

TOWN OF NEW CASTLE
CHAPLINE
MULTI-USE PEDESTRIAN
TRAIL WAY
FEASIBILITY STUDY

SUMMARY REPORT

APRIL 2021

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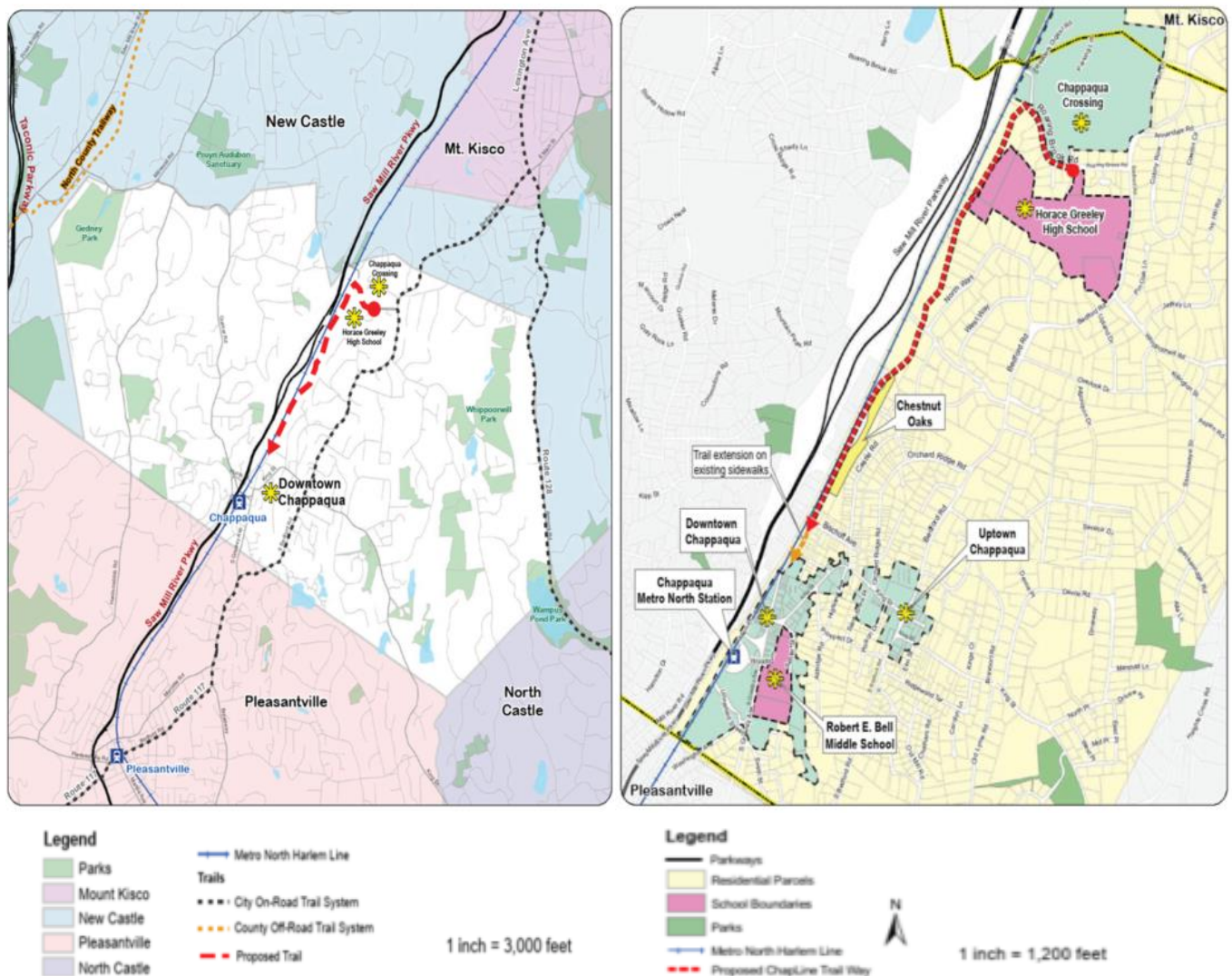
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1.0 INTRODUCTION

With the completion of the new Chappaqua Crossing shopping center opposite the entrance to Horace Greeley High School on Roaring Brook Road, and the existence of a cleared route through the woodlands and wetlands for the existing Westchester County Sewer trunk line, the Town of New Castle has sought to close a key gap in the anticipated North Westchester County Trail System that would benefit both the Town and the Region. Nicknamed the ChapLine, the nearly one and one-half-mile route will link downtown Chappaqua and Robert E. Bell Middle School with Chappaqua Crossings and Horace Greeley High School. The ChapLine trail corridor is rich in diverse landscapes, land use types, and flora and fauna.

The ChapLine Feasibility Study examined trail alignment opportunities and investigated constraints on the ground, researched environmental considerations and adjacent uses, and held thorough discussions with key stakeholders and interested public. The study evaluated alternative alignments, finally proposing a preferred alignment that includes a paved trail, boardwalks, and a bridge crossing ultimately connecting to a multi-use path along the south shoulder of Roaring Brook Road.



2.0 EXISTING CHAPLINE CORRIDOR PROFILE

2.1 Community Characteristics

The Town of New Castle is located in northern Westchester County in the lower Hudson River Valley about 45 minutes north of New York City. Situated in the rolling and rocky hillsides east of the Hudson River Valley it is bordered by the Village of Mount Kisco, and towns of Cortland, Yorktown, Somers, Bedford, North Castle and Mount Pleasant and Ossining. It is a highly desirable attractive suburban community noted for diversity of housing conveniently located along major highways and the Metro-North Harlem Line of the Metropolitan Transit Authority.

The Town includes the hamlets of Chappaqua and Millwood and occupies 23.4 square miles with a population of 18,035 according to the American Community Survey. Housing is primarily single family (88%) and owner occupied (93%) with 29% of the population under 18 years of age and 14% over 65 years of age. 32% of the population is enrolled in school including college, graduate and professional school. Median household income is \$211,105. Census data indicated that the majority of New Castle's 8,207 commuters drove to work alone (4,609 - 56%) while another 2,484 (30%) used public transportation, 265 (6%) carpooled and 189 (2%) walked to work.

2.2 Project Consistency with Existing Plans

Planning in the Town is guided by Westchester 2025 and the New Castle 2017 Comprehensive Plan. The Town's plan states that all but 500 acres of the Town is zoned for single-family residential use and most of that (91%) is zoned for one or two acre minimum lot sizes.

Following the adoption of the Plan, New Castle undertook a feasibility study consistent with the goal of "examine the feasibility of sidewalks on all major routes including Rt. 117." The feasibility study evaluated adding sidewalks to Rt. 117 and ultimately determined that it would be too expensive and not feasible for what the Town wants to achieve, alternative multi-modal transportation options. Rt. 117 is narrow and a new state requirement indicates that a municipality cannot use eminent domain for sidewalks, the property must be purchased from the residents along the road. The narrow width also precludes the inclusion of both sidewalks and bike lanes. These factors led to the conclusion that a sidewalk along Rt. 117 would not be feasible at this time.

2.3 Natural Resources Found in the ChapLine Corridor

Portions of the proposed trail are located in close proximity to the Chappaqua Brook, a Class C stream that is part of the Lower Hudson River Drainage Basin. Chappaqua Brook converges with the Saw Mill River (Waters Index No. H-4) 0.94 miles south of the project limits. The Saw Mill River subsequently drains into the Hudson River, approximately 1 mile south of the project location. The corridor is also occupied by federal and state freshwater wetlands, primarily in the lower lying portions of the corridor adjacent to the Metro-North Harlem Line.

CHAPLINE - Consistency with 2017 Town Comp Plan

- ❖ *Goal 7. Support the improvement and promote the use of alternative transit services including rail, bus, and school transportation.*
- ❖ *Goal 8. Ensure under-served and/or special need populations have access to adequate public transportation services.*
- ❖ *Goal 9. Alleviate traffic congestion.*
- ❖ *Goal 10. Provide access for non-motorized forms of transportation, make streets accessible for all users (i.e. pedestrians of all ages and abilities, cyclists, vehicles) and promote walkability.*
- ❖ *Goal 11. Improve circulation and connectivity within and between the hamlets and Chappaqua Crossing.*
- ❖ *Goal 12. Improve accessibility of train service.*
- ❖ *Goal 25. Reduce the Town's carbon footprint, encourage climate change adaptation measures, minimize energy demand and promote the use of alternative energy.*
- ❖ *Goal 35. Improve trail and unimproved linkages between open space parcels and prominent destinations in the Town.*
- ❖ *Goal 39. Improve road safety.*
- ❖ *Goal 40. Promote general public safety.*

The forested and wetland characteristics of the trail corridor can be expected to offer habitat for threatened and endangered species, thus this potential was examined in the field. Heavily vegetated areas that contain multiple trees greater than 3 inches in DBH, could provide potential roosting habitat for Indiana and northern long-eared bats. While suitable habitat exists to support bald eagle foraging within the project area, no potential nesting sites were noted within the limits of disturbance. The wetlands identified on site were shaded by forested over story and lacked microtopographic relief specific to suitable habitat Bog Turtle species. Dominant vegetation included phragmites and jewelweed, as well as, skunk cabbage. As few sedges preferred by the turtles were identified, it is unlikely that a population of bog turtles inhabits these wetlands.

2.4 Environmental Permitting

Table 1: ChapLine - Environmental Permitting & Reviews	
SEQR	Town of New Castle would act as Lead Agency and conduct review
DEC/ACOE	Joint Application for Permit may be required (unlikely)
Westchester County Highway Department	May require a work permit
State Historic Preservation	Office Review
Coordination	MTA-Metro North Railroad
Coordination/Review	Washington Co. Sewer Authority
Occupancy and Use Agreement	Washington Co. Sewer Authority



Bog Turtle



Bald Eagle



Northern Long-eared Bat

3.0 LOCAL NEEDS AND BENEFITS

3.1 Public Health

CLEAN AIR: Westchester County is an Air Quality Non-Attainment which means that urban air pollution standards are not being met. The shift in transportation modes resulting from the ChapLine project will help reduce emissions of greenhouse gases and other pollutants that contribute to global warming, smog, and acid rain in Westchester County. As a result of the project it is expected that there will be approximately 114 more bicyclists and 145 more pedestrian trips using this corridor, thus local greenhouse gas emissions will be reduced by 210 metric tons per year just for bicyclists.

PHYSICAL HEALTH: Regular physical activity can make a person look and feel better, as well as, reduce the risk of disease. Unhealthy diet and physical inactivity can cause or aggravate many chronic diseases and conditions, including type-2 diabetes, hypertension, heart disease, stroke, and some cancers (CDC, 2012). Regular physical activity is an important component of a healthy lifestyle, and aids in the prevention of many chronic diseases, disabling conditions and chronic risk factors (CDC, 2012). Bicycling and walking can also serve as the final leg of transit trips to and from other parts of the Chappaqua area, allowing riders to get between home and their train station or school and commercial districts and even home and shopping at Chappaqua Commons. As a result of the expected additional trips on the ChapLink Trail, there will be a local health care savings of around \$54,000 per year.

3.2 Economic

LOWER MEDICAL EXPENSES: Health care costs and insurance rates are escalating, causing serious impacts to the local economy. Lack of physical activity is a contributing factor to a growing number of serious illnesses and health problems among all age groups. As a result of the increased physical activity by ChapLink Trail users, there will be a local health care savings of around \$54,000 per year.

LOCAL INVESTMENT: The project is likely to catalyze school district investment into pedestrian connections to the trail; private investment at Chappaqua Commons to improve pedestrian and bicycle infrastructure.

TRANSPORTATION EQUITY: In addition to health-related costs, operating a personal automobile is very expensive and can be a barrier to lower income persons. It is estimated that of every dollar earned, the average household spends 18 cents on transportation, 94% of which is for buying, maintaining and operating cars, the largest source of household debt after mortgages (American Public Transit Association, 2007). The average vehicular commuter spends over \$7,500 per year on commuting expenses, which include the cost of gas, vehicle wear and tear, vehicle maintenance, and insurance. These costs can be a significant portion of a lower income family's budget.

On average, switching from driving to walking and cycling saves \$1.42/mile, money that can be re-invested in the local economy. As a result the three mile round trip on the ChapLine the local economy could save \$1,100 per day and over \$300,000 per year. The resulting savings for a young low income family would be extremely beneficial. Improving transportation equity by cultivating better walking and bicycling conditions provides mobility for the one-third of people in the United States who do not have cars. This improves access to jobs, education, and health care.

QUALITY OF LIFE: As of result of ChapLine, local residents will enjoy improved bicycling conditions which will add to the vitality and quality of life of the community and provide access to recreational destinations across the region. Bicycling and walking on the ChapLine will be appealing to families looking to engage in new recreational opportunities while increasing opportunities for social interaction and contributing to a sense of community. Increased use of the ChapLine will unilaterally increases safety for motorists, bicyclists, and walkers.

CHAPLINE BENEFITS

- ❖ *Reduces the Green House Gas Emissions by 210 MTe per year;*
- ❖ *Health Care Savings of around \$54,000 per year;*
- ❖ *Savings of \$1,100 per day and \$300,000 per year in commuting costs over travel by automobile;*
- ❖ *Improves local transportation equity;*
- ❖ *Increased quality of life, sense of community, safety for motorists, pedestrians and bicyclists.*

3.3 Natural Resources

The project is located in a heavily urbanize area and will result in the preservation of natural resources along the corridor and adjacent lands. Due to the project's proximity to a wide variety of the State's natural resources, the project should not only protect but also help preserve them. This project will improve the air quality in the area by reducing the amount of pollutants emitted from transportation vehicles such as black carbon. It also can help lower the amount of acid rain in the area by reducing the amount of sulfur and nitrous oxide being emitted into the air through transportation vehicles. Lowering the pollutants being emitted into the environment will not only help the people living in the area but also the natural resources in the area.

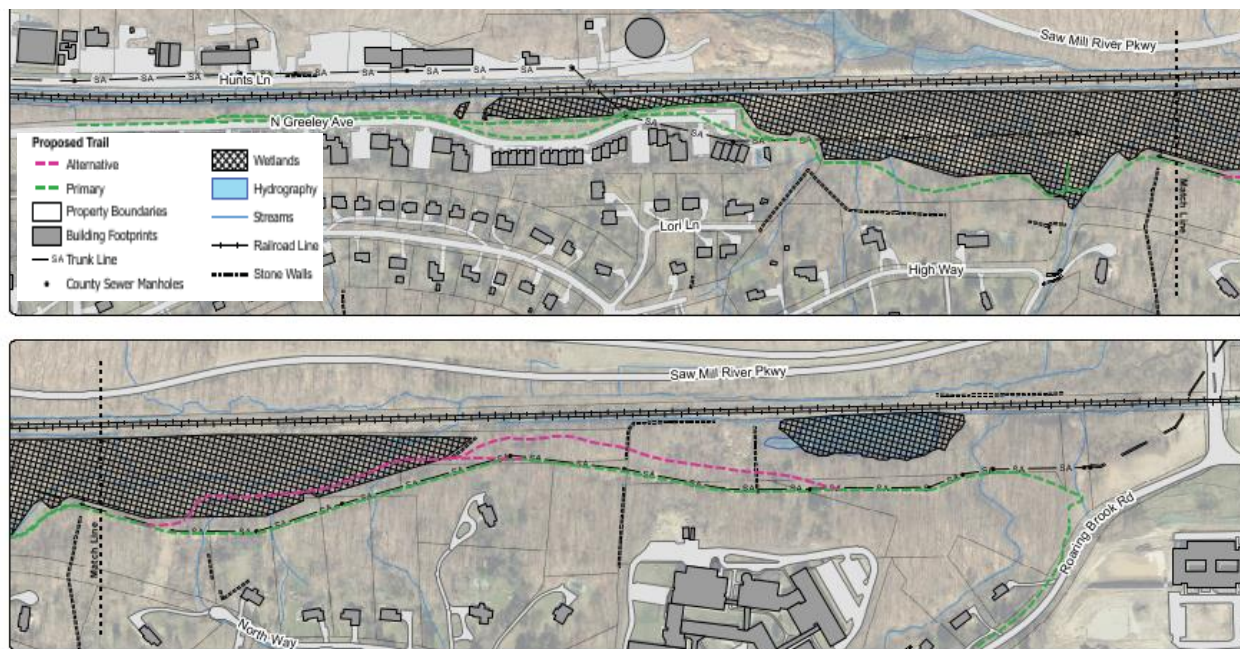


Figure 1: Existing Environmental Features – ChapLine Corridor

3.4 Sustainability

This project will help the Town of New Castle become a more sustainable community for generations to come. A multi-use trail will provide safer routes to Chappaqua Crossing, Horace Greeley High School, downtown Chappaqua, and Robert E. Bell Middle School. The Town will no longer need to depend solely on automobile transportation to get to and from these core community destinations which will greatly lower mobile GHG emissions in the area. This is vital since according to the 2012 Mid-Hudson Regional GHG Inventory, the Town of New Castle was 20th out of 48 municipalities in Westchester County with the highest Mobile Energy emissions of 64,474 MTe. Not only will this project help reduce GHG emissions by providing bike and pedestrian routes, it will also encourage residents to use more sustainable modes of transportation and reduce their carbon footprint.

4.0 CHAPLINE DESIGN

4.1 Objectives

Town of New Castle demographics (2107 American CommunitySurvey) indicated a very high commuter percentage and a higher than average school age population will result in a high number of users for the trail facility. In addition, the trail will complete a convenient link between downtown Chappaqua and Chappaqua Crossing, as well as, creating a convenient safe pedestrian connection Chappaqua residential areas to the High School Campus, thus strengthening the likely demand for the trail. The resulting level of service is likely to warrant a minimum 10' wide path with 2' shoulders and where feasible a 12' wide path with 2' wide shoulders.

4.2 Design Considerations

OPERATIONS AND MAINTENANCE: Operations and maintenance costs for trails can range between \$2,500 and \$6,000 per mile annually. Costs vary based on factors including construction methods, surfacing, environmental factors, ease of access, and infrastructure for the trail. For the ChapLine Trail Way, costs are likely to be in the higher average range per year due to the need for raised boardwalks, culverts, and bridges and due to the sloping and wooded nature of the corridor. These costs can be significantly reduced through the efforts of volunteer groups who can make regular inspections, make quick repairs to avoid further damage, respond quickly to mitigate vandalism and quickly report major damage. Regular maintenance is likely best handled by Town forces including regrading, mowing, plowing, and maintenance of vegetation.

RESILIENT CONSTRUCTION: Given the nature of the site, a hard surface is proposed using asphalt

pavement. Asphalt pavement requires considerably less regular maintenance and has a longer life span than softer surfaces. The flexible nature of the asphalt allows it to mold itself to changing conditions. Cracks are easily repaired as are potholes, both types of repairs when minor can be made by volunteers. Geotextile underlayment as part of the pavement section is also recommended. This will serve two purposes, it will provide for a significantly more resilient surface while preventing fine soils from percolating into the sub-base, preventing some freeze-thaw pavement damage.

For supporting structures on the raised boardwalks, the use of helical piles is recommended. These pilings are 'screwed' into the subgrade minimally impacting the wetlands and decking is then mounted onto them. The galvanized piles have a considerably longer lifespan than timber footings and maintain their form better than other footing methods.

Concrete surfacing is recommended for boardwalks and the bridge due to its inherent strength and minimal maintenance required as it will not rot, warp or twist due to thermal changes or UV exposure, and are termite proof.

Locust is recommended for timber railings for boardwalks as locust timber has become more readily available in recent years and has emerged as one of the most desirable timbers for outdoor construction. The initial cost of locust is considerably higher than pressure treated, but maintenance and life span costs are significantly lower.

For the bridge needed to cross the deep gorge a steel truss bridge is recommended. The steel truss is cost effective compared to timber bridges and has a longer lifespan requiring minimal long-term maintenance when compared to timber or precast concrete.

Signage supports should be difficult to vandalize and panels should have a graffiti-proof finish. Site amenities including light poles, benches, bollards, signage, and bike racks should also be finished with a vandalism and graffiti proof surface. Light fixtures in remote locations should be solar powered whenever possible. Highly efficient LED fixtures should be used which will reduce the load on solar storage systems.

GENERAL MAINTENANCE: The following are corridor-wide maintenance tasks that will be required on a regular and seasonal basis and after storm events.

- ❖ Maintenance of vegetation including pruning to restore the horizontal and vertical clearances around the trail corridor, mowing grass and meadow plantings, removal of downed trees and limbs.
- ❖ Trail surface repairs including crack and pothole repairs, removal of vegetation overgrowth, sweeping leaves and silt deposits.
- ❖ Trail corridor repairs to swales and/or erosion issues.
- ❖ Repairs to signage and other amenities.
- ❖ Snow and ice management, including plowing and sanding, to allow trail to be open year round.

SPECIFIC MAINTENANCE: Specific maintenance will be required for certain areas of the trail and for specific types of trail infrastructure.

- ❖ Trailheads at North Greeley and Roaring Brook Road - trash pickup; mowing and maintenance of landscape beds; cleaning and repair of signage and amenities; pavement cleaning and surface repairs; and graffiti removal.
- ❖ Possible fencing along Chestnut Oaks and private residences - Repairs to fence screening materials; re-plumb posts, replace damaged components; and remove graffiti.
- ❖ Bridge- Make repairs to decking to eliminate trip hazards; replace deteriorated decking; make repairs at approaches to eliminate trip hazards; repair bridge components; and remove graffiti.

MULTIMODAL DESIGN CONSIDERATIONS: As a shared use path, the standards to be applied to this design have taken into consideration the safety and operational performance of various trail users. The unique aspects of every trail will pose unique conflict areas that are worthy of additional design consideration.

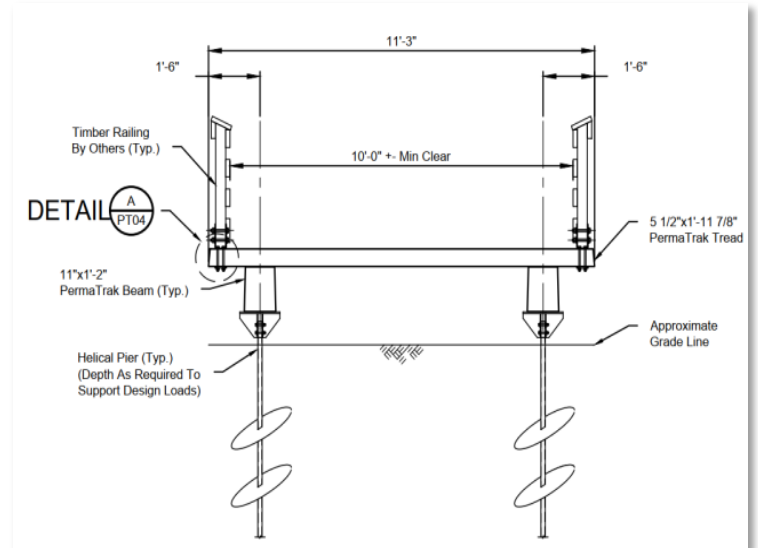


Figure 2: Helical piles foundation for proposed boardwalk segments.

Certain aspects of the ChapLine Trail Way are worthy of further consideration beyond these standards including entry points, side paths, trail heads, interpretive/ resting points, and crossings.

Logical entry points exist including North Greeley Avenue to the south and Roaring Brook Road to the north. Additional logical access points along the trail are at Shadow Brook Parkway, and to the back of Horace Greeley High School.

The northern terminus of this phase of the trail will be at the intersection of the entrances to Horace Greeley High School and Chappaqua Crossing along Roaring Brook Road. Here the trail will end transitioning to sidewalks and crosswalks at a signalized intersection. Space is limited so information about the trail entry point may need to be indicated in strong pavement coloring and textures.



The southern terminus of this phase of the trail will end transitioning to a crosswalk connecting to the existing sidewalks along North Greeley Avenue. Strong signage will be required to indicate the separate adjacent uses of the proposed trail and the existing Chestnut Oaks private community.

BRIDGE DESIGN CONSIDERATIONS: The proposed bridge crossing over the existing gorge would consist of a prefabricated pedestrian truss approximately 110 feet in length with a 14 foot clear width between railings. The truss would be placed on concrete abutments with wing-walls founded on rock or deep foundations.

Prefabricated bridges of this type are typically shipped to the site in two or three pieces. A crane would likely be located at each side of the gorge in order to pick the truss off the delivery truck and set onto the abutments. The bridge would be designed to carry H-10 loading (20,000 pounds) to accommodate construction vehicles when necessary, emergency service vehicles, and usage by Town maintenance vehicles.



LANDSCAPE DESIGN CONSIDERATIONS: Clearing of some existing shrubs and selective removal of trees will be required during construction to maximize safety, provide adequate vertical and horizontal clearance for the trail, and provide view sheds at optimal locations. Site furniture and materials including signage, bollards, gates, benches, and bicycle racks would be provided at rest areas, trailheads, and points of interest.

Plant materials will be used in trail design to stabilize slopes and control soil moisture to combat erosion; define boundaries and direct movement of pedestrians through public spaces and to direct the public away from nearby homes or schools; screen the trail from adjacent land uses and to create visual separation; maintain wildlife habitat throughout the project area and provide enhanced user experience providing shade, native flora, and aesthetic quality.

TRAIL AMENITIES: Numerous interpretive opportunities will exist along the trail including some important wetland habitat. These opportunities could be combined with viewing platforms, trail pull off/resting points and informational signage to enhance the user experience and educate about the trail corridor, local history and the trail's environmental setting. Wayfinding signage should also include entry signage (trailhead/parking areas), kiosk signage, trail directional and mile-markers.

DRAINAGE AND EROSION CONTROL: Portions of the project limits are mapped within the 100 year floodway of the Chappaqua Brook and other flood areas. Special flood proof construction will be needed including additional drainage stone and underdrainage for portions of the trail built in the flood zone.

Where portions of the trail are to be constructed in wetlands, crossing culverts should be placed at regular intervals to maintain a hydraulic connection.

TRAILHEADS: Trailheads should be established where feasible and should include wayfinding and interpretive signs as appropriate, provide local mapping which indicates nearby trail user amenities, restrooms, etc. Bicycle and pedestrian pathways should be clearly delineated from existing street infrastructure, parking areas, and private communities. Parking stalls and lanes should be adequate to accommodate loading and off-loading bicycles and should include ADA accessible spaces. Areas for shelter should be provided with seating. Separate parking should be provided for emergency services and police use to assist with surveillance at trailheads. An appropriate number of bike racks (two (2) per parking stall), a bike repair station and drinking fountain should be provided where feasible.

SITE LIGHTING: Lighting should be provided at trailheads and other areas identified where security risks are perceived as a minimum. Lighting along the length of the trail should be included if the trail is deemed open all day and night to allow for safe use by commuters and recreational users. Pedestrian scale poles and fixtures should be provided with LED cut-off style luminaries to limit light trespass. Solar powered lighting should be investigated as an option where needed in more remote areas of the trail. In addition to lighting to provide a level of safety along the trail for users, blue light emergency phones can be included. Blue light emergency phones are a crime deterrent, provide a sense of security and offer a quick notification and response in an emergency situation.

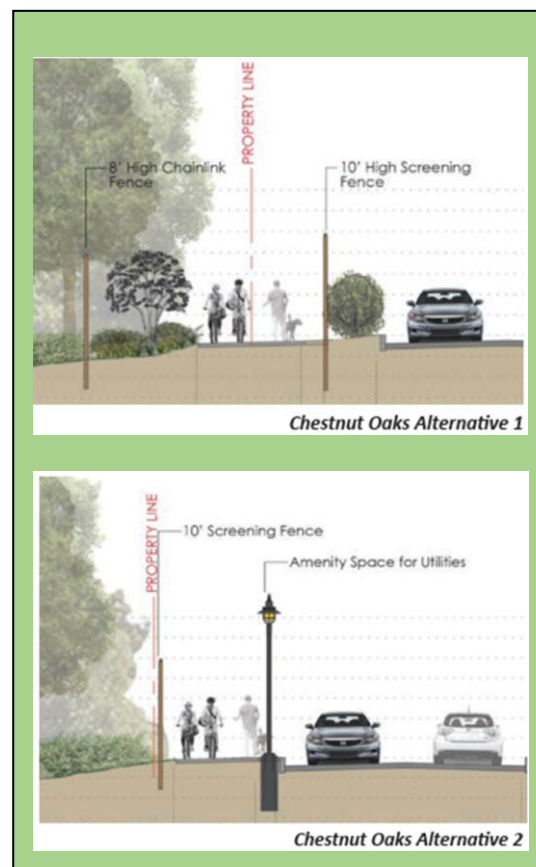
PEDESTRIAN CONSIDERATIONS: Benches, drinking water access, shaded rest areas and signage (wayfinding and interpretive) are valuable amenities to provide for pedestrians. Assuming dogs are permitted along ChapLine, providing dog-friendly drinking fountains, bag dispensers and trash bins may be desired to encourage people to pick up after their dogs.

SHARED-USE PATH DESIGN: The AASHTO's Guide for the Development of Bicycle Facilities is viewed as the national standard for bikeway design. Adherence to its guidelines will be required if the ChapLine receives funding from federal or state transportation, in addition to following any local Town or County guidelines.

4.3 Alternatives

CHESTNUT OAKS ALTERNATIVE 1: Alternative 1 proposes a 5-foot planted area with a screening hedge and the rehabilitation or replacement of the existing 12' high wood screening fence (only a portion of which to be replaced by the Town) adjacent to North Greeley Avenue and the Chestnut Oaks community. A proposed trailhead at the intersection of North Greeley Avenue and Bischoff Avenue will act as the beginning of the proposed 10-foot asphalt shared use path running parallel to North Greeley Avenue, located on Metro-North property. An additional proposed planted buffer zone and an 8-foot chain-link fence, as required by Metro-North Railroad, will separate the proposed trail from the railroad tracks within the Metro-North property limits along the western shoulder of the proposed path. Further along towards the Chestnut Oaks' pool and tennis courts, parking will remain along the existing cul-de-sac. Existing plantings and 12' high wood screening fence will conceal and separate the proposed 10-foot shared use path from vehicles traveling along the roadway. On the rail side of the trail a retaining wall and trail railing will be added to minimize impacts to the wetlands.

CHESTNUT OAKS ALTERNATIVE 2: Alternative 2 proposes an 8-foot asphalt shared use path adjacent to North Greeley Avenue. An additional 2-foot zone will be located between this proposed path and the roadway to provide a buffer and an amenity zone for lighting, signage, and other utilities. A proposed 8-foot chain-link fence will be placed between the shared use path and the Metro-North property, as required by Metro-North. Further

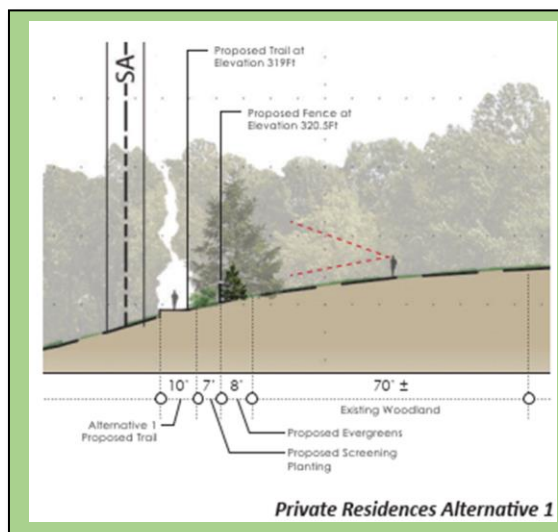


along towards the Chestnut Oaks' pool and tennis courts, the existing parking will be relocated to the north of the cul-de-sac and wrap along it. New proposed plantings and a proposed 10-foot wood screening fence will be added in this location to create a buffer between the North Greeley Avenue and the proposed shared use path.

WETLANDS SEGMENT ALTERNATIVES 1 AND 2: Through the wetland segment located north of Chestnut Oaks and then between the Metro-North Railroad tracks and the private residences of the Lawrence Farms neighborhood, both Alternative 1 and Alternative 2 routes the proposed trail way outside of the existing wetland area following the toe of the slope, located on Town property, to avoid impacting the wetlands. This deviates from the alignment of the Westchester County Department of Health Sewer Trunk Line (WCSTL) which traverses through the wetlands. A new pedestrian bridge crossing would also be located along this trail alignment to allow for minimal disturbance to an existing stream crossing.

PRIVATE RESIDENCES ALTERNATIVE 1: Alternative 1 proposes a 10-foot wide asphalt shared use path located along the cleared route of the WCSTL passes through the western edge of five (5) individual private properties. A proposed buffer of screening plantings and a 6-foot high screening fence is included to create a barrier between the proposed trail and the residences' properties. Evergreen trees would be added to provide additional screening in any areas necessary along the proposed fenceline to further shield residences' views of the trail. This route would require acquisitions, easements, and/or land swaps of the private properties.

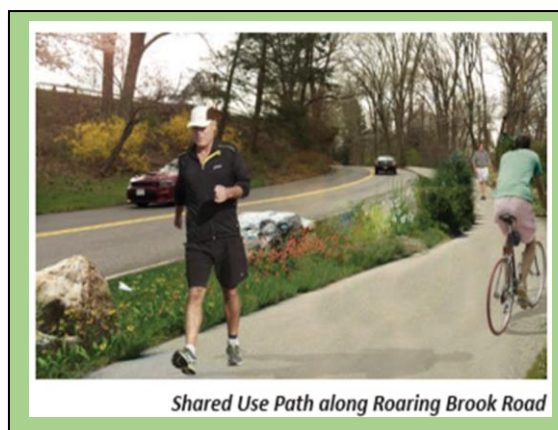
PRIVATE RESIDENCES ALTERNATIVE 2: Alternative 2 proposes a 10-foot wide boardwalk that meanders within the existing wetland exclusively on Town property. This trail alternative is located outside of all private residences' property limits. While it requires no land acquisitions or easements, it will require permitting for work within the wetlands.



HORACE GREELEY HIGH SCHOOL ALTERNATIVE 1: Alternative 1 proposes a 10-foot asphalt following the alignment of the WCSTL within the upland area, intersecting through School property in two (2) separate locations and would require an easement and/or land acquisitions of these School property parcels, along with cooperation and collaboration with the School.

HORACE GREELEY HIGH SCHOOL ALTERNATIVE 2: Alternative 2 proposes a 10-foot asphalt shared use path route that avoids School properties within the lowland area. This alignment is located on steep slopes owned by the Town and intersects an area of federal wetlands and will require earthwork and grading, as well as, possible tree removals.

ROARING BROOK ROAD SEGMENT ALTERNATIVES 1 AND 2: A new pedestrian truss bridge is proposed across an existing gorge to connect the HGHS Trail Segment to the Roaring Brook Trail Segment. For both alternatives, the 10-foot wide shared use path continues within the Town's right of way along the south side of Roaring Brook Road, running parallel to Roaring Brook Road, and ends at the South Farm Road/ Roaring Brook Road Intersection at the entrances to both HGHS and Chappaqua Crossing. An elevation change, along with a box beam guiderail and planted buffer area would separate the shared use path from the roadway and will follow the grade and contours of the road and will be ADA compliant wherever possible.



5.0 PREFERRED ALIGNMENT & TRAIL DESIGN

5.1 Preferred Alternative

The preferred trail alignment for the ChapLine Trail Way represents the most feasible option for completing this connection of Downtown Chappaqua with Chappaqua Crossing and Horace Greeley High School, connecting key areas of the Chappaqua community and providing residents and visitors with the most rewarding and practical trail experience. This alignment considered future connections that would enhance the pedestrian experience within the Hamlet and further the Town's goal of providing non-motorized transportation options and accessible recreation. The preferred alignment creates a constructible trail way that minimizes environmental impacts while providing an excellent user experience.

5.2 Pedestrian Improvements

The ChapLine Trail Way aims to connect three core community spaces: Downtown Chappaqua, Chappaqua Crossing, and Horace Greeley High School and will act as a safe, walkable trail for those who live, work, or attend schools in the neighboring area. The conceptual design of this proposed multi-use pedestrian trail way will be approximately 1.5 miles long and will allow visitors and residents to commute safely off-roads while offering a trail for recreational purposes.

5.3 Bicycle Improvements

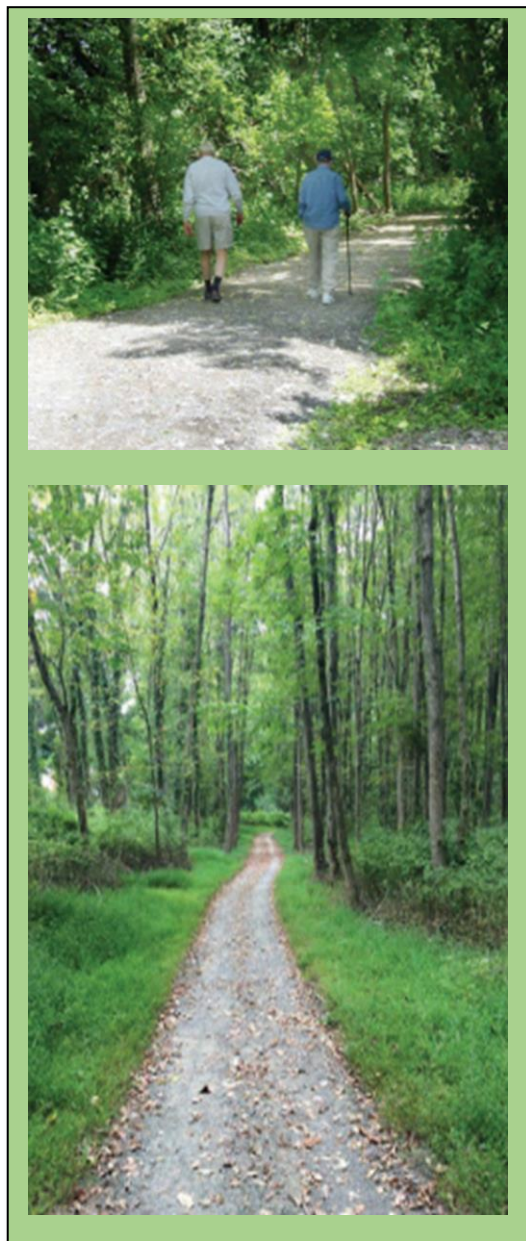
Including accommodations for bicycles and bicycle infrastructure along the trail way means ensuring that a network of infrastructure is in place to make bicycling a viable mode of travel within the Town. The recommended design of the preferred trail alternative includes safe infrastructure and considerations offering an easy and comfortable experience for users and is separated from vehicles. A benefit of bicycle infrastructure that is physically separated from vehicles is that it can help increase bicycle use, especially by less confident riders, and support safer travel.

This approach can promote health by providing added opportunity for physical activity from transportation. This strategy is related to and supports the United States Department of Transportation programs including Safe Routes to School, Complete Streets, and Encourage and Promote Safe Bicycling and Walking. Elements of bicycle and pedestrian infrastructure may include a multi-model trail supporting bicycle use; bicycle parking; guiderails; landscaping; bicyclist scaled lighting; separation of uses between vehicular and bicycle uses; landscaping buffers; and signage.

5.4 Intersection & Crossing Improvements

The preferred trail alignment falls off-road for the majority of the 1.5 miles route eliminating conflicts between trail users and automobiles except for the southern terminus along North Greeley Avenue and the northern terminus along Roaring Brook Road. In these locations at the south and north ends respectively, the trail intersects or runs alongside roads, driveways and intersections.

Recommended improvements at all areas of overlapping or adjacent uses along the preferred trail



alignment include:

- ❖ Vehicle control bollards to prevent vehicles from accessing the trail;
- ❖ Removable bollard(s) to allow for maintenance and emergency service vehicle access to the trail;
- ❖ Removal or thinning of vegetation to increase visibility as required;
- ❖ Pavement striping including crosswalks and restricted areas;
- ❖ Wayfinding signage;
- ❖ Relocated and/or improved traffic signals as required.

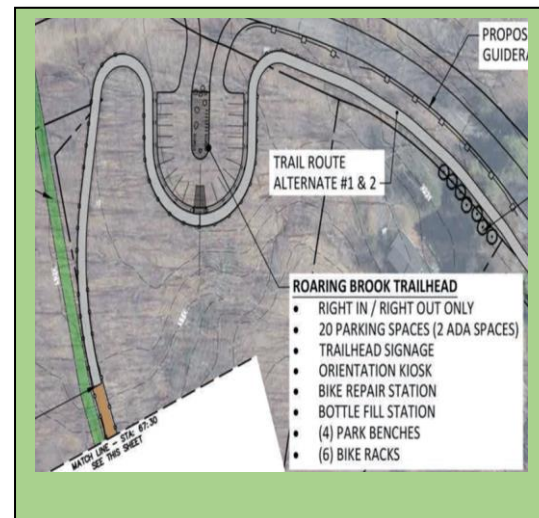
MAJOR INTERSECTIONS: Only one intersection was designated a major intersection – the intersection along Roaring Brook Road at the entrances to Horace Greeley High School and Chappaqua Crossing. This intersection was newly constructed with the completion of Chappaqua Crossing. Minor improvements are recommended to allow for a 10' wide multi-modal trail within the southern right-of-way along Roaring Brook Road to run between the said intersection, connecting to the existing sidewalks into the High School, and the new proposed trailhead parking lot to the west of this intersection. Improvements would include the relocation of the existing traffic signal, re-striping of Roaring Brook Road within the intersection area reducing the painted median slightly allowing travel and turning lanes to maintain their current width; wayfinding signage; and additional crosswalk striping.

MINOR INTERSECTIONS: Only one area was designated a minor intersection- the south terminus along North Greeley Avenue at Bischoff Avenue. This area presents low to moderate degree of difficulty in crossing North Greeley Avenue to reach the existing sidewalk that continues to Downtown Chappaqua. The recommended improvements to this minor intersection include a new pedestrian crosswalk and wayfinding signage, as well as, additional signage to indicate the private property of Chestnut Oaks to direct users to the proposed trail way and to instruct them not to enter or use private property.

PRIVATE DRIVEWAYS: Private driveways are defined as vehicle crossings providing access to private property adjacent to the trail, which serve a private resident. Recommended improvements in the areas where the proposed trail crosses private driveways include relocation of existing mailboxes; regrading of existing driveways to allow for a relatively flat trail crossing; removal or thinning of vegetation to increase visibility as required; addition of new vegetation to screen the proposed trail from the private properties; and the possible locating of local boulders to restrict vehicle access along the trail.

5.5 Gateways & Entrances

SOUTHERN TERMINUS: Located to the west of North Greeley Avenue, at the intersection with Bischoff Avenue and at the entrance to Chestnut Oaks, this trailhead is proposed to define the entrance to the trail way for users heading north and to provide amenities. This trailhead is proposed to be small to discourage long-term lingering in the area as it is within a residential area. The trailhead should include signage to distinguish the adjacent uses within the area, to indicate the entrance to the off-road trail for users heading north and to provide wayfinding to Downtown Chappaqua for users heading south. It is recommended to include trail map information, bike racks, benches, and lighting, all located off the existing roadway to allow for a safe and secure place for pedestrians and bicyclists to review trail information and plan their trip as needed.



NORTHERN TERMINUS: Along the south side of Roaring Brook Road, east of the Saw Mill River Parkway and the Metro-North railroad tracks, a trailhead parking lot and rest area is proposed to define the entrance to the trail way for users heading south and to provide amenities. This trailhead is proposed to include a parking area for twenty (20) vehicles, a small gathering area to include both wayfinding and interpretive signage, as well as, trail map signage, to indicate the entrance to the off-road trail for users heading south and to provide wayfinding to Chappaqua Crossing and Horace Greeley High School for users heading north. The trailhead should include trail map information, bike racks, a bike repair station, benches, a water fill station, and lighting, all located off of Roaring Brook Road to allow for a safe and secure place for pedestrians and bicyclists to review trail information and plan their trip as needed.

5.6 Landscape Enhancements

ROARING BROOK ROAD SEGMENT AND TRAILHEAD: The Roaring Brook Road segment and trailhead will offer a pleasant view of the Saw Mill River Valley and the various transportation corridors below. While the trail will provide a safe and attractive place for pedestrians and bicyclists, this highly visible segment should also be enhanced with native plantings, using them to screen utility elements of the trail, soften the large paved parking and trail areas, and provide shade for resting trail users. A combination of native street trees, flowering trees, evergreens for screening and native shrubs, perennials and grasses will add beauty and seasonal interest to the trailhead, including:

- ❖ Street Trees: red oak, red maple, hornbeam;
- ❖ Flowering Trees: serviceberry and redbud;
- ❖ Evergreen Trees: eastern red cedar, white spruce and white pine;
- ❖ Shrubs: maple leaf viburnum, rosebay rhododendron, shrub serviceberry, hollies;
- ❖ Perennials: daylilies, black-eyes Susans, coneflowers; and
- ❖ Grasses: broadleaf sedge, Pennsylvania sedge, little bluestem and northern prairie drop seed grass.

WOODLANDS AND WETLANDS SEGMENT: The hustle and bustle of the Roaring Brook Road segment quickly transitions to a pleasant woodland segment along the county utility corridor. Nestled between the bluff and low flood plain of the Saw Mill River, the segment will offer a variety of natural woodlands and low wetlands crossing numerous intermittent streams. Establishment of the trail will require some landscape management along the corridor including removal of invasive plants such as Japanese knotweed, oriental bittersweet vines, wild grape, poison ivy, barberries, non-native roses, and invasive honeysuckles. Wetland areas may also include invasive plants such as phragmites that will need to be removed. Initial management of these invasive plants should be aggressive and intended to reduce the need for yearly management to a level that can be effectively accomplished by volunteers.

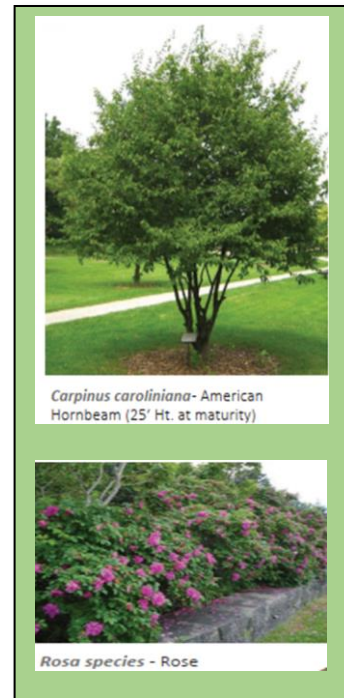
The varied woodland settings will offer some sites where resting spots and side paths can be established to allow for interpretive information, nature observation or just a quiet shaded resting spot. Existing native species including oaks, maples, hornbeam, and white pine have become well established and will offer a mature native base to be enhanced with other appropriate native plants including:

- ❖ Trees: red oak, sugar maple, hornbeam;
- ❖ Flowering trees: serviceberry and viburnum;
- ❖ Evergreen trees: white pine;
- ❖ Screening and boundary reinforcement plants: eastern red cedar, native shrub rose, low junipers;
- ❖ Shade tolerant shrubs: maple leaf viburnum, rosebay rhododendron, shrub serviceberry, hollies;
- ❖ Shade tolerant perennials: daylilies, liriopse, astilbe; and
- ❖ Grasses: big bluestem, little bluestem, Pennsylvania sedge, northern prairie drops edge.

CHESTNUT OAKS AND NORTH GREELEY AVENUE: Similar to the Roaring Brook Road segment, a well landscaped ChapLine segment adjacent the rail corridor will be a positive quality of life statement for the community when viewed by Metro-North commuters. The trail will emerge from the dense woodlands and wetlands into the well-manicured and maintained landscape of Chestnut Oaks apartments. The trail will pass near the tennis courts, pool and clubhouse shared by the apartment residents. Some screening with plants and screen fencing and additional layers of boundary reinforcement chain link fencing and plant materials should be introduced in coordination with the apartment management.

To accomplish the needed improvements and establish a safe trail corridor extensive plant removal and pruning will be needed. Care should be taken to retain as many of the large trees and beneficial native plants as possible. New low-maintenance plantings would then infill the shoulder spaces between the trail and fencing on both sides of the trail. Recommended planting in this corridor would include:

- ❖ Trees: red maple, sugar maple, hornbeam, tree form serviceberries, white spruce and white pine;
- ❖ Shrubs: shrub form serviceberries, maple leaf viburnum, nannyberry viburnum, rosebay rhododendron, inkberry holly, grey dogwood, bayberry, bearberry;
- ❖ Perennials: swamp milkweed, cardinal flower, daylilies, blue flag iris and Canada anemone;
- ❖ Grasses: big bluestem, little bluestem, Pennsylvania sedge, northern prairie drops edge.



5.7 Trail Safety & Security

The following is an initial analysis of potential safety and security issues and preliminary mitigation concepts developed by the B&L design team. This analysis is partially based on CPTED principles of natural access control, surveillance, territorial reinforcement, and maintenance. Many recommendations discussed below are in conflict and therefore a balance will need to be struck between the need to control access versus surveillance needs, as well as, access control and surveillance versus creating an interesting, inviting and attractive experience along the trail.

CHAPLINE SAFETY CONSIDERATIONS:

- ❖ Accessibility—This project will have some non-standard gradients in segments, notably along Roaring Brook Road.
- ❖ Pedestrian Safety Conflicts—Where the trail parallels or crosses roads, or railroads there will be the need to ensure safety and other safety to consider along and crossing Roaring Brook Road.
- ❖ Trail User Conflicts—A trail way width that accounts for the expected user volume and diversity of users will help address this conflict.
- ❖ Signage—The project should include trailhead mapping and information as well as mile markers and other advance warning along the route.
- ❖ Design Consistency—Maintain consistency when there is a transition from the off- road to road-side in design and signage conventions to reinforce the trail route for users.

SECURITY CONCERNS:

- ❖ Fear of Crime—Design and placement of safety enhancement measures for women who are more likely to fear, dark areas and poor maintenance/graffiti increase the perception of risk.
- ❖ Trail Security Misconceptions—Crime rates on trails tend to be lower than the areas they serve.
- ❖ Trailhead Security—Crimes are more likely to occur at trailheads than anywhere else on a trail. Lighting and other security enhancements should be concentrated in these areas. Facilities built to encourage visits and stays by police and other surveillance personnel will help address this concern.
- ❖ Usage Rates—The greater the number of users, the greater the sense of security on a trail. This trail is likely to be heavily used and should be heavily promoted within the community to ensure usage rates are high, encouraging self-policing along the route.
- ❖ Technology May Not be the Answer—Many studied trail systems have found expensive cameras, emergency phones, call boxes enhanced the sense of security but were generally never used, deteriorated quickly, attracted vandalism, and were expensive to operate. For this trail, this should be carefully considered and possibly phase in as the trail is in use.

MAINTENANCE FACTORS:

- ❖ Maintenance Deficiencies that affect Safety and Security—Safe and secure when well maintained and graffiti and vandalism are quickly addressed.
- ❖ Responsibility and Coordination—Clear agreement on maintenance and operation responsibilities among local agencies and volunteer organizations are crucial. Without them it can result in deterioration/decreased usage, a decrease in safety and an increased lack of a sense of user security.
- ❖ Snow Removal—Winter usage of the trail can cause damage and deterioration if not carefully considered in design. Winter usage by snowshoe or cross country skiers could eliminate the need for snow removal.
- ❖ Pavement/Surfacing—Maintenance related issues can be addressed more quickly with an easy reporting method such as a crowd-sourcing app and a clear understanding of who completes repairs.

NATURAL CONTROL MEASURES:

Natural access control measures include the use of plants, rock, steep slopes and other natural barriers to control access.

- ❖ Plantings: Hedges and other dense forms to funnel users to desired access points; screen views and prevent access.
- ❖ Steep slopes can also include creation of earthen berms to control vehicular access and direct bicyclists. Slopes are protected by cover with geo-web products, geo-technical matting, rock, deep mulch and dense vegetation including grasses.
- ❖ Natural rock can be used to restrict vehicular access, identify entrance ways, define pathways, and generally control access.

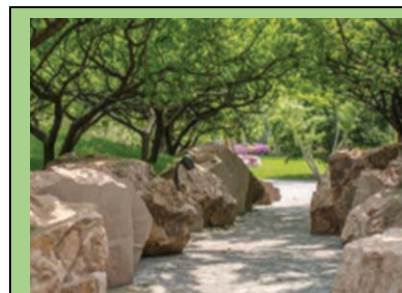


Figure 3: Natural Access Control with Boulders

TERRITORIAL REINFORCEMENT MEASURES:

- ❖ Directional and Warning Signage at the trail heads should inform and orient users with directions, information, trail mapping, and rules of use.
- ❖ Interpretive Signage and Site Markings along the trail can also provide territorial reinforcement encouraging trail use.
- ❖ Gateway treatments at the trail heads should clearly identify trail entrances, as well as, public and private areas. The Roaring Brook Road trail head will likely have more extensive user amenities the trail entrance near Chestnut Oaks can be primarily marked by signage.
- ❖ Fencing—along railroad, private property, guiderails along slopes, wetlands, high boardwalks, bridges. Use chain link and other transparent fencing to control access while still allowing for surveillance.



Figure 4: Territorial Reinforcement measures include trail signage and fencing.

SURVEILLANCE MEASURES:

- ❖ Increase visibility-The primary objective here is to eliminate hiding places and provide surveillance.
- ❖ Long sight lines-Design, whenever possible for long site lines. For this project there are segments where this may not be feasible such as near the tennis courts at Chestnut Oaks; measures including a larger clear zone and lighting will be needed to enhance surveillance in those areas. Clear all dense shrub growth and prune and remove low tree branches within an envelope of space 12' high and 10' wide from the edge of trail pavements. Bicycle racks, signage, call boxes, benches and exercise equipment should be provided an additional 10' clear zone. These amenities can be strategically placed along the trail to enhance sight lines.
- ❖ Lighting-Provide 12'-16' height solar powered LED lighting for areas of concern, especially at the trailheads, bridges, along roadways, problem prone spots and areas where hiding places may not be easily removed. Motion sensitive lighting can reduce electrical costs. Coordinate with police and emergency personnel to assist with trail surveillance. Provide amenities such as restroom facilities, benches, picnic tables, wifi and dedicated parking spaces to encourage surveillance by Police at the trailheads and trail entry points.
- ❖ Community Surveillance-'Friends of ...' groups can be extremely valuable as they are typically trail users and may be able to assist with surveillance. By organizing volunteers for spring and fall cleanups, inspecting the trail after storm events, and reporting damage, graffiti and incidents on the trail they provide a valuable communication of maintenance needs to those responsible for repairs. 'Friends of ...' groups can take on specific targeted projects such as quick responses to graffiti.
- ❖ Target Hardening-Vandalism resistant materials should be used for any large surfaces that can be painted. If a graffiti resistant surface is not possible, graffiti-proof coatings/paints are available for stone, wood and metal surfaces that make cleanup of graffiti much less labor intensive. Fencing, boardwalks, bridges, signage and other large surfaces would be susceptible; therefore lighting should be located to increase surveillance of those areas.
- ❖ Security Cameras-Provide lighting and cameras where problems exist or threats are presumed in a phased approach. This will require some coordination amongst the interested parties including the Town, Metro-North, Westchester County and the School District. During detailed design, a CPTED workshop can establish critical areas.
- ❖ Call boxes-were reportedly rarely used, vandalism targets, and costly to maintain.
- ❖ Well Maintained Trailway-Keeping a well maintained trail requires more than just one entity.

6.0 IMPLEMENTATION

6.1 Recommended ChapLine Standards

(Derived from AASHTO “Development of Bicycle Facilities”) Class I bikeways (bike paths) are facilities with exclusive right of way, with cross flows by motorists minimized. Class I bikeways are typically described as serving “the exclusive use of bicycles and pedestrians”.

Trailway Design Criteria:

CRITICAL DESIGN CRITERIA FOR SHARED-USE PATH		
ELEMENT	STANDARD	PROPOSED CONDITION
Design Speed	12-30 mph	20 mph ¹
Trail Width	8 ft. min. 10-14 ft. rec.	10 ft.
Shoulder Width	1 ft. min. 2-5 ft. rec.	2 ft Typ. 1 ft Min. (Bridge)
Bridge / Boardwalk Trail Width	8 ft. min. 10-14 ft. rec.	10 ft
Maximum Grade	4.5%	X.X%
Horizontal Curvature	115 ft. min.	2,000 ft
Sight Distance	50' min.; 100' min. downhill or road crossings	50 ft, 100 ft
Horizontal Clearance	1 ft min.	5 ft
Vertical Clearance	10 ft	10 ft
Travel Lane Cross Slope	1-2%	1.5%
Bridge / Structural Capacity	90 PSF (Pedestrian) H-10 (Vehicular) LRFD Specifications for Design of Pedestrian Bridges, 2009	90 PSF (Pedestrian) H-10 (Vehicular)
Level of Service	N/A	N/A
Surfacing Materials	Smooth pavement, asphalt, concrete, crushed stone, clay or stabilized earth	Asphalt
Control of Access	Controlled	Controlled
Pedestrian Accommodation	ADA, Universal Design	

WIDTH OF TRAILWAY: Under most conditions, the recommended paved width for the two-way shared use path is 10'. In sensitive ecological areas, however, an 8' trail width is allowed where sight distance and trail alignment are good, expected trail use is low, and access by the occasional trail maintenance vehicle will not cause trail surface damage. A minimum 2' graded area with a maximum 1:6 slope shall be provided adjacent to both sides of the path. A 3' graded area is recommended to provide clearance from poles, trees, walls, fences, guardrails, or other lateral obstructions.

CLEARANCE TO OBSTRUCTIONS: A minimum 8' horizontal clearance to obstructions shall be provided adjacent to the pavement or stone dust. A 10' clearance is recommended. Where the pavement width is wider than the minimum required, the clearance may be reduced accordingly; however, an adequate clearance is desirable regardless of the paved width. If a wide path has pavement that is contiguous with a continuous fixed object (i.e. a block wall), a 4" white edge stripe, 12" from the fixed object, is recommended to minimize the likelihood of a bicyclist hitting it. On structures, including bridges and boardwalks, the clear width between railings shall be the same as the approaching paved path plus the minimum 2' clear areas. The vertical clearance to obstructions across a bridge or structure shall be 10'.

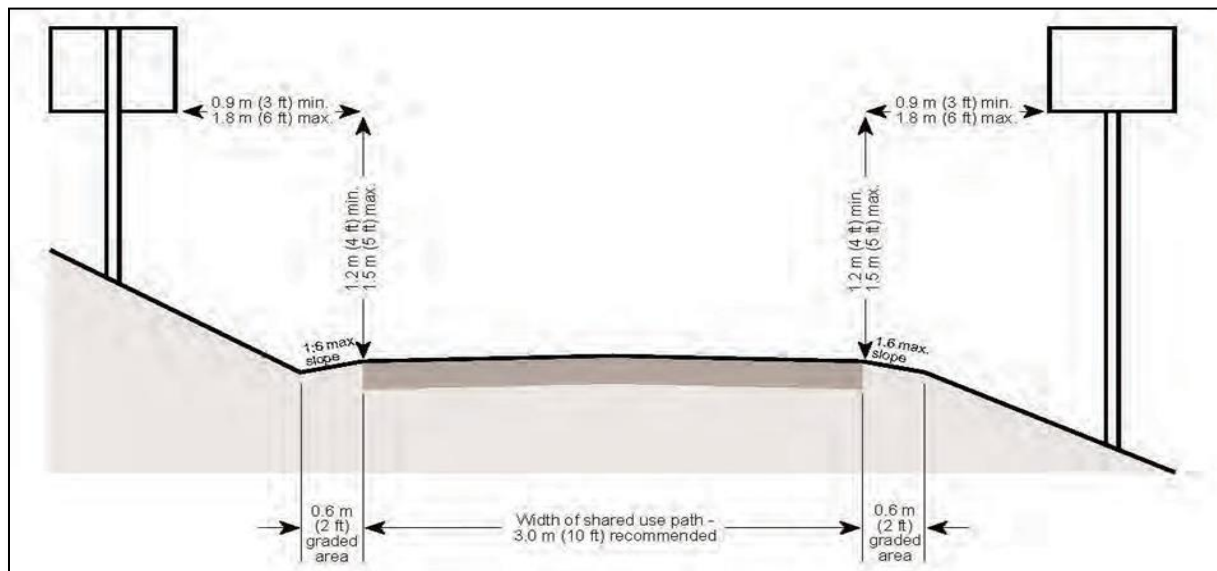


Figure 4: ChapLine Trailway Section

INTERSECTIONS WITH HIGHWAYS: Intersections are a prime consideration in bike path design. If alternate locations for a bike path are available, the one with the most favorable intersection conditions should be selected. Where motor vehicle cross traffic and bicycle traffic is heavy, grade separations are desirable to eliminate intersection conflicts. Where grade separations are not feasible, assignment of right of way by traffic signals should be considered. Where traffic is not heavy, stop or yield signs for bicyclists may suffice. Ramps should be installed in the curbs, to preserve the utility of the bike path. Ramps should be the same width as the bicycle paths. Curb cuts and ramps should provide a smooth transition between the bicycle path and the roadway.

DESIGN SPEED: The proper design speed for a trail is dependent on the expected type of use and on the terrain. The minimum design speed for a shared use path should be 20 mph.

HORIZONTAL ALIGNMENT: The recommended minimum radius for horizontal curves is 115'. For most bicycle path applications, the maximum super-elevation rate will be 3%. A straight 2% cross slope is recommended on tangent sections, and ADA guidelines require that cross slopes not exceed 2%-3%. The minimum super-elevation rate of 2% will be adequate for most conditions and will simplify construction.

LATERAL CLEARANCE ON HORIZONTAL CURVES: To avoid head-on bicycle accidents when approaching bicyclists ride abreast of each other on bicycle paths or ride near the middle of the path lateral clearances on horizontal curves should be provided. Lateral clearance is calculated based on the sum of the stopping sight distances for bicyclists traveling in opposite directions around a curve.

GRADES: Bike paths generally attract less skilled bicyclists, so it is important to avoid steep grades as cyclists not physically conditioned will be unable to negotiate long, steep uphill grades and poorly maintained bicycles may be unable to stop adequately on long downgrades causing problems. The maximum grade proposed for ChapLine is 5% and sustained grades longer than 500' it is limited to 2%.

TRAILWAY CROSS SECTION: The structural section should be designed to consideration given to the quality of the base soil and the anticipated loads the bikeway will experience. The finished surface should be a smooth riding surface with skid resistance. Loading should be designed for occasional County and Town maintenance vehicles as well as trail maintenance and emergency vehicles.

DRAINAGE: For proper drainage, the surface of a bike path should have a cross slope of 2%, preferably sloping in one direction. When a bike path is constructed on the side of a hill, a drainage ditch should be provided on the uphill side to intercept the hillside drainage. Where downhill runs result in concentrated flow, catch basins with drains or flared end sections should be provided to carry intercepted water under the trail way. Timber puncheons, timber culverts or bridges should be provided where a bike path crosses a drainage channel.

LIGHTING: Lighting for bicycle paths should be provided where riding at night is expected, such as bicycle paths serving college students or commuters. At a minimum, lighting should be provided at highway intersections; at all trailheads; bridges; trail access points; and where nighttime security could be a problem. Depending on the location, horizontal illumination levels of 5 lux to 22 lux should be maintained. Light poles should meet the recommended horizontal and vertical clearances. Luminaries and poles should be at a scale appropriate for a pedestrian or bicycle path.

6.2 ChapLine User Guide

BE COURTEOUS. All trail users, including bicyclists, joggers, walkers, wheelchairs, and skiers, should be respectful of other users regardless of their mode, speed, or level of skill.

BE PREDICTABLE. Travel in a consistent and predictable manner. Always look behind you before changing positions on the trail.

DON'T BLOCK THE TRAIL. When traveling in a group with other trail users or your pets, use no more than half the trail so as not to block the flow of other users.

KEEP RIGHT. Stay as near to the right side of the trail as is safe, except when passing another user.

PASS ON THE LEFT. Pass others, going your direction, on their left. Yield to slower and on-coming traffic. Use hand signals to alert those behind you of your moves. Look ahead and back to make sure the lane is clear before you pull out and pass. Pass with ample separation and do not move back to the right until safely past. Remember: children and pets can be unpredictable.

STOPPING. When stopping, move off of the trail. Beware of others approaching you from behind and make sure they know you are pulling over.

GIVE AUDIBLE WARNING BEFORE PASSING. Give a clear signal by using voice, bell or horn before passing. Give the person you are passing time to respond. Watch for their reaction. So that you can hear signals, don't wear headphones on the trail.

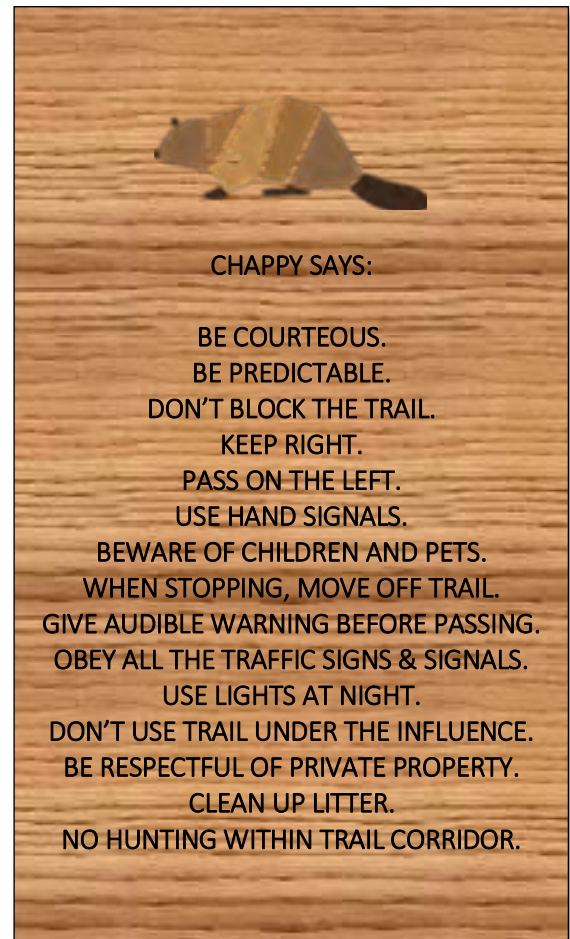
OBEY ALL THE TRAFFIC SIGNS & SIGNALS. Use extra caution where trails cross streets. Stop at all signs and intersections and be cautious when crossing driveways. When entering or crossing a trail, yield to traffic on the trail.

USE LIGHTS AT NIGHT. Be equipped with lights when using a trail at any time from dusk to dawn. Bicyclists should have a white light visible from five hundred feet to the front and a red or amber light visible from five hundred feet to the rear. Other trail users should have white lights visible from two hundred fifty feet to the front, and a red or amber light visible from two hundred fifty feet to the rear.

DON'T USE A TRAIL UNDER THE INFLUENCE OF ALCOHOL OR DRUGS. No alcohol or drugs are allowed on Town property. Don't overestimate the safety of any trail. You may need all of your reflexes quickly, so it is important that they are not impaired.

BE RESPECTFUL OF PRIVATE PROPERTY. Trails are open to the public, but often the land on the side of the trail is private property. Please respect all property rights.

CLEAN UP LITTER. Do not leave glass, paper, cans, plastic, or any other debris on or



near a trail. If you drop something, please remove it immediately.

RECOGNIZE WHEN YOU HAVE OUTGROWN TRAILS. Trails have engineering and design limits. If your speed or style endangers other users, check for alternative routes better suited to your needs. Selecting the right location is safer and more enjoyable for all concerned.

NO HUNTING WITHIN TRAIL CORRIDOR. No hunting on Town property is allowed.

6.3 Operations & Maintenance

OPERATIONS: The operation of a trail consists of the day-to-day management of trail use. This includes law enforcement, marketing, special events, map and brochure updates, and other functional considerations. The policies regarding the operation of a trail will most likely be decided prior to construction. After construction, a large part of trail operation consists of the execution of those policies.

MAINTENANCE: The maintenance of a trail includes the various activities involved in keeping the trail in a safe, usable condition. This includes efforts ranging from mowing and brush removal to replacement of damaged signs or benches to reconstruction of the trail. Lifetime trail maintenance will place ongoing costs on the operating agency, and this should be considered during the trail planning and funding process. In most cases, funding granted for trail construction cannot be applied to ongoing operations and maintenance. In order to maintain the quality of a newly constructed trail, local trail operators (Town of New Castle) must plan for the continued maintenance of the facility.



RECOMMENDED OPERATIONS & MAINTENANCE POLICY: These recommendations are designed to assist trail operators in the operation and maintenance of trail facilities, and should be viewed as guidelines. Guidelines for the operation and maintenance of the ChapLine Trail will help establish this pathway as a multi-use trail destination that can be managed and maintained safely and efficiently over the long term. The Operations and Maintenance Policy may cover a wide range of issues.

GENERAL POLICIES: The following items should be major considerations in the policy.

- ❖ Permitted uses on the trail.
- ❖ Marketing of the trail. Some communities may desire to reap the economic benefits of trails by actively marketing their facilities. The costs associated with marketing can vary greatly, depending on the intended audience and the intensity of the campaign.
- ❖ Policing and security on the trail. This may include the creation of an emergency response plan; provision for trail patrols through existing law enforcement or with special community bike patrols; or a plan for other safety measures such as emergency phones or call boxes.
- ❖ Liability. In many cases, existing laws will determine liability. The operating agency should fully understand the liability associated with the trail and verify that insurance is adequate. The trail operator will be responsible for providing a certificate of insurance to the land owner, in this case Town, for use of the corridor as a trail.
- ❖ Encroachment. Some local agencies may take ownership of a corridor that is being encroached upon by adjacent landowners. This is particularly true of railroad corridors bounded by agricultural uses. The implementing agency should set forth definitive policies relating to existing and future encroachments.
- ❖ Snow removal. In mild winters, some users will expect hard-surfaced trails to be plowed for use throughout the season. The operating agency should determine whether or not it will perform this maintenance. Cooperative maintenance agreements. In some cases, trail owners may wish to explore the possibility of

partnering with other government entities or private organizations in the operation and maintenance of a trail. Any operations or maintenance agreements should be articulated in the operations and maintenance policy.

- ❖ Seasonal maintenance. The operating agency should determine who will perform this maintenance. In many cases, volunteers or existing clubs can groom trails.
- ❖ Use of volunteers. Volunteers can be a cost-saving benefit for trail operators. They do, however, need to be supervised, and liability prevents their use in certain situations.
- ❖ Evaluation of trail conditions. Every trail should be evaluated on a regular schedule to identify the need for major and minor repairs. The operations and maintenance policy should delineate how often trail evaluations take place, preferably once a year.
- ❖ Short- and long-term maintenance program. See “Recommended Maintenance”.

RECOMMENDED MAINTENANCE: Different types of trails will differ greatly in their maintenance requirements. All trails however, will require a variety of maintenance activities at different points in their lives. Table 6 outlines some general guidelines for maintenance activities and the frequency at which they should be performed.

- ❖ “Frequency” refers to how often each maintenance item should be performed.
- ❖ “Maintenance” refers to the specific maintenance activity to be performed.
- ❖ “Performed by” refers to who may undertake the particular maintenance activity.

FREQUENCY	MAINTENANCE	PERFORMED BY
As needed	Tree/brush clearing and mowing Sign replacement, Map/signage updates Trash removal/litter clean-up Replace/repair trail support amenities (parking lots, benches, restrooms, etc.) Repair flood damage: silt clean-up, culvert clean-up, etc. Patching/minor regrading/stone dust replacement	Volunteers, trailoperator
Seasonal	Planting/pruning/beautification Culvert Cleanup Installation/removal of seasonal signage	Volunteers, trailoperator
Yearly	Surface evaluation to determine need for patching or regrading Evaluate support services to determine need for repair or re- placement	Trail operator
5-year	Repaint or repair trash receptacles, benches, signs, and other trail amenities, if necessary	Trail operator
10-year	Resurface/regrade	Hired contractor, trail operator, volunteers
20+ years	Replace/reconstruct trail	Hired contractor, trail operator, volunteers

TABLE 6: MAINTENANCE

MAINTENANCE COSTS: Maintenance costs will vary greatly depending on the type of trail, amount of volunteer labor, construction quality, and available services. According to the Rails-to-Trails Conservancy, the estimated maintenance cost for a stone dust trail is \$1,006 per mile (Rails-to-Trails Conservancy, 2014). This figure does not include snow removal.

7.0 FUNDING AND PROBABLE COST

7.1 Recommended ChapLine Funding

The Town is only seeking funding from NYSDEC Climate Smart Communities for the project. If the full amount of funding requested is not met, the Town would continue to seek grant funding from other sources in the future in order to proceed with the project. CFA grant funding is necessary to complete this project since it is for a recreational trail promoting non-motorized use.

7.2 ChapLine Project Schedule

Grant Awards	December 2021
Grant Contract	March 2022-April 2022
Consultant Procured	April 2022 – May 2022
Preliminary Design & Permitting	May 2022 – July 2022
Public Outreach	July 2022 – August 2022
Final Design & Bid Documents	August 2022 – November 2022
Bidding and Contract Award	December 2022 – February 2023
Construction	March 2023 – July 2023
Project Closeout	December 2023

7.3 ChapLine Probable Construction Cost

Description	Qty. Cost	Unit	Unit	Ext. Cost
Chestnut Oaks Final Alignment	1	LS	\$ 1,321,115	\$ 1,321,115
Trunk Line Alignment (Avoiding Private & School Properties)	1	LS	\$ 3,511,200	\$ 3,511,200
Roaring Brook Shared Use Path	1	LS	\$ 959,375	\$ 959,375
Roaring Brook Trailhead and Parking Area	1	LS	\$ 470,075	\$ 470,075
			Construction Subtotal	\$ 6,261,765
Basic Work Zone Traffic Control		1%		\$ 63,000
Survey Operations		2%		\$ 126,000
Mobilization		4%		\$ 251,000
Contingency		15%		\$ 940,000
			Construction Total	\$ 7,641,765
Survey, Design, Engineering, and Permitting		10%		\$ 765,000
Construction Administration and Observation		10%		\$ 765,000
Legal (Incl. Metro North Fees)		3%		\$ 230,000
Inflation (2020-2023)	3	@	3%	\$ 688,000
			Project Total	\$ 10,089,765
			Approximate Total	\$ 10,090,000

