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Department of Economic Opportunity Technical Assistance
Coast to Coast Leadership Team

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1: INTRODUCTION

Overview
The Coast to Coast Trail (C2C or "Trail") is a significant cross-state trail in Florida's statewide network of Greenways and Trails, spanning from the Gulf of Mexico to the Atlantic Ocean and traversing nine counties. This multi-jurisdictional, multi-agency effort is aimed at closing seven trail gaps across the state to create the “Trail.” C2C will be Florida's first cross-state paved trail. The Trail will span approximately 250 miles when completed. Currently, the C2C is nearly 75 percent complete. This trail will provide Floridians and visitors with a unique trail experience, both through natural Florida as well as through downtowns and other destinations. The C2C is a major priority within the Florida Greenways and Trails System Plan developed by the Office of Greenways and Trails.

Project Overview
In 2015, The Tampa Bay Regional Planing Council (TBRPC), in partnership with East Coast Central Florida Regional Planning Council (ECFRPC) received a Department of Economic Opportunity Technical Assistance Grant to develop an Urban-Rural Overlay, conduct an opportunities inventory, and to hold public workshops to gather necessary information for these analyses of the proposed “Trail”. The purpose of this study is to provide design continuity and recognition to the C2C Trail.

Design Process
This document outlines the public engagement, research, and design process to address the Urban-Rural Overlay concept, outlined in the following chapters:

Stakeholder Engagement
Three stakeholder workshops were held, in each of the east, central, and west areas of the C2C corridor in addition to numerous webinars.

Assets + Opportunities Inventory
Inventory was collected and analyzed to better understand the significant natural and cultural resources and opportunities; location of existing trailheads and related facilities (restrooms, water, emergency telephone, lighting, and parking); and opportunities for connections and destinations including multimodal connections, social destinations, economic hubs, and community centers within the C2C Trail trail corridor.

Conceptual Overlay
Utilizing input from regional partnerships and stakeholder engagement, a conceptual overlay was developed to provide a unifying theme for existing trail segments and to guide construction of new trail segments of the Trail. Improvement recommendations include the brand/identity, wayfinding signage, design standards, and amenities (such as trailheads).

How do you take 20 local trails and turn them into a trail with national and even global appeal?
The remaining phases and associated costs are estimates provided by metropolitan planning organizations and local governments. These estimates are subject to change as new information becomes available.

Date updated: 10/27/2014

Coast to Coast Connector
Total Estimated Miles: 250
Total Gap Estimated Miles: 69
Remaining estimated funding need: $63.3 Million
2: STAKEHOLDER ENGAGEMENT

The stakeholder engagement serve as a kick-off for the agency’s work on the opportunities mapping. In addition to conducting three workshops across the state, a training webinar was used to provide guidance to the TBRPC and ECFRPC staff on how to conduct the opportunities inventory and mapping. This webinar will be recorded and posted to a website so that it can be accessed by anyone involved in the project.

STAKEHOLDER WORKSHOPS

The following ideas resulted from brainstorming sessions throughout each of the stakeholder workshops. Workshop 1 was held in DeBary, FL on January 19th, 2016; Workshop 2 was held in Winter Garden, FL on January 20th; and Workshop 3 was held in Brooksville City, FL on January 21st.

Meeting Notice

Stakeholder Workshops Scheduled for January 2016 in Three Locations

The Tampa Bay Regional Planning Council, in partnership with East Central Florida Regional Planning Council, received a Florida Department of Economic Opportunity Technical Assistance Grant to develop an Urban-Rural Design Overlay and conduct an opportunities inventory for the Florida Coast to Coast Connector (C2C or “Connector”).

The Connector is a cross-state trail in the statewide network of Greenways and Trails. C2C stretches from the Gulf of Mexico to the Atlantic Ocean and traverses nine counties. This multi-jurisdictional, multi-agency effort is aimed at closing seven trail gaps across the state to create the “Connector.” C2C will be Florida’s first cross-state paved trail. The Connector will span approximately 250 miles when completed. The C2C is nearly 75 percent complete. This trail will provide Floridians and visitors with a unique trail experience, both through natural Florida as well as through downtowns and other destinations. Join the planning team at the upcoming workshops and provide your input.

Upcoming Coast to Coast Connector Stakeholder Workshops Dates and Times

- Tuesday, January 19, 2016
  1:30 – 4:00 P.M.
  DeBary City Hall
  16 Columba Road
  DeBary, FL 32713

- Wednesday, January 20, 2016
  1:30 – 4:00 P.M.
  Winter Garden City Hall
  300 W. Plant St.
  Winter Garden, FL 34787

- Thursday, January 21, 2016
  9:30 – Noon
  Brooksville City Hall
  201 Howell Avenue
  Brooksville, FL 34601

For more information visit the project portal at http://C2Cconnector.org

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Coast to Coast Connector – January Workshop

Coastal Design Overlay

What are the most inconsistent areas of the C2C (signage is difficult to read, trailheads are inaccessible, etc)?

________________________________________________________________________

What is one concern that you have related to the future of the Coast to Coast Connector? Are there areas where additional enhancements would be helpful?

________________________________________________________________________

Is there a trail segment of the C2C that represents the aesthetics of the entire trail network? If so, please describe this segment of the trail.

________________________________________________________________________
**Workshop Brainstorming Ideas**

**Workshop 1**
- “Every possible trail connection you will have on the C2C is found in Brevard County.”
- No water, restrooms, or parking in some areas.
- Signage and mile markers need consistency
- Brevard County has adopted US national grid system for emergency locate
- Standard trail width should be 12’
- Consider joint use of trailheads with private entities
- Logo: Need to include the word Florida - Consider a tag line of “Find your Space”
- Respect the legacy of local trails
- Max Brewer Bridge is dividing line between urban and rural
- Add directional signage for where “trail” seems lost due to sidewalk, gaps, etc.

**Workshop 2**
- Major trailheads should have bike repair station
- Need secure bike storage
- Trailheads are often in isolated areas - consider safety improvements
- Mile markers need consistency - current local jurisdictions restart mile markers for each section
- C2C is part of the Sun Trail network
- Additional amenities needed: benches, bike racks, wifi hot spots, usb charging points
- Florida park service could incorporate signage design standards
- Commercial trailheads should be identified first
- Map camping areas (Magnolia Park)
- Equestrian users in this area

**Workshop 3**
- Major trailheads should have bike repair station
- Need secure bike storage
- Trailheads are often in isolated areas - consider safety improvements
- Mile markers need consistency - current local jurisdictions restart mile markers for each section
- C2C is part of the Sun Trail network
- Additional amenities needed: benches, bike racks, wifi hot spots, usb charging points
- Florida park service could incorporate signage design standards
- Commercial trailheads should be identified first
- Map camping areas (Magnolia Park)
- Equestrian users in this area

**Takeaways**

**Consistent Design Elements**

Celebrate the diversity of landscapes found along the C2C. There is no one defining character except diversity - urban, rural, wilderness. Small towns have charm, respect what they have done and subtly apply the design overlay to the trail so as to not dominate what local jurisdictions have accomplished. It would be appropriate to have differing design element treatments based upon the specific location and context of the design element - ie. an urban area might have a different type of barrier fence vs. a wilderness area.

Consistency in design is accomplished through the use of consistent forms, materials, colors, fonts, line styles, connection method, etc.

**Key Design Elements that Need Consistency:**
- Logo
- Directional signage
- Mile markers with recommended zero/start point
- A means to identify jurisdictional change as one moves along the trail
- Trail and roadway intersections
- Emergency locate system
- Trailheads by type, with recommended design elements and recommended spacing
- Fencing/railing
- Unifying color scheme that can be applied to high visibility trail structures (overpasses, bridges)
- Landscape materials – it was noted that the natural vegetation (oaks, palms) establishes the character of the trail. Focus on native plant material theme, preserve what’s there.
Work group ideas + brainstorming from the stakeholder meetings.

Existing retail along the Trail.
3: ASSETS + OPPORTUNITIES INVENTORY

Assets + Opportunities Inventory

Inventory was collected and analyzed to better understand the significant natural and cultural resources and opportunities; location of existing trailheads and related facilities (restrooms, water, emergency telephone, lighting, and parking); and opportunities for connections and destinations including multimodal connections, social destinations, economic hubs, and community centers within the C2C Trail trail corridor.

Maps on the right outline the C2C route. Detailed maps are provided in Appendix A.
4: CONCEPTUAL OVERLAY

**Branding/Logo**

The Coast to Coast Trail brand was developed as part of a previous planning process. Intended to be a unifying brand, the current logo as it exist presents challenges to unifying the twenty separate named trails and does not convey a statewide network. As part of the overlay design, a branding session was held as part of the Coast to Coast workshops to develop ideas for recreating a brand that would represent all 10 counties and 270 miles of trail.

**Unifying Existing Trails**

There are numerous existing and planned trails that are sections of the C2C trail. Some of those include:

- Fred Marquis Pinellas Trail
- Tri-County Trail (conceptual)
- Jay B. Starkey Wilderness Park Trail
- Starkey Boulevard Trail
- Suncoast Trail
- Good Neighbor Trail
- Withlacoochee State Trail
- South Sumter Connector (conceptual)
- Gen. James A. Van Fleet State Trail
- Lake Minneola Scenic Trail
- South Lake Trail
- West Orange Trail
- Clarcona-Ocoee Trail (under development)
- Pine Hills Trail
- Seminole-Wekiva Trail
- Rinehart Trail (under development)
- Cross Seminole Trail
- Spring to Spring Trail
- East Central Regional Rail Trail
- Space Coast Trail (conceptual)
Various conceptual logo alternatives developed as part of the conceptual overlay process.
Unifying Color Scheme

As shown below, the color scheme that corresponds to the C2C logo connects and unifies the aesthetics of the C2C Trail.

C2C Color Palette

Proposed C2C brand / logo.

Proposed C2C brand / logo optional alternatives.
Wayfinding Signage

The following section outlines the desired characteristics of any proposed wayfinding, as discovered through stakeholder input and analysis; proposed signage designs; as well as some standard practices for the design, construction, and installation of wayfinding systems.

Key Characteristics

Based on the stakeholder feedback, the follow key terms, themes, and characteristics emerged as the desired traits of any proposed wayfinding signage systems:

- Simple
- Bold
- Fun
- Fresh/Clean
- Strong
- Modern
- Technical
- Playful
- Classic
- Approachable
- Earthy
- Active
- Friendly
- Handcrafted
- Warm

Goals

The following goals were developed to guide the design of the C2C wayfinding system, to ensure that the proposed design suits the needs of the C2C corridor, and its users.

- Enhance awareness for users that they are along a larger trail network
- Improve wayfinding throughout the Counties
- Improve connections to trail networks from adjacent neighborhoods/communities, improve connections from the trail network to nearby amenities, cultural destinations or recreational destinations.
- Enhance education opportunities about local history, amenities, culture and ecology

Proposed Signage

Multiple schemes were developed to provide a variety of aesthetic options that meet the same functional needs. The signs will need to be easily reproducible, since the implementation and construction will take place over many years.

Monument Signs

Monument signs are the preferred means of demarcating jurisdictional boundaries, which is one of the key design elements to provide aesthetic continuity.

Mile Markers

Mile markers are a key design element for wayfinding and branding along trails. Refer to page 17 for the proposed thermoplastic mile markers, which should be placed on the trail pavement every quarter of a mile. Mile zero is recommended to begin at the western most conclusion of the route, along the Pinellas Trail Corridor, and will end at the eastern most point at the Merrit Island to Atlantic Corridor.

Emergency Locate (National Grid)

The U.S. National Grid (USNG) is a universal location marking system for recreational trails and other U.S. rural areas without formal street addresses. These signs are GPS (Global Positioning System) compatible location markers that serve as an essential part of emergency response efforts.

The USNG is like the Military Grid Reference System (MGRS) - a location referencing and reporting system used by U.S./NATO Armed Forces for ground operations around the world because it is much easier to use accurately and less prone to human errors than latitude and longitude. GPS receivers use signals from a constellation of satellites to determine precise location information. When used together, USNG and GPS are an unbeatable combination.

The USNG does not replace street names and addresses, instead, it complements them. In case of emergencies in remote areas, or a natural disaster that destroys street signs and landmarks, emergency responders have a universal language of geographic reference.

Example signage: U.S. National Grid
Proposed Wayfinding Signage: Options
Proposed Wayfinding Signage: Final Recommendation
SIGNAGE AND USER REGULATION + STANDARDS

SIGNAGE GUIDANCE OVERVIEW
The goal of a signage program is to provide a sense of identity and utility for the existing trail network. Signage types include informational, directional, regulatory, confidence markers, access identification, and interpretive panels. The program adheres to a consistent, selective, and strategic manner so as not to clutter or dominate the visual character of the trails.

GATEWAY MONUMENTS
Municipalities often desire identification and a favorable image of their community. A Gateway Monument are typically any freestanding structure or sign that will communicate the name of a local entity. Gateway signs provide the first welcome to visitors while reinforcing community identity, pride, and sense of place. They should be integrated into the greater wayfinding plan in order to create a unified, welcoming, and legible system.

Gateway monuments should:
• Be a maximum of one Gateway Monument, visible from the traveled way, should be placed at the appropriate approach, to avoid distraction and visual clutter.
• Include the officially adopted C2C logo/seal, however this is not required.
• Be located well beyond the clear recovery zone or otherwise placed to minimize the likelihood of being struck by an errant vehicle (if along a roadway).
• Be kept clean, free of graffiti, and in good repair. Their care should be incorporated into City maintenance schedules prior to installation.
• Be developed and placed to require low or no maintenance to minimize exposure of workers and others to potential risks. Protective graffiti resistant coatings should be applied.
• Be composed of materials that are durable for the projected life span of the project.
• Be appropriate to the proposed setting and community context.
• Be in proper size and scale with its surroundings.

Gateway monuments should not:
• When placed along roadways, they should not create a distraction to the motoring public. For example, the proposed Gateway Monument shall be large enough to interpret at roadway speed, but not be so large that it demands attention from the motorist.
• Include reflective or glaring surface finishes
• Include illumination that impairs or distracts the vision of transportation system users.
• Contain religious, political, special interest, private, or commercial messages of any sort, including, but not limited to, symbols, logos, business names, trade names, jingles, or slogans.
• Display telephone numbers, street addresses, or Internet addresses.
• Make use of or simulate colors or combinations of colors usually reserved for official traffic control devices described in the FHWA Manual on Uniform Traffic Control Devices.
• Protrude or span over travel lanes or roadway.

**Destination/Directional Signs**
The ability to navigate through a city is informed by landmarks, natural features, and other visual cues. Wayfinding signs should indicate:

- Direction of travel
- Location of destinations
- Location of access points

These signs increase users’ comfort and accessibility to the trail network. Wayfinding signage can serve many purposes including:

- Helping to familiarize users with the trail system
- Helping users and emergency responders identify locations, in case of emergency on the trails.
- Helping users identify the best routes to destinations
- Helping overcome a “barrier to entry” for people who do not use the trail system
- Helps users find access points to the trail system

Wayfinding signs also visually cue motorists that they are driving near a trail corridor and should use caution. Signs are typically placed at key locations leading to and along routes, including the intersection of multiple routes.

**Regulatory Signs**
Regulatory signs give a direction that must be obeyed, and apply to intersection control, speed, vehicle movement and parking. The examples below are types of regulatory signage.

**Guidance**

- Smaller scale signs or plaques may be used for trail applications.
- See the MUTCD 9B for a detailed list of regulatory sign application and guidance.

**Etiquette Signage**
Informing trail users of acceptable etiquette is a common issue when multiple user types are anticipated. Yielding the right-of-way is a courtesy and yet a necessary part of a safe trail experience. The message must be clear and easy to understand. The most common trail etiquette systems involve yielding of bicyclists to pedestrians.

**Guidance**

- Trail etiquette information should be posted at access points and periodically along the trail.
**Interpretive Signage**
Interpretive displays provide trail users with information about the surrounding environment or site, wildlife, vegetation, history and the significance of cultural elements. Interpretive displays may also be combined with public art and sculpture opportunities along the trail.

**Guidance**
- Consider the character of the trail and surrounding elements when designing these signs.
- Work with experts specific to the information you are conveying on the signs such as historians, ecologists, or artists.
- Separate interpretive signage panels from the main trail circulation so that users can stop and not impede traffic.
- Consider including interpretive signage at rest stops or areas of congregation.
- Panels must be ADA accessible.
- Consider use of technology for interpretation.

**Informational Kiosks and Message Centers**
Kiosks and message centers provide trails users with information to orient themselves, learn of areas of interest, read the rules and regulations of the trail system, and find the hours of operation.

**Guidance**
- Install kiosks at each major and minor trailhead.
The entire C2C Trail, rules and regulations, and ADAAG accessibility advisories should be included on each kiosk.
- When locating kiosks next to parking facilities, set the units back far enough from traffic and protect the support posts or structure with appropriately sized barriers.
- Provide ADA access using established guidelines for visual height, clearance, and surface type where kiosks are located.
- Evaluate the use of emerging technology options for implementation of greenway information and messages as part of the signage program.
**Design Standards**

In addition to consistency in brand and signage, consistency in design elements can ensure a holistic greenway identity. Design standards include: fencing, landscaping, and roadway intersections.

**Fencing**

Architecture elements such as fencing often varies from the urban to rural setting.

**Fencing and Railings**

Railing and fences are important features on bridges, some boardwalks, or in areas where there may be a hazardous drop-off or incompatible adjacent land uses.

**Guidance**

- At a minimum, railings and fences should consist of a vertical top, bottom, and middle rail. Picket style fencing should be avoided as it presents a safety hazard for bicyclists.
- Railings should be at least 42 inches above the finished grade, and up to 48 inches where more hazardous conditions exist, such as a bridge over a highway.
- Openings between horizontal or vertical members on railings should be small enough that a 6 inch sphere cannot pass through in the lower 27 inches. For the portion of railing higher than 27 inches, openings may be spaced such that an 8 inch sphere cannot pass through.

- Use durable fencing and railing materials, such as vinyl or recycled plastic, for reduced maintenance and sustainability.
- The middle railing functions as a ‘rub rail’ for bicyclists and should be located 33 to 36 inches above the finished grade.
- Local, state, and/or federal regulations and building codes should be consulted to determine when it is appropriate to install a railing and comply with current standards.
**Landscaping**

Proposed landscaping standards include standard tree, shrub, and grass species, as well as guidance on establishing trail edges while preserving visibility.

**Resources**

http://www.floridanativenurseries.org/plant-communities/

http://floridasnature.com/florida_habitats.htm

**C2C Tree Species**
- Sea Grape (zone 9B-11)
- Sabal Palm/ Cabbage Palm (zone 8b+)
- Mahogany (zone 10B-11)
- Bald Cypress (zone 5A-10B)
- Southern Red Maple (zone 4A-9B)
- Live Oak (zone 7B-10B)
- Gumbo Limbo (zone 10B-11)
- Buttonwood (zone 10B-11)

**C2C Shrub Species**
- Beauty Berry (zone 7-11)
- Sweetshrub (zone 5B-10A)
- Tarflower (zone 8A-10)
- Viburnum (zone 8B-10A)
- Gallberry (zone 5-10A)
- Firebush (zone 9-11)
- Marlberry (zone 10-11)

**C2C Grass Species**
- Muhly Grass (zone 7-11)
- Fakahatchee (Cord Grass) (zone 8-11)
- Panicum amarum (zone 4-9)
- Indian Grass (zone 4-9)
- Giant Star Grass (zone 7A-10B)
- Red Fountain Grass (zone 9-10)
- Narrow-Leaf Blue Eyed Grass (zone 4-9)

Harinness zones and typical plant communities. See Appendix B for Detailed Maps of Habitat Communities along the C2C Corridor.
**Trail Edge Definition**
Vegetation, topography, ditches, fencing, railings, or walls may be used to clearly mark trail edges. Such features serve multiple purposes, including:
- Providing visual separation/privacy screens
- Delineating public space from private property adjacent to the trail
- Discouraging the development of unauthorized foot trails
- Separating users from hazardous drop-offs or adjacent non-compatible land use

Wildlife passage and safety for trail users are important factors in determining appropriate trail edge treatments. Although the public often perceives fencing as a means of providing safety by prevention of unwanted access, fencing that blocks visual access completely can have the opposite effect by impairing informal trail surveillance (see CPTED guidelines for more information).

**Guidance**
- If separation is desired purely for privacy reasons, native vegetation buffers or the use of topography are recommended where possible.
- For physical separation aimed at preventing trespassing or guarding against hazardous slopes, consider the use of topography, ditches, semi-transparent fencing or railings, and hostile vegetation.
- Fencing should strike a balance between adjacent residents’ privacy and informal surveillance of the trail. Permeable fencing of four feet tall or less can provide a barrier sufficient to denote property boundaries or to deter most access. Opaque fencing or walls can degrade the experience of trail users, obscure views, and create a “tunnel” effect that creates the effect of users feeling “trapped.”
- Railings on bridges, boardwalks, and at the edges of steep slopes should be provided. For more information, see the *Fencing and Railings* guideline.

**Vegetative Screening**
The presence or absence of vegetation and the type of vegetation present in a greenway corridor affects habitat quality, the greenway’s effectiveness as a wildlife corridor, ecological sustainability, and the aesthetic experience for the trail user. Trails are more effective at providing wildlife habitat and corridors when they have native trees and shrubs present. Trees and shrubs can also shade users from sun and shelter users from rain. When possible, protecting, preserving, and maintaining existing native vegetation when constructing trails through riparian corridors is the first choice for creating separation between the trail and adjacent properties. Vegetative buffers create a natural privacy screen, provide habitat for wildlife, and stabilize erodible soils.

**Guidance**
- In locations where trees and shrubs are lacking and can be planted, native species are the most ecologically sustainable choice. As a group, native species require less maintenance than horticultural plantings and often provide wildlife with a food source.
- To achieve an open line of sight, groundcover and shrub height should be a maximum of 24 inches above ground level.
- Topography and soil moisture regime largely determine where different plant species occur.
- Tree canopies should not obstruct trail illumination.
- Select and place trail vegetation to provide seasonal comfort: shade in the warmer months and sunlight in colder months.
- Select native landscaping material that can deter users from using unauthorized foot trails, access points, or exits (e.g. vegetation with thorns).
- Follow CPTED requirements.

**Maintenance and Establishment**
- Larger plants require more water to survive than seeds and smaller plants. Plant seeds and/or plants either right before or during the rainy season to take advantage of seasonal rainfall (spring and fall).
- Remove all competing invasive vegetation and or mulch regularly to conserve water.
- Trees should be trimmed to provide a minimum of 8 feet of vertical clearance within trail circulation.
- Fertilizing native plants is only necessary in extreme cases when the condition of the soil is still in need of repair.
**Guidance**

- The clear span width of the bridge should include 2 feet of clearance on both ends of the bridge approach for the shoulder.
- Bridge deck grade should be flush with adjacent trail tread elevation to provide a smooth transition. Any gap between bridge deck and trail tread should be covered with steel plate.
- Railing heights on bridges should include a 42 inch minimum guard rail, and 48 inches where hazardous conditions exist.
- A minimum overhead clearance of 10 feet is desirable for emergency vehicle access. Maximum opening between railing posts is 4 inches.
- A trail bridge should support 10 tons for 10 foot wide trails, and 20 tons for wider than 10 feet for emergency vehicle access.
- Bridges along trails that allow equestrian use should be designed for mounted unit loadings.
- When crossing small headwater streams, align the crossing as far upstream as possible in the narrowest section of stream channel to minimize impact.
- Trail drainage features should be constructed to manage stormwater before the trail crosses the watercourse (see Drainage and Erosion guideline).
- All abutment and foundation design should be completed and sealed by a professional structural engineer.
- All trail bridges will require local building permits, stormwater and land disturbance permits, floodplain development permits, and FEMA approval. Length and height of the bridge cords are governed by the width of the floodway and impacts to the base flood elevation of streams.
Special consideration must be given when delineating at-grade trail crossings. The sign types, pavement markings, and treatments will vary based on the roadway type the trail crosses. Proper signage and pavement markings alerts trail users of at-grade crossings must also be utilized. Care must be taken not to place too many signs at crossings lest they begin to lose their visual impact. Local Public Services Departments and FDOT should be consulted prior to design and installation of roadway crossing treatments. FDOT standards shall be met where appropriate.

INTERSECTIONS

OVERVIEW
At-grade roadway crossings can create potential conflicts between trail users and motorists, however, well-designed crossings can mitigate many operational issues and provide a higher degree of safety and comfort for users. In most cases, at-grade trail crossings can be properly designed to provide a reasonable degree of safety and can meet existing traffic and safety standards. Generally speaking, trail facilities for bicyclists require additional considerations due to the higher travel speed of bicyclists versus other trail users.

Example of at-grade roadway intersection, Walnut Creek Trail in Raleigh

INTERSECTIONS WITH OTHER TRAILS
At the intersection of two trails, users should be aware that they are approaching an intersection and of the potential for encountering different user types from a variety of directions. This can be achieved through a combination of regulatory and wayfinding signage and unobstructed sight lines.

Guidance
• Trails should be aligned to intersect at 90 degree angles when possible.
• Sight lines should be clear for all users, as determined by expected user speeds.
• Consider off-setting the trail intersection and creating two three-way intersections rather than one four-way intersection.
• A roundabout may be a viable design option to slow speeds and clarify expected operation.
• Include directional signage at intersections.
• If a roundabout design is used, consider the use of landscaping with low growing (no more than 24 inches high) and minimally spreading native shrubs and groundcover that require little maintenance and provide clear sight lines.
• Other material can be used within roundabouts such as boulders and public art to discourage shortcut paths through the central island as long as clear sight lines under 36 inches are maintained.
**Signalized Crossings**

Signalized crossings provide the most protection for users through the use of a red-signal indication to stop conflicting motor vehicle traffic. Trail crossings within approximately 400 feet of an existing signalized intersection with crosswalks are typically diverted to the signalized intersection to avoid traffic operation problems when located so close to an existing signal.

If possible, route users to signalized crossing. If no crossings are in vicinity, use appropriate crossing treatment. Any signal or “hawk” specific to greenway crossings has to be evaluated to have met FHWA warrants for the appropriate control device.

**Basic: Marked/Unsignalized Crossings**

A marked/unsignalized crossing typically consists of a marked crossing area, with signage and other markings to slow or stop traffic. The approach to designing crossings at mid-block locations depends on an evaluation of vehicular traffic, line of sight, trail traffic, use patterns, vehicle speed, road type, road width, and other safety issues such as proximity to major attractions.

When space is available, using a median refuge island can improve user safety by providing pedestrians and bicyclists space to perform the safe crossing of one side of the street at a time. Locate markings out of wheel tread when possible to minimize wear and maintenance costs.
Detectable warning strips help visually impaired pedestrians identify the edge of the street. If used, a curb ramp should be the full width of the path.

**Intermediate A: Median Refuge Islands**

Median refuge islands are located at the mid-point of a marked crossing and help improve trail user safety by directing crossing in one direction of traffic at a time. Refuge islands minimize user exposure by shortening crossing distance and increasing the number of available gaps for crossing.

**Guidance**

- Appropriate at signalized or unsignalized crosswalks.
- The refuge island must be accessible, preferably with an at-grade passage through the island rather than ramps and landings.
- If a refuge island is landscaped, the landscaping should not compromise the visibility of trail users crossing in the crosswalk. Consider the use of landscaping with low growing, minimally spreading native shrubs and ground cover that require little maintenance and are no higher than 18 inches.
- Refuge islands may collect road debris and may require somewhat frequent maintenance.
- The approach nose should be highly visible.
COMPlex: Active Warning Beacons

Enhanced marked crossings are unsignalized crossings with additional treatments designed to increase motor vehicle yielding compliance on multi-lane or high volume roadways.

These enhancements include pathway user or sensor actuated warning beacons, Rectangular Rapid Flash Beacons (RRFB) shown below, or in-roadway warning lights.

Guidance

- Guidance for Unsignalized Marked Crossings applies.
- Warning beacons shall not be used at crosswalks controlled by YIELD signs, STOP signs, or traffic control signals.
- Warning beacons shall initiate operation based on user actuation and shall cease operation at a predetermined time after the user actuation or, with passive detection, after the user clears the crosswalk.
- Rectangular rapid flash beacons show the most increased compliance of all the warning beacon enhancement options.
- A study of the effectiveness of going from a no-beacon arrangement to a two-beacon RRFB installation increased yielding from 18 percent to 81 percent. A four-beacon arrangement raised compliance to 88%. Additional studies of long term installations show little to no decrease in yielding behavior over time.
Pedestrian At-grade Railroad Crossings

Locations where sidewalks must cross railroad tracks are problematic for pedestrians, particularly for those with mobility or vision impairments. Wheelchair and scooter casters can easily get caught in the flangeway gap, and slippery surfaces, degraded rough materials, or elevated track height can cause tripping hazards for all pedestrians. Angled track crossings also limit sight triangles, impacting the ability to see oncoming trains.

Guidance

- Bells or other audible warning devices may be included in the flashing-light signal assembly to provide additional warning for pedestrians and bicyclists.
- Pedestrians need clear communication and warning to know that they may encounter a train and when a train is coming. Provide clear definition of where the safest place to cross is.
- The crossing should be as close as practical to perpendicular with tracks. Ensure clear lines of sign and good visibility so that pedestrians can see approaching trains.
- The crossing must be level and flush with the top of the rail at the outer edge and between the rails.
- Flangeway gaps should not exceed 2.5 in (3.0 in for tracks that carry freight.)

Crossing design and implementation is a collaboration between the railroad company and local agency. The railroad company is responsible for the crossbucks, flashing lights and gate mechanisms, and the local agency is responsible for advance warning markings and signs. Warning devices should be recommended for each specific situation by a qualified engineer based on various factors including train frequency and speed, path and trail usage and sight distances.
AMENITIES

When designing functional, attractive, and inviting trails, the small details matter. Elements such as a lighting fixtures, public art, benches/seating, drinking fountains, bike repair stations, and other amenities help create a unique identity for each trail. Design of these facilities vary greatly, and while consistent use of materials and design helps to reinforce the Trail identity, these elements primarily serve to enrich the trail user experience. They are not considered key design elements used to provide design consistency.

TRAILHEADS

Trailheads provide essential access to the trail system and can include many amenities in one location: automobile parking, bicycle parking, restrooms, drinking fountains, trash and recycle receptacles, dog waste stations, bicycle repair stations, and trail wayfinding and informational signage.

There is no prescription for the frequency of trailheads. Conduct user counts, vehicle counts, and surveys across the trail network at peak hours of use to determine parking demand. Consider locating trailheads with consideration to other available public facilities or through partnerships with owners of existing parking areas. When locating trailheads in or adjacent to neighborhoods streets, work with property owners to install no parking signs if desired, and to minimize impacts during construction and daily use.

MAJOR TRAILHEADS

Major trailheads should be established near large residential developments, commercial developments, and transportation nodes, making them highly accessible to the surrounding community and to the trail system. A major trailhead could include all of the items mentioned previously plus additional facilities, such as shelters, picnic areas, and extensive parking.

Guidance

- Major trailheads can provide parking for 10-40 vehicles, depending on availability of land and anticipated level of use of the trail.
- Consider 300 to 350 square feet for each parking space.
- Major trailheads will typically have a large paved parking lot that accommodate passenger vehicles and large vehicles year round. Consider locating larger lots in existing disturbed areas to minimize environmental impacts.
- Major trailheads should provide emergency and maintenance vehicle access and turnaround.
- Place ADA accessible parking spaces near the site’s accessible route, at a rate of one accessible space per 25 standard spaces. Parking spaces and access aisles should not exceed 2 percent slope in any direction.
- Parking lot surfaces should never exceed 5 percent slope in any direction.
- Where major trailheads are located near neighborhoods, provide user access from local streets crossing the trail. Where trails cross neighborhood streets, “No Parking” signs may be desirable to minimize impact on the neighborhood.
- Reduce the visual intrusion of large parking areas by using vegetative screening.
- Consider one-way vehicle circulation within parking areas to minimize road width.
- Refer to current setbacks and other requirements within the UDO. (A Unified Development Ordinance (UDO) is a local policy instrument that combines traditional zoning and subdivision regulations, along with other desired city regulations, such as design guidelines, sign regulations, and floodplain and stormwater management, into one document.)
Minor Trailheads are trail access points with very minimal infrastructure. They can occur at parks and residential developments. Some minor trailheads could include a small parking lot for five to six passenger vehicles. In addition to vehicle parking, minor trailheads may include drinking fountains, benches, trash and recycling receptacles, an information kiosk, and signage about the trail network.

Guidance
- Minor trailheads can provide parking for up to ten vehicles. The parking area may be asphalt or gravel, as long as ADA requirements are met.
- Minor trailheads should provide emergency and maintenance vehicle access.
- Minor trailheads should be ADA accessible and provide at least one accessible space near the accessible route.
- Provide adjacent wayfinding signage that directs trail users to minor trailheads.

Site Amenities

Trash and Recycling Receptacles
Trash and recycle receptacles provide for proper maintenance and appearance of the trail system. For recycling receptacles, signage should be provided indicating what recyclables are accepted. Consider including educational signage about the importance of recycling and the environmental benefits.

Guidance
- Locate receptacles at each trailhead and each seating area (one per every one picnic table, one per every two benches).
- In areas with adequate sunlight, consider compacting receptacles for trash and recyclables that use smart technology (such as Big Belly*).
- Placement of other receptacles will depend upon the location of concessions, facilities and areas of group activities.
- Receptacles need to be accessible to maintenance personnel and trail users.
- Receptacles should be selected using the following criteria:
  - Expected trash/recycling amount
  - Maintenance and collection program requirements

Restrooms
Public restrooms are one of the most critical building amenities because they need to be responsive to a wide range of human needs and abilities. Careful consideration should be given to a number of factors before locating restrooms, including available land, size of trailhead, existing restroom facilities within the system, utility availability, and user need.

Prior to undertaking any restroom building design, consultation with a structural and civil engineer, state building codes, health and safety codes, ADAAG and Public Rights-of-Way Accessibility Guidelines (PROWAG) standards, and local development codes (UDO) is required. The space required for each restroom building depends on the number of toilets to be provided.

Restrooms require considerable maintenance and service. Access to these resources should be a strong consideration when planning for restroom buildings.

Guidance
- Local, state, and federal codes take precedence for all restroom facilities.
- Prioritize location of restrooms at trailheads within existing parks and review gaps for placement at other trailheads or locations within the system.
• Restroom structures should be located adjacent to vehicular access points for security, maintenance, and access to water and sewer (unless they are self-composting).
• Restrooms should also make use of natural light and ventilation to the extent possible.
• Place bicycle parking close to restroom structures so that bicyclists do not impede trail access. Inadequate bicycle parking encourages informal propping of bicycles at or against restroom buildings.
• Provide restroom facilities that are durable and resistant to vandalism.
• Always provide restroom facilities outside of floodprone areas.
• Where other restroom facilities are available within the park and trail system, use wayfinding signage along trails to direct users appropriately.
• Composting toilets should be considered in remote areas or where utility connections are unavailable.

**Drinking Fountains**
Drinking fountains provide opportunities for users to replenish fluids and potentially extend their trip. Access to City water service must be available. Review Regulatory Flood Protection Elevation prior to locating.

**Guidance**
• Locate drinking fountains at least 5 feet from trail edge.
• Locate drinking fountains near restrooms, at trailheads, parks and other public gathering places along the trail.
• Standard and accessible fountains should be installed to accommodate all trail users.
• Consider grouping amenities together (seating, bicycle parking, drinking fountains, and bicycle repair stations) at a rest stop or comfort station. Drinking fountains should be placed on a well-drained surface (2 percent sloped concrete slab).
• Consider the use of durable and vandalism-resistant materials such as steel, or stone.
• Drinking fountains must be ADAAG compliant.

**Bicycle Repair Stations**
Bicycle repair stations are small kiosks designed to offer a complete set of tools necessary for routine bicycle maintenance. Popular locations for placement include major or minor trailheads and rest stops along trails.

**Guidance**
• Bicycle repair station tools are secured by high security cables, but will still be an attractive target for theft. Proper placement of kiosks in areas of high activity is one key strategy to reduce potential vandalism.
• Consider grouping repair stations together with other amenities (seating, bicycle parking, and drinking fountains) at a rest stop.

**Bicycle Parking**
Bicycle parking should be as convenient as the majority of automobile parking and should be easily accessible from the associated trail. Entrances and exits should be designed to minimize conflict with trail user traffic patterns.

Bicycle parking should be located on a hardscape surface and not be located directly in front of other trail amenities. Ideal rack location should be parallel along the trail approach. Parking should be located no more than 25 feet from ingress/egress and at least 5 feet from the edge of trail to avoid traffic conflict. Location should be highly visible.

Consideration should be given to avoid emergency ingress/egress, service access, and vehicular conflict areas.

**Guidance**
• Locate bicycle racks at restrooms, select trailheads, points of interest, and rest stops.
• The bicycle rack should support the bicycle in at least two places, preventing it from falling over.
• The bicycle rack should allow locking of the frame and one or both wheels with a U-lock.
• When installing racks on concrete surfaces, use 3/8 inch anchors to plate mount. Shim as necessary to ensure vertical placement.
• When installing racks on pavers or other non-stable surfaces, embed into base. Core holes no less than 3 inches in diameter and 10 inches deep.
• Ensure the rack is securely anchored to ground.
Consider bicycle racks that resist cutting, rusting, and bending or deformation.

**Seating**
Seating along trails provides a place for users to rest, congregate, contemplate, or enjoy art, nature, and interpretive elements. Benches can be designed to create identity along the trail or be strictly utilitarian. Picnic tables provide places for trail users to congregate for meals or to relax.

**Guidance**
- Locate benches and other site furniture a minimum of 3 feet from the edge of the trail.
- Locate benches along the trail where appropriate, or where there is a demand by users. Providing seating at one mile gaps is the goal. Seating within 1/2 mile of trailheads is recommended.
- Provide benches and picnic tables in areas that provide interesting views, are close to an interpretive element, and offer shade or shelter from seasonal winds.
- Drainage should slope away from the bench and the trail.
- Locate benches a minimum of 4 feet from restrooms and drinking fountains and a minimum of 2 feet from trash and recycling receptacles, lighting poles, and sign posts.
- Wheelchair access should be possible at some picnic tables and alongside benches. Provide access with a hardened surface such as concrete or asphalt.
- Seating should be securely anchored to the ground. Consider durable materials or native materials such as boulders that are vandalism-resistant.

**Public Art and Sculpture**
Public art engages the community through artists' work and creates a memorable experience for trail users. Art and sculpture can create an identity for the trail and strengthen the emotional connection between the C2C Trail and its users. Depending on the scale and form, it can become an “event” in itself and serve as a public attraction.

Public art can be aesthetic and/or functional, and double as sitting or congregational areas. Memorable installations can act as landmarks and serve as valuable wayfinding tools. Public art can be a device for telling a compelling and memorable story about the trail and area history.

**Guidance**
- Artists can be commissioned to provide art at one or multiple locations the Trail.
- When appropriate, artists could be engaged as part of the corridor planning and development process.
• Artists should be encouraged to produce artwork in a variety of materials for sites along the corridor.
• When appropriate, consider developing greenway furnishings and amenities with artistic intent. Key locations such as turns or landscape changes could be areas to highlight through the inclusion of public art. Consider how to provide continuity between elements while maintaining the unique styles of multiple artists.
• Provide art displays on trails with anticipated high use and user exposure.
• Consider community based art and temporary installations.

**Lighting**

Lighting for trails should be analyzed on a case-by-case basis with full consideration of the maintenance commitment lighting requires. In general, lighting is not appropriate for trails in remote areas, trails with low use, or where there is little to no development.

Lighting can improve visibility along the trail and intersection crossings at night for commuters. If a trail is determined to be unlit and closes at sun down, extended hours for commuters should be considered, particularly during winter months when trips to and from work are often made before sunrise and after sunset. Lighting may also be necessary for day-time use in greenway tunnels and underpasses.

**Guidance**

• Recommended locations for lighting include the following:
  • Trailheads and parking areas
  • Restroom facilities
  • Major trailhead intersections to use as a navigation aid
  • Entrances and exits of bridges and underpasses and in tunnels
  • Street crossings

• Low-cost light emitting diodes (LED) offer a wide range of light levels and can reduce long term utility costs.
• Design lighting levels appropriate to each situation.
• Trail lighting should be at pedestrian scale.

Lighting spacing along trails depends on the type and intensity of lights. 30-50 ft spacing is common for pedestrian scale lighting.
5: APPENDIX A

ASSETS + OPPORTUNITIES INVENTORY

Inventory was collected and analyzed to better understand the significant natural and cultural resources and opportunities; location of existing trailheads and related facilities (restrooms, water, emergency telephone, lighting, and parking); and opportunities for connections and destinations including multimodal connections, social destinations, economic hubs, and community centers within the C2C Trail trail corridor.
Map key for detailed maps on the following pages.
APPENDIX B

HABITAT COMMUNITIES MAPPING

Identifying habitat characteristics throughout the C2C corridor helps to pick the right plant for the right place. The following pages outline general habitat characteristics.
Trail Habitat Communities

Legend

- C2C Trail Corridor
- Habitat Communities

**TYPE**
- Bare Soil/Clearcut
- Bay Swamp
- Citrus
- Coastal Strand
- Exotic Plants
- Freshwater Marsh and Wet Prairie
- Hardwood Hammocks and Forest
- Mangrove Swamp
- Mixed Wetland Forest
- Open Water
- Salt Marsh
- Sand/Beach
- Sandhill
- Shrub and Brushland
- Xeric Oak Scrub
- crops/agriculture
- mixed hardwood swamp
- mixed pasture
- mixed prairie
- pine
- urban

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