

MORGAN CREEK GREENWAY CONCEPTUAL MASTER PLAN Including Carrboro High School Spur Trail

TOWN OF CARRBORO

FINAL REPORT
FEASIBILITY ANALYSIS

Prepared By
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Planning for the Future

INDEX

• Report Summary	3
• Summary of Findings and Recommendations	4
• Chapter 1 - Introduction	6
Project Purpose – Coulter Jewell Thames Scope of Work	
Goals	
Study Area	
Overview of Project	
• Chapter 2 - Existing Conditions	8
Overview	
Land Ownership and Use	
Map 1 – Land Ownership – Main Corridor	
Map 2 – Land Ownership – High School Spur Trail	
Accessibility and Circulation	
Map 3 – Nearby Destinations and Features	
Map 4 – Transportation – Main Corridor	
Map 5 – Transportation – High School Spur Trail	
Existing Environmental Conditions	
Map 6 – Hydrology Study – Main Trail Corridor	
Map 7 – Hydrology Study – High School Spur Trail	
Map 8 – Steep Slopes – Main Trail Corridor	
Map 9 – Steep Slopes High School Spur Trail	
Map 10 - Vegetation – Tree Cover – Main Trail Corridor	
• Chapter 3 - Opportunities and Constraints	24
Opportunities	
Constraints and Possible Design Solutions	
Map 11 – Opportunities and Constraints Composite Map – Main Trail Corridor	
Map 12 – Opportunities and Constraints Composite Map – High School Spur Trail	
Trail Feasibility – Main Trail	
Trail Feasibility – High School Spur Trail	



• Chapter 4 - Public Input	29
First Public Meeting – Information and Trail Alternatives	
Second Public Meeting – Recommended Main Trail Alignment	
• Chapter 5 - Proposed Design	34
Overview	
Final Trail Alignment	
Map 13 – Recommended Trail Alignment – East	
Map 14 – Recommended Trail Alignment – West	
Map 15 – Recommended Trail Alignment – High School Spur	
• Chapter 6 - Implementation	39
Action Steps	
Phasing Plan	
Cost Estimates	
Land Acquisition	
• APPENDICES	
Appendix A – Field Investigation – Photos	
Main trail corridor walk – February 24 2009	
South Bank Morgan Creek corridor walk – October 1 2009	
High School spur trail walk – December 30 2009	
Appendix B – Operations and Maintenance	
Appendix C – Design Guidelines	
Trail Design Standards	
Trail Construction Standards	
Trailhead Facilities	
Public Art	



REPORT SUMMARY

Coulter Jewell Thames has been charged with performing a study to determine the feasibility and possible alignment options of a paved trail in the Morgan Creek corridor between Smith Level Road and University Lake. This report is the first stage of the project. It involves data collection and field investigation to determine existing site conditions, and potential opportunities and constraints within the study area. Alignment alternatives were presented to various stakeholders, which then led to an alignment recommendation.

In summary the corridor presents a very feasible location for a trail. There are multiple options for trail location in some sections, and in other sections the most suitable trail location is evident immediately due to land ownership or extremely steep slope conditions or preservation areas limiting the potential route possibilities.

The first stage of the project was to conduct a field investigation of the trail corridor. The second stage was to determine the possible alignments for a trail using the base information already collected and also public input. The third stage involved narrowing the trail options to a recommended alignment and doing a cost estimate. The fourth stage was to determine a phasing plan for the trail construction.

At the west end of the corridor is the OWASA owned and managed University Lake area. Initial contact with OWASA representatives has given the group favorable feedback that they are willing to work with the Town of Carrboro to find a location for a trail on the University Lake property, though parts of it may have limited access because the lake itself is fenced and OWASA controls hours of operation when the lake recreation area is open to the public. There are existing trail segments, existing greenway easements, and Town owned properties along most of the corridor. Field investigation and analysis has found no reason not to use these areas to develop a formal trail through the corridor.

The results included in this report were presented to the Town of Carrboro Greenway Commission on various dates: March 16 2009, August 10 2009, October 12 2009, and January 25 2010.



SUMMARY OF FINDINGS AND RECOMMENDATIONS

- A connection between Jones Ferry Park-and-Ride and the Town of Carrboro Public Works facility site is very feasible.
- A small public parking area at the Town of Carrboro Public Works Facility site on Smith Level Road is feasible.
- A connection to the Jones Ferry Park-and-Ride lot needs more physical exploration and easement discussions with UNC and the Rosewalk community.
- The existing gravel trail around the Rosewalk community is already receiving a good amount of use.
- Locations near the confluence of Tom's Creek and Morgan Creek have the opportunity for future connections south to the high school on Rock Haven Road.
- Bridges need to be located carefully to create the lowest impact and also to find a location where the bridge length will be minimized.
- There is an existing greenway easement behind the tennis club. It is on fairly flat land and easily usable as a trail location.
- The south bank of Morgan Creek in this area is heavily wooded, there is nice understory growth, and many portions are rocky and narrow. It would be difficult and expensive to build in this area and would certainly intrude into the stream buffer.
- There is a need to cross Morgan Creek between Berryhill and Weatherhill Pointe to reach property already owned by the town of Carrboro on the east side of Morgan Creek. The recommended crossing point is between the east end of the Tennis Club property upstream of Weatherhill Pointe due to topography and flood management concerns.
- Land on the south side of Morgan Creek near the Berryhill Recreation area is already in Town ownership and has a well defined system of paths. Although it is in the floodway, the land is flat and trails could be added without creating flood rise. The north side of the creek through this area has severe slope constraints that would make trail development very costly.
- Trail opportunities exist on both sides of Morgan Creek near the Town's Public Works facility. Parking is more readily available on the north side of the creek at the Public Works facility site. There is one small area of moderately steep slopes on the Berryhill side of the creek. Flood management needs indicate a crossing to the north/east creek bank as far downstream as possible. Land ownership would indicate a crossing behind Berryhill residences just upstream of where the creek and the Duke Energy easement meet.
- There is a Town of Chapel Hill trail currently planned for termination on the north side of the creek just east of Smith Level Road.
- Flood studies need to be completed before final bridge locations can be determined.



- The change in elevation between the Morgan Creek at Tom's Creek and Carrboro High School is approximately 205 feet.
- The slopes of existing streets and driveways in the area for the High School spur trail are far more than 5%. Trails could be less steep than existing streets but in general would still be at 5% or steeper.



CHAPTER 1 - INTRODUCTION

PROJECT PURPOSE - COULTER JEWELL THAMES SCOPE OF WORK

The primary purpose of this study is to determine the opportunities and constraints for a trail location along Morgan Creek between Smith Level Road and University Lake. In addition, the study included an exploration to determine the opportunities and constraints for a connector trail from the main Morgan Creek trail to Carrboro High School.

GOALS

Goals of this study are:

- To determine the feasibility of a trail along Morgan Creek to provide a trail connection between University Lake Drive and Smith Level Road with a spur connection to Carrboro High School
- To determine a recommended trail alignment
- To create a phasing plan to build the most effective and cost efficient connectors earliest
- To determine a cost estimate by phases

STUDY AREA

Main Trail

The study area for the main trail is a corridor along Morgan Creek, approximately 500' wide, between University Lake and Smith Level Road.

Carrboro High School Spur Trail

The study area for the High School spur trail is between the north side of Morgan Creek on the north, the Carrboro High School property on the south, the Kramer property to the west, and Villages of Chapel Hill property to the east.



OVERVIEW OF PROJECT

Data Collection

- GIS information
- Utility company data
- National Heritage Databank
- FEMA
- Property ownership
- Easements
- Vegetation
- Community facilities
- Threatened and endangered species
- Public input

Field Investigation

- Existing trails
- Existing stream conditions
- Jurisdictional wetlands
- Jurisdictional streams
- Threatened and endangered species
- Invasive species
- Localized topographic and geological features



CHAPTER 2 - EXISTING CONDITONS

OVERVIEW

On February 24, 2009, the consultant's team and Town of Carrboro staff walked the trail corridor from the Park and Ride lot east of University Lake to the Public Works facility on Smith Level Road. At that time the investigation continued with an emphasis on keeping the west end of the trail on the north side of Morgan Creek. This was primarily because the land is already in Town of Carrboro ownership or there are recorded easements. The land in those parcels and easements is for the most part clear and flat. It seemed that there was no compelling reason to investigate alternatives that appeared more wooded, steeper, or in private ownership. By the midpoint of the main trail corridor the terrain and land ownership did not dictate an obvious route.

As the analysis continued and the component of a spur trail to Carrboro High School became more important, alternative routes along the south bank of Morgan Creek were investigated. This was done to explore the feasibility of reducing stream crossings by potentially shifting the main trail to the south side of the creek and therefore making the route to the high school more direct. On October 1, 2009 members of the consultant's team and the Town of Carrboro walked the trail corridor from Rosewalk to Berryhill along the south bank of Morgan Creek. The route covers property owned by Highland Hills Apartments and by the Triangle Land Conservancy. There are narrow footpaths in place along a portion of this route.

On December 30, 2009 members of the consultant's team and the Town of Carrboro walked alternative routes to investigate a trail location for a spur from the main trail to Carrboro High School.

The photos from each of these trail walks can be found in Appendix A.



LAND OWNERSHIP AND USE – Main Trail Corridor

The majority of property along this trail corridor is residential. Also along this corridor is land owned by the University of North Carolina (University Lake), the Chapel Hill Tennis Club facility, land owned by the Triangle Land Conservancy, land owned by the Town of Carrboro for facility operations, and multiple utility and greenway easements. Utilities in the easements along the corridor are OWASA water and sewer lines, Duke Energy overhead power transmission lines, and Piedmont Electric overhead power service lines.

Maps 1 and 2 show the land ownership in the corridor.

The property north and south of Morgan Creek at the west end of the corridor is owned by the University of North Carolina. The western end of the trail would start near University Lake. It is recommended that the trailhead connect to the UNC Park and Ride lot. This will provide parking for non-local users to access the trail. The parking lot is on land owned by the University of North Carolina in a long term lease to OWASA. The property includes University Lake, which provides water to Chapel Hill and Carrboro. This site is mainly wooded. The lake itself is also used for recreation purposes (non-motorized boats) but is fenced and frequently not accessible to the public. There are University facilities on site which are securely fenced.

The next property along the corridor on the north side of the creek is a residential town house development, Rosewalk. There is an existing 10' wide gravel trail on this site, and it is in a greenway easement deeded to the Town of Carrboro. The trail itself is located between the residential buildings and the creek. Most of the trail sits just outside the floodplain. On the south side of the creek there are single family homes on property owned by individuals.

Between Rosewalk and the next property along the corridor is a mapped stream, Tom's Creek which flows into Morgan Creek from the north. Both creeks have mapped floodways and floodplains. South of Tom's Creek the property rises steeply and is developed at the top as an apartment complex, Highland Hills Apartments. There are footpaths along the creek on this property but they are not in any recorded greenway easement. On the north side of the creek is the Chapel Hill Tennis Club. This property is mainly open and the facilities nearest the creek are the tennis courts. Along this stretch is an OWASA sanitary sewer easement as well as a 50' wide recorded greenway easement.

Moving east on the south side of Morgan Creek from Highland Hills is a steep slope owned by Triangle Land Conservancy. There is a narrow rocky ledge at the top of bank with a footpath worn into it. On the north side of the creek is some open space on the Tennis Club property. At this point the creek turns ninety degrees to the north. The property on the west side of Morgan Creek is flat and developed as Weatherhill Pointe, a single family residential neighborhood



with private streets. The east side of the creek is the Berryhill residential subdivision. There is a narrow strip of land between Morgan Creek and the Berryhill single family home lots that is owned by the Town of Carrboro.

The creek continues north almost to Hwy 54. At this point the creek turns ninety degrees to the east as it hits a rocky cliff and then ninety degrees south again, in a horseshoe shape. Hwy 54 is located approximately 70 feet above the creek. At the east end of the rocky area is a multifamily residential development – Canterbury Townhomes. The area inside the horseshoe on the south side of Morgan Creek is flat wooded land owned by the Town of Carrboro. The land is mature forest with a fairly clear floor, and there are multiple footpaths within the property. At the south edge of this property is an area owned by the Berryhill community and used as private soccer fields and a playground.

Moving toward Smith Level Road, the creek turns east again. The property on the north side of the creek is owned by the Town of Carrboro and used as their Public Works facility. There is some office on this property but the majority of the site is open and/or used for outdoor storage. Immediately south of the creek is a 60' wide Duke Energy easement and in it are transmission towers and lines. South of the easement are more single family homes, part of the Berryhill subdivision.

The eastern end of the trail will be at Smith Level Road. A small parking area should be provided on the Public Works property. This trail should end on the north side of Morgan Creek to allow for easy future connection with a similar trail to be built by the Town of Chapel Hill. The Chapel Hill trail will end on the north side of the creek on the east side of Smith Level Road right below Frank Porter Graham school.

LAND OWNERSHIP AND USE – High School Spur Trail Corridor

The spur trail to the high school would need to cross Morgan Creek near Tom's Creek and then work south. The property directly to the south of the creek is the steeply sloped property developed as Highland Hills Apartments. At the top of the slope is a public right of way, Tar Hill Drive which leads steeply but directly to the high school parcel. The difference in elevation between Morgan Creek and the school building is approximately 200 feet, over a straight line distance of only 1600 feet. That puts the average slope at a steady 12.5%. There is a bike lane on Tar Hill Drive but the slopes are over 10%. Alternative routes would need to wind either to the east or west.

Tar Hill Drive cuts through the Highland Hills Apartments and the land to the east and west is owned and developed as the apartment complex. West of Highland Hills and also on the south side of BPW Club Road is another apartment complex, Bridges at Chapel Hill. On the north side of BPW Club Road is a continuation of the Highland Hills Apartment complex. There is a mapped stream that runs north down to the creek at the eastern edge of their property.

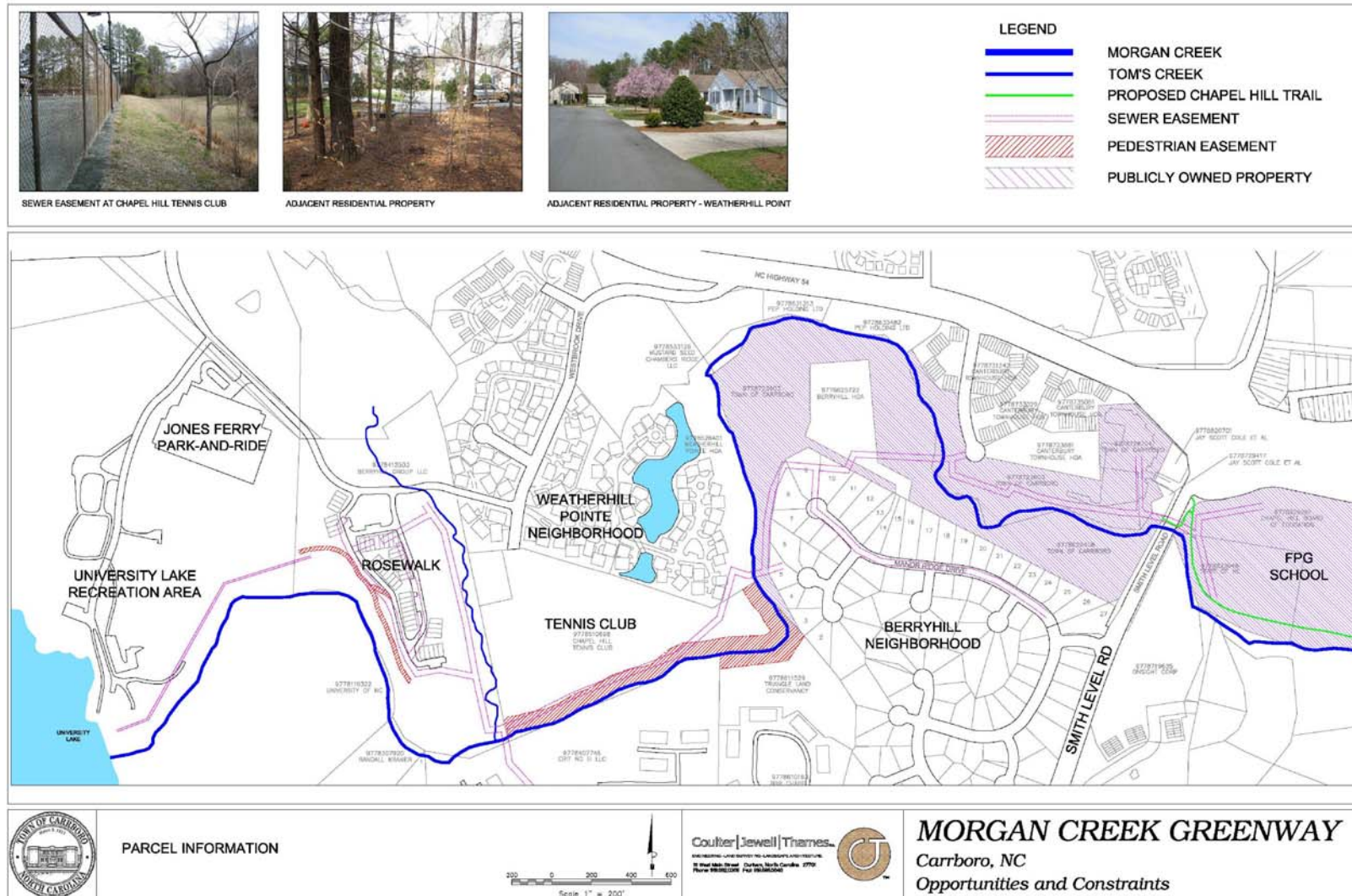


East of Highland Hills on the north side of BPW Club Road is the BPW Club. This property is heavily wooded. The building and parking are located at the east side of the site. South of the Club is an apartment complex, Villages of Chapel Hill. There are many existing wide driveways through the site though all are steeper than 5%.

To the south of the Villages apartments is another apartment complex, Rock Creek Apartments. This property fronts on the south edge onto a private easement known as Rock Haven Road. This easement contains a paved street with bike lanes that lead directly to the high school. Much of this existing street is also steeper than 5%.



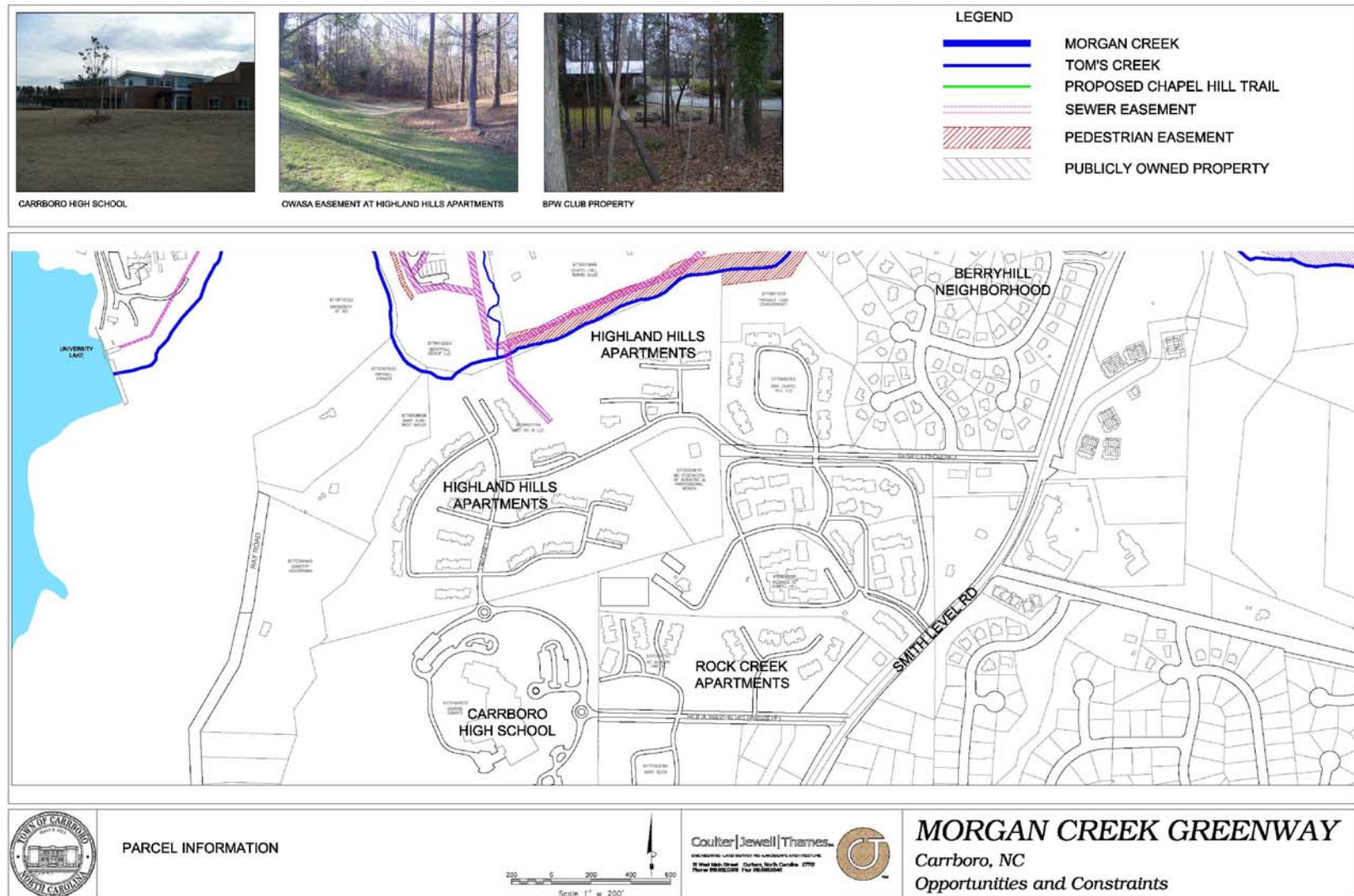
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Map 1 – Parcel Information – Main Trail Corridor



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Map 2 – Parcel Information – High School Spur Trail



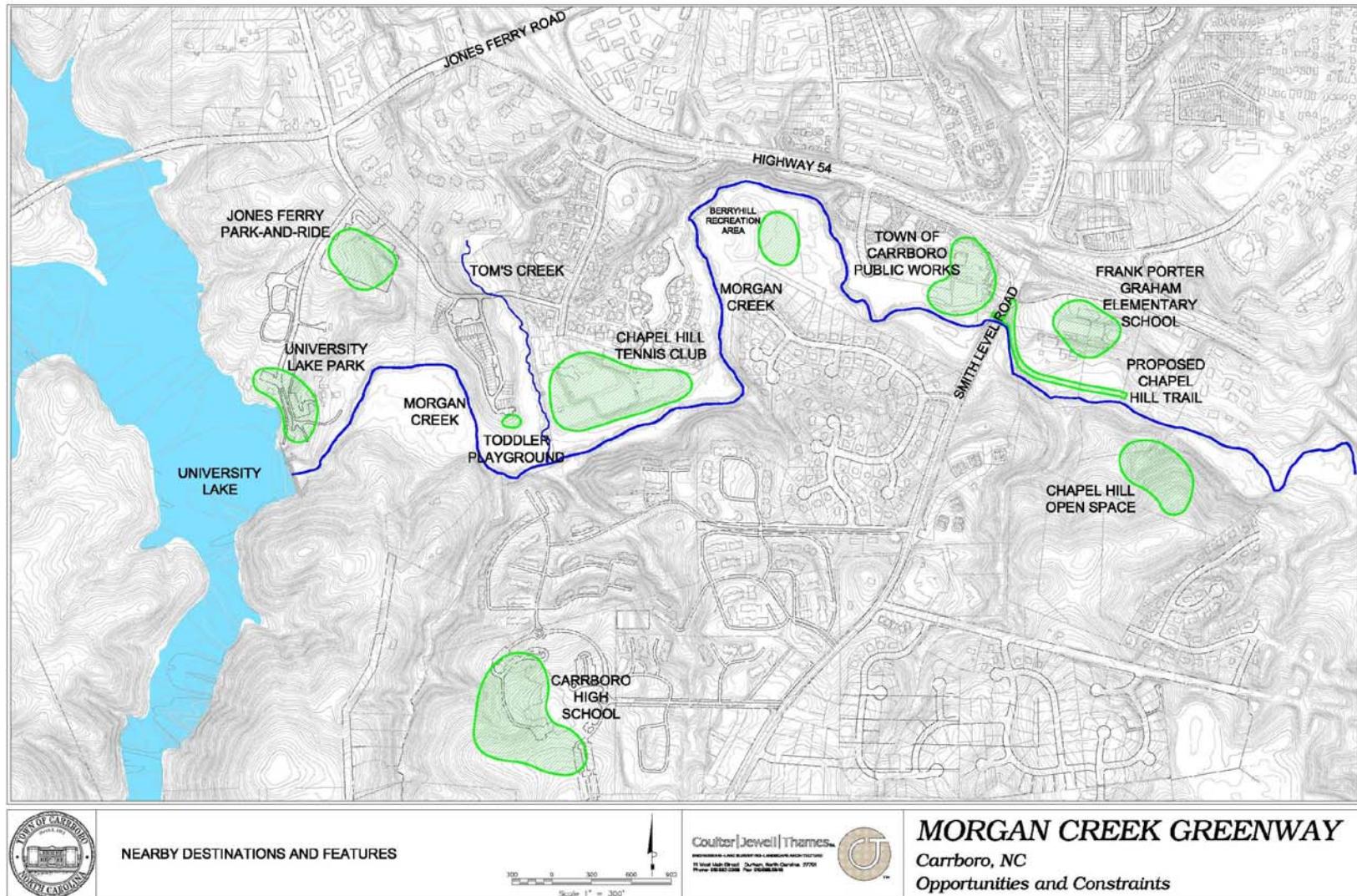
ACCESSIBILITY AND CIRCULATION

The main publicly funded trail can be made completely accessible with slopes under 5% and a paved surface. Parking is proposed at each end of the trail and will include ADA compliant accessible spaces. The trail will be accessible to all properties abutting the corridor including but not limited to: University Lake, the Jones Ferry Park-and-Ride lot, Berryhill Road, Rosewalk, the Chapel Hill Tennis Club, the Berryhill recreation area, Canterbury Townhomes, a parking area on the Carrboro Public Works property, and a future connection to a similar trail being built by the Town of Chapel Hill.

It will be challenging to create an accessible trail from Morgan Creek to the Carrboro High School facility. Existing bike lanes on public streets exceed 5% and in many cases exceed 10%. It may be possible to design an accessible connection between the creek and BPW Club Road.



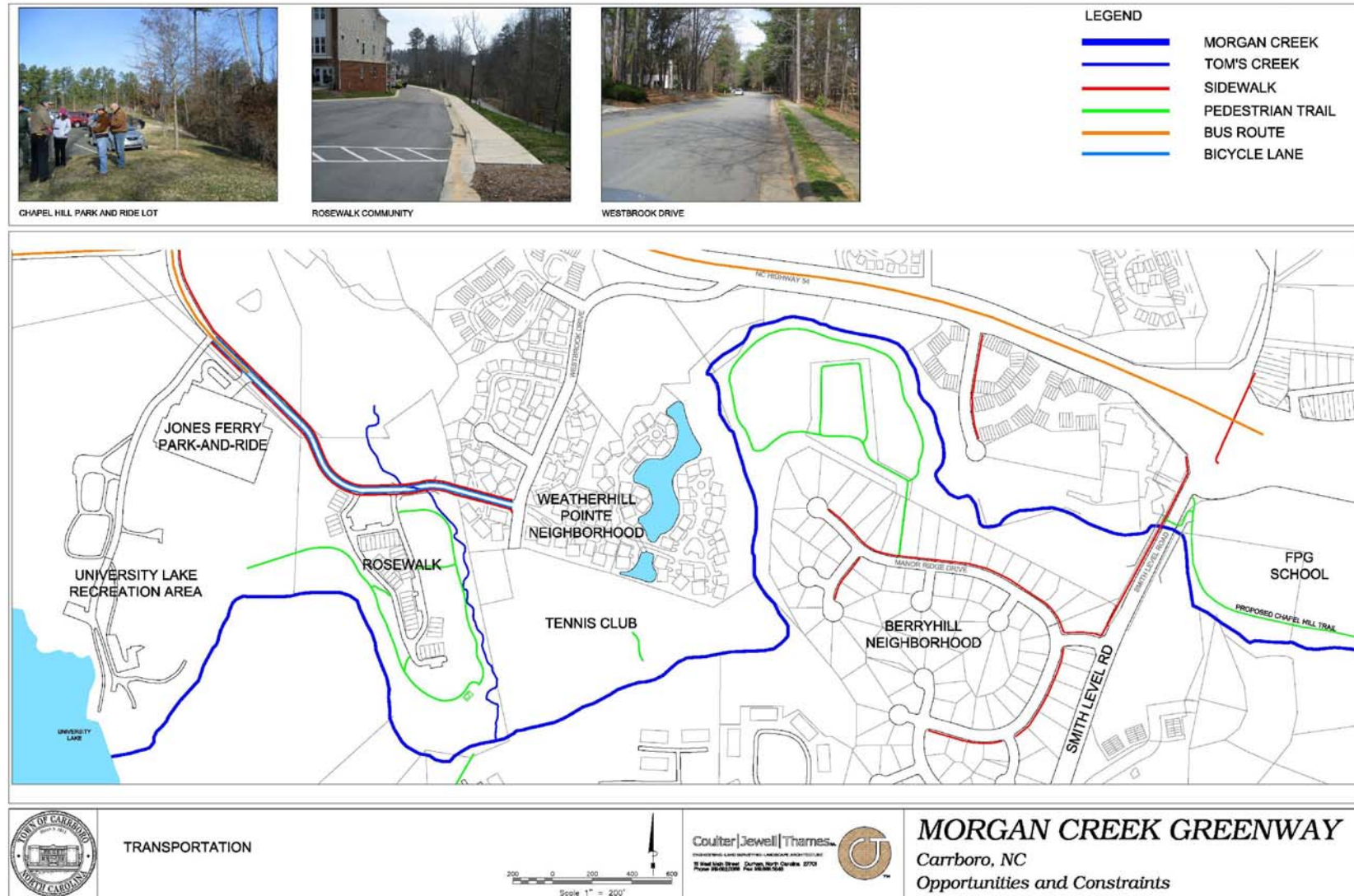
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Map 3 – Nearby Destinations and Features



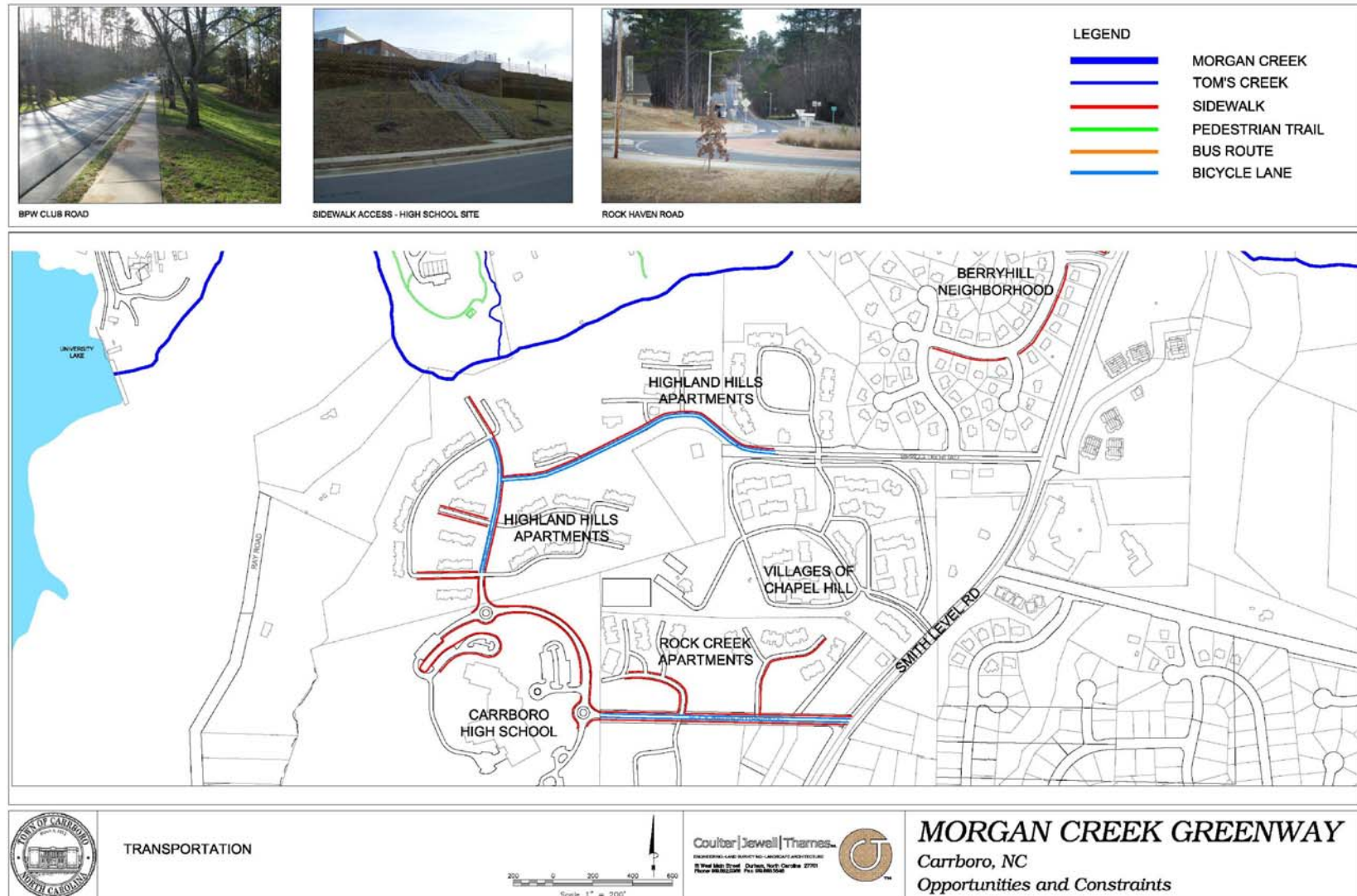
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Map 4 – Transportation – Main Corridor



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Map 5 – Transportation – High School Spur Trail



SUMMARY OF EXISTING ENVIRONMENTAL CONDITIONS

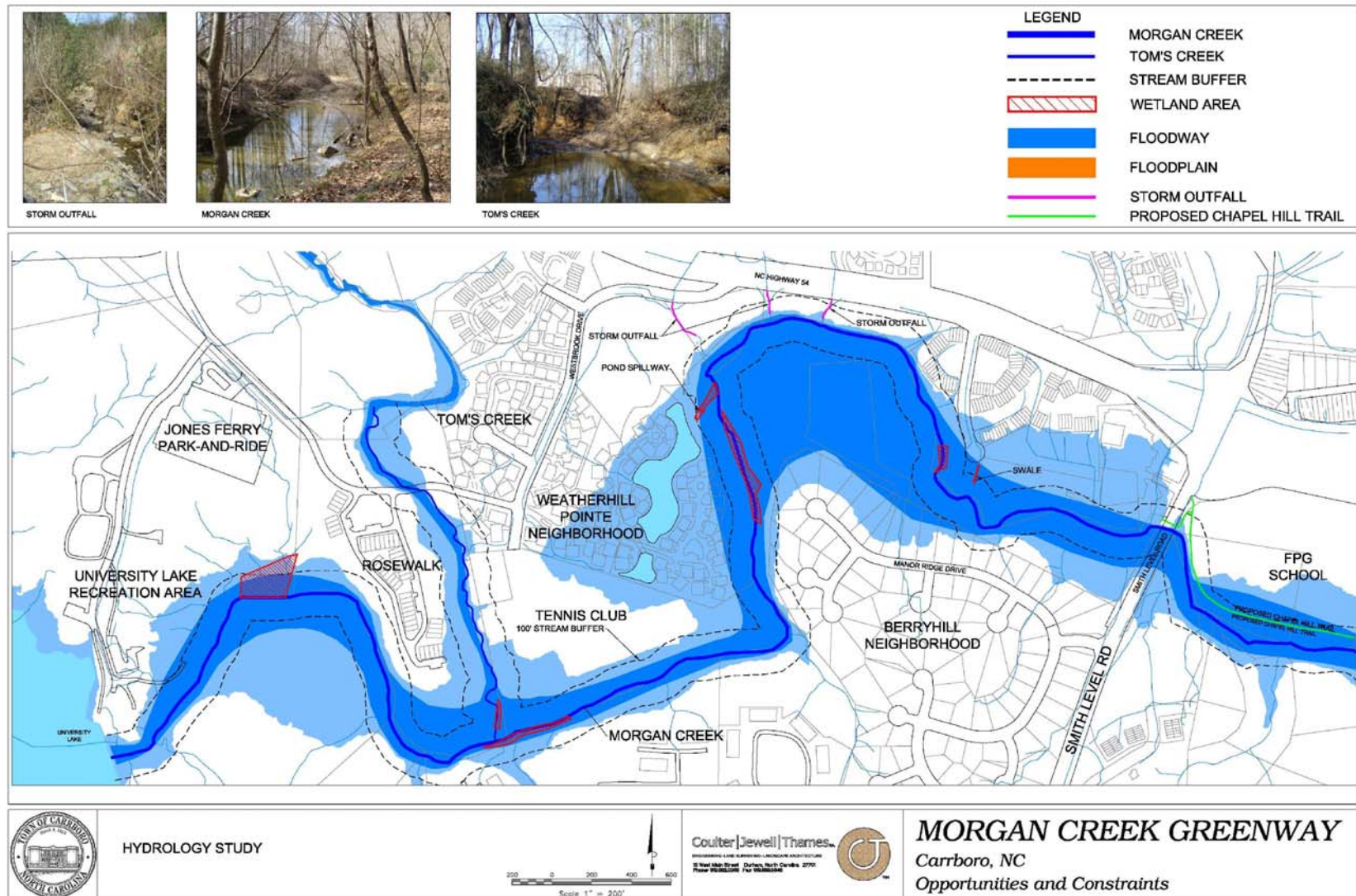
- There are jurisdictional streams with buffers and floodplains. Maps 5 and 6 on the following pages show the location of floodway and floodplain in the area. The majority of the main trail would be located in mapped floodplain or floodway. The majority of the high school spur trail would be above the floodplain elevation.
 - There are jurisdictional wetlands in the corridor. It will be possible to avoid wetland areas or to traverse wetlands with boardwalk to minimize disturbance.
 - There is one National Heritage Site in the corridor – the Piedmont Coast Plain and Heath Bluff, protected by the Triangle Land Conservancy. This is the site locally known as Rhododendron Bluffs.
 - There are three vertebrate Federal Species of Concern in the county:
 - American Eel
 - Carolina Darter
 - Roanoke Bass
 - There are five invertebrate Federal Species of Concern,
 - Brook Floater
 - Atlantic Pigtoe
 - Yellow Lampmussel
 - Green Floater
 - Savannah Lilliputand one invertebrate endangered species in the county.
 - Dwarf Wedgemussel
- The trail will not involve permanent disturbance of the stream bed, but bridges will have some shading impact. Some of these invertebrates are not visible this time of year. A further investigation will need to be conducted later in the spring.
- There are four plants listed as Federal Species of Concern:
 - Butternut
 - Creamy tick-trefoil
 - Sweet pinesap
 - Torrey's mountain mint
 - There are two plants listed as endangered species in the county:
 - Michaux's sumac
 - Smooth coneflower
 - Some of these plants are not visible at this time of year. A follow up assessment will be done once they emerge.



- There are three invasive plant species in the corridor:
 - Privet
 - Honeysuckle
 - Wisteria



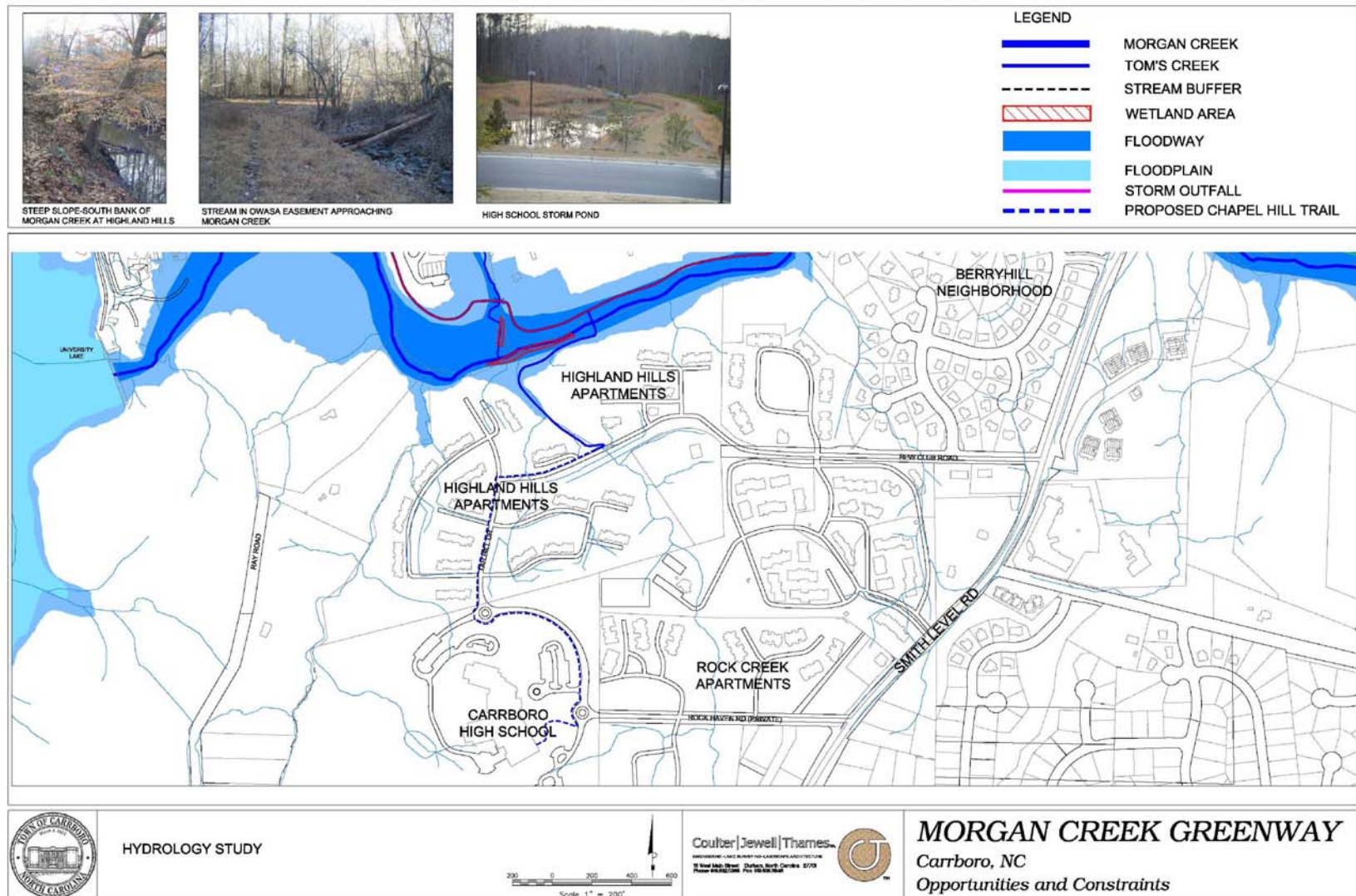
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Map 6 – Hydrology Study – Main Trail Corridor



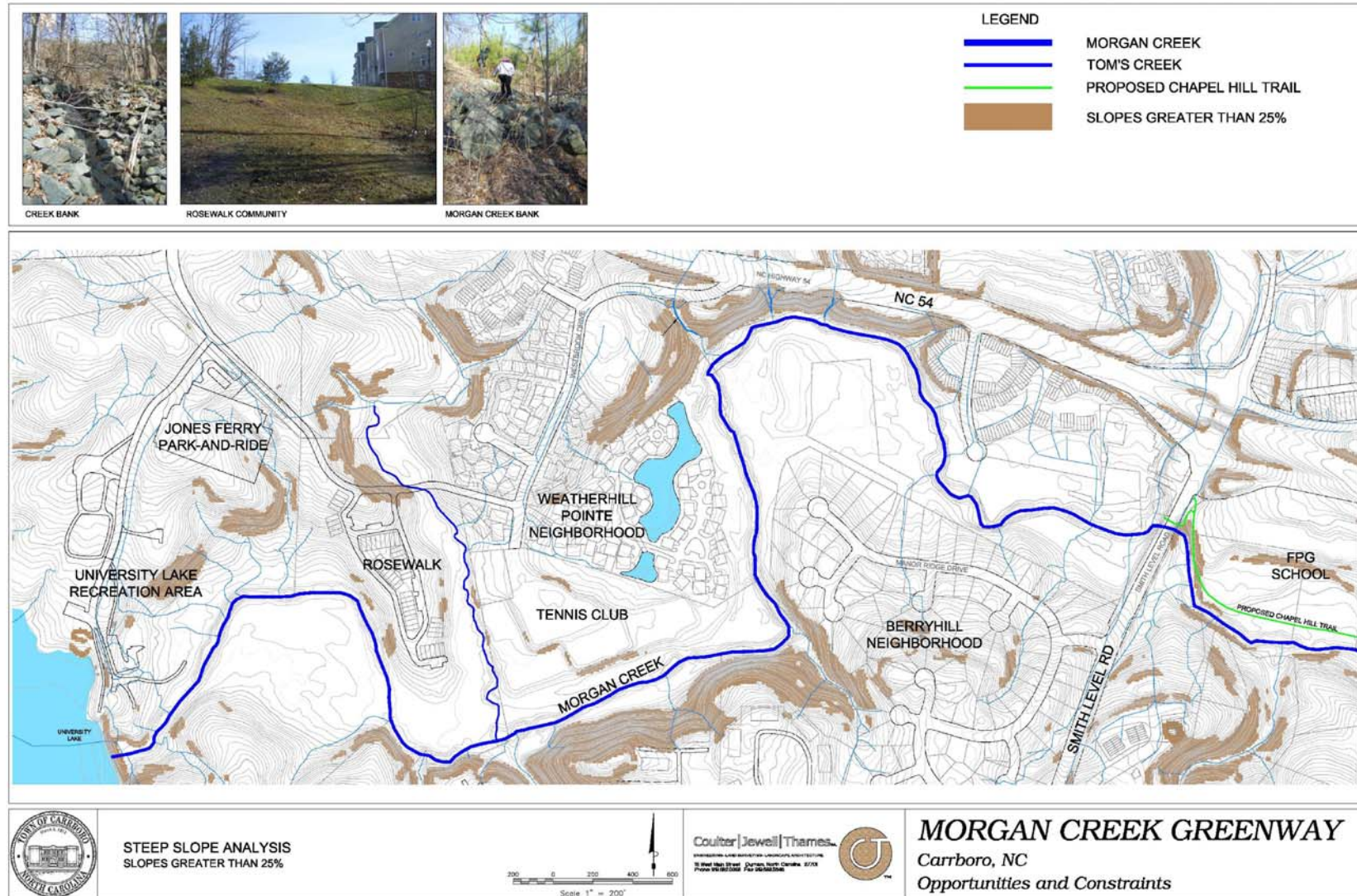
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Map 7 – Hydrology – High School Spur Trail



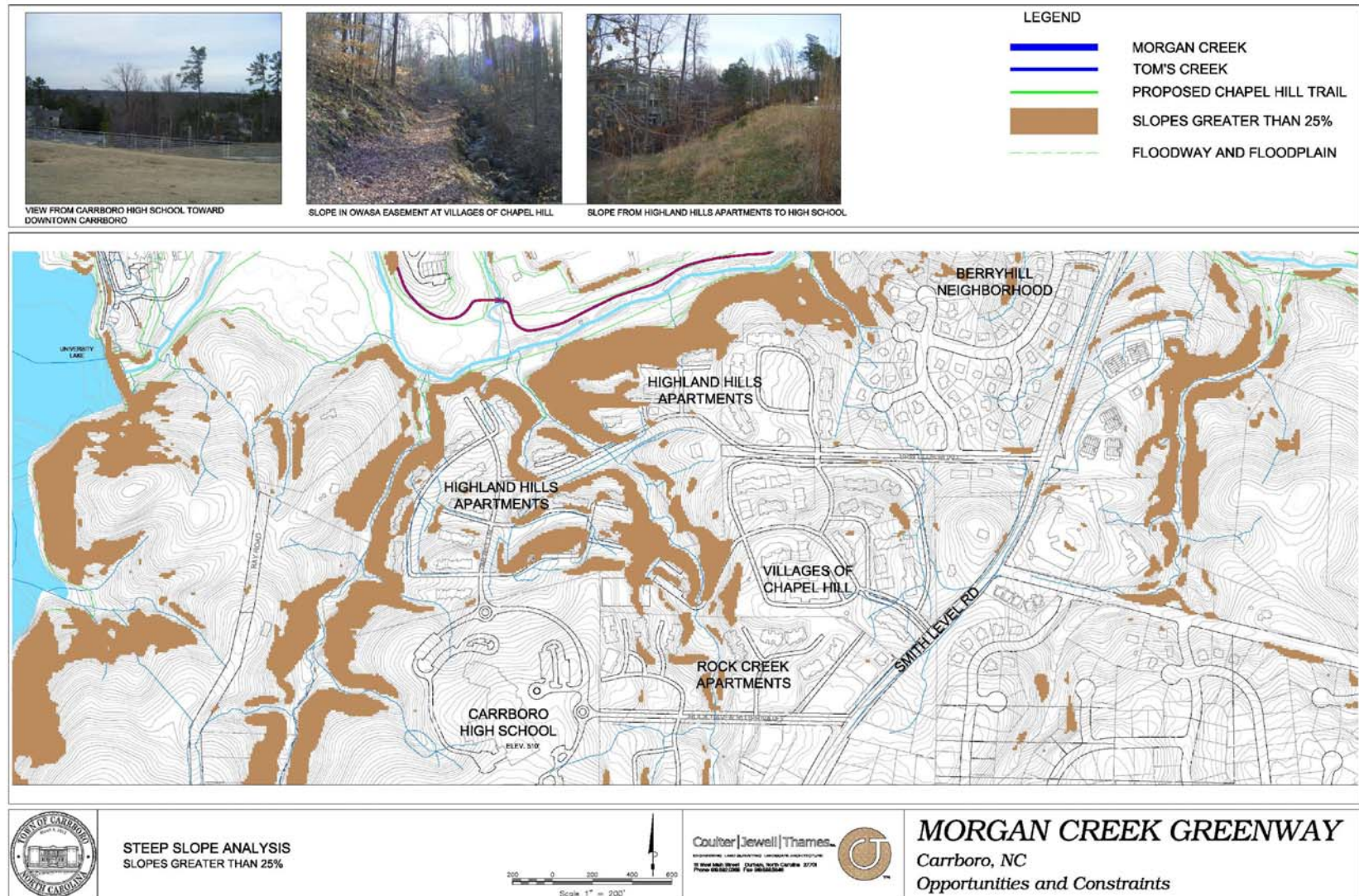
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Map 8 – Steep Slope Analysis – Main Trail Corridor



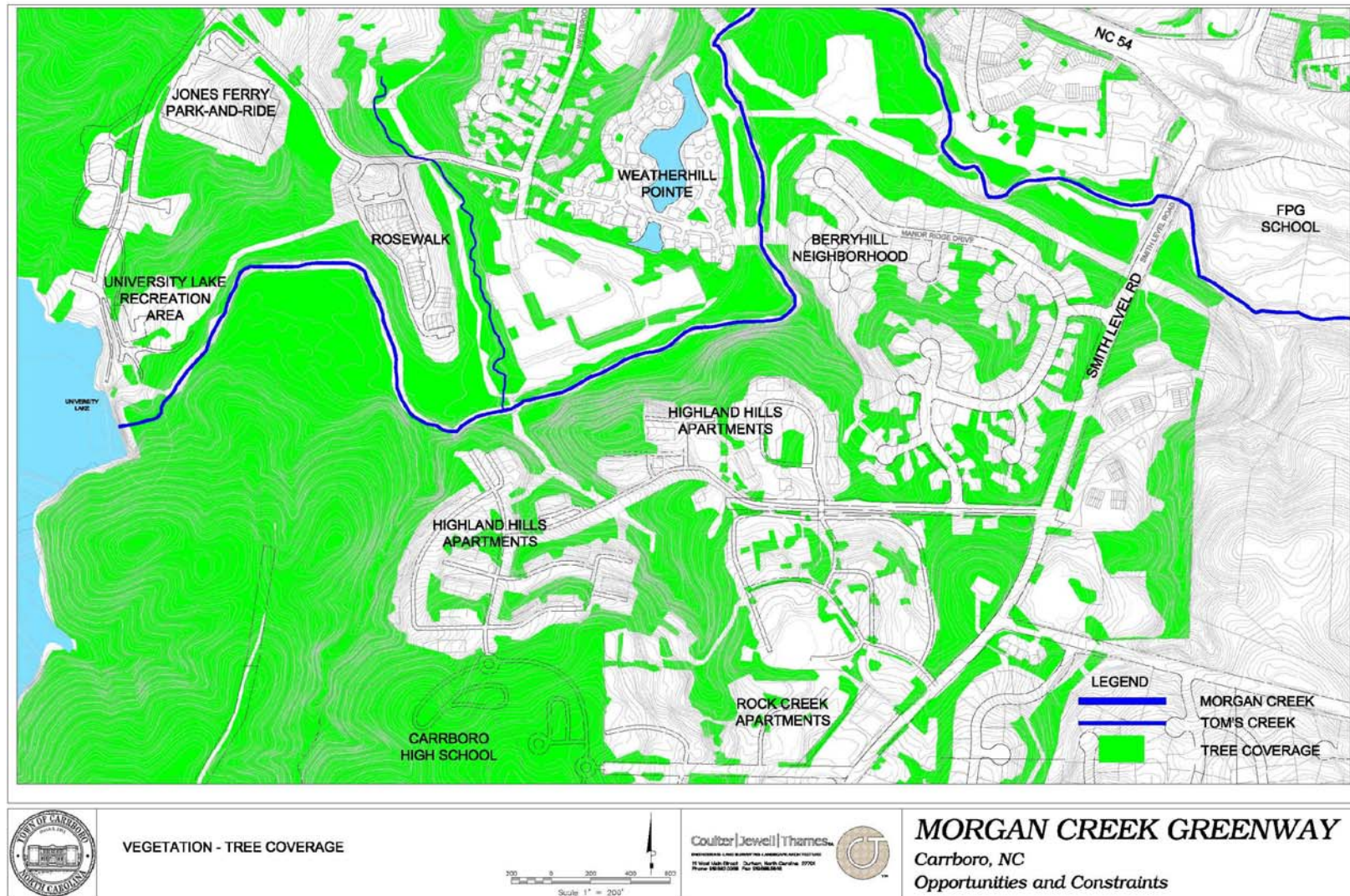
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Map 9 – Steep Slope Analysis – High School Spur Trail



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Map 10 – Tree Coverage



CHAPTER 3 - OPPORTUNITIES AND CONSTRAINTS

OPPORTUNITIES

The Morgan Creek corridor runs adjacent to many residential neighborhoods and there are numerous footpaths in the area indicating that people are already using the area for recreation. The trail location runs parallel to busy Hwy 54 and together with the Chapel Hill portion of the Morgan Creek trail will provide an easily accessible attractive route as an alternate transportation option. There are major destinations at the ends of the proposed trail route – Frank Porter Graham Elementary School, Carrboro High School, and University Lake. A connection to the Chapel Hill portion of the trail would extend east of NC 15/501.

The trail would give safer access to non-vehicular users. Specifically the residents of the Berryhill neighborhood would like a safer way to walk their children to school than the current route down Smith Level Road where there are no sidewalks. The trail would allow residents to walk along the creek and to cross Smith Level Road either at the existing crosswalk (traffic signal) or in the future under the Smith Level bridge completely separated from vehicular traffic. The trails could also connect multiple neighborhoods on the north side of Morgan Creek to the Carrboro High School site, thereby providing a safer way for the teenage students to ride bikes or walk to school.

There is a short portion of trail already built in the Rosewalk neighborhood. The proposed trail gives an opportunity for the Town to connect to and utilize a trail that has already been built, and gives the Rosewalk trail users an opportunity to connect to a larger trail system. The trail could also connect to a larger system in that the Town of Chapel Hill has recently started construction on an adjacent trail. The portion of Chapel Hill trail that would connect to Smith Level Road is a future phase but has been designed and has received local and state approvals.

CONSTRAINTS AND POSSIBLE DESIGN SOLUTIONS

The major constraints are related to topography and hydrology. The majority of the trail corridor is in mapped floodway and floodplain. Although it is possible to build the trail itself in a profile that does not add fill to the floodplain or floodway, it will be difficult to install bridges without causing a rise to the flood levels.

There are jurisdictional wetlands in the corridor. It will be possible to avoid wetland areas or to traverse wetlands with boardwalk to minimize disturbance.



There is one National Heritage Site in the corridor – the Piedmont Coast Plain and Heath Bluff, protected by the Triangle Land Conservancy. This is the site locally known as Rhododendron Bluffs. There is currently a footpath through the top of bank in this area which is creating an environment for erosion. It is unlikely that any portion of the trail will be built along these bluffs. There is a greenway easement on the property but the terrain is so steep and rocky that any trail here would have to be built as boardwalk with footings in rock and that would be very expensive. There would also be a fairly substantial construction impact to the rock outcroppings and the well established vegetation there.

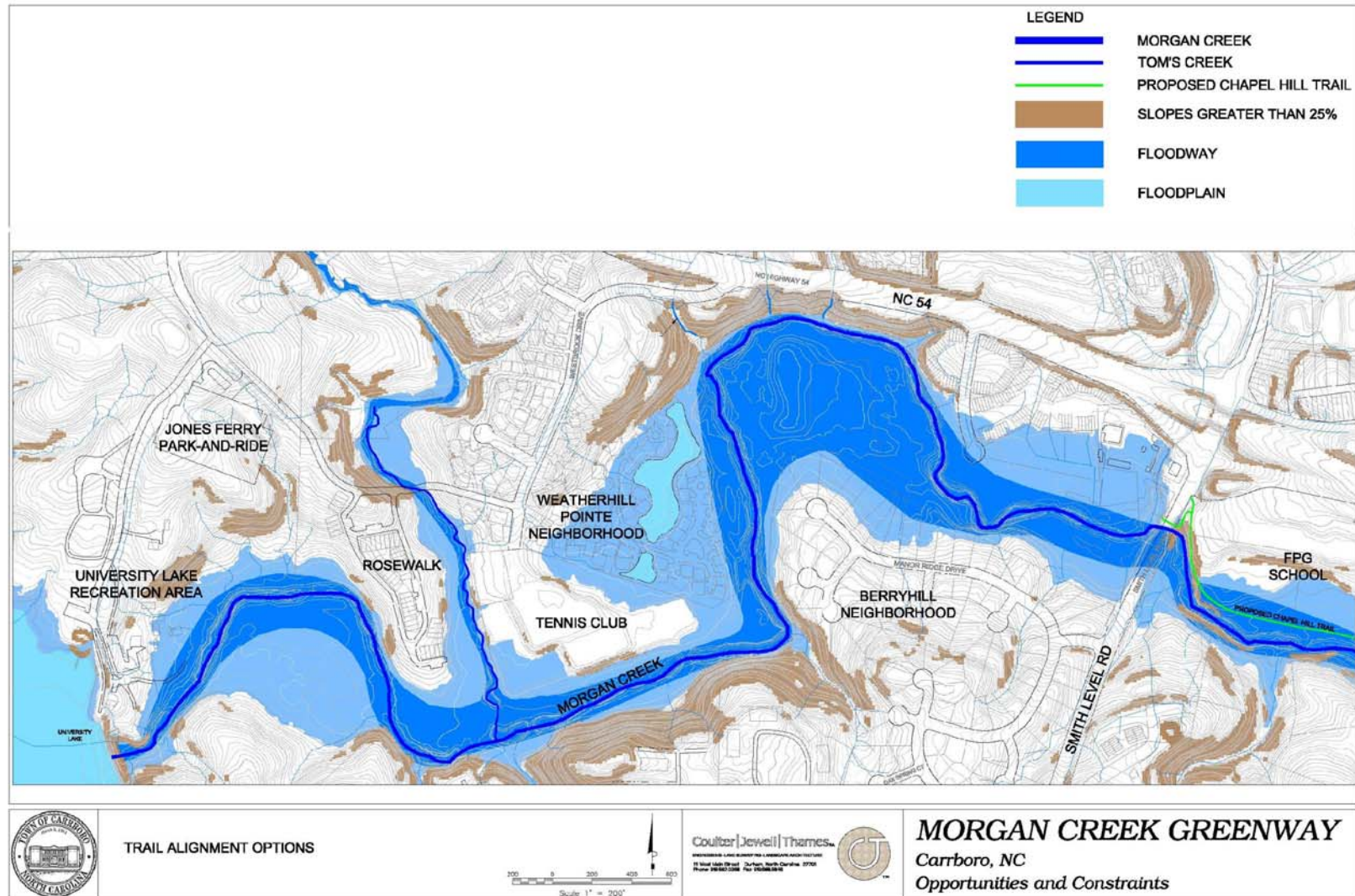
There are three vertebrate Federal Species of Concern, five invertebrate Federal Species of Concern, and one invertebrate endangered species (Dwarf Wedgemussel) in the county. The trail will not involve permanent disturbance of the stream bed, but bridges will have some shading impact. Some of these invertebrates are not visible during the winter months. A further investigation would need to be conducted during the design phase of the trail project.

There are four plants listed as Federal Species of Concern and two plants listed as endangered species in the county. These plants were not in evidence during the study period. A follow up assessment should be done during the design phase of the project.

For the spur trail from the Morgan Creek to Carrboro High School the major constraint is the difference in elevation and the steep slopes on existing streets.



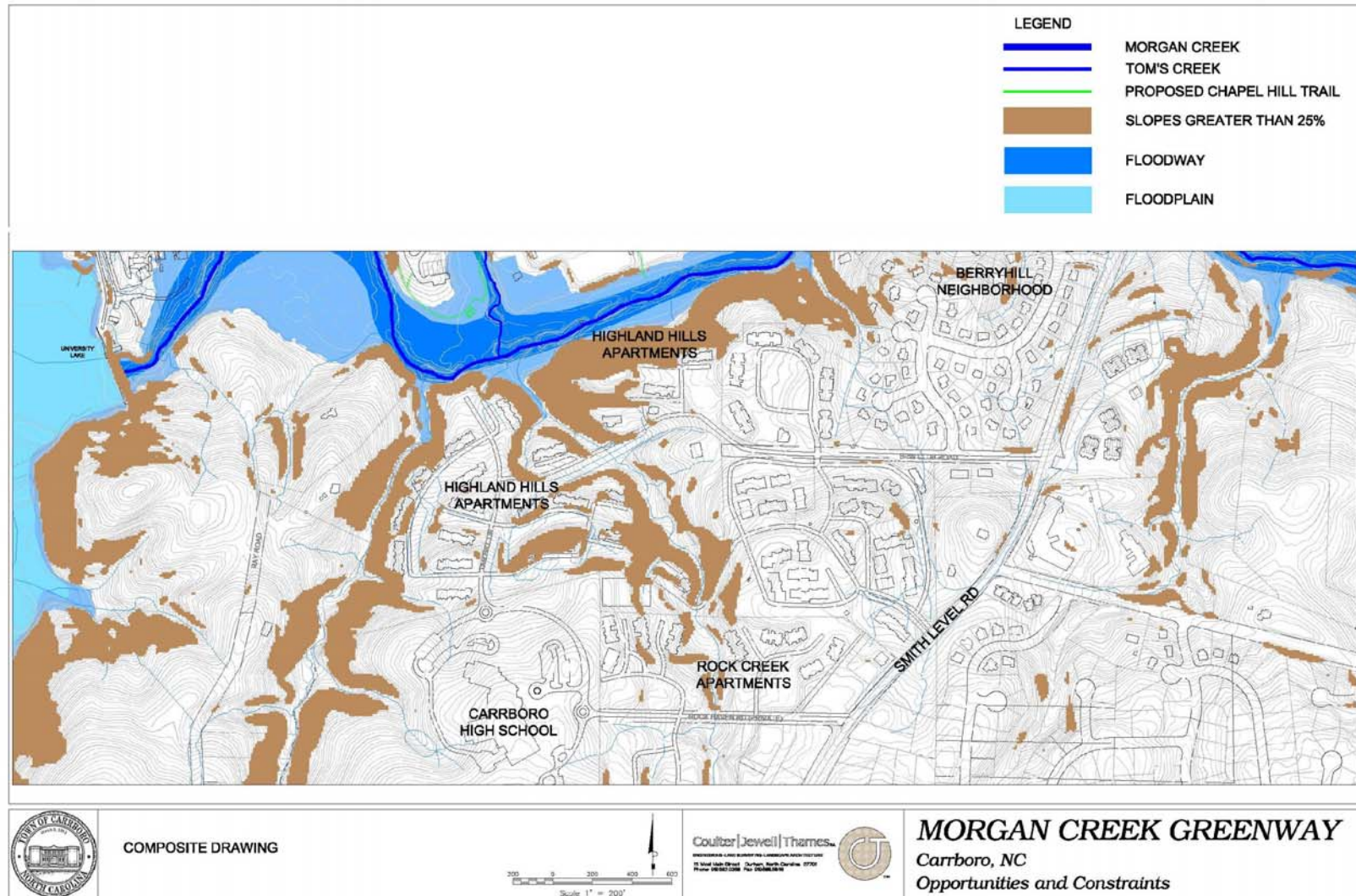
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Map 11 – Composite Opportunities and Constraints Map – Main Trail Corridor



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Map 12 – Composite Opportunities and Constraints Map – High School Spur Trail



TRAIL FEASIBILITY – Main Trail

A trail along the main Morgan Creek corridor in Carrboro is very feasible. There are hurdles to getting a trail completed including: bridge permits for crossing Morgan Creek and Tom's Creek, boardwalk permits based on no-rise studies, greenway easements that must be obtained from private landowners, DOT encroachment agreements for work that must be done in DOT rights of way, and permission from utility providers (Duke Energy, Piedmont Electric, OWASA) to install trail inside/cross utility easements. These hurdles are similar to what must be done in every municipality to complete greenways. Although a long process, generally there is enough cooperation from all parties to be able to build such a public facility.

TRAIL FEASIBILITY – High School Spur Trail

An accessible trail from Morgan Creek directly to the Carrboro High School is not feasible. There is no clear direct route that would provide access at less than a 5% slope and much of the route is so fully developed that working around existing structures and facilities is not an option. There are steep slopes and protected vegetation areas that are beyond the hurdles generally encountered in trail design. Although an off-road trail could be built that would be an improvement on existing road / bike lane conditions, it would not fully comply with ADA codes, AASHTO guidelines or DOT guidelines. Therefore the feasible section of this connection would appear to be a crossing of Morgan Creek to connect neighborhoods from the north, then a trail to connect from the creek to BPW Club Road. Once a user is at BPW Club Road, there are existing sidewalks and bike lanes to provide access to the high school site.



CHAPTER 4 - PUBLIC INPUT

After the initial field visit and after data analysis, a number of trail route options were developed. The information on the main trail was presented to the Greenways Commission in March 2009. In May 2009 a workshop was held with the consultants and Town Planning representatives and the members of the Greenways Commission. The pros and cons of various routes were visited, and by the end of the workshop there were three variations on trail alignment.

FIRST PUBLIC MEETING – Information and Trail Alternatives

The first of two public workshops for this future trail layout was held 15 June 2009 at the Frank Porter Graham Elementary School media center. The purpose of the workshop was to make research and information collected available to the public. It was intended to give an initial look at what routes were under consideration by the Town of Carrboro, and to give an opportunity for public review and feedback.

The school site was chosen as a meeting place as it is a familiar venue for most local residents, there is plenty of parking, and the site overlooks the study area. Various materials were available and displayed including photos from the corridor, mapped information boards as were presented to the Greenways Commission in March 2009, alternate routes where options presented themselves within the corridor, and educational information about various trail surfacing options. This first public meeting was not well attended. In fact only 11 people attended the meeting who were not affiliated with the consultants, the Town staff, or the Greenways Commission. Attendees were asked to fill out surveys regarding trail use and expectations, and all were given opportunities for general feedback, suggestions, and concerns.

The feedback can be summarized as:

- All attendees were interested in access to the University Lake property. There was one negative response in regards to the odor and noise from the University Lab facility.
- Berryhill residents are concerned that trail users will migrate from the footpaths on Town owned property to the private recreation facilities on the Berryhill property.
- Nearby residents are eager for some safe accessibility to the elementary school. They would like sidewalk connections from the Berryhill neighborhood to the school property. This issue was raised multiple times even though no such option was shown on the plans.

All respondents and people attending the public meeting want more trails in Carrboro and are regular trail users. There were no attendees who spoke against the trail system or who were against a trail in the Morgan Creek corridor.



Public perception of problems with current trails, and the three most cited aspects of the current trail system that need to be remedied are:

- Lack of connectivity with nearby destinations and other trails
- Accessibility concerns
- Unsafe street crossings.

Main uses of the trail would be walking, jogging, biking and rollerblading, reinforcing the need for some hard surface paving treatment.

The most desired destinations for trail users are University Lake, Downtown Carrboro, and Frank Porter Graham School.

The results of the limited responses to the survey and comments made by the meeting attendees reinforce the need for some kind of trail connection to the University Lake property and to Frank Porter Graham School, and for a safe way to cross Smith Level Road.



SECOND PUBLIC MEETING – Recommended Alignment

A second public meeting was held in October 2009 at the Chapel Hill Tennis Club. Again, this venue was chosen as it is within the neighborhood, has plenty of parking, and overlooks the trail site area. This second meeting was better attended. The materials presented included site analysis and the recommended alignment. The consultants and Town Staff representatives as well as many Greenway Commission members were in attendance to describe the process, the recommended alignment, and answer questions. Attendees were asked to write out their likes/dislikes, general comments, or the state concerns.

The results of the second public meeting as well as possible design responses are as listed below.

Route / Design Issues:

Concern about pedestrian safety crossing Smith Level Road (2)

One comment asked about getting DOT to add yellow flashing lights at this crosswalk

There is a standard traffic signal with a ped head at the existing crossing. It is unlikely that DOT would be willing to agree to a flashing light also. One solution is in the future phase of the design which takes the trail under Smith Level Road to provide a crossing that is physically separated from vehicular traffic.

Want to see Smith Level widened for bicycle safety

Widening of Smith Level Road is not within the scope of this project. NC DOT would be responsible for any road widening, which will take place according to a schedule and nature agreed upon by the Town and NC DOT and will involve other opportunity for public input. Therefore this trail study is considering how to best provide access to the trail system from points other than Smith Level Road.

Want the High School connector added (2)

The high school connector will be added to the study and a preferred alignment included in the final study design. In prioritizing the sections of trail to be built first, the Consultants and Town are looking at the portions of the trail that provide the most connectivity for the most users.

Place bridges near OWASA pipe crossings

OWASA will not allow bridges to be placed over existing pipes or in existing water or sewer easements. Also the bridge crossings will involve flood and no-rise studies and will be placed where their presence creates least flood disturbance. That will generally not be in the same locations as the sewer crossings.

Put the Berryhill-Public Works crossing as close to the soccer fields as possible

The bridge will need to be placed according to the restrictions of no-rise studies and keeping out of OWASA and Duke Energy easements. The next consideration is to keep bridges away from existing homes and yards but in some cases the flood and environmental issues will trump other considerations. Initial feedback from our



Hydrologic Consultant indicates that bridges would be best placed upstream of flood prone residential areas, or as far downstream as possible from floodprone residential areas.

Want access to Triangle Land Conservancy bluff

There is already a footpath along the south bank of Morgan Creek. When the bridge for the high school connector is installed it would provide access to the bluff along the unpaved footpath/spur. In an effort to minimize environmental impacts it is likely that the existing footpath will not be paved or further graded. Additionally there is no greenway easement in this area so the paths are on private property.

Want screening to protect residential privacy

The design and final recommendations will include more specifics about screening options and where screening would be most effective to retain privacy on adjacent residential properties.

Light portions of the trail near houses

Lighting has been considered and rejected. The trail is open only during daylight hours. The police advise against lighting this type of greenway trail as lighting would encourage 24 hour use. Also, lighting the trail near homes would create extra light in private yards.

Environmental Issues:

Want trail construction kept to 10' width with little adjacent grading and clearing

Minimize construction impact

Some amount of grading will need to be done to keep the trail ADA compliant. In general the disturbance in the floodway will be kept to a minimal amount and grading will not result in any net fill. A small strip of land adjacent to the trail is generally kept clear for safety and to provide space for passing and for runners who don't want to run on pavement. The alignment study can include typical cross sections which show that cleared area kept to a minimum.

Make bridges smaller to reduce impact

The bridge length is based on the size required to avoid or at least minimize effects on the floodplain upstream of the bridge. Because of this all bridges will be longer than simply top-of-bank to top-of-bank.

Want invasive species removed as part of trail construction

This issue will be addressed more specifically in the construction drawing phase of design. It is unlikely that invasive species or any plant material will be removed beyond what is being cleared for the trail and related grading/bridgework. Even if non-native species were to be removed during construction, they will re-colonize without constant maintenance.

Replant native species

Replant shrubs not grasses



Native shrubs and understory trees will be planted. The alignment and report will identify a list of appropriate native plantings for this area and specific conditions. This issue will be addressed in greater detail at the next level of design.

Other Issues:

There was no notice posted at Culbreth Middle School about the public workshop
How will safety and security be addressed, specifically regarding home break-ins



CHAPTER 5 - PROPOSED DESIGN

RECOMMENDED TRAIL ALIGNMENT

Main Trail Alignment

The recommended trail alignment has been determined from initial field visits, consultant expertise and interpretation of information, feedback from Town Staff, Greenways Commission members, and consideration of issues raised at public meetings.

The trail from west to east will start at the southwest corner of the University Lake area Jones Ferry Park-and-Ride lot. It will travel south parallel to the lake access drive, curving with the ground to maintain a slope of less than 5%. North of the lockable gates restricting access to the lake, the trail will turn east and travel through the woods, curving around the slope of the hill to keep the trail at less than 5% grade. A portion of this section of trail will cross a wetland and will require boardwalk. At the western edge of Rosewalk, the trail will connect to the existing gravel trail. The existing trail, though gravel, is hard packed and suitable for strollers and bikes. It would not be suitable for roller blades and may be resurfaced in asphalt at a later stage. The trail as far as Tom's Creek would be above flood plain elevations.

At the eastern edge of Rosewalk the main trail will need to cross Tom's Creek. The most reasonable place for the crossing will be north of the floodway, otherwise the bridge will be in the floodway backwaters of the main creek. Once across Tom's Creek, the trail will dip south into the existing greenway easement on the Tennis Club property. This stretch of trail will be installed in partially cleared land but will have easy views of Morgan Creek. This would be a good stretch to include some seating areas overlooking the creek.

As the creek bends to the north, and upstream of Weatherhill Pointe the trail will cross the creek to the Berryhill neighborhood and run along the eastern bank on a strip of Town of Carrboro land. The trail will continue to follow the creek around the "horseshoe" but out of the stream buffer. The land is already in Town of Carrboro ownership. Plant screening can be installed where necessary to keep the Berryhill soccer field visually separate from the public trail.

The trail will follow the creek as it bends east toward Smith Level Road. There is a pinch point where the Duke Energy easement and transmission lines intersect with the creek. Just upstream of this point the trail will cross the creek again to the north bank onto Town of Carrboro Public Works property. This will also give the Canterbury Townhome neighborhood access to the trail system. Toward Smith Level Road the trail will turn north and utilize some of the Public Works parking



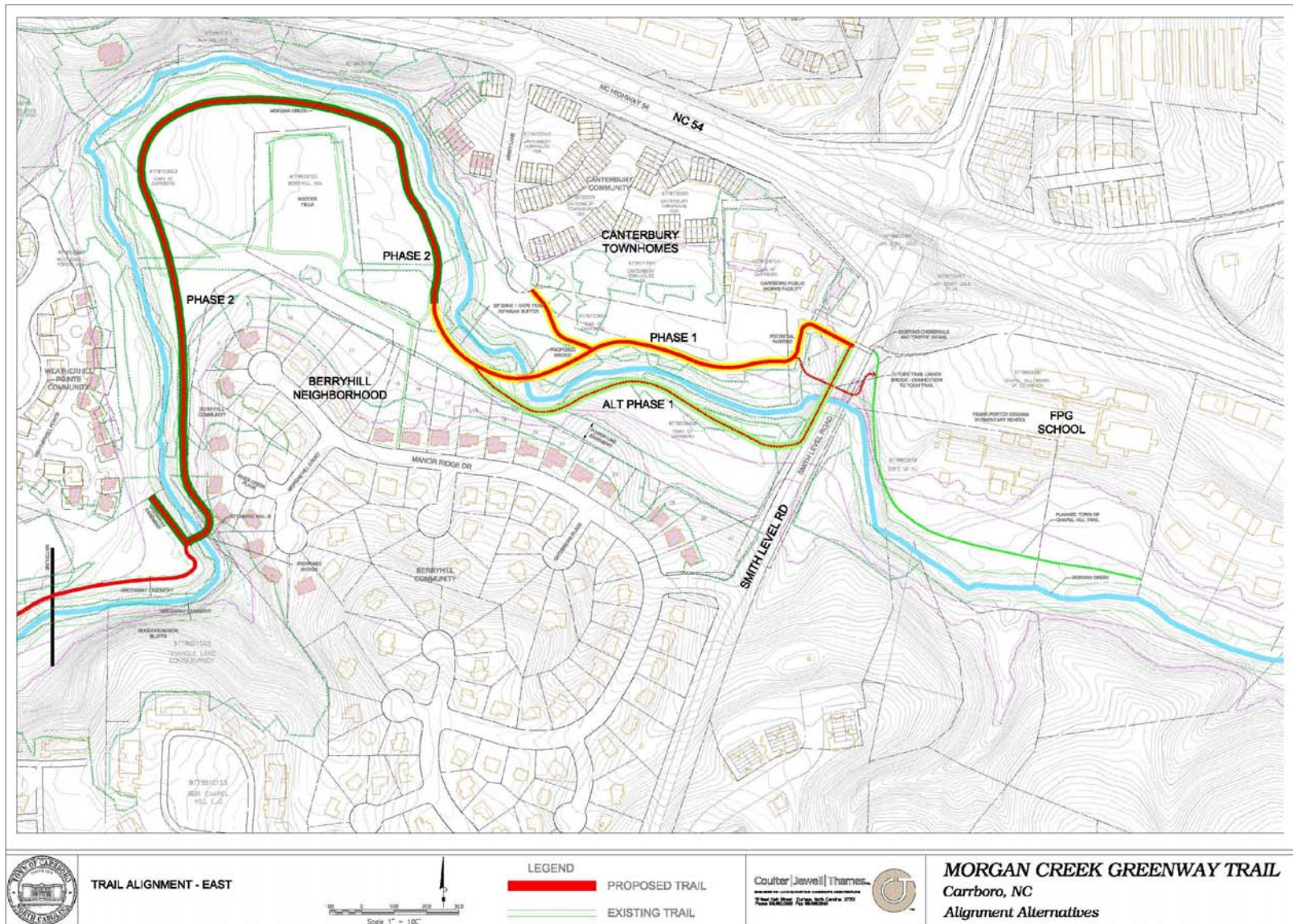
for public parking for trail users. The trail will follow the Public Works entry drive and end at the sidewalk on Smith Level Road where there is an existing traffic light and pedestrian crosswalk toward Frank Porter Graham Elementary School. As an alternative or perhaps a future connection, it would be possible to install trail under the Smith Level Road bridge on the north side of the creek and make a connection with the future Town of Chapel Hill trail – a connection that would be completely separate from vehicular traffic above.

Along this main trail corridor are multiple opportunities for communities to connect to the trail system. These connections could be provided by either the Town or by private entities to link neighborhoods and developments with the trail itself. It should be noted that some of these connectors may require signage indicating that the connector trail is on private property and not for public use. One connector that could be built as part of the project would connect the trail through Town property to the Abbey Lane right of way for access to the trail from the Canterbury Townhomes development. Other obvious connectors would need to be built privately as they would cross private land and would not be built in a greenway easement. Such connectors would include spurs into the tennis club, Weatherhill Pointe private streets, or connections between the trail and public roads in the Berryhill neighborhood. Such connections would be intended for local users to access the trail, and would need to be signed as private property unless individual owners agree to record greenway easements.

High School Spur Trail Alignment

The spur trail will cross Morgan Creek near Tom's Creek. On the south bank the trail will utilize a cleared and fairly flat draw currently which is an OWASA sanitary sewer easement. As the trail nears BPW Club Road a switchback should be enough extra length to keep the trail at an acceptable accessible grade under 5%. The remainder of the connection to the high school facility would be on existing streets that already have bike lanes marked.

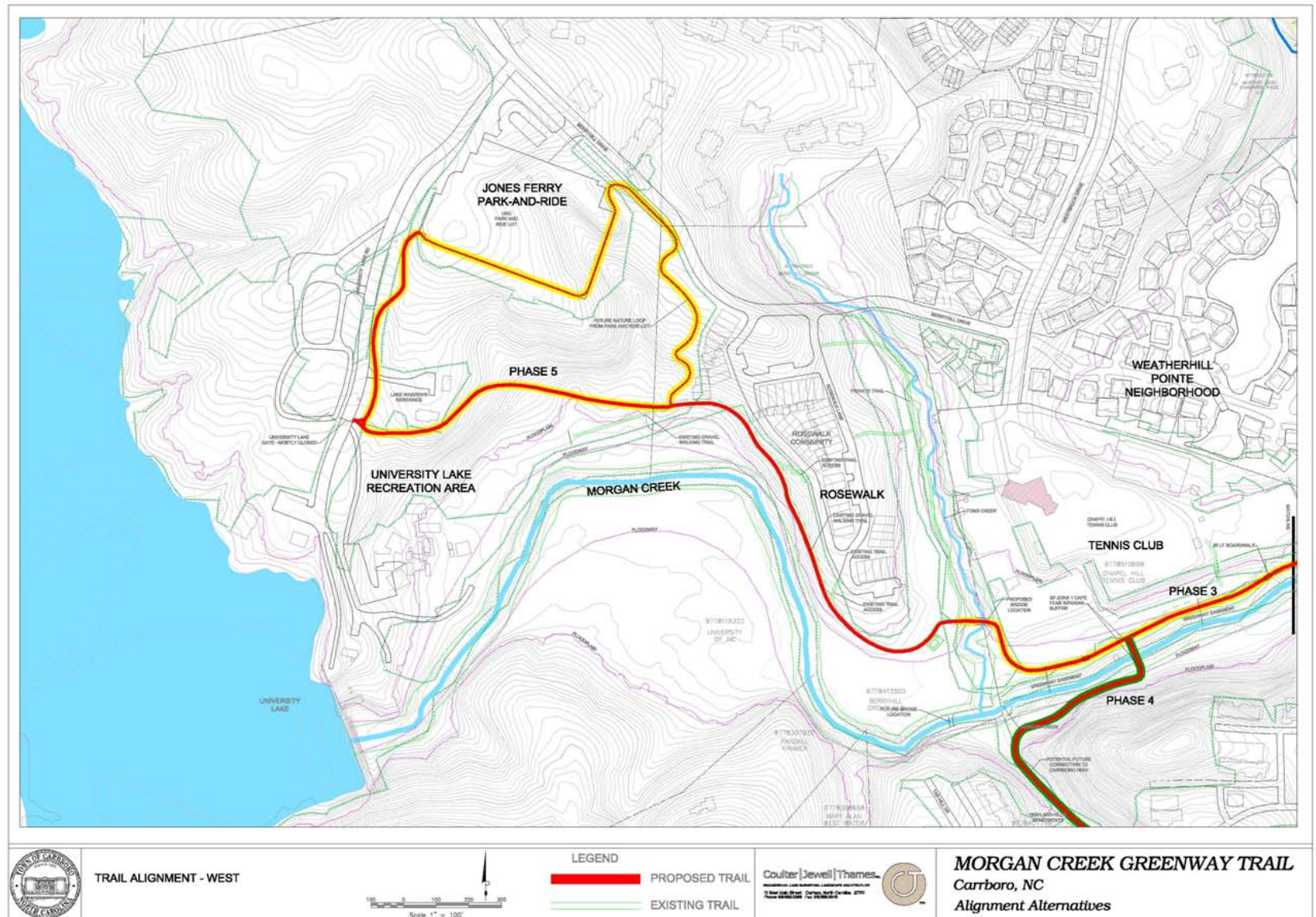




Map 13 – Recommended Trail Alignment – Main Trail, East



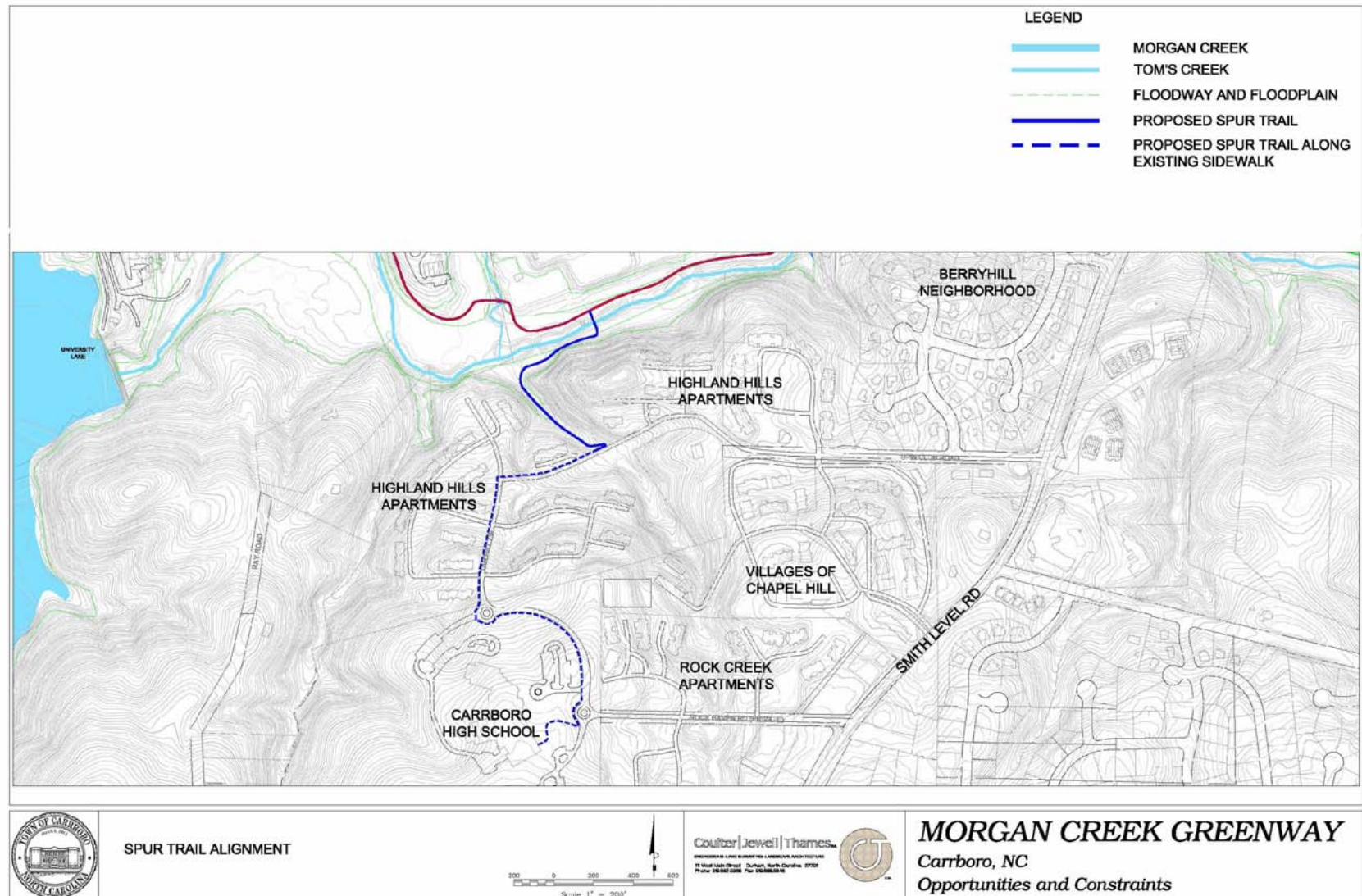
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Map 14 – Recommended Trail Alignment – Main Trail, West



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Map 15 – Recommended Trail Alignment – High School Spur Trail



CHAPTER 6 - IMPLEMENTATION

ACTION STEPS

The study to date has been based on information taken from GIS mapping from various sources. All future work on the design will require more accurate data. A field survey will be the first work that will need to be done. The surveyed area will need to include the main corridor as well as a corridor that follows the preferred route to the high school site. Although surveying could be done on a phase by phase basis, some overall creek surveying will need to be completed for the whole trail corridor to provide base information for bridge / creek crossing details.

Design development drawings will be done next using the surveyed base data. Talks should start with private landowners to start obtaining greenway easements. At this point the bridge crossings should be determined so the no-rise studies can be started. These studies will need to be done for four bridge crossings: the bridge over Tom's Creek, the bridge over Morgan Creek near Tom's Creek to be used for the high school connection, the bridge over Morgan Creek between Weatherhill Pointe and Berryhill, and the bridge over Morgan Creek between Berryhill and the Carrboro Public Works facility site. The no-rise studies may result in a different bridge design or slightly different bridge location. When bridge locations are determined, the plans and studies will need to go through FEMA for approvals which could take up to a year to obtain.

Once design development is complete, the Town should finalize any needed greenway easements or property purchases. While the Town is waiting for bridge crossing approvals the project may progress into the construction drawing phase.



PHASING PLAN

The entire trail project is estimated to cost substantially more than the amount of funds that the Town currently has available. It will therefore be necessary to divide the project into phases so that the project may proceed, focusing on the highest priority sections while additional funding is pursued.

Phase I

The budget for the first phase of the trail will allow approximately \$400,000 for construction after design and permitting fees. We feel that at least one creek crossing would be an important component for the first phase. There are various small walkable sections (paved and unpaved) along the corridor but no way or crossing the creek between Jones Ferry Road and Smith Level Road.

Our recommendation for the first phase is to build the trail between Smith Level Road and the existing pathways near the Berryhill recreation area. By starting at the eastern end of the trail, the Town will be able to provide a trailhead for corridor use on the Public Works site. It will also provide for the connection to the western end of the Chapel Hill trail when it gets built out. This section would provide a creek crossing and would provide a safe alternate route for Berryhill residents and Canterbury Townhouse residents to walk or ride to the Frank Porter Graham School site.

Included in the early phases of trail construction should be an allowance for cleaning out the creek. The extent of cleaning could range from simply removing large debris (fallen trees) and trash to removal of construction debris along the banks.

Phase 2

The second phase of the project should continue to link users and destinations. Two options for this phase present themselves.

The first option would be a 4000 linear foot westward extension of the phase 1 trail around the Berryhill recreation area, south along the creek, over the creek and dead ending in the Tennis Club property near the Weatherhill Pointe property line. This would provide a way for Weatherhill Pointe residents and Tennis Club members to cross the creek and join the trail system on foot. But there are no greenway easements or current trails through the Tennis Club or in this section of Weatherhill Pointe for connection, so the Town trail would need to stop at the property line and therefore would not actually end at a user access point. The Greenways Commission prefers this option as an extension of the first phase.



Alternatively, the second phase could be an extension from Rosewalk over Tom's Creek, along a short section of the Tennis Club property, over Morgan Creek and up the OWASA easement to BPW Club Road where there are existing sidewalks and bike lanes. This option would provide a route for neighborhoods on the north side of the creek to access the bike lanes and high school on the south side of the creek. This alternative would be only an 1800 linear foot stretch but would involve two bridge crossings.

Future Phases

As each section of trail is built, it should connect users and destinations. A separate phase could also be the Jones Ferry Park-and-Ride lot to the existing Rosewalk trail. This section would provide the western trailhead and additional parking.

As one of the links will be to the Chapel Hill trail section it would be advisable for both Towns to apply for federal grant money together to construction the connecting sections.



COST ESTIMATES

The main trail is estimated to cost approximately \$ 2.425 million including design, permitting, and construction. That is made up of \$ 2,137,300 in hard costs and an additional \$287,700 in soft costs.

Basically the design development, bridge crossing studies and permitting should be done for the entire trail at the beginning. Then construction drawings could be done phase by phase. The plans would be phased so that a section of trail linking two destinations could be built completely. Initial construction drawings that include a bridge crossing will have to include the no rise study for all the Morgan Creek bridge crossings. Because of this, some surveying will need to be done at each section. The no rise studies should be done at the very beginning to tie down the crossing locations and provide the Town with a comfort level that the crossings will be allowed. The Town has also requested that detailed construction drawings and permits for phases 1 and 2 be completed initially, with enough funding left for phase 1 construction. The design of phases one and two, and the installation of the phase one section should be buildable within the Town's budget.

The spur trail is estimated to cost approximately \$ 641,775 (\$558,000 hard costs and an additional \$83,775 in soft costs). This is an estimated cost for a trail to cross Morgan Creek and extend from the creek to existing transportation facilities on BPW Club Road.



Phase 1

The Town staff has indicated there is approximately \$600,000 for the first phase, or approximately \$400,000 for actual trail construction after surveying, design, studies, and permitting have been completed.

The unit cost of the trail without bridges is approximately \$100 per linear foot. That number includes periodic boardwalk installation for overland drainage, but longer boardwalk sections would be closer to a \$400 per linear foot cost.

The first phase should include a bridge to provide access to both sides of the creek for all users, even if it means some travel back and forth on either side of the creek. A bridge should be budgeted at about \$ 170,000. That would leave \$230,000 of funding for trail, or approximately 2300 linear feet of paving.

The first phase should provide connectors to bits of trail or sections already passable. It should also provide some trailhead parking.

The cost estimate for initial design a section of trail running from Smith Level Road to the Berryhill gravel trail is \$132,350. This estimate includes no rise studies for the whole trail, alterations of an existing parking lot for trailhead use, one bridge crossing, and a concrete overland trail. The estimated hard costs for construction of this proposed section is \$426,350. These costs include a 15% contingency.



LAND ACQUISITION

Main trail

Starting at the west end of the recommended alignment, the Town would need to get a greenway easement on the University Lake property. It would also be useful to sign some parking spaces for use during non-weekday work hours. It may be necessary to stripe to re-work one parking space to be ADA compliant at the start of the trail.

Much of the trail on the Rosewalk property has already been deeded to the Town. But a 400 linear foot stretch at the southeast still needs to be deeded. And the Town will need to obtain a greenway easement for a small connector from the existing trail, over Tom's Creek, and some easement from the Chapel Hill Tennis Club on the east side for the bridge installation. The majority of the trail on the Tennis Club property will be aligned within the existing greenway easement on that parcel.

At the crossing between the Tennis Club (upstream of Weatherhill Pointe) and the Berryhill subdivision, it may be necessary to obtain a temporary construction easement for the installation of the bridge abutment. This will not be definitively known until the area is field surveyed and the flood studies have been started. Once across the creek, the trail will be located on land already owned by the Town. The crossing between the south side of the creek and the Public Works parcel will all be on Town-owned land. Duke Energy will need to approve the trail intrusion across their easement.

The land acquisition required for the first phase of the trail would amount to a small easement (10-20 linear feet by 20-30 foot width) near the Berryhill gravel path for a connection.

High School Spur Trail

The Town will need to obtain a greenway easement on the Highland Hills Apartments property. The easement would be needed for the connection between the creek and BPW Club Road.



APPENDICES

Appendix A – Photos of Existing Conditions in Trail Corridor

Photos of existing conditions – Main trail corridor - February 2009

Photos of existing conditions – south bank Morgan Creek - October 2009

Photos of existing conditions – High School Spur Trail corridor – December 2009

Appendix B – Design Guidelines

Trail Design Standards

Trail Construction Standards

Trailhead Facilities

Public Art



Appendix A
Existing Conditions Main Trail Corridor – February 2009

Existing sidewalks and bike lanes on Berryhill Drive.



Steep rocky drainage way from UNC Park and Ride lot.



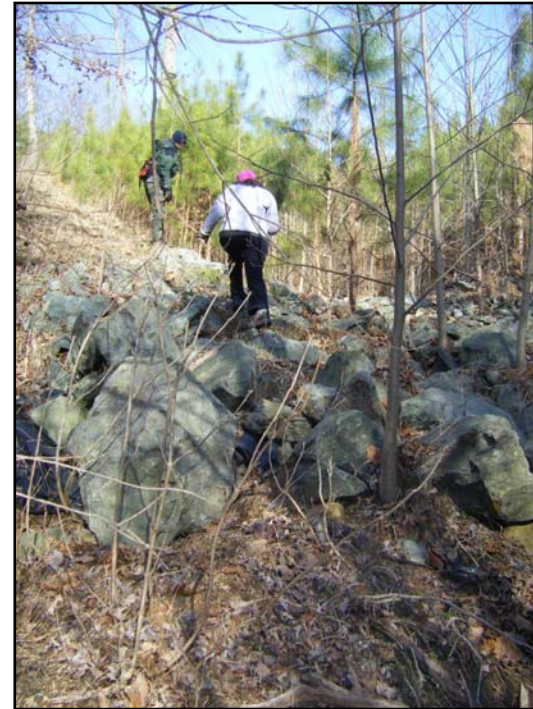
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There is space along Berryhill Drive to expand the existing walkway to create a 10' wide trail profile. There is space behind the Rosewalk townhouse development for a trail to be installed, but the terrain is generally steeper than would accommodate an accessible route, and there is a jurisdictional stream there so stream buffers would need to be respected.



Existing stream channel behind the RoseWalk Development on Berryhill Drive.



The very steep and rocky slope approaching the Park and Ride site



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Slope from the north end of the Rosewalk townhome site to the existing gravel trail.



Existing gravel trail at the south end of the Rosewalk townhome development.



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Existing 10' wide gravel trail along the west and south edges of the Rosewalk townhome development.



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A typical section of Tom's Creek dividing the Rosewalk townhome community and the Chapel Hill Tennis Club properties.



Intersection of Morgan Creek where Tom's Creek flows into it. The slopes are flat enough that any crossing at this point would be a very long bridge. Also there is a sewer line crossing the creek here and other debris type obstacles in Morgan Creek. The stream banks are not stable, which presents problems for stability of bridge abutments.



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Looking east along the south end of the Chapel Hill Tennis Club property. There is a sanitary sewer main along the left side of the clearing. The left side of this area is an existing greenway easement.



There are already informal footpaths from the proposed trail area and creek to the Tennis Club facilities.



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Chapel Hill Tennis Club property behind the Weatherhill Pointe homes.



Forested greenway easement area on the tennis club property between Weatherhill Pointe and Morgan Creek.



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Looking across Morgan Creek from Weatherhill Pointe to the Berryhill community. Across the creek to the left is the southern edge of the property owned by the Town of Carrboro. Homeowners have encroached slightly into Town owned property.



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An informal connection between the homes at Weatherhill Pointe and Morgan Creek.



A Piedmont Electric service line running parallel to Morgan Creek between Weatherhill Point and the creek. Piedmont Electric has indicated they would allow a paved trail under this service line.



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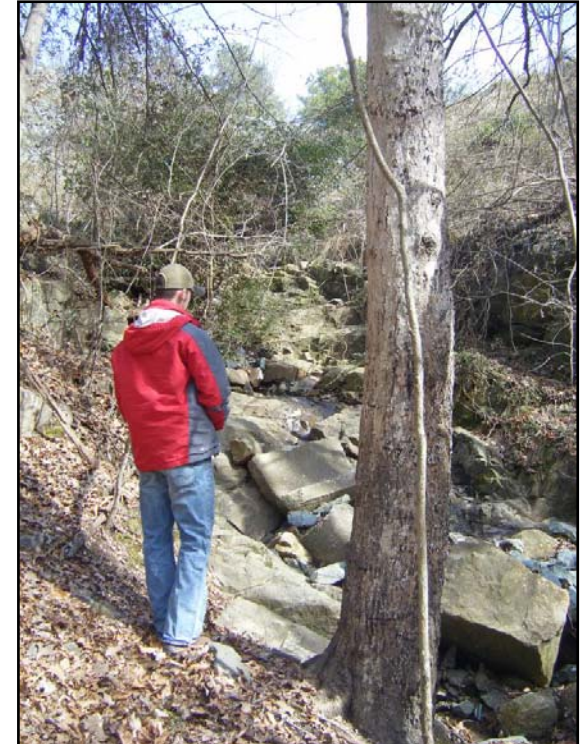
Drainage way between Westbrook Drive and Morgan Creek. Slopes here are moderately steep. The drainageway is not in the floodplain.



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Morgan Creek looking east at the base of the steep slope from Hwy 54 on the PEP Holding properties. At the west edge of the steep slope area there is a small "shelf" adjacent to the creek. It is in the FEMA mapped floodway. Slopes are extremely steep.



There is a lot of construction debris on the slope from Hwy 54. This area of debris is in a drainageway from the highway and concrete waste has been used with the rip rap for bank stabilization.



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Construction debris from past highway widening on the steep slopes below Hwy 54. This is the north streambank of Morgan Creek.



Rip-rap storm drainageways from Hwy 54 (guardrail on the highway is visible at the top of the photo).



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View of the Town-owned land on the south side of Morgan Creek across from the PEP Holding steep slope areas.



Informal footpaths through the Town-owned land on the south side of Morgan Creek north of the Berryhill community.



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Canterbury Townhouse Property, north side of the creek.



Existing OWASA sanitary line crossing Morgan Creek at the south end of the Canterbury Townhouse community. OWASA has added fencing to each side of the line to discourage pedestrian crossing.



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Driveway access to the Town property and drainageway in front of the Town of Carrboro Public Works site near the Smith Level Road bridge.



View from the Carrboro Public Works facility toward Smith Level Road on the north side of Morgan Creek. The proposed Town of Chapel Hill trail is planned to end on the other side of the bridge, on the north side of the creek.



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Existing Conditions – South Bank Morgan Creek – October 2009

Steep slope between the south bank of Morgan Creek and the end of Tar Hill Road.



Understory and ferns in wooded area on the south bank of Morgan Creek near Tom's Creek.



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Bench at top of bank on south side of Morgan Creek east of Tom's Creek.



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Western edge of Triangle Land Conservancy property.



The terrain is getting steeper and more rocky.



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By the east end of the Triangle Land Conservance property, there is almost no bench at the top of bank and the terrain becomes steeper. Streambanks in this area are somewhat unstable from erosion.



There are homes at the top of bank in the Berryhill neighborhood.



Existing Conditions – Spur Trail area – December 2009



Drainage way and OWASA easement south of Morgan Creek and east of Tar Hill Drive.



The same drainage way at the approach to BPW Club Road.



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Final Report***



OWASA easement on north side of BPW Club Road.



Gentle slopes from OWASA easement to Villages of Chapel Hill apartment complex.



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Final Report***



Wooded gentle slopes between the OWASA easement and the BPW Club on BPW Club property.



Steep stretch of OWASA easement approaching Villages of Chapel Hill driveway.



***MORGAN CREEK GREENWAY
Final Report***



Steep slopes between Villages of Chapel Hill and Rock Creek Apartments.



Access possibilities on Rock Creek Apartment property.





Parking lot at Rock Creek Apartments approaching Rock Haven Road.



Flat area around Carrboro High School building.



Steep slopes on high school parcel northwest of school building along stream.



Appendix B – Operations and Maintenance

The trail is a public facility and the main trail corridor should be maintained by the Town to keep the trail a safe and valued facility. At the trailheads there should be signage indicating the rules of trail use. Such rules would include hours of operation, acceptable uses (non-motorized vehicles), directional instructions (keep right, pass on the left, don't stop bikes in the middle of the trail, etc), dog leash and clean up requirements, and prohibitions (no litter, fires, or alcohol use). Trailhead signage should also include the trail name and section so that if a user needs to call for emergency aid they can indicate their location.

The local police should be informed when the trail construction starts and as trail paving progresses so they are aware of the new facility and can monitor the corridor use appropriately. Long term maintenance of the trail should include conversations with the police department to find out about illicit activity and safety hazards along the trail and take steps if necessary to implement design or operational measures to reduce it.

Though the trail would be mostly off-road, there needs to be a balance between a route “through the woods” and the elimination of overgrowth and large/thick understory near the trail itself. The edges of the trail should be maintained for safety reasons. Generally a 5'-10' wide space next to the paved surface should be mowed to keep up visibility and eliminate natural hazards. Additionally keeping a wider clear corridor will increase assure long sight lines keeping visibility to a level that users can see who is ahead or behind them. Invasive species in this zone should be removed to reduce their spread. Litter, debris, and graffiti should be removed immediately to discourage further personal property vandalism. In the case of litter and graffiti, the presence of those items make it appear that the trail is not being maintained and will encourage more similar activity. It may be possible to establish some “adopt-a-trail” sections near neighborhoods to keep litter and graffiti cleared and to notify Town personnel of any maintenance needs.

The trail should be traversed by Town employees on a schedule so that problems can be identified and fixed. Trail surfaces should be maintained and any repairs completed in a timely manner to keep the surface safe to use and to attend to problems before their repair becomes more costly. Rough edges, major cracked or uneven pavement, missing sections of paving or boardwalk should be repaired immediately.



Trailheads

Provide safe paved lighted parking areas.

Provide signage indicating location, trail name, rules of trail use.

Provide a trash can to reduce litter and to provide a receptacle for litter deposit for users.

Provide contact information so users can contact Town employees to report trail problems.

Routine Maintenance

Weekly traverse of the trail

Immediate removal of trash and graffiti and debris

Install trash cans only where Town staff can easily and routinely empty them

Immediate repair/replacement of vandalized or missing signs

Periodic surface cleaning and removal of sediment

Periodic mowing of edges – bi-weekly or monthly during spring, summer and fall months

Vegetation debris may be left off the edge of trail to decompose

Annual inspection of edge vegetation and removal of overhanging/dangerous limbs

Annual clearing of drainage channels

Traverse of the trail after storm events to determine required debris removal or trail repairs



Appendix C – Design Guidelines

Trail Design Standards

From the DOT NC Bike Facilities Planning and Design manual, standards call for a 2% slope for sustained grades, and a maximum acceptable slope of 5% for trails. A length of trail up to 500 LF may be more than 5% slope if it is a wider trail.

Less restrictive are AASHTO standards for trails which call for a slope of less than 5% for a shared use path. There are cases where steeper slopes are unavoidable without great expense in rerouting the trail or trail construction. AASHTO standards recommend for steeper slopes a maximum acceptable length depending on the grade, as follows:

% slope	Maximum Acceptable Length
5-6%	800'
7%	400'
8%	300'
9%	200'
10%	100'
11%	50'

Trail Construction Standards

As a condition of receiving NC DOT funding the trail must be accessible. Therefore the surface of new trail construction will need to be a hard surface such as asphalt or concrete. In general concrete is preferred when the trail will be located in floodway or floodplain because the concrete construction can withstand flooding better than asphalt. Pervious paving works best when the subgrade drains well and as there is poor drainage here due to the proximity to the creek and the location in floodway and floodplain, the extra cost of pervious paving would not be a good use of funding resources. Any wetland areas should be crossed with boardwalk to minimize permanent disturbance. Boardwalk should also be used periodically along flat stretches of trail to allow upland drainage sheetflow overland through to the creek.

AASHTO standards indicate a 10' width for shared use paths with additional 2'-4' width for stretches that are steeper. The cost estimates are based on a 10' standard width.



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Any trail built in floodway or floodplain should be built so that the final grades are the same as current grades. This will eliminate fill in the floodplain except for the bridge abutment locations. In this corridor, the majority of the trail will be built in the floodway.

The trail should be marked with distances ($\frac{1}{4}$ mile, $\frac{1}{2}$ mile, $\frac{3}{4}$ mile, even mile) for recreational users and also for aid in locating site needing maintenance or emergency access.

Trailhead Facilities

There is existing parking at the west end at the Jones Ferry Park-and-Ride lot. There should be signage at this point to indicate the start of the Morgan Creek Trail.

The existing parking lot at the Public Works facility on Smith Level Road already has parking, though it is fenced. The fencing and edge of parking could be reconfigured to accommodate 10 cars so those spaces would be available at any time, even if the Public Works facility were closed. There should be signage at this trailhead also.

Public Art

Public art may range from ornamental (sculpture) to practical (benches or signs). The cost of public art has not been calculated into the budget. Placement of public art will be important – it cannot be placed in the floodway if it will create a “fill” situation, and choice and installation of public art should include consideration that the area is prone to frequent flooding.

