



Darby Paoli Trails Plan

RADNOR TOWNSHIP, DELAWARE COUNTY

May 2015



Darby Paoli Trails Plan

RADNOR TOWNSHIP, DELAWARE COUNTY

May 2015



Hildacy Farm Preserve
1031 Palmers Mill Road
Media, PA 19063

610-353-5587
www.natlands.org

TABLE OF CONTENTS

CONTEXT	1
PURPOSE	1
CHARACTER	2
TRAIL SYSTEM	2
TRAIL SEGMENTS	3
Darby Paoli Road Trail (Orange)	3
The Willows Spur (Red).....	10
The Quarry Trail (Purple)	10
The Riparian Trail (Light Blue).....	12
The Saw Mill Field Loop (Yellow)	15
The Rye Field Loop (Dark Blue)	16
Proposed Trail Closure—The Compost Road.....	17
AMENITIES	17
Parking	17
Signage	18
Furniture	19
DESIGN RECOMMENDATIONS	20
Intersection Improvements.....	20
Riparian Buffers	21
Landscaping.....	21
Cross Country Courses	22
COST ESTIMATES	22
PHASING.....	24
CONCLUSION	24
MAPS	25
APPENDICES	46
Public Bike Pump.....	46
Public Work Stand	47
Potential Funders.....	48

CONTEXT

Radnor Township has recently acquired three parcels which were previously a part of the Ardrossan Estate. They are known as the Rye Field, the Quarry Tract and the Saw Mill Field. By acquiring these parcels, the Radnor Township has filled in the gaps between existing parks and laid the groundwork for an expanded trail system which can serve park visitors, recreational runners, walkers and cyclists, as well as pedestrian and bicycle commuters.

The three newly acquired parcels total approximately 71 acres. This land, combined with the existing Willows, Skunk Hollow, and Saw Mill Parks, creates an interconnected park system totaling 215 acres. Additionally, Township-owned parks and open spaces now occupy continuous frontage on Darby Paoli Road for a length of approximately 1.3 miles.

PURPOSE

New trails through the former Ardrossan parcels and the existing parks would serve two main purposes: provide a safe space for cyclists and pedestrians who currently use Darby Paoli Road and expand the existing trail system, providing 2.86 miles of additional trails as well as improved connections to the community. New trails could also better connect people to nature, history, and culture, as well as provide additional opportunities for recreation.

Darby Paoli Road is classified as a major collector road, accommodating between 3,500 and 10,000 average daily trips. Despite this heavy traffic volume, cyclists and pedestrians use the road routinely. Provision of a paved trail alongside the road could reduce or potentially eliminate conflicts between cars, pedestrians, and cyclists.

Before their acquisition by the Township, the Rye Field, Quarry Tract, and Saw Mill Field represented gaps between the existing Township parks. Now, the addition of these parcels allows the Township to make better connections between the trail systems within the parks. The additional parcels, covered in pasture and crops, home to grazing cattle, also provide different points of interest and other layers of history, culture, and nature to be experienced by visitors.



Radnor's parks and open spaces form a greenway along Darby Paoli Road from the Willows at the north end to the intersection with Godfrey Road at the south.

CHARACTER

The parks, forests, and fields provide a diverse and beautiful setting for the proposed trail system. Where the trail follows Darby Paoli Road, hills will challenge pedestrians and cyclists alike. Those looking for a more peaceful, quiet walk may wish to follow paths proposed through the woodlands, alongside streams and farm fields. History buffs will be greeted by ruins and a landscape shaped by the effects of mills and agriculture. Animal lovers may wish to stop and watch the cattle in the Saw Mill Field or look for fish in the Darby Creek and its many tributaries. This trail system and the landscape it inhabits will provide something of interest for everyone.

The many proposed trail segments are intended to serve different purposes and provide different experiences. Therefore, different segments of trail may be constructed of different materials, to meet the needs of the users and to match the intended experience. Some trail segments will be used as thoroughfares, primarily for moving people and bicycles. Others will permit a slow walk, for quiet contemplation, bird watching or simple enjoyment of nature. Macadam, natural surfaces, and commercially made soft surfaces all lend a different character and are proposed for use accordingly.



Cattle grazing in the Saw Mill Field.

The main stem of the Darby Paoli Trail, intended to serve as an alternative to the street for cyclists and pedestrians, should be wide and paved to permit cyclists and pedestrians to coexist comfortably. The remaining trail segments, intended for pedestrian use, should be of a natural surface (or a soft mixed material) at a width of 4 to 12 feet, depending on the setting. A softer, naturalistic surface will feel appropriate and blend with the landscape in more remote or naturalized areas.

TRAIL SYSTEM

The trails which exist within the Willows, Skunk Hollow, and Saw Mill Park provide a diversity of experiences. The paved trail within Saw Mill Park permits a nice leisurely stroll along the Darby Creek. The natural surface trails which hug the hillsides and weave between the rocks in Skunk Hollow Park and the Willows, present a serene, but more challenging experience. While these trails are a valuable amenity, the trail system is somewhat incomplete, as they exist mostly within the western edge of the parks. The proposed trails will link these trails to the western portions of the parks and the new open spaces (see *Proposed Trail Network* map).

The system will follow a stacked loop pattern. The Darby Paoli Trail will provide a stem, with numerous side trails forming small loops off of the stem, taking trail users into woodlands, through pasture lands, and along the streams. The main stem will connect the Willows and Skunk Hollow Park through the Quarry Tract. It will also provide access into the newly acquired Saw Mill Field. The many side trails will connect the main stem to the existing trails in the parks.

The recommendations contained in this report are conceptual. They address trail location and potential improvements. Many of these recommendations require further study or permitting before they can be implemented. These may include surveys, engineering studies of floodplains and streams, bridge design, or permitting from local, state or federal agencies. The plan includes **bold text to describe where additional study or permitting may be required.**

TRAIL SEGMENTS

Darby Paoli Road Trail (Orange)

SNAPSHOT

Approximate Length at Completion: 1.1 Miles

Primary Users: Pedestrians, Cyclists

Proposed Primary Surface Material: Asphalt

Proposed Secondary Surface Material:

Prefabricated Bridge

Proposed Trail Width: 10–12 feet

Proposed Corridor Width: 16–18 feet

Proposed Clearance Height: 8–10 feet



Cyclists ride on Darby Paoli Road, mixing with high speed traffic.

DESCRIPTION

The Darby Paoli Road Trail will be the main stem of the trail system. Aside from serving the adjacent parks and properties, it has the potential to be a major part of the developing Radnor Township-wide trail system, as well as an alternate route for the John Heinz Wildlife Refuge to Valley Forge Trail. The acquisition of the Quarry Tract and the Saw Mill Field make the creation of this trail possible, as the gaps between Township parks have been filled. The Township now has the ability to provide an off road alternative to cyclists and pedestrians wishing to follow Darby Paoli Road.

The Darby Paoli Trail is intended to follow the path of Darby Paoli Road, with deviations only where necessary due to existing natural features or other obstacles. This stem is intended to function not only as a recreational trail, but also as a thoroughfare, a means of transportation, where a direct route is preferred. Therefore, some sections of the trail will follow steep grades.

The trail would begin at the southernmost parking area along the Willows driveway and would essentially follow Darby Paoli Road south to the intersection with Lawrence Lane. Between the two endpoints, the trail will traverse the manicured turfgrass of the Willows, the cornfields in the Quarry Tract, riparian forests in Skunk Hollow Park, a meadow and ruins, remnants of the historic landscape, and pasture land in the Saw Mill Field. Few roadside trails in the region will match the beauty and diversity of scenery of the Darby Paoli Trail.

Many opportunities and obstacles exist within the proposed trail corridor. Natural features, including the many streams and rolling hills, provide beauty and interest, but also create difficulties in trail layout and construction. Some of the existing manmade structures are ugly, but can be used as trail infrastructure. The neighboring uses, such as grazing cattle provide interest, but interest best viewed from a distance. Most of these factors will be discussed below within descriptions of each sub-segment. Larger design issues, such as intersections, will be addressed later in the report.



Willows and Quarry Tract

The trail will begin at the Willows parking area located furthest south along the driveway. A connector trail is proposed to follow the driveway to Darby Paoli Road. The main stem of the Darby Paoli Trail begins here, going up the hill towards the intersection of Darby Paoli Road with Newtown Road. Connections to the proposed crosswalks should be incorporated. The trail then follows the edge of the existing cornfields to the southern end of the Quarry Tract, where it enters the woodlands. Existing tractor paths and unplanted areas between the cornstalks and the road will accommodate the trail corridor nicely. Removal of some small trees and scrub vegetation along the edge of the road may be necessary in this area.

Skunk Hollow Park Riparian Woodlands

At the boundary between the Quarry Tract and Skunk Hollow Park, cornfields give way to riparian woodlands. Within the woodlands, federally regulated wetlands and floodplains cover much of the landscape. There are two options for addressing this area: cross the wetlands and floodplains, or go around them. Each option presents additional challenges which require further study. In order to cross the wetlands and/or floodplains, permits must be obtained from the Pennsylvania Department of Environmental Protection (DEP), the Delaware County Conservation District, and potentially other agencies. Permits will likely require use of a bridge, boardwalk, or other elevated structure. These structures are costly and must be installed per DEP requirements.

The second option takes the trail around the wetlands and floodplains in the area, keeping it close to Darby Paoli Road. However, steep slopes in this area may require a structured trail to be constructed on the steep cross slopes. **Further study is required to determine the exact location of wetlands and floodplains.** After additional study of the wetlands and floodplains, an engineer should determine whether structures are necessary, or whether there is adequate area between floodplains/wetlands and the steep slopes to construct a trail at grade.



The edges of the cornfields along Darby Paoli Road provide a level surface for the trail to follow.

The Public Works Driveway

From the riparian woodlands, the trail winds through a rocky area before meeting Little Darby Creek. This creek is one of the larger tributaries, and intersects with the proposed trail corridor in two places. Fortunately, at the first intersection, a bridge already exists. The bridge is used by Public Works employees to access their material storage yard as well as the composting facility.

Sharing the bridge with large trucks and equipment may not be ideal, but it is the best option for bringing the trail over the creek, through a difficult landscape. The trail would connect to the driveway close to its entrance to Darby Paoli Road. It would then follow the driveway over the bridge before crossing the driveway into the materials yard.

The bridge and connected driveway should be marked with sharrows painted on the ground surface. Signage should be established along the trail and along the driveway to alert trail users and vehicles that they are entering a shared space. The surface of the bridge would also likely need to be repaved to match the surface of the trail.

The Public Works Materials Yard

After crossing the Public Works driveway bridge, the trail would use another utilitarian area. The Public Works materials storage yard exists to the south of the driveway, between the driveway and the southern section of Skunk Hollow Park. Little Darby Creek flows alongside the yard to the east, while sloped woodlands exist to its west. The materials yard provides a cleared, flat corridor for the trail.

The proposed trail will leave the driveway and follow the easternmost edge of the materials yard for less than 50 feet. Then it will slowly descend down to the banks of Little Darby Creek, snaking between large rocks and trees. It will then head south and curl around the corner of the materials yard. Much of the trail will be well below the grade of the yard. It would then continue south until it meets Camp Run.



Historic ruins exist below the public works materials yard.



With some improvements, the trail can use the existing bridge from Darby Paoli Road to the materials yard.



The trail is proposed to enter the materials yard before dipping down closer to the banks of the Little Darby Creek.

Proposed Bridge

In order to keep the Darby Paoli Trail close to Darby Paoli Road, maintaining its direct route, the trail corridor must pass over Camp Run. The stream offers few natural crossing points, as it meanders, features some steeply eroded banks, some sandy banks, deep pools, and wide turns. However, southeast of the materials yard, an existing pipe crosses the stream within a dam-like structure. This area features stable banks and ample, flat areas on each side. A new bridge could collocate with the existing pipe, reducing disturbance, and potentially providing better access to the pipe for maintenance.

Installation of a bridge will require additional engineering design and study as well as permitting.

A simple, prefabricated bridge may be adequate. The proposed bridge should be 10 to 12 feet wide, accommodating the trail at its full width. Cost of the proposed bridge may cause it to be installed as a second phase. In the interim, the existing Mill Race Trail can be used as a temporary connector.

The existing Mill Race Trail is extremely wet, as it exists within wetlands. The trail's surface is also below the surrounding grade. It appears to have been dug or cut into the landscape, but may be the result of subsided soil.



A new bridge will be necessary to cross Little Darby Creek near the existing sewer line crossing.



The existing trail and bridge can be used to cross Little Darby Creek until a new bridge can be constructed.

It resembles a wide trench. Due to its location within wetlands, a low impact treatment should be considered. A “turnpike” could be constructed by filling the trail trench with crushed stone to bring the surface above the surrounding grade. This would help alleviate the issue of standing water on the trail. A mixture of crushed stone and fines would create a relatively stable surface while still permitting drainage. **However, it is unclear whether this treatment would be permitted within the wetlands.**

The existing trail veers to the west, where it ultimately leads to the existing bridge, known as the “boy scout bridge.” On the south side of the boy scout bridge, the existing trail is much drier. It weaves through existing vegetation as a narrow, single track or shoulder width trail. If this section of trail is used as an interim connector, it should remain unchanged. Paving should not be undertaken in this area.

The existing trail emerges from the woodlands and follows mowed grass paths through a meadow along Sawmill Road. Trail users would be directed to Sawmill Road near the existing connections to Saw Mill Park. To access the proposed trails within the Saw Mill Field, users would need to cross the existing road bridge on foot. Additional signage regarding pedestrians should be installed to alert vehicles. This situation is not ideal, but may be suitable as a short term solution.

Meadow and Ruins

After crossing the proposed bridge, the Darby Paoli Trail will enter a meadow, hidden from the nearby roads by a strip of woodlands. Historic aerial photos reveal that between 1937 and 1971, this area was cleared as part of the Ardrossan agricultural operations. The photos do not show row crops, so it is assumed that the area was used as grazing land. The existing meadow appears to be the result of long term grazing, and has only recently begun the process of succession.

The existing meadow provides a transition area for the trail. To the north, the trail is within woodlands. To the south, the trail will be within open areas, along the right-of-way and pasture lands. It is likely that many trail users will stop in the meadow. The bridge will be a good point of orientation, an easily identifiable feature. Trail users



A meadow exists in Skunk Hollow Park, which will provide a change of scenery for trail users.



Mature forests and historic ruins both exist where the Darby Paoli Trail will approach Sawmill Road.

may also wish to check their maps here, before heading into the woods. The meadow provides a natural resting or gathering place, wide open and in the sunshine. At the southern end of the meadow, stone ruins exist within the thin strip of woodlands. The ruins may be remnants of a mill, forge, home, or other structure. The Radnor Historical Society or other community organizations should be consulted. The ruins provide a point of interest for trail users and should be highlighted with interpretive signage or other amenities.



The wide lawn between the grazing fields and the road provides a perfect setting for the Darby Paoli Trail.



The cattle in the fields will add to the diversity of scenery and surroundings throughout the trail system.

Saw Mill Field

After leaving the meadow and passing the ruins, the trail will cross Sawmill Road. The intersection does not appear adequate to safely accommodate a trail crossing. Suggested design improvements are discussed later in the report. After crossing Sawmill Road, the trail will follow the Darby Paoli Road right-of-way, along the edge of the recently acquired Saw Mill Field.

The northern portion of the Saw Mill Field frontage on Darby Paoli Road appears well suited to implementation of a trail. Much of the frontage is relatively flat and wide open, with few obstructions. Cattle graze nearby within the fenced area, lending more interest to the trail. A few large trees provide some shade as well as visual anchoring for this segment. Following relocation of some sections of the existing fence, the area should allow for installation of trailside amenities such as street trees and rain gardens.

The southern portion of the Saw Mill Field frontage will be slightly more challenging. The entire length of fence will need to be relocated. The trail will cross a small stream, squeeze between the road and an existing farm building, skirt a proposed parking area, then climb a steep hill. With additional design and study, these obstacles can be overcome.

The small stream originates in the Ardrossan parcels across the street. It travels beneath Darby Paoli Road through a box culvert, before spilling out into the field, where it meanders down to Darby Creek. It appears that the existing box culvert could be supplemented or extended with an additional culvert. The trail could then be built at grade over the culvert. **This may require permitting from DEP, DCCD, and possibly other agencies.**

South of the stream crossing, a small, corrugated metal, farm building stands approximately 30 feet from the edge of the road. The trail will travel between the building and the road. The building is used in relation to the cattle operation. To bring the trail behind the building would require the fencing to be moved further into the field, reducing the grazing area even further.

A new small parking area is proposed south of the building. The parking area will accommodate 10 to 15 spaces. Further design is necessary, but it will likely access southbound Darby Paoli Road with two one-way driveways. The parking area could be constructed with pervious paving, such as porous asphalt, crushed stone, or grass pavers. This is also a logical place for installation of an informational kiosk or signage and other amenities.

Travelling south from the parking area, the trail will climb a steep hill towards the historic schoolhouse, currently used by the Boy Scouts. Trail users travelling from the south, particularly cyclists, will find the downhill to be steep. In order to help control speed and manage the grade, the trail should be implemented with some meanders in this section. As the steep hill leads down to the parking area and shed, there are likely to be people gathering, entering, and exiting the trail in this area. It is important to manage speeds here to minimize high speed conflicts.

FUTURE CONNECTIONS

The historic schoolhouse marks the end of the Township's frontage on Darby Paoli Road. Here, the trail will be installed within the Darby Paoli Road right-of-way. There may be opportunities to continue the trail south along the road beyond the Township's holdings. The trail may need to be designed quite differently, potentially as a combination of on-road bike lanes, sidewalks, and other paths within the right-of-way. Additionally, some landowners to the south may wish to sell or donate easements or land to accommodate trail extensions, per the *Radnor Greenways and Open Space Network Plan*.



The existing culvert must be replaced or extended to accommodate the trail.



The Camp Run floodplain, which crosses Saw Mill Field, can be restored with riparian buffer plantings.



The existing shed will remain in use after the trail opens.

The Willows Spur (Red)

SNAPSHOT

Approximate Length at Completion: 0.16 Miles

Primary Users: Pedestrians, Cyclists

Proposed Primary Surface Material: Asphalt

Proposed Secondary Surface Material: None

Proposed Trail Width: 10–12 feet

Proposed Corridor Width: 16–18 feet

Proposed Clearance Height: 8–10 feet

DESCRIPTION

The spur is intended to provide direct access from the parking area to the paved Darby Paoli Trail. The spur is proposed to travel alongside the existing driveway, except to avoid the existing trees. As the Quarry and Riparian Trails are proposed to be surfaced with a soft material, the Willows Spur is proposed to be paved, likely making it the preferred option for cyclists wishing to get to the main trail expediently.



The Willows Spur will be adjacent to the existing driveway, providing a separate, safe space for bikers and walkers.

The Quarry Trail (Purple)

SNAPSHOT

Approximate Length at Completion: 0.16 Miles

Expected Users: Pedestrians

Proposed Primary Surface Material:

Compacted Soft Surface/ Aggregate

Proposed Secondary Surface Material:

Compacted Soil/ Tractor Path

Proposed Trail Width: 5–6 feet

Proposed Corridor Width: 9–10 feet

Proposed Clearance Height: 8–10 feet



The Quarry Trail will begin along the banks of Little Darby Creek within the Willows.

DESCRIPTION

The Quarry Trail will be used heavily to access the proposed trail system. From the existing parking area, visitors can take the Quarry Trail to the Darby Paoli Road Trail or to the proposed Riparian Trail (discussed later in this report). The Quarry Trail will offer a gently sloped, meandering, scenic route.

From the parking area, the trail will go west, towards Darby Creek. It will ascend the hillside using one very large climbing turn, winding the trail around existing stands of vegetation. It will then run across the top of the grassy hill before cutting through the hedgerow, into the quarry area. There, it will pick up the existing tractor path which meanders up to Darby Paoli Road.

The Quarry Trail will bring visitors to parts of the Quarry Tract which were previously off limits as it was private property. The 1937 aerial photograph clearly shows the area which was quarried. Now, eighty years later, the area has been reclaimed by nature. While the area is still a depression, other signs of the past use are not readily apparent. The surrounding trees make a private place, a stark contrast to the wide open turf fields of the neighboring Willows.



The existing tractor path provides an ideal connection to the Darby Paoli Trail.



Agricultural features, such as bee boxes, can be avoided or integrated as features of the trail system.



The Quarry Trail can follow the existing tractor path from the quarry area up to the Darby Paoli Trail.



The Quarry Trail can follow the existing tractor path from the quarry area up to the Darby Paoli Trail.

This area has been discussed as a potential future site for relocated farming activity. As other portions of the Ardrossan site are developed, displaced agricultural activities will need to find new homes. The quarry area could be a logical site. Should agricultural activities be relocated here, the trail would need to be carefully sited to limit interference or conflict. However, it is important that the two uses not be totally segregated from each other. An active farmstead or barnyard could provide more interest along the trail as well as present the potential for farm related activities and programs along the trail.

The trail is proposed to leave the quarry area, connect to the existing tractor path, and curve gently up the hill to Darby Paoli Road. The tractor path is well compacted. The surface can remain as it is, with some minor maintenance, including filling of some ruts. Trail users would need to be notified that they are on a shared path. They could encounter, and should yield to, farm equipment and vehicles. Farm vehicles are not expected to be on the path often, and especially not at peak times for trail use. The relationship between trail users and farm activities can be easily managed.

The Riparian Trail (Light Blue)

SNAPSHOT

Approximate Length at Completion: 0.30 Miles

Expected Users: Pedestrians

Proposed Primary Surface Material:

Compacted Soft Surface/Aggregate

Proposed Secondary Surface Material:

Compacted Soil/ Tractor Path

Proposed Trail Width: 5–6 feet

Proposed Corridor Width: 9–10 feet

Proposed Clearance Height: 8–10 feet

DESCRIPTION

The Riparian Trail is proposed to roughly follow the line where the existing cornfields meet the edge of Little Darby Creek's floodplain. The trail sprouts from the Quarry Trail and connects to the Darby Paoli Trail to the south. It will cross one small tributary flowing within a hedgerow,

separating the two cornfields. The trail should be close to, but kept out of the floodplain.

On the trail's downhill side, a fairly significant buffer exists, protecting Little Darby Creek from runoff flowing out of the cornfields. However, this same runoff will flow over the proposed trails surface prior to flowing into the buffer. This could lead to erosion issues without some constructed stormwater best management practices (BMPs). Additionally, the trail's surface should be constructed at an approximately 2% cross slope, to aid in the drainage of water off the surface and into the riparian buffer area.

To the east of the trail, the uphill side, BMPs should be installed to help slow, capture, and infiltrate stormwater before it meets the trail surface. Additional trees would help keep the soil from becoming further compacted, permitting more water to infiltrate. Rain gardens could be installed to capture stormwater and further beautify the trail. Plantings would require ongoing maintenance and would also take additional farmable land.

Installation of a level lip spreader may achieve similar results while requiring less ongoing maintenance. It may also occupy less farmable land. A level lip spreader is essentially a very shallow swale, constructed parallel to the uphill edge of the trail. The spreader can be planted with a mix of meadow grasses, which require less maintenance than specimen plants typically planted in rain gardens. Regardless of its effect on the trail surface, the level lip spreader will also help to protect Little Darby Creek from stormwater runoff.

The trail is proposed to follow the edge of the cornfields before heading into the rocky woodlands where Little Darby Creek approaches Darby Paoli Road. On its way, the trail must cross over a small culvert. The culvert currently permits farm vehicles to cross the tributary and easily cross between the two cornfields. It appears that the trail can be built on grade over the existing culvert. **However, it is recommended that the culvert undergo further study by an engineer to determine whether it is appropriately sized for the amount of water it conveys and whether it is structurally sound to support the proposed trail.**



Stormwater BMP's should be installed along the trail where agricultural runoff will cross its path before flowing into Little Darby Creek.

The Riparian Trail is then proposed to enter the woodlands and follow a curve in Little Darby Creek, before intersecting with the Darby Paoli Trail. This creekside area is beautiful, a hidden gem in the greenway. Small side paths can be installed to bring people down to the water's edge. With the abundance of large rocks which can be used for seating, this area is sure to be a natural stopping point.



Stormwater BMPs should be installed along the trail where agricultural runoff will cross its path before flowing into Little Darby Creek.



The Riparian and Darby Paoli Road Trails will converge at a beautiful bend in Little Darby Creek.



The large stones strewn about the woodlands provide added interest as well as natural seating.

The Saw Mill Field Loop (Yellow)

SNAPSHOT

Approximate Length at Completion: 0.5 Miles

Primary Users: Pedestrians

Proposed Primary Surface Material:

Compacted Soft Surface/ Aggregate or Gravel

Proposed Secondary Surface Material: None

Proposed Trail Width: 5–6 feet

Proposed Corridor Width: 9–10 feet

Proposed Clearance Height: 8–10 feet

DESCRIPTION

Most of the proposed trails travel through forests, along roads and cornfields, up and down hillsides. The Saw Mill Field Loop is different as it is relatively flat and circles pasture lands, with wide open views across the fields. Trail users will be able to get close, but not too close, to the grazing cattle. They'll be able to watch fishermen at Darby Creek. They'll see restoration projects with newly planted trees and shrubs growing up to reclaim the streambanks.

The Saw Mill Field Loop will provide options for visitors using the trail system in different ways. For visitors on a long walk or run through the trail system, the Saw Mill Field Loop can be used as a large turnaround. The loop, including the adjacent section of Darby Paoli Trail, is approximately a half-mile long, making it ideal for runners or walkers who want a measured workout. They may use the Saw Mill Field Loop more like a track, counting laps as they circle the cattle. It also provides a less direct, but more scenic route for trail users simply trying to get from one end of the trail system to the other.

The Saw Mill Field is currently home to grazing cattle, controlled by perimeter fencing. In order to implement the loop trail, the fencing will need to be relocated inward. The trail is proposed to fit within a 9–10 foot wide corridor. However, fences may need to be relocated farther in order to accommodate other amenities such as the parking lot and to meet current best management standards. New fencing may be necessary to keep the



The existing fencing around the the Saw Mill Field will need to be relocated to permit the trail to pass between the pasture and the mature sycamore trees.



The wide grass shoulder along Darby Paoli Road provides ample space to install the trail, street trees, and rain gardens.

cattle out of the stream which runs through the middle of the field. Fences may need to be moved further from Darby Creek in order to permit additional buffer plantings.

As the loop travels along Darby Creek, it will need to cross the small tributary which crosses the field. This is the same tributary that the Darby Paoli Trail is proposed to cross using an extended culvert. At this end of the tributary, close to its entrance to Darby Creek, it is unclear whether a culvert will be adequate, or whether a small bridge will be necessary.

While much of the Saw Mill Field is relatively flat, there is a steep hill at the southern end. The trail is proposed to stay as close to the existing southern property line as possible in order to leave as much usable pasture land as possible within the relocated fencing. However, in order to bring the trail up the hill, switchbacks or climbing turns will be necessary. The steep grade prohibits a straight trail. Trails which run straight up or down a slope are referred to as “fall line trails.” Fall line trails represent the most direct route for water to run down a slope. Therefore, fall line trails typically act as stormwater channels. This unintended consequence leads to severe erosion and an unsustainable trail. Therefore, fall line trails are to be avoided. Switchbacks or climbing turns must be utilized in this area to avoid the creation of a trail which cannot be maintained sustainably.

The Rye Field Loop (Dark Blue)

SNAPSHOT

Approximate Length at Completion: 0.8 Miles

Primary Users: Pedestrians

Proposed Primary Surface Material: Grass

Proposed Secondary Surface Material: None

Proposed Trail Width: 4–6 feet

(Depending on available mowing equipment)

Proposed Corridor Width: 4–6 feet

(Wider on curves as necessary)

Proposed Clearance Height: 8–10 feet

DESCRIPTION

The Rye Field sits up on a hillside, overlooking the Willows and Skunk Hollow Park. Preservation of the field was paramount to preserving the viewshed along Darby Paoli Road. Views out of the Rye Field to the neighboring parks and the landscape beyond make it a wonderful public space. The trail here will be different than the rest of the trail network.

The hillside and proposed grass paths will lend themselves more to casual strolls through the field. This will be a trail for enjoying the sunshine and watching birds, butterflies, and bees mingle in the meadow. The top of the hill will be a popular picnic spot. It will likely also be a great place to watch the sunset over the hills to the west.

The Rye Field sits on a challenging slope. The trail is proposed to connect to the intersection of Newtown and Darby Paoli Roads and encircle the preserved property. However, due to the slopes, a simple loop would lead to creation of fall line trails, which lead to major erosion issues. Similar to the sloped section of the Saw Mill Field Loop, climbing turns or switchbacks will be needed to create a sustainably maintainable trail.

Proposed Trail Closure: The Compost Road

The trail along the southeast side of the compost facility is problematic. This trail is really a dirt road meant to provide access to the compost facility. Water runs off from the hillside facility and soaks the trail, making it a rutted, muddy mess. The condition of the road, the conflicts with vehicles and machinery, and its surroundings make this trail a weak link in the network. When the Darby Paoli Trail and the connector trails are constructed, the compost road should be closed to pedestrians. The trail should be routed up the hill to make a loop around the CSA, or ended at the CSA entrance, providing access to the gardens, but not beyond.

AMENITIES

The trails themselves are the most important amenities, but the provision of additional features such as parking, signage, and site furniture can be the difference between a very good trail system and a great trail system. Additional parking can make the trail system accessible to more users. Signage can educate as well as help keep visitors from getting lost, making them feel safer. Site furniture such as benches can make visitors more comfortable. These amenities, provided judiciously, can make the trail network even better!

Parking

A small parking area is proposed to accommodate 10 to 15 spaces on the Saw Mill Field property. These spaces are necessary as there appears to be inadequate parking available to users of the southern end of the park system. The Saw Mill Field Loop could be used as a standalone trail. Parking would provide visitors with the opportunity to come directly to this trail.

In addition, parking here could help alleviate an existing problem. The historic schoolhouse, used by the Boy Scouts, has no parking associated with it. When parents drop children off, they often pull onto the neighboring residential streets. A new parking area in the Saw Mill Field could help alleviate this problem.



The road which serves the compost operation can be closed to pedestrians once the Darby Paoli Trail is opened.



Plantings can be installed to disconnect the grass path below the community gardens from the compost operation road.

The proposed parking area should be landscaped. The landscaping should block headlights and provide shade for parked cars. The parking area should not be completely screened, as views into the lot are necessary for reasons of security. Plant material should match material used throughout the trail network in order to better integrate the parking area with the surrounding landscape.

Stormwater management and restoration of stream corridors may be a major focus on the Saw Mill Field. Therefore, the parking area should be designed to be in harmony with these principles. That may mean construction with pervious materials such as porous asphalt, crushed stone, or grass pavers.

Rain gardens may be installed to catch any runoff from the lot, before it makes its way into the field. Sunken planting islands with no curbing could also retain water within the parking area's footprint. The parking lot presents opportunities for the Township to follow best management practices and educate trail users.

Signage

The trail network would benefit from the installation of wayfinding and interpretive signage. When the proposed trail network is completed and combined with the existing trails within Skunk Hollow and Saw Mill Parks, a total greater than five miles of trails will connect the parks and open spaces. Within these five miles, there will be countless intersections, twists, and turns. Wayfinding signage will be a necessity to help guide trail users. Additionally, the trail network will expose visitors to interesting bits of history, nature, and culture along the way. Interpretive signage can help enrich these experiences.

Wayfinding signs should be prevalent along the trail system, without overwhelming trail visitors. A hierarchy of signs should be established. Kiosks should be placed at parking areas and display trail maps, rules and regulations, and other important information. Smaller signs can be posted along trailsides at intersections or major features such as bridges. These signs may include information such as trail names and distance, and direction to other features or places. Finally, trails should be blazed or marked with simple markers along the way. Designating colors to

represent trails allows blazing of trees to let trail users easily identify the trail they are following.

Educational opportunities abound along the trail network. Interpretive signage can help to point out and explain some of the more interesting features. History, nature, and culture are all present throughout the network. Interpretive signage could be provided to explain the following topics:

- History and Culture
 - The industrial past and the legacy of the region's mills
 - The Ardrossan Estate
 - The Historic Schoolhouse
 - Agriculture: cattle and corn
- Nature
 - Wetland, floodplain, and upland plant communities
 - The importance of introduced and native bees to agriculture and native plant communities
 - Floodplain and riparian corridor restoration and the role of stormwater management
 - Meadow succession

Interpretive and wayfinding signage should be made to match. The signs should share common color schemes, fonts, and materials. A Township-wide signage system would integrate the parks and open spaces as a connected system.

Furniture

Like the existing trail network within the Township parks, the proposed network also does not need much site furniture. However, a few well placed items would go a long way. Benches, water fountains, bike pumps, and work stations can be installed fairly easily. Additional bathrooms may also be considered.

The Darby Paoli Trail is intended to lure cyclists off of Darby Paoli Road for their own safety. Provision of bike friendly amenities would help demonstrate that this trail welcomes cyclists. Public bike pumps and work stations can be installed near the parking areas. Bike pumps are useful to avid road cyclists as well as to the parent who has forgotten to pump up the tires on his child's tricycle. Work stations can be provided to help the more serious cyclist stop and fix any issues with the bike rather than heading home for a repair. Details for pumps and workstations are included in the appendix.

If public water is accessible, fountains should be installed at the existing parking area in the Willows as well as in the proposed parking area. These two locations would allow trail users to fill up before, during, or after using the trails. Additionally, the trails will likely be well used by dog walkers. Dog fountains and dog waste bag dispensers should also be considered.

Installation of benches should be limited to high visibility areas such as the existing and proposed parking areas and the Rye Field high points. Benches placed in low visibility areas may tend to be vandalized or act as unauthorized, after hours hangouts. The parking areas are logical locations for benches as trail users arriving there may momentarily use benches to change into the cycling shoes, tie their running shoes, wait for their friends, or otherwise get ready to hit the trails.

As discussed in the previous section, the Rye Field Loop will provide great views of the surrounding landscape. A few benches placed at the high points will encourage people to stop, sit, and enjoy the views. After sunset, the neighbors in the Ardrossan development should be close enough to see or hear anyone lingering at the benches.

Trail users who park at the Willows and venture to the end of the Saw Mill Field will find themselves a mile away from the nearest public restroom. The Township may wish to consider constructing additional restrooms near the southern end of the trail system. Prefabricated restrooms may be adequate, as many options beyond the typical port-a-potties are now available.

DESIGN RECOMMENDATIONS

The Township parks and open spaces are all beautiful settings for the proposed trail system. However, design of some additional elements will improve the trail system by making it safer, more beautiful, and more environmentally friendly. Where the trail is proposed to cross roads, safety improvements are a high priority. The addition of trees and shrubs along some trail segments will make it more beautiful. Streams and other natural features require some additional stewardship, which will benefit the trail as well.



Poor sight distance and steeply banked roadsides present challenges to creating a safe pedestrian crossing. Extensive grading may be necessary to connect the intersection to the trail system.

Intersection Improvements

The trail system is proposed to cross over Darby Paoli Road at the intersection with Newtown Road. The Darby Paoli Trail will connect to the Rye Field Loop. However, the intersection isn't very pedestrian friendly, and there are obstacles to improving it.

The intersection is to be improved to require all traffic to stop. A crosswalk should be installed connecting the northwest corner of the Rye Field, across Darby Paoli Road, to the Quarry Tract. Steep banks exist on the Quarry Tract side of Darby Paoli Road. Rather than bringing pedestrians up the bank, or undertaking major grading work, a ramp should be installed which runs generally parallel to the road and connects to the trail within the Willows. A retaining wall will likely be required to hold the bank.

On the Rye Field side of the road, the connection will be easier, requiring little grading. The area is relatively flat. The Rye Field Loop is proposed to be a mowed grass path. Where the crosswalk meets the grass, some paving may be necessary as a transition from the street to the grass. A short stretch of crushed stone pathway may help make this transition, as well as provide a harder surface for what should be a high traffic area.



Large turning radii keep traffic moving quickly at the intersection of Darby Paoli and Saw Mill Roads. Improvements including bumpouts and reduced radii could improve pedestrian safety here.

The Darby Paoli Road trail is proposed to cross Sawmill Road at the southern end of the network. Sawmill Road is a heavily traveled road as it is used as a shortcut from Route 3 and Goshen and Malin Roads to the west. From the other direction, traffic comes off of Darby Paoli Road at high speeds. The existing bridge over Darby Creek has a steep grade, making visibility beyond the bridge limited.

The Darby Paoli Trail is proposed to follow Darby Paoli Road and cross Sawmill Road near their intersection. This is a dangerous intersection due to the volume and speed of traffic as well as the sight distance issues associated with the bridge. A few improvements could lead to a safer trail crossing. The intersection could be reshaped to greatly reduce the turning radii. Traffic currently leaves Darby Paoli Road without slowing down much, as the large radii accommodate fast turns. Reduced radii would require traffic to slow down to turn.

Where the trail crosses Sawmill Road, it could occupy bumpouts. Bumpouts would make Sawmill Road even narrower, again forcing traffic to slow down. The combination of bumpouts and reduced turning radii may also encourage cars turning right from Sawmill Road onto Darby Paoli Road to come to a complete stop at the stop sign, rather than rolling through and making their turn without stopping. Additionally, signage should be considered on the western side of the bridge, alerting drivers to the existence of the trail before they can see it. **The intersection will require further study from an engineer,** but a combination of these measures may help slow down the traffic at this busy intersection.

Riparian Buffers

Radnor Township is consulting with the Stroud Water Research Center to establish riparian buffers along portions of Darby Creek and the tributary running through the Saw Mill Field. Stroud will lead the effort in designing the buffers and specifying the trees and shrubs. The buffers will improve water quality, but will also benefit the trail system. The additional vegetation should help reduce erosion issues near the trails, as well as beautify the surroundings. The buffers will also provide another opportunity for education while connecting with nature.

Landscaping

Most of the proposed trail routes go through woodlands or along their edges. Others weave through farm fields or meadows. These trails will require little to no additional landscaping. However, the portion of the Darby Paoli Trail proposed along the Saw Mill Field, will benefit from some additional landscaping for improved function and beauty.

The lawn between the existing fence and the road seems perfect for implementation of a trail. The grade is relatively flat, the soils are dry, there are no floodplains, and few physical obstacles. However, this area is exposed to Darby Paoli Road, with nothing to separate them. The addition of trees between the trail and the road would help the situation. Trees can act as traffic calming devices, encouraging drivers to slow down, making the trail corridor safer. As they mature, they can also provide a physical barrier. They can screen the road from the trail, making it more beautiful. Trees would also provide summer shade for a section of trail in full sun, making it more pleasant.

In addition to trees, shrubs and grasses can also improve the area. Stormwater runs off the road into the lawn where the trail is proposed. Rain gardens between the trail and the road can help keep water from reaching the trail. Additionally, rain gardens between the trail and the fences can help keep water from flowing into the pasture. Rain gardens and other plantings can also be used as barriers, allowing people to see the cattle, without letting them get too close to them.

At the northern end of the Saw Mill Field, the fence is located 40 to 50 feet from the road, which provides an adequate trail corridor along most of this frontage. However, there are two large Sycamore trees growing near the intersection with Sawmill Road. The fence should be relocated to allow for the trail to avoid these beautiful trees. Further south along Darby Paoli Road, the fence is much closer to the road. The fence will need to be set back further into the field to accommodate the proposed trail corridor.

Cross Country Courses

Skunk Hollow Park and the Willows are already home to the Radnor Conservancy's Race for Open Space 5K Trail Run. Now, with the addition of the parcels from Ardrossan and development of additional trails, the site can potentially host high school cross country meets as well. The rolling terrain will make both the 5K and 5 mile courses challenging, but the surrounding scenery, the woodlands, community garden, cornfields, and streamsid es, should make them enjoyable as well. The proposed courses (see *5 Mile Course* and *5K Course* maps) have been measured using online mapping software, but should be verified and measured in the field prior to any event planning.

COST ESTIMATES

During the subdivision process, Gannett Fleming prepared cost estimates for installation of a trail system comprised of macadam, gravel, and grass trails. The estimate addressed trails within the Quarry, Rye and Saw Mill Field tracts as well as a connecting trail through Skunk Hollow Park. This conceptual trail plan fine tunes the proposed trail layout and includes additional trails, spurs, and interim connections. The cost estimates below address the installation of the proposed conceptual trail layout and proposed stream crossings. The Gannett Fleming estimate included costs for additional items including relocation of fencing and cattle crossings, which this estimate does not include. Therefore, the two estimates should not be directly compared to each other.

Cost Estimate for Trails				
TRAIL NAME	PROPOSED MATERIAL	PROPOSED LENGTH (LF)	COST PER LF	COST OF TRAIL SEGMENT
Darby Paoli Trail	Macadam	5913	\$12.72	\$75,213.36
Willows Spur	Macadam	845	\$12.72	\$10,748.40
Quarry Trail	Gravel/Soft Surface	1584	\$9.28	\$14,699.52
Riparian Trail	Gravel/Soft Surface	1584	\$9.28	\$14,699.52
Saw Mill Field Loop	Gravel/Soft Surface	2640	\$9.28	\$24,499.20
Existing Trail Improvements	Gravel/Soft Surface	1505	\$9.28	\$13,966.40
Rye Field Loop	Mown Grass	4329	\$0.24	\$1,038.96
SUBTOTAL				\$154,865.36

Cost Estimate for Stream Crossings				
PROPOSED CROSSING LOCATION	PROPOSED CROSSING TYPE	QUANTITY	COST (LUMP SUM)	TOTAL COST
Darby Paoli Trail Bridge (Wigwam Run)	75' Span	1	\$72,000.00	\$72,000.00
Saw Mill Field Bridge	Macadam	845	\$12.72	\$10,748.40
(Camp Run)	75' Span	2	\$72,000.00	\$144,000.00
Wheeler Tract Culvert (Unnamed Tributary)	8' Length	1	\$1,000.00	\$1,000.00
SUBTOTAL				\$217,000.00
Total				\$371,865.36

PHASING

The plan proposes nearly three miles of new trails, three bridges, a new culvert, and many other associated improvements.

The project can be broken down into three phases: I) The Darby Paoli Trail, II) All Other Trails, and III) Additional Amenities.

Phase I

The Darby Paoli Trail could include installation of the following:

- The paved Darby Paoli trail and Willows Spur
- The proposed bridge over Wigwam Run
- The proposed bridge over Camp Run
- The proposed parking area
- Intersection improvements at the Sawmill Road crossing
- Street/trail trees along Darby Paoli Road adjacent to the Saw Mill Field
- Rain Gardens along the trail adjacent to the Saw Mill Field

Phase II

All Other Trails could include installation of the following:

- The mowed grass Rye Field Trail
- Intersection improvements at Newtown and Darby Paoli Roads including the trail connections
- The gravel Riparian Trail
- Level lip spreaders on the uphill side of the Riparian Trail
- The Quarry Trail
- The Saw Mill Field Loop Trail
- The proposed bridge over Camp Run on the Saw Mill Field Loop

Phase III

Additional Amenities could include installation of the following:

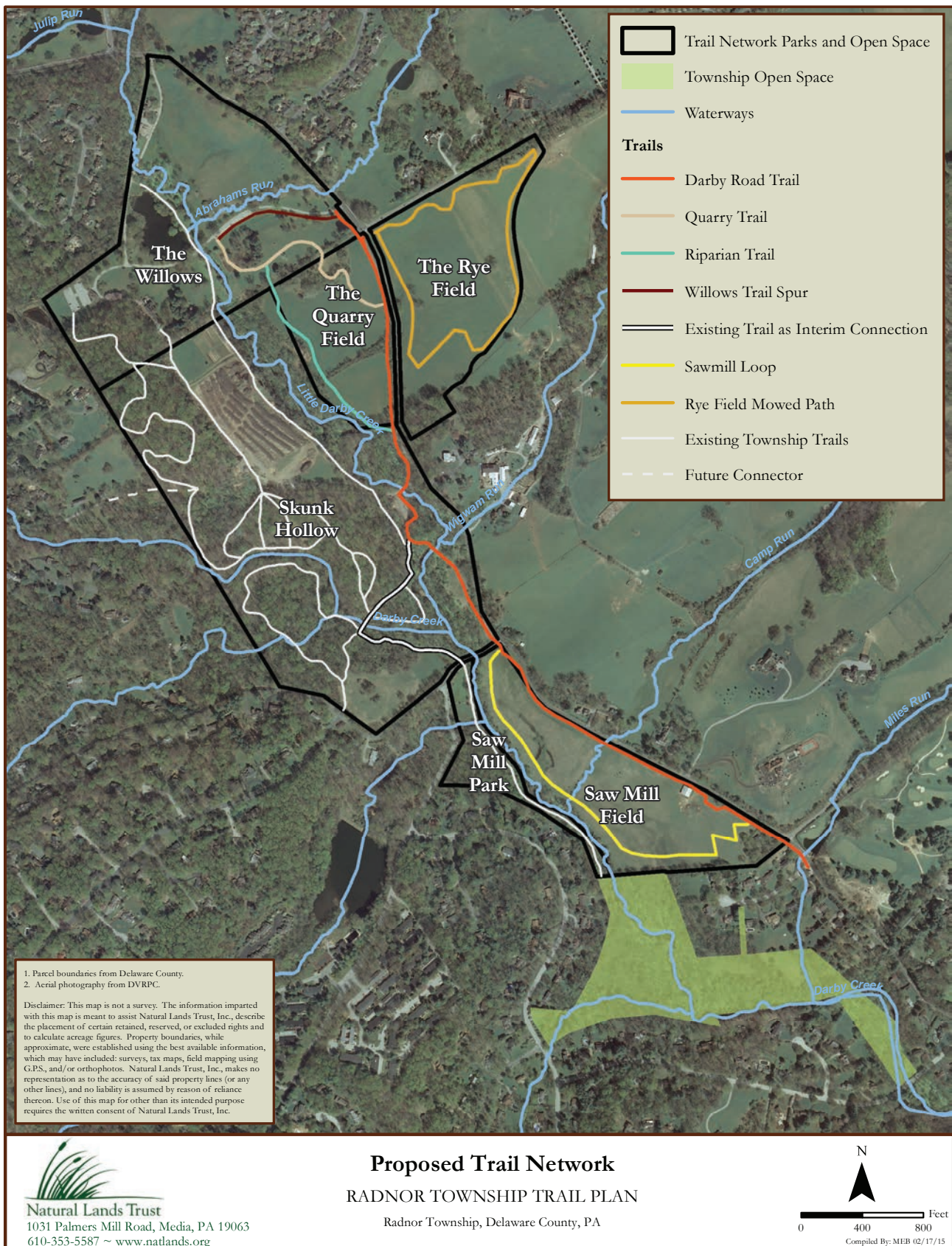
- Interpretive and wayfinding signage and trail markers
- Additional restrooms
- Riparian buffer plantings
- Site furniture such as benches, water fountains, and dog waste bag stations
- Specialized amenities such as pumps and emergency bike fix-it stations

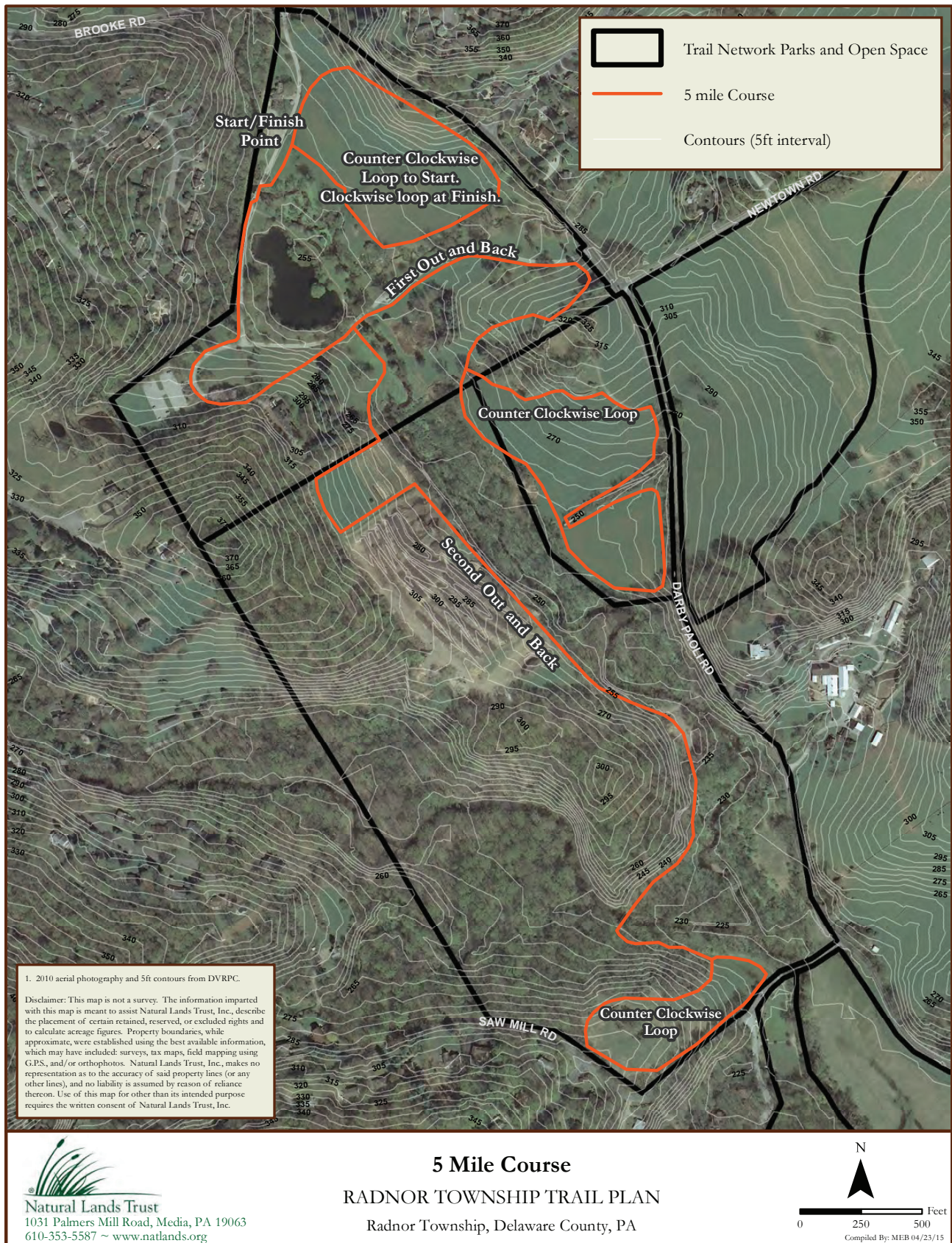
Note: Additional engineering, study, and permitting is likely necessary prior to installation of bridges and intersection improvements.

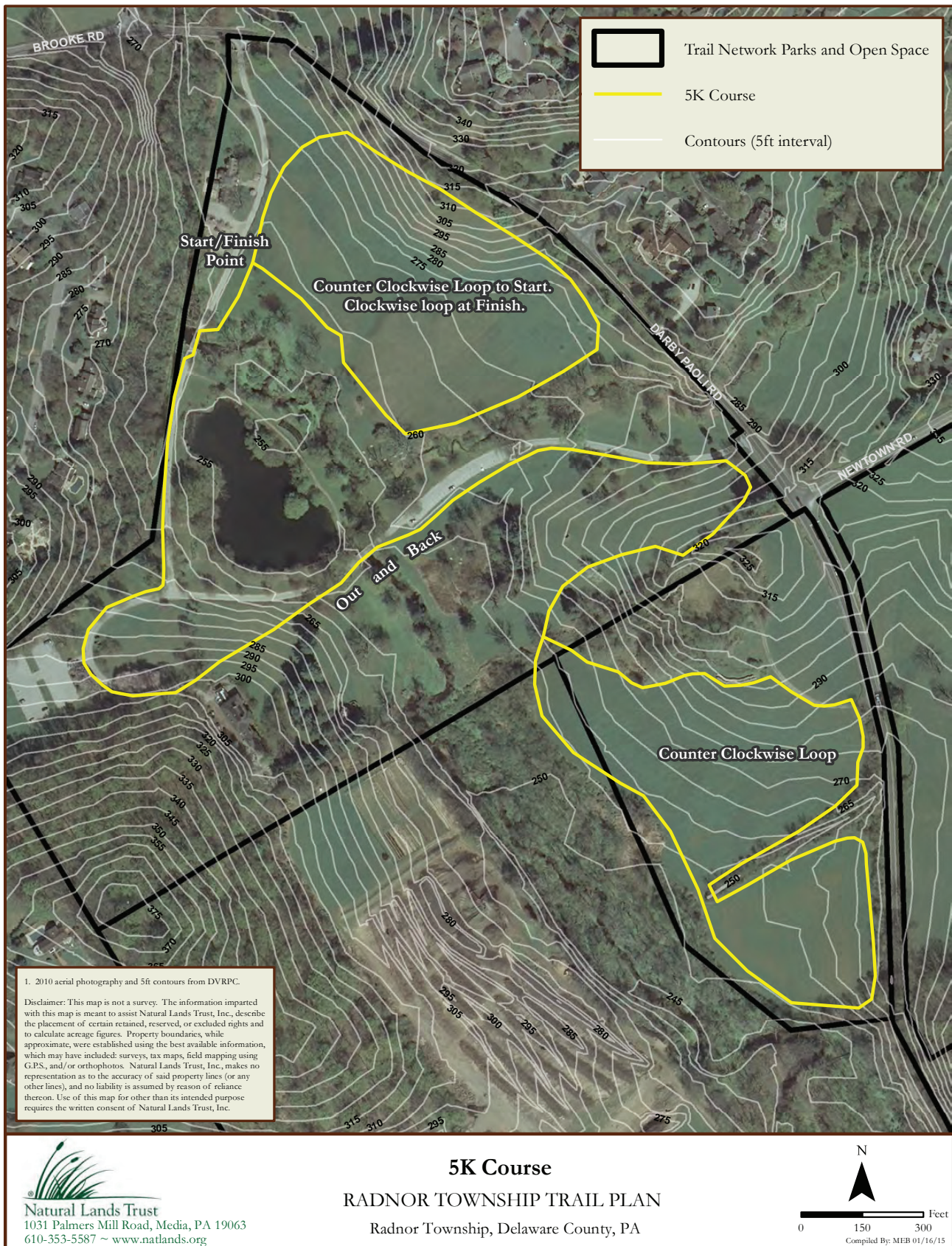
CONCLUSION

The addition of the Ardrossan Parcels to Radnor Township's existing park and open space corridor will allow for the creation of nearly three additional miles of trails. The Darby Paoli Trail will provide a safe place for walkers, cyclists, and runners who currently use the road. The connecting trails through the Quarry Tract and Skunk Hollow Park will bring visitors through cornfields, forests, and meadows. They will pass historic ruins and swimming holes.

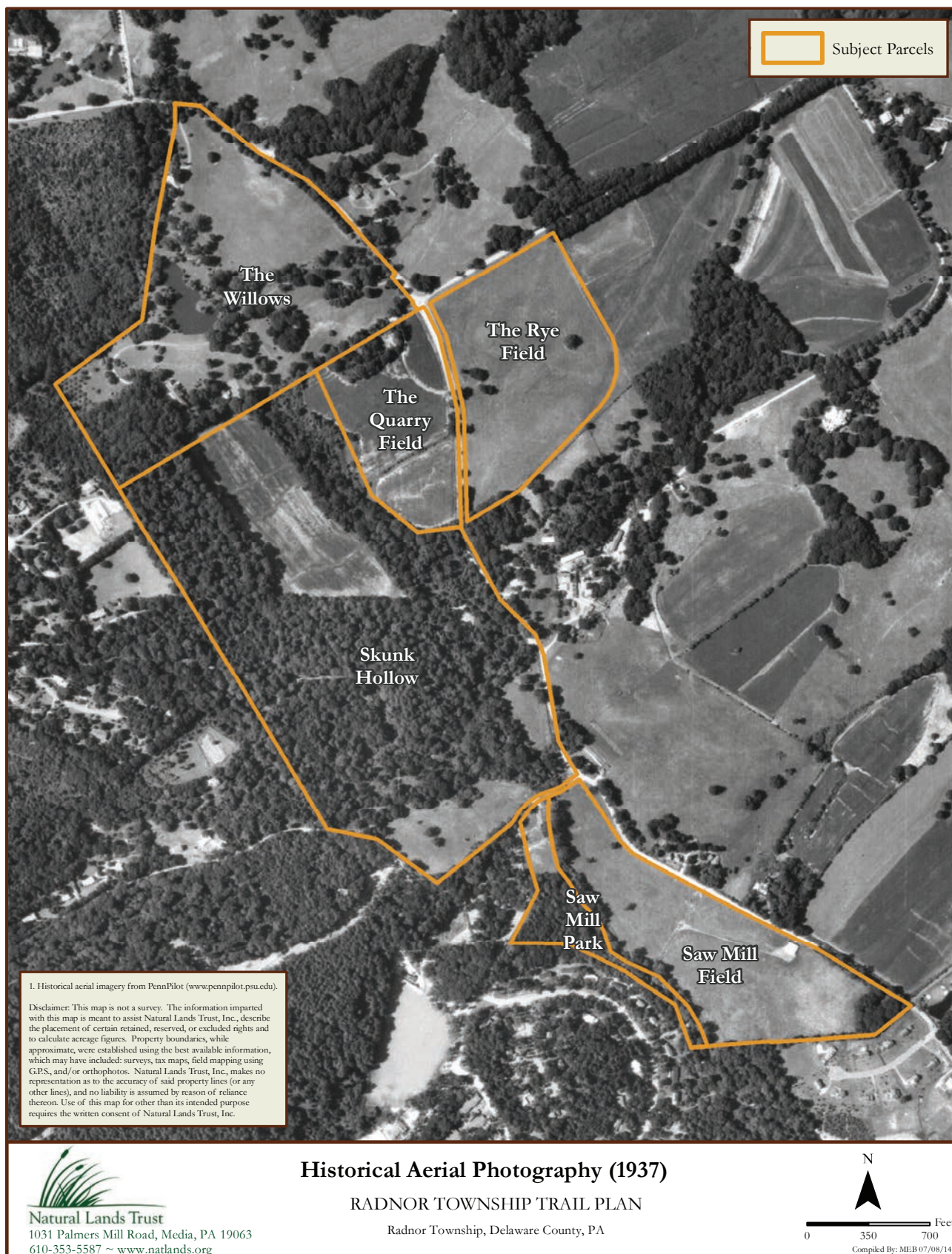
Walkers and runners will be able to measure their distances on the half mile loop proposed in the Saw Mill Field. The Rye Field trail will let people take a leisurely stroll through the grass, rest at a bench, and watch the sunset. The proposed trails, connected to the existing trails in the Willows, Skunk Hollow, and Saw Mill Park, will provide the citizens of Radnor with a beautiful, functional and fun trail system.





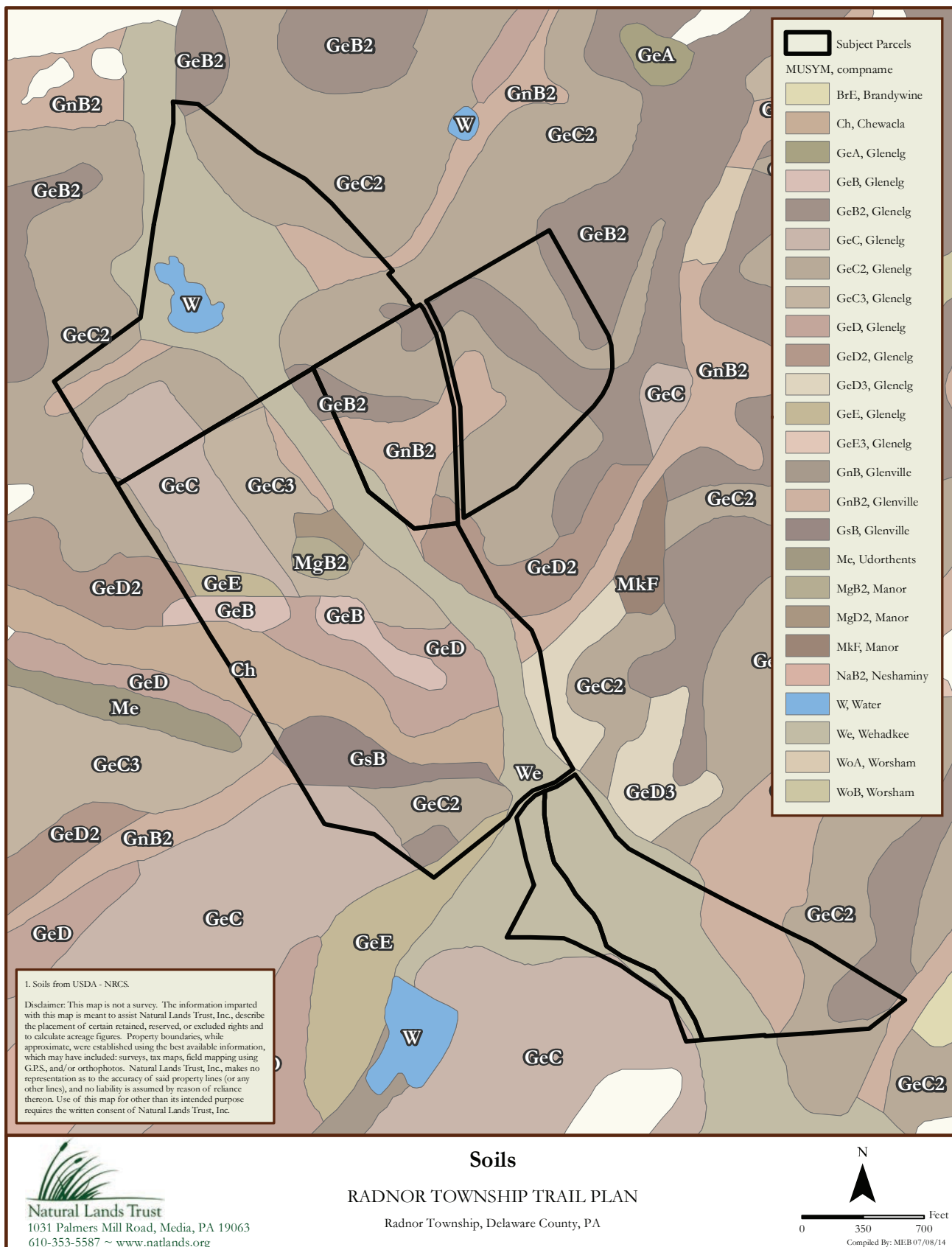


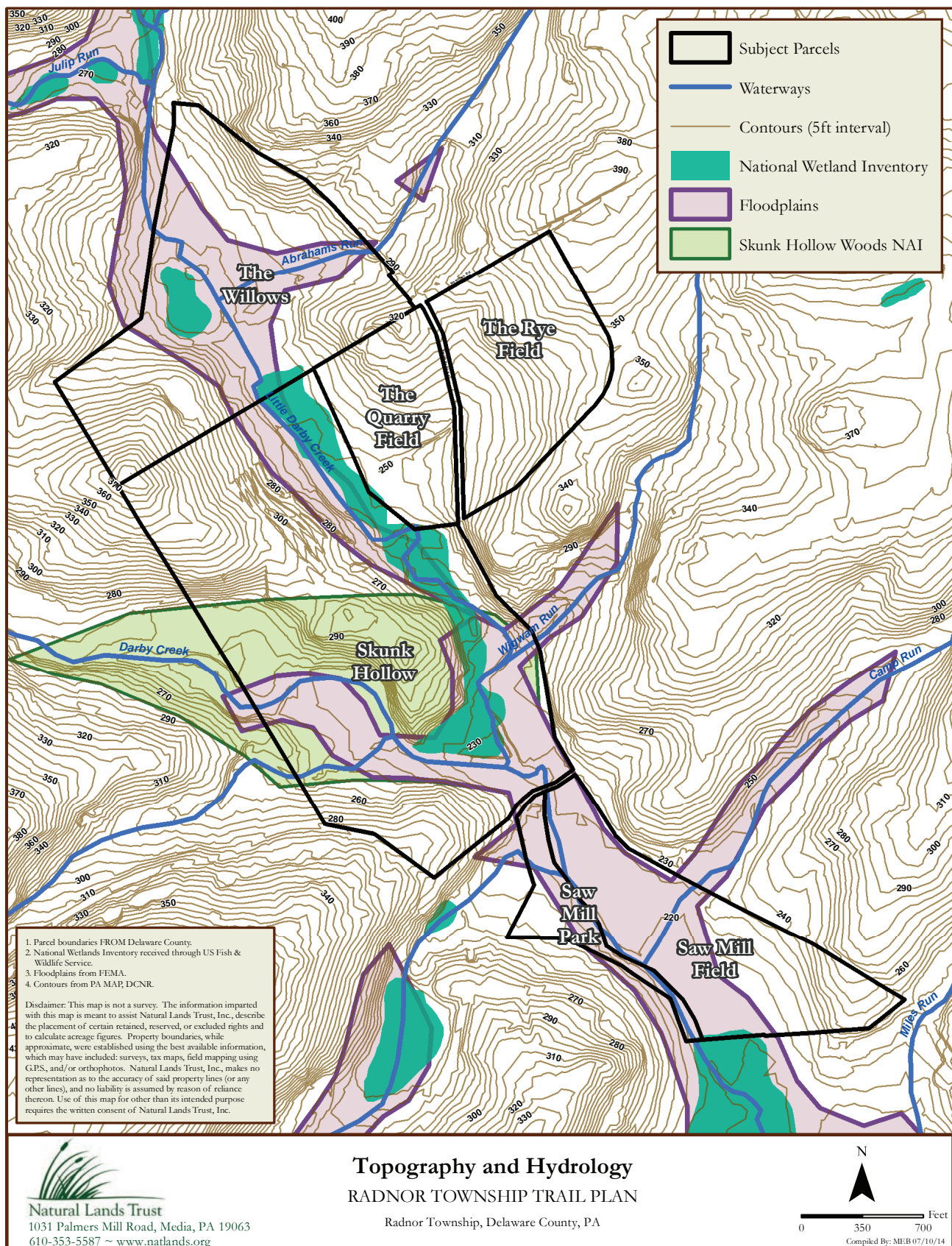










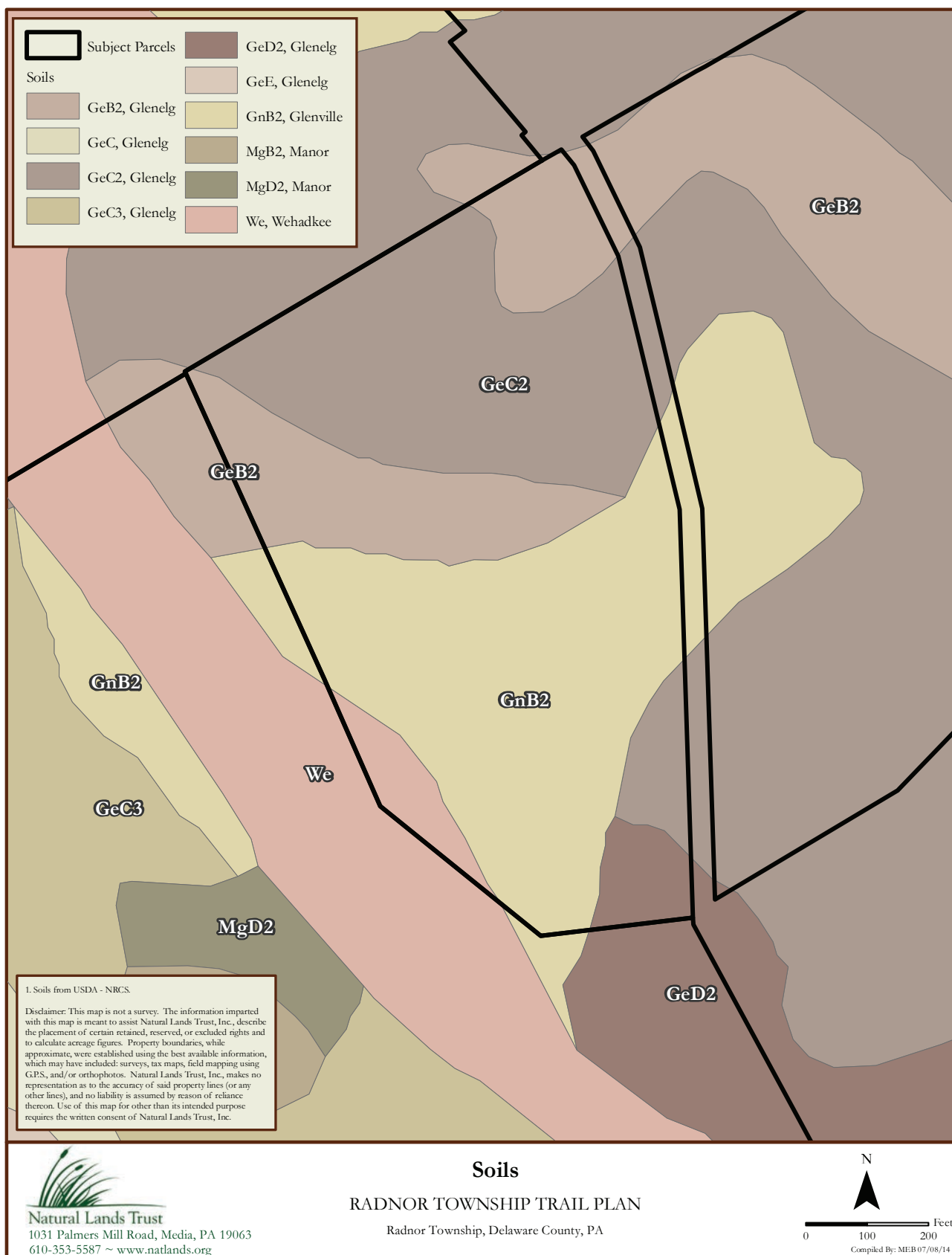


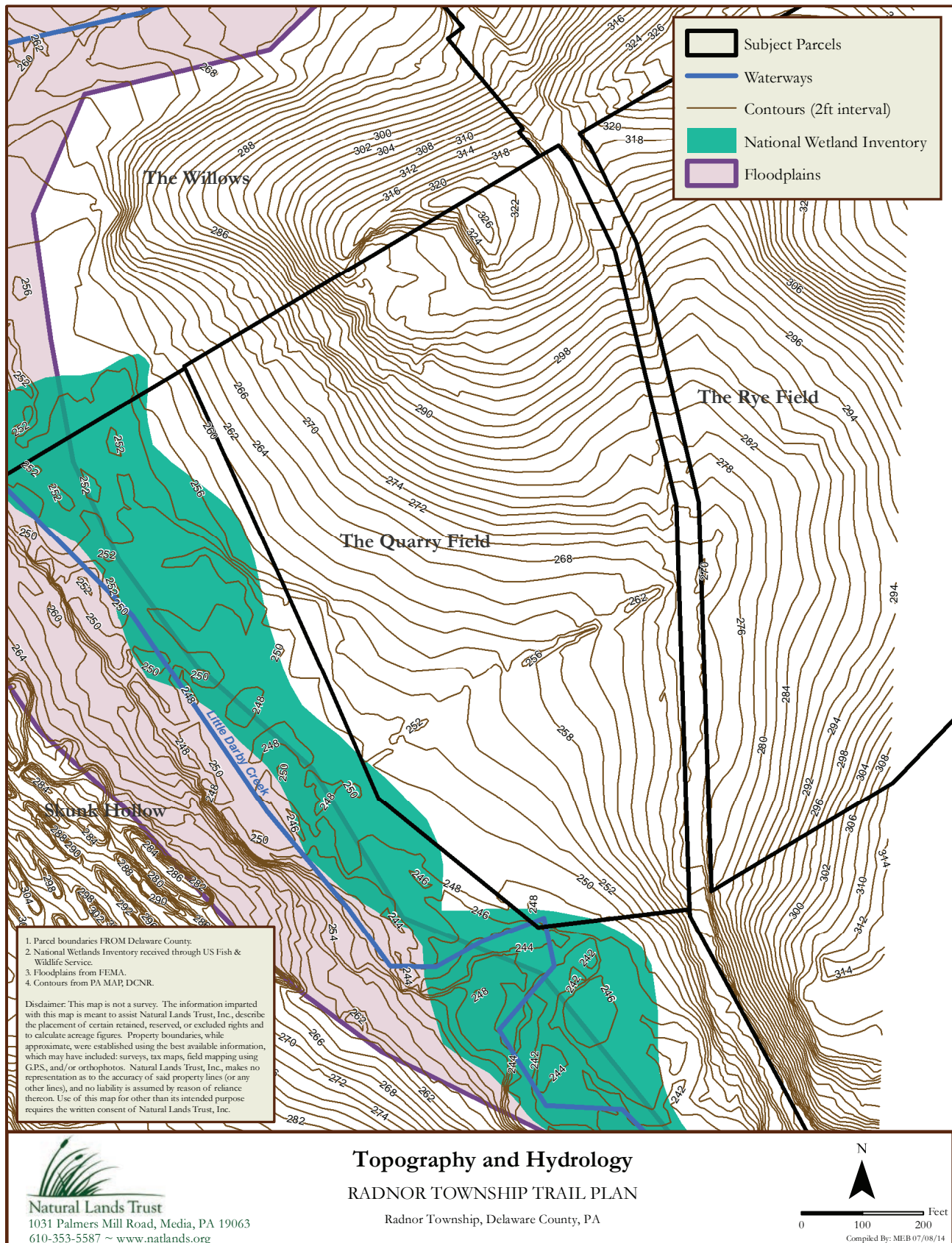








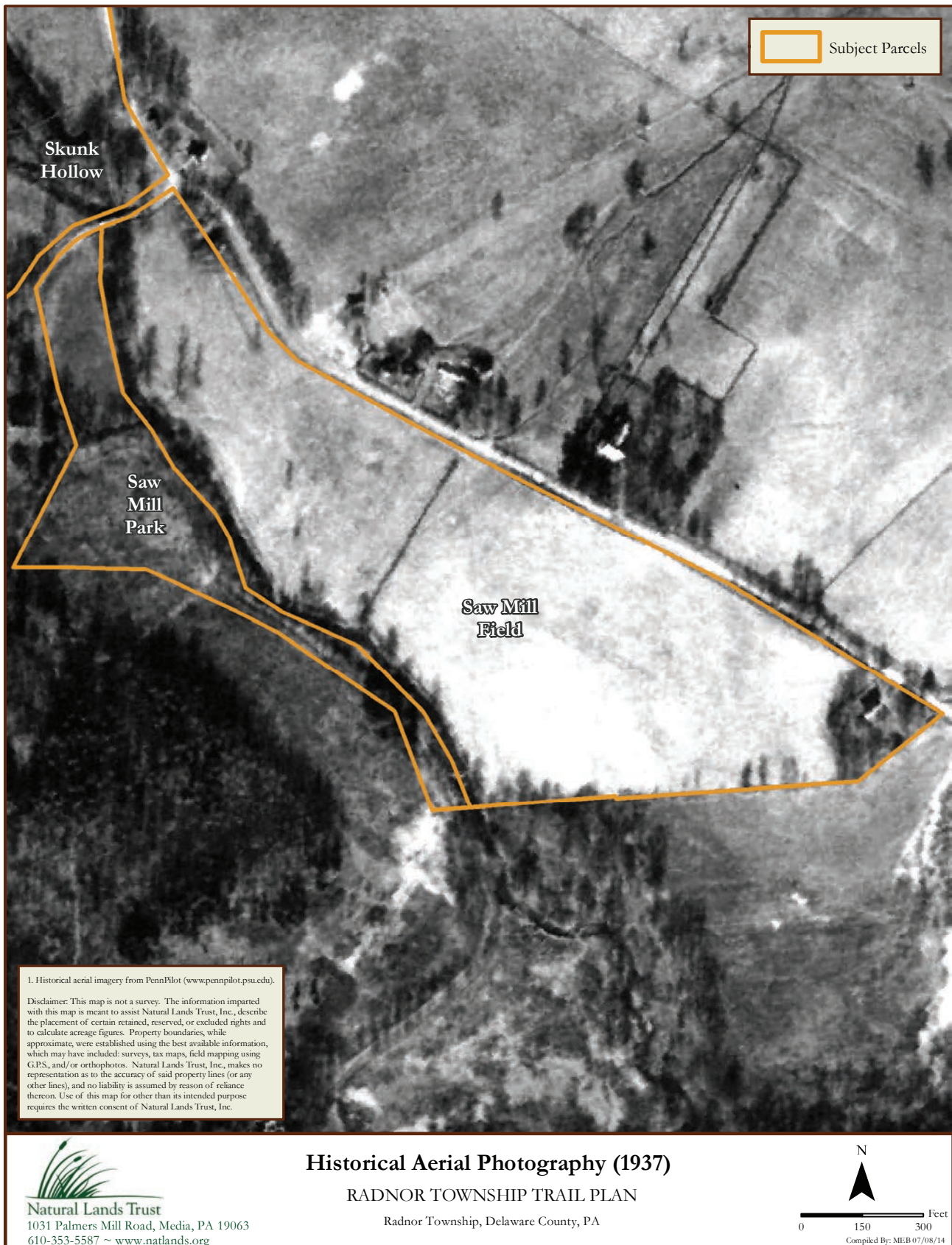


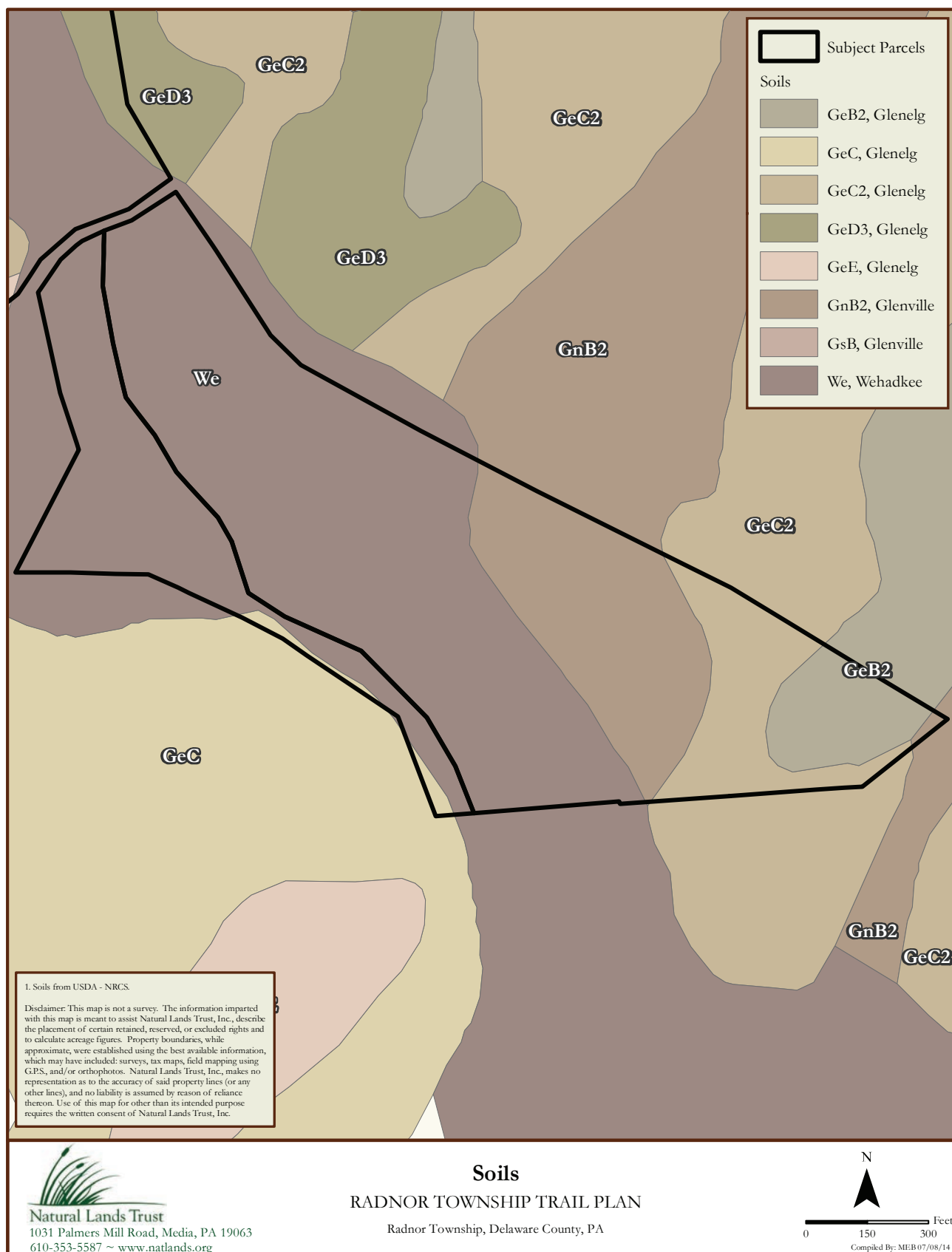


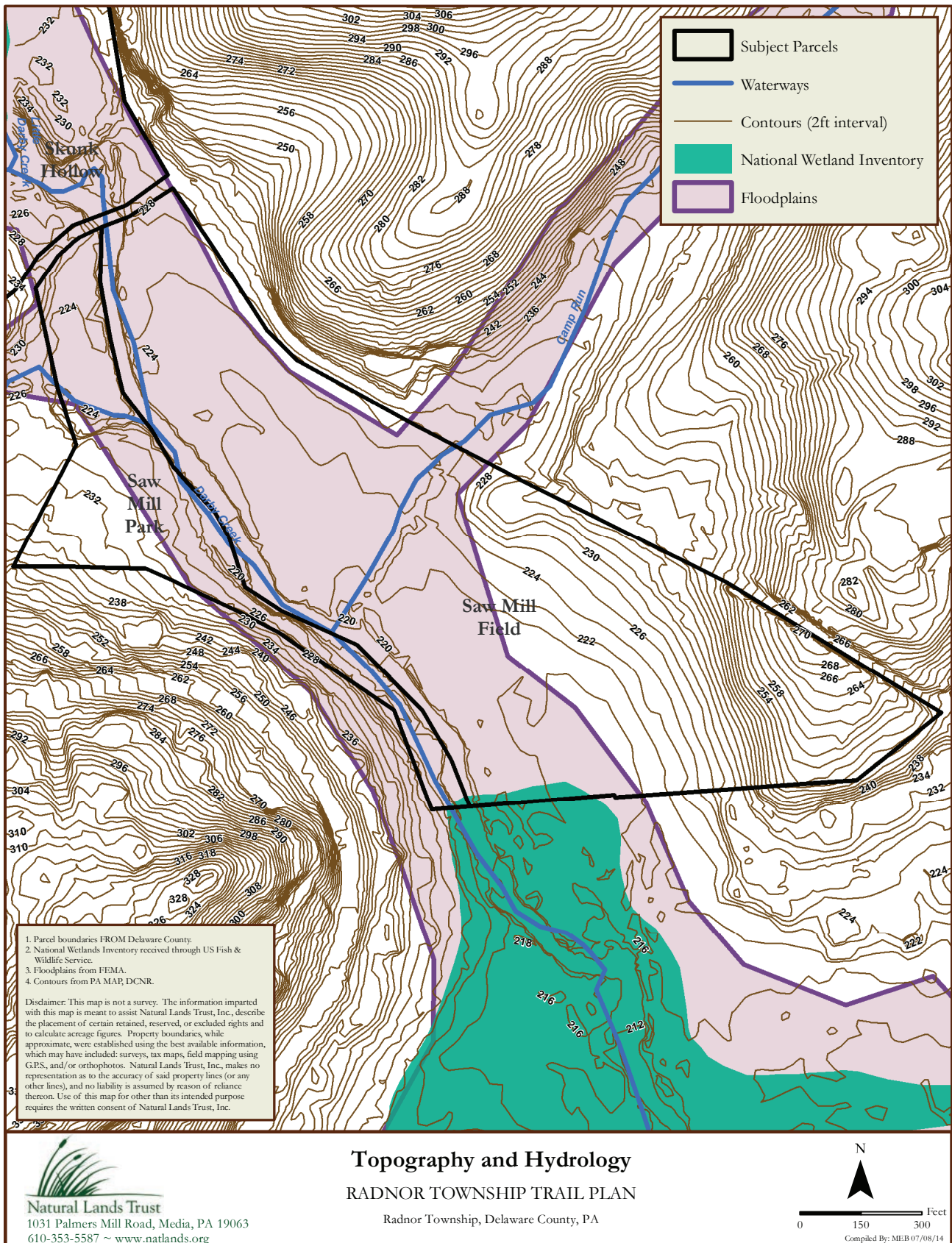












APPENDICES

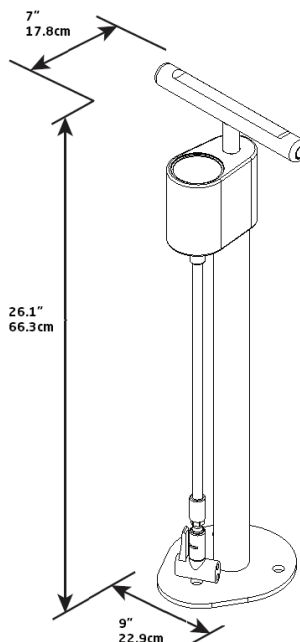


High Security Public Bike Pump

- New design is a perfect balance of ruggedness, durability, and price
- Ideal for campuses, cities, or other heavy use settings
- Ultra durable piston seal will outlast any other commercially available bike pump
- Heavy duty stainless steel construction ensures years of service
- Integrated top mounted pressure gauge provides accurate inflation pressure - avoid over inflation
- Hose is cut resistant and durable - comes in three lengths
- Pump head has no removable parts and is very secure, but can be replaced quickly and easily with proprietary tool
- Optional cable-tethered tools make changing a tube easy
- Floor-mount or rack mount options for installation
- Operational range:
 - 30 to 110° F
 - 34 to 43° C
- ADA compliant design
- Max pressure: 160psi / 11 bar
- Gaugeless version also available



Gaugeless version also available



Security Rating



Visit www.bikefixtation.com or call 612-568-3498 (USA) for more information



Public Work Stand

- Tool assemblies are spaced to prevent tangling
- Optimized ergonomics to work with all types of riders and bikes
- Designed for indoor or outdoor use
- Secure tool and stand fastening system
- I-beam design eliminates possibility of locking a bike to it
- ADA-compliant design

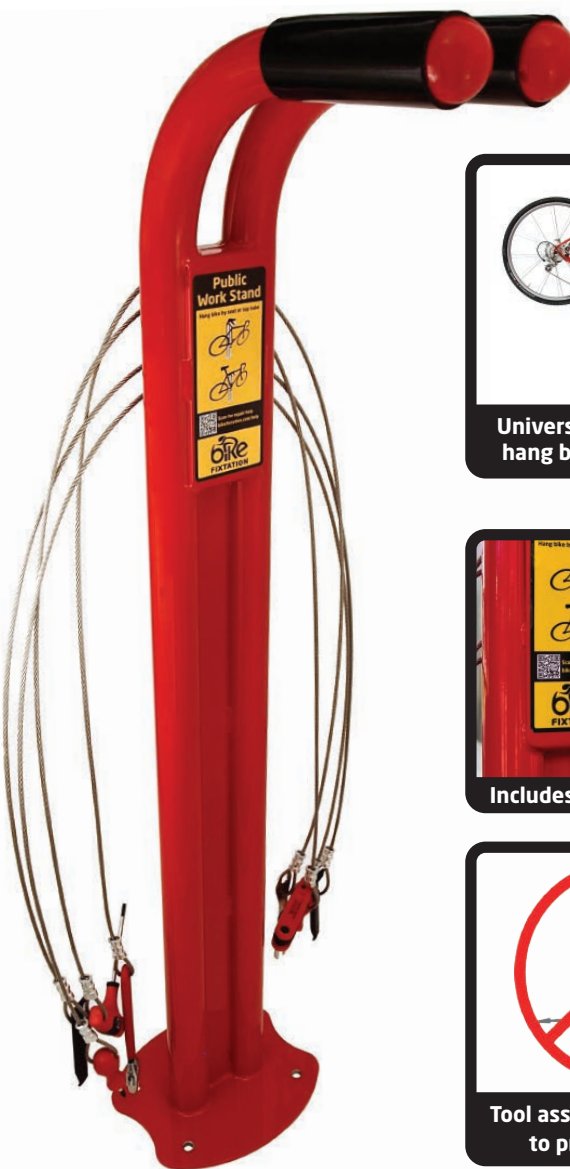
Specifications

Construction	
Material	Laser-cut steel DOM tubing
Tool tethering	Stainless steel aircraft cable
Finish Options	
UV resistant powder coat, custom colors available	
Galvanized	
Stainless steel	
Installation Options	
Surface mount	
Embedment	
Tools Included	
Hex key set	
Torx T-25	
Steel core tire levers (2)	
Adjustable wrench	
13/15mm cone wrench	
Phillips & standard screwdrivers	
Dimensions	
Imperial	8.5" W x 50" H x 16" D
Metric	21.6 x 126 x 40.6 cm

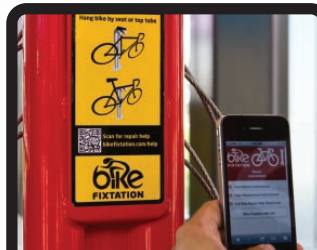
Security Rating



8/10



Universal bike mounting -
hang by seat or top tube



Includes link to online help



Tool assemblies are spaced
to prevent tangling

Visit www.bikefixtation.com or call 612-568-3498 (USA) for more information

Potential Funders for Radnor-Ardrossan Trail Projects		
POTENTIAL FUNDERS	PROGRAMS & TECHNICAL ASSISTANCE	CONTACT INFORMATION
Commonwealth Financing Authority	Greenways, Trails, and Recreation Program Watershed Restoration and Protection	717-787-6245 http://newpa.com/find-and-apply-for-funding/commonwealth-financing-authority
PA Department of Conservation and Natural Resources (DCNR)	Community Conservation Partnership Program PA Recreational Trails Program TreeVitalize	215-560-1183 http://www.dcnr.state.pa.us/brc/aboutus/index.htm
PA Bureau of Forestry	Service Forester Forest Stewardship Program	610-489-8326 http://www.dcnr.state.pa.us/forestry/yourwoods/serviceforesters/index.htm
PA Department of Environmental Protection (DEP)	Coastal Zone Management Environmental Education Growing Greener Nonpoint Source Implementation Program (Section 319) Water Resources Education Network (WREN)	484-250-5900 http://www.depweb.state.pa.us/portal/server.pt/community/regional_resources/13769
USDA Natural Resource Conservation Service (NRCS)	Environmental Quality Incentive Program (EQIP)	215-453-9527 ext 107 http://www.nrcs.usda.gov/wps/portal/nrcs/site/pa/home/

