



CHAPTER 4

**Infrastructure  
and Maintenance**

# OVERVIEW

The Air Line State Park Trail with the Portland Extension will ultimately create a 64-mile corridor from the center of Portland’s business district to the Tri-State marker in Thompson. Within this uninterrupted corridor, the state park trail system winds through twelve towns, a diverse assortment of hills and valleys, rural communities and urban centers and local roads and interstate highways. This diversity in the natural and built environment in which the trail bisects creates numerous opportunities for visitors to experience this unique state park. The next step focuses on developing strategies and recommendations for infrastructure improvements and routine maintenance that are necessary to assure park visitors have a lasting and positive impression of this state park.

The primary short term goal for the park’s regional continuity requires member towns, CT DEEP and project stakeholders to work together to close the existing gaps in the park. The trail communities of Thompson, Putnam, Windham, East Hampton and Portland continue to plan for and implement final projects to fill un-navigable gaps, which will ultimately complete this park system. To finish this state-owned park, the cost has been augmented by 20% match funding from towns to CT DEEP Recreational Trail Grants. The ALSPT towns also provide municipal funding to support maintenance and support of the trail system.

As these towns and CT DEEP work together and move toward completion of these gaps in the trail system, continuity in the reliable baseline trail conditions will significantly enhance the safety, security and positive experience for the trail user.

This Master Plan describes the importance of the Air Line State Park Trail to the overall economic growth of the region’s tourism economy. The towns and associated trail committees as well as trail advocates have expressed the importance of completing this east to west recreational and transportation corridor that spans eastern Connecticut.

The ALSPT Task Force and project team have worked with the towns and CT DEEP to define appropriate criteria for determining near-term opportunities for improving continuity of the trail as well as connections to town services critical to the trail user experience. This chapter seeks to outline the highlights of those discussions, surveys, and inventories to provide a summary of recommendations to enact the goals described below.

## INFRASTRUCTURE GOALS FOR THE AIR LINE STATE PARK TRAIL REGION STAKEHOLDER COMMITTEE



Analyze amenities and services available to trail users and optimize access to off-trail amenities



Implement sustainable and innovative practices for natural resource protection & reduction of natural hazard impacts



Increase cost efficiency for new infrastructure and maintenance through collaborative planning



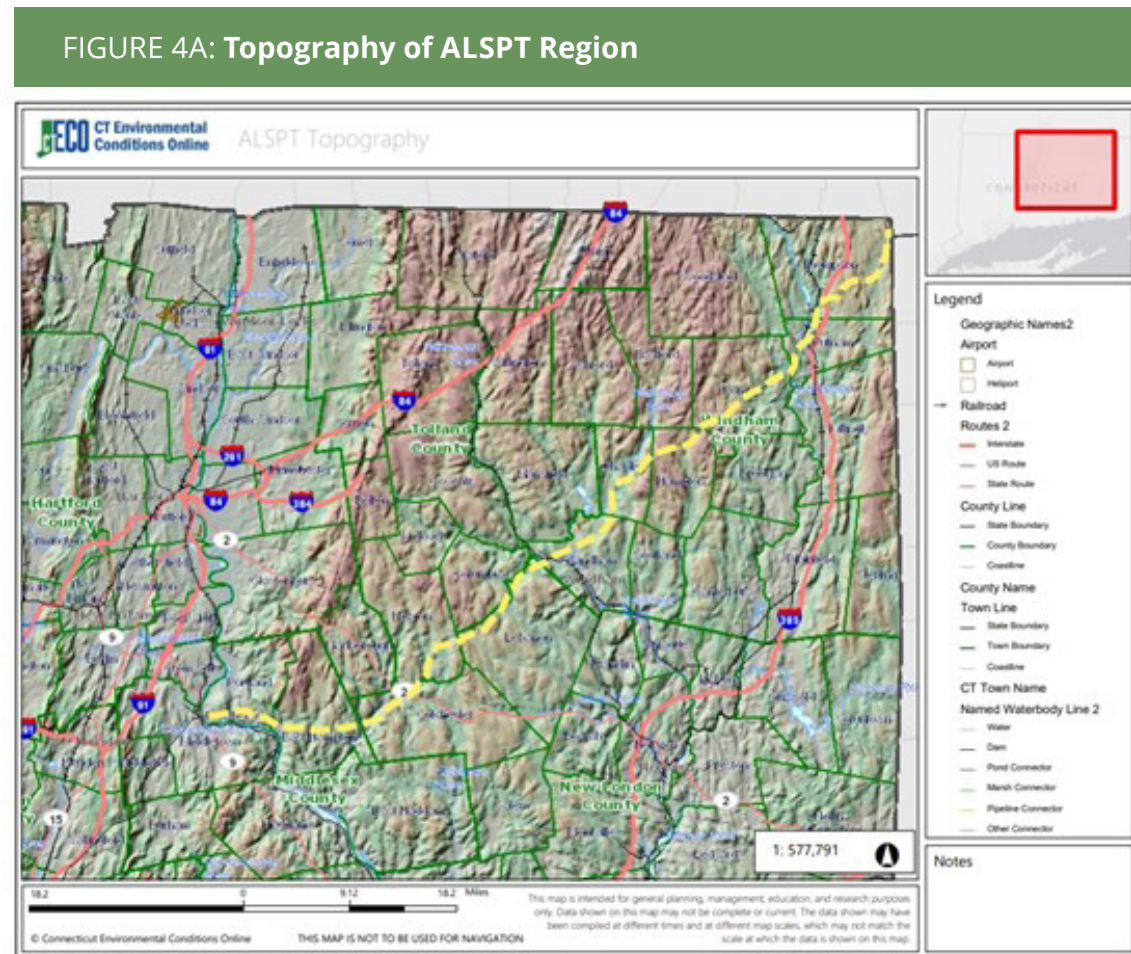
Identify optimal partnerships to obtain trail funding for continuity of trail conditions & new infrastructure

# GEOGRAPHY OF THE ALSPT REGION

New ALSPT cyclists riding from East Hampton toward Willimantic will notice the ease with which they cycle northeast only to realize the return trip is doggedly exhausting as the gentle upward slope of the trail creates an ongoing need to peddle. It's a workout.

Eastern Connecticut and the geography of the Air Line State Park Trail is characterized by the narrow river valleys and the low hills of the Eastern New England Upland, also referred to as the Eastern Highlands (see Figure 4A). The characteristic upland extends from East Hampton and the hills of Portland to the tri-state marker in Thompson and onward to Worcester Massachusetts. The land slopes downward from northwest to northeast and is characterized mostly by large swaths of forested uplands, stream valleys and plateaus of agriculture fields. Other than Willimantic, East Hampton, Portland and Putnam central business districts, the trail skirts through or near small village centers.

FIGURE 4A: Topography of ALSPT Region



**New ALSPT cyclists riding from East Hampton toward Willimantic will notice the ease with which they cycle northeast only to realize the return trip is doggedly exhausting as the gentle upward slope of the trail creates an ongoing need to peddle.**

The Air Line State Park Trail, when constructed as a rail line, took advantage of varied stream valleys to avoid cut and fills around highpoints near the route such as below Bull Hill in Colchester. Here the route follows the valley of the Salmon River and in Columbia below Post Hill near the border of Lebanon and Columbia (see Figure 4B).

While this creates a singular level ride experience, the ALSPT's topographic landscape also presents unique challenges for infrastructure, road crossings, and maintenance. Rolling gently through a mostly rural landscape, the trail often crosses stream, rivers, and wetlands. Neighboring hillside sometimes acts as a drainage basin and flood the trail during rainstorms or winter to spring melt. This is best illustrated in East Hampton, where a section of unfinished and impassable trail was designated as wetlands by the Army Corps of Engineers due to its function as a collection area for Gate Hill drainage before traveling to Mine Brook (see Figure 4C).

FIGURE 4B: Topographic Heat Map of Salmon River State Forest

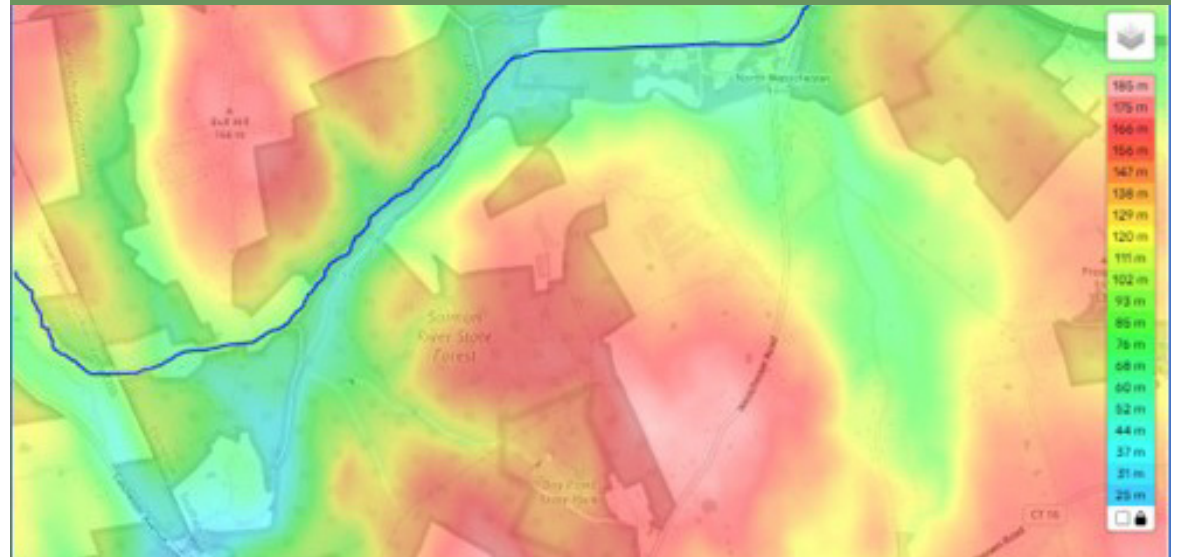
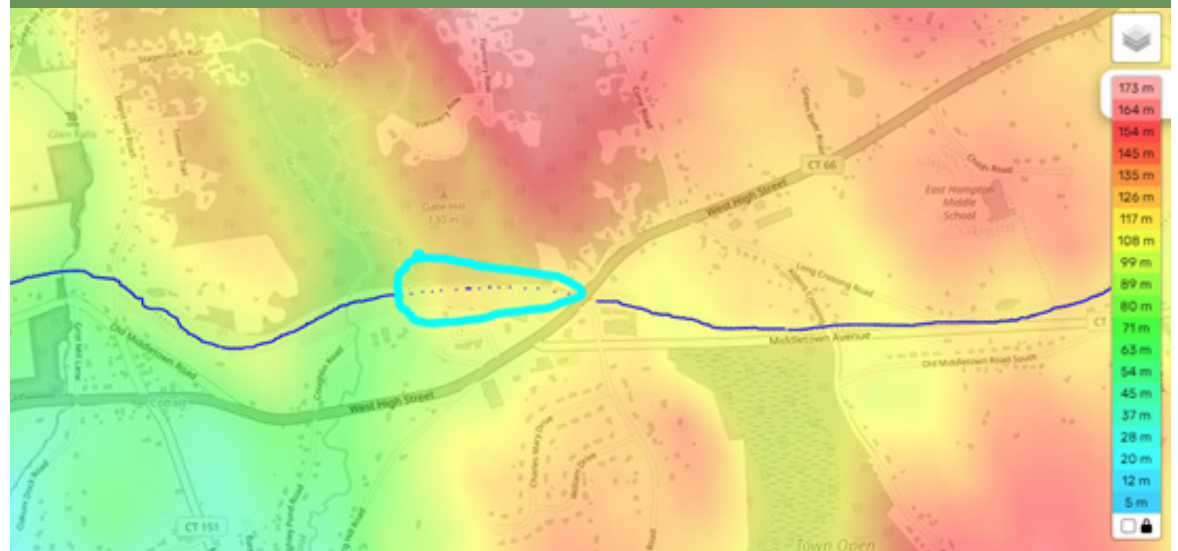


FIGURE 4C: Topographic Heat Map of East Hampton Gap



# INFRASTRUCTURE ALSPT ROLES

A number of stakeholders will play a role in planning and maintaining the infrastructure of the Air Line State Park Trail Region. The information below illustrates the varying levels of involvement and collaboration.



# COMPARATIVE STATE MULTI-USE TRAILS

The Air Line State Park Trail and the state parks and forests adjacent to its boundaries are under the operation and purview of the Connecticut Department of Energy and Environmental Protection. The CT DEEP manages 110 state parks, 32 state forests, 92 wildlife management areas, 5 wildlife sanctuaries, 7 natural preserve areas, 117 boat launch ramps, 140 miles of shoreline, 9 miles of sandy beach and one coastal preserve (per the Statewide Comprehensive Outdoor Recreation Plan | SCORP 2017-2022). The Air Line State Park Trail is one of several state owned parks with multi-use trail systems and is on an ever-growing list of Officially Designated Connecticut Greenways (see Figure 4D).

Of the numerous Connecticut State Parks and Forests many allow for multi-use trail options, including biking. The two Connecticut multi-use trail systems most comparable to the Air Line State Park Trail are the Naugatuck River Greenway Trail and the Farmington Canal Heritage Trail. Both of these long distance linear trail systems are planned and managed by organizations who work cooperatively with CT DEEP. They are not, in and of themselves, a complete state park system. The Air Line State Park Trail remains unique in its operational management by CT DEEP. This can be attributed to the build out and planning associated for these three trails over the last twenty years.

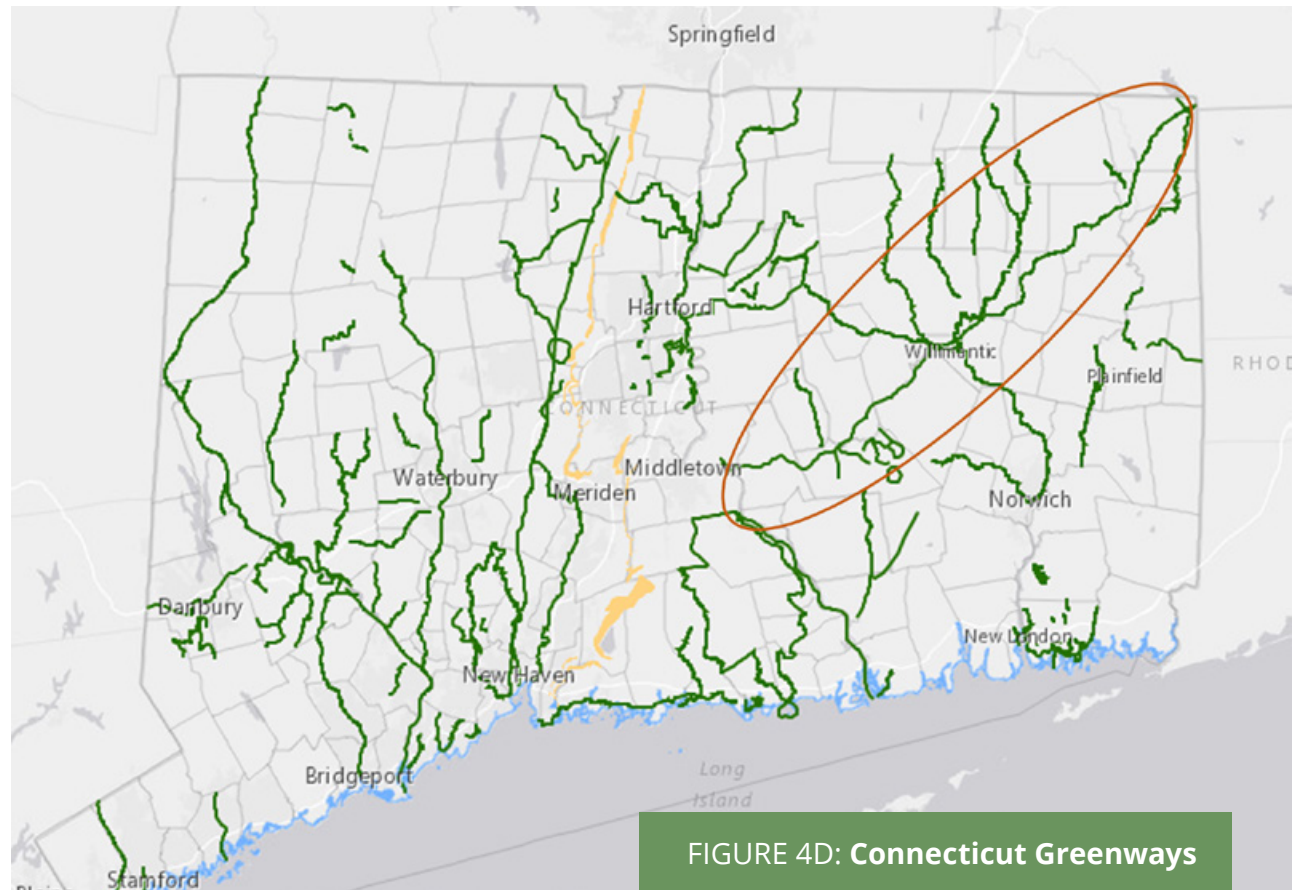


FIGURE 4D: Connecticut Greenways

A comparable planning document written by the Naugatuck Valley Council of Government took the lead for its member towns to design a systematic improvement plan for infrastructure and maintenance which leverages funding from multiple sources. The Farmington Canal Heritage

Trail organically grew with planning by towns and trail committee enthusiasts over many decades. In addition, the Hop River State Park Trail, which is forming as a regional trail organization, has many similarities to the Air Line State Park Trail and the region in terms of goals and management.



### NAUGATUCK RIVER GREENWAY TRAIL

The NRG Trail, a non-motorized multi-use trail, is being developed that will follow the river for 44 miles through all 11 Naugatuck River communities: Litchfield, Harwinton, Thomaston, Watertown, Waterbury, Naugatuck, Beacon Falls, Seymour, Ansonia, and Derby. Multi-use trails can be seen as bike and pedestrian highways and are typically 10-12' wide and have a paved or hard surface. The NRG Trail will connect green spaces and places throughout the corridor. It will provide

a non-motorized transportation option, support tourism and economic development, and improve the health and quality of life of residents. The NRG Trail is being developed by the towns and cities along the route, funded by state and federal grants along with local funds. The process is being aided by the NVCOG and the Northwest Hills COG that are helping to develop trail routing, conduct planning studies, and provide grant assistance.



### HOP RIVER STATE PARK TRAIL

Similar to and connecting with the Air Line State Park Trail in Windham (Willimantic Center), the Hop River State Park Trail "is a former railroad line transformed into a multi-use trail that winds 20.2 miles through the towns of Manchester, Vernon, Bolton, Coventry, Andover, and Columbia. Like a pathway through time, this serpentine path passes among modern subdivisions and crosses roads, but mostly takes the trail user along a remote, quiet and long unused path through the eastern Connecticut countryside." It also is a designated state park where CT DEEP managed park infrastructure and maintenance with ongoing planning needs

and concerns similar to those listed in this plan. Currently a Hop River Trail organization is forming as a nonprofit to advocate for trail improvements, wayfinding, and increased connections to the Hop River towns. The Hop River Alliance (HRA) relies on the enthusiastic volunteers of bikeway committee in each town to build synergy within the HRA. A formal Master Plan for the Hop River Trail State Park region, similar to this plan, has yet to be developed for the trail and the region. The HRA hopes to begin a master planning process in the near future, and there are opportunities for collaboration and positive outcomes between HRA and ALSPT regions.



## FARMINGTON CANAL HERITAGE TRAIL

The Farmington Valley Trails Council oversees the Farmington Canal Heritage Trail planning and infrastructure development as well as marketing, maintenance scheduling, and [website](#).

“The FCHT has been designated a Community Millennium Trail under the federal Millennium Trails Initiative based upon its special value to the communities it serves. Six town governments and staff cooperated in the creation of the trail development committee and in providing the 20% matching funds not supplied by ISTEA. The first sections of the “Farmington Valley Greenway” were paved in Simsbury and Farmington beginning in 1993/4. The mission is to build, maintain, beautify, and connect off-road multi-use trails throughout central Connecticut communities.” Our primary goal is to finish the 80.3-mile Farmington Canal Heritage Trail from Massachusetts to New Haven and the 16.1-mile Farmington River Trail, of which more than 75 % is now complete. Sections in Hamden and Cheshire are designated on CT DEEP’s website as a state park. The fifty-six miles of the Farmington Canal Heritage Trail (FCHT) and the eighteen miles of the Farmington River Trail constitute the most picturesque and historic greenways in New England. The Connecticut section from New Haven to Suffield runs through eleven towns and connects with many more biking and walking trails.”



# INFRASTRUCTURE PLANNING AND NEEDS



With a state park trail system that extends 53 miles and adding another fifteen miles for the Colchester Spur and the Portland Extension, routine trail maintenance and long-term infrastructure improvements require a coordinated and cost effective long term plan.

No single organization can succeed in managing a linear trail system. Similar to a Connecticut Department of Transportation's surface highway

**Connecticut's multi-use trails require special planning and maintenance management procedures as they are open and traveled with varied methods by the public daily and year round.**

system, numerous partners, state, regions, towns, and agencies with access to funding must work together to ensure the long term reliability and safety of Connecticut's state-owned multi-use trails system. There is over a hundred years of successful management of non-linear state parks and forests. Boundaries are such that it is easier to close the park to the public.

As local and tourism destinations, Connecticut's long distance linear multi-use trails require special planning and maintenance management procedures as they are open and traveled with varied methods by the public daily and year round. While multi-use trails are tourism and park like designations, they require specialized maintenance and management as reliable safe travel ways with road crossings, parking areas, signage and drainage infrastructure based on ongoing public use.

There are numerous examples nationwide of state agencies partnering with nonprofits toward planning and building expansive trail systems. The Palmetto Conservation Foundation commissioned the Palmetto Trail Statewide Master Plan to plan for and build out a 425 mile long multi-use trail across South Carolina. While the foundation spearheads the management of varied state owned, public or nonprofit owners of sections of

trail, there is a planned strategy with state agencies toward trail buildout, mapping, and maintenance. The Air Line State Park Trail will also require this type of across organization synergy and planning.

Maintenance, enforcement, and management challenges in ALSPT are inherent in the shape of the park along with exceptionally low levels of available ALSPT trail staff, as well as an ongoing need for multi-use trail maintenance equipment and training. Despite the current Passport to Parks funding program, additional specialized capital for the ALSPT including annual monetary allocations for an ALSPT dedicated staff person for management is essential for the safety and positive experience of the trail visitor. CT DEEP has experience in park systems and management of public expectations and maintenance. CT DEEP already successfully manages vast acreage within Connecticut Parks and Forests. To successfully manage this multi-use trail system, the agency will require legislative support and yearly strategic planning for maintenance and trail management. A new initiative to enact continuity of funding and maintenance would require leadership and advocacy from the member towns, the four Council of Governments and leaders of the ALSPT Region.

The ALSPT Region in partnership with CT DEEP can create a yearly or bi-yearly communications roundtable to address management and maintenance by CT DEEP, municipal partners and stakeholder groups. This step is critical to the long-term success and continued advancement of the Air Line State Park Trail and its viability as a tourism region. The ongoing issues of infrastructure and maintenance activities and concerns have been evaluated through interviews with towns and the CT DEEP. The following sections address common and singular concerns for the Air Line State Park Trail.



# PARKING AND ACCESS

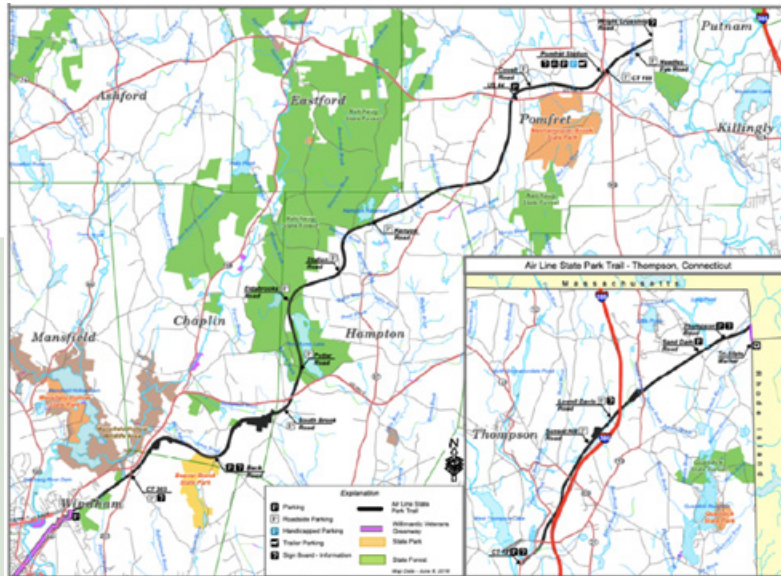


FIGURE 4E

**Northern Section of ALSPT with Official Parking Areas Depicted**

State parks throughout our state are generally comprised of a contiguous land area serviced by a single large parking lot or possibly, a selection of smaller lots. This configuration allows for CTDEEP staff to conveniently monitoring park access, easily observe parking conditions and have direct oversight for required maintenance activities as they relate to parking. The Air Line State Park Trail does not provide this same opportunity to CTDEEP’s park managers. Parking and trail access is comprised of improved parking areas at deliberate locations combined with numerous improvised parking locations scattered throughout public rights-of-way and private properties.

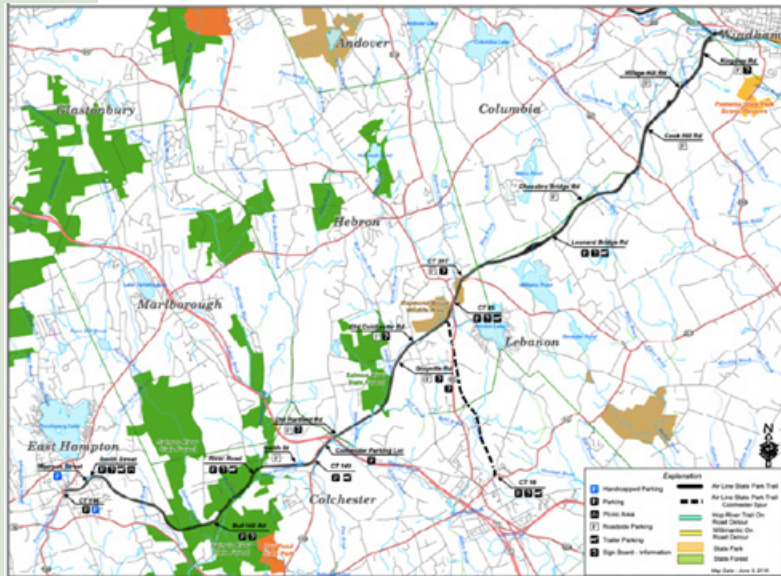


FIGURE 4F

**Southern Section of ALSPT with Official Parking Areas Depicted**

Connecticut’s [website](#) identifies at least 32 parking areas along a 50-mile section of the 64-mile-long trail. This large volume of parking options provides opportunities and also challenges to ALSPT access. Many of these locations have been a primary focus during numerous interviews with CT DEEP park staff, town representatives and project stakeholder.

They also represent a significant focus area for proposed ALSPT improvements within this chapter’s recommendations. With numerous official parking areas, there is an opportunity to interact positively with the public for amenities, information and public outreach (see Figures 4E and 4F).

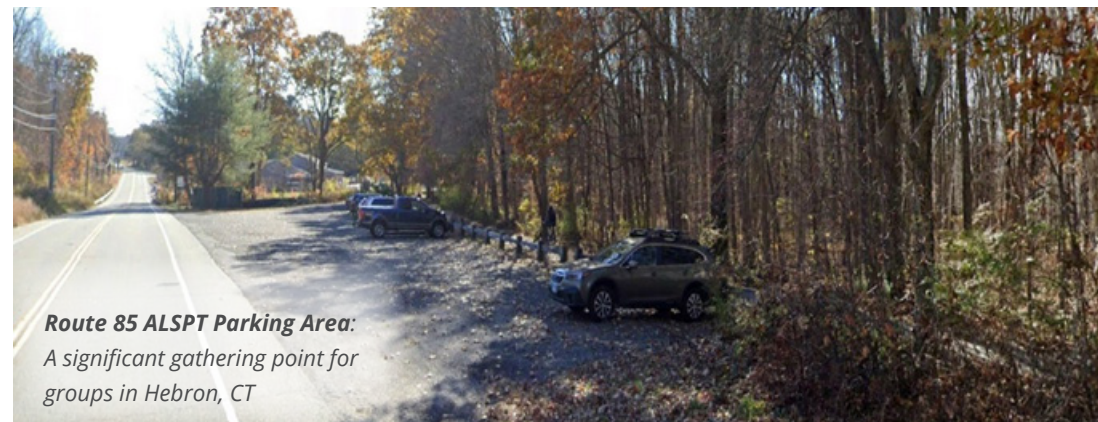
## Improved Parking and Access

The primary access for a large number of park visitors is through improved parking areas that generally contain parking for ten or more vehicles and provide safe and convenient access to an improved trailhead. These parking areas are evenly and well dispersed through the corridor, approximately 4-7 miles apart. Many parking areas are located near population centers, state highways or natural landmarks. They are also generally thought of as the park's regional trailheads and serve as popular destinations for group outings and organized trail events.

At many state and local road crossing locations, there are parking areas that are both formal and informal. Several of the more informal parking and road crossing

locations are characterized by very steep inclines from the trail to the road crossing point. Storm water runoff from the roads has created gravel/sand build-up at the bottom of the inclines. These spots are very hazardous for cyclists and inaccessible for wheelchairs or those who have limited mobility.

Due to the ALSPT's increasing popularity and high frequency of use, these locations require a higher level of maintenance and oversight by the CTDEEP and CTDOT on state routes and collaboration with municipal staff. There is generally a focus on the following off-trail resources at these locations, but consistent funding and staffing at CT DEEP needs support from the ALSPT Region and the member towns.



**Route 85 ALSPT Parking Area:**  
*A significant gathering point for groups in Hebron, CT*

### ADDITIONAL IMPROVEMENTS TO THESE LOCATIONS INCLUDE:

- Improved arrival and departure points to and from the trail in the parking lots/areas to ensure safety of trail users. This would include sight lines, reduction of steep inclines to and from the trail crossing, signage, and stormwater management near parking areas with conservation based infrastructure.
- Improved all-weather parking surfaces such as gravel, millings, or pavement along with traffic safety components such as timber guiderails, boulders, or other vehicle barriers
- Public informational signage/kiosks containing general park rules and maps or possibly trail-head specific information such as notifications of downed trees or trail closures
- Park amenities such as pavilions, toilet facilities, picnic tables, trash cans, benches, flag poles and where parking areas are large enough, a permitted vendor for food and drink.
- Routine patrolling performed by state and local police departments including environmental conservation police officers.
- Posting the number of spaces and locations of parking areas on the ALSPT Region website and CT TrailFinder.

## Unimproved Parking and Access

Unimproved parking and access points are located adjacent to nearly all at-grade crossings where the trail intersects a state or local road. These informal points of access provide convenient locations for visitors to access the park by way of small parking areas, turnouts along the shoulders of state and local roadways and via pedestrian pathways formed by frequent foot travel. Their locations vary in size, configuration, and level of amenities; however, many of them are frequent sources of concern as noted in the previous section.

The roles and responsibilities of state and local officials, issues of public safety, security, maintenance requirements

and property ownership are an ongoing discussion that requires strategic planning on a yearly or bi-yearly basis, collaborative support for ensuring funding for maintenance and where possible new infrastructure. Design consistency in trail conditions and parking areas would overall improve consistency and ease of maintenance for the parking areas and also the trail.

All parking areas and access points serving the park should provide the user with a safe and enjoyable experience; however, many of these informal locations routinely have site related constraints that prevent this goal from being realized (see next page).



### LOCATIONS OF LARGE IMPROVED PARKING

Town	Location	# of Spaces
Portland	Middle Haddam Road	20
East Hampton	Smith Street (Cranberry Bog)	20
Colchester	Rte. 149 (Westchester Road)	15
Hebron	Rte. 85 (Church Street)	35
Windham	Bridge Street	20
Pomfret	Rte. 44/169 (Pomfret Station)	20
Thompson	Rte. 12 (Riverside Drive)	10

*Smith Street (Cranberry Bog) – Popular starting point with quick access to the Lyman Viaduct Overlook, East Hampton, CT*





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*Sand Dam Road,  
Thompson, CT*

### **CONDITIONS EXIST AT SOME PARKING SITES THAT AFFECT SAFETY AND ENJOYMENT OF TRAIL USERS**

- Poor sight lines that typically restrict safe roadway access.
- Topographic limitations that prevent areas such as parking spaces, drive aisles and park entrances from complying with geometric standards and code requirements.
- Grading and drainage limitations that prevent the installation of appropriate stormwater drainage and infrastructure improvements to promote best management practices and the implementation/installation of water quality improvements.
- Compliance with property ownership resulting in encroachment onto private properties and state/local rights-of-way.
- Reduced access for maintenance activities that contribute to poor surface conditions and vegetation management issues.
- Poor soil quality and adverse growing conditions that prevent the growth of strong native plantings and support the growth of invasive plant species.



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*Chewink Road  
Informal parking  
and trail approach  
requires a bridge  
project similar to  
Pomfret Station,  
Chaplin, CT*

# ROADWAY INTERSECTIONS

The Air Line State Park Trail Region contains approximately 62 roadway intersections, and this number is expected to increase as Portland's trail continues to extend west to the Connecticut River and Putnam continues to close the gaps in the park through the downtown business district. These intersections are fairly evenly distributed throughout the ALSPT corridor and include:

- at-grade (level) crossings
- depressed crossings where the trail is below the road
- elevated crossings where the trail is above the road
- crossings where the trail and road are already separated by bridges or culvert crossings.

In a dated but still relevant study for CT DEEP, the University of Connecticut Landscape Architecture Advanced Design Studio assisted CT DEEP in developing an inventory of Trail-Road Crossings and Major/Minor Intersections from Windham to Thompson in the park (see Figures 4G, 4H and 4I).

FIGURE 4G

UConn Landscape Architecture Program Diagram of Composite Road Crossings for North Section of ALSPT

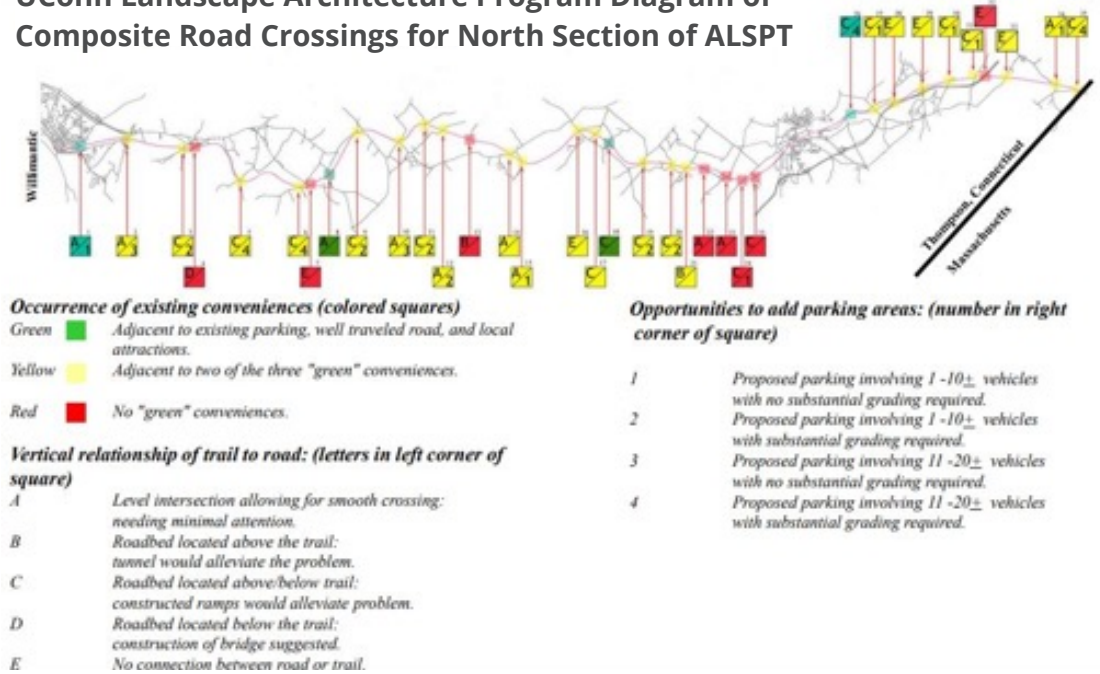


FIGURE 4H

UConn Landscape Architecture Program of Major and Minor Intersections for North Section of ALSPT

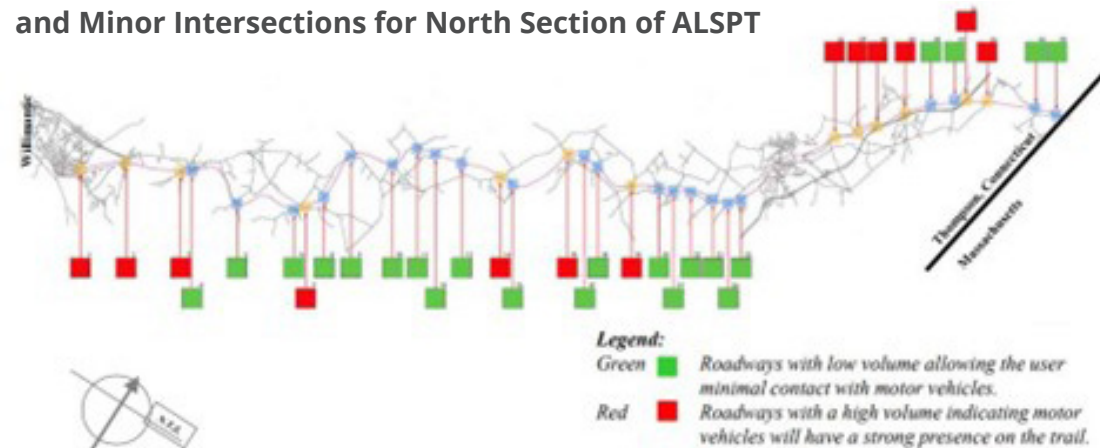
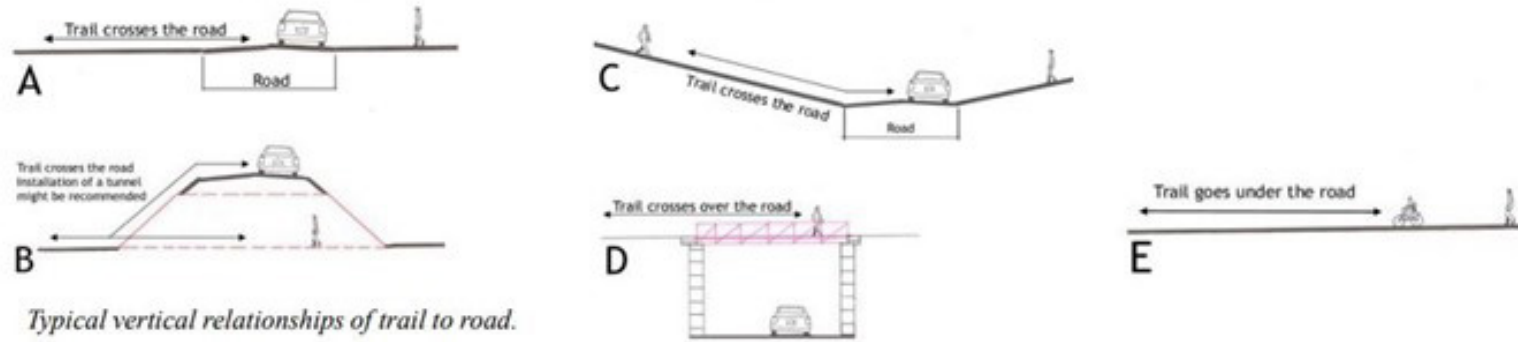


FIGURE 4I

UConn Landscape Architecture Program - Sectional Analysis of Trail Crossing



Additionally, the roadway intersections in the ALSPT range from low volume local roads with average daily traffic volumes less than 100 to interstate highway systems with counts that exceed 21,000 vehicles per day. (See Figure 4J)

These intersections have been the focus of numerous conversations with CT DEEP Parks Division, town public works and elected officials, Council of Government representatives and project stakeholders. They represent a significant focus area for proposed ALSPT improvement recommendations. Local and state resources are committed to making on-going intersection improvements through scheduled seasonal maintenance programs and longer-term infrastructure improvements, but there is significant work to be accomplished toward reliable infrastructure that is easier and cost effective to maintain.

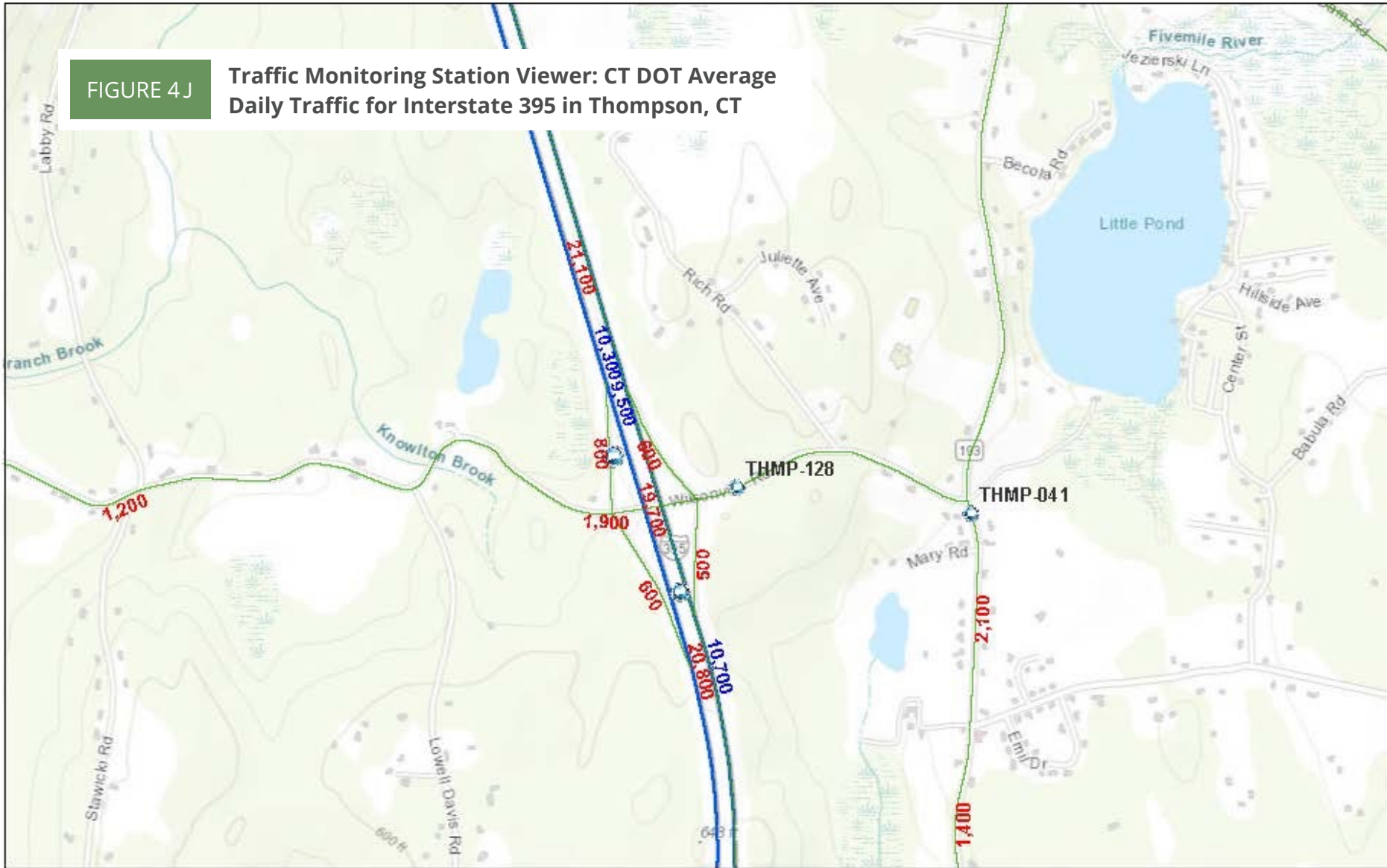


Example of a road crossing along the Air Line Trail State Park

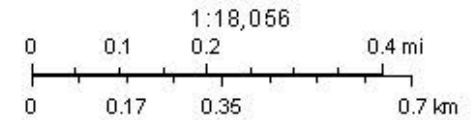


FIGURE 4J

Traffic Monitoring Station Viewer: CT DOT Average Daily Traffic for Interstate 395 in Thompson, CT



April 27, 2023



## Drainage Improvements

The park's trail system relies heavily on drainage infrastructure installed during the railroad's original construction in the 1800s, and many of the remaining features are in remarkably good condition. Original drainage features that range from simple dry-stacked stone culverts to elaborate mortared brownstone headwalls and culverts can be found throughout the corridor and offer unique opportunities for visitors to look back in time and envision the original construction efforts that made this park a reality.

This corridor has seen a significant impact caused by an increase in built development since the railroad's original construction. This growth in structures and roadways has led an increase to impervious coverage and a resulting decrease in pervious areas that allow stormwater to recharge into the ground. Negative impacts from increased runoff can be seen throughout the corridor.

### NEGATIVE IMPACTS OF RUN-OFF

- Existing trail-side drainage swales being diverted blocked by intersecting roadways or offsite development.
- Slope or embankment failures due to an increase in stormwater from offsite.
- Erosion of the trail's surface due to stormwater running onto the trail's natural stone dust surface. These conditions may cause severe

erosion very quickly due to the stone dust surface of the trail being highly erodible.

- Existing drainage pipes and culverts becoming undersized and unstable due to the increase in storm events and stormwater volume.

A significant amount of the corridor's trail is either built adjacent to or through existing wetlands and watercourse or constructed below the existing elevation of the surrounding land area. This construction was necessary to overcome Connecticut's steep terrain. However, this construction also requires numerous man-made drainage improvements to evacuate existing

water from the corridor and to mitigate the effects of storm related damages. These historic conditions combined with an average running slope of the trail not exceeding 6" of rise for every 100' of run (0.5% slope) result in numerous areas that experience interment ponding and seasonal flooding on the trail today. These focus areas require continued state and local resources to perform large scale infrastructure improvements such as culvert/bridge replacements and trail elevation through reconstruction, routine maintenance such as trail resurfacing, drainage swale cleaning and vegetation management to assure safe passage within the trail corridor.



*Draining culverts in Portland, CT. Original drainage features can be found throughout the corridor and offer an opportunity for visitors to look back in time and envision the original construction efforts that made this park a reality.*

FIGURE 4K

**Degrees of Stormwater Damage and Runoff from Upland impervious Surfaces and Buildings.**



*ALSPT Trail surface erosion from rain event*



*Major storm event flooding on ALSPT in Lebanon*



*Trail erosion from highway stormwater in Thompson*

**These focus areas require continued state and local resources to perform large scale infrastructure improvements such as culvert and bridge replacements and trail elevation through reconstruction and routine maintenance.**

## Trail Surfaces



FIGURE 4L

### Historic Photos of ALSPT Conditions at Acquisition by CT DEEP

- 1- East view near Old Colchester Road
- 2- Bridge over Judd Brook
- 3- West view of Raymond Marsh

The Air Line State Park Trail is constructed on a former rail bed and significant portions of this existing infrastructure are intact and functional. The trail's finished surfaces are comprised of either natural stone dust/ screenings in rural areas or bituminous asphalt in urban conditions. These surfaces are installed on a compact layer of earthen fill, stone ballast and processed aggregate base materials. The type of railroad bed construction was installed to support the railroad tracks and has been in place for

over a century. Therefore, it provides an optimal base for the trail's construction. Work since 1997 and earlier has been based on the historic structure of the rail and trail improvements. While bridges and underpasses, drainage and parking were a major source of required funding, clearing and expansion of stone dust surfaces have been an affordable mechanism for expanding the trail's usefulness since 1997 (see Figure 4L).

The CTDEEP and the ALSPT municipal partners understand that sections of the trail are part of the East Coast Greenway (ECG) and the ECG strives to create a safe and accessible infrastructure for all user groups (see Figure 4M). The trail's surfaces need to be easy to navigate, and withstand harsh weather conditions such as wind, rain and snowstorm events and be cost effective to maintain (see Figure 4N). Working within those parameters, the trail's typical cross sections include:

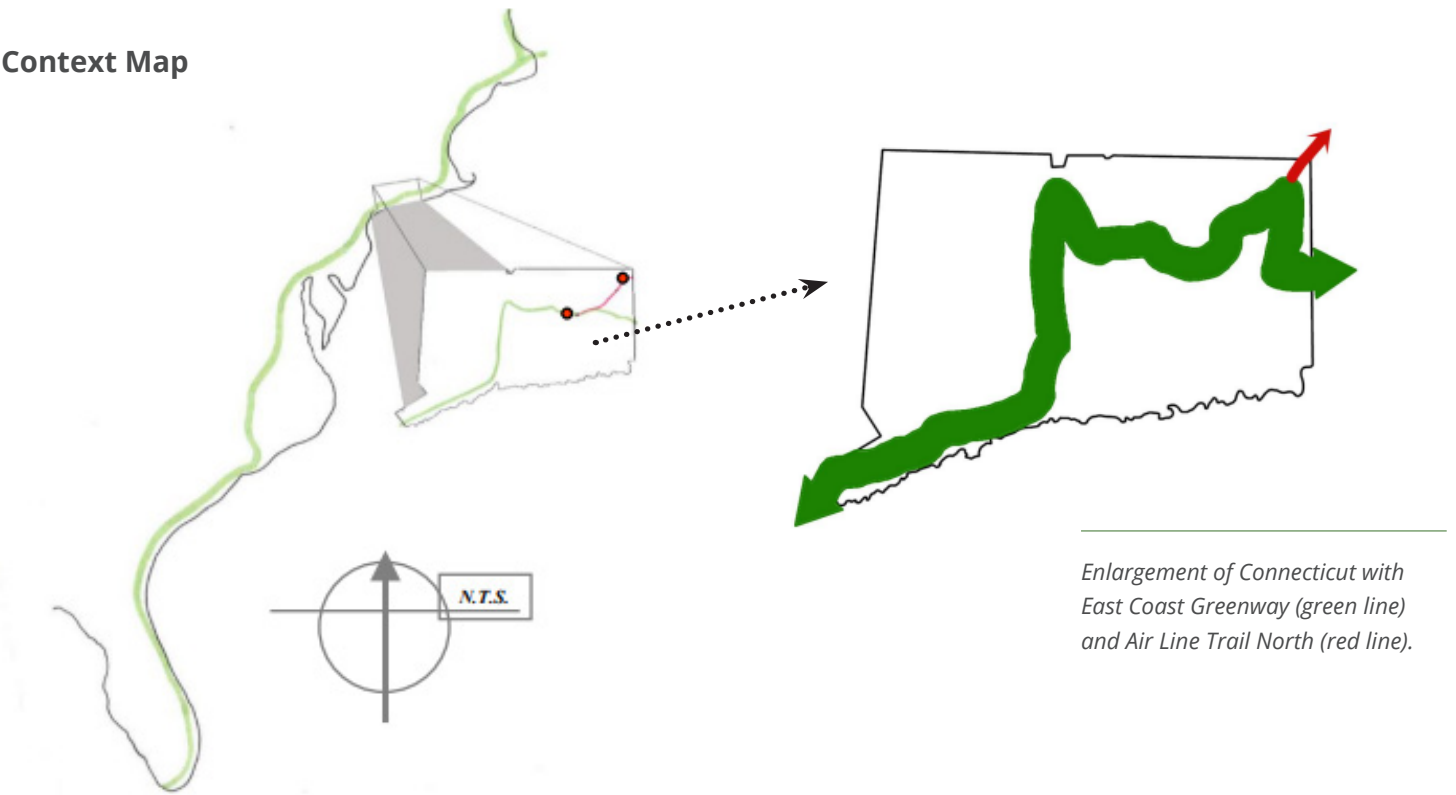
- A ten-foot wide (minimum) multi-use pathway constructed with a stone dust/screenings surface that is installed at a maximum cross slope of 2%. Variations in color and texture may occur in these surfaces due to local availability but all materials shall comply with the industry's standard material specifications.
- A two-foot wide (minimum) shoulder seeded with perennial grass seed and possibly native plantings such as wildflowers.
- Bituminous pavement in place of stone dust where conditions require an impervious surface.
  - The trail is excessively steep,
  - Erosion is prevalent and stormwater runoff would erode natural trail surfaces
  - Areas where a natural trail surface wouldn't be recommended, such as urban centers, along the shoulders of roadways and within floodplains.

FIGURE 4M

National/Regional Context Map

**“When deciding which surfact is suitable for a trail project, consideration should be given to the environmental context of the trail, expected volume of users, and user groups: pedestrians, cyclists, skateboarders, rollerbladers, equestrians, and others.”**

— EAST COAST GREENWAY DESIGN GUIDE

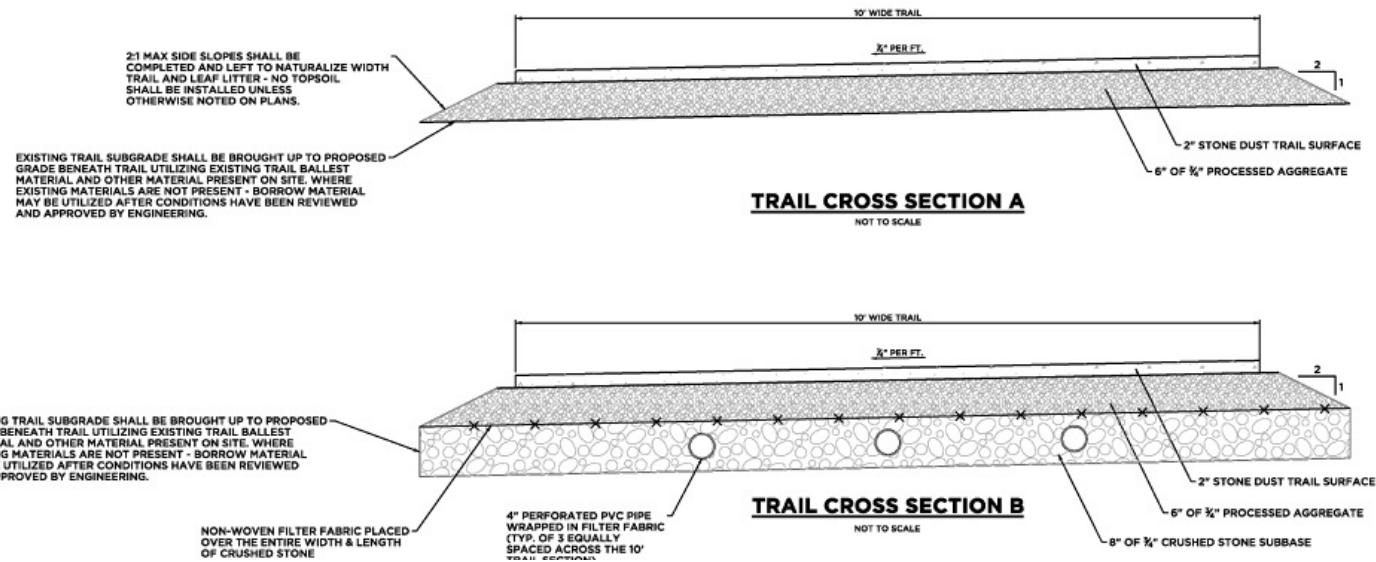


*Enlargement of Connecticut with East Coast Greenway (green line) and Air Line Trail North (red line).*

FIGURE 4N

## UConn Landscape Architecture Program Schematic

Schematic shows trail cross section for gravel trail to reduce erosion.



Stone dust installation in East Hampton (left) and Hebron (right), CT.

PHOTOS: K. GRINDLE AND S. MALCOLM



## Trail Surface Options

When considering routine trail maintenance or planning for long-term trail improvements, it is important to consider the appropriateness of the trail surfaces to the geology and adjacent slope or soil conditions (see Figure 4O). These recommendations contribute directly to the user experience and cost effective long-term maintenance for the CT DEEP and municipal partners.

<b>Stone Dust/ Screenings</b>	<p>Natural trail surfaces are typically used when funding constraints are a major consideration. These surfaces require more frequent maintenance than alternate materials, but are preferred in rural settings where user groups such as trail runners and equestrian riders prefer softer trail surfaces. Natural trail surfaces are</p>	<p>pervious and will allow stormwater to infiltrate. This is beneficial to the environment, as there will not be high rates of runoff from the trail. However, these trails will remain wet for longer periods of time after storm events and will be easily damaged by heavy use during wet periods of the year.</p>
<b>Bituminous Pavement</b>	<p>Paved trail surfaces are recommended where funding constraints are not present, as they're more expensive to install, but offer a longer service life than alternate natural surfaces. User groups including skate boarders, rollerbladers, people with strollers and commuters typically prefer pavement.</p> <p>Surface water runoff from paved trails will exceed the volume of run-off from non-paved trails. This run-off may need to be collected in green infrastructure design swales that promote conservation habitat, into subsurface piping and/or structures to be conveyed to stormwater basins for storage and infiltration. Stormwater run-off may be mitigated by the use of permeable or porous pavement materials. However, these alternative materials would require additional site investigations and would add to the</p>	<p>overall project costs in the short term, but may have long term cost effectiveness. Paved surfaces are typically installed within the Air Line State Park Trail where:</p> <ul style="list-style-type: none"> <li>• Trail grades are excessively steep, such as approaches to existing roadway intersections.</li> <li>• Erosion is prevalent and stormwater runoff would negatively affect natural trail surfaces.</li> <li>• A natural trail surface wouldn't be recommended, such as urban centers</li> <li>• Trails are constructed in areas susceptible to flooding such as floodplains or adjacent to watercourses. These areas may contain waters flowing at a high velocity that could erode natural trail surfaces.</li> </ul>
<b>Concrete &amp; Timber</b>	<p>The trail crosses natural and made-made features along the corridor that require bridges, boardwalks or underpasses to maintain the continuity of the trail. These engineered structures contain surface materials such as pre-stressed concrete panels and timber decking. It's also anticipated that engineered decking</p>	<p>materials will be used in the future, to construct and replace natural wood decking within this corridor. There are also locations where the trail is co-located on existing sidewalk networks that contain conventional poured concrete sidewalks within the trail's urban centers.</p>



FIGURE 40

**Varied Surface Conditions of the Air Line State Park Trail**

1 - Gravel 2 - Natural Soil Base 3 - Stone Dust  
4 - Pavement (bituminous has been use for trail approach to reduce erosion in Portland)



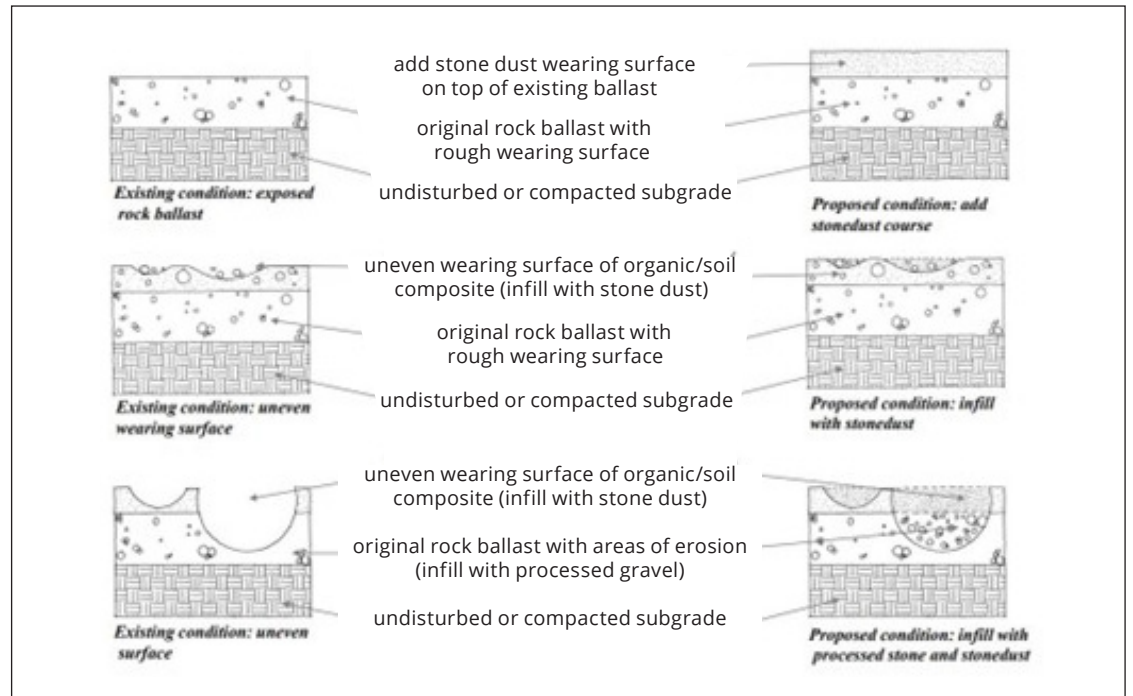
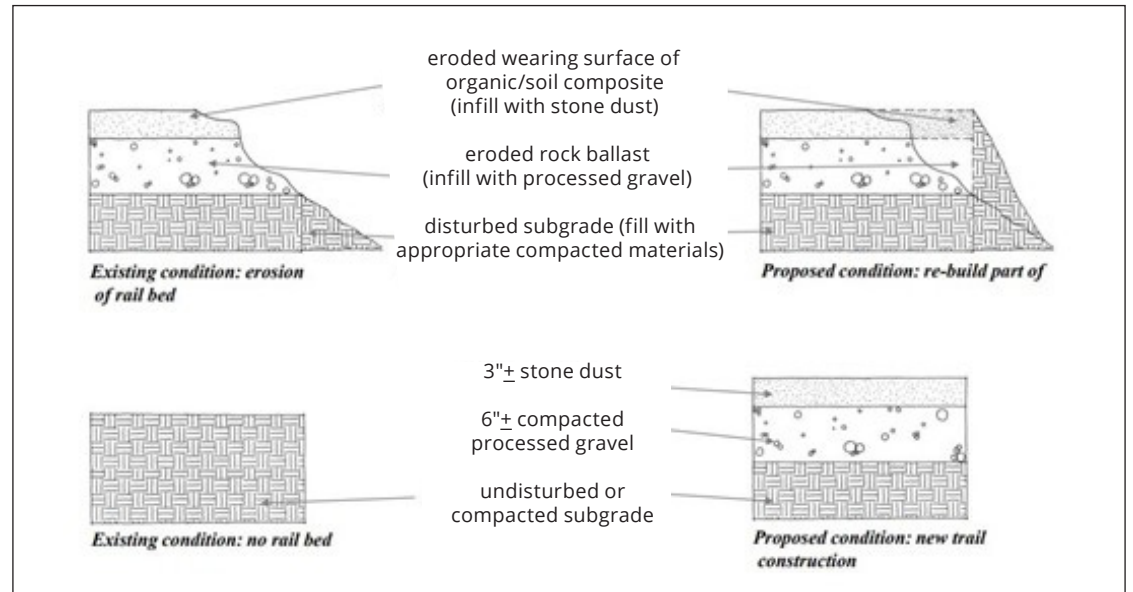
FIGURE 4P

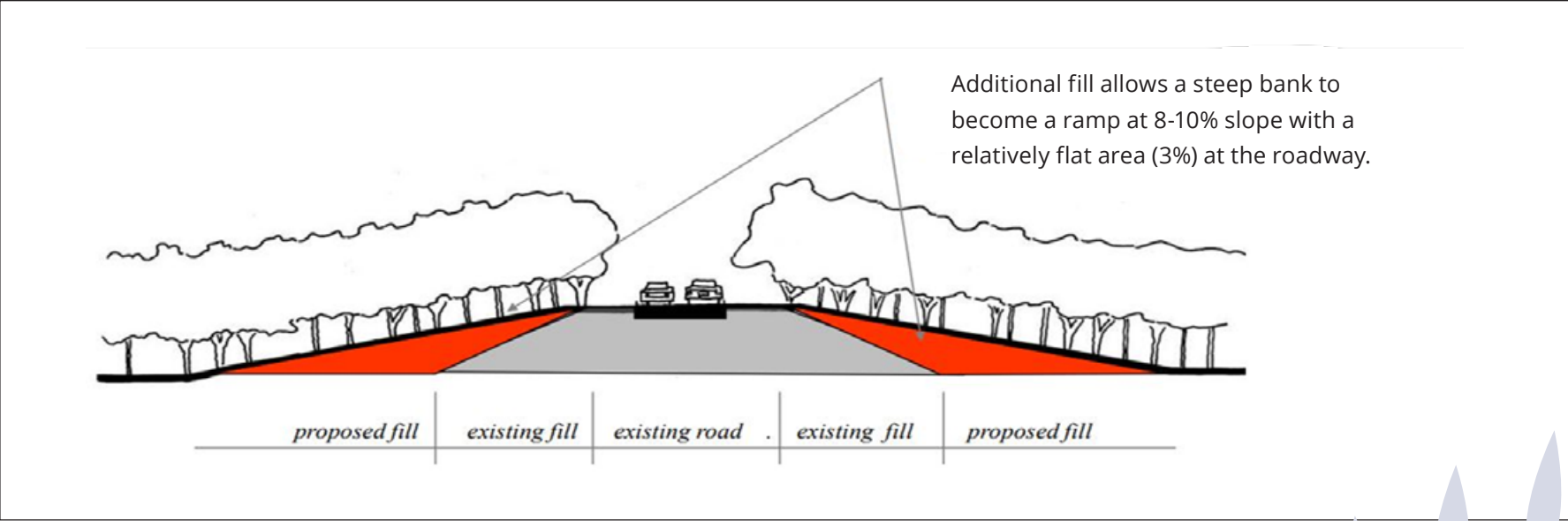
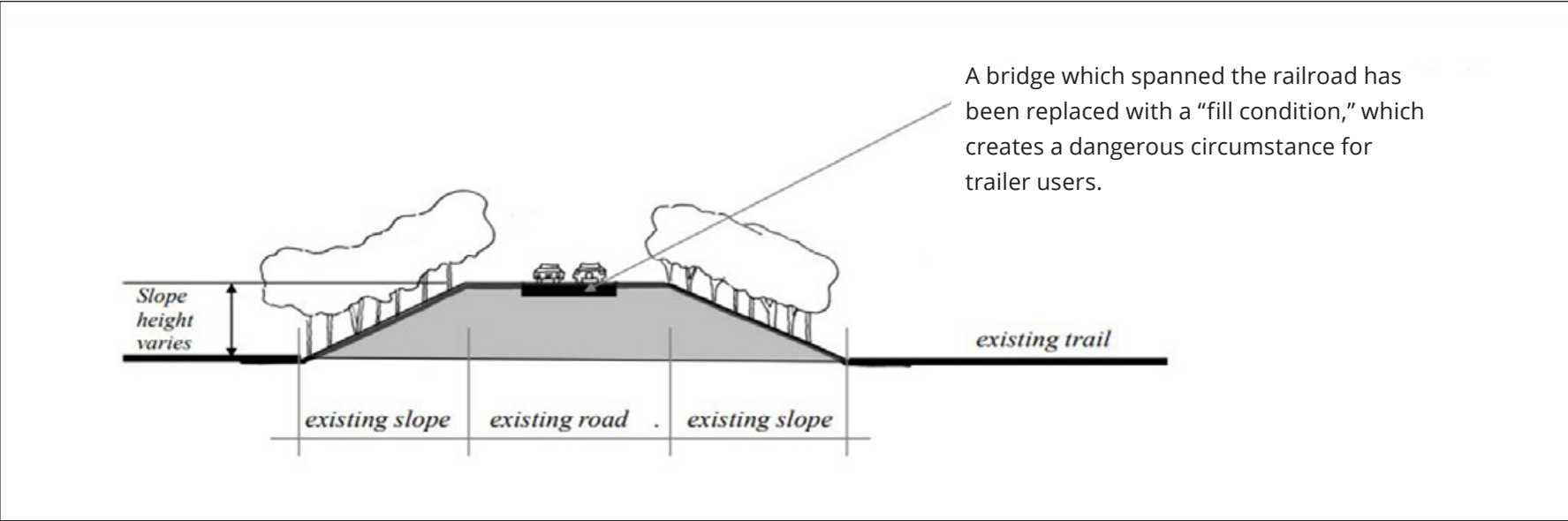
### Cross Section and Slope Design

*Cross section and slope design from UConn Landscape Architecture Program are still relevant for consideration in planning. Specialized engineering and landscape architecture plans would be required for future implementation*

The maintenance, installation and improvement of the trail's surface conditions consumes a significant amount of time and resources in this state park. Recent State Projects #172-421 (Air Line North materials only), #111-124 (Air Line North Pedestrian Trail Crossings), #163-194 (Air Line and Hop River Trail Extensions in Windham), and multiple CT DEEP Recreation Trail Grants and smaller state and local budget allocations have been used to make much needed improvements to the trail's surface.

The goal in long term coordination and design for the future is cost effectiveness and conservation of resources to ensure that almost \$10,000,000 of infrastructure improvements implemented since 1997 are maintained, enhanced, benefit of the trail user and support cost efficient maintenance.





## Trail Bridges

The topography and landscape of the ALSPT has required and will continue to require new bridge infrastructure to ensure ease of passage and safety of trail users. Bridge design and use of historic structures can also create viewsheds of scenery and experience for the trail user. (See Figure 4Q)

While many sections of the trail have been improved with new bridge infrastructure, a focus on key locations for safety is warranted (see Figures 4R and 4S).

FIGURE 4Q

### Bridges Along the ALSPT

*From accessibility to safety to history and scenic views, bridges of all types enhance the experience of the trail. The former bridge of the Lyman Viaduct was filled to create a scenic overlook. Small culvert bridges evoke the quaintness of the trail, and bridges over un-negotiable roads provide safe passage to trail users.*

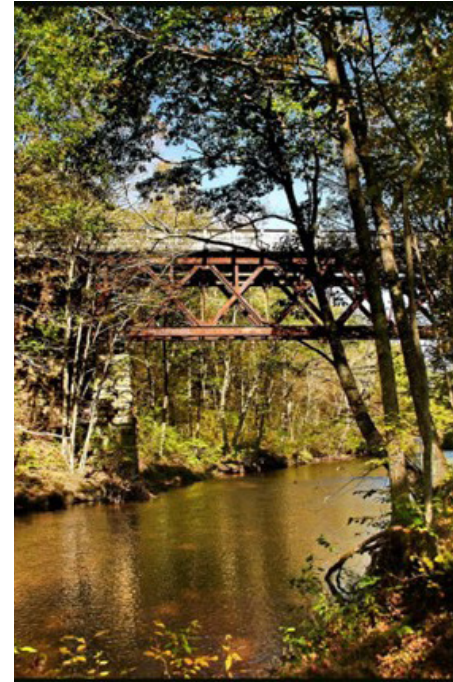


FIGURE 4R

### Bridge Construction

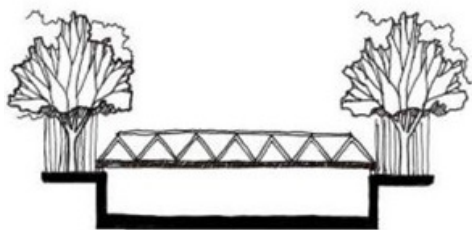
ALSPT and Chewink Rd intersection in Chaplin is a good example of prioritizing bridge construction to improve safety and maintenance. A bridge system similar to Pomfret's new bridge over Route 44 would mitigate trail erosion and storm water onto Cheswick Road



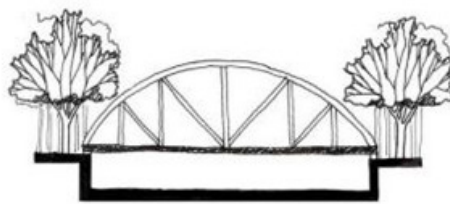
FIGURE 4S

### Bridge Types

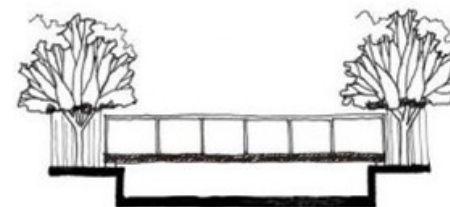
There are numerous types of bridge structures. Some of the most-popular and cost-effective include girder, beam and bow string girder. A schematic sketch and a brief description and cost information for each type follows. Relevant design for bridges should improve and not detract from the trail experience. Engineering and landscape architecture plans would be required for future bridge design on the trail. (Source: UConn Landscape Architecture Program)



The **lattice girder** comes in steel with a span range of 10' – 25' at a cost of \$150 – \$250 per linear foot. The same bridge construction in laminated timber can span between 5' – 15' at a cost of \$650 – \$800 per linear foot.



The **bow string girder** comes in steel with a span range of 15' – 30' at a cost of \$400 – \$500 per linear foot. The same bridge construction in laminated timber can span between 5' – 20' at a cost of \$650 – \$800 per linear foot.



The **continuous beam** comes in steel with a span range of 8' – 20' at a cost of \$200 – \$450 per linear foot. The same bridge construction in laminated timber can span between 15' – 30' at a cost of \$650 – \$800 per linear foot.

# VEGETATION MANAGEMENT IN THE ALSPT REGION

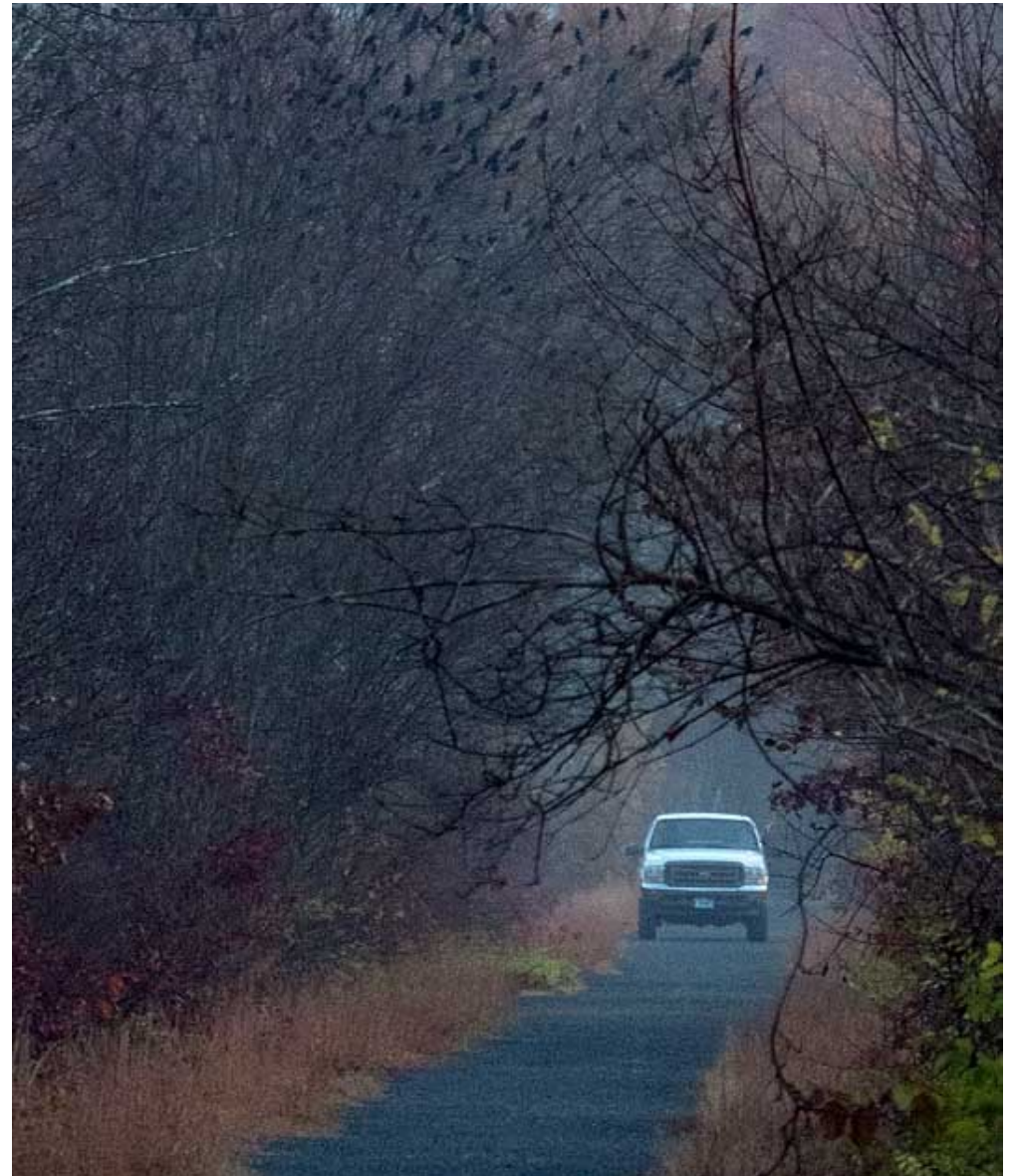
Vegetation management in the Air Line State Park Trail can be addressed through multiple approaches.

## SEASONAL MAINTENANCE

Seasonal maintenance is performed to create a horizontal and vertical “clear zone”, that is maintained in order to provide a user friendly and inviting experience for trail users as well as safe and secure access for emergency response personnel. This work is routinely undertaken by municipal public works/ highway departments, recreation departments and through volunteer efforts.



*Above, a maintenance crew uses an ATV for clearing trees and brush in Pomfret. Right, tree cover in need of clearing from the trail in Lebanon.*



## STORM DAMAGE

Storm damage response is performed to clear the corridor of downed trees and brush after seasonal storm events. This work is necessary to make the trail passible as soon after a storm as possible and is often performed by CTDEEP staff along with municipal public works and highway departments. Additional efforts to clear smaller downed trees and brush are commonly undertaken by trail users and volunteer groups who may use social media platforms or other means to organize trail clearing and trail clean-up events.

## HAZARDOUS TREES

The Hazard Tree Mitigation Policy (Sec. 17 of Public Act 22-143) provides CT DEEP a framework for addressing hazardous trees, which have been stressed by a number of natural events such as the spongy moth outbreak beginning in 2015 and persisting through 2017 in eastern and central Connecticut and the emerald ash borer first discovered in the state in 2012. [View the state's Mitigation Policy here.](#)



**Ongoing management activities keep the Air Line State Park Trail safe and appealing for visitors. 1 – Invasive management 2 – Vegetation management; 3 – Tree management; 4 – Invasive vegetation removal**

# ADDITIONAL INFRASTRUCTURE AND AMENITIES

From the engineering and planning in Putnam, Pomfret, and Thompson in the north to the major boardwalk connection in East Hampton that will link to the Portland Connector, building out the gaps in these sections on the trail is a reasonable objective in the next three to five years. Add to that a continued extension from the current Portland terminus at Butler Gravel and streetscape design in Willimantic and the full 64 miles of trail will be passable.

The important concurrent steps are to build out the trail conditions for 64 miles so there is reliable continuity all along the trail. In that design and build phase, it is worth recognizing the need for

important trail amenities. This subset of planning and wayfinding deserves a focused strategy by the ALSPT Region, CT DEEP and stakeholder partners. While there may be other amenities, this plan summarizes those amenities suggested in workshops and interviews with stakeholders, trail committees and CT DEEP.

## TRAIL AMENITIES

The Air Line State Park Trail is a unique State Park in its length and diversity. So when looking at the ALSPT amenities, it is critical that improvements provide a user-friendly experience for visitors. They should be distributed intentionally and evenly through the park, follow consistent

aesthetically pleasing design parameters and be accessible to all users. Beyond their utilitarian nature, trail amenities contribute profoundly to the user experience and may often be the subject of a user's reviews when speaking with friends and family.

Informational signage highlighting historic landmarks along the trail such as the East Thompson train wreck and the infamous ghost train along with amenities such as viewing platforms and seating, which bring attention to the preserved open lands, and natural habitats along the trail make this state park a one-of-a-kind experience.

### UNDERSTANDING THE IMPORTANCE OF TRAIL AMENITIES HIGHLIGHTED ABOVE, ONE MUST ALSO RECOGNIZE THESE FEATURES ARE OFTEN:



Removed from the park through acts of vandalism



Overlooked during maintenance and improvement projects in order to prioritize more critical infrastructure spending



Not installed at the locations or in the frequency that trail users and community stakeholders would like



The first items removed from trail construction budgets due to cost saving measures

The subject of improving or installing amenities along the trail often arises when local municipal partners, stakeholder groups, civic organizations or private donors express interest in contributing to the trail community. Improvements to the trail's amenities play key roles in supporting the economics of the trail highlighted in chapter 6 along with the marketing, branding and wayfinding highlighted in chapters 7 and 8.

These generous contributions typically involve requests from volunteers leading trail clean-up days, local businesses donating items such as bicycle repair stations, Eagle Scouts seeking to perform their Service Project within the park or private donors requesting the installation of a memorial bench, etc. The abundance of these requests, combined with the personal meaning that many of them have, exemplifies the importance this trail has to so many people in our community. It is important to remember that the State's rules and regulations must be followed when proposing improvements on state property. However, creative opportunities to promote and enhance the trail's existing and future amenities should be explored to the furthest extent possible.

Amenities are commonly thought of as items such as way-finding and informational signage and site furnishing such as benches, bike-racks and bicycle aid stations, etc. However, existing amenities along the Air Line Trail are so much more. There are also the categories of restrooms, waste management, cell service, call boxes and emergency management.



**Amenities are commonly thought of as items such as way-finding and informational signage and site furnishing such as benches, bike-racks and bicycle aid stations. However, existing amenities along the Air Line State Park Trail are so much more.**



## Restrooms and Drinking Water

Restrooms are a required amenity on the ALSPT, ideally situated at each official parking lot managed by either CT DEEP or a town. There are options toward permanent or temporary, portable restrooms as well as advantages and disadvantages to each option. The importance of restroom facilities cannot be overstated. Seasonally, CT DEEP contracts to situate portable restrooms at strategic locations in state parks. The ALSPT trail optimal locations are near parking areas on highly travel state roads and maintenance/vandalism can be a challenge. It will require collabo-

ration and partnership between hosting properties, whether state, town, nonprofit or business. The ALSPT Region might emulate the composting toilet study in the Farmington Heritage Canal Trail (see Appendix E) and should consider working with neighboring University of Connecticut engineering students toward solutions (see Figure 4T). As many of these towns are designated as rural within the USDA grant and loan program, they may be eligible for funds to build these types of community facilities on the town owned property.

<div style="background-color: #f4a460; color: white; padding: 5px; font-weight: bold; font-size: 0.8em;">MANAGEMENT AND ENGINEERING FOR MANUFACTURING</div>	<b>TEAM 10</b> Logan Miller Randall Louie Curtis Fetteroll Ahmed El-Mouwfi	<b>ADVISORS</b> Craig Calvert	<b>SPONSOR</b> <div style="font-size: 1.5em; font-weight: bold; color: red; margin-top: 5px;">LOOLOO</div>
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**It's More Than Just a Porta Potty: Development of the Revolutionary Smart Portable Toilet**

This interdisciplinary project aimed to develop a revolutionary portable toilet unlike anything already on the market. It has a modular design that is easy to assemble and includes features such as a waste management system and solar powered device charging capabilities. LooLoo will work with organizations already in the humanitarian aid sector to help those communities in need, specifically the homeless and disaster-affected or developing communities. These communities often struggle to accommodate their members' needs for a place to safely go to the bathroom, a privilege many people take for granted. This often causes health risks to develop due to open defecation in public facilities and water sources. The engineering design process in this project consisted of an iterative cycle of providing requirements, researching and presenting design solutions, reviewing those proposed designs, providing feedback, and repeating. Through this process the structural materials were narrowed down to those with the greatest balance of cost, weight, strength, and environmental resilience. The electrical components have been evaluated and modified multiple times to achieve an optimal design for power storage and output, while minimizing the cost. The waste management system minimizes bad odors while allowing for efficient storage, removal, and reuse. The business plan outlines the recommended marketing plan, distribution plan, and manufacturing plan for LooLoo to continue with in the future.



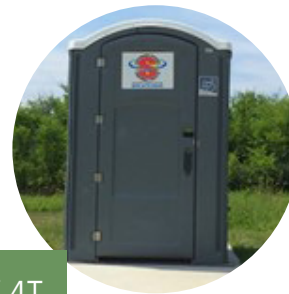


FIGURE 4T

### Creative Solutions for Restrooms

*Left, UConn Student Senior Project Engineering Team designed a smart portable toilet. Right, an accessible portalet on a concrete pad.*

### STRATEGIES FOR RESTROOMS ALONG ALSPT

- A permanently accessible restroom station with available drinking water may be a solution to deter vandalism and overuse. The systems designed at these locations could potentially be compostable systems powered by solar energy due to site constraints for a full septic system.
- Create accessible portable toilet system facilities at high visibility parking lot locations where contracted food vendors are also present. The business as part of the contract could open and close the portable toilets enclosure at sunrise and sunset.
- Install April to November accessible portable restroom stations within enclosures at more remote locations at parking lots on town owned roads or in adjacent state parks. Arrange with town officials to periodically monitor the area and public works to unlock and lock enclosure in the morning and end of day. Investigate options for facilities similar to CT DEEP restrooms at state parks and forests.
- Contract with one or two local businesses in village or town centers to provide accessible public access to their restrooms. Funds paid to these businesses could go toward daily cleaning and maintenance. The added benefit to the business is the targeted visit would lead to additional food or retail purchases.

## Cell Phone Signals and Charging Stations

Cell phone service on the trail is not reliable in many locations. This can create a safety issue for visitors who rely on their phone for location, directions, and information about the trail. As part of a next-step action in the building of amenities, work with service providers to survey signal strength over the length of the trail and identify solutions

toward improved signal strength if possible. Charging stations for bikes, wheelchairs, or automobiles should be considered at each parking area. Identify security options through interviews with other multi-use trail systems in Connecticut and nationally.



## Emergency Management Along 12 Towns of ALTSP Region

While the trail system is owned and managed by CT DEEP, emergency response to situations on the trail is generally tied to each of the twelve towns through which the trail travels. There are mutual aid agreements between towns to provide additional support to each other. CT DEEP coordinates with towns for these types of situations and there are additional options that can be explored to optimize safety and response to emergencies on the trail. Work closely with the CT Department of Emergency

Management and Homeland Security Regions 3 and 4 and the town representatives on these boards, to create an emergency response plan to support town response personnel. There also may be funding to build emergency response building at remote locations to house a trail sized rescue vehicle, defibrillator, and other medical equipment for emergency responders. These trailside buildings could also hold maintenance equipment for clearing impediments, such as downed trees, on the trail.



## Visual Amenities and Shelter

- Interpretational art such as trail-side installations and murals.
- Ornamental plantings such as pollinator gardens, garden club and master gardener installations.
- Stormwater treatment areas including but not limited to rain gardens.
- Trail signage such as mile markers, education, historical and town/state boundary markers.
- Shelters such as gazebos and pavilions.
- Trail art incorporated into unique bike racks and fix-it stations (East Hampton example)
- Kiosks and informational signage identifying urban centers, local businesses and nearby preserved open spaces.
- Marquees such as East Hampton's trail sign that extends over the trail at the Smith Street cranberry bog trailhead parking area.
- Ornamental flagpole installed through an Eagle Scout project at Portland's Middle Haddam Road trailhead parking area.

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### **Existing structures along the ALSPT Region**

1 — Shelter on Trail, Lebanon, CT, allows for shade and shelter from rainstorms; 2 — Newly Built Pomfret Station; 3 — Trailside Community Oriented Public Art



## RECOMMENDATIONS: Maintenance

Effective trail management and maintenance are critical components of establishing and sustaining a successful trail system to ensure a safe and reliable trail user experience. Identifying practical and cost-effective strategies for trail management and maintenance on the Air Line State Park Trail which are sustainable over time is crucial to the long term successes of this unique park system. For that reason, the recommendations and strategies for trail management and maintenance along the Air Line State Park Trail and associated state and local road crossings outlined below are based upon the trail's current conditions.

**01** Establish clear channels of communication between CT DEEP, the 12 Town ALSPT Alliance and Municipal Leaders and maintain these channels through regular correspondence and reoccurring meetings between CT DEEP's park management and municipal officials.

**02** Email a quarterly newsletter from CT DEEP staffers to inform municipal leaders of items such as upcoming scheduled maintenance, events requiring local collaboration, recent enforcement actions, etc.

**03** Consider a dedicated trail wide maintenance day, coordinated by CT DEEP and the ALSPT Region/member towns. Similar to a training event, engage the public awareness and interest in the trail through something similar to DEMHS Citizen Corp Training, the Appalachian Mountain Club or Maine Conservation Corp, provide basic training through CFPA, CT DEEP and CTDOT for trail committees and interested public to participate in weekend trail cleanup. Coordinate with trails day.

**04** Hold hybrid biannual meetings (February, before major trail use seasons of Spring/Summer/Fall and October, for funding strategies and infrastructure planning) to allow CT DEEP staff and trail stakeholders address key issues in the operations management of the trail. These meetings would provide an opportunity for members of the trail community and public to engage with state and local leaders.

**05** Develop a clear strategy for developing continuity in design and management throughout the trail corridor from Portland to Thompson. This effort would establish a unified vision for the park and provide the towns of East Hampton to Thompson with a clear understanding of CTDEEP's objectives for the trail. Since Portland is not technically part of the state park, these efforts would provide Portland with suggested guidelines to follow as they continue to expand their trail west to the Connecticut River. This effort would be in collaboration with the urbanized areas of Willimantic and Putnam who are working to close their gaps in the trail.

**06** Create a comprehensive set of design guidelines for trail designers and maintainers. These guidelines would establish standards for materials, construction methods, the materials and locations for site furnishings and recommend amenities that may be used to reinforce the trail's branding throughout the corridor. The guidelines would be derived from industry standard trail design manuals and CTDOT documents such as: AASHTO Guide for the Development of Bicycle Facilities; National Association of City Transportation Officials Urban Bikeway Design Guide; and the State of Connecticut DOT's Standard Specifications for Roads, and Bridges Facilities & Incidental Construction Form 818.

## RECOMMENDATIONS: Maintenance

- 07** Define the roles and responsibilities of each stakeholder. As the number of visitors to this park grows and the demand for expanded services becomes more apparent, this recommendation becomes critical to the future successes of the park.
- 08** Develop and/or strengthen maintenance protocols and arrange memorandums of understanding between CT DEEP and all towns adjacent to the ALSPT. These agreements need to outline the trail's maintenance and infrastructure requirements in a comprehensive manner including a clear framework of responsibilities that addresses the scope, timing and frequency of items including but not limited to: seasonal trail mowing, leaf removal, clearing storm damage, repairing and improving the trail surfaces, litter removal, public safety and enforcement patrols, and seasonal public safety improvements such as vegetation removal to maintain sight lines and snow removal from trailhead parking areas.
- 09** Investigate a methodology for towns to be reimbursed for the time & materials they contribute to the Air Line State Park Trail. These contributions often come in the form of local public work's departments contributing staff hours, equipment time/ operating costs and materials costs to maintain local sections of their trail and related amenities such as parking areas, signage, and trail crossings. A majority of the municipalities reiterated this request and many expressed frustrations that their local public works budgets were being negatively impacted to maintain this unique state park whereas they would not be expected to provide maintenance to a more conventional state park.
- 10** Develop a funding strategy for Recommendation #9, looking at the CTDOT's [Town Aid Road Program](#), a program that funds the construction, improvement and maintenance of roadways through grant payments based on calculations that factor in the town's population and miles of improved/unimproved roadway. A program such as this would work hand in hand with the recommended maintenance agreements to direct state funds to the towns based upon the linear mileage of trail, which they are responsible for maintaining.
- 11** Establishing this program and seeking a permanent revenue source to fund it would be a collaborative effort that could be spearheaded by the ALSPT Region Alliance and rely on the resources of the four councils of government who help manage the transportation planning funds for these trails: Lower Connecticut River Valley COG, Southeastern Connecticut COG, Capital Region COG, and Northeastern Connecticut COG.
- 12** Establish a mechanism where materials needed for trail maintenance such as process aggregate earth materials, stone dust or stone riprap may be supplied at no charge or at a reduced rate to the member towns. This would still encumber the town's labor and equipment however it would lessen the burden on local operating budget for maintaining the trail.

## RECOMMENDATIONS: Town-Based Recommendations

The Air Line State Park Trail Region Master Plan Consultant Team met with stakeholders and representatives from each of the twelve towns. These meetings were set with no time constraints and allowed for site visits and in depth conversations. The project planning team's objective was to listen and take the opportunity to see and hear firsthand what was on the minds of the people who are by default, the local ambassadors, and stewards of this trail. The general agenda to these meetings were as follows:

- Site walks led by trail committees to observe maintenance needs
- Discussions with municipal leaders to review funding opportunities
- Conversations with economic development officials regarding making regional connections to spur growth
- Meetings with public works staff where the question of "who's responsible for this?" was often a topic of conversation when discussing particular maintenance activities.

The lively requests for maintenance assistance and the breadth of ideas for infrastructure improvements at these meetings was extraordinary and extensive notes and photos were collected by the project planning team. These findings are summarized in Appendix A.

### SHORT TERM GOALS

- Initiate bi-annual meetings, led by ALSPT Region Alliance and CTDEEP to review upcoming seasonal maintenance protocols and projects identify funding mechanisms and plans for major infrastructure
- Create a sign manual and standards for sign placement to assist maintenance crews with design and installation
- Develop a standard for mile markers, where is Mile - 0.0 and work closely with Hop River Trail Alliance toward mile marker planning
- Install town boundary markers and clearly denote intersection names or convenience and emergency purposes
- Post consistent signage at all trailheads to inform users of park hours, rules and regulations for pets and their waste, etc.
- Add informational signage to promote features along the trail - such as nearby preserved lands and historic sites (include photographs)
- Consider opportunities for local businesses or civic organizations to sponsor the trail - Similar to Connecticut's 'Adopt a Highway' program
- Improve the trail surface through Hampton to provide continuity for users on Air Line - North
- Complete the removal of hazard trees adjacent to the trail, throughout the corridor
- Install drainage improvements where trailhead parking lots are negatively impacting local roads (Chewink Rd in Chaplin is of particular note)



## RECOMMENDATIONS: Town-Based Recommendations



### MID-TERM GOALS

- Replace gates to make them all uniform and make sure all gates are clearly marked 'No Parking' to allow emergency access at all times
- Provide improved access for persons with disabilities, this includes adding compliant parking spaces and trailhead access
- Improve parking lots including resurfacing, improved drainage, expansion for more vehicles, better sight lines and paved aprons
- Create additional parking areas for large vehicles such as recreational vehicles (RVs) and horse trailers
- Improve intersection signage and trail crossing conditions with better signage and painted crosswalks
- Make meaningful attempts at the state level to close the remaining gaps rather than relying on local advocates and policy makers
- Make funding available at the state level to care for this regional treasure rather than relying on grant funds to improve this state park
- Make connections to urban centers to promote economic development (Hebron & Columbia are of particular note)
- Acquire easements over adjacent properties where trail improvements are anticipated to impact private property (drainage/access/etc.)
- Fund an amenities installation study to secure infrastructure grant where possible for restrooms, cell service, charging stations and emergency utility structures.

## RECOMMENDATIONS: Town-Based Recommendations

### LONG-TERM GOALS

- Pursue the installation of Rectangular Rapid Flashing Beacons (RRFBs) where the trail crosses roadways with high traffic volumes and/or poor sight lines (the intersections that generated this comment are Rt. 207 & Rt 87 in Lebanon)
- Construct trailhead parking at the Rt. 87 trail crossing in Lebanon
- Complete trail construction to close all remaining gaps (East Hampton, Willimantic & Putnam)
- Work with DEMHS Regions 3 & 4 to determine the trail's capabilities to mitigate the effects of natural or man-made disasters in the region
- Design and install pedestrian bridges over Rt. 203 in Windham and Chewink Rd in Chaplin.
- Establish a protocol for performing annual inspections on all trail infrastructure including bridges, culverts, pipe crossings, hand railings and etc. to prioritize infrastructure spending.
- Consider replacing natural wood decking and railings with engineered wood products or possibly concrete to extend their service life and reduce long-term maintenance costs
- Install paved aprons with proper drainage improvements at all crossing where the trail intersects a paved roadway
- Review the feasibility of paving portions of the trail where the grades are too steep to prevent erosion
- Install public restrooms and potable water filling stations at impactful locations within the corridor

### ESTIMATING MAINTENANCE COSTS

Maintenance costs within the Air Line State Park Trail vary significantly based upon a variety of factors such as the existing trail's condition, the age of existing infrastructure, and intensity of the trail's use along with the nature of the desired improvements. For the purposes of this plan, the cost estimate relies on the consultant team's knowledge of the overall park system, recent construction costs and the opinion that regular maintenance contributes to the long term success of the park. The following estimates are assembled as a cost per linear foot/per mile however, they are general in nature. A detailed breakdown of the cost estimates by town along with an inventory of every location where the trail crosses a public roadway are included in Appendices A and B.