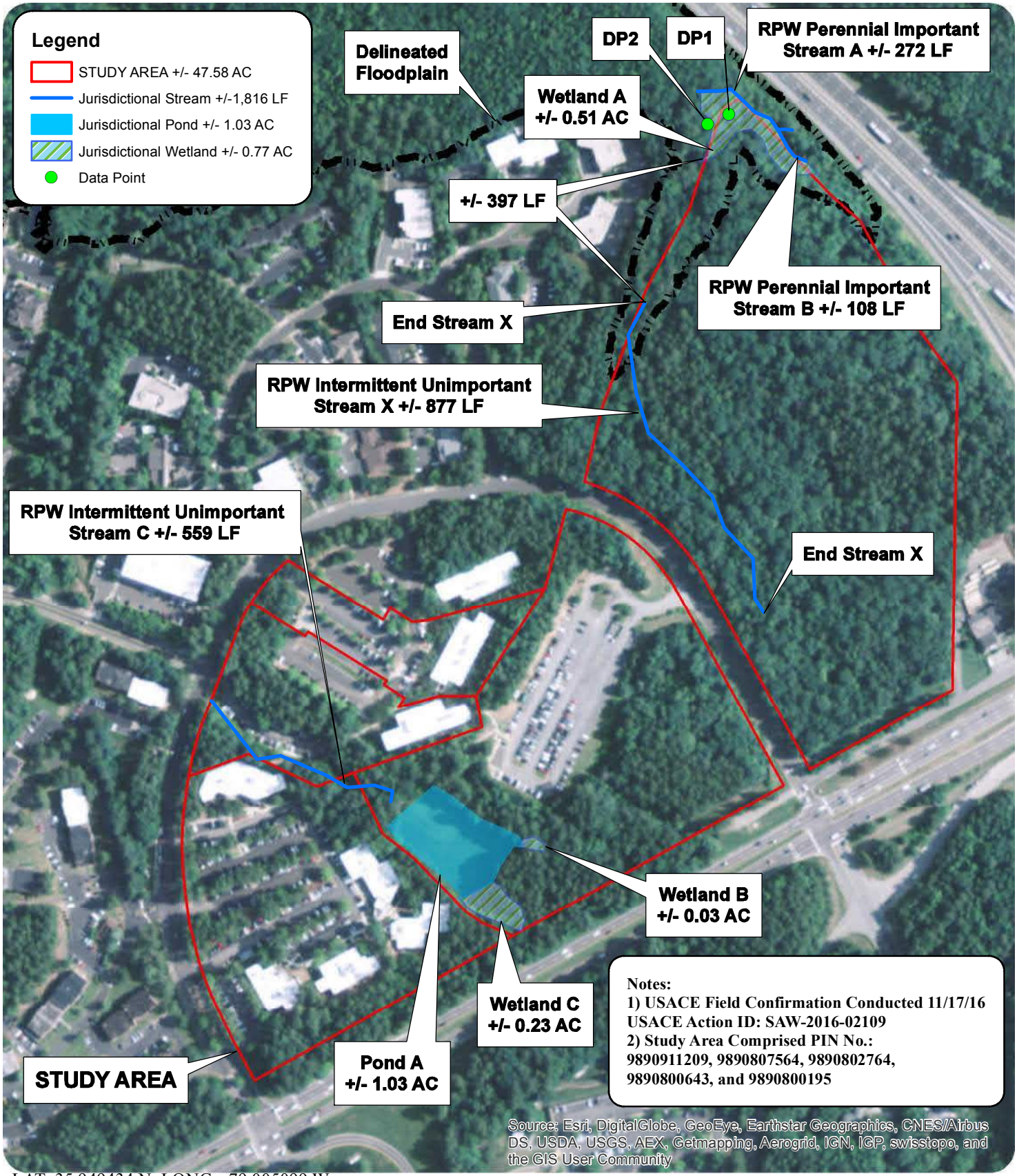
DAILEY.SAMANTHA.J.1387567948

Digitally signed by DAILEY.SAMANTHA.J.1387567948
DN: c=US, o=U.S. Government, ou=DoD, ou=PKI, ou=USA, cn=DAILEY.SAMANTHA.J.1387567948
Date: 2017.05.19 11:26:26 -04'00'

Signature and date of Regulatory Project Manager (REQUIRED)

Signature and date of person requesting preliminary JD (REQUIRED, unless obtaining the signature is Impracticable)

1 Districts may establish timeframes for requestor to return signed PJD forms. If the requestor does not respond within the established time frame, the district may presume concurrence and no additional follow up is necessary prior to finalizing an action.



LAT: 35.949434 N, LONG: -79.005099 W

N

DATE: 02/10/17

0 200 400 800 Feet

1 inch = 400 feet

UNC HOSPITALS - EASTOWNE CAMPUS

WETLAND/STREAM DELINEATION

FIGURE 3. EXISTING CONDITIONS

PROJECT #: EMA-16000

CHAPEL HILL, NORTH CAROLINA

McADAMS

Appendix G: Town of Chapel Hill Buffer Determinations

Stream Determination Area Map

- Unclassified Stream
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Culverts
- 2-foot Contours
- 10-foot Contours
- Buildings
- Parcels
- Approximate Jordan Buffer
- Subject Property

Flood Zones

- 500-year floodplain
- 100-year floodplain

- Ephemeral Breakpoint
- Intermittent Breakpoint
- Perennial Breakpoint

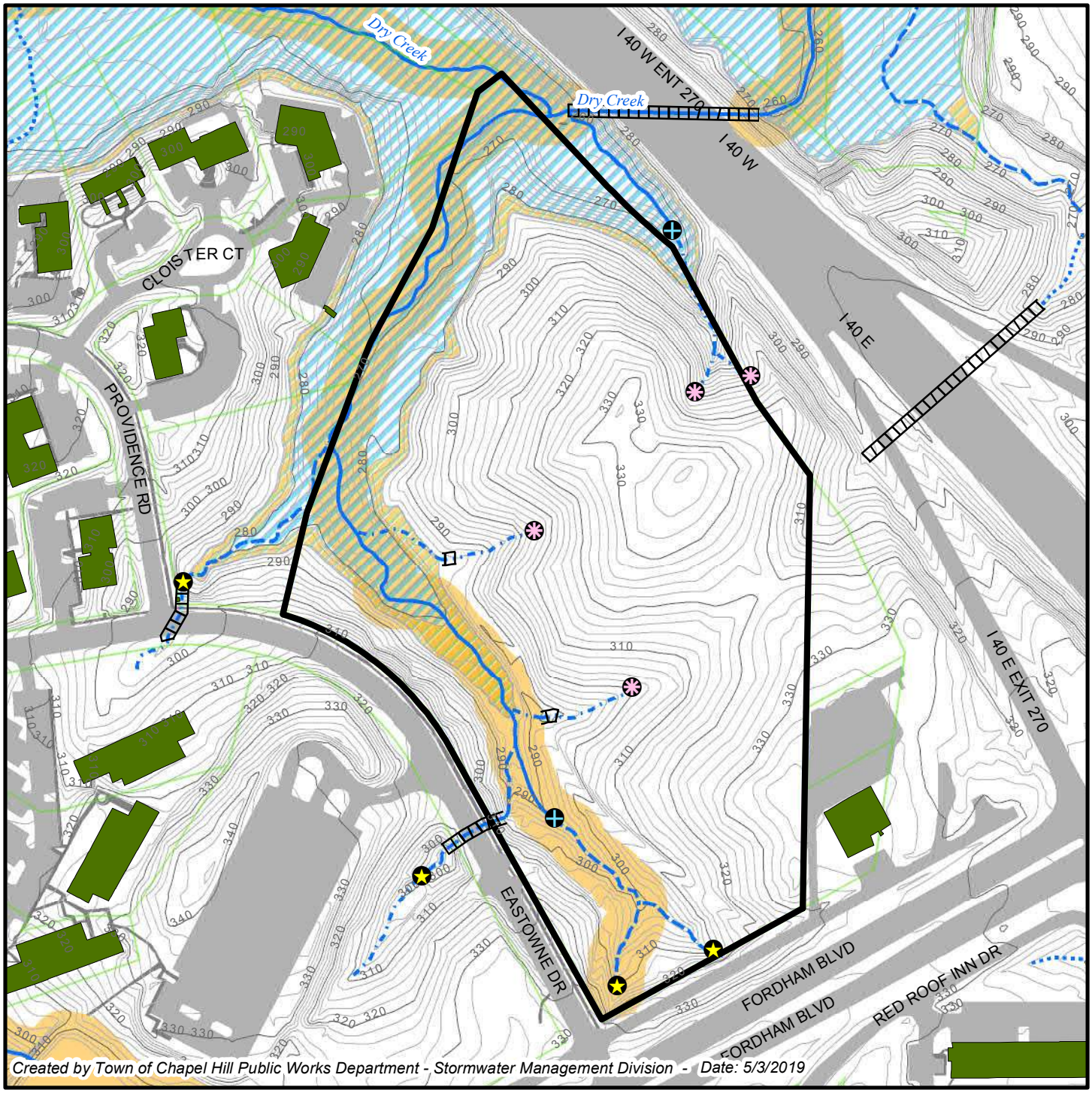
Address: Between Eastowne Dr & I-40
Chapel Hill, NC

Parcel ID: 9890-91-1209

0 125 250 500 Feet

1 inch = 250 feet

**Stream locations are approximate and must be verified by survey.
Buffers are measured from top of bank. RCD buffers may apply.
Please contact the Town of Chapel Hill Planning Department to verify.**



Created by Town of Chapel Hill Public Works Department - Stormwater Management Division - Date: 5/3/2019

Stream Determination Area Map

- Unclassified Stream
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Culverts
- 2-foot Contours
- 10-foot Contours
- Buildings
- Parcels
- Subject Property
- Possible Jurisdictional Wetlands
- Perennial Waterbody
- Approximate Jordan Buffer
- Ephemeral Breakpoint
- Intermittent Breakpoint
- Perennial Breakpoint

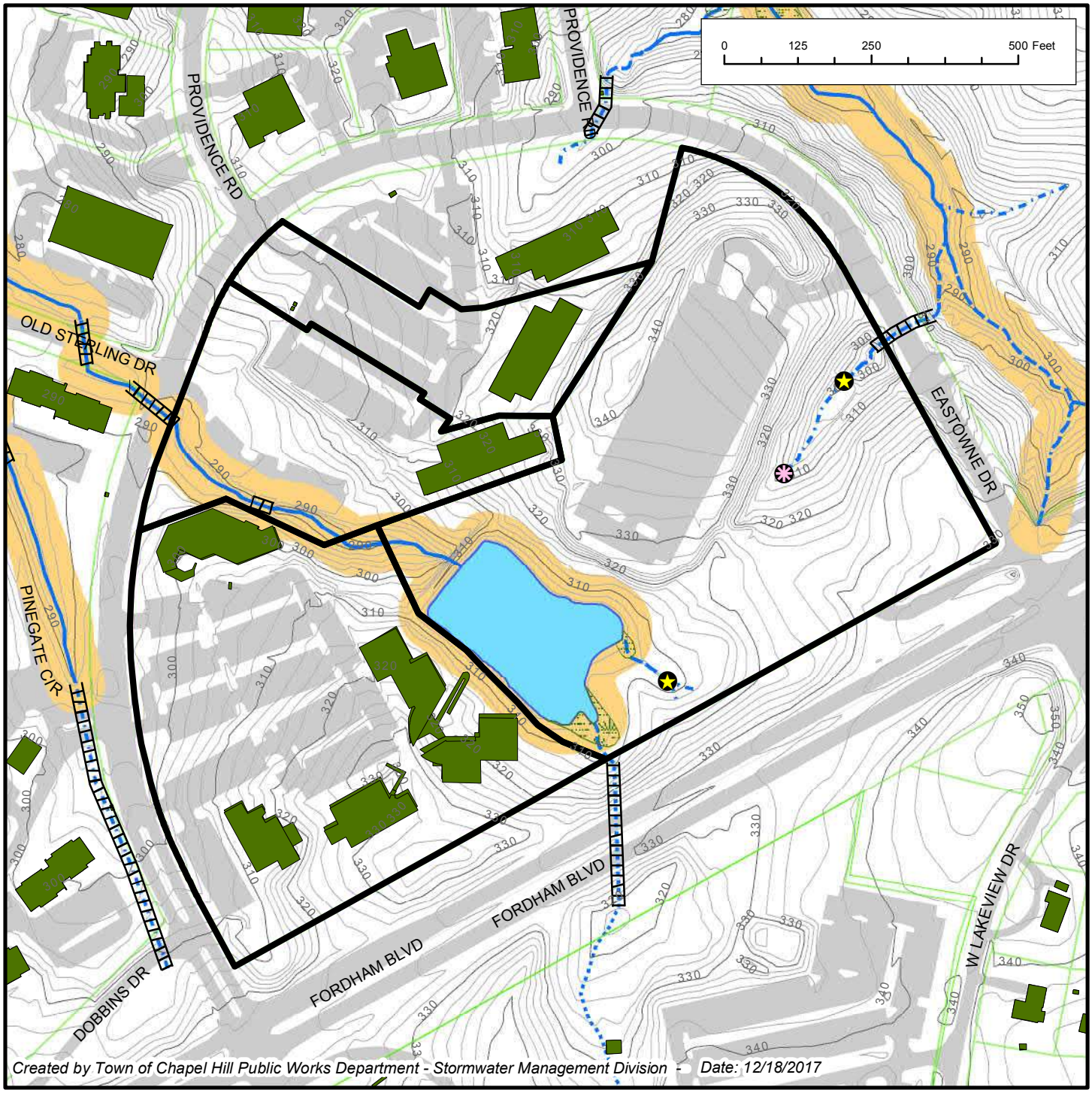
Address: 100, 600, 700 Eastowne Drive, Chapel Hill, NC

Parcel ID: 9890-80-7564, 9890-80-0195, 9890-80-0643, 9890-80-2764

Stream and wetland locations are approximate and must be verified by survey. Buffers are measured from top of bank. RCD buffers may apply. Please contact theTown of Chapel Hill Planning Department to verify.

N

1 inch = 245 feet



Created by Town of Chapel Hill Public Works Department - Stormwater Management Division - Date: 12/18/2017

Appendix H: Streams and Wetlands Photographs

Photo 1: Stream C lower section

Photo 2: Stream C upper section

Photo 3: Stream X

Photo 4: Stream X

Photo 5: Wetland A – Bottomland Hardwood Forest

Photo 6: Wetland C1 – Headwater Forest section facing away from pond edge

Photo 7: Wetland C2 – Emergent fringe at pond edge

Appendix I: NCSAM Forms & Results

NC SAM FIELD ASSESSMENT RESULTS
Accompanies User Manual Version 2.1

USACE AID #: NCDWR #:

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.

NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).

PROJECT/SITE INFORMATION:

1. Project name (if any): Eastowne Stream C - DS
2. Date of evaluation: 6/7/2019
3. Applicant/owner name: UNC Health Systems
4. Assessor name/organization: McAdams
5. County: Orange
6. Nearest named water body on USGS 7.5-minute quad: Dry Creek
7. River basin: Cape Fear
8. Site coordinates (decimal degrees, at lower end of assessment reach): 35.949499, -79.006413

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Stream C - DS
10. Length of assessment reach evaluated (feet): 390
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 0.4-0.5 ☐Unable to assess channel depth.
12. Channel width at top of bank (feet): 4-5
13. Is assessment reach a swamp steam? ☐Yes ☐No
14. Feature type: ☐Perennial flow ☒Intermittent flow ☐Tidal Marsh Stream

STREAM CATEGORY INFORMATION:

15. NC SAM Zone: ☐ Mountains (M) ☒ Piedmont (P) ☐ Inner Coastal Plain (I) ☐ Outer Coastal Plain (O)
16. Estimated geomorphic valley shape (**skip for Tidal Marsh Stream**):
☐A  (more sinuous stream, flatter valley slope)
☒B  (less sinuous stream, steeper valley slope)
17. Watershed size: **(skip for Tidal Marsh Stream**) ☒Size 1 (< 0.1 mi^2) ☐Size 2 (0.1 to < 0.5 mi^2) ☐Size 3 (0.5 to < 5 mi^2) ☐Size 4 (≥ 5 mi^2)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? ☒Yes ☐No If Yes, check all that apply to the assessment area.
☐Section 10 water ☐Classified Trout Waters ☒Water Supply Watershed (☐I ☐II ☐III ☐IV ☒V)
☐Essential Fish Habitat ☐Primary Nursery Area ☐ High Quality Waters/Outstanding Resource Waters
☐Publicly owned property ☒NCDWR Riparian buffer rule in effect ☒Nutrient Sensitive Waters
☐Anadromous fish ☐303(d) List ☐CAMA Area of Environmental Concern (AEC)
☐Documented presence of a federal and/or state listed protected species within the assessment area.
List species:
☐Designated Critical Habitat (list species)
19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? ☒Yes ☐No

1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)
☐A Water throughout assessment reach.
☒B No flow, water in pools only.
☐C No water in assessment reach.

2. Evidence of Flow Restriction – assessment reach metric
☒A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
☐B Not A

3. Feature Pattern – assessment reach metric
☐A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
☒B Not A

4. Feature Longitudinal Profile – assessment reach metric
☐A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
☒B Not A

5. Signs of Active Instability – assessment reach metric
Consider only current instability, not past events from which the stream has currently recovered. Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).
☒A < 10% of channel unstable
☐B 10 to 25% of channel unstable
☐C > 25% of channel unstable

6. Streamside Area Interaction – streamside area metric
Consider for the Left Bank (LB) and the Right Bank (RB).

LB	RB	
☒A	☐A	Little or no evidence of conditions that adversely affect reference interaction
☐B	☐B	Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
☐C	☒C	Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

7. Water Quality Stressors – assessment reach/intertidal zone metric
Check all that apply.

- ☐A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- ☒B Excessive sedimentation (burying of stream features or intertidal zone)
- ☐C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- ☐D Odor (not including natural sulfide odors)
- ☐E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- ☐F Livestock with access to stream or intertidal zone
- ☐G Excessive algae in stream or intertidal zone
- ☐H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- ☐I Other: _____ (explain in "Notes/Sketch" section)
- ☐J Little to no stressors

8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)
For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- ☐A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- ☐B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- ☒C No drought conditions

9. Large or Dangerous Stream – assessment reach metric
☐Yes ☒No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. Natural In-stream Habitat Types – assessment reach metric
10a. ☐Yes ☐No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) **(evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)**

10b. **Check all that occur** (occurs if > 5% coverage of assessment reach) **(skip for Size 4 Coastal Plain streams)**

- ☐A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- ☐B Multiple sticks and/or leaf packs and/or emergent vegetation
- ☐C Multiple snags and logs (including lap trees)
- ☐D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter
- ☒E Little or no habitat

Check for Tidal Marsh Streams Only

- ☐F 5% oysters or other natural hard bottoms
- ☐G Submerged aquatic vegetation
- ☐H Low-tide refugia (pools)
- ☐I Sand bottom
- ☐J 5% vertical bank along the marsh
- ☐K Little or no habitat

**************************************REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS************************************

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. ☐Yes ☒No Is assessment reach in a natural sand-bed stream? **(skip for Coastal Plain streams)**

11b. Bedform evaluated. **Check the appropriate box(es).**

- ☒A Riffle-run section **(evaluate 11c)**
- ☒B Pool-glide section **(evaluate 11d)**
- ☐C Natural bedform absent **(skip to Metric 12, Aquatic Life)**

11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. **Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**. Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
☒	☐	☐	☐	☐	Bedrock/saprolite
☒	☐	☐	☐	☐	Boulder (256 – 4096 mm)
☒	☐	☐	☐	☐	Cobble (64 – 256 mm)
☐	☒	☐	☐	☐	Gravel (2 – 64 mm)
☐	☒	☐	☐	☐	Sand (.062 – 2 mm)
☐	☐	☐	☐	☒	Silt/clay (< 0.062 mm)
☐	☒	☐	☐	☐	Detritus
☐	☒	☐	☐	☐	Artificial (rip-rap, concrete, etc.)

11d. ☐Yes ☒No Are pools filled with sediment? (**skip for Size 4 Coastal Plain streams and Tidal Marsh Streams**)

12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

12a. ☒Yes ☐No Was an in-stream aquatic life assessment performed as described in the User Manual?
If No, select one of the following reasons and skip to Metric 13. ☐No Water ☐Other: _____

12b. ☒Yes ☐No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

1	>1	Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams.
☐	☒	Adult frogs
☐	☐	Aquatic reptiles
☐	☐	Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
☐	☐	Beetles
☐	☐	Caddisfly larvae (T)
☐	☐	Asian clam (*Corbicula*)
☐	☐	Crustacean (isopod/amphipod/crayfish/shrimp)
☐	☐	Damselfly and dragonfly larvae
☐	☐	Dipterans
☐	☐	Mayfly larvae (E)
☐	☐	Megaloptera (alderfly, fishfly, dobsonfly larvae)
☐	☐	Midges/mosquito larvae
☐	☒	Mosquito fish (*Gambusia*) or mud minnows (*Umbra pygmaea*)
☐	☐	Mussels/Clams (not *Corbicula*)
☐	☐	Other fish
☐	☐	Salamanders/tadpoles
☐	☐	Snails
☐	☐	Stonefly larvae (P)
☐	☐	Tipulid larvae
☐	☐	Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
☐A	☐A	Little or no alteration to water storage capacity over a majority of the streamside area
☒B	☐B	Moderate alteration to water storage capacity over a majority of the streamside area
☐C	☒C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB	
☐A	☐A	Majority of streamside area with depressions able to pond water ≥ 6 inches deep
☐B	☐B	Majority of streamside area with depressions able to pond water 3 to 6 inches deep
☒C	☒C	Majority of streamside area with depressions able to pond water < 3 inches deep

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)
Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

LB	RB	
☐Y	☐Y	Are wetlands present in the streamside area?
☒N	☒N	

16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)
Check all contributors within the assessment reach or within view of <u>and</u> draining to the assessment reach.

☐A	Streams and/or springs (jurisdictional discharges)
☒B	Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
☐C	Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
☒D	Evidence of bank seepage or sweating (iron in water indicates seepage)
☒E	Stream bed or bank soil reduced (dig through deposited sediment if present)
☐F	None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)
Check all that apply.

☐A	Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
☒B	Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
☒C	Urban stream (≥ 24% impervious surface for watershed)
☒D	Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach
☐E	Assessment reach relocated to valley edge
☐F	None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)
Consider aspect. Consider "leaf-on" condition.

☐A	Stream shading is appropriate for stream category (may include gaps associated with natural processes)
☒B	Degraded (example: scattered trees)
☐C	Stream shading is gone or largely absent

19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams)
Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

Vegetated		Wooded		
LB	RB	LB	RB	
☐A	☐A	☐A	☐A	≥ 100 feet wide or extends to the edge of the watershed
☐B	☐B	☐B	☐B	From 50 to < 100 feet wide
☐C	☐C	☐C	☐C	From 30 to < 50 feet wide
☒D	☒D	☐D	☐D	From 10 to < 30 feet wide
☐E	☐E	☒E	☒E	< 10 feet wide or no trees

20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)
Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).

LB	RB	
☐A	☐A	Mature forest
☒B	☐B	Non-mature woody vegetation or modified vegetation structure
☐C	☒C	Herbaceous vegetation with or without a strip of trees < 10 feet wide
☐D	☐D	Maintained shrubs
☐E	☐E	Little or no vegetation

21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)
Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).
If none of the following stressors occurs on either bank, check here and skip to Metric 22: ☐

Abuts		< 30 feet		30-50 feet		
LB	RB	LB	RB	LB	RB	
☐A	☐A	☐A	☐A	☐A	☐A	Row crops
☐B	☒B	☐B	☐B	☐B	☐B	Maintained turf
☐C	☐C	☐C	☐C	☐C	☐C	Pasture (no livestock)/commercial horticulture
☐D	☐D	☐D	☐D	☐D	☐D	Pasture (active livestock use)

22. Stem Density – streamside area metric (skip for Tidal Marsh Streams)
Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).

LB	RB	
☒A	☐A	Medium to high stem density
☐B	☐B	Low stem density
☐C	☒C	No wooded riparian buffer or predominantly herbaceous species or bare ground

23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)
Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.

LB	RB	
☒A	☐A	The total length of buffer breaks is < 25 percent.
☐B	☐B	The total length of buffer breaks is between 25 and 50 percent.
☐C	☒C	The total length of buffer breaks is > 50 percent.

24. Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)
Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.

LB	RB	
☐A	☐A	Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
☒B	☐B	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
☐C	☒C	Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.

25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)
25a. ☐Yes ☒No Was conductivity measurement recorded?
If No, select one of the following reasons. ☐No Water ☐Other: _____

25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).
☐A < 46 ☐B 46 to < 67 ☐C 67 to < 79 ☐D 79 to < 230 ☐E ≥ 230

Notes/Sketch:
-evaluated reach includes Stream C downstream of utility easement crossing
-water in <10% of channel - only in upper part of reach evaluated
-riffles burried in sediment
-3-5 mosquito fish and several frogs observed

Draft NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name	Eastowne Stream C - DS	Date of Assessment	6/7/2019
Stream Category	Pb1	Assessor Name/Organization	McAdams

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	**MEDIUM**	**MEDIUM**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Flood Flow	**MEDIUM**	**MEDIUM**
(3) Streamside Area Attenuation	**LOW**	**LOW**
(4) Floodplain Access	**MEDIUM**	**MEDIUM**
(4) Wooded Riparian Buffer	**LOW**	**LOW**
(4) Microtopography	NA	NA
(3) Stream Stability	**HIGH**	**HIGH**
(4) Channel Stability	**HIGH**	**HIGH**
(4) Sediment Transport	**LOW**	**LOW**
(4) Stream Geomorphology	**HIGH**	**HIGH**
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	**LOW**	**LOW**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Streamside Area Vegetation	**LOW**	**LOW**
(3) Upland Pollutant Filtration	**LOW**	**LOW**
(3) Thermoregulation	**MEDIUM**	**MEDIUM**
(2) Indicators of Stressors	**NO**	**NO**
(2) Aquatic Life Tolerance	**LOW**	**NA**
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	**LOW**	**LOW**
(2) In-stream Habitat	**LOW**	**LOW**
(3) Baseflow	**MEDIUM**	**MEDIUM**
(3) Substrate	**LOW**	**LOW**
(3) Stream Stability	**HIGH**	**HIGH**
(3) In-stream Habitat	**LOW**	**LOW**
(2) Stream-side Habitat	**LOW**	**LOW**
(3) Stream-side Habitat	**LOW**	**LOW**
(3) Thermoregulation	**MEDIUM**	**MEDIUM**
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone	NA	NA
Overall	**LOW**	**LOW**

NC SAM FIELD ASSESSMENT RESULTS
Accompanies User Manual Version 2.1

USACE AID #: NCDWR #:

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.

NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).

PROJECT/SITE INFORMATION:

1. Project name (if any): Eastowne Stream C - US
2. Date of evaluation: 6/7/2019
3. Applicant/owner name: UNC Health Systems
4. Assessor name/organization: McAdams
5. County: Orange
6. Nearest named water body on USGS 7.5-minute quad: Dry Creek
7. River basin: Cape Fear
8. Site coordinates (decimal degrees, at lower end of assessment reach): 35.949562, -79.006820

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Stream C - US
10. Length of assessment reach evaluated (feet): 210
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 0.25-0.4 ☐Unable to assess channel depth.
12. Channel width at top of bank (feet): 4
13. Is assessment reach a swamp steam? ☐Yes ☐No
14. Feature type: ☐Perennial flow ☒Intermittent flow ☐Tidal Marsh Stream

STREAM CATEGORY INFORMATION:

15. NC SAM Zone: ☐ Mountains (M) ☒ Piedmont (P) ☐ Inner Coastal Plain (I) ☐ Outer Coastal Plain (O)
16. Estimated geomorphic valley shape (**skip for Tidal Marsh Stream**):
☐A  (more sinuous stream, flatter valley slope)
☒B  (less sinuous stream, steeper valley slope)
17. Watershed size: **(skip for Tidal Marsh Stream**) ☒Size 1 (< 0.1 mi^2) ☐Size 2 (0.1 to < 0.5 mi^2) ☐Size 3 (0.5 to < 5 mi^2) ☐Size 4 (≥ 5 mi^2)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? ☒Yes ☐No If Yes, check all that apply to the assessment area.
☐Section 10 water ☐Classified Trout Waters ☒Water Supply Watershed (☐I ☐II ☐III ☐IV ☒V)
☐Essential Fish Habitat ☐Primary Nursery Area ☐ High Quality Waters/Outstanding Resource Waters
☐Publicly owned property ☒NCDWR Riparian buffer rule in effect ☒Nutrient Sensitive Waters
☐Anadromous fish ☐303(d) List ☐CAMA Area of Environmental Concern (AEC)
☐Documented presence of a federal and/or state listed protected species within the assessment area.
List species:
☐Designated Critical Habitat (list species)
19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? ☒Yes ☐No

1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)
☒A Water throughout assessment reach.
☐B No flow, water in pools only.
☐C No water in assessment reach.

2. Evidence of Flow Restriction – assessment reach metric
☐A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
☒B Not A

3. Feature Pattern – assessment reach metric
☐A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
☒B Not A

4. Feature Longitudinal Profile – assessment reach metric
☒A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
☐B Not A

5. Signs of Active Instability – assessment reach metric
Consider only current instability, not past events from which the stream has currently recovered. Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).
☐A < 10% of channel unstable
☐B 10 to 25% of channel unstable
☒C > 25% of channel unstable

6. Streamside Area Interaction – streamside area metric
Consider for the Left Bank (LB) and the Right Bank (RB).

LB	RB	
☐A	☐A	Little or no evidence of conditions that adversely affect reference interaction
☒B	☒B	Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
☐C	☐C	Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

7. Water Quality Stressors – assessment reach/intertidal zone metric
Check all that apply.
☐A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
☐B Excessive sedimentation (burying of stream features or intertidal zone)
☐C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
☐D Odor (not including natural sulfide odors)
☐E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in “Notes/Sketch” section.
☐F Livestock with access to stream or intertidal zone
☐G Excessive algae in stream or intertidal zone
☐H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
☐I Other: ____________________ (explain in “Notes/Sketch” section)
☒J Little to no stressors

8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)
For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
☐A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
☐B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
☒C No drought conditions

9. Large or Dangerous Stream – assessment reach metric
☐Yes ☒No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. Natural In-stream Habitat Types – assessment reach metric
10a. ☐Yes ☐No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) **(evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)**

10b. **Check all that occur** (occurs if > 5% coverage of assessment reach) **(skip for Size 4 Coastal Plain streams)**
☐A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
☐B Multiple sticks and/or leaf packs and/or emergent vegetation
☐C Multiple snags and logs (including lap trees)
☒D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter
☐E Little or no habitat

Check for Tidal Marsh Streams Only
☐F 5% oysters or other natural hard bottoms
☐G Submerged aquatic vegetation
☐H Low-tide refugia (pools)
☐I Sand bottom
☐J 5% vertical bank along the marsh
☐K Little or no habitat

**************************************REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS********************************

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. ☐Yes ☒No Is assessment reach in a natural sand-bed stream? **(skip for Coastal Plain streams)**

11b. Bedform evaluated. **Check the appropriate box(es).**
☐A Riffle-run section **(evaluate 11c)**
☒B Pool-glide section **(evaluate 11d)**
☐C Natural bedform absent **(skip to Metric 12, Aquatic Life)**

11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. **Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**. Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
☒	☐	☐	☐	☐	Bedrock/saprolite
☒	☐	☐	☐	☐	Boulder (256 – 4096 mm)
☐	☒	☐	☐	☐	Cobble (64 – 256 mm)
☐	☒	☐	☐	☐	Gravel (2 – 64 mm)
☐	☐	☒	☐	☐	Sand (.062 – 2 mm)
☐	☐	☐	☒	☐	Silt/clay (< 0.062 mm)
☐	☒	☐	☐	☐	Detritus
☒	☐	☐	☐	☐	Artificial (rip-rap, concrete, etc.)

11d. ☐Yes ☒No Are pools filled with sediment? (**skip for Size 4 Coastal Plain streams and Tidal Marsh Streams**)

12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

12a. ☒Yes ☐No Was an in-stream aquatic life assessment performed as described in the User Manual?
If No, select one of the following reasons and skip to Metric 13. ☐No Water ☐Other: _____

12b. ☒Yes ☐No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

1	>1	Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams.
☐	☒	Adult frogs
☐	☐	Aquatic reptiles
☐	☐	Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
☐	☐	Beetles
☐	☐	Caddisfly larvae (T)
☐	☐	Asian clam (*Corbicula*)
☐	☐	Crustacean (isopod/amphipod/crayfish/shrimp)
☐	☐	Damselfly and dragonfly larvae
☐	☐	Dipterans
☐	☐	Mayfly larvae (E)
☐	☐	Megaloptera (alderfly, fishfly, dobsonfly larvae)
☐	☐	Midges/mosquito larvae
☐	☐	Mosquito fish (*Gambusia*) or mud minnows (*Umbra pygmaea*)
☐	☐	Mussels/Clams (not *Corbicula*)
☐	☐	Other fish
☐	☐	Salamanders/tadpoles
☐	☐	Snails
☐	☐	Stonefly larvae (P)
☐	☐	Tipulid larvae
☐	☐	Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
☐A	☐A	Little or no alteration to water storage capacity over a majority of the streamside area
☒B	☒B	Moderate alteration to water storage capacity over a majority of the streamside area
☐C	☐C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB	
☐A	☐A	Majority of streamside area with depressions able to pond water ≥ 6 inches deep
☐B	☐B	Majority of streamside area with depressions able to pond water 3 to 6 inches deep
☒C	☒C	Majority of streamside area with depressions able to pond water < 3 inches deep

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)
Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

LB	RB	
☐Y	☐Y	Are wetlands present in the streamside area?
☒N	☒N	

16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)
Check all contributors within the assessment reach or within view of <u>and</u> draining to the assessment reach.

☐A Streams and/or springs (jurisdictional discharges)
☒B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
☐C Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
☐D Evidence of bank seepage or sweating (iron in water indicates seepage)
☒E Stream bed or bank soil reduced (dig through deposited sediment if present)
☐F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)
Check all that apply.

☐A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
☒B Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
☒C Urban stream (≥ 24% impervious surface for watershed)
☐D Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach
☐E Assessment reach relocated to valley edge
☐F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)
Consider aspect. Consider "leaf-on" condition.

☒A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
☐B Degraded (example: scattered trees)
☐C Stream shading is gone or largely absent

19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams)
Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

Vegetated		Wooded		
LB	RB	LB	RB	
☐A	☐A	☐A	☐A	≥ 100 feet wide or extends to the edge of the watershed
☒B	☒B	☒B	☒B	From 50 to < 100 feet wide
☐C	☐C	☐C	☐C	From 30 to < 50 feet wide
☐D	☐D	☐D	☐D	From 10 to < 30 feet wide
☐E	☐E	☐E	☐E	< 10 feet wide or no trees

20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)
Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).

LB	RB	
☒A	☒A	Mature forest
☐B	☐B	Non-mature woody vegetation or modified vegetation structure
☐C	☐C	Herbaceous vegetation with or without a strip of trees < 10 feet wide
☐D	☐D	Maintained shrubs
☐E	☐E	Little or no vegetation

21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)
Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).
If none of the following stressors occurs on either bank, check here and skip to Metric 22: ☒

Abuts		< 30 feet		30-50 feet		
LB	RB	LB	RB	LB	RB	
☐A	☐A	☐A	☐A	☐A	☐A	Row crops
☐B	☒B	☐B	☐B	☐B	☐B	Maintained turf
☐C	☐C	☐C	☐C	☐C	☐C	Pasture (no livestock)/commercial horticulture
☐D	☐D	☐D	☐D	☐D	☐D	Pasture (active livestock use)

22. Stem Density – streamside area metric (skip for Tidal Marsh Streams)
Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).

LB	RB	
☒A	☒A	Medium to high stem density
☐B	☐B	Low stem density
☐C	☐C	No wooded riparian buffer or predominantly herbaceous species or bare ground

23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)
Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.

LB	RB	
☒A	☒A	The total length of buffer breaks is < 25 percent.
☐B	☐B	The total length of buffer breaks is between 25 and 50 percent.
☐C	☐C	The total length of buffer breaks is > 50 percent.

24. Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)
Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.

LB	RB	
☐A	☐A	Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
☐B	☒B	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
☒C	☐C	Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.

25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)
25a. ☐Yes ☒No Was conductivity measurement recorded?
If No, select one of the following reasons. ☐No Water ☐Other: _____

25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).
☐A < 46 ☐B 46 to < 67 ☐C 67 to < 79 ☐D 79 to < 230 ☐E ≥ 230

Notes/Sketch:
-evaluated reach includes Stream C upstream of utility easement crossing and downstream of pond dam
-very low flow to stagnant water throughout channel

Draft NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name	Eastowne Stream C - US	Date of Assessment	6/7/2019
Stream Category	Pb1	Assessor Name/Organization	McAdams

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	**MEDIUM**	**MEDIUM**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Flood Flow	**MEDIUM**	**MEDIUM**
(3) Streamside Area Attenuation	**MEDIUM**	**MEDIUM**
(4) Floodplain Access	**MEDIUM**	**MEDIUM**
(4) Wooded Riparian Buffer	**HIGH**	**HIGH**
(4) Microtopography	NA	NA
(3) Stream Stability	**MEDIUM**	**MEDIUM**
(4) Channel Stability	**LOW**	**LOW**
(4) Sediment Transport	**HIGH**	**HIGH**
(4) Stream Geomorphology	**MEDIUM**	**MEDIUM**
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	**LOW**	**LOW**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Streamside Area Vegetation	**MEDIUM**	**MEDIUM**
(3) Upland Pollutant Filtration	**MEDIUM**	**MEDIUM**
(3) Thermoregulation	**HIGH**	**HIGH**
(2) Indicators of Stressors	**NO**	**NO**
(2) Aquatic Life Tolerance	**LOW**	**NA**
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	**HIGH**	**HIGH**
(2) In-stream Habitat	**HIGH**	**HIGH**
(3) Baseflow	**MEDIUM**	**MEDIUM**
(3) Substrate	**HIGH**	**HIGH**
(3) Stream Stability	**LOW**	**LOW**
(3) In-stream Habitat	**HIGH**	**HIGH**
(2) Stream-side Habitat	**HIGH**	**HIGH**
(3) Stream-side Habitat	**HIGH**	**HIGH**
(3) Thermoregulation	**HIGH**	**HIGH**
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone	NA	NA
Overall	**MEDIUM**	**MEDIUM**

NC SAM FIELD ASSESSMENT RESULTS
Accompanies User Manual Version 2.1

USACE AID #: NCDWR #:

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.

NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).

PROJECT/SITE INFORMATION:

1. Project name (if any): Eastowne Stream X - DS
2. Date of evaluation: 6/11/2019
3. Applicant/owner name: UNC Health Systems
4. Assessor name/organization: McAdams
5. County: Orange
6. Nearest named water body on USGS 7.5-minute quad: Dry Creek
7. River basin: Cape Fear
8. Site coordinates (decimal degrees, at lower end of assessment reach): 35.951582, -79.003851

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Stream X - DS
10. Length of assessment reach evaluated (feet): 865
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 0.25 ☐Unable to assess channel depth.
12. Channel width at top of bank (feet): 4-5
13. Is assessment reach a swamp steam? ☐Yes ☐No
14. Feature type: ☐Perennial flow ☒Intermittent flow ☐Tidal Marsh Stream

STREAM CATEGORY INFORMATION:

15. NC SAM Zone: ☐ Mountains (M) ☒ Piedmont (P) ☐ Inner Coastal Plain (I) ☐ Outer Coastal Plain (O)
16. Estimated geomorphic valley shape (**skip for Tidal Marsh Stream**): ☒A  (more sinuous stream, flatter valley slope) ☐B  (less sinuous stream, steeper valley slope)
17. Watershed size: **(skip for Tidal Marsh Stream**) ☒Size 1 (< 0.1 mi^2) ☐Size 2 (0.1 to < 0.5 mi^2) ☐Size 3 (0.5 to < 5 mi^2) ☐Size 4 (≥ 5 mi^2)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? ☒Yes ☐No If Yes, check all that apply to the assessment area.
    - ☐Section 10 water
    - ☐Classified Trout Waters
    - ☒Water Supply Watershed (☐I ☐II ☐III ☐IV ☒V)
    - ☐Essential Fish Habitat
    - ☐Primary Nursery Area
    - ☐ High Quality Waters/Outstanding Resource Waters
    - ☐Publicly owned property
    - ☒NCDWR Riparian buffer rule in effect
    - ☒Nutrient Sensitive Waters
    - ☐Anadromous fish
    - ☐303(d) List
    - ☐CAMA Area of Environmental Concern (AEC)
    - ☐Documented presence of a federal and/or state listed protected species within the assessment area. List species:
    - ☐Designated Critical Habitat (list species)
19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? ☒Yes ☐No

1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

- ☒A Water throughout assessment reach.
- ☐B No flow, water in pools only.
- ☐C No water in assessment reach.

2. Evidence of Flow Restriction – assessment reach metric

- ☐A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
- ☒B Not A

3. Feature Pattern – assessment reach metric

- ☐A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
- ☒B Not A

4. Feature Longitudinal Profile – assessment reach metric

- ☐A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
- ☒B Not A

5. Signs of Active Instability – assessment reach metric

Consider only current instability, not past events from which the stream has currently recovered. Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

- ☒A < 10% of channel unstable
- ☐B 10 to 25% of channel unstable
- ☐C > 25% of channel unstable

6. Streamside Area Interaction – streamside area metric
Consider for the Left Bank (LB) and the Right Bank (RB).

LB	RB	
☒A	☒A	Little or no evidence of conditions that adversely affect reference interaction
☐B	☐B	Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
☐C	☐C	Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

7. Water Quality Stressors – assessment reach/intertidal zone metric
Check all that apply.

- ☐A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
- ☐B Excessive sedimentation (burying of stream features or intertidal zone)
- ☐C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
- ☐D Odor (not including natural sulfide odors)
- ☐E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
- ☐F Livestock with access to stream or intertidal zone
- ☐G Excessive algae in stream or intertidal zone
- ☐H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
- ☐I Other: _____ (explain in "Notes/Sketch" section)
- ☒J Little to no stressors

8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)
For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.

- ☐A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
- ☐B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
- ☒C No drought conditions

9. Large or Dangerous Stream – assessment reach metric
☐Yes ☒No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. Natural In-stream Habitat Types – assessment reach metric
10a. ☐Yes ☐No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) **(evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)**

10b. **Check all that occur** (occurs if > 5% coverage of assessment reach) **(skip for Size 4 Coastal Plain streams)**

- ☐A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
- ☒B Multiple sticks and/or leaf packs and/or emergent vegetation
- ☒C Multiple snags and logs (including lap trees)
- ☒D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter
- ☐E Little or no habitat

Check for Tidal Marsh Streams Only

- ☐F 5% oysters or other natural hard bottoms
- ☐G Submerged aquatic vegetation
- ☐H Low-tide refugia (pools)
- ☐I Sand bottom
- ☐J 5% vertical bank along the marsh
- ☐K Little or no habitat

**************************************REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS*********************************

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. ☒Yes ☐No Is assessment reach in a natural sand-bed stream? **(skip for Coastal Plain streams)**

11b. Bedform evaluated. **Check the appropriate box(es).**

- ☒A Riffle-run section **(evaluate 11c)**
- ☒B Pool-glide section **(evaluate 11d)**
- ☐C Natural bedform absent **(skip to Metric 12, Aquatic Life)**

11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. **Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**. Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
☐	☒	☐	☐	☐	Bedrock/saprolite
☒	☐	☐	☐	☐	Boulder (256 – 4096 mm)
☒	☐	☐	☐	☐	Cobble (64 – 256 mm)
☐	☒	☐	☐	☐	Gravel (2 – 64 mm)
☐	☐	☐	☒	☐	Sand (.062 – 2 mm)
☐	☐	☐	☒	☐	Silt/clay (< 0.062 mm)
☐	☒	☐	☐	☐	Detritus
☒	☐	☐	☐	☐	Artificial (rip-rap, concrete, etc.)

11d. ☐Yes ☒No Are pools filled with sediment? (**skip for Size 4 Coastal Plain streams and Tidal Marsh Streams**)

12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

12a. ☒Yes ☐No Was an in-stream aquatic life assessment performed as described in the User Manual?
If No, select one of the following reasons and skip to Metric 13. ☐No Water ☐Other: _____

12b. ☒Yes ☐No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

1	>1	Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams.
☒	☐	Adult frogs
☐	☐	Aquatic reptiles
☐	☐	Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
☐	☐	Beetles
☐	☐	Caddisfly larvae (T)
☐	☐	Asian clam (*Corbicula*)
☐	☐	Crustacean (isopod/amphipod/crayfish/shrimp)
☐	☐	Damselfly and dragonfly larvae
☐	☐	Dipterans
☐	☐	Mayfly larvae (E)
☐	☐	Megaloptera (alderfly, fishfly, dobsonfly larvae)
☐	☐	Midges/mosquito larvae
☐	☐	Mosquito fish (*Gambusia*) or mud minnows (*Umbra pygmaea*)
☐	☐	Mussels/Clams (not *Corbicula*)
☐	☐	Other fish
☐	☐	Salamanders/tadpoles
☐	☐	Snails
☐	☐	Stonefly larvae (P)
☐	☐	Tipulid larvae
☐	☐	Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
☒A	☒A	Little or no alteration to water storage capacity over a majority of the streamside area
☐B	☐B	Moderate alteration to water storage capacity over a majority of the streamside area
☐C	☐C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB	
☐A	☐A	Majority of streamside area with depressions able to pond water ≥ 6 inches deep
☒B	☒B	Majority of streamside area with depressions able to pond water 3 to 6 inches deep
☐C	☐C	Majority of streamside area with depressions able to pond water < 3 inches deep

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)
Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

LB	RB	
☐Y	☐Y	Are wetlands present in the streamside area?
☒N	☒N	

16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)
Check all contributors within the assessment reach or within view of <u>and</u> draining to the assessment reach.

- ☐A Streams and/or springs (jurisdictional discharges)
- ☐B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- ☐C Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- ☒D Evidence of bank seepage or sweating (iron in water indicates seepage)
- ☒E Stream bed or bank soil reduced (dig through deposited sediment if present)
- ☐F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)
Check all that apply.

- ☐A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- ☐B Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- ☒C Urban stream (≥ 24% impervious surface for watershed)
- ☐D Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach
- ☐E Assessment reach relocated to valley edge
- ☐F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)
Consider aspect. Consider "leaf-on" condition.

- ☒A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- ☐B Degraded (example: scattered trees)
- ☐C Stream shading is gone or largely absent

19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams)
Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

Vegetated LB	Vegetated RB	Wooded LB	Wooded RB	
☒A	☒A	☒A	☒A	≥ 100 feet wide or extends to the edge of the watershed
☐B	☐B	☐B	☐B	From 50 to < 100 feet wide
☐C	☐C	☐C	☐C	From 30 to < 50 feet wide
☐D	☐D	☐D	☐D	From 10 to < 30 feet wide
☐E	☐E	☐E	☐E	< 10 feet wide or no trees

20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)
Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).

LB	RB	
☒A	☒A	Mature forest
☐B	☐B	Non-mature woody vegetation or modified vegetation structure
☐C	☐C	Herbaceous vegetation with or without a strip of trees < 10 feet wide
☐D	☐D	Maintained shrubs
☐E	☐E	Little or no vegetation

21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)
Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).
If none of the following stressors occurs on either bank, check here and skip to Metric 22: ☒

Abuts LB	Abuts RB	< 30 feet LB	< 30 feet RB	30-50 feet LB	30-50 feet RB	
☐A	☐A	☐A	☐A	☐A	☐A	Row crops
☐B	☒B	☐B	☐B	☐B	☐B	Maintained turf
☐C	☐C	☐C	☐C	☐C	☐C	Pasture (no livestock)/commercial horticulture
☐D	☐D	☐D	☐D	☐D	☐D	Pasture (active livestock use)

22. Stem Density – streamside area metric (skip for Tidal Marsh Streams)
Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).

LB	RB	
☒A	☒A	Medium to high stem density
☐B	☐B	Low stem density
☐C	☐C	No wooded riparian buffer or predominantly herbaceous species or bare ground

23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)
Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.

LB	RB	
☒A	☒A	The total length of buffer breaks is < 25 percent.
☐B	☐B	The total length of buffer breaks is between 25 and 50 percent.
☐C	☐C	The total length of buffer breaks is > 50 percent.

24. Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)
Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.

LB	RB	
☒A	☒A	Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
☐B	☐B	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
☐C	☐C	Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.

25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)
25a. ☐Yes ☒No Was conductivity measurement recorded?
If No, select one of the following reasons. ☐No Water ☐Other: _____

25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).
☐A < 46 ☐B 46 to < 67 ☐C 67 to < 79 ☐D 79 to < 230 ☐E ≥ 230

Notes/Sketch:
-bedform absent in riffle/run sections
-the site experienced heavy rain on 6/8/2019

Draft NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name	Eastowne Stream X - DS	Date of Assessment	6/11/2019
Stream Category	Pa1	Assessor Name/Organization	McAdams

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	**HIGH**	**HIGH**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Flood Flow	**HIGH**	**HIGH**
(3) Streamside Area Attenuation	**HIGH**	**HIGH**
(4) Floodplain Access	**HIGH**	**HIGH**
(4) Wooded Riparian Buffer	**HIGH**	**HIGH**
(4) Microtopography	**HIGH**	**HIGH**
(3) Stream Stability	**HIGH**	**HIGH**
(4) Channel Stability	**HIGH**	**HIGH**
(4) Sediment Transport	**HIGH**	**HIGH**
(4) Stream Geomorphology	**HIGH**	**HIGH**
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	**LOW**	**LOW**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Streamside Area Vegetation	**MEDIUM**	**MEDIUM**
(3) Upland Pollutant Filtration	**MEDIUM**	**MEDIUM**
(3) Thermoregulation	**HIGH**	**HIGH**
(2) Indicators of Stressors	**NO**	**NO**
(2) Aquatic Life Tolerance	**LOW**	**NA**
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	**HIGH**	**HIGH**
(2) In-stream Habitat	**MEDIUM**	**MEDIUM**
(3) Baseflow	**MEDIUM**	**MEDIUM**
(3) Substrate	**LOW**	**LOW**
(3) Stream Stability	**HIGH**	**HIGH**
(3) In-stream Habitat	**HIGH**	**HIGH**
(2) Stream-side Habitat	**HIGH**	**HIGH**
(3) Stream-side Habitat	**HIGH**	**HIGH**
(3) Thermoregulation	**HIGH**	**HIGH**
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone	NA	NA
Overall	**HIGH**	**HIGH**

NC SAM FIELD ASSESSMENT RESULTS
Accompanies User Manual Version 2.1

USACE AID #: NCDWR #:

INSTRUCTIONS: Attach a sketch of the assessment area and photographs. Attach a copy of the USGS 7.5-minute topographic quadrangle, and circle the location of the stream reach under evaluation. If multiple stream reaches will be evaluated on the same property, identify and number all reaches on the attached map, and include a separate form for each reach. See the NC SAM User Manual for detailed descriptions and explanations of requested information. Record in the "Notes/Sketch" section if supplementary measurements were performed. See the NC SAM User Manual for examples of additional measurements that may be relevant.

NOTE EVIDENCE OF STRESSORS AFFECTING THE ASSESSMENT AREA (do not need to be within the assessment area).

PROJECT/SITE INFORMATION:

1. Project name (if any): Eastowne Stream X - US
2. Date of evaluation: 6/11/2019
3. Applicant/owner name: UNC Health Systems
4. Assessor name/organization: McAdams
5. County: Orange
6. Nearest named water body on USGS 7.5-minute quad: Dry Creek
7. River basin: Cape Fear
8. Site coordinates (decimal degrees, at lower end of assessment reach): 35.950503, -79.002960

STREAM INFORMATION: (depth and width can be approximations)

9. Site number (show on attached map): Stream X - US
10. Length of assessment reach evaluated (feet): 425
11. Channel depth from bed (in riffle, if present) to top of bank (feet): 0.25 ☐Unable to assess channel depth.
12. Channel width at top of bank (feet): 3-4
13. Is assessment reach a swamp steam? ☐Yes ☐No
14. Feature type: ☐Perennial flow ☒Intermittent flow ☐Tidal Marsh Stream

STREAM CATEGORY INFORMATION:

15. NC SAM Zone: ☐ Mountains (M) ☒ Piedmont (P) ☐ Inner Coastal Plain (I) ☐ Outer Coastal Plain (O)
16. Estimated geomorphic valley shape (**skip for Tidal Marsh Stream**):
☒A  (more sinuous stream, flatter valley slope)
☐B  (less sinuous stream, steeper valley slope)
17. Watershed size: **(skip for Tidal Marsh Stream**) ☒Size 1 (< 0.1 mi^2) ☐Size 2 (0.1 to < 0.5 mi^2) ☐Size 3 (0.5 to < 5 mi^2) ☐Size 4 (≥ 5 mi^2)

ADDITIONAL INFORMATION:

18. Were regulatory considerations evaluated? ☒Yes ☐No If Yes, check all that apply to the assessment area.

☐Section 10 water	☐Classified Trout Waters	☒Water Supply Watershed (☐I ☐II ☐III ☐IV ☒V)
☐Essential Fish Habitat	☐Primary Nursery Area	☐ High Quality Waters/Outstanding Resource Waters
☐Publicly owned property	☒NCDWR Riparian buffer rule in effect	☒Nutrient Sensitive Waters
☐Anadromous fish	☐303(d) List	☐CAMA Area of Environmental Concern (AEC)

☐Documented presence of a federal and/or state listed protected species within the assessment area.
List species:
☐Designated Critical Habitat (list species)

19. Are additional stream information/supplementary measurements included in "Notes/Sketch" section or attached? ☒Yes ☐No

1. Channel Water – assessment reach metric (skip for Size 1 streams and Tidal Marsh Streams)

☐A Water throughout assessment reach.
☒B No flow, water in pools only.
☐C No water in assessment reach.

2. Evidence of Flow Restriction – assessment reach metric

☐A At least 10% of assessment reach in-stream habitat or riffle-pool sequence is severely affected by a flow restriction or fill to the point of obstructing flow or a channel choked with aquatic macrophytes or ponded water or impoundment on flood or ebb within the assessment reach (examples: undersized or perched culverts, causeways that constrict the channel, tidal gates, debris jams, beaver dams).
☒B Not A

3. Feature Pattern – assessment reach metric

☐A A majority of the assessment reach has altered pattern (examples: straightening, modification above or below culvert).
☒B Not A

4. Feature Longitudinal Profile – assessment reach metric

☐A Majority of assessment reach has a substantially altered stream profile (examples: channel down-cutting, existing damming, over widening, active aggradation, dredging, and excavation where appropriate channel profile has not reformed from any of these disturbances).
☒B Not A

5. Signs of Active Instability – assessment reach metric

Consider only current instability, not past events from which the stream has currently recovered. Examples of instability include active bank failure, active channel down-cutting (head-cut), active widening, and artificial hardening (such as concrete, gabion, rip-rap).

☒A < 10% of channel unstable
☐B 10 to 25% of channel unstable
☐C > 25% of channel unstable

6. Streamside Area Interaction – streamside area metric
Consider for the Left Bank (LB) and the Right Bank (RB).

LB	RB	
☒A	☒A	Little or no evidence of conditions that adversely affect reference interaction
☐B	☐B	Moderate evidence of conditions (examples: berms, levees, down-cutting, aggradation, dredging) that adversely affect reference interaction (examples: limited streamside area access, disruption of flood flows through streamside area, leaky or intermittent bulkheads, causeways with floodplain constriction, minor ditching [including mosquito ditching])
☐C	☐C	Extensive evidence of conditions that adversely affect reference interaction (little to no floodplain/intertidal zone access [examples: causeways with floodplain and channel constriction, bulkheads, retaining walls, fill, stream incision, disruption of flood flows through streamside area] or too much floodplain/intertidal zone access [examples: impoundments, intensive mosquito ditching]) or floodplain/intertidal zone unnaturally absent or assessment reach is a man-made feature on an interstream divide

7. Water Quality Stressors – assessment reach/intertidal zone metric
Check all that apply.
☐A Discolored water in stream or intertidal zone (milky white, blue, unnatural water discoloration, oil sheen, stream foam)
☐B Excessive sedimentation (burying of stream features or intertidal zone)
☐C Noticeable evidence of pollutant discharges entering the assessment reach and causing a water quality problem
☐D Odor (not including natural sulfide odors)
☐E Current published or collected data indicating degraded water quality in the assessment reach. Cite source in "Notes/Sketch" section.
☐F Livestock with access to stream or intertidal zone
☐G Excessive algae in stream or intertidal zone
☐H Degraded marsh vegetation in the intertidal zone (removal, burning, regular mowing, destruction, etc)
☐I Other: ____________________ (explain in "Notes/Sketch" section)
☒J Little to no stressors

8. Recent Weather – watershed metric (skip for Tidal Marsh Streams)
For Size 1 or 2 streams, D1 drought or higher is considered a drought; for Size 3 or 4 streams, D2 drought or higher is considered a drought.
☐A Drought conditions and no rainfall or rainfall not exceeding 1 inch within the last 48 hours
☐B Drought conditions and rainfall exceeding 1 inch within the last 48 hours
☒C No drought conditions

9. Large or Dangerous Stream – assessment reach metric
☐Yes ☒No Is stream is too large or dangerous to assess? If Yes, skip to Metric 13 (Streamside Area Ground Surface Condition).

10. Natural In-stream Habitat Types – assessment reach metric
10a. ☐Yes ☐No Degraded in-stream habitat over majority of the assessment reach (examples of stressors include excessive sedimentation, mining, excavation, in-stream hardening [for example, rip-rap], recent dredging, and snagging) **(evaluate for Size 4 Coastal Plain streams only, then skip to Metric 12)**

10b. **Check all that occur** (occurs if > 5% coverage of assessment reach) **(skip for Size 4 Coastal Plain streams)**
☐A Multiple aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
☒B Multiple sticks and/or leaf packs and/or emergent vegetation
☐C Multiple snags and logs (including lap trees)
☒D 5% undercut banks and/or root mats and/or roots in banks extend to the normal wetted perimeter
☐E Little or no habitat

Check for Tidal Marsh Streams Only
☐F 5% oysters or other natural hard bottoms
☐G Submerged aquatic vegetation
☐H Low-tide refugia (pools)
☐I Sand bottom
☐J 5% vertical bank along the marsh
☐K Little or no habitat

**********************************REMAINING QUESTIONS ARE NOT APPLICABLE FOR TIDAL MARSH STREAMS******************************

11. Bedform and Substrate – assessment reach metric (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)

11a. ☒Yes ☐No Is assessment reach in a natural sand-bed stream? **(skip for Coastal Plain streams)**

11b. Bedform evaluated. **Check the appropriate box(es).**
☒A Riffle-run section **(evaluate 11c)**
☒B Pool-glide section **(evaluate 11d)**
☐C Natural bedform absent **(skip to Metric 12, Aquatic Life)**

11c. In riffle sections, check all that occur below the normal wetted perimeter of the assessment reach – whether or not submerged. **Check at least one box in each row (skip for Size 4 Coastal Plain streams and Tidal Marsh Streams)**. Not Present (NP) = absent, Rare (R) = present but ≤ 10%, Common (C) = > 10-40%, Abundant (A) = > 40-70%, Predominant (P) = > 70%. Cumulative percentages should not exceed 100% for each assessment reach.

NP	R	C	A	P	
☒	☐	☐	☐	☐	Bedrock/saprolite
☒	☐	☐	☐	☐	Boulder (256 – 4096 mm)
☒	☐	☐	☐	☐	Cobble (64 – 256 mm)
☒	☐	☐	☐	☐	Gravel (2 – 64 mm)
☐	☐	☐	☒	☐	Sand (.062 – 2 mm)
☐	☐	☐	☒	☐	Silt/clay (< 0.062 mm)
☐	☒	☐	☐	☐	Detritus
☒	☐	☐	☐	☐	Artificial (rip-rap, concrete, etc.)

11d. ☐Yes ☒No Are pools filled with sediment? (**skip for Size 4 Coastal Plain streams and Tidal Marsh Streams**)

12. Aquatic Life – assessment reach metric (skip for Tidal Marsh Streams)

12a. ☒Yes ☐No Was an in-stream aquatic life assessment performed as described in the User Manual?
If No, select one of the following reasons and skip to Metric 13. ☐No Water ☐Other: _____

12b. ☒Yes ☐No Are aquatic organisms present in the assessment reach (look in riffles, pools, then snags)? If Yes, check all that apply. If No, skip to Metric 13.

1	>1	Numbers over columns refer to "individuals" for Size 1 and 2 streams and "taxa" for Size 3 and 4 streams.
☒	☐	Adult frogs
☐	☐	Aquatic reptiles
☐	☐	Aquatic macrophytes and aquatic mosses (include liverworts, lichens, and algal mats)
☐	☐	Beetles
☐	☐	Caddisfly larvae (T)
☐	☐	Asian clam (*Corbicula*)
☐	☐	Crustacean (isopod/amphipod/crayfish/shrimp)
☐	☐	Damselfly and dragonfly larvae
☐	☐	Dipterans
☐	☐	Mayfly larvae (E)
☐	☐	Megaloptera (alderfly, fishfly, dobsonfly larvae)
☐	☐	Midges/mosquito larvae
☐	☐	Mosquito fish (*Gambusia*) or mud minnows (*Umbra pygmaea*)
☐	☐	Mussels/Clams (not *Corbicula*)
☐	☐	Other fish
☐	☐	Salamanders/tadpoles
☐	☐	Snails
☐	☐	Stonefly larvae (P)
☐	☐	Tipulid larvae
☐	☐	Worms/leeches

13. Streamside Area Ground Surface Condition – streamside area metric (skip for Tidal Marsh Streams and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB). Consider storage capacity with regard to both overbank flow and upland runoff.

LB	RB	
☒A	☒A	Little or no alteration to water storage capacity over a majority of the streamside area
☐B	☐B	Moderate alteration to water storage capacity over a majority of the streamside area
☐C	☐C	Severe alteration to water storage capacity over a majority of the streamside area (examples: ditches, fill, soil compaction, livestock disturbance, buildings, man-made levees, drainage pipes)

14. Streamside Area Water Storage – streamside area metric (skip for Size 1 streams, Tidal Marsh Streams, and B valley types)
Consider for the Left Bank (LB) and the Right Bank (RB) of the streamside area.

LB	RB	
☐A	☐A	Majority of streamside area with depressions able to pond water ≥ 6 inches deep
☐B	☐B	Majority of streamside area with depressions able to pond water 3 to 6 inches deep
☒C	☒C	Majority of streamside area with depressions able to pond water < 3 inches deep

15. Wetland Presence – streamside area metric (skip for Tidal Marsh Streams)
Consider for the Left Bank (LB) and the Right Bank (RB). Do not consider wetlands outside of the streamside area or within the normal wetted perimeter of assessment reach.

LB	RB	
☐Y	☐Y	Are wetlands present in the streamside area?
☒N	☒N	

16. Baseflow Contributors – assessment reach metric (skip for Size 4 streams and Tidal Marsh Streams)
Check all contributors within the assessment reach or within view of <u>and</u> draining to the assessment reach.

- ☐A Streams and/or springs (jurisdictional discharges)
- ☐B Ponds (include wet detention basins; do not include sediment basins or dry detention basins)
- ☐C Obstruction passing flow during low-flow periods within the assessment area (beaver dam, leaky dam, bottom-release dam, weir)
- ☒D Evidence of bank seepage or sweating (iron in water indicates seepage)
- ☒E Stream bed or bank soil reduced (dig through deposited sediment if present)
- ☐F None of the above

17. Baseflow Detractors – assessment area metric (skip for Tidal Marsh Streams)
Check all that apply.

- ☐A Evidence of substantial water withdrawals from the assessment reach (includes areas excavated for pump installation)
- ☐B Obstruction not passing flow during low-flow periods affecting the assessment reach (ex: watertight dam, sediment deposit)
- ☒C Urban stream (≥ 24% impervious surface for watershed)
- ☐D Evidence that the streamside area has been modified resulting in accelerated drainage into the assessment reach
- ☐E Assessment reach relocated to valley edge
- ☐F None of the above

18. Shading – assessment reach metric (skip for Tidal Marsh Streams)
Consider aspect. Consider "leaf-on" condition.

- ☒A Stream shading is appropriate for stream category (may include gaps associated with natural processes)
- ☐B Degraded (example: scattered trees)
- ☐C Stream shading is gone or largely absent

19. Buffer Width – streamside area metric (skip for Tidal Marsh Streams)
Consider "vegetated buffer" and "wooded buffer" separately for left bank (LB) and right bank (RB) starting at the top of bank out to the first break.

Vegetated		Wooded		
LB	RB	LB	RB	
☒A	☐A	☒A	☐A	≥ 100 feet wide or extends to the edge of the watershed
☐B	☒B	☐B	☒B	From 50 to < 100 feet wide
☐C	☐C	☐C	☐C	From 30 to < 50 feet wide
☐D	☐D	☐D	☐D	From 10 to < 30 feet wide
☐E	☐E	☐E	☐E	< 10 feet wide or no trees

20. Buffer Structure – streamside area metric (skip for Tidal Marsh Streams)
Consider for left bank (LB) and right bank (RB) for Metric 19 ("Vegetated" Buffer Width).

LB	RB	
☒A	☒A	Mature forest
☐B	☐B	Non-mature woody vegetation or modified vegetation structure
☐C	☐C	Herbaceous vegetation with or without a strip of trees < 10 feet wide
☐D	☐D	Maintained shrubs
☐E	☐E	Little or no vegetation

21. Buffer Stressors – streamside area metric (skip for Tidal Marsh Streams)
Check all appropriate boxes for left bank (LB) and right bank (RB). Indicate if listed stressor abuts stream (Abuts), does not abut but is within 30 feet of stream (< 30 feet), or is between 30 to 50 feet of stream (30-50 feet).
If none of the following stressors occurs on either bank, check here and skip to Metric 22: ☒

Abuts		< 30 feet		30-50 feet		
LB	RB	LB	RB	LB	RB	
☐A	☐A	☐A	☐A	☐A	☐A	Row crops
☐B	☒B	☐B	☐B	☐B	☐B	Maintained turf
☐C	☐C	☐C	☐C	☐C	☐C	Pasture (no livestock)/commercial horticulture
☐D	☐D	☐D	☐D	☐D	☐D	Pasture (active livestock use)

22. Stem Density – streamside area metric (skip for Tidal Marsh Streams)
Consider for left bank (LB) and right bank (RB) for Metric 19 ("Wooded" Buffer Width).

LB	RB	
☒A	☒A	Medium to high stem density
☐B	☐B	Low stem density
☐C	☐C	No wooded riparian buffer or predominantly herbaceous species or bare ground

23. Continuity of Vegetated Buffer – streamside area metric (skip for Tidal Marsh Streams)
Consider whether vegetated buffer is continuous along stream (parallel). Breaks are areas lacking vegetation > 10 feet wide.

LB	RB	
☒A	☒A	The total length of buffer breaks is < 25 percent.
☐B	☐B	The total length of buffer breaks is between 25 and 50 percent.
☐C	☐C	The total length of buffer breaks is > 50 percent.

24. Vegetative Composition – streamside area metric (skip for Tidal Marsh Streams)
Evaluate the dominant vegetation within 100 feet of each bank or to the edge of the watershed (whichever comes first) as it contributes to assessment reach habitat.

LB	RB	
☐A	☐A	Vegetation is close to undisturbed in species present and their proportions. Lower strata composed of native species, with non-native invasive species absent or sparse.
☒B	☒B	Vegetation indicates disturbance in terms of species diversity or proportions, but is still largely composed of native species. This may include communities of weedy native species that develop after clear-cutting or clearing or communities with non-native invasive species present, but not dominant, over a large portion of the expected strata or communities missing understory but retaining canopy trees.
☐C	☐C	Vegetation is severely disturbed in terms of species diversity or proportions. Mature canopy is absent or communities with non-native invasive species dominant over a large portion of expected strata or communities composed of planted stands of non-characteristic species or communities inappropriately composed of a single species or no vegetation.

25. Conductivity – assessment reach metric (skip for all Coastal Plain streams)
25a. ☐Yes ☒No Was conductivity measurement recorded?
If No, select one of the following reasons. ☐No Water ☐Other: _____

25b. Check the box corresponding to the conductivity measurement (units of microsiemens per centimeter).
☐A < 46 ☐B 46 to < 67 ☐C 67 to < 79 ☐D 79 to < 230 ☐E ≥ 230

Notes/Sketch:
-channel structure alternates between sections with undercut banks and pool-glide structure and sections with no bed and bank structure
-there are old road beds on both side of the channel and there are invasive species growing adjacent to the channel
-the site experienced heavy rain on 6/8/2019

Draft NC SAM Stream Rating Sheet
Accompanies User Manual Version 2.1

Stream Site Name	Eastowne Stream X - US	Date of Assessment	6/11/2019
Stream Category	Pa1	Assessor Name/Organization	McAdams

Notes of Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Additional stream information/supplementary measurements included (Y/N)	YES
NC SAM feature type (perennial, intermittent, Tidal Marsh Stream)	Intermittent

Function Class Rating Summary	USACE/ All Streams	NCDWR Intermittent
(1) Hydrology	**HIGH**	**HIGH**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Flood Flow	**HIGH**	**HIGH**
(3) Streamside Area Attenuation	**HIGH**	**HIGH**
(4) Floodplain Access	**HIGH**	**HIGH**
(4) Wooded Riparian Buffer	**HIGH**	**HIGH**
(4) Microtopography	**HIGH**	**HIGH**
(3) Stream Stability	**HIGH**	**HIGH**
(4) Channel Stability	**HIGH**	**HIGH**
(4) Sediment Transport	**HIGH**	**HIGH**
(4) Stream Geomorphology	**HIGH**	**HIGH**
(2) Stream/Intertidal Zone Interaction	NA	NA
(2) Longitudinal Tidal Flow	NA	NA
(2) Tidal Marsh Stream Stability	NA	NA
(3) Tidal Marsh Channel Stability	NA	NA
(3) Tidal Marsh Stream Geomorphology	NA	NA
(1) Water Quality	**LOW**	**LOW**
(2) Baseflow	**MEDIUM**	**MEDIUM**
(2) Streamside Area Vegetation	**MEDIUM**	**MEDIUM**
(3) Upland Pollutant Filtration	**MEDIUM**	**MEDIUM**
(3) Thermoregulation	**HIGH**	**HIGH**
(2) Indicators of Stressors	**NO**	**NO**
(2) Aquatic Life Tolerance	**LOW**	**NA**
(2) Intertidal Zone Filtration	NA	NA
(1) Habitat	**LOW**	**HIGH**
(2) In-stream Habitat	**LOW**	**MEDIUM**
(3) Baseflow	**MEDIUM**	**MEDIUM**
(3) Substrate	**LOW**	**LOW**
(3) Stream Stability	**HIGH**	**HIGH**
(3) In-stream Habitat	**MEDIUM**	**HIGH**
(2) Stream-side Habitat	**HIGH**	**HIGH**
(3) Stream-side Habitat	**HIGH**	**HIGH**
(3) Thermoregulation	**HIGH**	**HIGH**
(2) Tidal Marsh In-stream Habitat	NA	NA
(3) Flow Restriction	NA	NA
(3) Tidal Marsh Stream Stability	NA	NA
(4) Tidal Marsh Channel Stability	NA	NA
(4) Tidal Marsh Stream Geomorphology	NA	NA
(3) Tidal Marsh In-stream Habitat	NA	NA
(2) Intertidal Zone	NA	NA
Overall	**LOW**	**HIGH**

Appendix J: NCWAM Forms & Results

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #		NCDWR#	
Project Name	Eastowne	Date of Evaluation	06/11/19
Applicant/Owner Name	UNC Health	Wetland Site Name	Wetland A
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	K. Roth & J. Burdette
Level III Ecoregion	Piedmont	Nearest Named Water Body	Clark Lake
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030002
County	Orange	NCDWR Region	Raleigh
☐ Yes ☒ No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.953952, -79.003303

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☐ Yes ☒ No

Regulatory Considerations - Were regulatory considerations evaluated? ☒Yes ☐No If Yes, check all that apply to the assessment area.

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☒ NCDWR riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☒ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☒ Yes ☐ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
☒A	☒A	Not severely altered
☐B	☐B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☒A	☒A	Water storage capacity and duration are not altered.
☐B	☐B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐C	☐C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐A	☐A	Majority of wetland with depressions able to pond water > 1 deep
	☐B	☐B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☒C	☒C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☐D	☐D	Depressions able to pond water < 3 inches deep

3b. ☐A Evidence that maximum depth of inundation is greater than 2 feet
☒B Evidence that maximum depth of inundation is between 1 and 2 feet
☐C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐A Sandy soil
- ☒B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐C Loamy or clayey soils not exhibiting redoximorphic features
- ☐D Loamy or clayey gleyed soil
- ☐E Histosol or histic epipedon

4b.
- ☒A Soil ribbon < 1 inch
- ☐B Soil ribbon ≥ 1 inch

4c.
- ☒A No peat or muck presence
- ☐B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☒A	☒A	Little or no evidence of pollutants or discharges entering the assessment area
☐B	☐B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐C	☐C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

WS	5M	2M	
☒A	☒A	☒A	≥ 10% impervious surfaces
☐B	☐B	☐B	Confined animal operations (or other local, concentrated source of pollutants
☐C	☐C	☐C	≥ 20% coverage of pasture
☐D	☐D	☐D	≥ 20% coverage of agricultural land (regularly plowed land)
☐E	☐E	☐E	≥ 20% coverage of maintained grass/herb
☐F	☐F	☐F	≥ 20% coverage of clear-cut land
☐G	☐G	☐G	Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

7a. Is assessment area within 50 feet of a tributary or other open water?
☒Yes ☐No If Yes, continue to 7b. If No, skip to Metric 8.
Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the .water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- ☐A ≥ 50 feet
- ☒B From 30 to < 50 feet
- ☐C From 15 to < 30 feet
- ☐D From 5 to < 15 feet
- ☐E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
☒≤ 15-feet wide ☐> 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
☐Yes ☒No

7e. Is stream or other open water sheltered or exposed?
☒Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
☐Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐A	☐A	≥ 100 feet
☐B	☐B	From 80 to < 100 feet
☐C	☐C	From 50 to < 80 feet
☐D	☒D	From 40 to < 50 feet
☐E	☐E	From 30 to < 40 feet
☐F	☐F	From 15 to < 30 feet
☐G	☐G	From 5 to < 15 feet
☐H	☐H	< 5 feet

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

☒A Evidence of short-duration inundation (< 7 consecutive days)
☐B Evidence of saturation, without evidence of inundation
☐C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

☒A Sediment deposition is not excessive, but at approximately natural levels.
☐B Sediment deposition is excessive, but not overwhelming the wetland.
☐C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐A	☐A	☐A	≥ 500 acres
☐B	☐B	☐B	From 100 to < 500 acres
☐C	☐C	☐C	From 50 to < 100 acres
☐D	☐D	☐D	From 25 to < 50 acres
☐E	☐E	☐E	From 10 to < 25 acres
☐F	☐F	☐F	From 5 to < 10 acres
☐G	☐G	☐G	From 1 to < 5 acres
☒H	☒H	☒H	From 0.5 to < 1 acre
☐I	☐I	☐I	From 0.1 to < 0.5 acre
☐J	☐J	☐J	From 0.01 to < 0.1 acre
☐K	☐K	☐K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

☐A Pocosin is the full extent (≥ 90%) of its natural landscape size.
☐B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

Well	Loosely	
☐A	☐A	≥ 500 acres
☐B	☐B	From 100 to < 500 acres
☐C	☐C	From 50 to < 100 acres
☒D	☐D	From 10 to < 50 acres
☐E	☐E	< 10 acres
☐F	☐F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

☐Yes ☐No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

☐A 0
☒B 1 to 4
☐C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

☐A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
☐B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
☒C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

☐A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
☐B Vegetation diversity is low or has > 10% to 50% cover of exotics.
☐C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?
☒Yes ☐No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.
☐A ≥ 25% coverage of vegetation
☐B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	☒A	☒A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	☐B	☐B	Canopy present, but opened more than natural gaps
	☐C	☐C	Canopy sparse or absent
Mid-Story	☐A	☐A	Dense mid-story/sapling layer
	☐B	☐B	Moderate density mid-story/sapling layer
	☒C	☒C	Mid-story/sapling layer sparse or absent
Shrub	☐A	☐A	Dense shrub layer
	☐B	☐B	Moderate density shrub layer
	☒C	☒C	Shrub layer sparse or absent
Herb	☒A	☒A	Dense herb layer
	☐B	☐B	Moderate density herb layer
	☐C	☐C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

☐A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
☒B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

☒A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
☐C Majority of canopy trees are < 6 inches DBH or no trees.

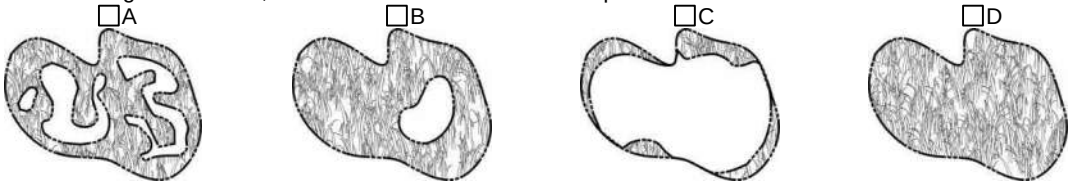
20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
☒A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☐B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐A ☐B ☐C ☐D



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.
☐A Overbank and overland flow are not severely altered in the assessment area.
☐B Overbank flow is severely altered in the assessment area.
☒C Overland flow is severely altered in the assessment area.
☐D Both overbank and overland flow are severely altered in the assessment area.

Notes
Sparse privet; microstegium 80%

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name	Wetland A	Date of Assessment	06/11/19
Wetland Type	Bottomland Hardwood Forest	Assessor Name/Organization	K. Roth & J. Burdette

Notes on Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Wetland is intensively managed (Y/N)	NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	YES
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**MEDIUM**
	Sub-surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence (Y/N)	**NO**
	Particulate Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence (Y/N)	**NO**
	Soluble Change	Condition	**MEDIUM**
		Condition/Opportunity	**MEDIUM**
		Opportunity Presence (Y/N)	**NO**
	Physical Change	Condition	**LOW**
		Condition/Opportunity	**LOW**
		Opportunity Presence (Y/N)	**NO**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	**HIGH**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	**MEDIUM**
Water Quality	Condition	**MEDIUM**
	Condition/Opportunity	**MEDIUM**
	Opportunity Presence (Y/N)	**NO**
Habitat	Condition	**LOW**

Overall Wetland Rating **MEDIUM**

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #		NCDWR#	
Project Name	Eastowne	Date of Evaluation	06/11/19
Applicant/Owner Name	UNC Health	Wetland Site Name	Wetland C1
Wetland Type	Non-Tidal Freshwater Marsh	Assessor Name/Organization	K. Roth & J. Burdette
Level III Ecoregion	Piedmont	Nearest Named Water Body	Clark Lake
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030002
County	Orange	NCDWR Region	Raleigh
☐ Yes ☒ No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.948612, -79.005295

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☐ Yes ☒ No

Regulatory Considerations - Were regulatory considerations evaluated? ☒Yes ☐No If Yes, check all that apply to the assessment area.

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☒ NCDWR riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☒ Yes ☐ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
☒A	☐A	Not severely altered
☐B	☒B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☒A	☒A	Water storage capacity and duration are not altered.
☐B	☐B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐C	☐C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐A	☐A	Majority of wetland with depressions able to pond water > 1 deep
	☐B	☐B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐C	☐C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒D	☒D	Depressions able to pond water < 3 inches deep

3b. ☐A Evidence that maximum depth of inundation is greater than 2 feet
☒B Evidence that maximum depth of inundation is between 1 and 2 feet
☐C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐A Sandy soil
- ☒B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐C Loamy or clayey soils not exhibiting redoximorphic features
- ☐D Loamy or clayey gleyed soil
- ☐E Histosol or histic epipedon

4b.
- ☒A Soil ribbon < 1 inch
- ☐B Soil ribbon ≥ 1 inch

4c.
- ☐A No peat or muck presence
- ☒B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☒A	☒A	Little or no evidence of pollutants or discharges entering the assessment area
☐B	☐B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐C	☐C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

WS	5M	2M	
☒A	☒A	☒A	≥ 10% impervious surfaces
☐B	☐B	☐B	Confined animal operations (or other local, concentrated source of pollutants
☐C	☐C	☐C	≥ 20% coverage of pasture
☐D	☐D	☐D	≥ 20% coverage of agricultural land (regularly plowed land)
☐E	☐E	☐E	≥ 20% coverage of maintained grass/herb
☐F	☐F	☐F	≥ 20% coverage of clear-cut land
☐G	☐G	☐G	Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

7a. Is assessment area within 50 feet of a tributary or other open water?
☒Yes ☐No If Yes, continue to 7b. If No, skip to Metric 8.
Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the .water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- ☒A ≥ 50 feet
- ☐B From 30 to < 50 feet
- ☐C From 15 to < 30 feet
- ☐D From 5 to < 15 feet
- ☐E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
☐≤ 15-feet wide ☐> 15-feet wide ☒ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
☒Yes ☐No

7e. Is stream or other open water sheltered or exposed?
☒Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
☐Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐A	☐A	≥ 100 feet
☐B	☒B	From 80 to < 100 feet
☐C	☐C	From 50 to < 80 feet
☒D	☐D	From 40 to < 50 feet
☐E	☐E	From 30 to < 40 feet
☐F	☐F	From 15 to < 30 feet
☐G	☐G	From 5 to < 15 feet
☐H	☐H	< 5 feet

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

☐A Evidence of short-duration inundation (< 7 consecutive days)
☐B Evidence of saturation, without evidence of inundation
☒C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

☐A Sediment deposition is not excessive, but at approximately natural levels.
☐B Sediment deposition is excessive, but not overwhelming the wetland.
☐C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐A	☐A	☐A	≥ 500 acres
☐B	☐B	☐B	From 100 to < 500 acres
☐C	☐C	☐C	From 50 to < 100 acres
☐D	☐D	☐D	From 25 to < 50 acres
☐E	☐E	☐E	From 10 to < 25 acres
☐F	☐F	☐F	From 5 to < 10 acres
☐G	☐G	☐G	From 1 to < 5 acres
☐H	☐H	☐H	From 0.5 to < 1 acre
☐I	☒I	☐I	From 0.1 to < 0.5 acre
☒J	☐J	☐J	From 0.01 to < 0.1 acre
☐K	☐K	☐K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

☐A Pocosin is the full extent (≥ 90%) of its natural landscape size.
☐B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

Well	Loosely	
☐A	☐A	≥ 500 acres
☐B	☐B	From 100 to < 500 acres
☐C	☐C	From 50 to < 100 acres
☐D	☒D	From 10 to < 50 acres
☒E	☐E	< 10 acres
☐F	☐F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

☒Yes ☐No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

☐A 0
☒B 1 to 4
☐C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

☐A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
☐B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
☐C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

☐A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
☒B Vegetation diversity is low or has > 10% to 50% cover of exotics.
☐C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?
☒Yes ☐No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.
☒A ≥ 25% coverage of vegetation
☐B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	☐A	☐A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	☐B	☐B	Canopy present, but opened more than natural gaps
	☐C	☐C	Canopy sparse or absent
Mid-Story	☐A	☐A	Dense mid-story/sapling layer
	☐B	☐B	Moderate density mid-story/sapling layer
	☐C	☐C	Mid-story/sapling layer sparse or absent
Shrub	☐A	☐A	Dense shrub layer
	☐B	☐B	Moderate density shrub layer
	☐C	☐C	Shrub layer sparse or absent
Herb	☐A	☐A	Dense herb layer
	☐B	☐B	Moderate density herb layer
	☐C	☐C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

☐A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
☒B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

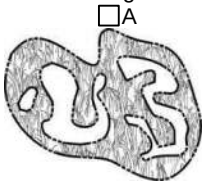
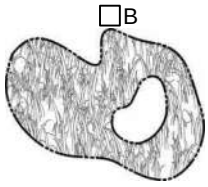
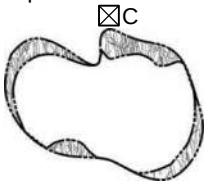
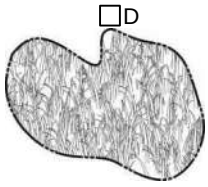
☐A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☐B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
☐C Majority of canopy trees are < 6 inches DBH or no trees.

20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
☐A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☐B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐A 
☐B 
☒C 
☐D 

22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.
☒A Overbank and overland flow are not severely altered in the assessment area.
☐B Overbank flow is severely altered in the assessment area.
☐C Overland flow is severely altered in the assessment area.
☐D Both overbank and overland flow are severely altered in the assessment area.

Notes
W2 is similar to W1 Emergent except it has less veg (<25% cover) & has canopy cover from adjacent uplands

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name	Wetland C1	Date of Assessment	06/11/19
Wetland Type	Non-Tidal Freshwater Marsh	Assessor Name/Organization	K. Roth & J. Burdette

Notes on Field Assessment Form (Y/N)	YES
Presence of regulatory considerations (Y/N)	YES
Wetland is intensively managed (Y/N)	NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	YES
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	NA
	Sub-surface Storage and Retention	Condition	NA
Water Quality	Pathogen Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Particulate Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Soluble Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Physical Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	**LOW**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**MEDIUM**

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	**HIGH**
Water Quality	Condition	**HIGH**
	Condition/Opportunity	**HIGH**
	Opportunity Presence (Y/N)	**YES**
Habitat	Condition	**LOW**

Overall Wetland Rating **HIGH**

NC WAM FIELD ASSESSMENT FORM
Accompanies User Manual Version 5.0

USACE AID #		NCDWR#	
Project Name	Eastowne	Date of Evaluation	06/11/19
Applicant/Owner Name	UNC Health	Wetland Site Name	Wetland C2
Wetland Type	Headwater Forest	Assessor Name/Organization	K. Roth & J. Burdette
Level III Ecoregion	Piedmont	Nearest Named Water Body	Clark Lake
River Basin	Cape Fear	USGS 8-Digit Catalogue Unit	03030002
County	Orange	NCDWR Region	Raleigh
☒ Yes ☐ No	Precipitation within 48 hrs?	Latitude/Longitude (deci-degrees)	35.948500, -79.005204

Evidence of stressors affecting the assessment area (may not be within the assessment area)

Please circle and/or make note on the last page if evidence of stressors is apparent. Consider departure from reference, if appropriate, in recent past (for instance, within 10 years). Noteworthy stressors include, but are not limited to the following.

- Hydrological modifications (examples: ditches, dams, beaver dams, dikes, berms, ponds, etc.)
- Surface and sub-surface discharges into the wetland (examples: discharges containing obvious pollutants, presence of nearby septic tanks, underground storage tanks (USTs), hog lagoons, etc.)
- Signs of vegetation stress (examples: vegetation mortality, insect damage, disease, storm damage, salt intrusion, etc.)
- Habitat/plant community alteration (examples: mowing, clear-cutting, exotics, etc.)

Is the assessment area intensively managed? ☐ Yes ☒ No

Regulatory Considerations - Were regulatory considerations evaluated? ☒Yes ☐No If Yes, check all that apply to the assessment area.

☐ Anadromous fish
☐ Federally protected species or State endangered or threatened species
☒ NCDWR riparian buffer rule in effect
☐ Abuts a Primary Nursery Area (PNA)
☐ Publicly owned property
☐ N.C. Division of Coastal Management Area of Environmental Concern (AEC) (including buffer)
☐ Abuts a stream with a NCDWQ classification of SA or supplemental classifications of HQW, ORW, or Trout
☐ Designated NCNHP reference community
☐ Abuts a 303(d)-listed stream or a tributary to a 303(d)-listed stream

What type of natural stream is associated with the wetland, if any? (check all that apply)

☐ Blackwater
☒ Brownwater
☐ Tidal (if tidal, check one of the following boxes) ☐ Lunar ☐ Wind ☐ Both

Is the assessment area on a coastal island? ☐ Yes ☒ No

Is the assessment area's surface water storage capacity or duration substantially altered by beaver? ☐ Yes ☒ No

Does the assessment area experience overbank flooding during normal rainfall conditions? ☒ Yes ☐ No

1. Ground Surface Condition/Vegetation Condition – assessment area condition metric

Check a box in each column. Consider alteration to the ground surface (GS) in the assessment area and vegetation structure (VS) in the assessment area. Compare to reference wetland if applicable (see User Manual). If a reference is not applicable, then rate the assessment area based on evidence an effect.

GS	VS	
☒A	☐A	Not severely altered
☐B	☒B	Severely altered over a majority of the assessment area (ground surface alteration examples: vehicle tracks, excessive sedimentation, fire-plow lanes, skidder tracks, bedding, fill, soil compaction, obvious pollutants) (vegetation structure alteration examples: mechanical disturbance, herbicides, salt intrusion [where appropriate], exotic species, grazing, less diversity [if appropriate], hydrologic alteration)

2. Surface and Sub-Surface Storage Capacity and Duration – assessment area condition metric

Check a box in each column. Consider surface storage capacity and duration (Surf) and sub-surface storage capacity and duration (Sub). Consider both increase and decrease in hydrology. A ditch ≤ 1 foot deep is considered to affect surface water only, while a ditch > 1 foot deep is expected to affect both surface and sub-surface water. Consider tidal flooding regime, if applicable.

Surf	Sub	
☒A	☒A	Water storage capacity and duration are not altered.
☐B	☐B	Water storage capacity or duration are altered, but not substantially (typically, not sufficient to change vegetation).
☐C	☐C	Water storage capacity or duration are substantially altered (typically, alteration sufficient to result in vegetation change) (examples: draining, flooding, soil compaction, filling, excessive sedimentation, underground utility lines).

3. Water Storage/Surface Relief – assessment area/wetland type condition metric (skip for all marshes)

Check a box in each column. Select the appropriate storage for the assessment area (AA) and the wetland type (WT).

	AA	WT	
3a.	☐A	☐A	Majority of wetland with depressions able to pond water > 1 deep
	☐B	☐B	Majority of wetland with depressions able to pond water 6 inches to 1 foot deep
	☐C	☐C	Majority of wetland with depressions able to pond water 3 to 6 inches deep
	☒D	☒D	Depressions able to pond water < 3 inches deep

3b. ☐A Evidence that maximum depth of inundation is greater than 2 feet
☐B Evidence that maximum depth of inundation is between 1 and 2 feet
☒C Evidence that maximum depth of inundation is less than 1 foot

4. Soil Texture/Structure – assessment area condition metric (skip for all marshes)

Check a box from each of the three soil property groups below. Dig soil profile in the dominant assessment area landscape feature. Make soil observations within the top 12 inches. Use most recent National Technical Committee for Hydric Soils guidance for regional indicators.

4a.
- ☐A Sandy soil
- ☒B Loamy or clayey soils exhibiting redoximorphic features (concentrations, depletions, or rhizospheres)
- ☐C Loamy or clayey soils not exhibiting redoximorphic features
- ☐D Loamy or clayey gleyed soil
- ☐E Histosol or histic epipedon

4b.
- ☐A Soil ribbon < 1 inch
- ☒B Soil ribbon ≥ 1 inch

4c.
- ☒A No peat or muck presence
- ☐B A peat or muck presence

5. Discharge into Wetland – opportunity metric

Check a box in each column. Consider surface pollutants or discharges (Surf) and sub-surface pollutants or discharges (Sub). Examples of sub-surface discharges include presence of nearby septic tank, underground storage tank (UST), etc.

Surf	Sub	
☒A	☒A	Little or no evidence of pollutants or discharges entering the assessment area
☐B	☐B	Noticeable evidence of pollutants or discharges entering the wetland and stressing, but not overwhelming the treatment capacity of the assessment area
☐C	☐C	Noticeable evidence of pollutants or discharges (pathogen, particulate, or soluble) entering the assessment area and potentially overwhelming the treatment capacity of the wetland (water discoloration, dead vegetation, excessive sedimentation, odor)

6. Land Use – opportunity metric (skip for non-riparian wetlands)

Check all that apply (at least one box in each column). Evaluation involves a GIS effort with field adjustment. Consider sources draining to assessment area within entire upstream watershed (WS), within 5 miles and within the watershed draining to the assessment area (5M), and within 2 miles and within the watershed draining to the assessment area (2M).

WS	5M	2M	
☒A	☒A	☒A	≥ 10% impervious surfaces
☐B	☐B	☐B	Confined animal operations (or other local, concentrated source of pollutants
☐C	☐C	☐C	≥ 20% coverage of pasture
☐D	☐D	☐D	≥ 20% coverage of agricultural land (regularly plowed land)
☐E	☐E	☐E	≥ 20% coverage of maintained grass/herb
☐F	☐F	☐F	≥ 20% coverage of clear-cut land
☐G	☐G	☐G	Little or no opportunity to improve water quality. Lack of opportunity may result from little or no disturbance in the watershed or hydrologic alterations that prevent drainage and/or overbank flow from affecting the assessment area.

7. Wetland Acting as Vegetated Buffer – assessment area/wetland complex condition metric (skip for non-riparian wetlands)

7a. Is assessment area within 50 feet of a tributary or other open water?
☒Yes ☐No If Yes, continue to 7b. If No, skip to Metric 8.
Wetland buffer need only be present on one side of the water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.

7b. How much of the first 50 feet from the bank is wetland? (Wetland buffer need only be present on one side of the .water body. Make buffer judgment based on the average width of wetland. Record a note if a portion of the buffer has been removed or disturbed.)
- ☐A ≥ 50 feet
- ☒B From 30 to < 50 feet
- ☐C From 15 to < 30 feet
- ☐D From 5 to < 15 feet
- ☐E < 5 feet or buffer bypassed by ditches

7c. Tributary width. If the tributary is anastomosed, combine widths of channels/braids for a total width.
☒≤ 15-feet wide ☐> 15-feet wide ☐ Other open water (no tributary present)

7d. Do roots of assessment area vegetation extend into the bank of the tributary/open water?
☒Yes ☐No

7e. Is stream or other open water sheltered or exposed?
☒Sheltered – adjacent open water with width < 2500 feet and no regular boat traffic.
☐Exposed – adjacent open water with width ≥ 2500 feet or regular boat traffic.

8. Wetland Width at the Assessment Area – wetland type/wetland complex condition metric (evaluate WT for all marshes and Estuarine Woody Wetland only; evaluate WC for Bottomland Hardwood Forest, Headwater Forest, and Riverine Swamp Forest only)

Check a box in each column for riverine wetlands only. Select the average width for the wetland type at the assessment area (WT) and the wetland complex at the assessment area (WC). See User Manual for WT and WC boundaries.

WT	WC	
☐A	☐A	≥ 100 feet
☐B	☒B	From 80 to < 100 feet
☒C	☐C	From 50 to < 80 feet
☐D	☐D	From 40 to < 50 feet
☐E	☐E	From 30 to < 40 feet
☐F	☐F	From 15 to < 30 feet
☐G	☐G	From 5 to < 15 feet
☐H	☐H	< 5 feet

9. Inundation Duration – assessment area condition metric (skip for non-riparian wetlands)

Answer for assessment area dominant landform.

☐A Evidence of short-duration inundation (< 7 consecutive days)
☒B Evidence of saturation, without evidence of inundation
☐C Evidence of long-duration inundation or very long-duration inundation (7 to 30 consecutive days or more)

10. Indicators of Deposition – assessment area condition metric (skip for non-riparian wetlands and all marshes)

Consider recent deposition only (no plant growth since deposition).

☐A Sediment deposition is not excessive, but at approximately natural levels.
☒B Sediment deposition is excessive, but not overwhelming the wetland.
☐C Sediment deposition is excessive and is overwhelming the wetland.

11. Wetland Size – wetland type/wetland complex condition metric

Check a box in each column. Involves a GIS effort with field adjustment. This metric evaluates three aspects of the wetland area: the size of the wetland type (WT), the size of the wetland complex (WC), and the size of the forested wetland (FW) (if applicable, see User Manual). See the User Manual for boundaries of these evaluation areas. If assessment area is clear-cut, select "K" for the FW column.

WT	WC	FW (if applicable)	
☐A	☐A	☐A	≥ 500 acres
☐B	☐B	☐B	From 100 to < 500 acres
☐C	☐C	☐C	From 50 to < 100 acres
☐D	☐D	☐D	From 25 to < 50 acres
☐E	☐E	☐E	From 10 to < 25 acres
☐F	☐F	☐F	From 5 to < 10 acres
☐G	☐G	☐G	From 1 to < 5 acres
☐H	☐H	☐H	From 0.5 to < 1 acre
☐I	☒I	☐I	From 0.1 to < 0.5 acre
☒J	☐J	☒J	From 0.01 to < 0.1 acre
☐K	☐K	☐K	< 0.01 acre or assessment area is clear-cut

12. Wetland Intactness – wetland type condition metric (evaluate for Pocosins only)

☐A Pocosin is the full extent (≥ 90%) of its natural landscape size.
☐B Pocosin type is < 90% of the full extent of its natural landscape size.

13. Connectivity to Other Natural Areas – landscape condition metric

13a. **Check appropriate box(es) (a box may be checked in each column).** Involves a GIS effort with field adjustment. This metric evaluates whether the wetland is well connected (Well) and/or loosely connected (Loosely) to the landscape patch, the contiguous naturally vegetated area and open water (if appropriate). Boundaries are formed by four-lane roads, regularly maintained utility line corridors the width of a four-lane road or wider, urban landscapes, maintained fields (pasture and agriculture), or open water > 300 feet wide.

Well	Loosely	
☐A	☐A	≥ 500 acres
☐B	☐B	From 100 to < 500 acres
☐C	☐C	From 50 to < 100 acres
☐D	☒D	From 10 to < 50 acres
☒E	☐E	< 10 acres
☐F	☐F	Wetland type has a poor or no connection to other natural habitats

13b. **Evaluate for marshes only**.

☐Yes ☐No Wetland type has a surface hydrology connection to open waters/stream or tidal wetlands.

14. Edge Effect – wetland type condition metric (skip for all marshes and Estuarine Woody Wetland)

May involve a GIS effort with field adjustment. Estimate distance from wetland type boundary to artificial edges. Artificial edges include non-forested areas ≥ 40 feet wide such as fields, development, roads, regularly maintained utility line corridors, and clear-cuts. Consider the eight main points of the compass. Artificial edge occurs within 150 feet in how many directions? If the assessment area is clear cut, select option "C."

☐A 0
☒B 1 to 4
☐C 5 to 8

15. Vegetative Composition – assessment area condition metric (skip for all marshes and Pine Flat)

☐A Vegetation is close to reference condition in species present and their proportions. Lower strata composed of appropriate species, with exotic plants absent or sparse within the assessment area.
☐B Vegetation is different from reference condition in species diversity or proportions, but still largely composed of native species characteristic of the wetland type. This may include communities of weedy native species that develop after clearcutting or clearing. It also includes communities with exotics present, but not dominant, over a large portion of the expected strata.
☒C Vegetation severely altered from reference in composition, or expected species are unnaturally absent (planted stands of non-characteristic species or at least one stratum inappropriately composed of a single species), or exotic species are dominant in at least one stratum.

16. Vegetative Diversity – assessment area condition metric (evaluate for Non-tidal Freshwater Marsh only)

☐A Vegetation diversity is high and is composed primarily of native species (< 10% cover of exotics).
☐B Vegetation diversity is low or has > 10% to 50% cover of exotics.
☐C Vegetation is dominated by exotic species (> 50 % cover of exotics).

17. Vegetative Structure – assessment area/wetland type condition metric

17a. Is vegetation present?
☒Yes ☐No If Yes, continue to 17b. If No, skip to Metric 18.

17b. Evaluate percent coverage of assessment area vegetation **for all marshes only**. Skip to 17c for non-marsh wetlands.
☐A ≥ 25% coverage of vegetation
☐B < 25% coverage of vegetation

17c. **Check a box in each column for each stratum**. Evaluate this portion of the metric **for non-marsh wetlands**. Consider structure in airspace above the assessment area (AA) and the wetland type (WT) separately.

	AA	WT	
Canopy	☒A	☒A	Canopy closed, or nearly closed, with natural gaps associated with natural processes
	☐B	☐B	Canopy present, but opened more than natural gaps
	☐C	☐C	Canopy sparse or absent
Mid-Story	☐A	☐A	Dense mid-story/sapling layer
	☒B	☒B	Moderate density mid-story/sapling layer
	☐C	☐C	Mid-story/sapling layer sparse or absent
Shrub	☒A	☒A	Dense shrub layer
	☐B	☐B	Moderate density shrub layer
	☐C	☐C	Shrub layer sparse or absent
Herb	☒A	☒A	Dense herb layer
	☐B	☐B	Moderate density herb layer
	☐C	☐C	Herb layer sparse or absent

18. Snags – wetland type condition metric (skip for all marshes)

☐A Large snags (more than one) are visible (> 12 inches DBH, or large relative to species present and landscape stability).
☒B Not A

19. Diameter Class Distribution – wetland type condition metric (skip for all marshes)

☐A Majority of canopy trees have stems > 6 inches in diameter at breast height (DBH); many large trees (> 12 inches DBH) are present.
☒B Majority of canopy trees have stems between 6 and 12 inches DBH, few are > 12 inch DBH.
☐C Majority of canopy trees are < 6 inches DBH or no trees.

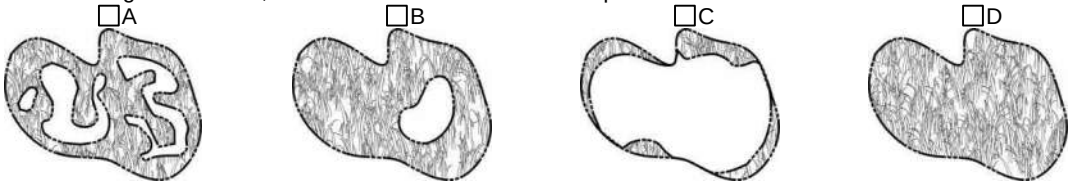
20. Large Woody Debris – wetland type condition metric (skip for all marshes)

Include both natural debris and man-placed natural debris.
☐A Large logs (more than one) are visible (> 12 inches in diameter, or large relative to species present and landscape stability).
☒B Not A

21. Vegetation/Open Water Dispersion – wetland type/open water condition metric (evaluate for Non-Tidal Freshwater Marsh only)

Select the figure that best describes the amount of interspersion between vegetation and open water in the growing season. Patterned areas indicate vegetated areas, while solid white areas indicate open water.

☐A ☐B ☐C ☐D



22. Hydrologic Connectivity – assessment area condition metric (evaluate for riparian wetlands and Salt/Brackish Marsh only)

Examples of activities that may severely alter hydrologic connectivity include intensive ditching, fill, sedimentation, channelization, diversion, man-made berms, beaver dams, and stream incision. Documentation required if evaluated as B, C, or D.
☒A Overbank and overland flow are not severely altered in the assessment area.
☐B Overbank flow is severely altered in the assessment area.
☐C Overland flow is severely altered in the assessment area.
☐D Both overbank and overland flow are severely altered in the assessment area.

Notes

NC WAM Wetland Rating Sheet
Accompanies User Manual Version 5.0

Wetland Site Name	Wetland C2	Date of Assessment	06/11/19
Wetland Type	Headwater Forest	Assessor Name/Organization	K. Roth & J. Burdette

Notes on Field Assessment Form (Y/N)	NO
Presence of regulatory considerations (Y/N)	YES
Wetland is intensively managed (Y/N)	NO
Assessment area is located within 50 feet of a natural tributary or other open water (Y/N)	YES
Assessment area is substantially altered by beaver (Y/N)	NO
Assessment area experiences overbank flooding during normal rainfall conditions (Y/N)	YES
Assessment area is on a coastal island (Y/N)	NO

Sub-function Rating Summary

Function	Sub-function	Metrics	Rating
Hydrology	Surface Storage and Retention	Condition	**HIGH**
	Sub-surface Storage and Retention	Condition	**MEDIUM**
Water Quality	Pathogen Change	Condition	**HIGH**
		Condition/Opportunity	**HIGH**
		Opportunity Presence (Y/N)	**YES**
	Particulate Change	Condition	**MEDIUM**
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
	Soluble Change	Condition	**HIGH**
		Condition/Opportunity	**HIGH**
		Opportunity Presence (Y/N)	**YES**
	Physical Change	Condition	**HIGH**
		Condition/Opportunity	**HIGH**
		Opportunity Presence (Y/N)	**YES**
	Pollution Change	Condition	NA
		Condition/Opportunity	NA
		Opportunity Presence (Y/N)	NA
Habitat	Physical Structure	Condition	**MEDIUM**
	Landscape Patch Structure	Condition	**LOW**
	Vegetation Composition	Condition	**LOW**

Function Rating Summary

Function	Metrics	Rating
Hydrology	Condition	**HIGH**
Water Quality	Condition	**HIGH**
	Condition/Opportunity	**HIGH**
	Opportunity Presence (Y/N)	**YES**
Habitat	Condition	**LOW**

Overall Wetland Rating **HIGH**

SITE SURVEY REPORT

SITE NAME: Dry Creek/Mount Moriah Bottomland – Eastowne tract

DATES VISITED: August 7, 2019

INVESTIGATORS: Mike Schafale, with Allison Weakley (Town of Chapel Hill) and Jennifer Burdette (McAdams Company).

REPORT AUTHOR: Mike Schafale
DATE OF REPORT: August 2019

BACKGROUND INFORMATION/PURPOSE OF VISIT: The Eastowne tract was visited at the request of the Town of Chapel Hill, because the tract was part of a natural area previously identified by NHP. The tract is part of a larger master planning effort that includes adjacent developed areas, and is the subject of a Development Agreement being negotiated between the town and the landowner.

The area of the Eastowne tract was first identified in the Orange County Natural Areas inventory under the name of Cedar Terrace Bottoms. The report emphasized the floodplain communities but included the upland area in the natural area boundary. Cedar Terrace Bottoms was later combined with the adjacent Mount Moriah Bottomlands natural area recognized in the Durham County Natural Areas Inventory.

OWNER: Health Systems Properties, LLC
OWNER CONTACT + NOTES: The owner was contacted by the McAdams Company for permission to survey the tract, prompted by a request from the Town of Chapel Hill... Permission for the survey was given by Simon George of UNC Health Care Real Estate and Development (email July 25 to Bill Derks).

COUNTY: Orange **QUAD:** Chapel Hill

LOCATION / ACCESS: The Eastowne tract is located on the northeastern edge of Chapel Hill, on the west side of I-40 and north of US 15-501 and its service road. Eastowne Drive runs along the west side of the tract. Providence Road is just west of the tract.

GENERAL DESCRIPTION: The Eastowne tract consists primarily of upland slopes, broad ridges, and a gentle knoll. A substantial stream valley with an intermittent to perennial stream and several ephemeral stream courses dissect the area. The north edge of the tract extends to the larger floodplain of Dry Creek. The site occurs within the Durham Triassic basin geological region but is unusual in having substantial relief rather than the subdued topography more typical of that region. In addition to sandstone substrate, diabase dikes are present, which produce soils with higher pH and higher base saturation than is typical in most of the Piedmont. The predominant natural community of the site is Dry-Mesic Basic Oak—Hickory Forest. Small areas of Basic Mesic Forest, Piedmont Headwater Stream Forest, Piedmont Alluvial Forest, and

Piedmont Swamp Forest are present. All of these forest communities are unusually mature, with large old trees.

SIGNIFICANCE OF SITE: The overall Dry Creek/Mount Moriah Bottomland natural area is currently rated at Moderate significance (R5 C4). Besides its natural community occurrences, it is an important landscape linkage. It provides biological connection for wildlife movement between the extensive conservation lands around Jordan Lake and those of Duke Forest upstream, with a partial connection to the Eno River basin. In the heavily urbanized areas of Chapel Hill and Durham, this natural area is the last such link remaining. The Eastowne tract is not in the direct line of the landscape connection. It contains a small portion of the floodplain communities but is particularly notable in being one of the few parts of the site with significant intact mature upland hardwood communities to complement the floodplains. Uplands around most of the site have been developed or have successional vegetation. The communities are unusual in having base-rich soils, because of one or more dikes of diabase underlying the area.

SPECIAL STATUS SPECIES: None noted. Gray petaltail dragonfly (*Tachopteryx thoreyi*), reported in the earlier survey, is no longer tracked as a rare species but is uncommon. It likely is still present.

POTENTIAL FOR OTHER SPECIAL STATUS SPECIES: Low, but *Enemion biternatum* or other plants of base-rich soils but not visible in late summer could possibly be present,

OTHER NOTEWORTHY SPECIES AND FEATURES:

SIZE: The Eastowne tract is 20.5 acres. The overall Dry Creek/Mount Moriah Bottomland natural area is approximately 485 acres.

ELEVATION: 265-335 feet.

TOPOGRAPHY: Upland slopes and broad ridges, dissected by several small drainages. The north end of the tract is in the wide floodplain of Dry Creek.

HYDROLOGY AND MOISTURE: Most of the acreage is dry-mesic uplands and slopes. The lower parts of the stream valley and the larger Dry Creek floodplain probably are flooded most years. The mapped 100 year floodplain extends up the lower slopes around them.

PRESENCE OF STREAMS AND SEEPS: One perennial stream is present, along the west side of the tract. A stream determination by Allison Weakley also identified intermittent and ephemeral streams in the smaller drainages.

GEOLOGY: The area lies in the Durham Triassic basin, and is underlain by Triassic sandstone. One or more diabase dikes are present within the tract. Outcrops of both diabase and sandstone were seen in the bed of the creek, and diabase float was also seen on the east side of the tract. Though the substrate is a mix of lithology, the vegetation suggests influence of mafic or calcareous rock throughout the tract.

SOIL: White Store (Fine, mixed, active, thermic Oxyaquic Vertic Hapludalfs) is mapped over most of the tract.
Goldston (Loamy-skeletal, siliceous, semiactive, thermic, shallow Typic Dystrudepts) is mapped on the steeper slopes along the drainages. Small areas of alluvial soil are not mapped.

Chewacla (Fine-loamy, mixed, active, thermic Fluvaquentic Dystrudepts) is present on the larger floodplain to the north and probably occurs as inclusions in the stream valley in the tract.

COMMENTS ON PHYSICAL DESCRIPTION: The site is unusual in having more relief than is typical for Triassic basin sites.

NATURAL COMMUNITY DESCRIPTION
Dry-Mesic Basic Oak—Hickory Forest (Piedmont Subtype): Upland slopes and ridges, occupying most of the tract. The canopy is dominated by Quercus alba and Quercus rubra, with frequent associates being Fraxinus americana, Fraxinus biltmoreana, Carya glabra, and Carya tomentosa. A few Pinus echinata are present. The understory includes Acer floridanum, Acer leucoderme, Cornus florida, Prunus serotina, Cercis canadensis, and a few Carpinus caroliniana. An open shrub layer includes abundant Viburnum rafinesqueanum, Viburnum prunifolium, Viburnum acerifolium, and patches with some Vaccinium pallidum and Vaccinium tenellum. A few Lindera benzoin were present in the upland, as well as small Crataegus sp., Diospyros virginiana, and a few other species. The herb layer is typically low in density, but includes multiple species indicative of base-rich soil, such as Dichanthelium boscii, Elymus virginicus, Phryma leptostachya, and Sanicula sp., as well as widespread upland species such as Tipularia discolor, Hexastylis arifolia, and Galium circaezans. A little Scleria oligantha and Piptochaetium avenaceum were seen. This forest is quite mature. Canopy trees average over 12” dbh and trees 16” are common. A few as large as 24” dbh were seen. The Natural Resources report by McAdams Company reports checking of aerial photos back to 1938 which suggest more than 80 years without disturbance over most of the area, and reports trees exceeding 30” dbh.

Basic Mesic Forest (Piedmont Subtype): Occurs on more sheltered slopes. The only extensive patch is on the east side of the tract, along a ravine. It is too small in extent to be highly significant by itself. The canopy is dominated by Fagus grandifolia. Fraxinus americana, Quercus rubra, Acer floridanum, and one large Liquidambar styraciflua also occur. The understory consists the same species, but a few Carpinus caroliniana are present. There is almost no shrub layer, but a few Aesculus sylvatica are present. Herbs are sparse, except for some beds of Polystichum acrostichoides. Despite the base-rich soil conditions indicated by the presence of Fraxinus and abundance of Acer floridanum, only a few herbs indicative of these conditions (e.g. Elymus virginicus) were seen. This may be due to the late season or to the small extent of the community. This forest is quite mature, with canopy trees averaging 16” dbh.

Piedmont Headwater Stream Forest: Small areas of this community occur along the upstream part of the main creek on the tract as well as in narrow bands along several ephemeral tributaries. The canopy is dominated Liriodendron tulipifera and has a typical mix of floodplain and upland species, including Liquidambar styraciflua, Ulmus americana, and Quercus alba. The understory includes Carpinus caroliniana as well as canopy species. Shrubs are sparse. Herbs generally are low in density and are a mix of species, including Polystichum acrostichoides, Dichanthelium

boscii, Prunella vulgaris, Viola sp., Iris cristata, Nabalus sp., and Agrimonia sp. Microstegium vimineum is present but not extensive. This forest is comparable in maturity to the upland forests.

Piedmont Alluvial Forest: Allluvial Forest occurs along the downstream part of the primary stream on the tract, where alluvial soils are better developed and the floodplains are wider. As is characteristic, the canopy is dominated by Liquidambar styraciflua. Other species include Liriodendron tulipifera, Acer floridanum, Quercus alba, and Platanus occidentalis. The understory is dominated by Carpinus caroliniana, but includes some Asimina triloba and Ulmus rubra, as well as canopy species. Lindera benzoin is the dominant shrub. Notable were a number of Styrax grandifolius on the edge of the floodplain. Rosa multiflora is frequent but no large individuals were seen. The herb layer is dense in much of the community. Microstegium vimineum dominates some large patches. A variety of native species are present, including Elymus virginicus, Leersia virginica, Agrostis sp., Rudbeckia laciniata, Sanicula sp., and Viola sp. Spring ephemeral species may also be present but were not visible at this season. The Piedmont Alluvial Forest is quite mature, with many trees 16-20" dbh.

Piedmont Swamp Forest: Present in the floodplain of Dry Creek, at the northern edge of the tract. The canopy is dominated bv Liquidambar styraciflua and Fraxinus pennsylvanica, with some Ulmus americana and Platanus occidentalis. The understory is dominated by Carpinus caroliniana, and some Asimina triloba is present. Shrubs are largely absent, though some large vines are present. The herb layer is dense. Patches are dominated by Saururus cernuus, Impatiens capensis, Microstegium vimineum, or by a mix that includes Agrostis sp., Boehmeria cylindrica, Lycopus sp., Persicaria sp., and other species. The swamp forest is quite mature at its southern end, on the Eastowne tract, with canopy trees averaging 16" dbh. The more extensive floodplain north of that is younger, with canopy trees averaging 8" dbh.

OTHER COMMUNITIES PRESENT:
Two patches of successional pine communities are present on the tract, as well as a small grove on the western periphery. These patches my represent long-abandoned fields, but one is on a fairly substantial slope. The disturbance was many decades ago, and the trees are large – most 12-16" dbh. Notably, Pinus echinata appears to be more abundant than Pinus taeda. There has been much recent concern about declines in Pinus echinata populations. Unlikely Pinus taeda, the species was naturally abundant in oak forests. It once was a predominant invader of abandoned clearings, but has been supplanted by Pinus taeda in more recent decades.

ANIMAL HABITAT COMPONENTS
POOLS AND SEEPS : Small seeps are present.
ROCK DENNING SITES: None noted.
BIG TREES/LARGE CAVITIES: Trees up to 20-24" dbh are present.
SNAGS AND LOGS: Moderate numbers, including some recently fallen trees.

AQUATIC HABITAT FACTORS
The channel of Dry Creek here is about 4 feet wide, with banks 2-3 feet high and a muddy bed. The water appeared fairly muddy at this time. The primary stream within the tract is perennial

along most of its length, intermittent at the upstream end. Its lower reach flows through a broad floodplain to the confluence with Dry Creek. Its bed is predominantly sand, and there are a couple of small rock outcrops along it. The downstream part of it has a braided series of flow paths rather than a single channel.

SITE INTEGRITY

LAND USE IMPACTS: Two old roadbeds cross the tract, running along each side of the primary stream. One especially is much larger than a typical logging road; it is graded as wide as a typical two-lane road. Though no remnants of pavement were seen, this could have been an important road before the construction of US 15-501. Where it crosses the primary stream, just upstream from its confluence with Dry Creek, there is fill some 10 feet deep. The fill has been breached, with a steep-sided gully cut through it down to stream level around the remnants of a culvert.

The successional pine stands suggest small fields or other clearings in the past. The forest presumably was logged in the past as well, though possibly only for local use by the landowner. All such activities were many decades in the past, and the forest is comparable to the most mature forests in the Piedmont.

One of the sandstone outcrops near the stream appeared to have been quarried or blasted. Drill holes were visible on the edge of the rock. The outcrop is small and is not along the road bed, so it is unclear why this would have been done.

EXOTIC/WEEDY SPECIES: Exotic plants are widely distributed in the tract but are not dense in most places. Microstegium vimineum dominates some patches in the Piedmont Swamp Forest and Piedmont Alluvial Forest. It is present less extensively in the Piedmont Headwater Stream Forest and a few patches occur even in the upland forests.

Rosa multiflora is frequent in the Piedmont Alluvial Forest and present in the Piedmont Headwater Stream Forest, on the roadbed, and scattered elsewhere, but no large plants or thickets were seen.

One small Nandina domestica bush was seen in the upland.

Glechoma hederacea, common in floodplains, was not noted, and Lonicera japonica is either minor or absent.

Stellaria media is not visible at this time of year, and may or may not be present in the floodplains.

DIRECT HUMAN INTRUSION: Probably low. However, remnants of a tent were found, which Allison Weakley reported was occupied by a homeless person earlier in the year. She also reported a separate camp of homeless people on the I-40 right-of-way near the tract. Both were abandoned at the time of this visit.

DISTURBANCE SENSITIVE SPECIES: None noted.

FIRE REGIME: No sign of fire. The oak forests would naturally burn, and if it were possible to conduct, prescribed burning would be beneficial.

ADJACENT LAND USE/OFFSITE STRESSES: The tract is closely surrounded by developed areas on most sides. Wide busy highways mark two boundaries, while a street borders a third. Large buildings and parking lots border part of it. Stresses from adjacent areas presumably are typical: altered stream hydrology, sediment and chemicals in runoff, penetration of light and weeds along the forest edges, and increased populations of animals associated with forest edges. One stress of adjacent developed areas, domestic pets, may not be present since the surrounding area is not residential, but feral animals are still likely.

RELATION/CONNECTION TO OTHER SITES AND HABITAT PATCHES: The Eastowne tract is connected to the Dry Creek floodplain and, through it, to the rest of the Dry Creek/Mount Moriah Bottomland natural area, the New Hope Creek corridor, Duke Forest, and Jordan Lake. The adjacent lands along Dry Creek are owned by the Town of Chapel Hill and portions are under conservation easement with Clean Water Management Trust Fund.

DEGREE OF THREAT/POTENTIAL FOR CHANGE: Very high. UNC Health Systems is in a negotiated master plan and development agreement process that involves this tract as well as adjacent tracts.

BOUNDARY EXPLANTATION/JUSTIFICATION: No changes have been made in the natural area boundary. It is marked by roads and developed areas. Most of it is the mature forest communities. Small areas of successional forest are included for site continuity.

RECOMMENDATIONS FOR PROTECTION: This tract is worthy of protection in its natural condition, through whatever means are feasible. The tract adjoins conservation lands owned by the Town of Chapel Hill and is connected through them to Durham County lands and to a larger network of conservation lands.

MANAGEMENT RECOMMENDATIONS AND RESTORATION NEEDS: The only significant management need is control of the exotic plants.

NEED FOR FURTHER STUDY: Low. A spring visit likely would find many additional plant species.

REFERENCES:

McAdams Company. 2019. Natural Resources Report and Preliminary Assessment, UNC HCS – Eastowne Campus. EMA-17000.

Sather, D., and S.P. Hall. 1988. Inventory of Natural Areas and Wildlife Habitats for Orange County, North Carolina. Orange County Environment and Resources Conservation Department and North Carolina Natural Heritage Program. Updated by Bruce Sorrie and Rich Shaw 2004.

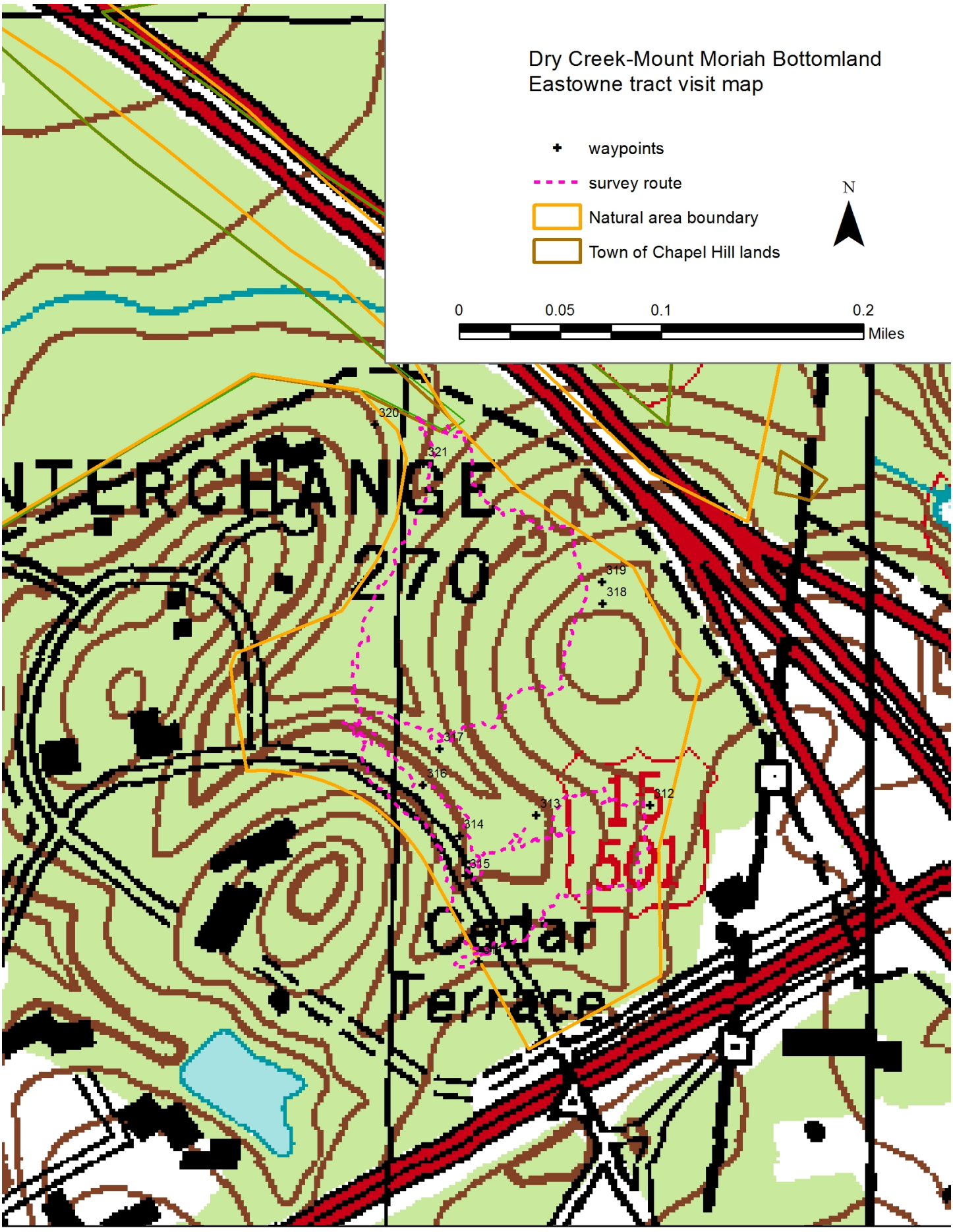
Weakley, A.S. 2019. Stream determination site visit results, May 1, 2019.

PLANT SPECIES OBSERVED:
THOROUGHNESS OF LIST: (moderate)
O = Dry-Mesic Basic Oak—Hickory Forest
M = Basic Mesic Forest
H = Piedmont Headwater Stream Forest
A = Piedmont Alluvial Forest
S = Piedmont Swamp Forest

canopy		
Acer floridanum	M, H, A	c
Carya glabra	O	c
Carya tomentosa	O	c
Fagus grandifolia	M	c
Fraxinus americana	O, M	c
Fraxinus biltmoreana	O	c
Fraxinus pennsylvanica	S	c
Liquidambar styraciflua	A, S, H, M	c
Liriodendron tulipifera	H, A	c
Pinus echinata	succ, O	c
Pinus taeda	succ	c
Platanus occidentalis	A, S, H	c
Quercus alba	O, H, A	c
Quercus rubra	O, M	c
Ulmus americana	A, S, H	c
Understory		
Acer floridanum	O	u
Acer leucoderme	O	u
Acer rubrum	O	u
Amelanchier arborea	O	u
Asimina triloba	A, S	u
Carpinus caroliniana	A, S, H, O, M	u
Carya ovata	O	u
Cercis canadensis	O	u
Cornus florida	O	u
Juniperus virginiana	O	u
Prunus serotina	O	u
Quercus falcata	O	u
Ulmus rubra	A	u
shrubs		

Aesculus sylvatica	M	s
Crataegus sp.	O	s
Diospyros virginiana	O	s
Ilex decidua	O	s
Lindera benzoin	A, O	s
Nandina domestica	O	s
Rosa multiflora	A	s
Styrax grandiflora	A	s
Vaccinium pallidum	O	s
Vaccinium tenellum	O	s
Viburnum acerifolium	O	s
Viburnum prunifolium	O, H	s
Viburnum rafinesqueanum	O, M	s
vines		
Campsis radicans	H	v
Lonicera sempervirens	O	v
Muscadinia rotundifolia	H, A, S, O, M	v
Parthinocissus quinquefolius	O	v
Smilax rotundifolia	O	v
Thyrsanthella difforme	A	v
Toxicodendron radicans	S	v
herbs		
Agromonia pubescens?	H	h
Agrostis sp.	S, A	h
Asclepias sp.	H	h
Boehmeria cylindrica	S	h
Carex spp.	A, M	h
Carex typhina?	S	h
Clitoria mariana	succ	h
Coreopsis verticillata	O	h
Dichanthelium boscii	O, H	h
Dichanthelium sp.	S	h
Dioscorea villosa	O	h
Elephantopus nudatus	H	h
Elymus virginicus	H, A, O, M	h
Euphorbia pubentissima	O	h
Galium circaezans	O	h
Hexastylis arifolia	O	h
Hexastylis virginica	M	h
Impatiens capensis	S	h
Iris cristata	H	h
Leersia virginica	A	h
Ligusticum canadense	S	h
Lycopus sp.	S	h

Maianthemum canadense	O, H	h
Microstegium vimineum	S, A, H, O	h
Nabalus sp.	H	h
Persicaria sp.	S	h
Persicaria virginiana	S	h
Phryma leptostachya	A, O	h
Piptochaetium avenaceum	O	h
Polystichum acrostichoides	M, H	h
Prunella vulgaris	A, H	h
Rudbeckia laciniata	A	h
Ruellia caroliniana	H	h
Sanicula sp.	S, A, O	h
Saururus cernuus	S	h
Scleria oligantha	O	h
Tipularia discolor	O	h
Uvularia perfoliata	O	h
Viola sp.	O, M, H, A	h


Dry Creek-Mount Moriah Bottomland
Eastowne tract visit map
waypoints
survey route
Natural area boundary
Town of Chapel Hill lands
N
0
0.05
0.1
0.2
Miles
320
321
319
318
317
316
315
314
313
312
15
501
Cedar
Terrace

ORANGE COUNTY TAX ADMINISTRATION
228 S CHURTON STREET, SUITE 200
PO BOX 8181
HILLSBOROUGH, NORTH CAROLINA 27278
Telephone (919) 245-2725 **Fax** (919) 644-3332
Dwane Brinson, Tax Administrator

April 29, 2013

Health System Properties LLC
3rd FL Med Wing E
Campus Box 7600
Chapel Hill NC 27514

RE: Property Tax Exemption or Exclusion

To Whom It May Concern:

The General Statutes of North Carolina allow exemption from property taxes on certain types of properties depending on the use of the property. **In order to qualify for the exemption you must apply.** Application should be made between January 1st and January 31st. if January 1st has past there are also provisions for filing a late application.

In order to consider the application for exemption you must submit copies of your 501 © (3) determination letter, bylaws, charter and any additional information that you have that shows what the organization does.

Late applications for exemption must be made prior to December 31. Enclosed you will find a blank application for your convenience.

Applications should be mailed to:

Orange County Tax Administration
Attn: Kandice Wright
PO Box 8181
Hillsborough NC 27278

Sincerely,

Kandice Wright
Exemption Program

UNC
HEALTH CARE

January 28, 2013

Orange County Tax Administration
Attn: Orange Co. Tax Administrator
P.O. Box 8181
Hillsborough, North Carolina 27278-8181

RE: Real and Personal Property Listing as of January 01, 2013 - Health System Properties, LLC

Dear Orange County Tax Administrator:

I am in receipt of the Real and Personal Property Listing as of January 01, 2013, for Health System Properties, LLC.

Health System Properties, LLC ("HSP") is wholly owned by the University of North Carolina Health Care System ("UNC HCS"). For the real property and equipment owned by HSP at Eastowne, Orange County has entered into private agreements with HSP for the payment of taxes. As an example, please see the attached document regarding property taxes for property referenced as the "Eastowne Parcel," located off of 15-501 in Chapel Hill. Moreover, HSP does not own any personal property, and all personal property located at any HSP-owned location belongs to and is utilized for the business purposes of UNC Hospitals, a state agency.

Given this set of circumstances, we do not believe HSP is required to complete the Real and Personal Property Listing, and I am therefore returning the forms to you. Please do not hesitate to contact me at 919-966-4038 if you have any questions or need further information.

Sincerely,

Mary Beck
Sr. Vice President
UNC Health Care System

MEMORANDUM OF UNDERSTANDING FOR HEALTH SYSTEM PROPERTIES ACQUISITIONS

NOW COME Health System Properties, LLC, a corporate entity, and Orange County, a political subdivision of the State of North Carolina, together "the Parties", and acknowledge and agree to the following:

1. In return for good and valuable consideration, the receipt of which is hereby acknowledged, Health System Properties, LLC, has agreed to pay to Orange County, from 2012 forward, a sum equal to the 2011 property tax amount on a tract of land, located in Orange County, Chapel Hill, North Carolina, which Health System Properties purchased on January 6, 2012 ("Eastowne Parcel")at the following location: being all of tract 4 containing 20.5049 acres +/- as shown on plat entitled "survey of tract 4, Eastowne Office Park", prepared by Al Prince & Associates, P.A., and recorded in book of maps 73, page 142, Orange County Registry, and also being all of Orange County Pin No. 9890911209.
2. The Parties agree that Health System Properties, LLC, will pay $38,534.52 as a fixed amount on an annual basis, upon receipt of an invoice from the Orange County Tax Collector Office, for the Eastowne Parcel.
3. The Parties agree that the $38,534.52 shall be distributed annually on a pro rata basis the same as tax receipts for any other similarly situated property would be distributed.
4. The Parties hereby agree that Health System Properties, LLC, will not pay any amount, annual or otherwise, for any future structures or equipment located in Orange County, Chapel Hill, North Carolina, on this Eastowne Parcel (Orange County Property Identifier 9890911209).
5. The Parties agree that this Memorandum will cease to apply to this Eastowne Parcel should Health System Properties, LLC, sell the parcel to an entity that is not a North Carolina governmental entity.
6. The Parties agree that this Memorandum constitutes and expresses the entire agreement and understanding between the Parties concerning the subject matter herein.

This the 2nd day of April 2012.

Health System Properties, LLC

By: _____
William L. Roper, President

Orange County.

By: _____
Frank Clifton, County Manager

0000204715-2013-2013-0000

#BWNJSCP *********ALL FOR ADC 275
44846 1 FP 0.424

044846

HEALTH SYSTEM PROPERTIES LLC
3RD FL MED WING 3 44846
CAMPUS BOX 7600 259
CHAPEL HILL NC 27514

PLEASE MAKE ANY ADDRESS CORRECTIONS BELOW

Address 1: _____

Address 2: _____

City: _____ State: _____ Zip: _____

DO NOT WRITE IN SHADED AREAS TAX OFFICE USE ONLY

IMPORTANT NOTICE: MOTOR VEHICLES WITH CURRENT LICENSE TAGS ARE NOT TO BE LISTED ON THIS FORM EXCEPT MULTI-YEAR TAGGED VEHICLES

ORANGE COUNTY

REAL AND PERSONAL PROPERTY
LISTING AS OF JANUARY 1, 2013

IMPORTANT : DO NOT USE THIS FORM FOR LISTING BUSINESS PERSONAL PROPERTY
OFFICE HOURS 8:00 - 5:00 MONDAY - FRIDAY
DIRECT DIAL: 919-245-2100

ABSTRACT NUMBER	TAX JURISDICTION
0000204715	CHHL, CHSC, ORAG

MARKET VALUE: 2,501,592
DEFERRED VALUE:

DATE / /

REAL PROPERTY DESCRIPTION	ACRES/LOT	ASSESSED VALUE
4 EASTOWNE OFFICE PARK P73/142		2,501,592

PARCEL ID NUMBER	IF THIS IS RENTAL PROPERTY WHICH YOU OWN, LIST THE VALUE OF APPLIANCES AND OTHER PROPERTY YOU PROVIDE FOR YOUR TENANTS.
9890911209	

LISTED BELOW ARE ALL MOBILE HOMES, BOATS AND MOTORS, JET SKIS, AIRCRAFT, AND ANY UNLICENSED AUTOMOBILES, TRUCKS, TRAILERS, CAMPERS AND MOTORCYCLES THAT YOU LISTED IN THE PREVIOUS YEAR. MAKE CORRECTIONS BY DELETING OR MAKING ANY NEW ADDITIONS AS OF JAN. 1 OWNERSHIP. MULTI-YEAR TAGGED VEHICLES SHOULD BE LISTED HERE.

HOMESTEAD EXEMPT.

PROPERTY ID	DESCRIPTION OF PROPERTY	TAX OFFICE USE

TO AVOID 10% Llate CHARGE ON PERSONAL PROPERTY, THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED OR POSTMARKED NO LATER THAN JANUARY 31.

ORANGE COUNTY TAX ADMINISTRATION
P.O. BOX 8181
HILLSBOROUGH, NORTH CAROLINA 27278

EMPLOYER	HOME PHONE	WORK PHONE	TOTAL

SOCIAL SECURITY NO.

SPOUSE'S EMPLOYER

SPOUSE'S SOCIAL SECURITY NO.

Your Social Security number is being requested under the authority of 42 U.S.C. 405(c)(2)(C)(i) and will be used to facilitate collection of property taxes, utility billings, and other taxes and obligations owed to this local government if you do not timely and voluntarily pay such taxes, billings and obligations. For collection purposes, your Social Security number may be disclosed to (i) the state to claim payment from any state income tax refund, lottery winnings, or other payments that might otherwise owed to you; (ii) a bank or an employer to attach bank accounts or garnish wages; and, (iii) to other local governments and other departments of this local government to facilitate the collection of taxes and other obligations owed to those governments and departments.

PLEASE DO NOT ENCLOSE ANY PAYMENTS

UNDER PENALTIES PRESCRIBED BY LAW I HEREBY AFFIRM THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS LISTING INCLUDING ANY ACCOMPANYING STATEMENTS IS TRUE AND COMPLETE.

SIGNATURE OF OWNER

TAX RELIEF

INFORMATION CONCERNING PROPERTY TAX HOMESTEAD EXCLUSION FOR ELDERLY OR DISABLED AND CIRCUIT BREAKER DEFERMENT

General Statute 105-277.1 Property Tax Homestead Exclusion For Elderly Or Disabled Persons:

North Carolina excludes from property taxes a portion of the appraised value of a permanent residence owned and occupied by North Carolina residents who are at least 65 years of age or are totally and permanently disabled, and whose income does not exceed twenty-eight thousand one hundred dollars ($28,100). The amount of the appraised value of the residence that may be excluded from taxation is the greater of twenty-five thousand dollars ($25,000) or fifty percent (50%) of the appraised value of the residence. Income means all moneys received from every source other than gifts or inheritances received from a spouse, lineal ancestor, or lineal descendant.

If you received this exclusion last year, you do not need to apply again unless you have changed your permanent residence. If you received the exclusion last year but the property no longer qualifies for any reason, you must notify the assessor. Failure to notify the assessor that the property no longer qualifies for the exclusion may cause the property to be subject to discovery with penalties and interest pursuant to G.S. 105-312.

If you did not receive the exclusion last year, but are now eligible, you may obtain an application from the county tax department. It must be filed with the county assessor by **June 1,** to be timely filed.

General Statute 105-277.1B Property Tax Homestead Circuit Breaker Deferment:

North Carolina defers a portion of the property taxes on the appraised value of a permanent residence owned and occupied by a North Carolina resident who has owned and occupied the property at least five years, is at least 65 years of age or is totally and permanently disabled, and whose income does not exceed forty-two thousand one hundred and fifty dollars ($42,150). If the owner's income is twenty-eight thousand one hundred dollars ($28,100) or less, then the portion of property taxes imposed on the residence that exceeds 4% of the owner's income may be deferred. If the owner's income is more than twenty-eight thousand one hundred dollars ($28,101) but less than or equal to forty-two thousand one hundred and fifty dollars ($42,150) then the portion of the property taxes on the residence that exceeds 5% of the owner's income may be deferred.

The deferred taxes become a lien on the residence and the most recent three years of deferred taxes preceding a disqualifying event become due with interest upon one of the following disqualifying events: 1) the owner transfers the residence; 2) the owner dies; or 3) the owner ceases to use the property as a permanent residence. Multiple owners of a permanent residence must all qualify for the circuit breaker before a deferment of taxes will be allowed.

You must apply for the opportunity to defer property taxes each and every year that you wish to defer taxes. The application may be obtained from the county tax department and it must be filed with the county assessor by **June 1,** to be timely filed.

Note: An owner who qualifies for both the property tax homestead exclusion and the property tax homestead circuit breaker may elect to take only one of these forms of property tax relief.

Orange County Tax Office, P.O. Box 8181, Hillsborough, NC 27278, (919) 245-2100

☐ ACCORDING TO THE INFORMATION ABOVE, I NO LONGER QUALIFY FOR THE HOMESTEAD EXEMPTION.

☐ I WANT TO RECEIVE A HOMESTEAD/CIRCUIT BREAKER/DISABLED VETERANS APPLICATION.

NEW CONSTRUCTION OR IMPROVEMENTS made to your Real Property during the preceding calendar year. (DESCRIBE THE IMPROVEMENTS)

ESTIMATED CONSTRUCTION COST WHEN COMPLETED $	PERCENT COMPLETION ON JAN. 1, THIS YEAR

GIVE NAME OF LANDOWNER, IF YOU RENT / OR NAME OF MOBILE PARK / OR APT.

NAME

ADDRESS

CITY/STATE/ZIP

ITEMS FURNISHED BY LANDOWNER

FOR LANDOWNER ONLY
ARE THERE MOBILE HOMES LOCATED ON THIS LAND?
YES ☐ NO ☐ NUMBER _____

IF "YES" LIST OWNER'S NAME AND ADDRESS BELOW

NAME & ADDRESS _____

NAME & ADDRESS _____

IF LISTING A MOBILE HOME, PLEASE LIST THE PHYSICAL/STREET ADDRESS:

NOTES IF NEEDED

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION

UNC
HEALTH CARE

January 28, 2013

Orange County Tax Administration
Attn: Orange Co. Tax Administrator
P.O. Box 8181
Hillsborough, North Carolina 27278-8181

RE: Real and Personal Property Listing as of January 01, 2013 - Health System Properties, LLC

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2. The Parties agree that Health System Properties, LLC, will pay $42,055.64 as a fixed amount on an annual basis, upon receipt of an invoice from the Orange County Tax Collector Office, for the Eastowne Parcel.
3. The Parties agree that the $42,055.64 shall be distributed annually on a pro rata basis the same as tax receipts for any other similarly situated property would be distributed.
4. The Parties hereby agree that Health System Properties, LLC, will not pay any amount, annual or otherwise, for any future structures or equipment located in Orange County, Chapel Hill, North Carolina, on this Eastowne Parcel (Orange County Property Identifier 9890807564).
5. The Parties agree that this Memorandum will cease to apply to this Eastowne Parcel should Health System Properties, LLC, sell the parcel to an entity that is not a North Carolina governmental entity.
6. The Parties agree that this Memorandum constitutes and expresses the entire agreement and understanding between the Parties concerning the subject matter herein.

This the 2nd day of April 2012.

Health System Properties, LLC

By: _____
William L. Roper, President

Orange County

By: _____
Frank Clifton, County Manager

0000204714-2013-2013-0000

#BWNJSCP *********ALL FOR ADC 275
44936 2 FP 0.424

044936

HEALTH SYSTEM PROPERTIES LLC
3RD FL MED WING E 44936
CAMPUS BOX 7600 260
CHAPEL HILL NC 27514

PLEASE MAKE ANY ADDRESS CORRECTIONS BELOW

Address 1: _____

Address 2: _____

City: _____ State: _____ Zip: _____

DO NOT WRITE IN SHADED AREAS TAX OFFICE USE ONLY

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ORANGE COUNTY

REAL AND PERSONAL PROPERTY
LISTING AS OF JANUARY 1, 2013

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OFFICE HOURS 8:00 - 5:00 MONDAY - FRIDAY
DIRECT DIAL: 919-245-2100

ABSTRACT NUMBER	TAX JURISDICTION
0000204714	CHHL, CHSC, ORAG

MARKET VALUE: 2,603,586
DEFERRED VALUE:

DATE / /

REAL PROPERTY DESCRIPTION	ACRES/LOT	ASSESSED VALUE
TR 3 REV 3 EASTOWNE OFFICE PARK P73/		2,603,586

PARCEL ID NUMBER	IF THIS IS RENTAL PROPERTY WHICH YOU OWN, LIST THE VALUE OF APPLIANCES AND OTHER PROPERTY YOU PROVIDE FOR YOUR TENANTS.
9890807564	

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HOMESTEAD EXEMPT.

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ORANGE COUNTY TAX ADMINISTRATION
P.O. BOX 8181
HILLSBOROUGH, NORTH CAROLINA 27278

PLEASE DO NOT ENCLOSE ANY PAYMENTS

EMPLOYER	HOME PHONE	WORK PHONE	TOTAL

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SPOUSE'S EMPLOYER

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ESTIMATED CONSTRUCTION COST WHEN COMPLETED $	PERCENT COMPLETION ON JAN. 1, THIS YEAR

GIVE NAME OF LANDOWNER, IF YOU RENT / OR NAME OF MOBILE PARK / OR APT.

NAME

ADDRESS

CITY/STATE/ZIP

ITEMS FURNISHED BY LANDOWNER

FOR LANDOWNER ONLY
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NAME & ADDRESS _____

NAME & ADDRESS _____

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NOTES IF NEEDED

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION

UNC
HEALTH CARE

January 28, 2013

Orange County Tax Administration
Attn: Orange Co. Tax Administrator
P.O. Box 8181
Hillsborough, North Carolina 27278-8181

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Health System Properties, LLC ("HSP") is wholly owned by the University of North Carolina Health Care System ("UNC HCS"). For the real property and equipment owned by HSP at Eastowne, Orange County has entered into private agreements with HSP for the payment of taxes. As an example, please see the attached document regarding property taxes for property referenced as the "Eastowne Parcel," located off of 15-501 in Chapel Hill. Moreover, HSP does not own any personal property, and all personal property located at any HSP-owned location belongs to and is utilized for the business purposes of UNC Hospitals, a state agency.

Given this set of circumstances, we do not believe HSP is required to complete the Real and Personal Property Listing, and I am therefore returning the forms to you. Please do not hesitate to contact me at 919-966-4038 if you have any questions or need further information.

Sincerely,

Mary Beck
Sr. Vice President
UNC Health Care System

MEMORANDUM OF UNDERSTANDING FOR HEALTH SYSTEM PROPERTIES ACQUISITIONS

NOW COME Health System Properties, LLC, a corporate entity, and Orange County, a political subdivision of the State of North Carolina, together "the Parties", and acknowledge and agree to the following:

1. In return for good and valuable consideration, the receipt of which is hereby acknowledged, Health System Properties, LLC, has agreed to pay to Orange County, from 2012 forward, a sum equal to the 2011 property tax amount on a tract of land located in Orange County, Chapel Hill, North Carolina, which Health System Properties purchased on January 6, 2012 ("Eastowne Parcel"), at the following location: being all of tract 3b containing 3.733+/- acres as shown on Eastowne Office Park, recombination plat tract 1 and tract 3b shown on plat book 73, page 10 of the Orange County Register of Deeds, and also being known as all of Orange County Pin No. 9890800643.
2. The Parties agree that Health System Properties, LLC, will pay $59,782.16 as a fixed amount on an annual basis, upon receipt of an invoice from the Orange County Tax Collector Office, for the Eastowne Parcel.
3. The Parties agree that the $59,782.16 shall be distributed annually on a pro rata basis the same as tax receipts for any other similarly situated property would be distributed.
4. The Parties hereby agree that Health System Properties, LLC, will not pay any amount, annual or otherwise, for any future structures or equipment located in Orange County, Chapel Hill, North Carolina, on this Eastowne Parcel (Orange County Property Identifier 9890800643).
5. The Parties agree that this Memorandum will cease to apply to the Eastowne Parcel should Health System Properties, LLC, sell the parcel to an entity that is not a North Carolina governmental entity.
6. The Parties agree that this Memorandum constitutes and expresses the entire agreement and understanding between the Parties concerning the subject matter herein.

This the 2nd day of April 2012.

Health System Properties, LLC

By: _____
William L. Roper, President

Orange County

By: _____
Frank Clifton, County Manager

0000197403-2013-2013-0000

#BWNJSCP

HEALTH SYSTEM PROPERTIES LLC
3RD FL MED WING E
CAMPUS BOX 7600
CHAPEL HILL NC 27514

PLEASE MAKE ANY ADDRESS CORRECTIONS BELOW

Address 1: _____

Address 2: _____

City: _____ State: _____ Zip: _____

DO NOT WRITE IN SHADED AREAS TAX OFFICE USE ONLY

IMPORTANT NOTICE: MOTOR VEHICLES WITH CURRENT LICENSE TAGS ARE NOT TO BE LISTED ON THIS FORM EXCEPT MULTI-YEAR TAGGED VEHICLES

ORANGE COUNTY

REAL AND PERSONAL PROPERTY
LISTING AS OF JANUARY 1, 2013

IMPORTANT : DO NOT USE THIS FORM FOR LISTING BUSINESS PERSONAL PROPERTY
OFFICE HOURS 8:00 - 5:00 MONDAY - FRIDAY
DIRECT DIAL: 919-245-2100

ABSTRACT NUMBER	TAX JURISDICTION
0000197403	CHHL, CHSC, ORAG

MARKET VALUE: 3,805,126
DEFERRED VALUE:

DATE / /

REAL PROPERTY DESCRIPTION	ACRES/LOT	ASSESSED VALUE
3B REV EASTOWNE OFFICE PARK P73/10		3,805,126

PARCEL ID NUMBER	IF THIS IS RENTAL PROPERTY WHICH YOU OWN, LIST THE VALUE OF APPLIANCES AND OTHER PROPERTY YOU PROVIDE FOR YOUR TENANTS.	
9890800643		

LISTED BELOW ARE ALL MOBILE HOMES, BOATS AND MOTORS, JET SKIS, AIRCRAFT, AND ANY UNLICENSED AUTOMOBILES, TRUCKS, TRAILERS, CAMPERS AND MOTORCYCLES THAT YOU LISTED IN THE PREVIOUS YEAR. MAKE CORRECTIONS BY DELETING OR MAKING ANY NEW ADDITIONS AS OF JAN. 1 OWNERSHIP. MULTI-YEAR TAGGED VEHICLES SHOULD BE LISTED HERE.

HOMESTEAD EXEMPT.

PROPERTY ID	DESCRIPTION OF PROPERTY	TAX OFFICE USE

TO AVOID 10% Llate CHARGE ON PERSONAL PROPERTY, THIS FORM MUST BE COMPLETED, SIGNED, AND RETURNED OR POSTMARKED NO LATER THAN JANUARY 31.

ORANGE COUNTY TAX ADMINISTRATION
P.O. BOX 8181
HILLSBOROUGH, NORTH CAROLINA 27278

EMPLOYER	HOME PHONE	WORK PHONE	TOTAL

SOCIAL SECURITY NO.

SPOUSE'S EMPLOYER

SPOUSE'S SOCIAL SECURITY NO.

Your Social Security number is being requested under the authority of 42 U.S.C. 405(c)(2)(C)(i) and will be used to facilitate collection of property taxes, utility billings, and other taxes and obligations owed to this local government if you do not timely and voluntarily pay such taxes, billings and obligations. For collection purposes, your Social Security number may be disclosed to (i) the state to claim payment from any state income tax refund, lottery winnings, or other payments that might otherwise owed to you; (ii) a bank or an employer to attach bank accounts or garnish wages; and, (iii) to other local governments and other departments of this local government to facilitate the collection of taxes and other obligations owed to those governments and departments.

UNDER PENALTIES PRESCRIBED BY LAW I HEREBY AFFIRM THAT TO THE BEST OF MY KNOWLEDGE AND BELIEF THIS LISTING INCLUDING ANY ACCOMPANYING STATEMENTS IS TRUE AND COMPLETE.

SIGNATURE OF OWNER

TAX RELIEF

INFORMATION CONCERNING PROPERTY TAX HOMESTEAD EXCLUSION FOR ELDERLY OR DISABLED AND CIRCUIT BREAKER DEFERMENT

General Statute 105-277.1 Property Tax Homestead Exclusion For Elderly Or Disabled Persons:

North Carolina excludes from property taxes a portion of the appraised value of a permanent residence owned and occupied by North Carolina residents who are at least 65 years of age or are totally and permanently disabled, and whose income does not exceed twenty-eight thousand one hundred dollars ($28,100). The amount of the appraised value of the residence that may be excluded from taxation is the greater of twenty-five thousand dollars ($25,000) or fifty percent (50%) of the appraised value of the residence. Income means all moneys received from every source other than gifts or inheritances received from a spouse, lineal ancestor, or lineal descendant.

If you received this exclusion last year, you do not need to apply again unless you have changed your permanent residence. If you received the exclusion last year but the property no longer qualifies for any reason, you must notify the assessor. Failure to notify the assessor that the property no longer qualifies for the exclusion may cause the property to be subject to discovery with penalties and interest pursuant to G.S. 105-312.

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General Statute 105-277.1B Property Tax Homestead Circuit Breaker Deferment:

North Carolina defers a portion of the property taxes on the appraised value of a permanent residence owned and occupied by a North Carolina resident who has owned and occupied the property at least five years, is at least 65 years of age or is totally and permanently disabled, and whose income does not exceed forty-two thousand one hundred and fifty dollars ($42,150). If the owner's income is twenty-eight thousand one hundred dollars ($28,100) or less, then the portion of property taxes imposed on the residence that exceeds 4% of the owner's income may be deferred. If the owner's income is more than twenty-eight thousand one hundred dollars ($28,101) but less than or equal to forty-two thousand one hundred and fifty dollars ($42,150) then the portion of the property taxes on the residence that exceeds 5% of the owner's income may be deferred.

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Orange County Tax Office, P.O. Box 8181, Hillsborough, NC 27278, (919) 245-2100

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☐ I WANT TO RECEIVE A HOMESTEAD/CIRCUIT BREAKER/DISABLED VETERANS APPLICATION.

NEW CONSTRUCTION OR IMPROVEMENTS made to your Real Property during the preceding calendar year. (DESCRIBE THE IMPROVEMENTS)

ESTIMATED CONSTRUCTION COST WHEN COMPLETED	PERCENT COMPLETION ON JAN. 1, THIS YEAR
$	

GIVE NAME OF LANDOWNER, IF YOU RENT / OR NAME OF MOBILE PARK / OR APT.

NAME

ADDRESS

CITY/STATE/ZIP

ITEMS FURNISHED BY LANDOWNER

FOR LANDOWNER ONLY
ARE THERE MOBILE HOMES LOCATED ON THIS LAND?
YES ☐ NO ☐ NUMBER _____

IF "YES" LIST OWNER'S NAME AND ADDRESS BELOW

NAME & ADDRESS _____

NAME & ADDRESS _____

IF LISTING A MOBILE HOME, PLEASE LIST THE PHYSICAL/STREET ADDRESS:

NOTES IF NEEDED

PLEASE DO NOT ENCLOSE ANY PAYMENTS

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION

UNC
HEALTH CARE

January 28, 2013

Orange County Tax Administration
Attn: Orange Co. Tax Administrator
P.O. Box 8181
Hillsborough, North Carolina 27278-8181

RE: Real and Personal Property Listing as of January 01, 2013 - Health System Properties, LLC

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2. The Parties agree that Health System Properties, LLC, will pay $143,651.17 as a fixed amount on an annual basis, upon receipt of an invoice from the Orange County Tax Collector Office, for the Eastowne Parcel.
3. The Parties agree that the $143,651.17 shall be distributed annually on a pro rata basis the same as tax receipts for any other similarly situated property would be distributed.
4. The Parties hereby agree that Health System Properties, LLC, will not pay any amount, annual or otherwise, for any future structures or equipment located in Orange County, Chapel Hill, North Carolina, on this Eastowne Parcel (Orange County Property Identifier 9890800195).
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This the 2nd day of April 2012.

Health System Properties, LLC

By: _____
William L. Roper, President

Orange County

By: _____
Frank Clifton, County Manager

0000197402-2013-2013-0000

#BWNJSCP

HEALTH SYSTEM PROPERTIES LLC
3RD FL MED WING E
CAMPUS BOX 7600
CHAPEL HILL NC 27514

PLEASE MAKE ANY ADDRESS CORRECTIONS BELOW

Address 1: _____

Address 2: _____

City: _____ State: _____ Zip: _____

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TAX OFFICE USE ONLY

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ORANGE COUNTY

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LISTING AS OF JANUARY 1, 2013

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DIRECT DIAL: 919-245-2100

ABSTRACT NUMBER	TAX JURISDICTION
0000197402	CHHL, CHSC, ORAG

MARKET VALUE: 9,064,994
DEFERRED VALUE:

DATE / /

REAL PROPERTY DESCRIPTION	ACRES/LOT	ASSESSED VALUE
1 REV EASTOWNE OFFICE PARK P73/10		9,064,994

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ORANGE COUNTY TAX ADMINISTRATION
P.O. BOX 8181
HILLSBOROUGH, NORTH CAROLINA 27278

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SPOUSE'S EMPLOYER

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ESTIMATED CONSTRUCTION COST WHEN COMPLETED	PERCENT COMPLETION ON JAN. 1, THIS YEAR
$	

GIVE NAME OF LANDOWNER, IF YOU RENT / OR NAME OF MOBILE PARK / OR APT.

NAME

ADDRESS

CITY/STATE/ZIP

ITEMS FURNISHED BY LANDOWNER

FOR LANDOWNER ONLY
ARE THERE MOBILE HOMES LOCATED ON THIS LAND?
YES ☐ NO ☐ NUMBER _____

IF "YES" LIST OWNER'S NAME AND ADDRESS BELOW

NAME & ADDRESS _____

NAME & ADDRESS _____

IF LISTING A MOBILE HOME, PLEASE LIST THE PHYSICAL/STREET ADDRESS:

NOTES IF NEEDED

SEE REVERSE SIDE FOR ADDITIONAL INFORMATION

Eastowne Conditional Zoning

Town Council

May 24, 2023

Summary of Work Since Opening Public Hearing

- ❑ Continued discussion on parking needs and the Northern 20 acres
- ❑ Community Benefits
- ❑ Finalizing the site specific ordinance

Eastowne Development at Full Build Out with Parking on N20 (if required)

Northern 20 acres (N20)

UNC Health will place a minimum of 10 acres in to perpetual preservation

UNC Health have accepted an easement request from ToCH for a potential future road across the N20 (stip. #52)

Maximum 1,200-space parking structure, shall be subsequently authorized by the Town Manager upon demonstration of additional need to include:

- Surveys of existing parking lot utilization with documentation provided by UNCH of vehicular parking utilization at peak hours, number of staff on-site, number of patients, and use of bicycle parking spaces

- If peak hour utilization of the vehicular parking spaces exceed 80% of the capacity, a parking structure to provide the additional parking necessary to meet the overall demonstrated need for the Eastowne development will be approved on the N20

Community Benefit

UNC Health presented the following community benefit options to the Town:

- $5M 20-year loan at 0% interest

Loan Opportunity Cost

- Using a 6% annual rate of return, a 20-year $5M loan would cost UNC Health ~$11M in opportunity costs:
  - UNC Health would otherwise use the $5M to invest in improving healthcare delivery
  - The ~$11M in appreciation is occurring during a time that UNC Health is experiencing increasing costs and capital needs relative to cash available
  - These factors affect UNC Health's ability to continue providing affordable care to the community

Note: In 2022, UNC Health provided ~$34M in unreimbursed care to patients within the Town of Chapel Hill

Each year, UNC Health and/or its subsidiaries directly pay (payments in-lieu) and indirectly pay (reimbursement of property taxes to third-party landlords) ~$1.6M to Orange County and the Town of Chapel Hill

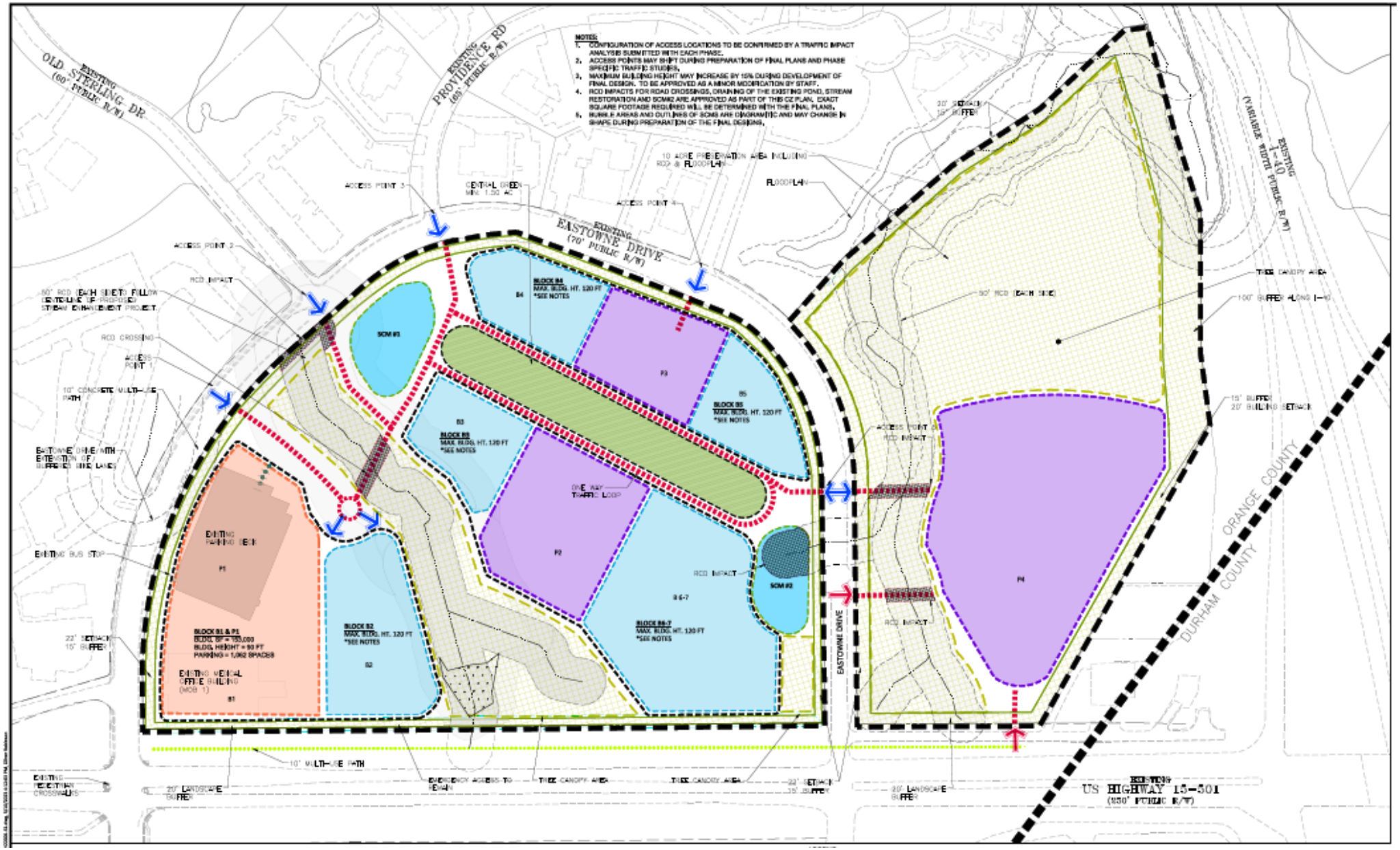
Action Requested

Vote of approval by Council for the Conditional Zoning application

Questions & Discussion

Appendix

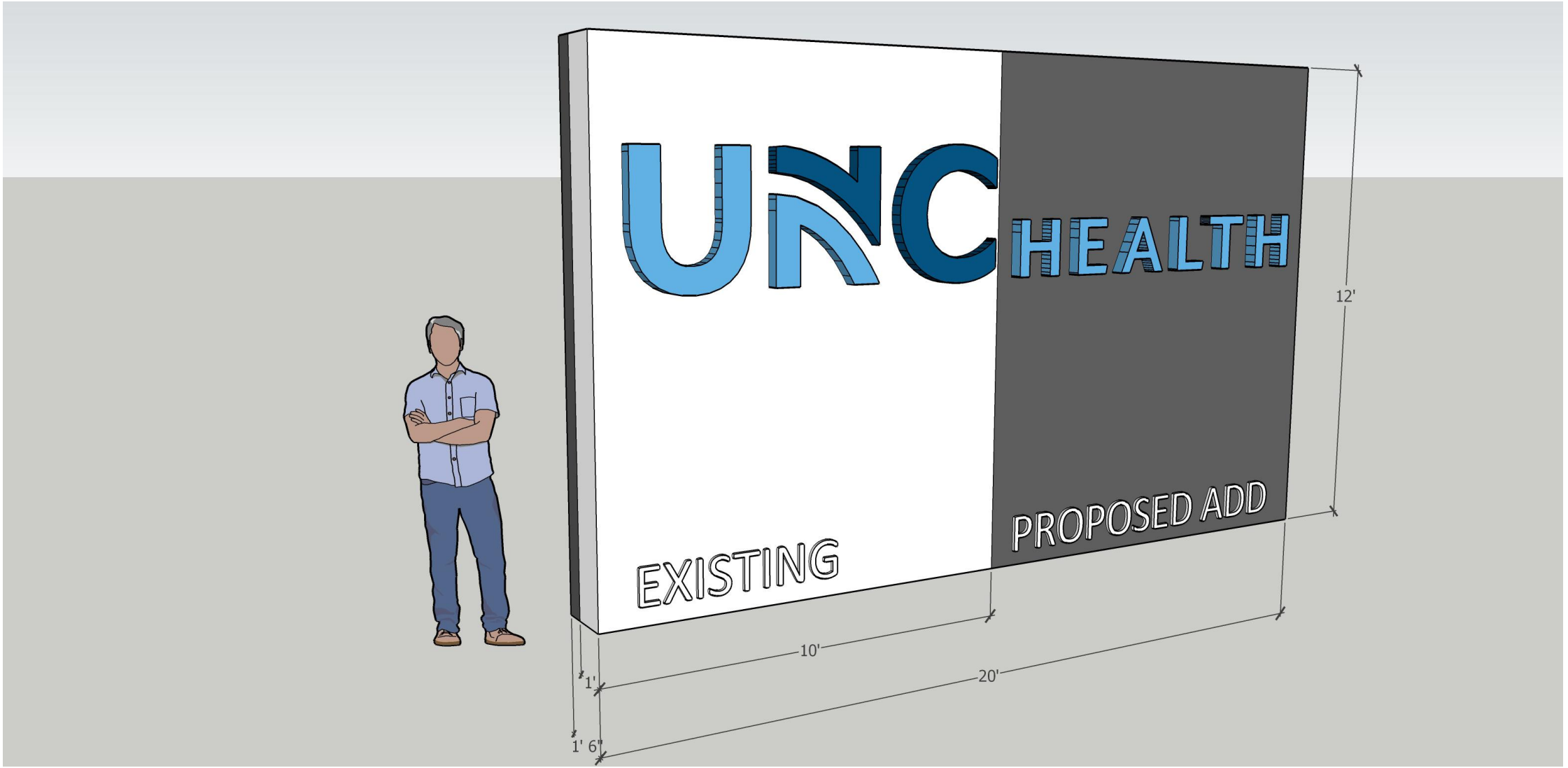
Revised Concept Site Plan



McAdams

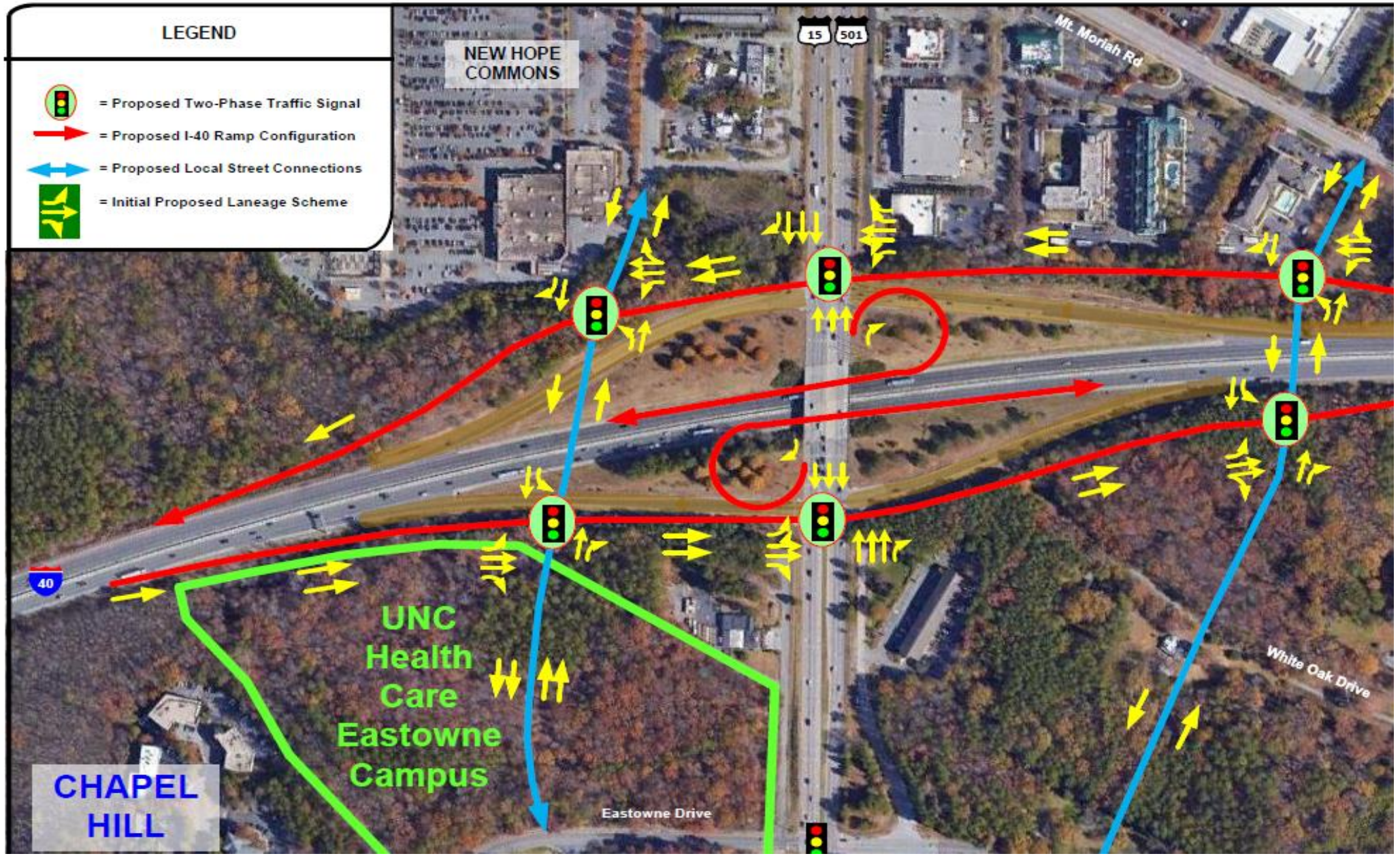
UNC HEALTH

Eastowne Development Proposed Signage Increase

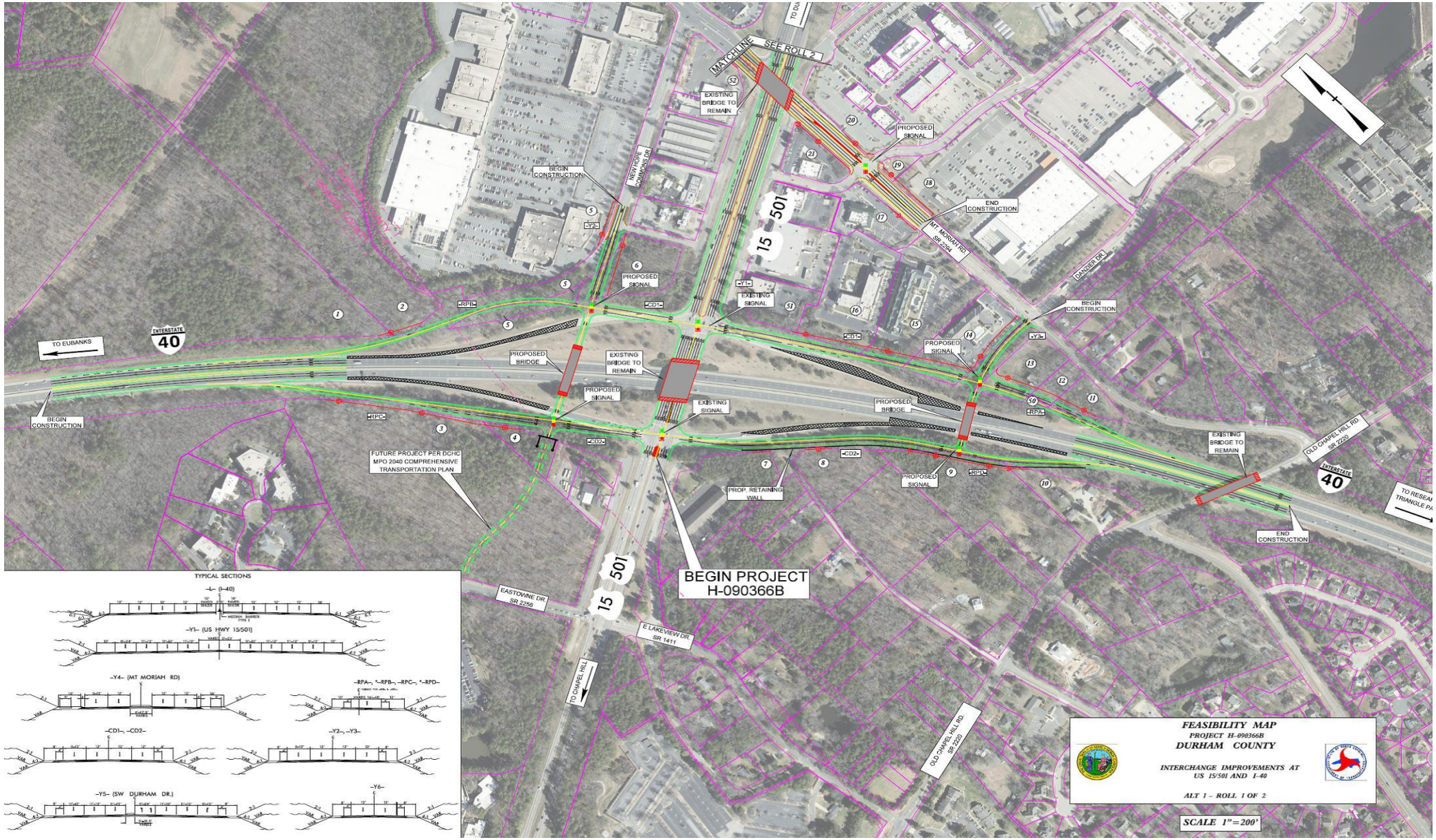


* This is a diagram, not a design. Color variations are only meant to exemplify the existing allowable size vs. the proposed sign area.

New Hope Connector



New Hope Connector



New Hope Connector

Northern 20 acres – Natural Area

Revised Proposed Eastowne Development – Use, Size, & Timeline

Primary Use:	Health care and associated functions, research, and site-specific retail
Size:	~1.1M sq. ft. net new (excluding ET1)
Number of buildings:	6 (plus 3-4 structured parking) (excluding ET1)
Development Timeline:	1 building every 3-5 years
	Full build out 25+ years
	Medical Office Building 2 - ASAP

Key Points for Today

- ❑ The Importance of Eastowne
- ❑ Summary of Work to Date
- ❑ Review Updated Concept (Bubble) Plan
- ❑ Review of Masterplan
- ❑ Discuss Community Benefits Options
- ❑ Questions

Eastowne Development – Why?

- ❑ Provide affordable and accessible health care
- ❑ Better patient experience
- ❑ Keep it local – within the Chapel Hill community
- ❑ Move and decompress outpatient services from the Medical Center
- ❑ Increase bed capacity and throughput at the Medical Center

Healthcare Was Changing Prior to the Pandemic

Personalization

Convenience

Affordability

Transparency

The Pandemic Accelerated that Change and Spurred More

How COVID Has Impacted Chronic Disease

Aside from its own direct and terrible death toll, the COVID-19 pandemic is intertwined with the trajectories of other dangerous health conditions – and the consequences are still playing out.

By Steven Ross Johnson | March 10, 2022, at 4:38 p.m.

U.S. News & World Report

The Impact of COVID-19 on Cancer Screening: Challenges and Opportunities

Ramon S Cancino [1, 2]; Zhaohui Su [2]; Ruben Mesa [2, 3];
Gail E Tomlinson [2, 4]; Jing Wang [2, 5]

JMIR Cancer
Patient-Centered Innovations, Education and Technology for Cancer
Published on 29.10.2020 in Vol 6, No 2 (2020): Jul-Dec

COVID-19 pandemic triggers 25% increase in prevalence of anxiety and depression worldwide

World Health Organization

2 March 2022 News release Reading time: 3 min (927 words)

Prepare for Shifts in Alternative Care Settings

2022 Environmental Scan

American Hospital Association

Pandemic-Driven Health Policies To Address Social Needs And Health Equity

HealthAffairs

MARCH 10, 2022

William K. Bleser, Humphrey Shen, Hannah L. Crook, Andrea Thoumi, Rushina Cholera, Jay Pearson, Rebecca G. Whitaker, Robert S. Saunders

How COVID-19 has changed the way US consumers think about healthcare

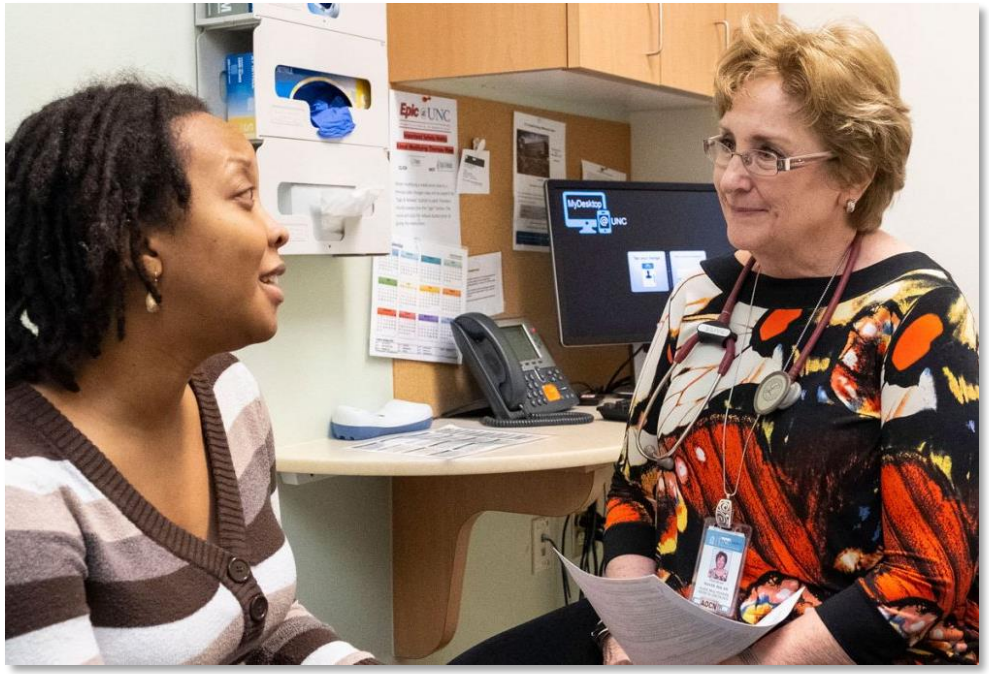
June 4, 2021 | Article

by Jenny Cordina, Eric Levin, Andrew Ramish, and Nikhil Seshan

McKinsey&Company

UNC HEALTH

Our Patients' & Community's Expectations Have Evolved



Easy, affordable access is a must for our patients & community

UNC Health must respond to the changing needs and expectations of those we serve

Original Proposed Eastowne Development – Use, Size, & Timeline

Primary Use:	Health care and associated functions, research, and site specific retail
Size:	~1.6M sq. ft. - ~1.8M sq. ft.
Number of buildings:	~8 (plus structured parking)
Development Timeline:	1 building every 3-5 years
	Full build out 25+ years
	Medical Office Building 2 - ASAP

Recent Progress

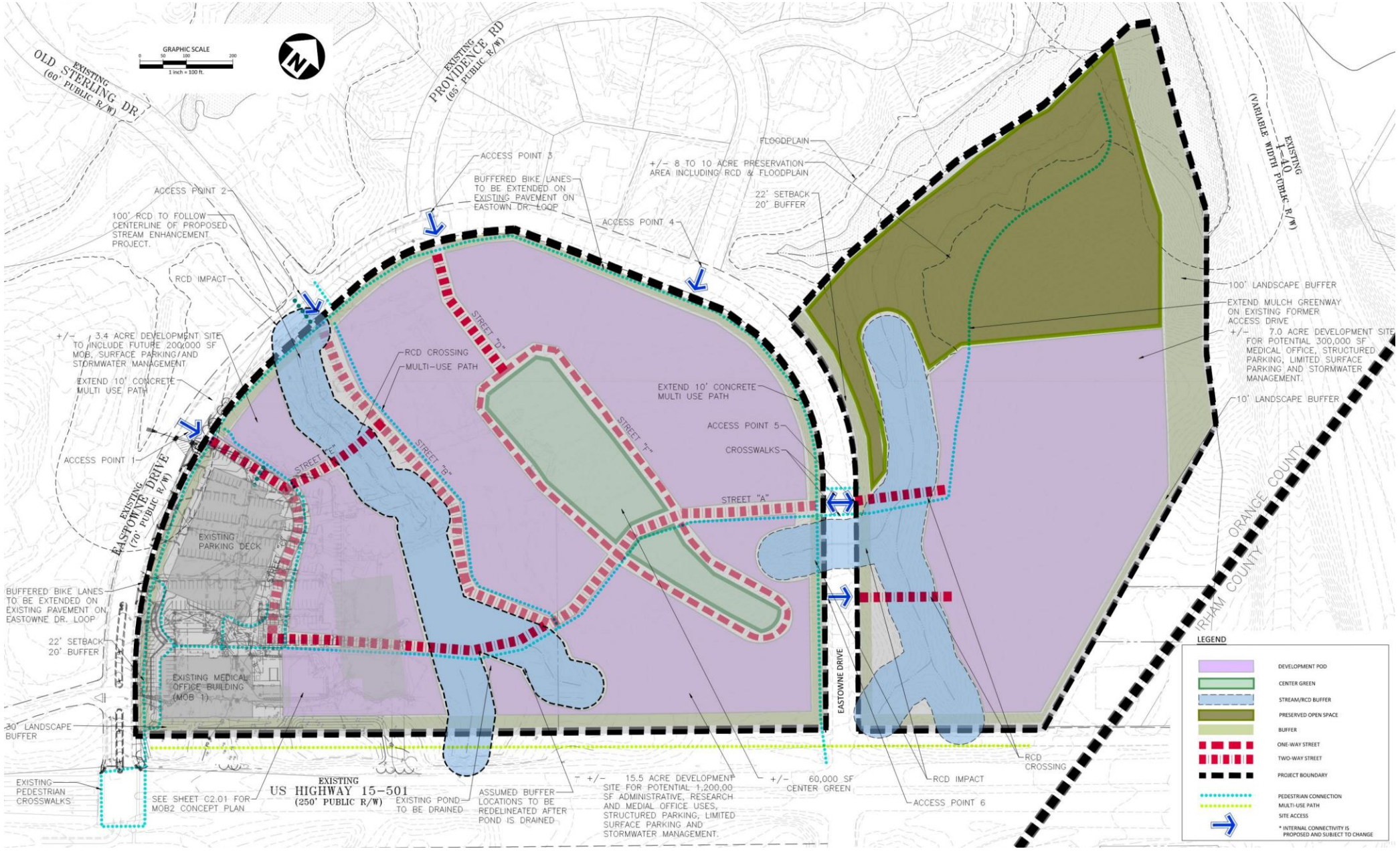
Many productive meetings between Planning Staff and UNC Health team

Conducted Traffic Impact Analysis that shows if we build more than 1.1M net new sq. ft. major road improvements at 15-501 and I-40 would be required

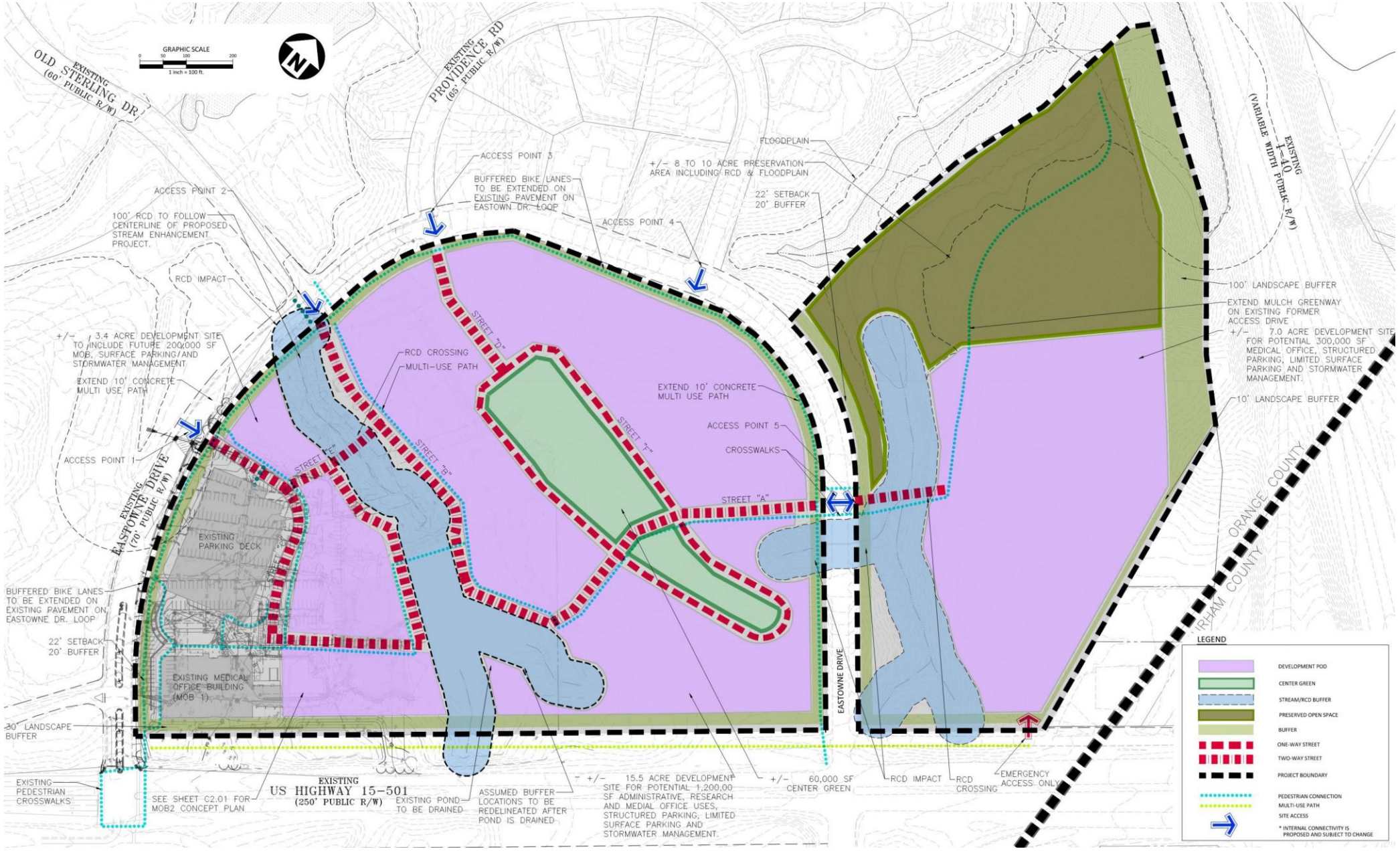
Continue to refine campus layout options for Eastowne campus

Continued discussion regarding affordable housing

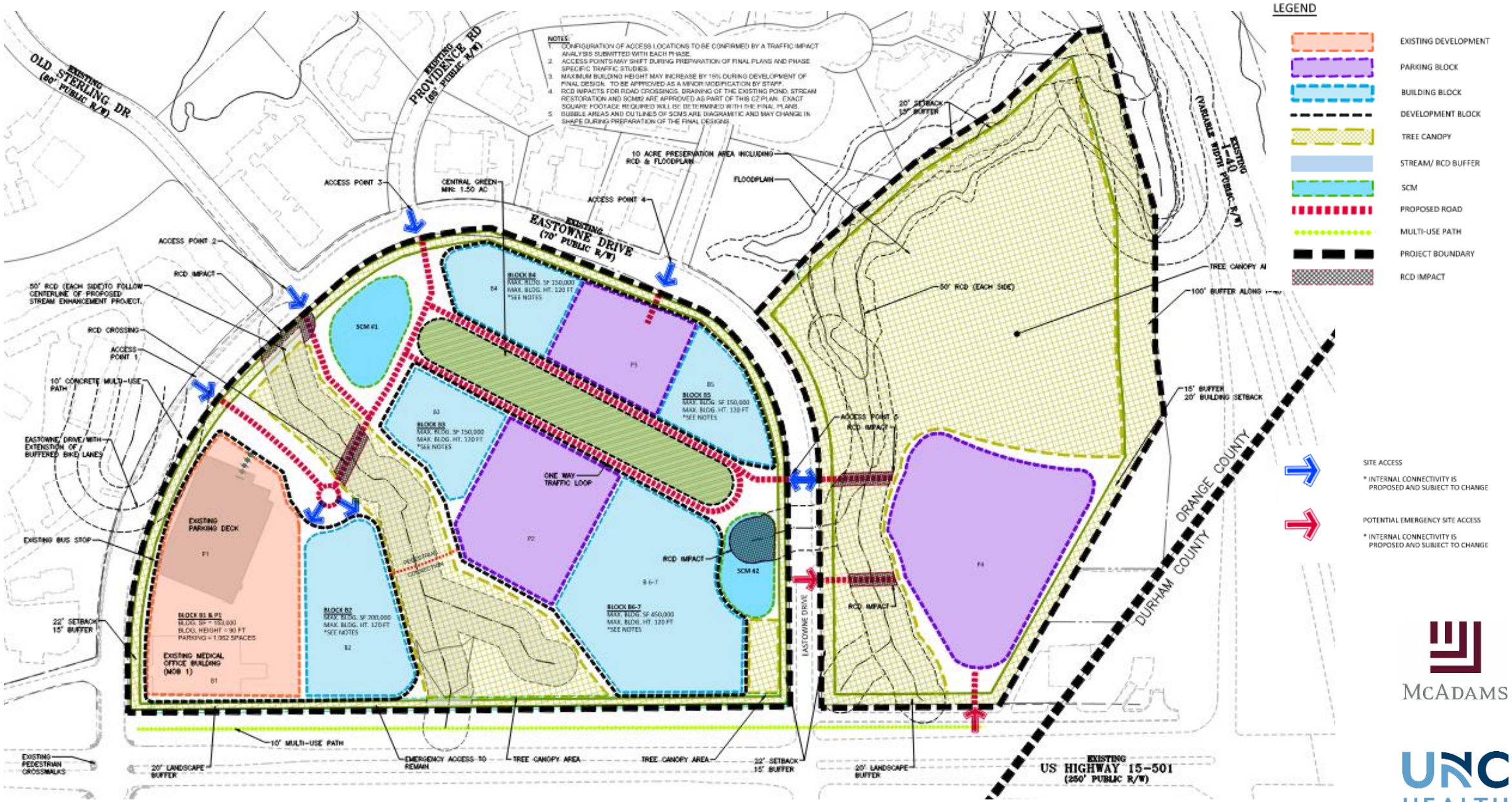
Submitted Concept Site Plan



Revised Concept Site Plan



Revised Concept Site Plan



Eastowne Development at Phase 2

GAD
GESTALT ARCHITECTURE + DESIGN

UNC HEALTH

Eastowne Development at Full Build Out

GAD
GESTALT ARCHITECTURE + DESIGN

UNC HEALTH

Eastowne Development at Full Build Out with Parking on N20 (if required)

View from Parkline/ 15-501

We are using this rendering to express massing and general circulation only and DOES NOT illustrate intended building or site design. ALL existing and or negotiated standards for planting and pedestrian paths will be followed.

East Entrance to center green with six story parking decks

* We are using this rendering to express massing and general circulation only and DOES NOT illustrate intended building or site design. ALL existing and or negotiated standards for planting and pedestrian paths will be followed.

GAD
GESTALT ARCHITECTURE + DESIGN

UNC HEALTH

East Entrance to center green with six story parking decks

* We are using this rendering to express massing and general circulation only and DOES NOT illustrate intended building or site design. ALL existing and or negotiated standards for planting and pedestrian paths will be followed.

West Entrance to center green with six story parking decks

* We are using this rendering to express massing and general circulation only and DOES NOT illustrate intended building or site design. ALL existing and or negotiated standards for planting and pedestrian paths will be followed.

View from existing parking deck with MOB II on the right

* We are using this rendering to express massing and general circulation only and DOES NOT illustrate intended building or site design. ALL existing and or negotiated standards for planting and pedestrian paths will be followed.

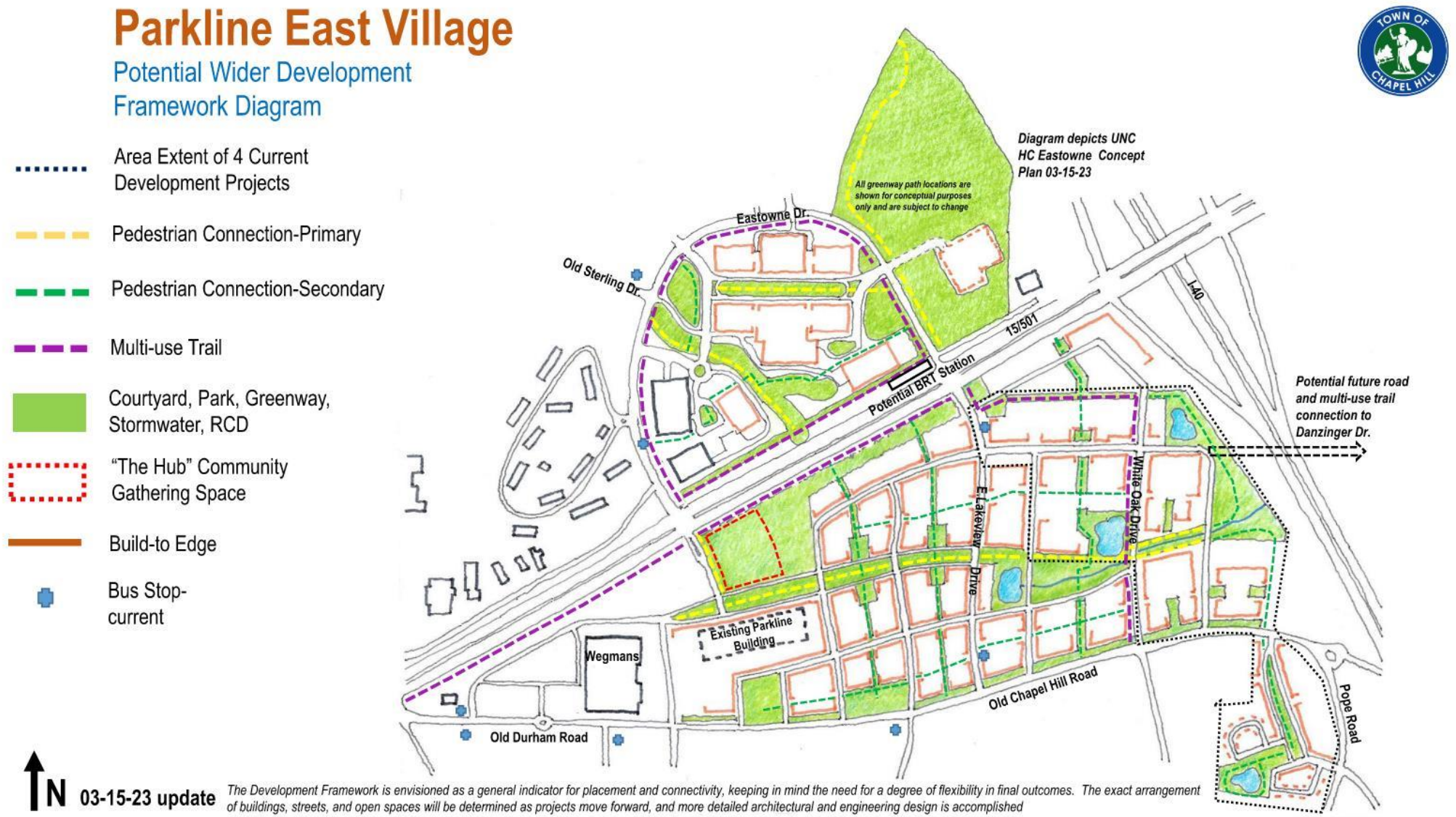
View from MOB I with MOB II (and walkway) on the right

* We are using this rendering to express massing and general circulation only and DOES NOT illustrate intended building or site design. ALL existing and or negotiated standards for planting and pedestrian paths will be followed.

Connectivity Through and Around the Site

All pedestrian path locations are shown for conceptual progress only and are subject to change

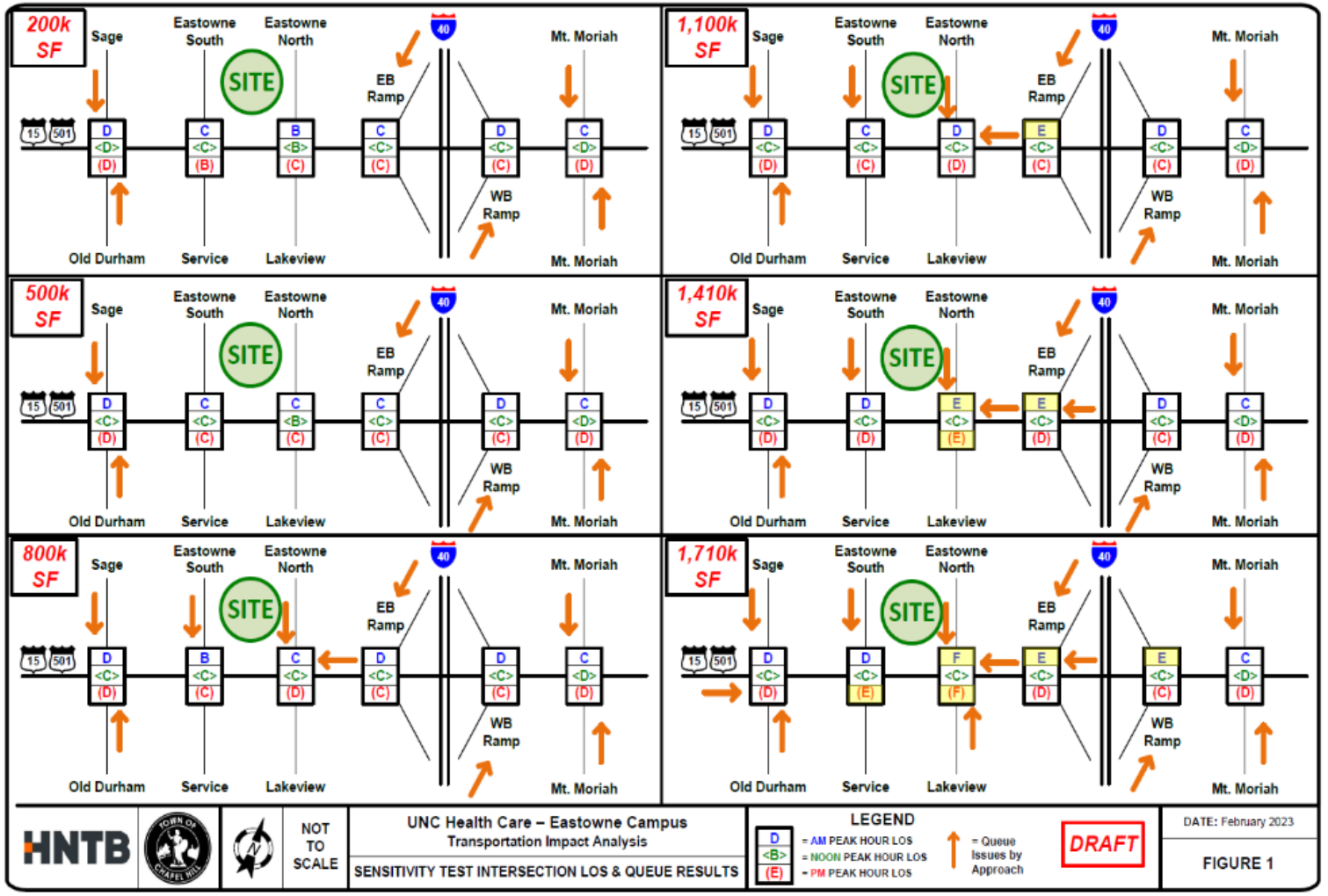
Complete Community Diagram



Complete Community Framework Diagram

Traffic Sensitivity Study

- Traffic mitigation requirements were studied for 6 development densities.
- Significant coordination with Town Staff, HNTB and UNC Health Team to determine appropriate study points and methodology
- UNC Health rightsized the Eastowne development based on practical road network improvements and patient needs.
- To avoid heavy modification to I-40/15-501 interchange, 1.1MSF was selected for max density.



Traffic Impact Analysis

Our original plan was to develop up to 1.7 million square feet of medical office, research and support services during the next 20-25 years

At the beginning of 2023, an incremental sensitivity analysis, to understand what thresholds of development on the Eastowne site would begin to stress the adjacent roadways

Based on the sensitivity analysis of the adjacent roadways, 1.7 million square feet of development would stress the system to a point of requiring roadway improvements beyond UNC Health's ability to mitigate, specifically modifications to the I-40 / 15-501 interchange

Therefore, the proposed development at Eastowne should be held to 1.1 million square feet net new (1.25M sq. ft with ET 1) to limit the traffic improvements that would be triggered by a larger development

Current Timeline

April 18	Planning Commission
April 26	Open Public Hearing
May 24	Town Council Vote on Conditional Zoning for Eastowne

Complete Community Framework

Assets	
Mature Tree Canopy	
	Preservation of a minimum of 10-acres of mature tree canopy on the northern 20
	Preservation of tree canopy at the corner of Eastowne Drive & 15-501 and along the 15-501 frontage
Natural landscapes, waterways, features	
	1,000 foot stream restoration from 15-501 to Eastowne Drive inside the loop
	Limited crossings of streams / RCD
	Preservation of a minimum of 10-acres of mature tree canopy on the northern 20
Opportunity to add density & create critical mass	
	Redevelopment of an aged, low density, sub-urban office park into a high density medical/ research campus
UNC Presence	
	Allowing the growth and improvement of services by UNCH within the Town
Willingness to Innovate	
	This conditional zoning is designed to be a innovative sustainable development integrated into the complete community it will be a part of, day one. It is also flexible to adapt to the changes in the community over time.

Complete Community Framework

Design Attributes	
Friendly to Children and Seniors	
	Structured visitor parking adjacent to all buildings
	One way traffic for all building drop offs
	Minimize pedestrian and vehicular crossings
	All efforts will be made to insure as much of this site as possible is meet the requirements for ADA accessibility
Mitigate climate risks: Green infrastructure	
	Stormwater management exceeding the Town's requirements
	Green stormwater infrastructure treating a minimum of 1-acre of impervious area
Walkable	
	Closely spaced buildings to parking structures
	Multi-Use Paths are designed to surround the perimeter of the development and connect to the planned multi-use paths by the town outside the scope of this development
	Multiuse paths such that they are inviting and connective
Human scale	
	All buildings will have canopies connecting each building to the parking structure that serve it, at a minimum. This canopy will also be sized to ensure the passenger side of vehicles in all drop off lanes are covered, at a minimum
	The ground floor of each building will be inviting and articulated to reinforce the pedestrian scale
	Site furniture and landscaping will be used to reinforce this experience
	No building will have an unbroken façade for more than 250 feet. If a Building façade exceeds 250 feet a recess in the building façade will be provided at a minimum of 10 feet wide and 10 feet deep

UNC HEALTH

Complete Community Framework

Design Attributes	
Identifiable & Distinct	
	The outer most corner of each building on the central green will be glazed to erode the building's higher elevations
	All four side of each building will be designed with similar materials, percentage of glazing and design
	Building designs provide a depth and layering in the facades to minimize flatness in material expressions
	The building elements and features organically express the building's function
	Façades use fenestration and design features to appear largely open and transparent
Everywhere to everywhere greenways	
	Completing the multi-use path around the Eastowne Drive loop
	Completing the section of the multi-use path along the 15-501 frontage
	Negotiating pedestrian crossing options for pedestrians to safely cross 15-501
Watersheds as pedestrian and cycling options	
	Pedestrian trail along the restored stream inside the Eastowne Drive loop
Program & Amenities	
	UNCH is excited to be a part of this complete community and looks forward to supporting the residential and commercial components existing currently and planned for the future
Research & Development	R&D is an anticipated part of this campus as it grows.

Complete Community Framework

Social Equity Drivers	
Active transportation options	Coordinating & constructing new bus stop locations with Chapel Hill Transit
	Completing bike lanes around the Eastowne Drive loop
	Commitment to support future BRT station on 15-501
	Providing bicycle parking and bicycle fix-it stations
Access to parks and green space	
	Internal central green
	Stream restoration project is adjacent pedestrian trail
	Commitment for easement for pedestrian connections to Dry Creek Trail and New Hope Commons Drive when needed
New affordable housing models	
	UNCH providing no-cost line of credit
Access to homeownership for historically marginalized communities	
	UNCH providing no-cost line of credit
Live/work neighborhoods	
	Eastowne provides the work for existing and future adjacent residential developments

Findings of Fact

Finding #1: Proposed zoning amendment is necessary to correct a manifest error.

- No manifest error in the Town's Zoning Atlas is being corrected by the requested action.=

Finding #2: The proposed zoning amendment is necessary because of a changed or changing conditions in a particular are or in the jurisdiction generally.

- Growth in the healthcare needs for the Town of Chapel Hill and the entire region require the decompression of the medical center by relocating outpatient services.
- The growth of UNC Health and need to provide regional access to healthcare, without entering the center of Chapel Hill is a changed condition due access challenges created by the increased development density within the Town.

Finding #3: The proposed zoning amendment is necessary to achieve the purposes of the comprehensive plan.

- Facilitates the development as designated on the Future Land Use Map – North 15-501 Corridor Focus Area for higher intensity uses.
- Supports the Chapel Hill 2020 Plan including *A Place for Everyone, Community Prosperity & Engagement, Getting Around, Good Places-New Spaces,* and *Nurturing our Community.*
- Rezoning will promote public health, safety and general welfare, and is in conformance with the comprehensive plan.