



Analysis of Route Alternatives

Assessing Feasibility - Planning Methodology

Community Outreach and the Planning Process

Public and stakeholder engagement was a critical part of the master planning process. Four public meetings were held (see photos at right) at key intervals during the planning process. Each of the meetings had strong participation, with over 100 people attending each event. Online outreach included direct emails to several local email lists and meeting notifications on the project's website and Facebook page. Public comments were also solicited using a dedicated e-mail address as well as an online survey that received more than 450 responses.

The Steering Committee helped raise awareness of the planning process and opportunities for public and stakeholder input by compiling a list of, and notifying, public agencies and local organizations that focused on topics such as recreational activities, preservation, and economic development. Many of these organizations distributed meeting announcements to their own lists of constituents, which increased awareness of this project and helped attract public participation.

Public Meetings

Meeting 1: February 17, 2014

Introduced the project and master planning process, along with trail types that might comprise the different alignment possibilities. Led a table mapping exercise in which participants provided detailed input on the route in three sections. Each section was discussed at three or more tables, after which each group presented their discussion to the larger group.

Meeting 2: July 9, 2014

Provided updates on the route analysis, including Breakneck Connector funding application (see page 34 for more info on this project component). Fielded public comments and then responded to open questions, with the design team utilizing display boards and maps.

Meeting 3: October 23, 2014

Public presentation of draft Master Plan recommendations followed by Q & A and ongoing discussions around display boards and maps.

Meeting 4: April 29, 2015

Presentation of final Master Plan



First row: Photo from Public Meeting 3

Second row: Photos from Public Meeting 2
(Photo credit: Facebook page)

To communicate progress between public meetings, the design team developed an online newsletter called *Field Notes from the Hudson Highlands Fjord Trail Master Planning Process*, which was posted to the project’s Facebook page.

Agency Communication and Coordination

Preparation of this master plan required close coordination with the project Steering Committee, key project stakeholders, including numerous government agencies, and the public.

Key government stakeholders included: local, state and regional agencies. Other key stakeholders included: non-profit organizations, property owners and local businesses, all of whom provided invaluable input throughout the master planning process. Many of these organizations had been working together on the early stages of planning this trail prior to the master plan, and, therefore, were able to provide important background information.

The following were among the stakeholder interviews held: NYSDOT, OPRHP, Metro-North, NYCDEP, NYSDEC, Central Hudson, First Responders, Melissa McGill (Artist: *Constellations*)

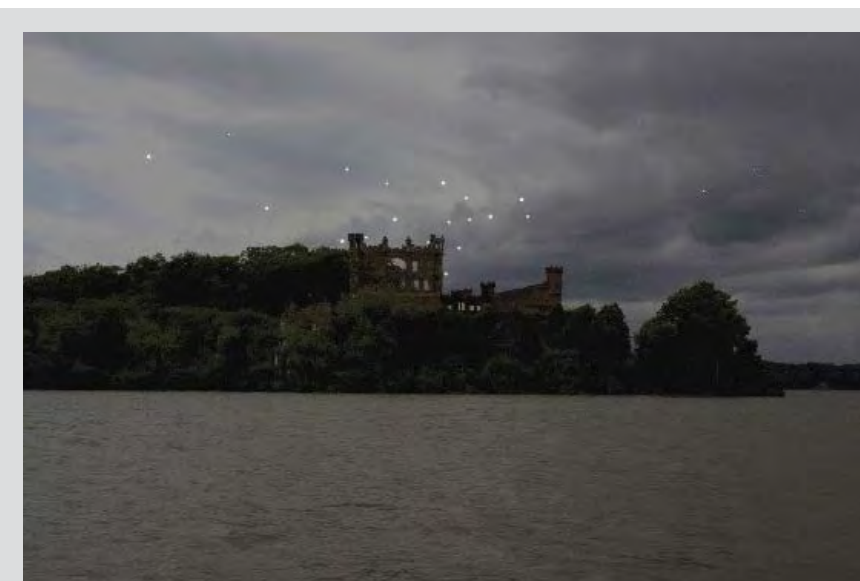
Property Ownership

Most of the property considered for the various trail alignments is owned, operated and maintained by government agencies, all of which participated in the Steering Committee and were regularly updated about the master planning process. As such, the project team was notified about specific operational or physical constraints within these public properties.

For some alignments considered it was necessary to explore the feasibility of routing the trail on private property. The use of private property would take place only with the consent of each individual property owner. Where trail alignments were considered that would cross private property, efforts were made to engage those property owners in a discussion about the potential and likelihood of granting an easement or change of lot line to accommodate the trail. The sensitive nature of this subject together with the need to cross not just one but several consecutive private parcels was among the most significant constraints associated with the designation of a trail alignment on private property.

Relevant Agency Abbreviations

DEC	New York State Department of Environmental Conservation
DEP	New York City Department of Environmental Protection
DOT	New York State Department of Transportation
DFW	New York State Department of Fish and Wildlife
NOAA	National Oceanic and Atmospheric Administration
NYNJTC	New York-New Jersey Trail Conference
OPRHP	New York State Office of Parks, Recreation and Historic Preservation
SHPO	New York State Historic Preservation Office
ACOE	United States Army Corps of Engineers
DOS	New York State Department of State
FHWA	Federal Highway Administration



Constellations Public Art Installation on Pollepel (Bannerman’s) Island

Local artist Melissa McGill is designing a public art installation at Bannerman’s Castle on Pollepel Island. Early in the planning process, Melissa met with the design team to discuss potential synergies between her installation and the trail. The collaboration continued throughout the planning process.



Hudson Fjord ice in winter

Opportunities and Constraints Mapping

At the start of this project, data was gathered from publicly available sources, local municipalities and Steering Committee members. Once compiled, this data was mapped to evaluate the opportunities and constraints that needed to be addressed in the routing and design of this trail. While this mapping took place in the first phase of the Master Plan, data was added as it became available. This mapping is not meant to be exhaustive, as further review will be required during design, particularly with respect to wetlands and endangered species.

Resiliency: Designing for the elements

The feasibility analysis of the various options included a close look at the weather-related conditions each segment of trail would need to withstand, if implemented. On land, that includes drainage and erosion on steep slopes and selecting materials that can withstand accumulations of snow and ice. The Hudson River is a tidal estuary with strong currents, and is susceptible to sea level rise and storm surges. These were all major considerations for trail alignments proposed along the shoreline. As the photo above shows, the river sometimes freezes in the winter, covered with thick sheets of ice. Any concept considered would have to withstand these conditions. Designing a resilient shoreline is also an opportunity to integrate the trail, thus realizing two important objectives simultaneously.

LEGEND

 State Parks	 Existing hiking trails
 Municipal Parks	Shoreline Type
 National Wetlands Inventory	 Natural
 Tidal Wetland	 Engineered
 Submerged Vegetation	 Potential Historic Fill (Udortheents)
	! Remediation Sites (DEC)

Mapping for planning purposes only; Map features are approximate and not based on engineering survey



Map showing known Environmental issues and constraints

Inventory of Natural and Cultural Resources

Conservation of Natural Resources

It is critical to understand potential impacts of the proposed trail on sensitive Hudson River ecosystems, identify environmental constraints within the potential trail corridor, and determine how to avoid or minimize any negative impacts to natural resources.

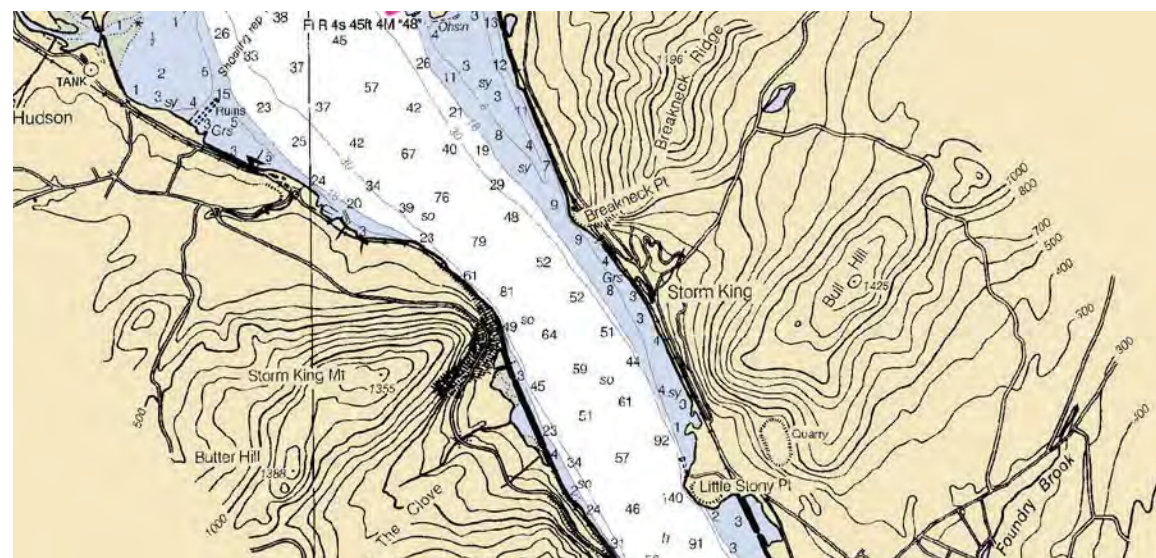
The proposed trail, which is located within a NYS Coastal Area Boundary, traverses or runs closely past several ecological communities, including mature forested and forested/scrub shrub communities, tidal and non-tidal freshwater wetlands, tidal and non-tidal watercourses, and developed urban areas.

The proposed trail may impact both federal and state freshwater wetlands/waters and regulated adjacent areas. Floodplains might be affected for portions of the trail alignment that traverse the Hudson River floodplain.

The trail may also traverse or pass very close to threatened and endangered species habitat and sensitive vegetative communities, as described on the next page. Some alignments proposed must cross steep slopes and/or pass above shallow bedrock.

Given the built and natural characteristics of this section of the Hudson River, the following specific environmental elements are most important to consider for the alignment and design of the proposed trail:

- NYSDEC Freshwater wetlands and regulated adjacent area
- NYS Tidal Wetlands
- Federally mapped wetlands: field delineation may be required
- Local wetlands: if regulated at local level
- Fluvial floodplain areas
- Tidal floodplain limits
- Submerged Aquatic Vegetation
- Threatened and Endangered Species: benthic, avian and land-based species
- Hazardous Materials: depending on degree of excavation required for trail
- Deforestation/Reforestation (depending on the final trail alignment)



NOAA Bathymetry Chart showing river depths



DEC mapping showing Udorthents (potential historic fill sites, landfills and remediation sites)

Habitat Preservation, Protection, and Restoration

The Hudson River Estuaries are known habitat for Atlantic Sturgeon (*Acipenser oxyrinchus*) breeding and feeding grounds, a recently listed federally endangered species under the jurisdiction of the NOAA's National Marine Fisheries Service.

The entire east side of Route 9D contains potential habitat for the Timber Rattlesnake (*Crotalus horridus*), a species listed as “threatened” by the State of New York. If a known population occurs on the ridges and slopes of the Hudson Highlands within a half mile of the trail, DEC may require construction monitoring and exclusion fences during construction activities. The area is also home to Peregrine falcons, Fence lizards and Eastern worm snakes. Other species may also be found in the vicinity of the project.

Where the trail causes no disturbance to the Hudson River, surveys for freshwater mussels are not anticipated. The route segment along the shoreline may require additional fauna surveys.

Impacts to these species will need to be assessed for any construction in the area (new trails and/or improvements to trails). Impacts can include the construction activity itself and the resultant increase in human activity in the area from increased access. A full impact assessment should be undertaken, and impacts fully avoided or minimized. If impacts to the state-listed threatened and endangered species cannot be avoided and minimized, an ECL Article 11, Part 182 take permit may be required.

Timing Restrictions

Bald eagles (*Haliaeetus leucocephalus*) utilize portions of this area for fishing and foraging. Nests are known to exist within the vicinity of the project. Construction timing restrictions could be required during nesting and wintering seasons.

A timing restriction may be required for the cutting of large trees (greater than 6” dbh) due to the potential for both the federally listed Indiana bat (*Myotis sodalis*) and the federal candidate species, Northern Long-eared bat (*Myotis septentrionalis*) occurring in the area. Trees might need to be cleared for constructing parking areas on the east side of Route 9D and for constructing the trail on the west side of the road. If trees do not have to be cleared, then there are no anticipated issues with these species.

Removal of Invasive Species and Prevention of Spread

The entire project corridor from the Hudson River across the Metro-North railroad tracks and Route 9D to the slopes of the Hudson Highlands are heavily overgrown with invasive plant species such as Swallowwort, Glossy Buckthorn, Tree of Heaven, Multiflora rose, Japanese stiltgrass, Common Reed, Norway Maple, Amur Maple and numerous others. Also, along the shore of the Hudson River in the vicinity of the project, thousands of Chinese Water-Chestnut seedpods were observed washed up on the shore. During the construction of the project, best management practices should be included to prevent further spread of these invasive species further into the trail corridor. If project funding allows, invasive species removal and revegetation with native species should be included in the scope of work for trail construction.

Hazardous Materials

The proposed trail corridor passes through, or immediately adjacent to, NYSDEC mapped wetlands and tidal wetlands. Udorthents are defined and mapped by NYSDEC as “historic fill” areas. Historic fill areas are those areas consisting of non-indigenous material, deposited to raise the topographic elevation of the site, which was contaminated prior to placement, and is in no way connected with the operations at the location of placement. Historic fill area includes, without limitation, construction debris, dredge spoils, incinerator residue, demolition debris, fly ash, or non-hazardous solid waste. Historic fill material does not include any material that is substantially chromate chemical production waste or any other chemical production waste or waste from processing of metal or mineral ores, residues, slag or tailings.

In addition to historic fill areas, the proposed trail corridor runs near but not within any NYSDEC remediation sites located in Beacon, Fishkill and Cold Spring, based on an NYSDEC prepared aerial map showing the locations of NYSDEC site remediation areas and landfills in the vicinity of the proposed trail corridor (see map on p. 15).

A Phase I Environmental Site Assessment should be undertaken to determine whether the presence of any hazardous materials is suspected and if sampling will be required as part of a Phase II to determine the qualitative levels of contaminants.

Potential Approvals and Permits Required

Construction of the trail will require regulatory approvals and permits. Until the trail is in design, it is not known specifically which permits will be required. Permits that may be required include:

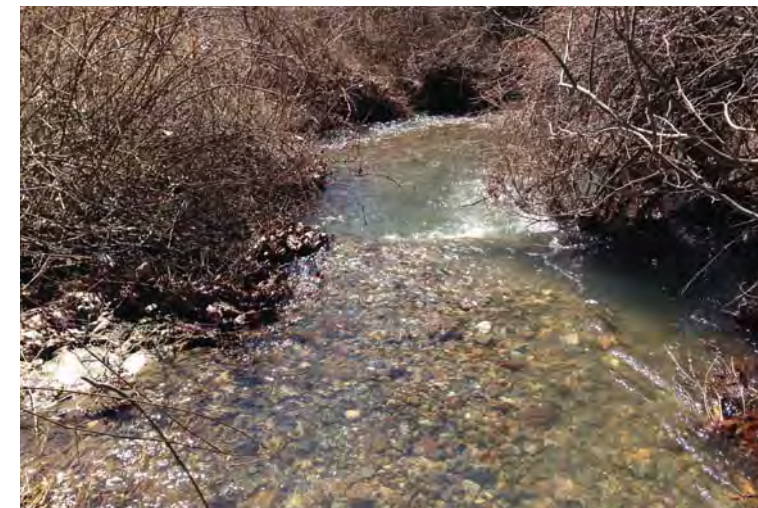
- SEQRA approval based on findings once the lead agency accepts a Final Environmental Impact Statement
- US Army Corps of Engineers wetland permits (likely one or more Nationwide Permit)
- NYSDEC Wetlands Permits and possibly local wetland permits
- ECL Article 11, Part 182 take permits where state listed species are found
- A SPDES Permit for construction stormwater will likely be required (anticipate greater than one acre of site disturbance for the overall trail) with a SWPP and Erosion and Sedimentation Control Certification requirement as well
- Timing restrictions on tree clearing and other trail construction and related activities are likely to apply due to the potential for threatened and endangered species impacts
- Given that the proposed project is also in a New York State Coastal Area Boundary, Coastal Zone Management Approval and a Federal Consistency Determination may be required from the New York State Department of State
- NYSDOT Highway Work Permit



Wetland in Brickyards Parkland near the adjacent Metro-North tracks



Wetland south of Breakneck Ridge, between Route 9D and the Metro-North tracks



Gordons Brook in the Brickyards Parkland

Funding

If federal funding is used for the project, a National Environmental Policy Act (NEPA) compliance document will be required. The federal agency providing the funding would typically be designated as the Lead Federal Agency. The document may potentially be completed as a Categorical Exclusion (CE), as trail projects are typically listed as being considered to have minimal environmental impact and, thus, categorically excluded from NEPA. Given the nature of the route and the environmental constraints involved, the impacts could potentially be significant enough to elevate the NEPA document to a Generic Environmental Impact Statement (GEIS). A GEIS is the most likely route of future environmental review.

If the trail results in any impacts to Hudson Highlands State Park or any other publically owned designated park land, and federal transportation funds are obtained via FHWA/NYS DOT, an additional layer of review (ie. Section 4/f) may be required as part of the NEPA process.

Historic and Cultural Resources

There are several sites in the study area that are listed on the National Register of Historic Places. Below are sites either directly on or in the vicinity of the proposed route of the trail. See map on p. 20 for locations of the following National Register sites.

1. Cold Spring Historic District

Part of the Hudson Highlands Multiple Resource Area

From the river along a generally east-west axis, largely along Market, Main, Fair, and Chestnut Streets and Paulding Avenue. The proposed trail route's southern end begins in the district, proceeding north along the railroad, then turning right onto Main Street, then left onto Fair Street and Church Street (see p. 32-33 for details).

2. Bannerman's Island Arsenal

Part of the Hudson Highlands Multiple Resource Area

Pollepel Island, Beacon. Commonly known as "Bannerman's Castle," the complex was designed by military surplus dealer Francis Bannerman in the style of a castle. Construction completed in 1918. The complex was partly destroyed by an explosion in 1920, vacated in 1950, and has been subject to further collapse over the years. The locally famous ruins are easily viewed from the shoreline and by rail commuters. Bannerman's Island, also called Pollepel or Pollepel's Island, was important in the American Revolution, when a chevaux de frises, or blockade of iron spikes, was set up between the island and the western shore of the Hudson. The entire island is included in the National Register.

3. Dutchess Manor

Part of the Hudson Highlands Multiple Resource Area

400 Breakneck Road (Route 9D), Beacon. Distinctive home built in 1889 in the Second Empire style for brickyard owner Francis Timoney. The building faces east toward Route 9D and is readily visible from this proposed route. The bricks used in the buildings were produced at Timoney's nearby brickyard (located on the river on the north side of Wade's Brook to the north, see Map 5); architect unknown. Currently a restaurant and event venue.

4. St. Luke's Episcopal Church Complex

Wolcott Avenue and Rector Street, Beacon. Stone Gothic Revival style Church and Rectory built circa 1870, designed by noted architect Frederick Clarke Withers. The naturalistic landscape design is attributed to noted landscape gardener and Beacon resident Henry Winthrop Sargent. The property comprises 12 acres and includes the associated cemetery.

5. Howland Library

477 Main Street, Beacon. Built in 1872 as Matteawan Village's library, the building was designed by noted architect Richard Morris Hunt, brother-in-law of the owner, Joseph Howland. It features varied forms, materials, colors, and patterns, an excellent example of the eclectic style of the time, though unique within the cityscape. Now the home of the Howland Cultural Center, the building is also within the locally designated Upper Main Street Historic District.

6. Beacon Post Office

369 Main Street (at the corner of Veterans Place), Beacon. Colonial Revival style locally-sourced, rough-cut stone building erected in the mid-1930s, an excellent example of the Federal architecture adopted for public projects during the Great Depression.

7. Lower Main Street Historic District

142-192 Main Street and 131-221 Main Street, Beacon. The district comprises the first few blocks at the west end of Main Street, including 32 buildings in several distinct groupings. Most are of late-19th to early 20th-century (circa 1870-1929) construction, predominately 2 to 3-story attached brick rows dating to the 1870s to 1890s. The district reflects the development of the village of Fishkill-on-Hudson, which would later be merged with neighboring Matteawan into Beacon. One individually-listed property, the Lewis Tompkins Hose Company No. 1 Firehouse at 140 Main Street, is located within the district. This Second Empire style building was erected in 1893. It is currently an art glass studio.

8. Trinity Methodist Church

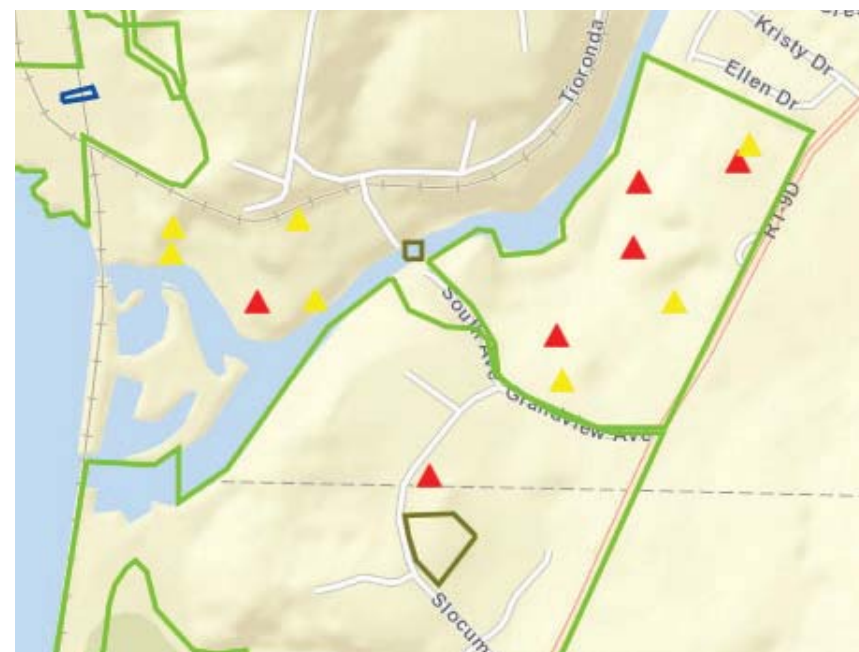
8 Mattie Cooper Square, Beacon. Brick edifice built in 1849 (subsequently expanded several times). It is currently the Springfield Baptist Church. The church faces south and is easily visible and very noticeable from the proposed Main Street route, located one block to the north at the end of Digger Phelps Court.

9. National Biscuit Company Carton-Making and Printing Plant

Beekman Street, Beacon. The 300,000 square-foot factory was built in 1929 by the National Biscuit Company (Nabisco), on the banks of the Hudson with ready access to the rail line. It remained in operation until 1991. Constructed of brick, steel, concrete, and glass, the facility is exemplary of early twentieth century industrial architecture. The building was renovated by the Dia Foundation and opened as a museum in 2003 housing Dia:Beacon, Riggio Galleries, a museum for Dia Foundation's collections.

10. Tioranda Bridge (dismantled)

South Avenue over Fishkill Creek, Beacon. This bridge, built by the Ohio Bridge Company between 1869 and 1873, was listed in the National Register in 1980 but dismantled in 2006. The mortared stone abutments and piers remain. The original bridge was a rare multiple-span, wrought iron, riveted tubular bowstring arch truss bridge.



Screenshot from NYS Historic Preservation Office on-line system: green areas have had an archaeological survey conducted, red triangles are pre-historic sites, yellow triangles are historic sites





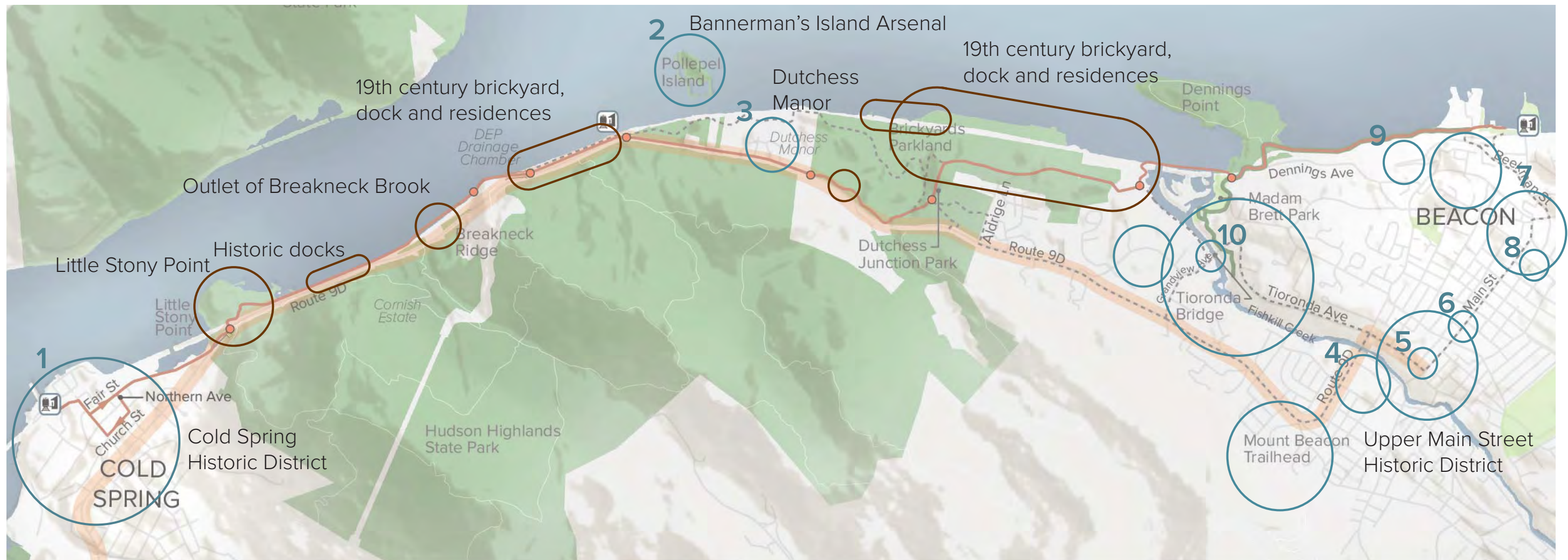
1858 Bachman Map of Dutchess County
Published by John E. Gillette

Archaeological Sensitivity

Some areas considered sensitive based on historic map research are indicated on the map below. Many areas within the City of Beacon, especially along Fishkill Creek, also have potential for both historic-period and pre-contact period archaeological resources.

In future phases of design, additional map research can be used to pinpoint anticipated historic archaeological sites. It is also recommended that archaeologically significant locations along the preferred trail alignment be used as an educational opportunity, telling the story of the rich historic and pre-contact background along the trail through interpretive signage.

-  National Register of Historic Places listed site
-  Potential archaeological site



Trail Alignment - Alternatives Considered

Due to various constraints within the project study area, the design team assessed several route alternatives for each route segment. The cross-section below illustrates those alternatives in general terms. The recommended route of the trail makes use of Alternatives 2-5. No portion of the proposed route of the trail, however, lies east of Route 9D (Alternative 1). From right to left, with the primary custodial agencies indicated, they are as follows:

1. **East of Route 9D:** on or along the steep slopes of the Hudson Highlands State Park Preserve (OPRHP)
2. **Along or on Route 9D:** in right-of-way, alongside roadway (DOT)
3. **Between railroad and Route 9D:** area width and character varies along this State road (Metro-North, DOT, OPRHP)
4. **Along the shoreline:** on the existing land mass, or on a more storm resilient, reconstructed and expanded shoreline (Metro-North, DEC, ACOE)
5. **Off-shore structure:** boardwalk over the river or above a wetland (DEC, ACOE)

Early on in the planning process, Alternative 1 - routing the trail in state park land east of Route 9D - was seen as a viable choice, but upon closer examination this option was ultimately not selected for any portion of the trail because it would require multiple at-grade road crossings or expensive bridges over Route 9D. In addition, it is very costly and disruptive to build a trail into a steep wooded mountainside with stream crossings and private parcels nearby.

The preferred alignment, as detailed in the next chapter, consists of a combination of Alternatives 2-5. Consideration of technical feasibility, cost, construction impacts, jurisdictional issues/availability of necessary property and a lightness of physical touch were weighed in the context of the project goals to improve corridor safety, enhance recreation, and maintain or provide greater access to natural beauty.

The evaluation process that led to the selection of the preferred alignment is described in the following chapter.

