Bay Circuit Trail and Greenway

TRAIL INVENTORY AND ASSESSMENT REPORT

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Larry Garland, Cartographer
Appalachian Mountain Club
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Executive Summary

The Bay Circuit Trail and Greenway (BCT) was initially proposed by The Trustees of Reservations in the late 1920s as a parkway forming an “outer emerald necklace” linking existing reservations around the Boston metropolitan area. Although a state parkway never came to be, a resurgence of interest by volunteers in the 1980’s led to the founding of the Bay Circuit Alliance (BCA) in 1990 and the eventual designation of a 230+ mile recreational trail spanning 37 towns from Newburyport to Duxbury.

In the fall of 2012, the Appalachian Mountain Club and The Trustees of Reservations, two of Massachusetts’ largest and oldest conservation organizations, began collaboratively leading the Bay Circuit Alliance to fulfill the vision of the Bay Circuit Trail and Greenway. Early in 2013, AMC’s Cartographer Larry Garland was tasked with collecting baseline data to serve the planning needs for corridor protection, trail management, stewardship, and positive user experience.

Field work was conducted between April 1 and June 5, 2013, as Mr. Garland inventoried the trail by on-the-ground field inspection. He walked virtually all of the off-road segments and most of the connecting on-road segments. Longer on-road segments and rail trails were spot-checked by car for access, signage, and utility. The assessment consisted of making point observations about particular features or elements, noting the existence (location) of features as well as the condition (quality) of most features and whether any deficiencies, problems, or issues were apparent. Over 1200 observations were recorded with more than 670 photos.

The BCT generally is in good condition, despite some localized areas that are not quite up to standard. Despite some “growing pains” related to stewardship and oversight, the Bay Circuit Trail is alive and well, enjoyed by users of different stripes, including: hikers, joggers, dog walkers, children in strollers, mountain bikers, roller bladers, snowshoers, cross country skiers, school and civic groups, bird watchers, and nature enthusiasts. More than a trail, it is a multi-faceted cultural and recreational experience. There is both precedent and potential for incentivizing the host towns to protect more openspace and expand trail opportunities.

One outstanding benefit of the BCT is that it focuses attention on local neighborhoods as potential links in a regional greenbelt. It provides context for establishing a recreational corridor that infuses neighborhoods and connects communities. The accessibility of this outdoor resource provides opportunities for healthy lifestyle activities for more than 4 million people in eastern Massachusetts. All these users collectively represent a large stakeholder base and an equally large stewardship and advocacy community.

The Bay Circuit Trail and Greenway has evolved to its current state by virtue of the passion and dedication of many committed volunteers who offer their time stewarding the trail, participating with local trails clubs or associations, sitting on local conservation commissions, or serving on land trust boards. These individuals are the champions of the BCT, and future efforts will necessarily build on this spirit of grassroots advocacy and support.
Recommendations

This section attempts to encapsulate a synopsis of recommendations that should be considered as part of an overall management strategy for the future growth and health of the Bay Circuit Trail and Greenway. Certainly, there are additional influences, factors, and suggestions that are discussed in the full text of this report, and this list does not fully account for all the elements that are part of this assessment. Some of these items may already be practiced or under consideration, in which case these entries can hopefully reinforce or help to focus such efforts within the context of an overall management plan.

Sec III-A Access Points

Each potential access point should be evaluated and documented for: safety, legality, property rights, nuisance factors, and history of complaints or vandalism. Only those access points that satisfy these criteria should be identified and described in the trail descriptions and reference materials.

Public access from Commuter Rail stations, Park-and-Ride lots, and MBTA and regional bus routes should be documented in the trail descriptions, and displayed on all trail maps.

Sec III-B Trailheads

Criteria should be established that provides a clear definition as to which access points will be inventoried, managed, and described as bona-fide trailheads. All designated trailheads should be inviting, welcoming, and assuring for prospective users.

All designated trailheads should have written agreements with land owners/managers stating maintenance responsibilities (upkeep, snowplowing), allowance for signage, use restrictions, and remediation should misuse occur.

Sec III-C Parking

Parking should be subject to explicit landowner/agency permission, with signage that clearly indicates intended use and any restrictions that may apply. Conversely, places where public parking is not allowed should be posted accordingly in order to avoid land owner conflicts and liability.

Sec III-D Points of Interest

Places of natural, cultural, or historic interest briefly noted in trail descriptions can be more fully described in supplemental narratives apart from navigational information such that users could selectively choose or reference content according to their particular interests.

Sec III-E Recreation Facilities

An inventory of schools, parks, and visitor centers in proximity to the BCT could be leveraged to organize and promote civic group outings and educational programs as part of community outreach.

If overnighting is to be allowed, permission needs to be secured from the landowner or managing agency, and proper etiquette including Leave No Trace® principles should be prominently posted. Where camping is not allowed, posting would help to alleviate doubts and conflicts.

Sec III-F Route Markings
Blazing needs to be adequate to assure the casual or inexperienced users who may lack “trail sense”.

Trail blazing and signage needs to conform to adopted policy, and should be implemented with consistency through proper training and oversight.

BCT signage should be present at all designated access points, trailheads, and parking areas.

Kiosks should provide information that assures users of their BCT location, describes what the Bay Circuit is, and provides contact information for additional follow-up.

Sec III-G Traffic Hazards

All traffic hazards should be inventoried, risk-rated, and mitigated.

Sec III-H Treadway

Treadway stabilization and hardening are needed in many areas where deficiencies exist: a) saturated soils, low areas, and old woods roads cause water to pool due to lack of drainage; or b) steep slopes with loose soils are prone to erosion, creating gullies and unstable footing.

Sec III-I Alignment and Multiple Uses

Each trail segment should be documented with respect to its designated and managed use as well as other allowed uses in order to build and maintain appropriate trail structures and encourage (enforce) legitimate use.

Trail maintenance standards and protocols should be documented for mixed-use trails.

Where user conflicts could occur, appropriate “yield” signage should be evident, or segregated alignments should be created.

Sec III-J Encroachments

Ensure that dumping and abandoned vehicles do not contain hazardous materials or polluting chemicals.

In places where unauthorized activities occur, signage consistent with management direction should be posted, supplemented by monitoring and educational outreach.

Sec III-K Stuff Happens

Establish protocols whereby regular patrols by volunteers or reports from trail users can register information about trail damage, and appropriate resources can be directed to mitigate or rectify the situation.

Sec IV-A Identity and Branding

Promote the BCT brand through marketing and outreach in order to build community awareness, advocate for resources and support, and secure funding for improvements. Elevate public perception as to what the Bay Circuit is and what it has to offer.
Simplify the BCT logo, and create an extractable element that can easily be used for trail signage and blazing.

Sec IV-B  Corridor Protection and Connectivity

Shift the focus from trail miles dedicated to miles protected.

Where possible, buffer the trail corridor to protect and enrich the user experience.

Identify all civic groups, agencies, organized user associations, and land trusts within 10 miles of the BCT to enlist their support and sponsorship in protecting the trail and greenway.

Sec IV-C  Trail Management and Stewardship

For each host town, identify the agency responsible for BCT oversight, along with an appropriate contact liaison and technical expertise available or needed.

For each host town, offer experiential practicums as a way to cultivate a working familiarity with the obligations and responsibilities of effective oversight.

Enlist local businesses and civic organizations as resource pools of community pride and service to become invested in the economic development of the BCT by sponsoring or adopting user amenities.

Reach out to local and regional activity clubs to solicit their collaboration when considering trail designs or co-alignments that may be necessary.

Update the BCT Maintenance Manual (2004); consider reference to AMC’s Trail Building and Maintenance manual, and multiple use characteristics of the trail.

Institutionalize the creation, assimilation, and management of geographic information through GIS.

Sec IV-D  Ensuring a Positive User Experience

Facilitate trip planning through the improved integration of source/reference materials (state parks, town forests, and land trusts).

The creation and deployment of interactive digital maps would support scalability, add detail when zoomed in, and allow the user to query features and apply filters in order to plan and execute a trip that is appropriate for their level of interest and ability.

Editorial consistency is needed in the writing of trail descriptions as they currently are highly variable in both content and style.

The packaging of non-linear, loop, or extended itineraries (“suggested hikes”) would save the user the time and effort of researching and creating their own itinerary from scratch, and more easily entice someone to pick a route and go. A further enhancement would be to qualify itineraries by location, time, difficulty, appropriate/managed uses, and subjects of interest.

The availability of a “trail concierge” or local shuttle service that could readily recommend pick-up and drop-off points would alleviate a major obstacle for those that are not familiar with a local area.
I. INTRODUCTION

A. Purpose

The purpose of the Bay Circuit Trail (BCT) assessment is to collect baseline trail data to serve the planning needs for corridor protection and trail management, as well as to augment trail guides and informational resources for users when planning recreational itineraries.

A secondary outcome, based on meetings and discussions with volunteers and stakeholders, is to offer observations and recommendations regarding the overall structure, stewardship, and vision of the Bay Circuit.

B. Background

The initial idea for the Bay Circuit Trail and Greenway first arose in the late 1920’s as part of a study on the “Needs and Uses of Open Spaces” in Massachusetts. Benton MacKaye, originator of the Appalachian Trail, was an early advocate for open spaces that “should lie in lines or belts rather than in scatter fragments.” In 1937, The Trustees of Public Reservations of Massachusetts proposed “....a state parkway through a number of reservations in the circuit of Massachusetts Bay”. At that time, The Trustees owned 18 reservations covering 11,423 acres within a thirty mile radius of Boston.

It wasn’t until 1956 that Massachusetts Governor Christian Herter signed legislation officially establishing the Bay Circuit. Although a state parkway never came to be, a resurgence of interest by volunteers in the 1980’s led to the founding of the Bay Circuit Alliance (BCA) in 1990 led by volunteer Chairman Al French of Andover, an avid outdoorsman and conservationist who organized the Alliance. Through the tireless volunteer efforts and advocacy of French along with hundreds of volunteers, the Bay Circuit became a viable reality as a 230+ mile recreational trail spanning 37 towns from Newburyport to Duxbury.

Appendix A shows a locus map of the Bay Circuit, and Appendix B lists the trail mileage for each of the host towns.

In the fall of 2012, the Appalachian Mountain Club and The Trustees of Reservations, two of Massachusetts’ largest and oldest conservation organizations, began collaboratively leading the Bay Circuit Alliance to fulfill the vision of the Bay Circuit Trail and Greenway.

Today, the Bay Circuit Alliance is a partnership of organizations and individuals working to protect and enhance the trail and greenway. BCA’s membership consists of six regional, four statewide, and more than 30 local member organizations, plus many interested individuals. BCA helps local communities establish their portion of the Bay Circuit Trail through planning and technical assistance, route identification, land protection, and trail management and construction. BCA also maintains contact with state and federal government representatives and agencies to promote the Bay Circuit concept and to consult on corridor-wide, trail-related issues. For more information about the BCT, the Alliance and its mission, visit the website www.baycircuit.org/wordpress.

There are now a number of regional and local trail systems, recreational use areas, and thousands of acres of conservation lands that are connected by the Bay Circuit Trail. As such, the Bay Circuit serves as the backbone for a recreational corridor and greenway, providing close-to-home recreational opportunities for
more than 4 million people. See Appendix C for resident population (2010) within the Bay Circuit corridor.

As open space and recreational resources are secured to permanently establish the Trail, this composite corridor is creating a greenbelt or “outer Emerald Necklace” on the suburban landscape of Eastern Massachusetts which focuses public perception on the value of protected open space within local communities.

As of the summer of 2013, there were 231 miles of dedicated trail open to public access. Of this total, 128 miles (55.6%) of the trail were off road1, with 112 miles (46%) on land that is protected from development by public ownership, easement, or deed restriction. See Appendix D for tabulations of trail mileage by class and protection status.

In its present configuration, there are only 16 miles in 9 gaps – sections of non-designated travel – that stand in the way of a contiguous corridor, although these gaps can be circumvented by using “temporary” routes on public roadways. Two alternative branches of the Bay Circuit (in Ipswich and Andover-Tewksbury-Billerica) would add approximately twenty one miles to the total mileage.

Most sections of the BCT are popular with hikers, joggers, dog walkers, bird watchers, mountain bikers, cross-country skiers, snowshoers, equestrians, and others, offering a range of mixed use outdoor recreation, serving a broad spectrum of constituent groups who collectively have a vested interest as stewards and advocates. There are some sections that have user restrictions, such as prohibiting the use of mountain bikes, and other sections that are managed primarily as non-pedestrian trails, e.g., equestrian use.

As the trail traverses the suburban-metropolitan Boston area, a traveler is exposed to a multi-faceted historical, cultural, and ecological cornucopia of life in New England. These sites offer a rich interpretive which complements the natural and forested areas, highlighting neighborhoods and communities.

C. Objectives of Field Assessment

Early in 2013, AMC’s Cartographer Larry Garland was tasked with collecting baseline data to serve the planning needs for corridor protection, trail management, stewardship, and positive user experience. Larry has been professionally engaged with mapping, GIS, and GPS data collection for nearly 20 years. He has hiked literally thousands of miles for AMC map production, personal recreation, and regional land trusts and trail clubs. Trail building and maintenance are familiar to him as a trail adopter and frequent volunteer for trail and land stewardship. And in a broader perspective, he has traveled (and hiked) in more than 20 countries, appreciating the design, construction, and community-integration of recreational trails.

The principal objectives of this inventory and assessment were to: a) identify trail segments that are in need of further investment to either protect the trail or increase their utility, and b) stimulate and encourage greater use of the BCT by assisting in the development of user-friendly trail information, e.g., paper and digital maps, BCT website, Google Maps, etc.

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1 On-road is defined as a road segment in the MassGIS state-maintained street transportation dataset (EOTROADS 2012) with a CLASS code of 1-5. All other travelways, including class 6 roads, service drives, private driveways, and trails are considered off-road for the purposes of this assessment. On-road trail segments can inherit attributes of their corresponding MassGIS road segment, including class, shoulder, speed limit, average daily traffic, etc. which is useful for descriptive purposes and street-map reference (e.g., Google Maps), as well as hazard analysis.
It was not the intention of this assessment to map the trail in detail as there was already very good digital data of the trail location and all road intersections. (The location of the trail was checked however, for anomalies and recent relocations.) Rather, the focus of the assessment was to collect and document observations of conditions that would likely be useful for future stewardship and planning.

II. ASSESSMENT METHODOLOGY AND PROTOCOL

Larry Garland, AMC’s Cartographer who works from AMC’s Pinkham Notch office, inventoried the whole trail by on-the-ground field inspection. He walked virtually all of the off-road segments and most of the connecting on-road segments. Longer on-road segments and rail trails were spot-checked by car for access, signage, and utility.

When staging the field assessment, an effort was made to reach out to Bay Circuit stakeholders and volunteers for logistical support. This was very helpful not only with car-spotting (which saved significant time), but also with regards to conversations about the Trail, and gleaning perspective from those most familiar with its utility and relevance to a local community (either geographical or user). The volunteers who assisted with the field work are listed in Appendix E.

Field work was conducted between April 1 and June 5, 2013. Observations were mostly limited to “on the trail” features and conditions, with limited digression to nearby off-trail locations, assuming that front-country or on-road assessment can more easily be conducted at any time using a car. The trail was assessed from north to south as consistently as possible with a “thru-hike” perspective for continuity.

The assessment consisted of making point observations about particular features or elements at a particular place. A synthesis of the number and severity of deficiencies along a trail segment would infer a rating or priority for stewardship needs along that segment. Hence, trail segments were not evaluated as entities per se in the field, but the “health” of a trail could be deduced from reviewing the observation data in aggregate.

Locational data was collected with a Trimble Pathfinder GPS unit consisting of a Pro 6T receiver and Nomad datalogger. GPS data was post-processed for differential correction, resulting in data that was accurate to within 2 meters +/- . The datalogger had an on-board camera that was used for taking geo-tagged images of certain inventoried features. The camera is somewhat rudimentary, thus the quality of the images may be limited to documentation rather than publication. Over 670 photos were collected for 1200 observation points.

Observations consisted of recording point features that could be classified as:

- trailheads;
- parking;
- points of interest (summits, viewpoints, historic sites);
- recreation facilities (day use areas, athletic fields);
- route markings (blazing, signage);
- traffic hazards (road crossings and road travel);
- treadway issues (bridges, bog bridging, boardwalks, wet areas, steep slopes, vegetation, blowdowns);
- alignment and multiple uses;
- encroachments (dumping, illegal camping).
In some cases, the mere existence (location) of a feature was recorded. In many cases, assessment consisted of noting the condition (quality) of a feature and whether any deficiencies, problems, or issues were apparent.

See Appendix F “Features as Observation Points” for definitions and criteria used in the recording of observations. This narrative report makes reference to specific field observations and draws generalizations from them. These data are available in raw form to those with GIS software, understanding however that observations were based on initial impressions and incomplete information; erroneous and incomplete data-entry did occur, which will hopefully be remedied in subsequent analysis and data management.

Observations are intended to identify deficiencies or issues, not solutions. Firstly, identifying solutions requires additional information or expertise that is not always available in the field at the time of observation. A proper solution may not be obvious until soil analysis, trail use statistics, materials cost, logistics, permissions, or funding is determined. Secondly, it may be that a solution becomes viable only when bundled or combined with other needs in the immediate area, including mobilization of labor or bulk purchase/delivery of materials. Solutions can more appropriately be evaluated by looking at the context and aggregation of observations in a particular area, and comparing alternative design/cost scenarios.

Observations required subjective interpretation without background or reference information such as historical use or landowners’ intentions. Field data collection is not the sole source of information to be incorporated in an assessment. It is understood that follow-up and additional data will need to be assimilated from other sources to augment these observations for further analysis.

An additional factor in designing the data collection protocol and subsequent data assimilation is to be cognizant of sharing data with others who may have lower or lesser means of GIS capability. Thus, a “simple” or lowest common denominator approach is more useful in situations where data is to be shared or distributed to and by stakeholders, including the myriad of town representatives, regional coordinators, and team captains.

The assessment methodology attempted to accommodate the multiple uses that the Bay Circuit supports. Travel along recreational routes could be on primitive trails as well as developed walkways and roads. Furthermore, conditions should be evaluated with respect to intended or managed use, e.g., a problem for a hiker may not be a problem for a mountain biker. It is possible that a true condition assessment at a particular point may depend on information regarding managed use which may not be evident at the time of observation.

Consideration as to data criteria and structure for this suburban environment has been “unconventional” when compared to typical backcountry terrain. The AMC Trails Department as well as the National Park Service and the Appalachian Trail Conservancy were consulted for appropriate metrics, but considerable variation was required to account for such conditions as on-road travel, highway crossings, commercial districts, and traffic hazards. It is hoped that the data construct used can serve the on-going stewardship needs that may evolve, and also become an effective management tool for future urban/suburban trail networks.
III. FINDINGS

A. Access Points

In order for users to enjoy the trail, they must be able to access it – know where the access points are, be confident that they are “in the right place”, and assured that they are welcome. People who are regular users of the trail or live in the local neighborhood are likely comfortable with these issues. But first-time or inexperienced users may be intimidated and require explicit assurance.

It was noted during the field assessment that trail access points and parking that were identified in the written trail descriptions could be hard to find in the field due to lack of signage or any BCT identification. Users should not have to guess whether access is legitimate (legal and permissible). The published trail descriptions must be clear about where the public is directed and invited to get on or off the trail without upsetting local residents, businesses, or communities.

Each potential access point should be evaluated and documented for: safety, legality, property rights, nuisance factors, and history of complaints or vandalism. Only those access points that satisfy these criteria should be identified and described in the trail descriptions and reference materials.

It is not clear if the Alliance has a working definition that qualifies an access point as a trailhead. It is likely that not all access points would be (or should be) construed as trailheads. If this is the case, how might these distinctions be depicted on maps or qualified in trail descriptions?

There are 9 commuter rail stations within 1 mile of the BCT, and 7 Park-and-Ride lots within 1 mile of the BCT (see Appendix G). MBTA buses serve the BCT towns of Bedford and Walpole. These need to be documented in the trail descriptions, and displayed on all trail maps. Likewise, there are local & regional bus routes (e.g., Lowell Transit) that provide service to access points. In the spirit of low-carbon-footprint and close-to-home recreation, publication of suggested day-hike itineraries facilitated by public transportation is highly recommended.

There are also boat landings from rivers that provide access to the Bay Circuit:
- Sudbury River, Rt 117, Lincoln
- Sudbury River, Mill Pond, Ashland
- Charles River, Rocky Narrows Reservation, Sherborn
- Charles River, Charles River State Reservation Rt 27, Medfield-Sherborn line
- Charles River, Shattuck Reservation, Medfield
- Neponset River, South St, Walpole
- Town River, Reynolds Landing, West Bridgewater

B. Trailheads

Trailheads are the “public face” of the trail, typically supported by infrastructure such as designated parking, signed for public access, and a kiosk with BCT trail information. They should be inviting, welcoming, and assuring for prospective users.

Trailheads are those access points that are legitimate, sanctioned by the community, and for which explicit permissions have been given for public access. From a management perspective, the landowner or agency/manager should be known, with appropriate contact information. If appropriate, written agreements should be on file stating any use restrictions, maintenance (e.g., snowplowing), or remediation
should misuse occur. Just as we strive to secure permission to use hiking trails by signed agreements, so should we document owners/managers of trailheads and secure agreements for public access and proper management.

As discussed above under Access Points, it is believed that not all access points would qualify as trailheads. From both a management and liability standpoint, criteria should be established that provides a clear definition as to which access points will be inventoried, managed, and described as bona-fide trailheads. It is suggested that criteria include (but not necessarily limited to) designated off-road parking and BCT signage/info (not just logo/blaze).

During the field assessment over 50 potential trailheads were observed, yet a formal designation cannot be attributed without further research and verification of both qualifying criteria and landowner agreements. Incomplete knowledge of owner, manager, permissions, or restrictions made it difficult to assess the legitimacy and proper use of potential trailheads. Follow-on inventory, research, documentation, and administration are needed for responsible management of these amenities.

C. Parking

Parking can be designated, allowed, or simply ad hoc. If trail access points are not signed for intended use, then users are left to their own discretion as to whether they can leave a car at a particular location. Often, users may resort to a “can I get away with it” approach which could jeopardize landowner relations, emergency operations, or future use by others.

Anyplace where parking is represented to the public in BCT reference materials, this privilege (like trailhead use) should be subject to explicit landowner/agency permission. Again, there could be liability associated with where we are directing users to park their vehicles. Signage should clearly indicate intended use and any restrictions that may apply.

Even though the trail descriptions indicate where parking is available, it was noted that some of these locations were restricted. Restrictions could include: employees only, residents only, by permit only, no overnight, or time limits. Some parking areas are equipped with gates which implies that they may close seasonally or at other times. Restrictions need to be documented and reviewed within the context of management plans.

Approximately a dozen locations currently identified in the trail descriptions were deemed “inadequate” due mostly to the lack of signage; rough, rugged, or poorly drained surfaces; or risk-exposed to hazardous traffic.

Seven Park-and-Ride lots are within 1 mile of the BCT, and six of these have bus service. These are ideal locations for groups to meet and for arranging shuttles and carpools.

As a result of this field assessment and synthesis with other data sources, nearly 150 locations have been inventoried as possibly legitimate for parking. This inventory includes preliminary information about landowner, land manager, type, surface, spaces, seasonal or permit restrictions, and distance from the trail. Further research and documentation will be required in order to distribute responsible user information.

D. Points of Interest
Points of interest could include locations of scenic, historic, or cultural value.

There are several summits or elevated overlooks with distant views. These include:

- Old Town Hill Res, off Newman Rd, Newbury
- Holt Hill, Ward Reservation (TTOR), Andover
- Merrimack River Trail, Andover; bluff under powerlines
- Tipling Rock, Sudbury
- Nobscot Hill, Framingham (no view at summit communications towers, partial view east from eastern outlook, open view from western outlook); summit is the highest point on the BCT.
- King Phillips overlook, Rocky Narrows, Sherborn
- Noon Hill, Medfield
- Bluff Mtn, Moose Hill Reservation, Sharon

There are also numerous places that have aesthetic value such as ponds, riverbanks, wetlands, and mature forests, not to mention the oceanscapes of the northern and southern termini of the BCT. A review of natural heritage data can help to identify the many natural areas of ecological importance, including natural history, unusual ecological communities, ecological services, and wildlife habitat.

This region is also extremely rich with cultural and historic sites. Many are noted in the trail descriptions or signed in the field with interpretive information. One excellent source for historic and cultural sites is the Massachusetts Cultural Resource Information System (MACRIS) (http://mhc-macris.net/) maintained by the Massachusetts Historical Commission (MHC). This resource includes references to the Inventory of Historic Assets of the Commonwealth, National Register of Historic Places nomination forms, local historic district study reports, local landmark reports, and other materials.

All these places (viewpoints, natural heritage sites, cultural and historic sites) can serve as major attractions or focal points for BCT itineraries, with supplemental narratives to provide interpretive content and enhance the experience. Suggested loops, spurs, or tours that incorporate the BCT could be offered separately from the standard linear trail descriptions, and not be limited to BCT main-lining.

### E. Recreation Facilities

The many state parks, town forests, town parks and athletic fields all underscore that the BCT is more than a trail; it’s a greenway, a corridor linking communities and openspace. These facilities often serve as trailheads or group meeting sites for organized activities and school groups. Public parking is generally available. It should also be noted that developed recreation facilities and athletic fields are the most likely locations to find toilets along the BCT, along with town centers and commercial businesses (Appendix H).

Nearly 30 schools, athletic fields, or visitor centers were observed on the BCT (Appendix I). There are many others that are in close proximity, or may exist on a park/forest out of view of the “mainline” assessment. A proper inventory would assist with organized group outings and school programs.

A few campsites were observed and believed to be legitimate (permissible).

- Harold Parker State Forest, North Andover; DCR campground
- Rocky Narrows Reservation, Charles River landing, Sherborn
- Duffy Point, Town Forest, Walpole
- Hanson Town Forest, Wampatuck Pond, Rt 58, Hanson
There were other areas where fire rings and cleared space indicated that camping had occurred but it was not apparent that camping was a permitted use. If overnighting is to be represented in the BCT literature, permission needs to be secured from the landowner or managing agency, and signage would help to alleviate doubts and conflicts. Furthermore, legitimate campsites should provide posted information on proper etiquette including Leave No Trace® principles.

F. Route Markings

Perhaps the single-most critical factor to a positive user experience (and the success of the Bay Circuit) is the adequacy of the route markings, which includes blazing, signage, and kiosks. Anecdotally (no empirical data), poor or inadequate trail markings are the chief complaint registered by disgruntled hikers. Despite this reputation, blazing was found to be generally good, but inconsistent or sparse in some areas. Unfortunately, those sparse areas are the places where someone can easily get disoriented (or lost) and those are the experiences we hear about. It is strongly recommended that all users carry and use printed trail descriptions, and not rely solely on blazing for navigation.

There are several philosophies about blazing a trail; some suggest a minimum distance between blazes, a minimum number of blazes that can be viewed from standing in one location, or a “low impact” ethic that a minimum number of blazes be used. It is noted that the BCT Maintenance Manual, Version 1W, December 12, 2004 states “In the woods the markings should be located 500 feet apart.”

In the case of the Bay Circuit, many inexperienced users unfamiliar with trail hiking are likely to be on the trail. Blazing needs to be adequate to assure the casual or inexperienced users who may lack “trail sense”. A linear measurement for blazing may not be the most useful criteria when considering that ground conditions, such as a lightly-trod treadway that is not worn in, or open woods with no undergrowth, will also influence the necessary spacing or frequency of blazes.

Although the BCA does have documented “best practices” for trail blazing, field observations indicate that these standards are not always followed, perhaps due to lack of training or oversight.

One notable deficiency during the trail assessment was the lack of a confirming blaze shortly after a trail junction or double-blazed turn (also recognizing that there was an overuse of double-blazes on curves or turns where there was no risk of going off route due to corridor definition). Additionally, there were “triple” blazes on the Brimstone CR in Framingham (just west of Nobscot Hill) that do not conform to standard practices.

Occasionally there are open fields or meadows where there might be blazing placed on raised 4x4 posts, yet traversing or exiting the field into the woods was not clearly marked (West Parish Meadow in Andover, the north end of Wheaton Farm in Easton, and Moon Hill in Bradley Palmer State Park are examples).

Areas that have dense trail networks with many junctions and side trails are an additional concern. These networks often are marked with other routes which can be confusing.

Signage serves multiple purposes: BCT identity, welcoming assurance for novices, and information such as trail names, land owner, and mileages. It is suggested that there be BCT-logo signage at all access points, trailheads, and designated parking areas. A stand-alone BCT logo should be used at major trail junctions, and periodically along the route for assurance.
Kiosks were observed at approximately 35 trailheads plus a dozen or so other locations. A majority of these kiosks were for public or easement-managed lands but did not display information about the Bay Circuit. Some of them may have had a BCT blaze or logo affixed, but it is very important that kiosks provide information that assures users of their BCT location (within the context of a local map, as well as the overall Bay Circuit), describes what the Bay Circuit is, and provides contact information for additional research and follow-up.

Ideally, there should be a kiosk with BCT-specific information at every designated trailhead. I have seen an example of another trail network where a user could scan a QR code with their mobile device in the field (at a kiosk, say) and link to a web resource with a map.

G. Traffic Hazards

The absolute #1 priority for trail management should be safety; safety for hikers and trail users as well as motorists. This is especially true for kids, families, school programs, and group outings, and needs to consider inclement weather such as heavy rain (limited visibility, driver distraction, and standing puddles in roadways) and winter snowbanks.

Traffic hazards can include: high speed or high volume traffic, active railroad crossings, road crossings without crosswalks or traffic signals, constrictions (narrow underpass or guardrail), congestion (parking and turning traffic), obscure sightlines (hills and curves), and travel along roads without sidewalks or adequate shoulders. As part of this assessment, nearly 50 locations were judged to be notable road hazards (see Appendix J).

As part of an overall management plan, all traffic hazards should be inventoried, risk-rated, and mitigated. Hazards should be a primary criteria for prioritizing the realignment of BCT segments off-road and to signalized highway crossings. To aid with risk-ratings, each road segment should be attributed with ADT (Average Daily Traffic) and accident data (where available), in addition to the specific hazards mentioned above. Mitigation should include signage for both trail users and motorists.

H. Treadway

Treadway structures are intended to preserve a safe travelway by preventing soil erosion, as well as protecting sensitive vegetation and ground resources. Structures can take the form of: bridges, bog bridging, boardwalks, step stones, water bars, drainage dips or channels, cribbing, steps, rungs, or ladders.

This assessment inventoried over 125 bridges, bog bridges, and boardwalks. Some of these were impressive structures requiring skill, craftsmanship, and substantive time and cost to construct. Approximately 12% of inventoried structures were deemed damaged, deteriorated, or inadequate, and there were a few locations where bridges were clearly needed but absent (Mill River in Georgetown-Rowley State Forest, east of Old Washington Street in Pembroke, Jones River in Kingston, and west entrance to Sampson Forest in Kingston are examples).

There were many instances where saturated soils, low areas, and old woods roads cause water to pool due to lack of drainage. Examples include the section just south of the Rowley/Ipswich townline, Georgetown-Rowley State Forest between Boxford Road and I-95, Boxford State Forest just east of the North Andover townline, the Fish Brook Conservation Area in Andover, the Rockland Street Trail in Borderland State Park, and the Burrage Pond WMA in Hanson. Such conditions generally cause hikers to
detour, creating more damage and degradation. Remedies such as step stones, drainage dips, and channeling were notably lacking, and indicated a need to focus on these elements.

Steep slopes with loose soils are prone to erosion, allowing water to flow down the treadway creating gullies with unstable footing. Locations where this is evident include: either side of Mill Brook in the Georgetown-Rowley State Forest, the southern section of the deer Jump reservation in Andover (north or powerlines), Nobscot Reservation in Sudbury, Sherborn Town Forest south of Farm Road, the section along Mine Brook in Medfield and Walpole, and Duxbury Conservation land between Franklin Street and King Phillip Path. Water bars are urgently needed in these situations to divert flowing water off the treadway, yet very few water bars were observed along the entire BCT.

There were several sections of trail that are shared with motorized wheeled vehicles (ATVs) in areas that were particularly wet and prone to holding pooled water in depressions and swales. Pembroke south of Plain Street, Burrage Pond WMA just east of the East Bridgewater/Hanson townline, and the Satucket River Frontage in East Bridgewater show signs of aggravated ATV use. If ATV use is legitimate (if it is not, that is a separate management issue), then alternative alignments need to be established.

The excellent work that has gone in to building bridges and boardwalks needs to be emulated for the just-as-important tasks of treadway stabilization and hardening. In areas where extensive treadway remediation is required and will likely require a high level (and cost) of maintenance in the future, a realignment to more suitable ground should be considered.

As we know, vegetation never stops growing and falling down. Semi-annual patrols by adopters, volunteers, or civic groups to clip back vegetation and report more serious problems to their section leader can make the trail more friendly and enjoyable.

I. **Alignment and Multiple Uses**

The BCT is promoted as a multi-use trail, providing close-to-home recreation including: walking, biking, horseback riding, snowshoeing, and cross-country skiing. Activities include jogging, dog walking, pushing strollers, roller blading, wildlife viewing, and nature appreciation. There were sections where equestrians or motorized use with ATVs was evident.

Positive examples of compatible multiple uses are the 12 miles of rail trails, and the wonderful bicycle trail along Rt 126 in Lincoln.

But not all activities are allowed on every trail, nor are all trails built and maintained to accommodate all potential uses. For example, some conservation lands do not allow mountain biking, and trails shared with equestrians could create user conflicts.

As part of a permanent trail inventory, each trail segment should be documented with respect to its designated and managed use as well as other allowed uses. This should be researched with the respective land owners such that permissions are in place for appropriate trail structures and signage (and enforcement). Furthermore, allowed uses can be important criteria for potential users who may be seeking a particular trail experience, and will not want to be surprised by encountering bikes, horses, or ATVs.
In areas where multiple uses are allowed, a possible mitigation for managing user conflicts is to create separate alignments whereby different uses are segregated (using different trails within the same network).

And multiple use isn’t just about managing user conflicts, as treadways and structures built to support one type of use may be inappropriate for other uses. Bridges with step approaches or step stones in a wet area may be fine for hikers, but not useable or sufficient for bikers or strollers. Bikers love to charge up and down steep slopes, yet hikers will likely find it more enjoyable to circle around or slab a slope. This was observed along Mine Brook in Walpole, between High Street and Robbins Road, where the BCT is marked on a down-and-up mountain bike trail while there are options for a level or more graded hiking trail in the immediate vicinity. This raises a question about the designation of the BCT route in a local area where local land stewards may not be aware of or attuned to the objectives of the Bay Circuit (such as maintainability, or enjoyment by kids/families).

Whereas the BCT is advertised for multiple uses (which may require alternative or modified treadway designs), the BCT Maintenance Manual, Version 1W, December 12, 2004 (posted on the Bay circuit website) seems to assume all users are hikers; there are no expressed considerations of trail standards or maintenance for other trail uses.

There is much interest and emphasis on realigning the Bay Circuit off of public roads. It won’t be possible to avoid all roads as there are limited crossings of major highways and rivers on road bridges. But not all roads need to be avoided. There were some road walks that were quite pleasant and beautiful, displaying New England charm (e.g., Stevens Street in Sherborn, or the historic Great Road (Rt 4) in Bedford Center).

Similarly, it may not be desirable to circumvent all town centers or villages, as these locations provide easy access (parking), cultural interest, as well as food and toilets.

One of the benefits of locating the BCT within existing trail networks is that it provides users with multiple options for varying their itinerary, especially when a loop hike or side excursion is preferred over a linear point-to-point trip. Applying the concept that the BCT is a “backbone” that links to and can leverage other trail opportunities, side trips and circuitous routes could be considered optional. Every mile of designated Bay Circuit Trail bears a cost and responsibility of maintaining those miles.

**J. Encroachments**

Encroachments may be intentional, accidental, or unknowing.
A half-dozen instances of dumping (vehicle chasses, tires, appliances, and bulk trash) were noted. Vehicle parts could well have been on site pre-dating the designation of the BCT. Caution should be taken where hazardous materials or polluting chemicals may be present. Organized stewardship events (conducted annually or semi-annually as part of a “civic pride” initiative) can help to alleviate the bulk trash that will inevitably occur.

A few locations displayed fire rings and evidence of camping or partying. As noted previously under Recreation Facilities, it may not be apparent whether camping is allowed, but littering is never acceptable. In places where habitual gathering occurs, signage consistent with management direction should be posted.

Land use violations such as building or harvesting on protected lands can only be evaluated with full knowledge of land ownership (parcel boundaries) and land management (easements or other restrictions). There were only a couple of instances where land use may have been a concern to trail navigation, yet these were deemed minor or temporary. Any land use not restricted by easement or overstepping boundaries is at the discretion of the landowner.

All instances of suspected encroachments should be reported to section leaders who should know the proper protocol for directing such concerns to town agencies, land managers, or other officials.

**K. Stuff Happens**

Trail maintenance and upkeep are on-going, but even meticulous care cannot prevent damage due to storms or misuse. Blowdowns, flooding, or encroachments need to be dealt with on an ad-hoc and as needed basis. Protocols should exist whereby regular patrols by volunteers or reports from trail users can register information about trail damage, and appropriate resources can be directed to mitigate or rectify the situation.

The occasional blowdown or broken bog bridge can be repaired during scheduled work parties using skilled labor; more serious damage may require a temporary closing or re-route of the trail which needs to be posted to a website and in the field in a timely manner.

**L. Assessment Target Areas**

As was noted in the Assessment Methodology, looking at the collective observations and weighing the relative frequency and severity of deficiencies, it should be possible to deduce the general “health” of the trail in a local area. This was attempted for the Bay Circuit by identifying “target areas” where a marshalling of resources would likely provide the greatest improvements to the user experience; not as a rigorous analytic, but rather as a somewhat subjective filter to provide a starting point for stewards and volunteers. Certainly, most every section of the trail could use work and be improved. These preliminary target areas are intended simply as the “low hanging fruit” that could benefit from immediate attention.

For the 31 areas noted below, it must be emphasized that a reference to a State Forest, Town Forest, or tract/area does not imply that the whole forest or tract is deficient. These references are based on the point-observation data that should be considered when evaluating and organizing field work.
## Preliminary Target Areas

<table>
<thead>
<tr>
<th>LOCATION</th>
<th>TOWN</th>
<th>DESCRIP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prospect Hill</td>
<td>Rowley</td>
<td>steep slope, clogged waterbars</td>
</tr>
<tr>
<td>Georgetown-Rowley SF</td>
<td>Rowley</td>
<td>Mill River crossing; many wet areas; steep slopes</td>
</tr>
<tr>
<td>Georgetown-Rowley SF</td>
<td>Boxford</td>
<td>wet areas, flooding</td>
</tr>
<tr>
<td>JC Phillips Sanctuary</td>
<td>Boxford</td>
<td>steep slopes, wet areas; erosion control</td>
</tr>
<tr>
<td>Boxford SF</td>
<td>Boxford-North Andover</td>
<td>wet areas forcing detours</td>
</tr>
<tr>
<td>Harold Parker SF</td>
<td>North Andover</td>
<td>wet areas</td>
</tr>
<tr>
<td>Hammond and Mary French Reservations</td>
<td>Andover</td>
<td>deteriorating earthen dam and boardwalk</td>
</tr>
<tr>
<td>Fish Brook area</td>
<td>Andover</td>
<td>wet areas</td>
</tr>
<tr>
<td>Deer Jump Reservation</td>
<td>Andover</td>
<td>steep slopes, erosion control</td>
</tr>
<tr>
<td>Nashoba Brook Cons Area</td>
<td>Acton</td>
<td>wet areas</td>
</tr>
<tr>
<td>Hapgood Wright Forest</td>
<td>Concord</td>
<td>wet areas</td>
</tr>
<tr>
<td>Nobscot Scout Reservation</td>
<td>Sudbury</td>
<td>steep slopes, erosion control</td>
</tr>
<tr>
<td>Gross Tract, SVT</td>
<td>Framingham</td>
<td>wet areas</td>
</tr>
<tr>
<td>Sudbury Reservoir</td>
<td>Marlborough</td>
<td>overgrown</td>
</tr>
<tr>
<td>Sherborn TF</td>
<td>Sherborn</td>
<td>overgrown</td>
</tr>
<tr>
<td>Sherborn TF, Rocky Narrows</td>
<td>Sherborn</td>
<td>erosion control</td>
</tr>
<tr>
<td>Noon Hill Reservation</td>
<td>Medfield</td>
<td>disfunctional water bars</td>
</tr>
<tr>
<td>Mine Brook area</td>
<td>Walpole</td>
<td>steep slopes in loose soils; mtn bike use</td>
</tr>
<tr>
<td>Moose Hill Reservation</td>
<td>Sharon</td>
<td>overgrown</td>
</tr>
<tr>
<td>Borderland SP</td>
<td>Easton</td>
<td>Rockland Street Trail very wet</td>
</tr>
<tr>
<td>Old Pond New Pond</td>
<td>Easton</td>
<td>overgrown, wet areas</td>
</tr>
<tr>
<td>Fox Mtn Cons Area</td>
<td>Easton</td>
<td>wet area</td>
</tr>
<tr>
<td>Satucket River Cons Area</td>
<td>East Bridgewater</td>
<td>overgrown; ATV use</td>
</tr>
<tr>
<td>East Bridgewater Water Dept</td>
<td>East Bridgewater</td>
<td>collapsed boardwalk; veg obstruction (easy bypass)</td>
</tr>
<tr>
<td>Burrage Pond WMA</td>
<td>Hanson</td>
<td>very wet, ATV use</td>
</tr>
<tr>
<td>Burrage Pond WMA</td>
<td>Hanson</td>
<td>Indian Crossway flooded; poorly marked area</td>
</tr>
<tr>
<td>Hanson TF</td>
<td>Hanson</td>
<td>overgrown, hard to navigate, camping?</td>
</tr>
<tr>
<td>Pembroke TF</td>
<td>Pembroke</td>
<td>School St access overgrown; gully-erosion control</td>
</tr>
<tr>
<td>Pembroke off Old Washington St</td>
<td>Pembroke</td>
<td>very overgrown &amp; wet; unsafe bridge, 2nd bridge needed</td>
</tr>
<tr>
<td>Pembroke south of Plain St</td>
<td>Pembroke</td>
<td>overgrown, ATV use, wet areas, getting lost</td>
</tr>
<tr>
<td>Water Dept &amp; Sampson Forest</td>
<td>Kingston</td>
<td>South St access obscure; needs bridge; overgrown</td>
</tr>
</tbody>
</table>
IV. CHALLENGES AND OPPORTUNITIES

A. Identity and Branding

The Bay Circuit was initially conceived in the 1930s as a parkway connecting a series of open spaces (then-existing TTOR Reservations, targeted Outing Areas, Connecting Lands, Canoe Lanes, and Outdoor Stations or Observation Sites). Efforts were renewed in the late 1980s to create a linear recreational trail or a “greenbelt” of connected trail networks, inviting the possibilities of appropriate amenities such as overnight shelters or host B&Bs.

During the assessment, it was noted that there was lack of awareness as to the existence, location, or intended use of the Bay Circuit. There are many who either have not heard of the BCT or understand what it is.

As the BCT continues to evolve, the manner in which it is promoted depends in large part on its identity. How it is branded and perceived has direct consequences for acceptance, stewardship, and public support.

One important item that encapsulates the identity of the BCT is the logo. The current logo, although made up of fairly simple elements, is unnecessarily complex and difficult to emulate in such applications as trail signage. The textured ocean, jagged coastline, corner flourishes, and explicit spelling of the name in varying fonts could be reduced or eliminated to create a more simple, clean and quick-to-recognize design. It is also possible to embed a simplified (and perhaps stylized) acronym “BCT” within the logo that could be used separately as a trail moniker or stand-alone icon, such as identifying the BCT on a trail map.

Community awareness will be necessary for official support from government agencies, as well as by citizens who might advocate for the trail, vote on land/resource protection ordinances, appropriate resources, or host the trail as landowners. Allocating resources for its development and stewardship requires a clear vision of what the trail has to offer, as well as what it may not.

Day hiking requires a greater number of access points, parking, and local options; thru-hiking requires overnight accommodations, either backcountry and/or front-country; multiple use requires management and stewardship that caters to different activities and trail design/structures; those seeking solace, quietude, or wildlife may desire different amenities than educational programs, dog walks, or staged races and promotional events.

The Bay Circuit is currently referred to as a multiple use trail, yet there are some sections that are closed to or do not accommodate certain types of use. Public perception could be jeopardized if “misunderstandings” occur.

While the BCT is principally a linear trail, it connects a number of local-area trail networks and recreational venues. The BCT has the potential to focus attention on and exploit related amenities/opportunities, and local trails might gain stature (recognition, use, priority) as being part of or related to the Bay Circuit. Branding can add value, and leverage public perception in promoting the trail.

Can the BCT be effectively promoted by using a singular message to a “unified” audience, or will it be advantageous to tailor messaging to different user groups?
B. Corridor Protection and Connectivity

Undoubtedly, the biggest challenges to the viability of the Bay Circuit are: securing a permanent corridor, and securing public access. Connectivity through an increasingly fragmented landscape, off-road alignments, and designated access points with safe and adequate parking are all critical infrastructure needs that must be addressed in order to insure the viability of the BCT.

Currently, approximately 95% of the trail is considered “dedicated”, e.g., public access is allowed. This classification however, does not insure continued public access in that access may not be guaranteed in the future.

As of the summer of 2013, approximately 48.7% of the dedicated miles were located on protected land\(^2\) Seventy percent of dedicated off-road miles were located on protected land. Over 47 miles (29.5%) of off-road dedicated trail are unprotected (or protection status unknown). Over 70 miles of dedicated trail are on public roads. See Appendix D for a recap of trail mileage by type.

It is suggested that the Alliance shift its focus from miles dedicated to miles protected. Each parcel that the trail uses ought to be attributed by the protection status and use restrictions (allowed/managed use) as related to the BCT mission (public land w/ public access allowed, public land with public access restricted, easement, deed restriction, landowner agreement).

TTOR has undertaken to identify all parcels within ¼ mile of the current trail corridor for the purpose of obtaining permanent protection for trail use. Attempting to protect this corridor will be a massive and long-term project, so establishing criteria and prioritizing will be very important in order to leverage the greatest benefits from limited resources.

There are currently 9 gaps – sections of non-designated travel – in the designation of the BCT amounting to 16 miles. There are proposals to designate two alternative branches of the Bay Circuit (Ipswich to Crane Beach, and Andover-Tewksbury-Billerica) that would add approximately 21 miles to the trail.

The user experience, furthermore, is more than being allowed to travel a dedicated or protected centerline. It is the experience of being in a special place. Buffered corridors will have greater value to the objectives and relevance of the BCA and its mission.

In an increasingly fragmented landscape, protection of the trail corridor will require partnerships and coordination between State agencies, land trusts, towns, and private landowners. Success will depend greatly on a shared vision, and the advocacy of citizens and trail users within their local communities. A useful strategy might be to identify all civic groups, agencies, organized user associations, and land trusts within 10 miles of the BCT to enlist their support and sponsorship in protecting the trail and greenway.

C. Trail Management and Stewardship

The Bay Circuit Trail travels through 37 cities and towns that host the Trail. Each municipality is nominally responsible for the Trail within their jurisdiction. Some towns are in the forefront with corridor protection and stewardship, while others are yet to be fully engaged due either to a less-than-ardent

\(^{2}\) Protection is defined as parcels in the MassGIS Openspace database attributed as protected. This includes publically owned land and private land with a conservation easement, conservation restriction, or agricultural restriction. Analysis and figures related to protection status provided by TTOR.
commitment to the vision, or insufficient resources to follow through with intentions. Highlighting the economic benefits of recreational trails and the positive influence on property values can be effective tools for enlisting community support.

Of those towns with management oversight, there are various levels of expertise or experience with recreational trails. Identifying deficiencies that require maintenance, setting priorities for corridor protection, and allocating resources to steward the trail will likely depend on the skills and leadership of individuals within each town. Outreach, training, and experiential practicums could be very helpful in cultivating a working familiarity with the obligations and responsibilities of effective oversight.

Some towns might assign stewardship responsibility for the trail to a Conservation Commission, while others may delegate to a Recreation Committee, Trails Committee, or ad hoc group. For each host town, the responsible agency should be identified along with an appropriate contact liaison.

Stewardship is coordinated and facilitated through Section Leaders who are themselves volunteers attempting to marshal and organize other volunteers to work on specific tasks. This arrangement appears to be loosely organized and mostly ad hoc, contingent on the dedication of the individuals involved. It is not known whether the duties and responsibilities of region leaders and town captains are explicitly stated, or assumed by informal understanding.

It was noted during the field assessment that some sections of the trail did not seem to take optimal alignments when considering treadway conditions, aesthetic appreciation, or distance traveled. As alternate alignments were often available, a question arises as to whether the mission and goals of the BCT are considered with respect to trail alignments.

Success for the BCT will likely depend on how enjoyable the trail is to users. Amenities must be planned, designated, and cared for. This is a great opportunity for local businesses and civic organizations to vest themselves in the economic development of the BCT by sponsoring or adopting user amenities.

As the BCT caters to different user groups and activities, it is appropriate to recognize that different users have different needs. It will be important to solicit their input and get their buy-in when considering multiple use designs or co-alignments that may be necessary.

A typical stewardship model is for lightly-trained volunteers to perform on-going maintenance (brushing, blazing, drainage), and more skilled teams to do the “heavy lifting”. Investments in volunteer recruitment, engagement, and training can leverage great dividends. Civic groups such as AMC Chapters, outing clubs, Scouts, church groups, Kiwanis, etc. are resource pools of community pride and service.

Although the Bay Circuit Trails Committee has published stewardship guidelines, there appear to be inconsistent practices and lapses in adherence or oversight. Consistency in stewardship is very important to a satisfying user experience. The BCT Maintenance Manual (2004) needs to be updated; consider reference to AMC’s Trail Building and Maintenance manual.

As the Bay Circuit evolves, both in its physical designation (trail segment attributes, user amenities) and its organizational support (broader volunteer base, community engagement), the need to gather, assimilate, and share information about the trail will become a necessity. The ability to organize and manage this information can best be achieved using a geographic information system (GIS) that is capable of handling robust attributing that can be queried, related or associated (e.g., trailheads and parking), and used for map rendering. The institutionalization of information management will be a critical tool in the effective pursuit of the Bay Circuit’s mission and objectives.
D. Ensuring a Positive Experience

Easy to find and identify Trailheads and Parking
Nothing will frustrate a user more than not being able to find or get onto the trail. Well marked trailheads and parking areas need to assure the user that they are in the right place and welcome.

Navigability: Signage & blazing
Getting lost or disoriented can be a disheartening if not dangerous predicament. Signs and blazes can become obscured, vandalized, or lost. Regular patrols and adherence to stewardship protocols can alleviate this threat.

Traffic hazards mitigated
As it will not be possible to avoid all roads and traffic, mitigation must be applied to reduce the potential hazards. All traffic hazards should be inventoried and risk rated. Ways to improve safety include: signalized road crossings, signed crosswalks, pedestrian bridges or tunnels, travelways along roads protected by barriers (travelways outside of guardrails or fencing), sidewalks with curbs or separated from roadway, etc.

Planning info
The Alliance currently produces a series of 15 maps with trail descriptions. These are available on their website for users to download in PDF format. The maps, rendered at a scale of 1:63360, are adequate for general planning, but the scale is insufficient for trail navigation. Furthermore, the maps do not visually differentiate between roaded and off-road segments, making both planning and navigation problematic.

As the maps and trail descriptions are typically updated once a year, the webpage for Trail Notices is an important resource for updates and corrections, and needs to be managed diligently and proactively.

There are many very useful references to third party materials (state parks, town and land trust websites, etc.) but the effort required by the user to acquire, assimilate, and cross-reference multiple sources can be daunting if not discouraging. Integration of source/reference materials will make planning easier and more comprehensive, understanding that this will be more feasible with an interactive platform (web interface with hyperlinks).

Ideally, maps should be scalable for ease of synthesizing detail with context. Digital maps that add detail when zoomed in are more useful than simply enlarging static content. Furthermore, the ability to interactively query the features in the map and apply filters for desired information allow users the ability to plan and execute a trip that is appropriate for their level of interest and ability. Obviously, this functionality is available only with a digital delivery platform (e.g., Google Earth or custom device app), and both application development and data enhancement would be required to address various platform standards & protocols.

Trail descriptions
The existing written trail descriptions are highly variable in both content and style; editorial consistency is needed.

Occasionally there are brief mentions of historical or cultural items, but the majority of the text is dedicated to trail navigation. Greater interest and enjoyment of the trail could be stimulated by optional or supplemental interpretive information of landscapes, ecology, and wildlife as well as cultural heritage. More robust and descriptive interpretive information in addition to and separate from turn-by-turn directives would provide flexibility for the user to both navigate and appreciate the route. This could be
achieved by distributing supplemental interpretive documents, or creating dynamic extensible text available on mobile devices such as e-books, utilizing hyperlinks, pop-ups, and drill-downs.

**Itineraries**
Currently, the BCT is described as a linear trail to be navigated in one direction: north to south. There are many other ways to experience the BCT, including south to north as well as part of a loop or excursion that makes use of other connecting trails. The fact that the BCT links many local-area trail networks is touted as a highlight, yet planning an itinerary that makes use of non-BCT trails requires cross-referencing multiple sources of information in varying formats and levels of detail.

Enjoyment of the BCT would be greatly enhanced by packaging non-linear, loop, or extended itineraries, such as side excursions to points of interest, or historically themed tours, or narratives about natural heritage or ecosystems. Educational packages could be offered to schools or after-school programs. Creating a library of “suggested hikes” would save the user the time and effort of researching and creating their own itinerary from scratch, and more easily entice someone to pick a route and go.

Furthermore, quick access to supplemental trail information would be useful if plans or conditions unexpectedly change. This is another justification for dynamic or online access to integrated source reference information.

During the assessment, it was readily evident that a major obstacle to using and enjoying a positive BCT experience is the research and planning that must necessarily go into creating a daily itinerary: Locating trailheads and parking, guesstimating trail mileage for various options, and spotting cars for drop-off or pick-up consume a great deal of time and persistence. The availability of a “trail concierge” or local shuttle service that can readily recommend pick-up and drop-off points, and provide a shuttle van, would alleviate a major obstacle for those that are not all that familiar with the lay of the land.
V. SUMMARY

The Bay Circuit Trail is an established recreational route from Newburyport to Duxbury. Nearly 230 miles of the trail are considered “dedicated” (open for public use), with a few “gaps” where public access has not been secured yet “bypass” travel is allowed on public streets.

The BCT generally is in good condition, despite some localized areas that are not quite up to standard. There is both precedent and potential for incentivizing towns to protect more openspace and expand trail opportunities. More than a trail, it is a multi-faceted cultural and recreational experience.

The Bay Circuit Trail and Greenway has evolved to its current state by virtue of the passion and dedication of many committed volunteers. This passion and dedication continue to be exemplified in the many individuals who offer their time stewarding the trail, participating with local trails clubs or associations, sitting on local conservation commissions, or serving on land trust boards. These individuals are the champions of the BCT, and future efforts will necessarily build on this spirit of grassroots advocacy and support.

The Trail is enjoyed by many users of different stripes, including: hikers, joggers, dog walkers, children in strollers, mountain bikers, roller bladers, snowshoers, cross country skiers, school and civic groups, bird watchers, and nature enthusiasts. The accessibility of this outdoor resource provides opportunities for healthy lifestyle activities. All these users collectively represent a large stakeholder base and an equally large stewardship and advocacy community.

Many schools are located next to or very close to the BCT, affording opportunities for after-school programs and nature-based educational curricula. There were a number of Eagle Scout projects along the trail which speaks to civic engagement, as municipal support or corporate sponsorships are often involved. Numerous programs and activities could be imagined that would bring together and engage local citizens from a multitude of civic or activity groups.

Recreational trails are often associated with a backcountry experience “in the woods”. Yet, just as the Lowell Historic National Park was an innovation of an urban park, the BCT is pushing the envelope with urban and suburban trails. There are different ways of thinking about mobility, recreation, communities, and visual landscapes (as well as safety and traffic hazards) within a “front country” environment. Let the innovation continue.

One outstanding benefit of the BCT is that it focuses attention on local neighborhoods as potential links in a regional greenbelt. It provides context for establishing a recreational corridor that infuses neighborhoods and connects communities. The BCA should continue to be a strong voice for the positive economic and social benefits that derive from this valuable resource.

The organizational commitments of The Trustees of Reservations and the Appalachian Mountain Club will bring awareness, credibility, and institutional know-how to the forefront in fulfillment of the BCA’s mission. TTOR’s focus on corridor protection and AMC’s staffing of a Bay Circuit Trail Volunteer Programs Supervisor promise to elevate the needs, concerns, and level of community engagement in the protection and enhancement of this regional trail and greenway.

Despite some “growing pains” related to stewardship and oversight, the Bay Circuit Trail is alive and well, enjoyed by thousands. Suffice it to say that if we were starting out today at square one, it would be virtually impossible to build what we now have in place. There is a viable foundation on which to build a future.
“This cannot be achieved without achieving something else – namely the desire on the part of our citizens, who have imagination, to cherish and conserve our natural heritages.”

The Bay Circuit: A practical plan for the extension of the Metropolitan Park System and the development of a state parkway through a number of Reservations in the circuit of Massachusetts Bay, The Trustees of Public Reservations of Massachusetts, 1937.
VI. APPENDICES

List of Appendices and Attachments:

A  Location of the Bay Circuit Trail
B  Dedicated Trail Mileage by Class within Host Municipalities
C  Resident 2010 Population Proximate to the Bay Circuit
D  Trail Mileage by Class and Protection Status
E  Volunteers Who Supported the Assessment
F  Features as Observation Points
G  Public Transportation: Commuter Rail Stations and Park and Ride Lots
H  Town Centers and Commercial Districts
I  Schools, Athletic Fields, Visitor Centers
J  Traffic Hazards
Appendix A

Location of the Bay Circuit Trail
## Appendix B

### Dedicated Trail Mileage by Class within Host Municipalities (summer 2013)

<table>
<thead>
<tr>
<th>Towns</th>
<th>MassDOT Road Class</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>off road</td>
</tr>
<tr>
<td>Acton</td>
<td>3.84</td>
</tr>
<tr>
<td>Andover</td>
<td>12.95</td>
</tr>
<tr>
<td>Ashland</td>
<td>4.47</td>
</tr>
<tr>
<td>Bedford</td>
<td>0.94</td>
</tr>
<tr>
<td>Billerica</td>
<td>0.43</td>
</tr>
<tr>
<td>Boxford</td>
<td>5.99</td>
</tr>
<tr>
<td>Bridgewater</td>
<td></td>
</tr>
<tr>
<td>Chelmsford</td>
<td></td>
</tr>
<tr>
<td>Concord</td>
<td>2.85</td>
</tr>
<tr>
<td>Duxbury</td>
<td>5.37</td>
</tr>
<tr>
<td>East Bridgewater</td>
<td>1.14</td>
</tr>
<tr>
<td>Easton</td>
<td>4.09</td>
</tr>
<tr>
<td>Framingham</td>
<td>4.9</td>
</tr>
<tr>
<td>Georgetown</td>
<td>0.86</td>
</tr>
<tr>
<td>Hamilton</td>
<td>4.87</td>
</tr>
<tr>
<td>Hanson</td>
<td>3.16</td>
</tr>
<tr>
<td>Ipswich</td>
<td>8.09</td>
</tr>
<tr>
<td>Kingston</td>
<td>5.02</td>
</tr>
<tr>
<td>Lincoln</td>
<td>2.6</td>
</tr>
<tr>
<td>Lowell</td>
<td>1.96</td>
</tr>
<tr>
<td>Marlborough</td>
<td>1.34</td>
</tr>
<tr>
<td>Medfield</td>
<td>6.07</td>
</tr>
<tr>
<td>Newbury</td>
<td>2.03</td>
</tr>
<tr>
<td>Newburyport</td>
<td>0.11</td>
</tr>
<tr>
<td>North Andover</td>
<td>5.2</td>
</tr>
<tr>
<td>Pembroke</td>
<td>7.92</td>
</tr>
<tr>
<td>Rowley</td>
<td>2.94</td>
</tr>
<tr>
<td>Sharon</td>
<td>8.76</td>
</tr>
<tr>
<td>Sherborn</td>
<td>8.57</td>
</tr>
<tr>
<td>Southborough</td>
<td>0.16</td>
</tr>
<tr>
<td>Sudbury</td>
<td>2.19</td>
</tr>
<tr>
<td>Tewksbury</td>
<td>0.52</td>
</tr>
<tr>
<td>Topsfield</td>
<td>0.36</td>
</tr>
<tr>
<td>Walpole</td>
<td>4.53</td>
</tr>
<tr>
<td>Wayland</td>
<td>4.09</td>
</tr>
<tr>
<td>West Bridgewater</td>
<td>0.05</td>
</tr>
<tr>
<td>Westford</td>
<td></td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>128.32</strong></td>
</tr>
</tbody>
</table>

Additional municipalities through which Proposed segments of the main stem could run (2): Carlisle and Middleton
Appendix C

Resident 2010 Population Proximate to the Bay Circuit

The 37 “footprint” municipalities cited above that host dedicated trail mileage had a cumulative 2010 population of 773,187.

There are 94 additional municipalities* in Massachusetts that have substantial land area (guesstimated as >50%) within a 10-mile buffer of the BCT. Note: this does not include the City of Boston or its nearest neighbors**. These municipalities had a cumulative 2010 population of 2.04 million.

The 2010 resident population within the Massachusetts municipalities that are within the 10-mile buffer to the BCT (including “footprint” municipalities) was 2.83 million.

There are 6 municipalities in New Hampshire that have substantial land area (guesstimated as >50%) within the 10-mile buffer of the BCT: Seabrook, South Hampton, Salem, Windham, Hudson, and Pelham. These municipalities had a cumulative 2010 population of 89,239. There are no municipalities in RI that have substantial land area within the 10-mile buffer of the BCT.

The 2010 resident population within the Massachusetts and New Hampshire municipalities that are within the 10-mile buffer to the BCT (including “footprint” municipalities) was 2.91 million.

There are 22 additional municipalities** in the metropolitan Boston area that are not substantially within the 10-mile buffer, yet constitute a meaningful user and advocacy community. These municipalities had a cumulative 2010 population of 1,528,851.

The 2010 resident population within eastern Massachusetts (footprint, plus 10-mile buffer, plus metropolitan Boston municipalities) was 4.36 million.

The 2010 resident population within the eastern Massachusetts and neighboring southern New Hampshire municipalities was 4.44 million.


**The Boston metropolitan cities that do not have substantial area within the 10 mile buffer are: Swampscott, Lynn, Nahant, Saugus, Revere, Melrose, Malden, Medford, Everett, Chelsea, Winthrop, Somerville, Cambridge, Boston, Brookline, Milton, Quincy, Braintree, Weymouth, Hingham, Cohasset, and Hull.
## Appendix D

### Trail Mileage by Class and Protection Status (Summer 2013)

**Bay Circuit Trail Mileage by Class**

Mileage is flat-plane GIS distance, does not account for slope distance

<table>
<thead>
<tr>
<th>Designation</th>
<th>Mass DoT</th>
<th>Road</th>
<th>Class</th>
<th>unimprvd</th>
<th>rail</th>
<th>Grand Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated</td>
<td>128.32</td>
<td>9.24</td>
<td>8.5</td>
<td>53.76</td>
<td>18.48</td>
<td>230.7</td>
</tr>
<tr>
<td>Temporary</td>
<td>1.03</td>
<td>4.56</td>
<td>0.89</td>
<td>5.36</td>
<td></td>
<td>11.84</td>
</tr>
<tr>
<td><strong>Grand Total</strong></td>
<td><strong>129.35</strong></td>
<td><strong>13.8</strong></td>
<td><strong>9.39</strong></td>
<td><strong>59.12</strong></td>
<td><strong>18.48</strong></td>
<td><strong>242.54</strong></td>
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</table>

**Bay Circuit Trail Mileage by Protection Status**

Data provided by The Trustees of Reservations

<table>
<thead>
<tr>
<th>Trail Designation</th>
<th>Category</th>
<th>Miles</th>
<th>Sub-total</th>
<th>% of Trail</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedicated</td>
<td>Public ROW</td>
<td>71.2</td>
<td>71.2</td>
<td>30.9%</td>
</tr>
<tr>
<td><strong>Sub-total Dedicated Public ROW’s</strong></td>
<td><strong>71.2</strong></td>
<td><strong>71.2</strong></td>
<td><strong>30.9%</strong></td>
<td></td>
</tr>
<tr>
<td>Dedicated</td>
<td>State protected</td>
<td>36.4</td>
<td></td>
<td>15.8%</td>
</tr>
<tr>
<td>Dedicated</td>
<td>Federal protected</td>
<td>0.7</td>
<td></td>
<td>0.3%</td>
</tr>
<tr>
<td>Dedicated</td>
<td>Non-profit protected</td>
<td>26.1</td>
<td></td>
<td>11.3%</td>
</tr>
<tr>
<td>Dedicated</td>
<td>Private protected (CR / APR)</td>
<td>2.6</td>
<td></td>
<td>1.1%</td>
</tr>
<tr>
<td>Dedicated</td>
<td>Municipal protected</td>
<td>46.7</td>
<td></td>
<td>20.2%</td>
</tr>
<tr>
<td><strong>Sub-total Dedicated Protected</strong></td>
<td><strong>112.5</strong></td>
<td></td>
<td><strong>48.7%</strong></td>
<td></td>
</tr>
<tr>
<td>Dedicated</td>
<td>Water</td>
<td>1.2</td>
<td></td>
<td>0.5%</td>
</tr>
<tr>
<td>Dedicated</td>
<td>RAIL_ROW</td>
<td>3.2</td>
<td></td>
<td>1.4%</td>
</tr>
<tr>
<td>Dedicated</td>
<td>PRIV_ROW</td>
<td>0.2</td>
<td></td>
<td>0.1%</td>
</tr>
<tr>
<td>Dedicated</td>
<td>Unprotected</td>
<td>21.5</td>
<td></td>
<td>9.3%</td>
</tr>
<tr>
<td>Dedicated</td>
<td>Municipal protection unknown</td>
<td>19.8</td>
<td></td>
<td>8.6%</td>
</tr>
<tr>
<td>Dedicated</td>
<td>State protection unknown</td>
<td>1.3</td>
<td></td>
<td>0.6%</td>
</tr>
<tr>
<td><strong>Sub-total Dedicated Unprotected or Unknown</strong></td>
<td><strong>47.1</strong></td>
<td></td>
<td><strong>20.4%</strong></td>
<td></td>
</tr>
<tr>
<td><strong>Total Dedicated</strong></td>
<td><strong>230.9</strong></td>
<td></td>
<td><strong>100.0%</strong></td>
<td></td>
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</tbody>
</table>
### Appendix E

#### Volunteers Who Supported the Assessment

<table>
<thead>
<tr>
<th>Name</th>
<th>Role/Contribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kristen Sykes</td>
<td>AMC; BCA Director of Operations</td>
</tr>
<tr>
<td>Heather Clish</td>
<td>AMC; Director of Conservation and Recreation Policy</td>
</tr>
<tr>
<td>Alan French</td>
<td>BCA</td>
</tr>
<tr>
<td>Denny Nackoney</td>
<td>BCA and Region 8 section leader</td>
</tr>
<tr>
<td>Wesley Ward</td>
<td>TTOR Director of Conservation</td>
</tr>
<tr>
<td>Vincent Antil</td>
<td>TTOR GIS Manager</td>
</tr>
<tr>
<td>Andy Falender</td>
<td>former AMC President; meeting</td>
</tr>
<tr>
<td>Dan Streeter</td>
<td>Region 1 section leader; meeting &amp; transportation</td>
</tr>
<tr>
<td>Maureen Thomas</td>
<td>Region 10 section leader, co-chair Bay Circuit Trails Committee; meeting &amp; transportation</td>
</tr>
<tr>
<td>Tom and Nell Horth</td>
<td>overnight accommodations, transportation</td>
</tr>
<tr>
<td>Nancy Merrill</td>
<td>overnight accommodations, transportation</td>
</tr>
<tr>
<td>Glen &amp; Sothy Aspeslagh</td>
<td>overnight accommodations, transportation</td>
</tr>
<tr>
<td>John &amp; Kathy Hess</td>
<td>overnight accommodations, transportation</td>
</tr>
<tr>
<td>Marlies Henderson</td>
<td>overnight accommodations, transportation</td>
</tr>
<tr>
<td>Jane Calvin</td>
<td>Lowell Parks and Conservation Trust; meeting</td>
</tr>
<tr>
<td>Colleen McLaughlin</td>
<td>overnight accommodations, transportation</td>
</tr>
<tr>
<td>Christine Turnbull</td>
<td>Mass Audubon; overnight accommodations</td>
</tr>
<tr>
<td>Len Ulbrict</td>
<td>transportation</td>
</tr>
<tr>
<td>Rita Corey</td>
<td>transportation</td>
</tr>
<tr>
<td>Jim &amp; Jan Fowler</td>
<td>overnight accommodations, transportation</td>
</tr>
<tr>
<td>Jim &amp; Linda McCollum</td>
<td>overnight accommodations, transportation</td>
</tr>
<tr>
<td>Forrest Berkley &amp; Marcie Tyre</td>
<td>overnight accommodations</td>
</tr>
<tr>
<td>Lanci &amp; Page Valentine</td>
<td>overnight accommodations</td>
</tr>
</tbody>
</table>
Appendix F

Features as Observation Points

Assessment consists of singular observations about particular features or elements at a particular place.

Observations can be either noting the physical location/existence of a feature (inventory), or a qualified condition or deficiency (“problem” or “issue”) that would be of interest to management or stewardship.

Observations are intended to identify problems rather than solutions, as a particular problem might potentially be resolved in one of several ways, and the determination of the best or most suitable solution may require further research or resource allocations that are not evident in the field. Furthermore, singular issues may eventually be dealt with differently than a cluster of issues that could indicate a more systemic situation requiring “bulk” resources.

Following are the categories and classifications that were used (and possibly revised in hindsight) to collect field data. This data structure was optimized for efficient field data collection, but may require alterations to be fully useful in a greater context. This is not a complete or strict Data Dictionary definition; most often each feature type contains an “other” attribute and “comment” field for description or clarification. Most feature types have attributes for “condition” and “severity” (noted at the end of this section) for purposes of assessing management or stewardship needs.

ACCESS

Any place a person could potentially get on or off the BCT, usually a road/trail junction or road crossing, could also be a designated or shared facility along the route; must be qualified for public access and landowner permission. Includes places where parking is not allowed/available (e.g., drop off, bicycle, boat, or local/neighborhood use).

- Trailhead Accessible by car with designated parking and signage. Intended for BCT use. Land owner or manager must be known and agreeable for use to be legit.
- Parking A permissible place to leave a car. Could be off-route, at a shared facility, or roadside. Can be classified as: dedicated lot for recreation, commercial lot, municipal lot, visitor center, shared facility, on-street, pull-in, on shoulder. Should be qualified if restricted (residents or employees only, by permit, ADA, no overnight use, number of hours, etc.).
- Access point Usually a road crossing or road/trail junction without developed amenities. Should be qualified as parking allowed, parking not allowed, or ad hoc parking. Could also be a boat landing for river travel.

FACILITY

Recreation areas or public places that are used for other purposes, either front-country or back-country. Note: additional attributes may be collected for structures and amenities that support recreational activity at these sites (such as pavilions, shelters, toilets, water source, etc.).

- Day Use Area, Athletic field, Park
- Overnight Use Area
- Visitor Center, Administration
POINTS OF INTEREST

Places of scenic, historic, or cultural value.
- Summit
- Viewpoint
- Fire/observation tower
- Waterfall
- Boulder/rock/formation
- Historic Site
- Nature/wildlife
- Landscape/typical scene

ROUTE MARKINGS

Markings are aids to trail navigation; finding or following the trail.
- Blazing
- Signage
- Cairn
- Scree

TRAFFIC HAZARD

Any place where there could be conflicts (exposure or risk) associated with motorized vehicles (car or rail), typically on public roads class 1-4. In this inventory, places are identified as “potential hazards” even if risk is low or negligible. Consideration should be made from a child’s perspective.
- Road crossing consider: crosswalk, signals, traffic volume and speed
- Railroad crossing (active)
- Constriction such as narrow underpass or guardrail with no shoulder
- Congestion vehicles turning or parking such as a town center or commercial district
- Sightline limited view, such as blind curves
- Travel along road consider: sidewalk, shoulder, traffic volume and speed, with or against traffic flow

TREADWAY STRUCTURE

Built structures on/above treadway designed to provide a stable travel surface and protect resources.
- Bridge
- Bog bridging
- Boardwalk
- Turnpike
- Step stones
- Stairs, ladder, rungs
- Waterbar
- Cribbing
- Drainage dip/ditch, channeling

TREADWAY

Ground conditions (no structure) where maintenance or stewardship may be of concern.
- Open stream crossing
- Wet area
- Flooding
- Steep slope
- Sidehill, slumping (e.g., river bank)
- Gully, rock/mud slide
- Vegetation
- Blowdown
- Alignment & multiple use

ENCROACHMENT
- Non-managed recreational use
- Land use (e.g., harvesting, agriculture)
- Building or structure
- Dumping

POINT REFERENCE / UTILITY
Man-made features not specifically related to recreational activity
- Trail junction
- Road/trail junction
- Gate/stile
- Railroad
- Powerline
- Pipeline
- Communications tower
- Geodetic marker
- Boundary marker
- Fence/wall (crossing or corner)
- Dam

TRAVELWAY – [Linear feature] Route of travel
- Class Road, trail, water/ice
- Type Trail, spur trail, highway, street, improved local road, unimproved road, carriage road, service road, service path, unmaintained road
- Managed Use Hiking, nature/interp, mountain bike, ski, snowmobile, mixed use (non-motorized), multi-use (motorized), vehicular, paddling/ferry, portage, equestrian
- Surface Paved, natural, gravel, hardpack, boardwalk, field/meadow, water
- Status Active/maintained, temporary/alternate, proposed, closed, abandoned/bootleg
- Name

LINEAR REFERENCE
- Fence
- Stone wall
- Vegetation
• Boundary
• Parking area
• Utility
• Shoreline/stream

ASSESSMENT ATTRIBUTES

CONDITION

• Adequate
• None / missing
• Inadequate
• Inappropriate
• Damaged
• Deteriorated
• Poor Location
• Obstruction
• Potential Problem exposure to unsafe condition, or likely to become risky if unchecked
• Restricted

SEVERITY

• OK / no deficiency
• Minor (low risk)
• Serious (moderate risk)
• Critical (high risk)
Appendix G

Public Transportation: Commuter Rail Stations and Park and Ride Lots

There are 9 Commuter Rail Stations within 1 mile of the Bay Circuit Trail:

<table>
<thead>
<tr>
<th>COMMUTER RAIL LINE</th>
<th>STATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Newburyport/Rockport</td>
<td>Rowley</td>
</tr>
<tr>
<td>Haverhill</td>
<td>Andover</td>
</tr>
<tr>
<td>Lowell</td>
<td>Lowell</td>
</tr>
<tr>
<td>Fitchburg</td>
<td>Concord</td>
</tr>
<tr>
<td></td>
<td>Lincoln</td>
</tr>
<tr>
<td>Framingham/Worcester</td>
<td>Ashland</td>
</tr>
<tr>
<td>Franklin</td>
<td>Walpole</td>
</tr>
<tr>
<td>Providence/Stoughton</td>
<td>Sharon</td>
</tr>
<tr>
<td>Kingston/Plymouth</td>
<td>Hanson</td>
</tr>
</tbody>
</table>

For further information, visit http://www.mbta.com/

PARK AND RIDE

There are 7 Park and Ride Lots within 1 mile of the Bay Circuit Trail:

Boxford, Middleton Rd (rear of firehouse)
Acton, Rt 2A and Rt 119 (bus)
Concord, Sudbury Rd at Crosby’s Market (bus, rail)
Sudbury, Rt 20 at Concord Rd (bus)
Framingham, Mass Pike exit 12 at Rt 9 (bus)
West Bridgewater, Rt 24 at Rt 106 (bus)
Kingston, Rt 3 exit 10 at Rt 3A (bus)

For further information, visit http://www.massdot.state.ma.us/highway/TrafficTravelResources/ParkandRideMap.aspx
Appendix H

Town Centers and Commercial Districts

Newbury, Plum Island Turnpike
Newbury Lower Green, Rt 1A
Rowley, Rt 1A “Rowley Gap”
Boxford Center and Village Store, Elm St
Andover, Rt 28 Main St, Andover
Lowell Canalway and National Historical Park
Bedford Center, Rt 4, Great Road
Chelmsford, Rt 4 and 110
Concord, Monument Square
Wayland, Rts 20 & 27
Rt 30 Boston Rd, Southborough
Ashland town center, Main Street
Ashland, Rt 126, Pond Plaza
Walpole, Rts 27 and 1A
West Bridgewater, Rt 28 and 106
Hanson, Rt 14 and 58
Kingston, Rts 27 and 3A
Duxbury, East St crossing over Rt 3
Appendix I

Schools, Athletic Fields, Visitor Centers

Parker River NWR Visitor Center, Newburyport
Spencer-Peirce-Little Manor House, Newbury
Boy Scout Park, Cahoon /Dana Rd, Boxford
Sharpner's Pond Athletic Fields, North Andover
Phillips Academy and Athletic Fields, Andover
Andover High School, Andover
Lowell National Historical Park Visitor Center
Middlesex Community College, Billerica/Bedford
Bedford High School, Bedford
John Glenn Middle School, Bedford
Minuteman National Historical Park visitor center, Concord
Concord Visitor Information Center, Concord
Ashland schools and athletic fields [between Wildwood Cem & Cadorette Rd]
Pine Hill School, Sherborn
McCarthy Athletic Fields, off hospital Rd, Medfield
Wheelock School and athletic fields, Medfield
Eleanor Johnson Middle School, Robbins Rd, Walpole
Carolyn Woodward Playground & Joe Morgan ballfield, School St, Walpole
Moose Hill Wildlife Sanctuary and visitors' Center, Sharon
Deborah Sampson Park, Sharon
Massapoag Lake, Memorial Park Beach and boat access, Sharon
Borderland State Park Visitor Center, Sharon/Easton townline
Indian Head School, Hanson
Robinson Street athletic fields, Hanson
Bryantville Elementary School, Pembroke
Silver Lake Regional High School, Kingston
Reed Community Building and Bailey Memorial Playing Fields, Kingston
Pembroke High School, Pembroke
Hobomock Elementary School, Pembroke
Appendix J

Traffic Hazards

Crossing Rt 1A Newbury (multiple)
Along Rt 1A Rowley
Crossing Rt 1, Newburyport Turnpike, Ipswich (at East St)
Crossing Boxford Rd, Rowley (Georgretown-Rowley SF); blind curve
Crossing Rt 114, North Andover
Crossing Rt 125, Andover Bypass, Andover
Along Rt 125, Andover Bypass, Andover (north of tree belt)
Crossing Rt 28, Andover (Phillips Academy)
Central St underpass (RR bridge), Andover
Crossing Rt 133 Lowell St, Andover (West Parish Cemetery to Doyle Link)
Along High Plain Rd, Andover (narrow and curvy for 1.3 miles)
Along River Rd, Tewksbury (constricted)
Crossing Rt 38 Nesmith St in Lowell (signalized crosswalk)
Crossing Rt 4, Bedford Center (signalized crosswalk)
Along College Road, Concord; narrow and curvy
Crossing Rt 62, Concord, Monument Square (2 instances)
Crossing Rt 2 Concord
Along Rt 20 Boston Post Rd, Sudbury (Temporary)
Along Rt 30 Boston Rd, Southborough at Framingham line
Along Edmands Rd, Framingham (narrow, blind curve, no shoulder)
Crossing Firmin Ave over Rt 9 overpass
Crossing Rt 135 Union Street, Ashland (signalized crosswalk)
Crossing Rt 126, Pond St, Ashland (Market Basket)
Crossing Rt 27, North Main Street, Sherborn
Crossing Rt 16 Eliot Street, Sherborn
Along and crossing Rt 27, South Main Street, Sherborn to Medfield townline
Crossing and along Rt 27, North Meadows Rd, Medfield
Crossing and along Rt 27 High Street, Medfield (at Forest St)
Along Rt 27 Elm Street, Walpole; under narrow RR underpass
Crossing Rt 1, Walpole
Along Pine St, Walpole (east of Rt 1; narrow, sharp curves, constricted by guardrail)
Crossing South Main Street at Farnham, Sharon
Crossing and along Rt 106 Foundry Street, Easton
Crossing Rt 28 South Main Street, West Bridgewater
Crossing and along Rt 28 South Main St, West Bridgewater and Main St, Bridgewater
Crossing Washington Street, East Bridgewater
Crossing and along Rt 27 Main Street, Hanson
Crossing and along Rt 14 & 58, Liberty Street, Hanson
Crossing Rt 36 Center St, Pembroke
Crossing Rt 27 School St at Lake St, Pembroke
Crossing Rt 3A Summer St, Kingston
Along Landing Road, Kingston (through narrow underpass)
Crossing Rt 14 & 53 Washington Street, Pembroke
Crossing Rt 3A Tremont St, Duxbury