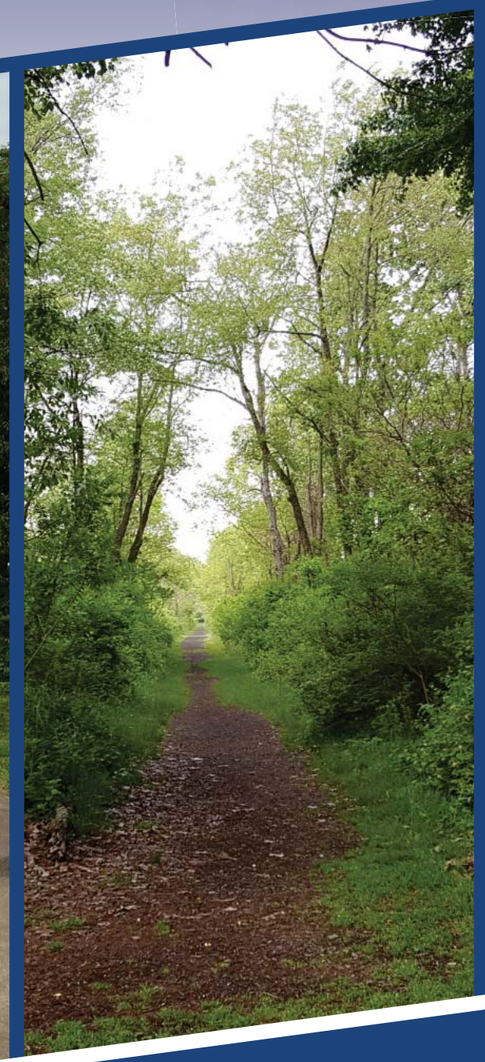
Pennsylvania Route 6
Bicycle Master Plan Design Guide

Section 1: Ohio/Pennsylvania Border to McKean/Potter County Line



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Governor

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Secretary of Transportation

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Deputy Secretary of Multimodal Transportation

ACKNOWLEDGEMENTS

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Municipal Partners

Conneaut Lake Borough
City of Corry
Edinboro Borough
Kane Borough
Union City Borough
Youngsville Borough

County Partners

Crawford County
Elk County
Erie County
McKean County
Warren County

State Partners

PA Department of Community and Economic Development
PA Department of Conservation and Natural Resources

Regional Partners

North Central Planning & Development Commission
Northwest Planning Commission
Emerge 2040
Erie Metropolitan Planning Organization

Public-Private Stakeholders

Allegheny National Forest Visitors Bureau
Bike Erie
Erie Arts & Culture
Pennsylvania Route 6 Alliance
Visit Crawford
Visit Erie
YMCA of Greater Erie

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December 2016

Pennsylvania Route 6 Master Plan Design Guide

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Available as separate publications

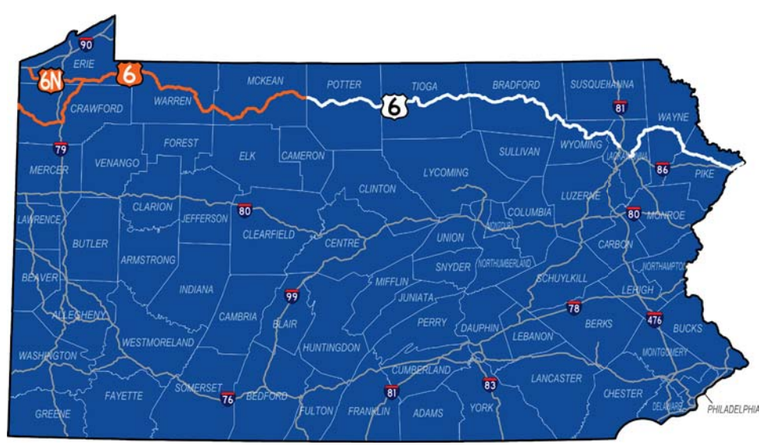
1. Existing Conditions Inventory and Assessment
2. Stakeholder Outreach Documentation

PA Route 6: An Iconic Pennsylvania Roadway

Spanning 427 miles across Pennsylvania's northern tier, PA Route 6 connects individuals to local heritage communities, recreational attractions, scenic landscapes, and historically significant sites. The corridor can be traced back to the early 1800's, when officials mandated a road be built through the Moosic Mountains to enable easier travel to the western part of the state. As Pennsylvania grew, so too did PA Route 6. The highway quickly became a vital link between new industry in the west and railroads in the east. The story of PA Route 6 began with the need to move resources across the state. However, in recent decades, the corridor has transformed into a tourist destination thanks to its picturesque beauty, charming towns, and recreational opportunities. Today, approximately 3.5 million people travel along the historic highway each year to visit historic sites, state parks, and quaint towns.

The Pennsylvania Department of Transportation (PennDOT) recognizes the statewide importance of PA Route 6 and has identified bicycle improvements along the corridor as a high priority initiative. PennDOT, in collaboration with the Pennsylvania Department of Conservation and Natural Resources (DCNR), Department of Community and Economic Development (DCED), and the Pennsylvania Route 6 Alliance, is in the process of completing a PA Route 6 Bicycle Master Plan Design Guide to address bicycle safety, accessibility, and connectivity along PA Route 6, which generally aligns with BicyclePA Route Y. **As the first section of a three-part study, this Plan focuses on the route's first 150 miles (from the Ohio-Pennsylvania border to the McKean-Potter County line) and includes the 30 mile segment of PA Route 6 North (from the Ohio-Pennsylvania Border to US Route 19)**.

Key themes identified through the bicycle master planning process include heritage tourism, economic development in trail towns, and bicycle safety and education. The Plan also evaluates bicycle level of service, existing and potential trail connections, and targeted infrastructure improvements. These improvements are to be considered alongside future related transportation projects. Rather than addressing bicycle improvements separately along PA Route 6 and 6N, these improvements will have already been identified by local stakeholders and can be incorporated into routine project level planning. Because of this, exact timelines and funding sources are contingent upon future projects and they are not included in this Design Guide.



Pennsylvania Route 6 Bicycle Master Plan Design Guide Section 1 Study Area

PA Route 6 Master Plan Design Guide

This **PA Route 6 Master Plan Design Guide** is intended to provide guidance for targeted proposed improvements along the Section 1 corridor. These improvements, varying in terms of cost and ease of implementation, are proposed at various locations along PA Route 6 and PA Route 6 North and are shown in more detail in the following pages of this guide. These improvements will benefit the corridors by:

- **Providing consistency along PA Route 6 and PA Route 6 North with respect to design and signage.** Both corridors vary greatly in terms of roadway and traffic conditions, which collectively impact bicycle comfort. The recommended improvements to the routes will help offer a consistent and enjoyable bicycle experience across the corridor, benefitting long-distance cyclists and locals, alike.
- **Assisting communities in conformance with future projects.** Rather than having to determine and incorporate bicycle improvements for projects along PA Route 6 and PA Route 6 North, all of these items will have already been planned or implemented.

Resources

The American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities was traditionally the primary national resource for planning, designing, and operating bicycle facilities. The passage of the FAST Act provides greater flexibility and the FHWA now supports additional design resources, including the National Association of City Transportation Officials (NACTO) Urban Bikeway Design Guide and the Institute of Transportation Engineers (ITE) Designing Urban Walkable Thoroughfares. These guidelines build upon the flexibilities provided in the AASHTO guides, which can help communities plan and design safe and convenient facilities for pedestrian and bicyclists. In addition, PENNDOT provides planning, design, and maintenance guidance for bicycle facilities and projects, while the FHWA's Manual on Uniform Traffic Control Devices (MUTCD) provides guidance on traffic control for bicycle facilities.

Local Community Improvements

It is anticipated that several types of improvements, such as wayfinding signage, sharrows, and bike lanes, would be completed at the local level. Local municipal entities will be responsible for maintaining these improvements.

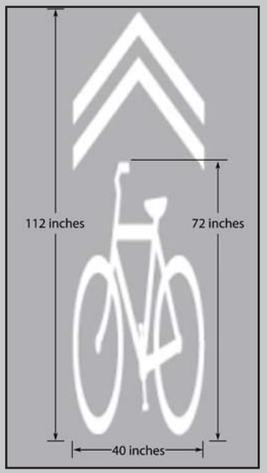
Wayfinding Signage

It is recommended that wayfinding signage be installed to direct cyclists from BicyclePA Route Y to/from local communities, such as Conneaut Lake, Meadville, and Corry. These signs should reference local amenities or points of interest in prominent areas that are bypassed by the corridor. The signs should be installed at each turn of the detour and should also help cyclists return to BicyclePA Route Y following the deviation. In some cases, it may be easier and more efficient for cyclists to deviate on one road and return to Bike Route Y on another route. *See wayfinding improvements on Page 18.*

Example of wayfinding signage for the City of Corry (MUTCD D1-3b)

Sharrows

Given the right-of-way constraints through the corridor's communities, it is recommended that the communities install shared-lane markings (sharrows) through their downtowns. While sharrows do not offer designated infrastructure for cyclists, they help visually demonstrate where cyclists can safely ride to avoid the "door zone" from parked zones and also help make motorists more aware of cycling activity. Sharrows are recommended where the posted speed limit is 35 mph or less while "Bicycle May Use Full Lane" signage (shown on next page) may be used on roadways with higher speeds. Sharrows should be placed a minimum of 4 feet from the face of curb or roadway edge to the center of the sharrow marking. When used adjacent to a parking lane, they should be placed a minimum of 4 feet from the edge of the parking edge line to the center of the sharrow marking. Because Route 6 is a state-owned route, a maintenance agreement is required if a municipal entity requests to install sharrows.



Sharrow dimensions
Source: Michael Baker International and MUTCD

PennDOT Improvements

While local improvements help address cycling safety, mobility, and accessibility within the Bicycle Route Y communities, larger-scale improvements are also needed to help improve cycling conditions along the corridor's rural segments. These improvements include additional signage for vehicles and bicyclists, bridge repairs and replacements, shoulder repairs, and rumble strip repairs. It is anticipated that these investments will be made under the direction of PennDOT with community support, as needed. PennDOT will be responsible for maintaining these improvements.

Signage

Improving or adding signage is an easy way to promote bicycle safety and improve motorist awareness. The following sign types are proposed along BicyclePA Route Y.

Route Y Signs

Existing signs can be reconfigured in some areas to improve BicyclePA Route Y corridor movements for bicyclists. New signs are required where realignment is recommended, such as the segments on Linn Road, Fries Road, and the Spillway Trail outside of Linseville, PA.

Bikes May Use Full Lane

Install "bicycles may use full lane" signs (MUTCD R4-11) on roadway segments lacking bike lanes or sufficient shoulders and where travel lanes are too narrow for bicyclists and motor vehicles to operate side by side. Install these signs ½ mile before any other cyclist obstruction requiring vehicle lane travel.

Road Narrows

Place these signs (MUTCD, X-W5-1) a minimum of 50' from any locations with a shoulder narrowing that force cyclists into the roadway.

Fluorescent Warning Signs

Install bicycle warning signs (MUTCD, W11-1) in locations with poor sight distances, on hills, and on highway ramps to help alert motorists of cyclists. Please visit the MUTCD Guidelines, Part 9 for more information on warning signs and plaques.

Bridge Replacement

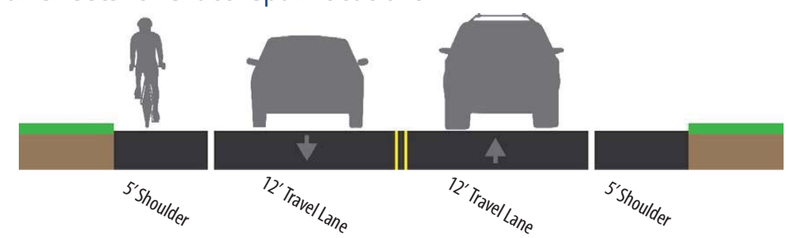
Cycling across bridges that have inadequate shoulders is especially dangerous because cyclists are forced into the general travel lanes in the event of mechanical issues or shoulder debris. Any future structure replacements should provide sufficient shoulders for cyclists. A total of four (4) bridges currently require expanded shoulders.

Other Improvements: Rails-to-Trails

While several rails-to-trails concepts have been proposed along the corridor, these projects are contingent on funding and will vary in terms of design complexity, user permissions, and implementation. The PA DCNR provides statewide guidelines for uniform trail construction, maintenance and signage, as well as best management practices for planning, designing, and constructing trails for universal accessibility. These publications can be found on DCNR's website (www.dcnr.pa.gov).

Widen/Repair Shoulders

Where possible, shoulders should be expanded along the corridor that are 4' wide or less to a more comfortable 5' width. Shoulder widths vary, which keeps cyclists from being comfortable as they worry about how to navigate the roadside. A consistent shoulder width would greatly increase comfort and safety for cyclists, removing the need for travel in the general travel lanes. Additionally, cyclist comfort is greatly impacted when required to navigate eroded shoulders. Shoulders which are a minimum of 5' may not require widening, but may need to be repaired or resurfaced if in poor condition. Shoulder maintenance activities, such as street sweeping, can benefit cyclist comfort by removing roadway debris. Please see plan sheets for exact repair locations.



Rumble Strips

Rumble strips can be a significant barrier to bicyclist comfort, especially on narrow shoulders. Cyclists cannot easily ride over them and may need to enter general travel lanes in instances where the shoulder narrows. It is recommended that standard rumble strips are replaced by bicycle friendly strips when the shoulder is 4' feet wide or less. When rumble strips are needed along newly expanded shoulders, one-foot strips should be placed just inside the shoulder striping so they do not interfere with cyclists who ride in the shoulder.

Edgeline rumble strips (ERS) are a nationally accepted, cost effective safety countermeasure that help mitigate issues such as roadway departure, hit-fixed-object, and drowsy driving crashes; however, it is generally acknowledged that ERS can impact bicyclist comfort. When an issue regarding ERS is raised, PennDOT can review the installation of existing ERS to insure they are properly placed, include adequate gaps, and do not unnecessarily disrupt the use of shoulders for people riding bicycles. The PennDOT District Office may choose to modify the ERS as part of a future resurfacing project should any deficiencies be identified.

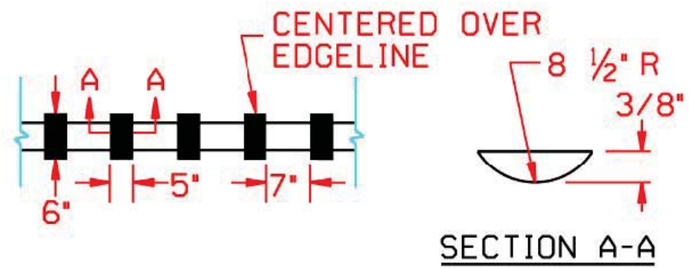
It must be noted that removing rumble strips entirely can have adverse effects such as an increase in serious and fatal injuries and in locations with distinctive crash histories, where ERS are the appropriate countermeasure, PennDOT will maintain those treatments.

6 General Bicycle Improvements

PA Route 6 and PA Route 6 North Signage

SIGN	SIGN #	PLAN SYMBOL	DESCRIPTION	QTY
	X-W5-1		Road Narrows Sign	12
	W11-1		Bicycle Warning Sign	3
	D1-3B		Wayfinding Sign	32
	R4-11		Bikes May Use Full Lane Sign	43
	M1-8		BicyclePA Route Y Sign	38

PA Route 6 and PA Route 6 North Rumble Strips



RUMBLE STRIP DETAIL

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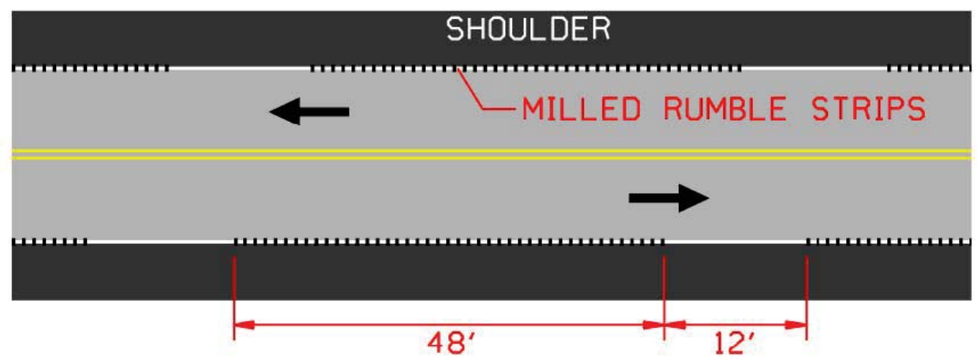

RUMBLE STRIP PLACEMENT DETAIL

NOT TO SCALE

PA Route 6 & PA Route 6 North
Improvements Plan

Quantities Summary

Road Narrows Sign.....**12**

Bicycle Warning Sign.....**3**

Wayfinding Sign.....**32**

Bicycle May Use Full Lane Sign.....**43**

BicyclePA Route Y Sign **38**

Rumble Strip Rework.....**6 Miles**

General Plan Notes

1. Shoulder widening to take place when existing shoulder widths are 4' or less. The amount of widening will be dependant on the existing road, and will be widened to 5'.

2. Some small-shouldered areas that are marked for widening may not be able to be widened due to existing geography or other. It will be up to the contractor to determine if shoulder widening is feasible at each location

3. Place "Bike May Use Full Lane" signs before sharrows.

4. See pages 10 - 22 for sign locations.

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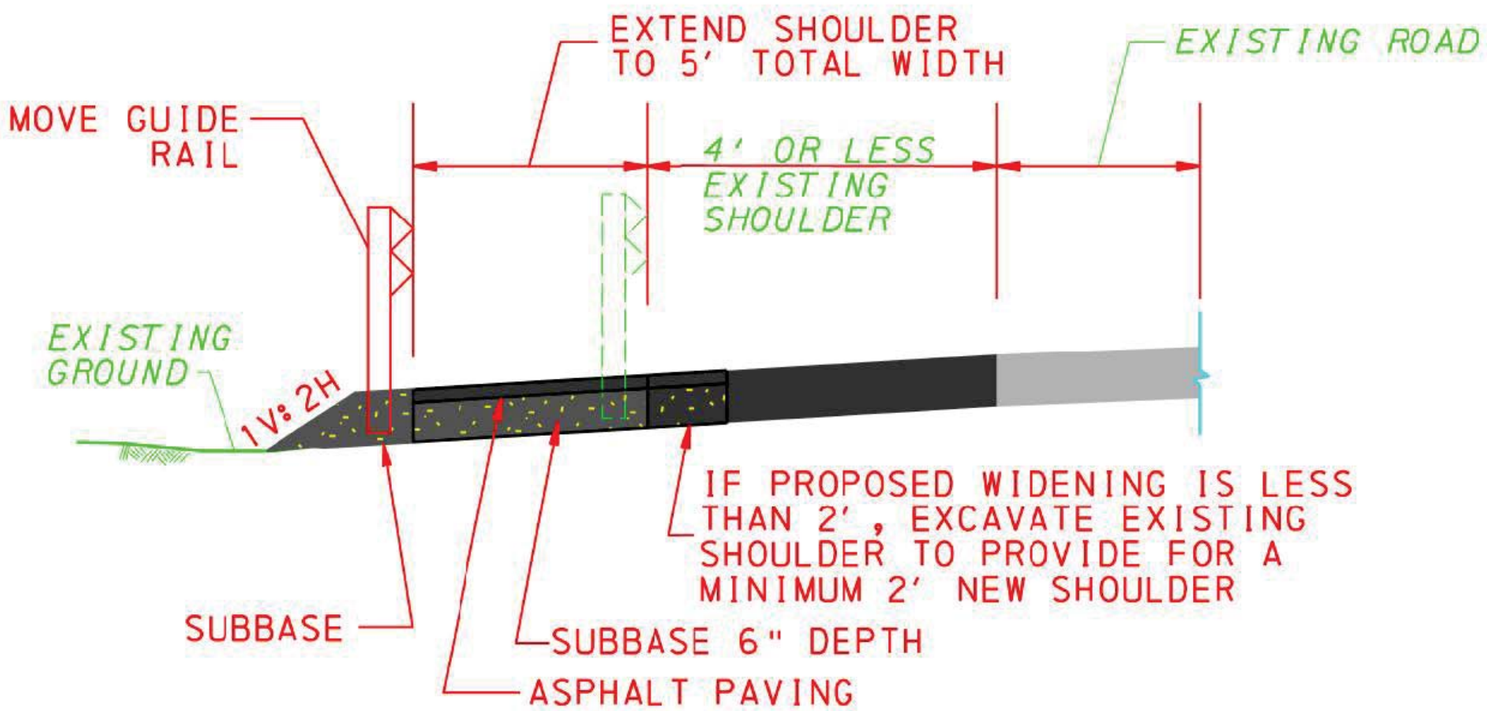
PA Route 6 and PA Route 6 North Shoulder Widening

Before

After



PA Route 6 & PA Route 6 North Improvements Plan

Quantities Summary

Shoulder Expansion:
205 lane miles

Shoulder Repair:
13 miles

Move/Remove Guide Rail:
42 miles

General Plan Notes

1. Shoulder widening to take place when existing shoulder widths are 4' or less. The amount of widening will be dependant on the existing road/shoulder, and will be widened to 5'.

2. In order to allow for proper compaction of placed material, a minimum 2' widening width is required. If widening is less than 2', cut back existing shoulder to provide a minimum 2' shoulder replacement.

3. For shoulder construction details, please see PennDOT RC-25M Standard.

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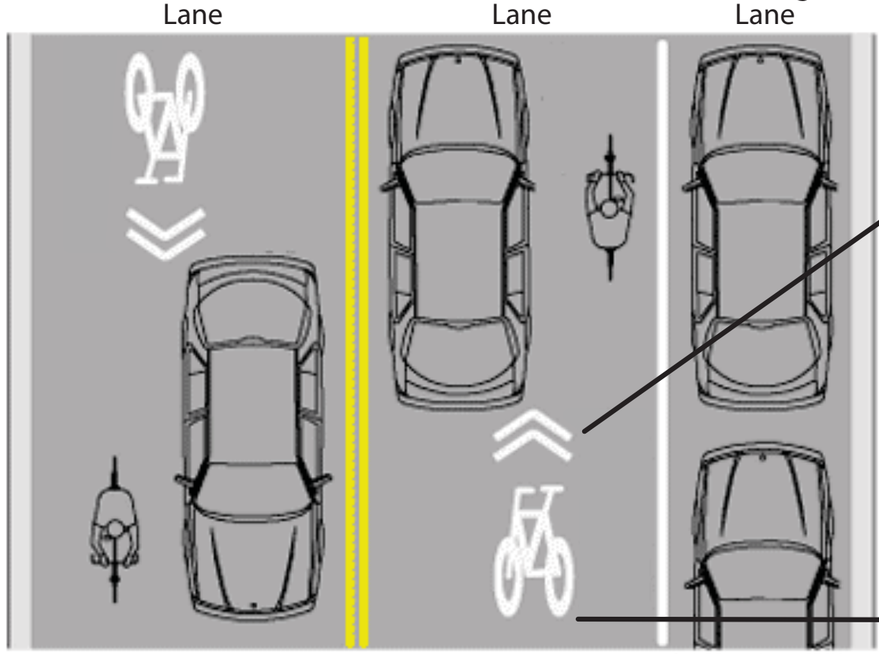
PA Route 6 and PA Route 6 North Shoulder Widening

Before

After



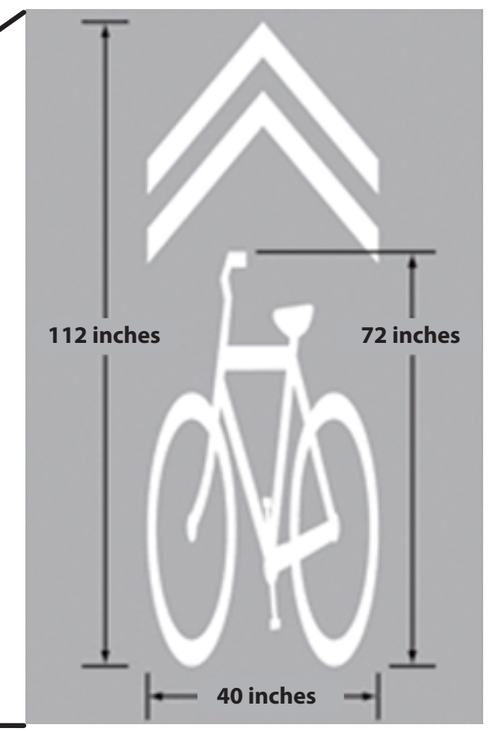


Image from Seattle.gov website

PA Route 6 & PA Route 6 North Improvements Plan

Quantities Summary

Sharrow Painting Length:
51 lane miles

General Plan Notes

1. Sharrows to be used throughout local communities where there is no defined shoulder or on-street vehicle parking.

2. Sharrows to be placed at a minimum of 4' from the curb on lanes without parking, and a minimum of 11' from the curb on lanes with parking.

3. On 25 mph streets, the preferred placement of sharrows is at the center of the travel lane.

4. Place sharrows at an interval spacing of 250' and after every intersection.

5. "Bike May Use Full Lane" signs may be used in addition to sharrows if required

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General Improvements

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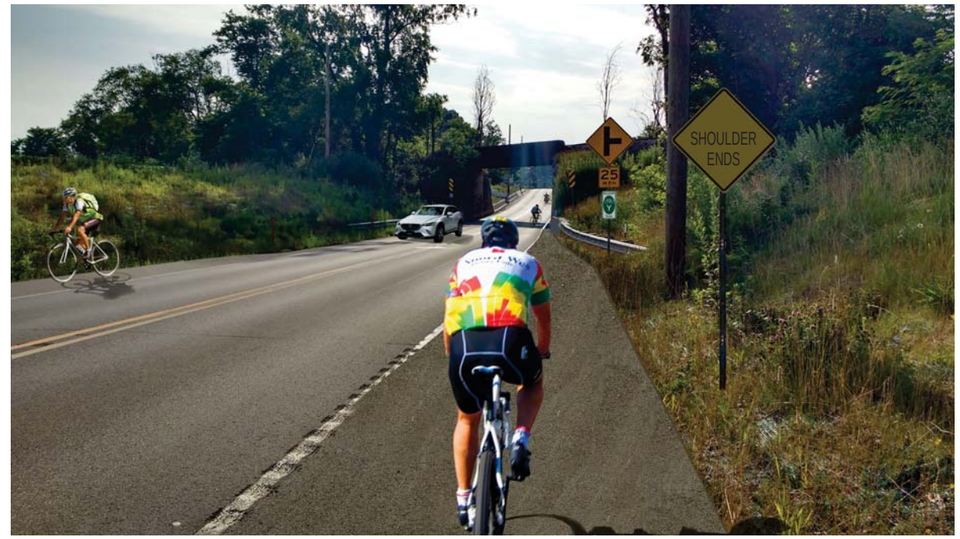
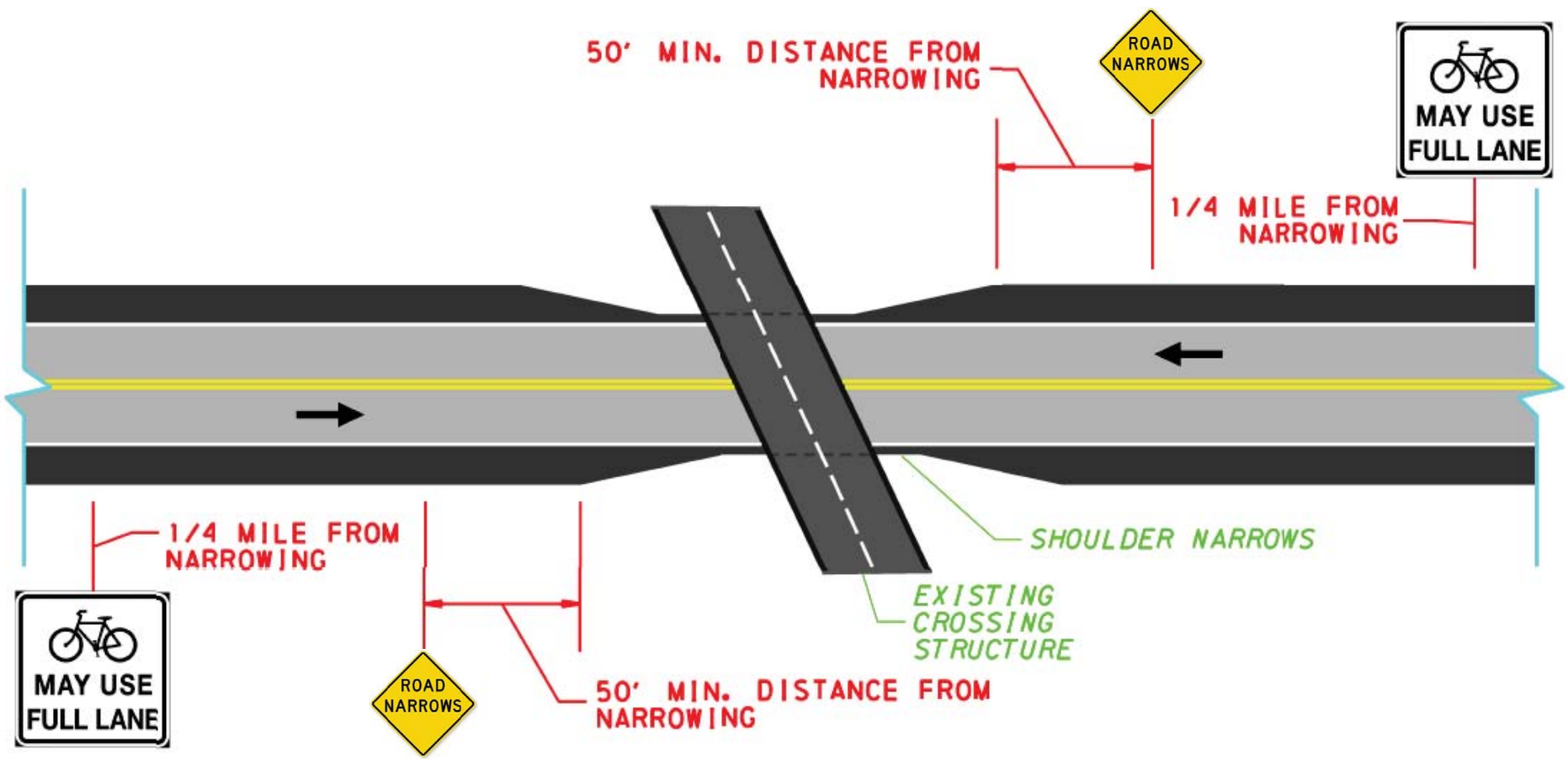
PA Route 6 and PA Route 6 North Road Narrowing

Before

After





PA Route 6 & PA Route 6 North Improvements Plan

Quantities Summary

Road Narrowing Locations.....**8**

Road Narrows Signs.....**12**

Bicycle May Use Full Lane Sign.....**14**

General Plan Notes

1. Place appropriate warning signs a minimum of 50' from the hazard.

2. Place "Bikes May Use Full Lane" signs approximately 1/4 mile from the location that cyclists may need to enter travel lanes.

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General Improvements

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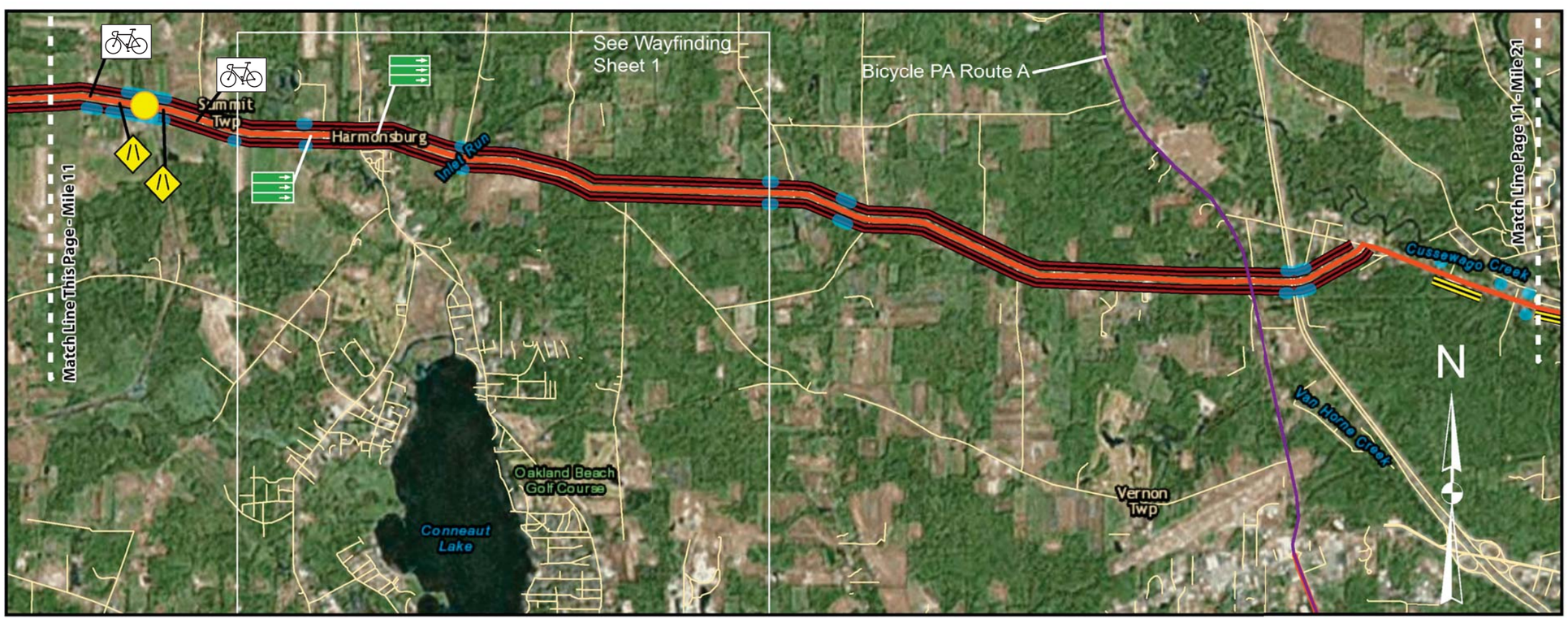
PA Route 6 Corridor Improvements



PA Route 6 Improvements Plan

Legend

- BicyclePA Route Y
- Existing Bicycle / Recreational Trail
- Route Y Realign - Trail
- Route Y Realign - Road
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Repair Shoulder
- Sharrows
- Long Term Replacement

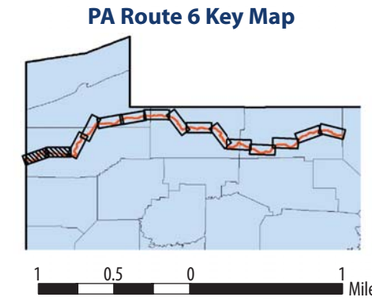
SIGNAGE

- Bike May Use Full Lane
- Wayfinding
- Road Narrows
- BicyclePA Route Y Sign

Notes

1. Wayfinding signage to be placed along BicyclePA Route Y in Harmonsburg, directing cyclists to points of interest in Conneaut Lake.
2. A short reroute of BicyclePA Route Y is suggested from Mile 1.6 to 7.5 because of the small shoulders and numerous intersections along the existing route. Use and improve existing trail.

PA Route 6 Key Map



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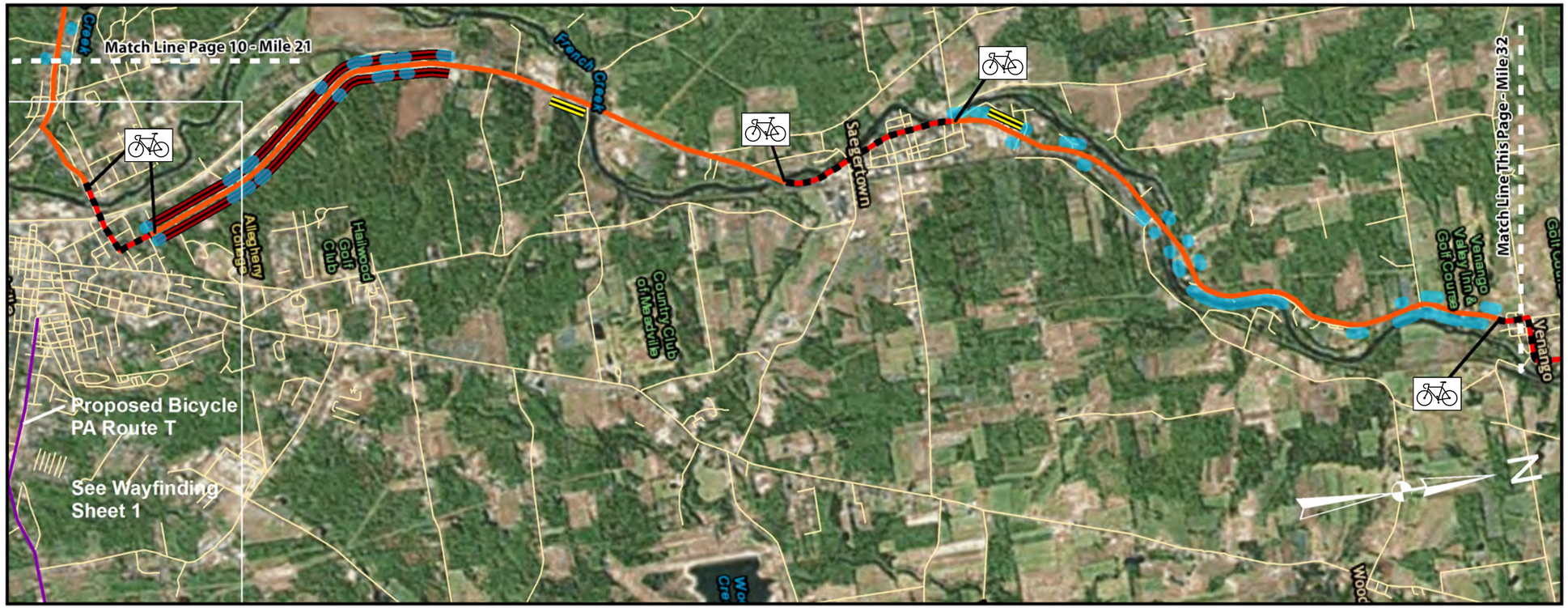


PA Route 6 Improvements Plan

Legend

- BicyclePA Route Y
- Existing Bicycle / Recreational Trail
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Repair Shoulder
- Sharrows

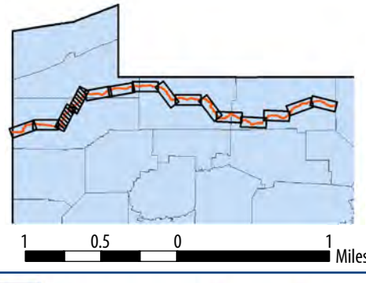
SIGNAGE

- Bike May Use Full Lane
- Road Narrows

Notes

1. Wayfinding signage to be placed along BicyclePA Route Y in Meadville, directing cyclists to amenities and points of interest in historic Meadville.

PA Route 6 Key Map



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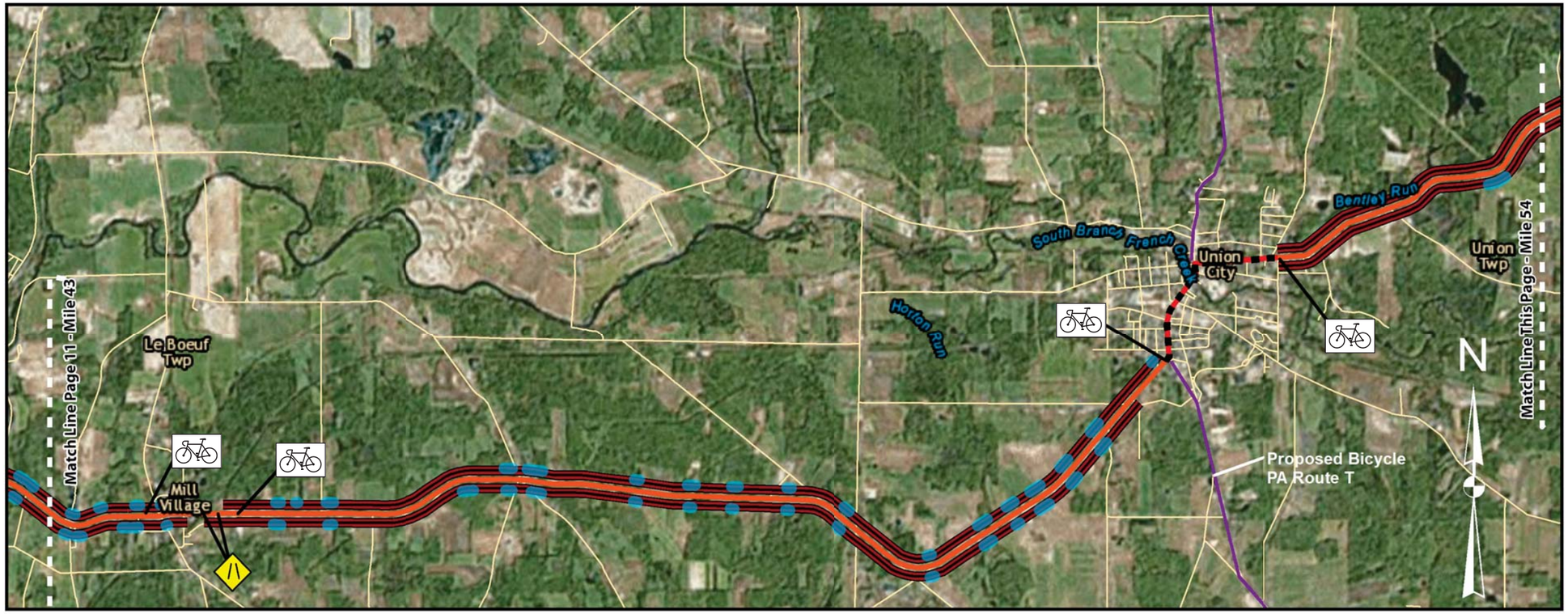
PA Route 6 Improvements Plan



Legend

- BicyclePA Route Y
- Existing Bicycle / Recreational Trail
- Other Proposed Trail / Route
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Repair Shoulder
- Sharrows
- Wayfinding Route
- Long Term Replacement

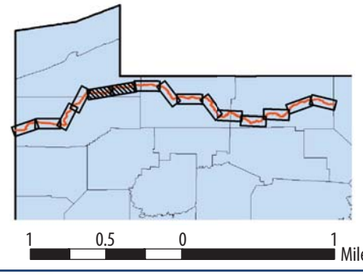
SIGNAGE

- Bike May Use Full Lane
- Wayfinding
- Road Narrows

Notes

1. Place wayfinding signage along the alternative route shown to guide cyclists through downtown Corry.

PA Route 6 Key Map



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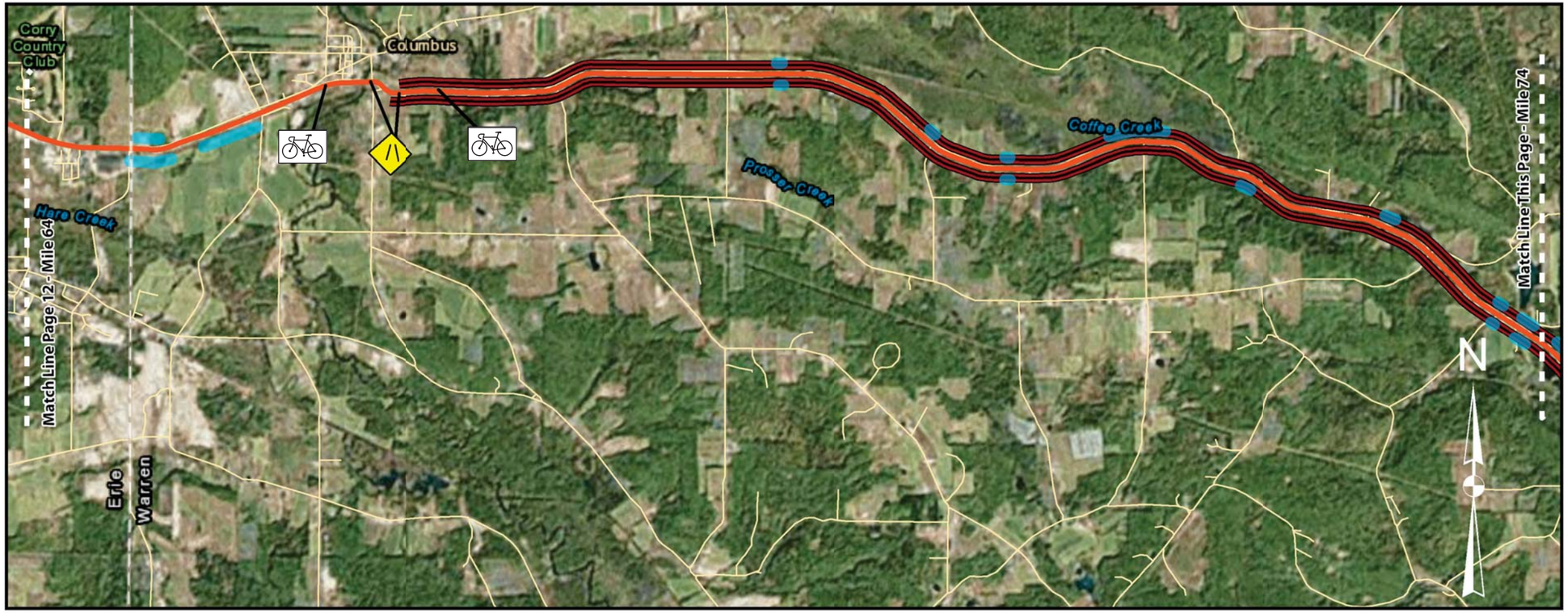
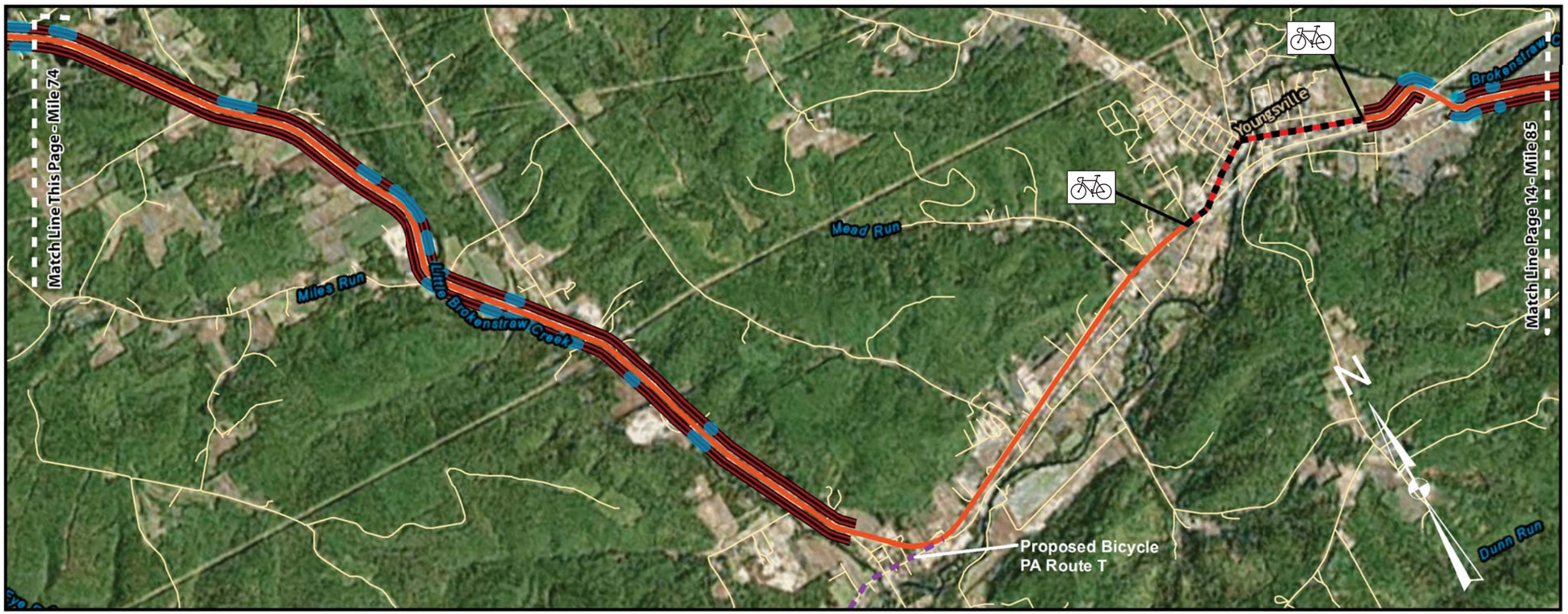




PA Route 6 Improvements Plan

Legend

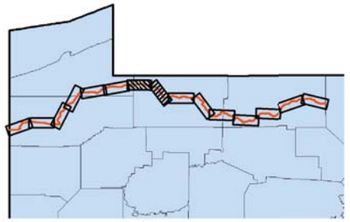
- BicyclePA Route Y
- Other Proposed Trail / Route
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Sharrows
- Move/Remove Guide Rail
- Long Term Replacement

SIGNAGE

- Bike May Use Full Lane
- Road Narrows

Notes

PA Route 6 Key Map



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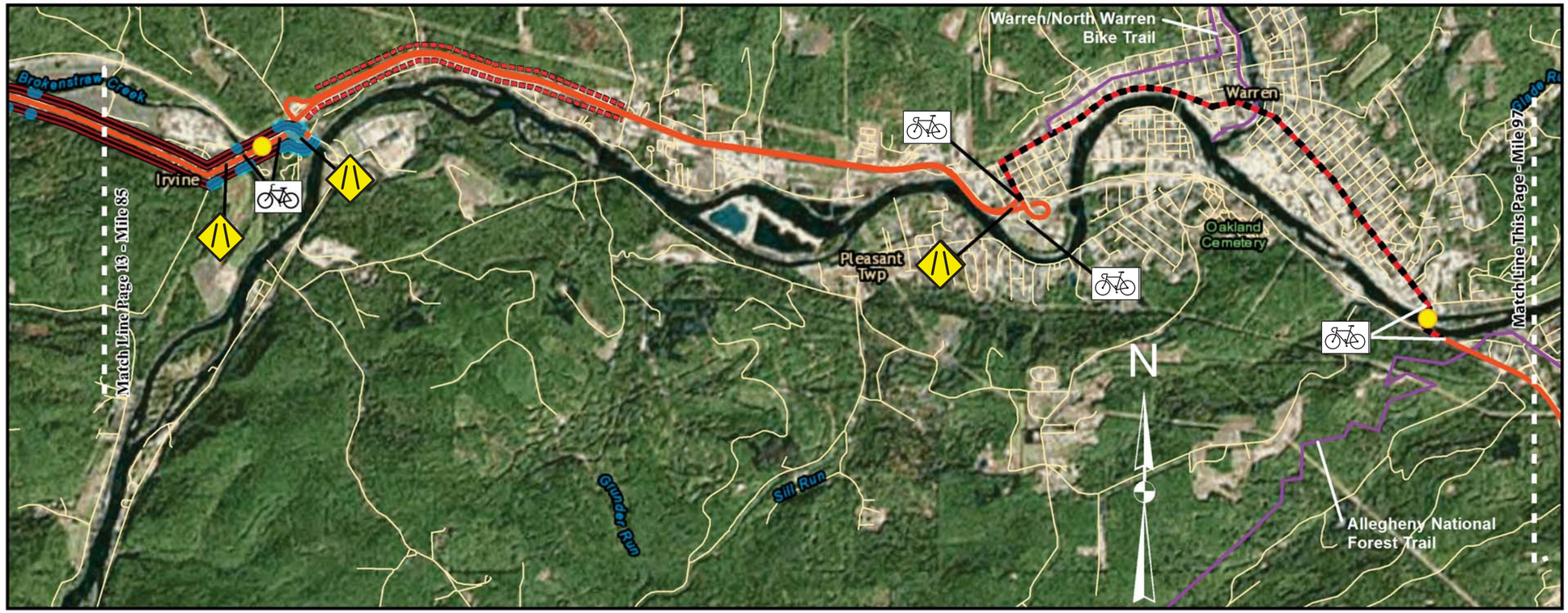
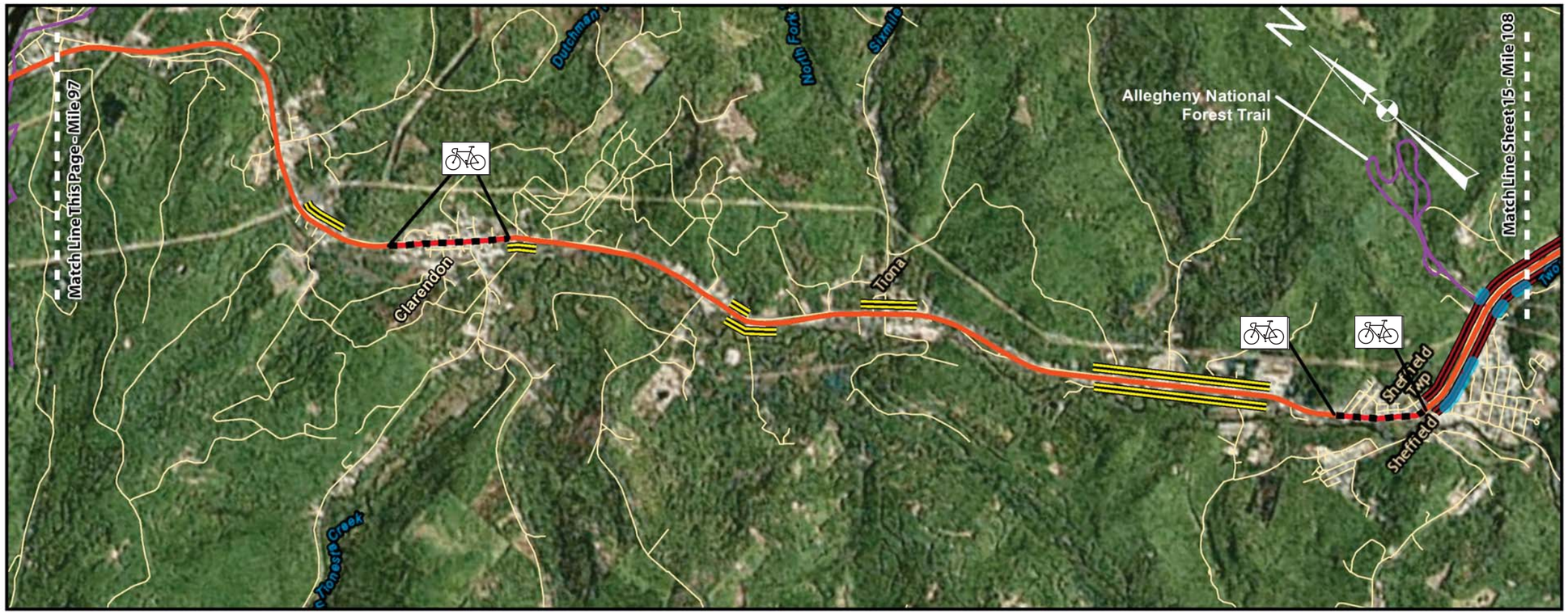




PA Route 6 Improvements Plan

Legend

- BicyclePA Route Y
- Existing Bicycle / Recreational Trail
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Repair Shoulder
- Sharrows
- Reconfigure Rumble Strips
- Long Term Replacement

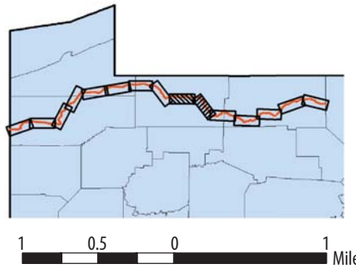
SIGNAGE

- Bike May Use Full Lane
- Wayfinding
- Road Narrows
- BicyclePA Route Y Sign

Notes

1. An off-road trail is recommended from PA Route 6 to Betts Park as a long-term improvement for Eastbound BicyclePA Route Y. This would bypass the highway exit, conveying cyclists Northbound onto Ludlow Street.

PA Route 6 Key Map



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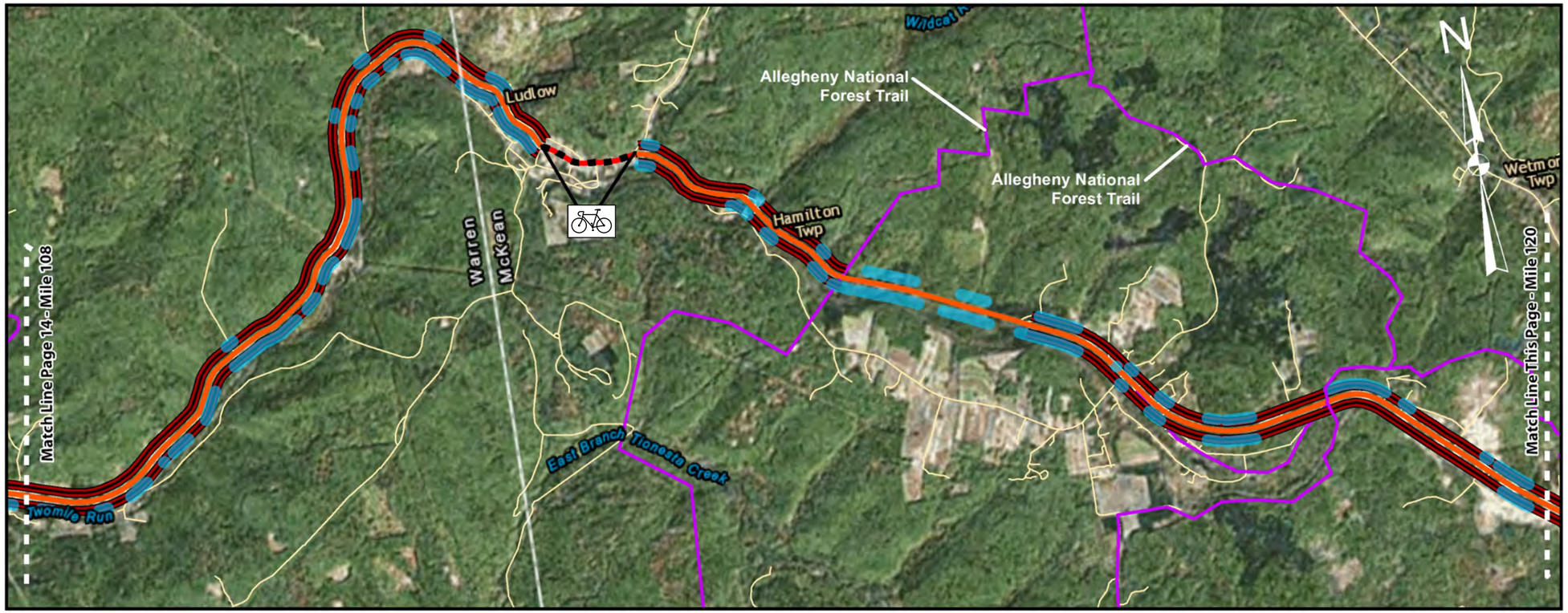
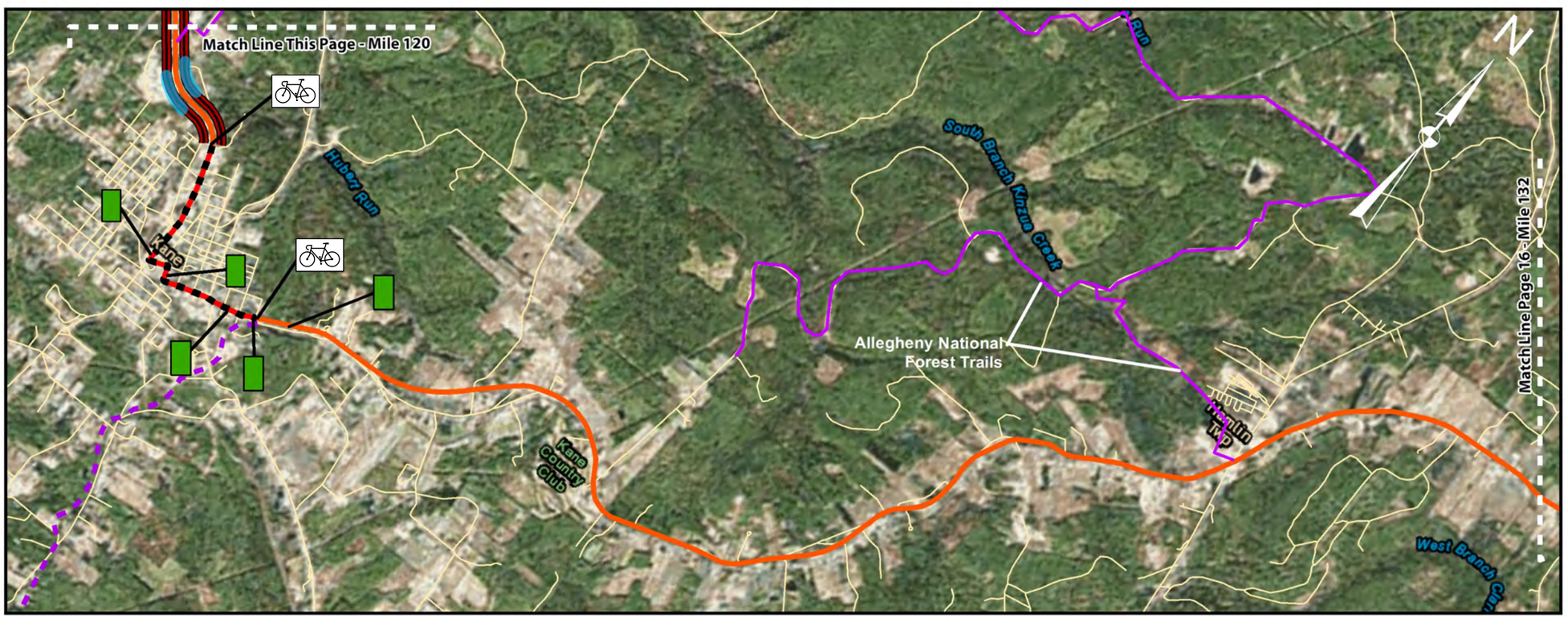
PA Route 6 Improvements





Legend

- BicyclePA Route Y
- Existing Bicycle / Recreational Trail
- Other Proposed Trail / Route
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Sharrows

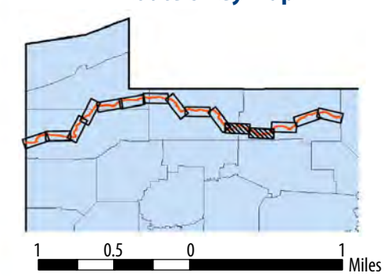
SIGNAGE

- Bike May Use Full Lane
- BicyclePA Route Y Sign

Notes

1. An Alternate route of BicyclePA Route Y from PA Route 6 is suggested onto a Rails-to-Trails project currently being planned from Kane to Mount Jewett.

PA Route 6 Key Map



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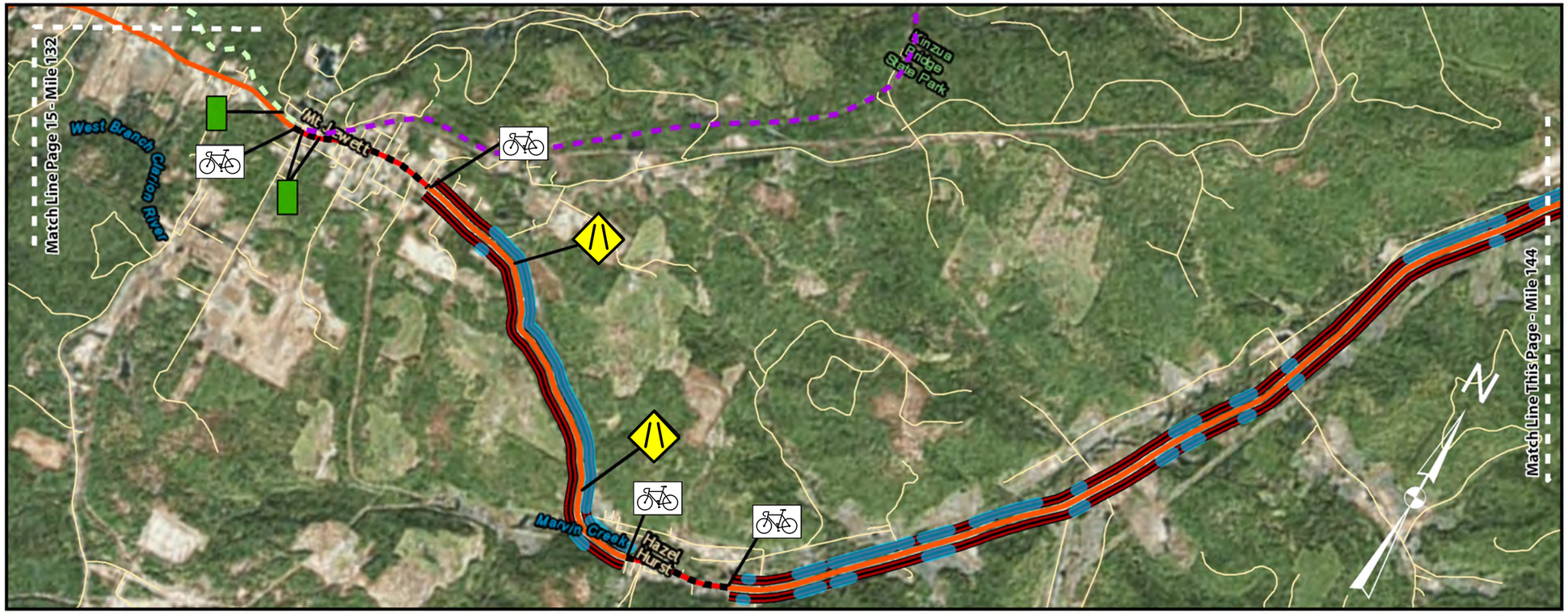
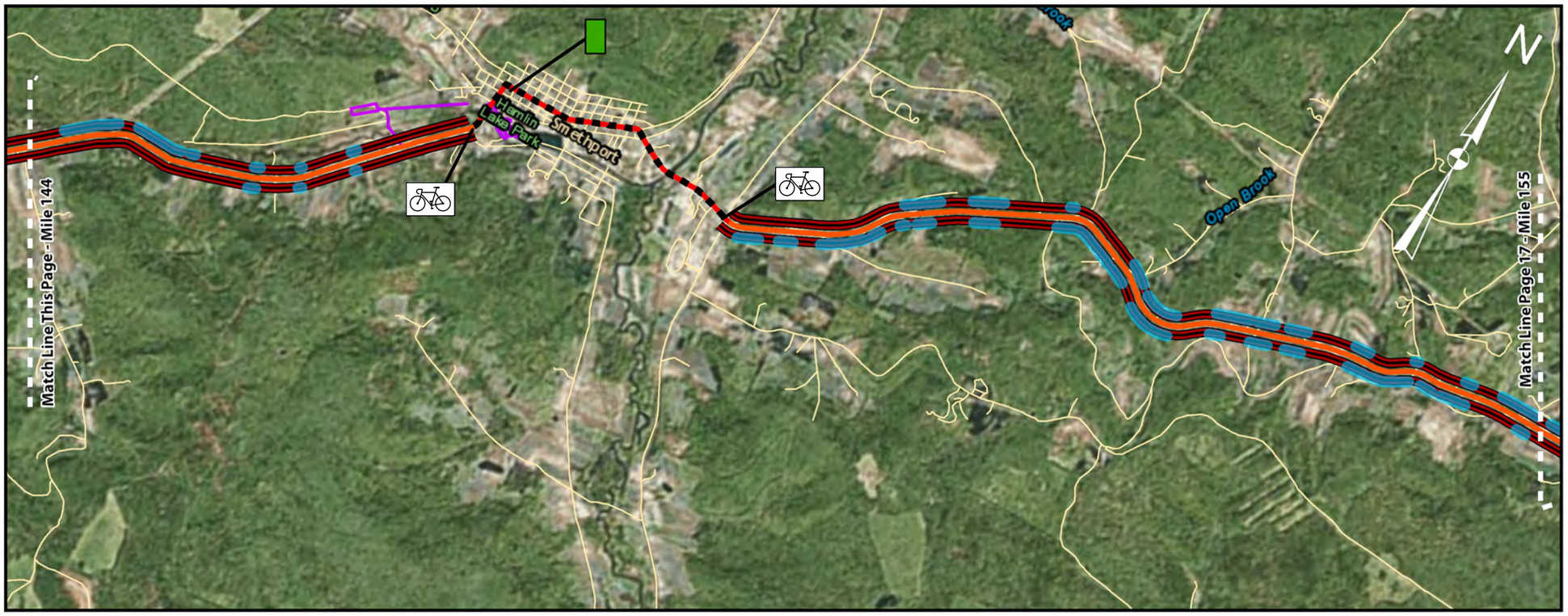




PA Route 6 Improvements Plan

Legend

- BicyclePA Route Y
- Existing Bicycle / Recreational Trail
- Other Proposed Trail / Route
- Route Y Realign - Trail
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Sharrows
- Long Term Replacement

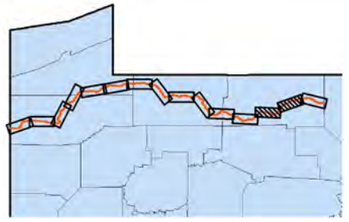
SIGNAGE

- Bike May Use Full Lane
- Road Narrows
- BicyclePA Route Y Sign

Notes

1. It is recommended that BicyclePA Route Y be realigned to an off-road facility in the event that the Rails-to-Trails project from Kane to Mount Jewett is constructed.

PA Route 6 Key Map



1 0.5 0 1 Miles

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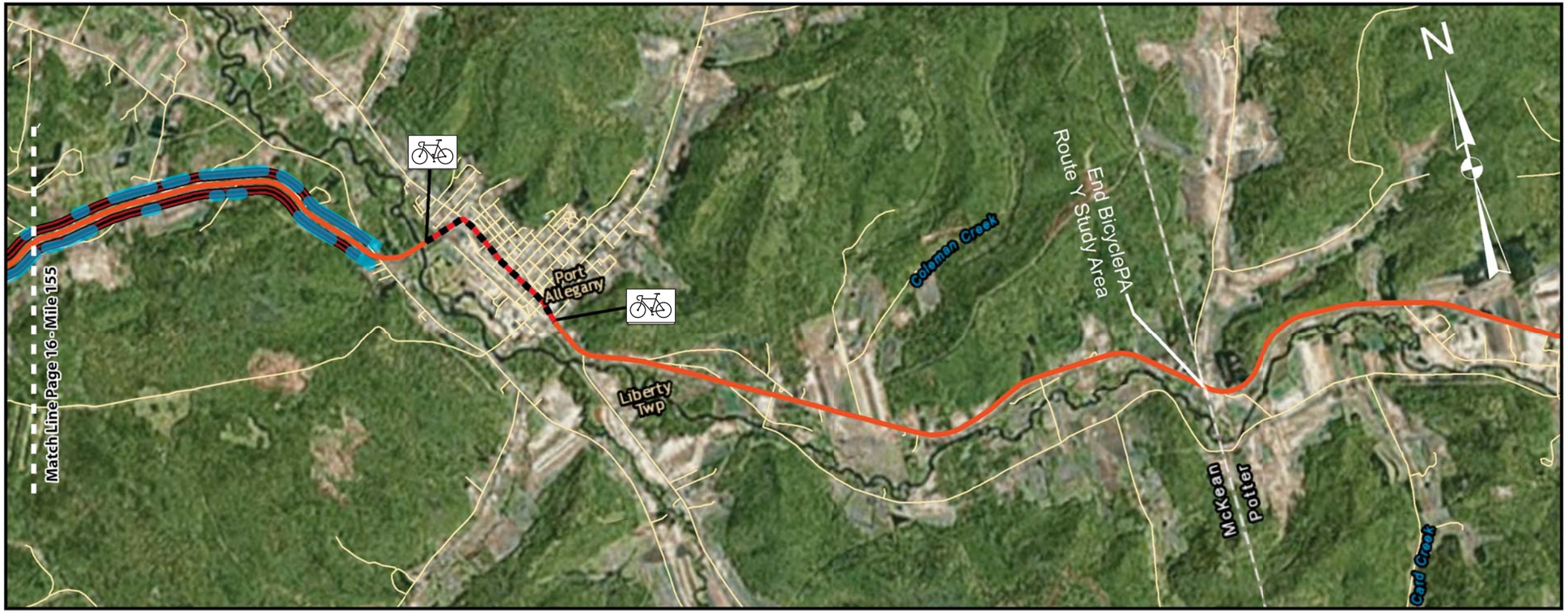


PA Route 6 Improvements Plan

Legend

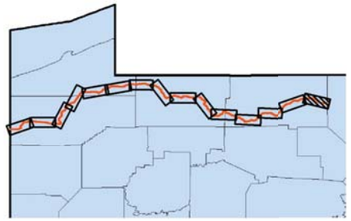
- BicyclePA Route Y
- Existing Bicycle / Recreational Trail
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Sharrows

SIGNAGE

- Bike May Use Full Lane

Notes

PA Route 6 Key Map



1 0.5 0 1 Miles

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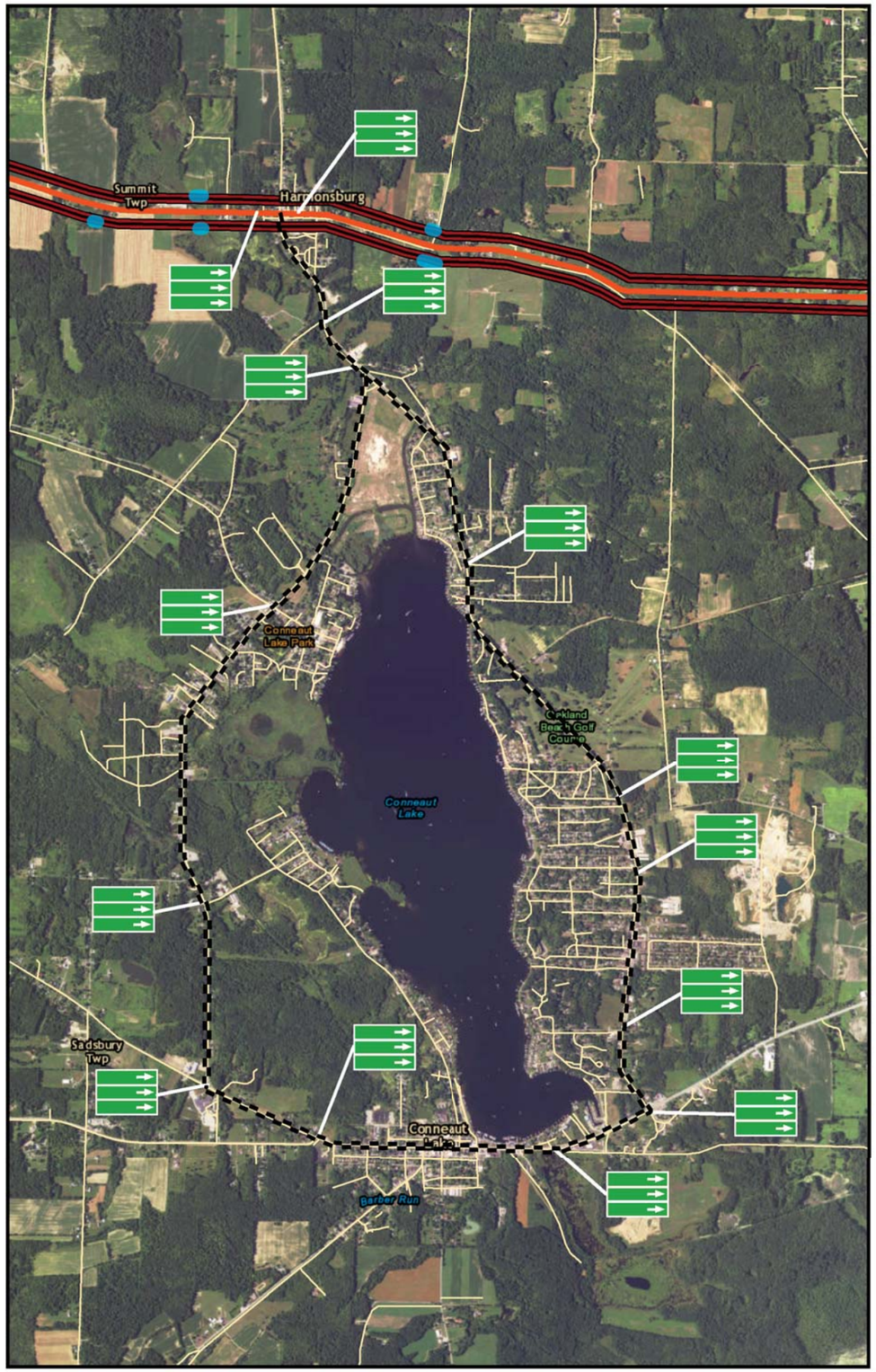
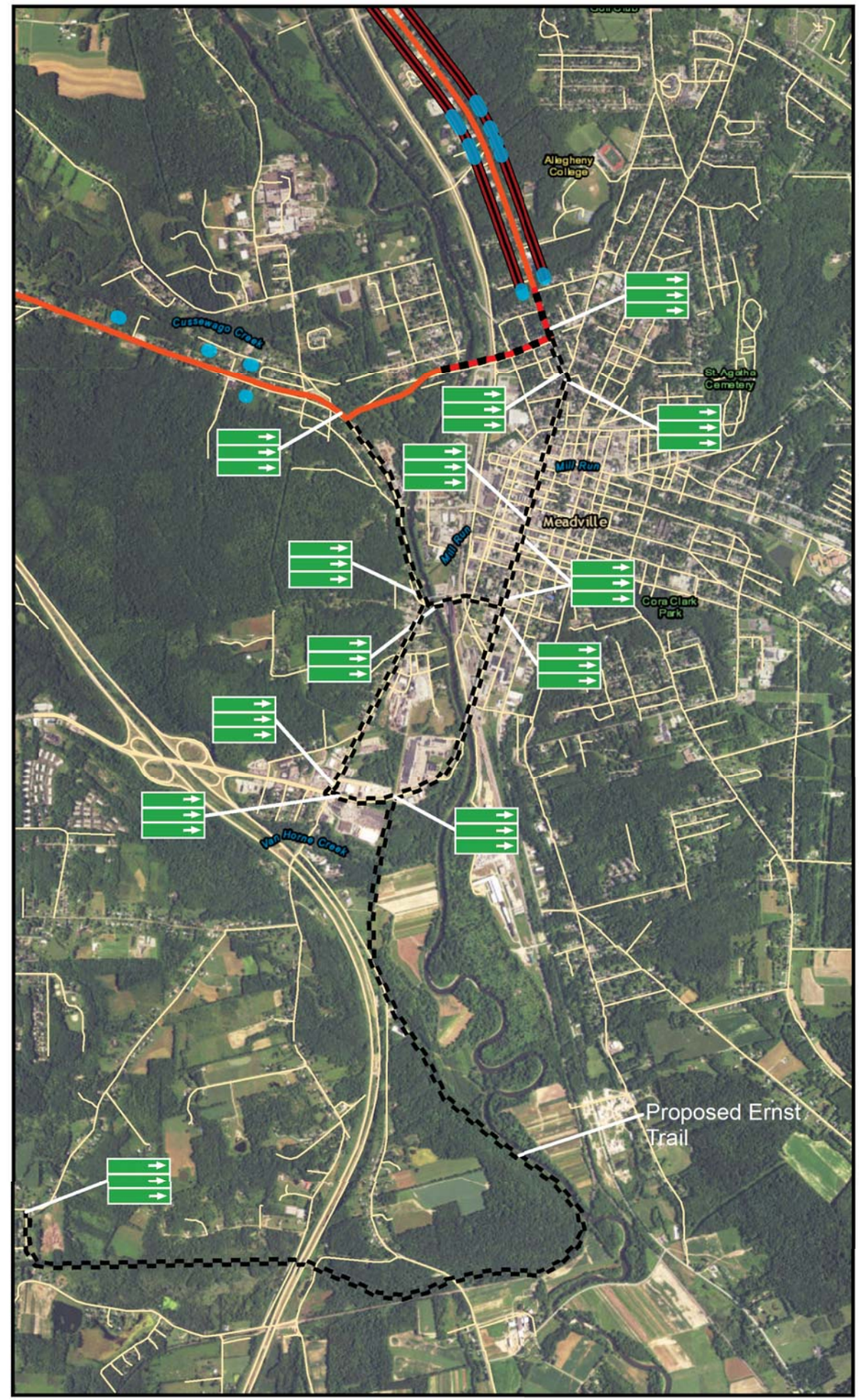
PA Route 6 Wayfinding Improvements





PA Route 6 Wayfinding

Legend

- BicyclePA Route Y
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Repair Shoulder
- Sharrows
- Wayfinding Route
- Long Term Replacement

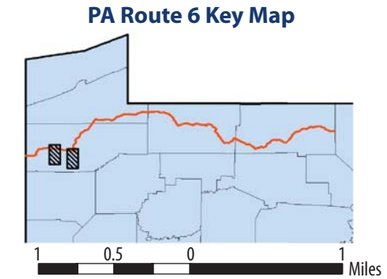
SIGNAGE

- Wayfinding

Notes

1. Wayfinding signage to be placed along BicyclePA Route Y in Harmonsburg, directing cyclists to points of interest in Conneaut Lake.
2. Wayfinding signage to be placed along BicyclePA Route Y in Meadville, directing cyclists south through downtown Meadville, which would otherwise be bypassed by BicyclePA Route Y.

PA Route 6 Key Map



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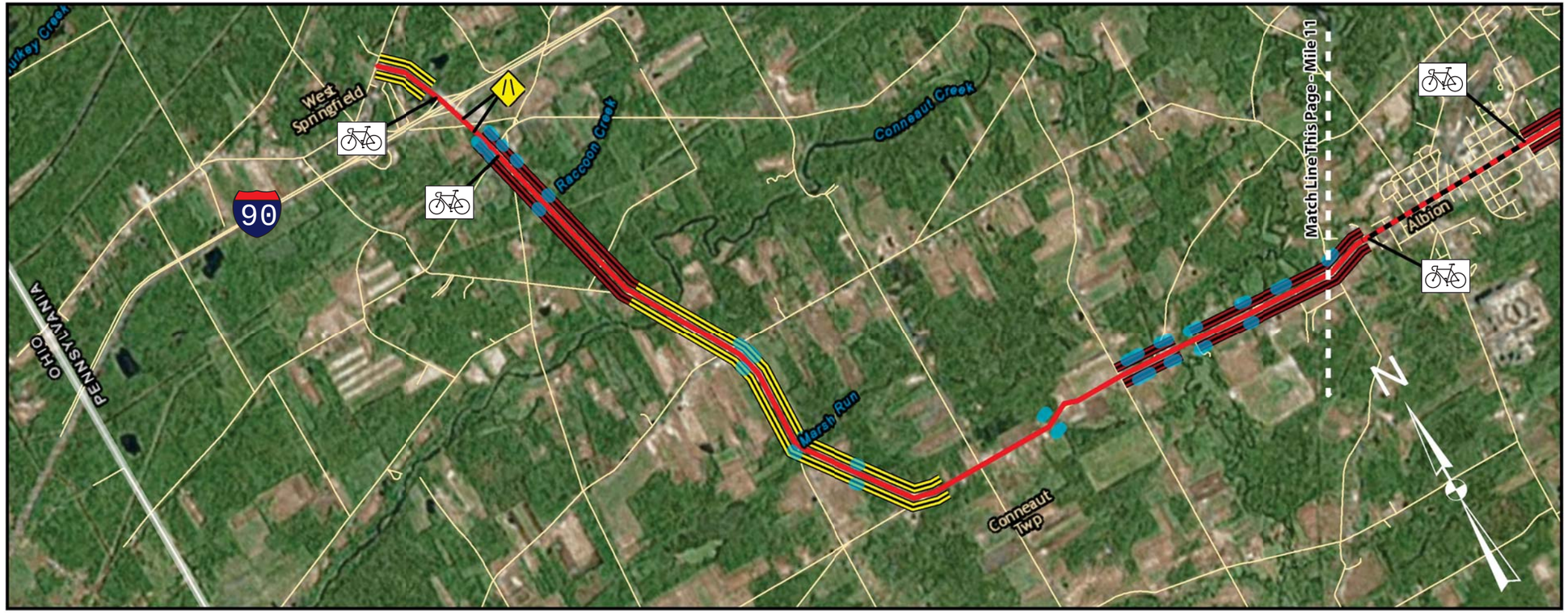
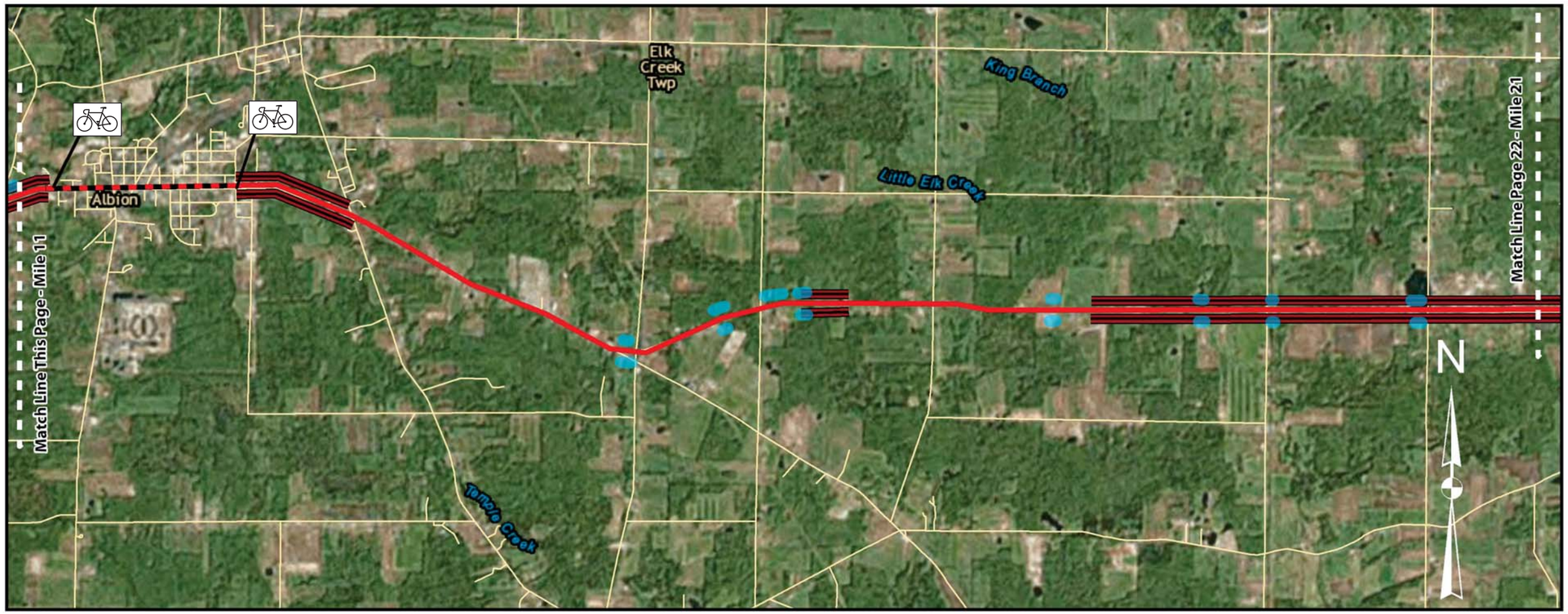
PA Route 6 North Improvements

PA Route 6 North Improvements Plan





Legend

- BicyclePA Route Y
- BicyclePA Route 6 North
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Repair Shoulder
- Sharrows

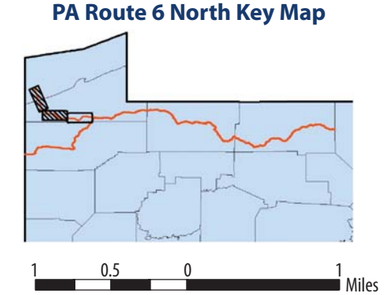
SIGNAGE

- Bike May Use Full Lane
- Wayfinding
- Road Narrows

Notes

1. New Route 6 North signs should be installed every three miles in each direction, for a total of 20 signs.

PA Route 6 North Key Map



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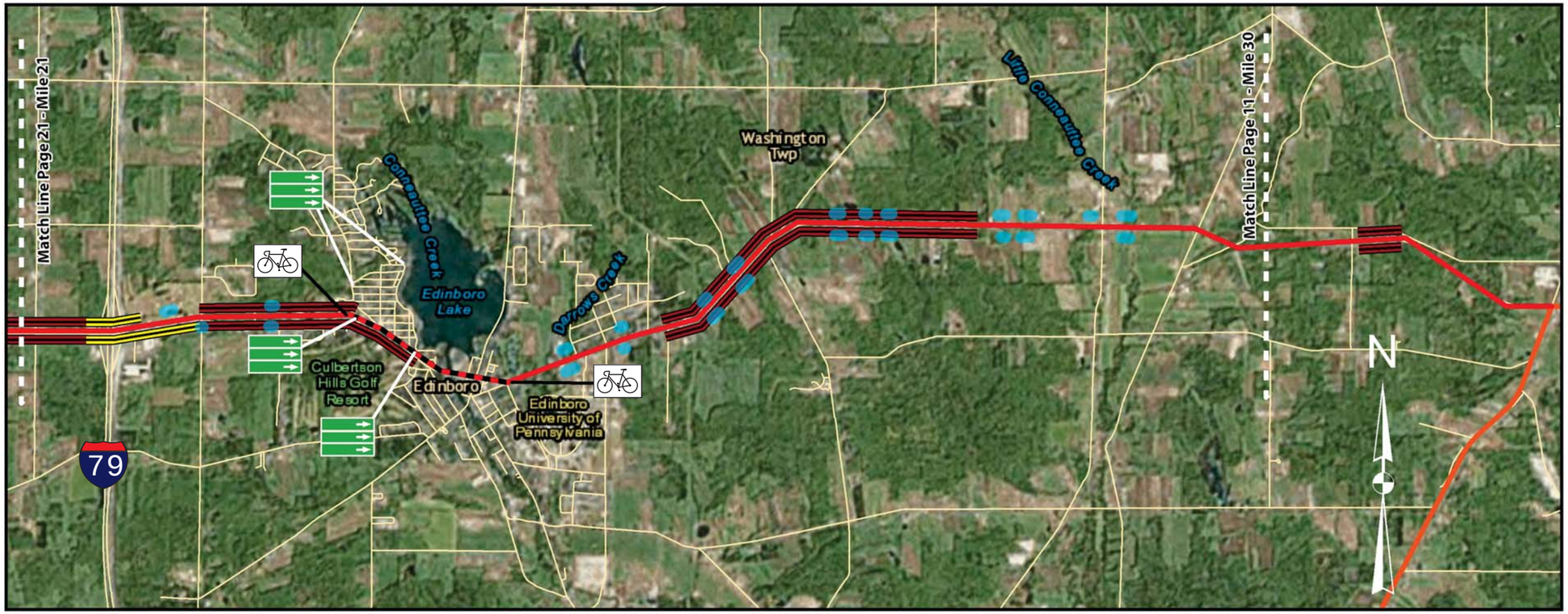


PA Route 6 North Improvements Plan

Legend

- BicyclePA Route Y
- BicyclePA Route 6 North
- Move/Remove Guide Rail
- Widen Shoulder to 5'
- Repair Shoulder
- Sharrows

SIGNAGE

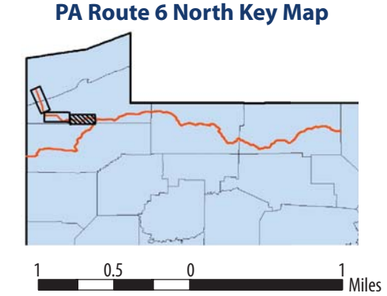
- Bike May Use Full Lane
- Wayfinding

Notes

1. New Route 6 North signs should be installed every three miles in each direction, for a total of 20 signs.

2. The existing bike lane through part of Edinboro will be repainted and maintained.

PA Route 6 North Key Map



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6 Improvement Cost Estimates

PA Route 6 Quantities and Cost Estimate Details

The costs outlined on the following pages have been estimated based on similar PennDOT projects. Construction costs are shown separately, and the total costs are shown in the last column. These total costs include the following items:

- *Design (10%)*
- *Construction Inspection (10%)*
- *Mobilization (8%)*
- *Contingencies (5%)*
- *Traffic control and other minor items (2%)*

Maintenance costs would be mostly confined to newly constructed shoulder widening, sign replacement, and new paint striping. Because the shoulder widths will only increase an average of 3', any increase in maintenance cost is negligible. Street and shoulder sweeping is performed by PennDOT already, and adding a small amount of width will not significantly increase that cost, unless there is currently no shoulder, which only exists very rarely along PA Route 6. For sharrows and signage, the municipality will need to sign a local maintenance agreement with PennDOT.

Description	Unit	Unit Cost	Quantity	Construction Cost	Other Cost	Total Cost
Cost-Effective Improvements						
Road Narrows Sign	EA	$120	12	$1,440	$504	$1,944
Bicycle Warning Sign	EA	$120	3	$360	$126	$486
Bikes May Use Full Lane Sign	EA	$200	43	$8,600	$3,010	$11,610
Route Y Sign	EA	$50	38	$1,900	$665	$2,565
Sharrows	EA	$300	1,071	$321,240	$112,434	$433,674
Sign Installation	EA	$200	96	$19,200	$6,720	$25,920
Cost-Effective Improvements Total				**$352,740**	**$123,459**	**$476,199**
Community Projects						
Sign Installation	EA	$200	32	$6,400	$2,240	$8,640
Wayfinding Sign	EA	$200	32	$6,400	$2,240	$8,640
Community Projects Total				**$12,800**	**$4,480**	**$17,280**
PennDOT Maintenance Projects						
Shoulder Widening	Mile	$138,512	205	$28,394,960	$9,938,236	$38,333,196
Shoulder Repair	Mile	$92,341	13	$1,200,437	$420,153	$1,620,590
Replace Rumble Strips	Mile	$16,241	6	$97,445	$34,106	$131,551
Move/Remove Guide Rail	LF	$4	221,350	$885,400	$309,890	$1,195,290
PennDOT Maintenance Projects Total				**$30,578,243**	**$10,702,385**	**$41,280,628**
Bridge Projects						
Warren Bridge Replacement	EA	$15,000,000	1	$15,000,000	$5,250,000	$20,250,000
Small Bridge Replacement	EA	$2,000,000	3	$6,000,000	$2,100,000	$8,100,000
Bridge Projects Total				**$21,000,000**	**$7,350,000**	**$28,350,000**

Total Construction Cost = $51,943,783
Total Other Cost = $18,180,324

TOTAL COST = $70,124,107

PA Route 6 North Quantities and Cost Estimate Details

Description	Unit	Unit Cost	Quantity	Construction Cost	Other Cost	Total Cost
Cost-Effective Improvements						
Road Narrows Sign	EA	$120	2	$240	$84	$324
Bikes May Use Full Lane Sign	EA	$200	6	$1,200	$420	$1,620
Route 6 North Sign	EA	$50	20	$1,000	$350	$1,350
Sharrows	EA	$300	65	$19,645	$6,876	$26,521
Sign Installation	EA	$200	28	$5,600	$1,960	$7,560
Cost-Effective Improvements Total				**$27,685**	**$9,690**	**$37,375**
Community Projects						
Sign Installation	EA	$200	8	$1,600	$560	$2,160
Wayfinding Sign	EA	$200	8	$1,600	$560	$2,160
Community Projects Total				**$3,200**	**$1,120**	**$4,320**
PennDOT Maintenance Projects						
Shoulder Widening	Mile	$92,341	33	$3,047,264	$1,066,542	$4,113,806
Shoulder Repair	Mile	$138,512	9	$1,246,608	$436,313	$1,682,921
Move/Remove Guide Rail	LF	$4	16,889	$67,556	$23,645	$91,201
PennDOT Maintenance Projects Total ($5,887,927)				**$4,361,428**	**$1,526,500**	**$5,887,928**

Total Construction Cost = $4,392,313
Total Other Cost = $1,537,310

TOTAL COST = $5,929,623