SR 322/22 / Bike Route J:
Safety Conflicts Design Study

PennDOT Bureau of Public Transportation Central Office - Multimodal

September 29, 2017
ACKNOWLEDGMENTS

This report is a collaborative effort by PennDOT District 8, PennDOT Bureau of Public Transportation Central Office - Multimodal, Middle Paxton Township, and stakeholders from the region and bicycle advocate groups. Below is a list of the Steering Committee members who participated in the project.

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- Ed Krebs, Lebanon Valley Bicycle Coalition
- Dick Norford, Bicycle South Central Pennsylvania
- Bill Hoffman, Pedestrian and Pedalcycle Advisory Committee
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1 Purpose and Goals of the Study

Bike Route J is a 232-mile long Pennsylvania state-designated bicycle route that connects the north and south borders of the state between the towns of South Waverly and New Freedom. Bike Route J passes through Williamsport, Lewisburg, Harrisburg, and York, PA and is a key bicycle connection through Harrisburg. One of the main pinch points for riders on Bike Route J occurs in Dauphin Borough and Middle Paxton Township just north of Harrisburg where the route is located on the shoulder of Route 322. Route 322/22 in this area is severely constrained by the Susquehanna River on one side and the NS rail line and steep mountain topography on the other side. At the pinch point, the Route 322/22 roadway narrows underneath a Norfolk Southern (NS) owned freight rail bridge, causing dangerous conditions for cyclists both in terms of poor sight lines approaching the rail bridge and the close proximity of cyclists to high-speed vehicles under the bridge. Route 322/22 also experiences flooding of the roadway at the pinch point during heavy rain events due to the lowered elevation of the roadway required to pass under the rail bridge. Major flooding occurs infrequently, but the flood waters can take up to 4 days to recede in major rain events. This flooding cuts off Dauphin Borough and Middle Paxton Township from emergency services, which is of particular concern for those trying to travel south to hospitals in the Harrisburg area. A design solution is needed to allow cyclists to safely traverse this section of Bike Route J while also considering how to provide emergency vehicle access during times of flooding.

PennDOT Central Office - Multimodal led the effort with support from PennDOT District 8 (D-8) and Middle Paxton Township for a conceptual design study to investigate improved access for cyclists and emergency vehicles through Route 322/22 / Bike Route J in Dauphin Borough/Middle Paxton Township. The Study has developed several scenarios that would allow bicycles and in some cases pedestrians to avoid the pinch point through Dauphin Borough and Middle Paxton Township on Bike Route J. Each of the four options developed in the design alternatives takes into account the advantages, disadvantages, project costs, and maintenance responsibilities associated with the design. These options would create a safer environment for cyclists and improve trail connectivity throughout the area.

2 Existing Condition Evaluation

PROCESS

The Consultant team studied the area along SR 322/22 from the intersection of Allegheny Avenue and Delaware Street in Dauphin Borough to Fort Hunter Park in Susquehanna Township. The study area includes local streets in Dauphin Borough, Middle Paxton Township, and Susquehanna Township, private roads in Middle Paxton Township, and state owned Route 322/22 in all three municipalities. The Consultant team developed base maps that detail roadway and railroad centerlines, parcels, streams and LIDAR contours based on available AutoCAD, GIS, and PDF files obtained from the Tri-County Regional Planning Commission and DCNR.

EXISTING CONDITIONS

The existing Susquehanna Township Bicycle Path Connection, also known as PA Bike Route J, is currently segmented from Fishing Creek Valley Road (to the East) to Allegheny Street (to the West). The primary concern with the existing bicycle path connection is that it travels along Route 322/22 highway in the east and west bound lanes for this portion of the bike path, specifically under an existing Norfolk Southern railroad overpass. This results in narrow shoulders and creates a pinch point for bicyclists on State Route 322/22, a four-lane limited access highway. Within the study area, there is one full interchange (partial diamond and partial clover leaf) with Fishing Creek Valley Road, and one partial interchange at Allegheny Street (westbound exit). A study area map with existing conditions photos is shown on the following page.
STUDY AREA MAP WITH EXISTING CONDITIONS PHOTOS

Legend

- Existing Route J
- Municipal Boundaries
- 50-Foot Contours
- Municipal Parks
- Railroads

- Narrow ROW on River Road
- Gap between the end of River Road and SR 322
- Gap between the end of Erie Street and SR 322
- Narrow shoulder and poor lines of sight under the rail structure
- Shoulder area on the west side of 322 south of the rail structure
- Narrow space between rails and cliff slope

Cemetery Road dead-ends
Cemetery Road
Front Street has enough width for on-street improvements
The current Average Daily Traffic (ADT) for Route 322/22 is as follows:
• Eastbound - 29,124 (12% truck traffic)
• Westbound - 27,459 (12% truck traffic)

These current traffic conditions are a safety concern for novice bicyclists as well as experienced bicyclists.

STAKEHOLDER OUTREACH

The consultant team facilitated a kick-off meeting on July 6, 2017, with members of BPT, District 8, the Tri-County Regional Planning Commission (TCRPC), and local bicycle advocates to review the project goals, scope, and schedule, as well as to obtain additional relevant background information. This meeting gave the consultant team an opportunity to obtain relevant information with regard to pinch points along SR 322, flooding issues, and regional impacts on the site to better understand the physical constraints and issues to be evaluated during the conceptual design study. The following issues and concerns were noted during the meeting:

• Issues related to the railroad structure across Route J/SR 322:
  ◊ The curve in the road as it goes under the bridge leads to line-of-sight issues, particularly on the southbound side.
  ◊ The shoulders under the structure are very narrow and force cyclists to ride close to fast-moving vehicles.
  ◊ The primary users of Route J are commuter or serious touring cyclists who are used to the sort of conditions on this route.

• Connectivity to other trail networks in the area, including the Capital Area Greenbelt, Stony Creek Trail and Lykens Valley Trail should be investigated.

• Flooding under the rail structure cuts off emergency access on SR 322/22, which will continue to be an issue as the population in the area experiences growth.

• Route J/SR 322/22 is impacted by regional travel issues, including people from northern areas heading south for vacation; the growth of the State College area; and the planning of state bike routes from Rochester, NY to Washington, DC.

Opportunities for Bike Route J identified during kickoff meeting include:
• Improving Cemetery Rd and the space to the east of the railroad tracks.
• Connecting River Road to the inbound side of Route J/SR 322/22.
• Building a cantilevered structure or floating bridge on the west side of SR 322/22.
• Constructing a fly-over above the railroad structure.
• Replacing the structure and raising the road.

Constraints for Bike Route J identified during kickoff meeting include:
• Opposition from Norfolk Southern regarding encroachment on their right-of-way at the terminus of Cemetery Road.
• Extensive impacts to the existing rail line (several miles) would be required with any vertical adjustments to the existing rail overpass.
• Narrow space between the railroad tracks and the face of the mountain.
• SR 322/22 is built on fill up to the edge of the river leaving little land to develop on the west side of the road.
• River Road is a narrow roadway, and there is at least one property that would require an easement between the existing road and SR 322/22.
• Vertical clearance is required for a fly-over of the NS rail line, which would require construction of a long ramp that will reach that clearance at a required slope.
• General constructibility constraints resulting from the active NS rail line, SR 322/22 corridor, and Susquehanna River.

The consultant team also conducted a site visit on July 11, 2017, led by local bicycle advocate Dick Norford. The team traveled along all sections of Route J within the study area, including sections of SR 322/22, Allegheny St, Front St, and Fishing Creek Valley Rd; as well as potential alternative routes, including Erie St, River Rd, Cemetery Rd, and Canal St. Based on the site visit the consultant team made additional observations about the conflict points along Route J/SR 322/22 as follows:

• A fly-over to Erie Street would require land acquisition and possibly air rights from the railroad as well as a resident.
• Front St between the SR 322/22 offramp and Fort Hunter Park has sufficient width to include bicycle facilities on both sides of the road in each direction, with the exception of the intersection with Fishing Creek Valley Rd, where islands are used to remove the shoulder and narrow the travel lanes.
• Cemetery Rd dead-ends at a residence, beyond which the slopes become too extreme to build on without significant excavation and retention; Norfolk Southern has gated the spot where residents formerly entered the railroad right-of-way to connect to Erie St; the gate is monitored by railroad security personnel.

EXISTING ENVIRONMENTAL CONDITIONS

A desktop environmental screening was completed for the project location and surrounding area. The project screening area consisted of an approximately two-mile long segment of the 322/22 corridor within Middle Paxton Township, Dauphin Borough, and Susquehanna Township. State Route 322/22 is a four-lane limited access highway that runs east/west across Pennsylvania. The area of focus for the screening, from Fort Hunter Park in the southeast to Delaware Street in Dauphin Borough to the northwest, captured existing conditions pertaining to the following environmental resources:

• Agricultural
• Aquatic
• Hazardous and Residual Waste
• Wildlife Habitat
• Cultural
• Parkland
• Socioeconomic
• Air Quality

The summary of the environmental screening is included in the Appendix of this Report.

OPPORTUNITIES & CONSTRAINTS

Based on feedback from stakeholder outreach, existing conditions base mapping, and information from the environmental screening, the Consultant team developed a diagram of opportunities and constraints for the Bike Route J study area and for the main pinch point of Bike Route J; these diagrams are shown on the following pages.
BIKE ROUTE J OPPORTUNITIES & CONSTRAINTS DIAGRAM

On-street connection via River Rd, Canal St, and Delaware St to existing Route J. Narrow width on River Rd

Medians aren't wide enough to allow for northbound travel along Front St

Narrow space (approx. 12 ft) between cliff and rails; historically used to drive between Erie St and Cemetery Rd

Shadows on Front St are wide enough for two-way bike travel if a northbound connection is provided

Shoulders on Front St are wide enough for two-way bike travel if a northbound connection is provided

Bikes on narrow highway shoulder with no physical separation; no land on west side of highway to expand onto without additional structure

Potential connections from Fort Hunter Rd to Cemetery Rd would require going under SR 322 and railroad

Steep slopes and cliffs limit ability to expand right-of-way

Cemetery Rd dead-ends, separated from existing Route J by railroad tracks

Steep slopes and cliffs limit ability to expand right-of-way

Bikes on narrow highway shoulder with no physical separation; no land on west side of highway to expand onto without additional structure

Potential connections from Fort Hunter Rd to Cemetery Rd would require going under SR 322 and railroad

Shadows on Front St are wide enough for two-way bike travel if a northbound connection is provided

Opportunity for improved connection to Fort Hunter Park

Norfolk Southern rail overpass; narrow shoulders on 322; flooding area during major rain events

On-street connection via River Rd, Canal St, and Delaware St to existing Route J. Narrow width on River Rd

Shadows on Front St are wide enough for two-way bike travel if a northbound connection is provided

Narrow space (approx. 12 ft) between cliff and rails; historically used to drive between Erie St and Cemetery Rd

Opportunity for improved connection to Fort Hunter Park

Medians aren't wide enough to allow for northbound travel along Front St

Legend

- Existing Route J
- Potential New Connections
- Municipal Boundaries
- Potential On-Street Connections
- 50-Foot Contours
- Municipal Parks
- Steep Slopes
- Pinch Points
- Railroads
- 500-Year Floodplain
- 100-Year Floodplain

FORT HUNTER PARK

FISHING CREEK VALLEY RD

ALLEGHENY ST

CANAL ST

RIVER RD

ERIE ST

CEMETERY RD

FRONT ST

0 1/200 1/100 1/50 1/10

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River Road has narrow ROW (approx. 12 ft at bridge)

There is an approx. 700 ft gap on private property between the end of River Rd and SR 322 that would require acquisition.

Railroad structure creates major choke point; narrow shoulders and poor lines of sight create unsafe bicycle conditions; road under structure occasionally floods, cutting off emergency vehicle access.

Connection from northbound lane to River Rd would require a flyover high enough to clear the road, but not the railroad, as at Erie St.

Steep slopes and cliffs limit ability to expand right-of-way; historically, space between cliff and tracks (approx. 12 ft) was used to connect Erie St and Cemetery Rd; railroad access only.

Connection to Erie St would require flyover high enough to clear active railroad tracks; may also require land acquisition or purchase of air rights from railroad.

Steep slopes and limited land area to the west of SR 322.
Development of Design Alternatives

Based on information gained from the stakeholder meeting, site tour, and base mapping, the Consultant team developed a series of 4 route alternatives for Bike Route J that are illustrated on the following pages. The alternatives show a range of options, from less-intensive one-way routes that utilize existing streets to more intensive two-way fly-over structures. The design alternatives include options that utilize private property (i.e. River Road), as well as non-private property options as a contingency in case agreements with property owners could not be obtained. The Consultant team looked into options for providing emergency vehicle access during times that Route 322/22 is closed due to flooding; however, because of site constraints related to Norfolk Southern, steep topography, and the proximity of the river to available roadways, it was determined that there is not a viable option that would make the route accessible to emergency vehicles.

The route alternatives were presented to the Steering Committee at a meeting on September 15, 2017. The Consultant team incorporated feedback from the Steering Committee into the route alternatives described below.

Option 1: Inbound-only Route Via River Road
- On-road facilities from Allegheny Street through Dauphin Borough to River Road
- On-road facilities on River Road
- New off-road one-way trail on private property between River Road and Route 322/22
- New Connection to the existing on-road Route J shoulder facilities on Route 322/22 southbound

Option 2: Two-Way Route Via Cantilever/Boardwalk
- On-road facilities between Allegheny Street and River Road through Dauphin Borough
- On-road facilities on River Road
- New off-road two-way trail on private and public property parallel to Route 322/22
- New two-way cantilever structure attached to Route 322/22 or a boardwalk structure in the river
- New off-road two-way trail on public property parallel to Route 322/22, the Route 322/22 exit ramp, and Front Street
- New two-way cycle track on the west side of Front Street
- Connections to the existing on-road Route J shoulder facilities on Front Street after Fishing Creek Valley Road

Option 3: Outbound-only Route Via Erie Street
- Existing on-road Route J shoulder facility on Route 322/22 northbound
- New one-way ramp structure from Route 322/22 northbound over Norfolk Southern rail line landing at Erie Street via switchback ramp
- On-road one-way facilities on Erie Street
- Connection to existing Allegheny Street shoulder bike lane

Option 4: Two-Way Route Via 322/22 Flyover
- Existing Allegheny Street shoulder bike lane (northbound) and new Allegheny Street shoulder bike lane (southbound)
- On-road two-way facilities on Erie Street
- New two-way ramp structure from Erie Street via switchback ramp over Norfolk Southern rail line and Route 322/22 down to land adjacent to the southbound side of Route 322/22
- New two-way cantilever structure attached to Route 322/22 or a boardwalk structure in the river
- New off-road two-way trail on public property parallel to Route 322/22, the Route 322/22 exit ramp, and Front Street
- New two-way cycle track on the west side of Front Street
- Connections to the existing on-road Route J shoulder facilities on Front Street after Fishing Creek Valley Road
OPTION 1: Inbound-Only Route Via River Road

ROUTE MAP

SECTION 1

SECTION 2

SECTION 3
OPTION 1: Inbound-Only Route Via River Road Focus Area
OPTION 2: Two-Way Route Via Cantilever/Boardwalk

ROUTE MAP

SECTION 1

SECTION 2

SECTION 3
OPTION 2: Two-Way Route Via Cantilever/Boardwalk Focus Area

- Two-Way Off-Road Alignment on Public Property
- Potential Private Road Ownership
- Easement Needed
- Norfolk-Southern Rail Overpass & Bike Route J Pinch Point
- Two-Way Off-Road Alignment on Private Property
- Two-Way Off-Road Alignment on Public Property
- Two-Way Off-Road Alignment on Route 322/22 Cantilever Structure or Boardwalk in River

Bike Route J Proposed Alignment
- Existing Route
- Proposed Route
- Route Direction
- Former Bike Route J
- Former Route Direction
- Municipal Boundary
OPTION 3: Outbound-Only Route Via Erie Street

ROUTE MAP

SECTION 1

SECTION 2

SECTION 3
OPTION 3: Outbound-Only Route Via Erie Street Focus Area

Bike Route J Proposed Alignment
- Existing Route
- Proposed Route
- Route Direction
- Former Bike Route J
- Former Route Direction
- Municipal Boundary

- One-Way Off-Road Alignment on Ramp Structure
- One-Way Off-Road Alignment at Grade
- One-Way Off-Road Alignment Structure Over Rail Line
- One-Way Off-Road Alignment on Ramp Structure
- Norfolk-Southern Rail Overpass & Bike Route J Pinch Point

Existing Allegheny Street Shoulder Bike Lane
One-Way On-Road Alignment on Erie Street Connecting to Existing Allegheny Street Shoulder Bike Lane

One-Way Off-Road Alignment on Erie Street
One-Way Off-Road Alignment on Sitchback Ramp

One-Way Off-Road Alignment Structure Over Rail Line

Norfolk-Southern Rail Overpass
& Bike Route J Pinch Point

Existing Route 322/22 Shoulder Bike Lane
Start One-Way Off-Road Alignment on Ramp Structure from Route 322

Susquehanna River

Dauphin Borough
Middle Paxton Township
Dauphin Borough
OPTION 4: Two-Way Route Via Route 322/22 Flyover

ROUTE MAP

SECTION 1

SECTION 2

SECTION 3
OPTION 4: Two-Way Route Via Route 322/22 Flyover Focus Area
4 Design Alternatives Summary Matrix

PURPOSE AND INTENT OF THE SUMMARY MATRIX

A summary matrix of the four design alternatives for Bike Route J was prepared to provide a “quick-look” comparison of the alternatives. For each of the options, the matrix includes a brief description of the proposed route, advantages and disadvantages of the route, project cost range, and a maintenance rating. The project cost range is a complete project development cost, including planning, design, permitting, construction and construction management/inspection. The maintenance rating is based upon the additional maintenance requirements that will be realized by D-8 and the local municipalities as a result of the proposed improvements. The Design Alternatives Summary Matrix is provided on the following pages.
### Concept Design Summary Matrix

<table>
<thead>
<tr>
<th>Alternate</th>
<th>Advantages</th>
<th>Disadvantages</th>
<th>Project Costs Range (millions)</th>
<th>Maintenance Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Option 1: Inbound-only Route Via River Road</strong></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>Inbound only option which shifts Bike Route J off of Eastbound Route 322/22 near the Park &amp; Ride to avoid the Norfolk Southern Rail Overpass.</td>
<td>• Inbound only option which shifts Bike Route J off of Eastbound Route 322/22 near the Park &amp; Ride to avoid the Norfolk Southern Rail Overpass.</td>
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</tr>
<tr>
<td>On-road facility from Park &amp; Ride through Dauphin Borough via Allegheny Street &amp; Delaware/Canal Streets.</td>
<td>• On-road facility from Park &amp; Ride through Dauphin Borough via Allegheny Street &amp; Delaware/Canal Streets.</td>
<td>• On-road facility from Park &amp; Ride through Dauphin Borough via Allegheny Street &amp; Delaware/Canal Streets.</td>
<td>TOTAL: $0.6 to $0.7</td>
<td>5-Lowest Maintenance Requirements</td>
</tr>
<tr>
<td>o Alternate Route would be Allegheny Street &amp; Market Street.</td>
<td>• Alternate Route would be Allegheny Street &amp; Market Street.</td>
<td>• Alternate Route would be Allegheny Street &amp; Market Street.</td>
<td>Roadway/Trail – $0.50 to $0.55</td>
<td>1-Highest Maintenance Requirements</td>
</tr>
<tr>
<td>Includes shared lane facility along River Road (Private Road) in the eastbound (Inbound) direction.</td>
<td>• Includes shared lane facility along River Road (Private Road) in the eastbound (Inbound) direction.</td>
<td>• Includes shared lane facility along River Road (Private Road) in the eastbound (Inbound) direction.</td>
<td>Drainage/E&amp;S – $0.02 to $0.07</td>
<td></td>
</tr>
<tr>
<td>Includes an on-road segment required within private property beyond the east end of River Road.</td>
<td>• Includes an on-road segment required within private property beyond the east end of River Road.</td>
<td>• Includes an on-road segment required within private property beyond the east end of River Road.</td>
<td>Design/Permitting – $0.05 to $0.07</td>
<td></td>
</tr>
<tr>
<td>Off-road segment ties into Eastbound Route 322/22 shoulder (Ex. Bike Route J) east of the Norfolk Southern Rail Overpass.</td>
<td>• Off-road segment ties into Eastbound Route 322/22 shoulder (Ex. Bike Route J) east of the Norfolk Southern Rail Overpass.</td>
<td>• Off-road segment ties into Eastbound Route 322/22 shoulder (Ex. Bike Route J) east of the Norfolk Southern Rail Overpass.</td>
<td>CM/CI – $0.03 to $0.04</td>
<td></td>
</tr>
<tr>
<td>o Bollards/barriers are required to prohibit vehicular traffic on this portion of the facility.</td>
<td>• Bollards/barriers are required to prohibit vehicular traffic on this portion of the facility.</td>
<td>• Bollards/barriers are required to prohibit vehicular traffic on this portion of the facility.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Outbound route would not change from existing, however this option could be combined with Option 3 to address both the inbound and outbound routes.</td>
<td>• Outbound route would not change from existing, however this option could be combined with Option 3 to address both the inbound and outbound routes.</td>
<td>• Outbound route would not change from existing, however this option could be combined with Option 3 to address both the inbound and outbound routes.</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Option 2: Two-Way Route Via Cantilever/Boardwalk</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Two-Way option which shifts Bike Route J off of Eastbound and Westbound Route 322/22 near the Park &amp; Ride to avoid Norfolk Southern Rail Overpass.</td>
<td>• Two-Way option which shifts Bike Route J off of Eastbound and Westbound Route 322/22 near the Park &amp; Ride to avoid Norfolk Southern Rail Overpass.</td>
<td>• Two-Way option which shifts Bike Route J off of Eastbound and Westbound Route 322/22 near the Park &amp; Ride to avoid Norfolk Southern Rail Overpass.</td>
<td>TOTAL: $8.5 to $10.0</td>
<td></td>
</tr>
<tr>
<td>On-road facility from Park &amp; Ride through Dauphin Borough via Allegheny Street &amp; Delaware/Canal Streets.</td>
<td>• On-road facility from Park &amp; Ride through Dauphin Borough via Allegheny Street &amp; Delaware/Canal Streets.</td>
<td>• On-road facility from Park &amp; Ride through Dauphin Borough via Allegheny Street &amp; Delaware/Canal Streets.</td>
<td>Roadway/Trail – $2.00 to $2.50</td>
<td>5-Lowest Maintenance Requirements</td>
</tr>
<tr>
<td>o Alternate Route would be Allegheny Street &amp; Market Street.</td>
<td>• Alternate Route would be Allegheny Street &amp; Market Street.</td>
<td>• Alternate Route would be Allegheny Street &amp; Market Street.</td>
<td>Cantilever – $5.00 to $5.80</td>
<td>1-Highest Maintenance Requirements</td>
</tr>
<tr>
<td>Includes shared lane facility along River Road (Private Road).</td>
<td>• Includes shared lane facility along River Road (Private Road).</td>
<td>• Includes shared lane facility along River Road (Private Road).</td>
<td>Drainage/E&amp;S – $0.05 to $0.09</td>
<td></td>
</tr>
<tr>
<td>Includes an off-road segment required within private property beyond the east end of River Road.</td>
<td>• Includes an off-road segment required within private property beyond the east end of River Road.</td>
<td>• Includes an off-road segment required within private property beyond the east end of River Road.</td>
<td>Design/Permitting – $0.95 to $1.04</td>
<td>5-Lowest Maintenance Requirements</td>
</tr>
<tr>
<td>Off-road segment continues as a cantilever/boardwalk structure which parallels Route 322/22 for approximately 2,500 feet.</td>
<td>• Off-road segment continues as a cantilever/boardwalk structure which parallels Route 322/22 for approximately 2,500 feet.</td>
<td>• Off-road segment continues as a cantilever/boardwalk structure which parallels Route 322/22 for approximately 2,500 feet.</td>
<td>CM/CI – $0.50 to $0.60</td>
<td>1-Highest Maintenance Requirements</td>
</tr>
<tr>
<td>Off-road segment continues to the east, adjacent to Route 322/22 and transitions to a two way on-road (cycle-track) facility along Front Street until just east of the Fishing Creek Valley Road intersection, where the facility would transition back to the existing Bike Route J (shoulders of eastbound and westbound Front Street).</td>
<td>• Off-road segment continues to the east, adjacent to Route 322/22 and transitions to a two way on-road (cycle-track) facility along Front Street until just east of the Fishing Creek Valley Road intersection, where the facility would transition back to the existing Bike Route J (shoulders of eastbound and westbound Front Street).</td>
<td>• Off-road segment continues to the east, adjacent to Route 322/22 and transitions to a two way on-road (cycle-track) facility along Front Street until just east of the Fishing Creek Valley Road intersection, where the facility would transition back to the existing Bike Route J (shoulders of eastbound and westbound Front Street).</td>
<td></td>
<td>2-Highest Maintenance Requirements</td>
</tr>
</tbody>
</table>

**Rating:**
- Option 1: Inbound-only Route Via River Road - Rating: 5
- Option 2: Two-Way Route Via Cantilever/Boardwalk - Rating: 2
<table>
<thead>
<tr>
<th>Option 3: Outbound-Only Route Via Erie Street</th>
<th>Advances</th>
<th>Disadvantages</th>
<th>Project Costs Range</th>
<th>Maintenance Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Outbound only option which ramps up Bike Route J along the shoulder of westbound Route 322, approximately 1,000 feet east of the Norfolk Southern Rail Overpass.</td>
<td>• Eliminates approximately 0.4 miles of existing bike facility along westbound Route 322</td>
<td>• Bicycle facility still remains on a majority of Route 322/22 in eastbound and westbound directions</td>
<td>TOTAL: $5.0 to $6.0</td>
<td>5-Lowest Maintenance Requirements</td>
</tr>
<tr>
<td>• The ramp transitions to a pedestrian / bicycle bridge which crosses over the Norfolk Southern rail lines.</td>
<td>• Eliminates pinch point through existing overpass in the outbound direction</td>
<td>• Cost of pedestrian bridge and ramps, as well as constructability challenges associated with the structures.</td>
<td>Roadway / Trail – $0.10 to $0.20</td>
<td>1-Highest Maintenance Requirements</td>
</tr>
<tr>
<td>• From the bridge structure, the trail ramps down to Erie Street and continues as a shared lane facility along Erie Street and Allegheny Street through Dauphin Borough (along the existing outbound Route J).</td>
<td></td>
<td>• Impacts to vehicular traffic along 322/22 during construction.</td>
<td>Pedestrian Bridge – $4.00 to $4.75</td>
<td></td>
</tr>
<tr>
<td>• Inbound route would not change from existing, however this option could be combined with Option 1 to address both the inbound and outbound routes.</td>
<td></td>
<td>• Requires coordination with Norfolk Southern and approvals by NS for construction within their right-of-way.</td>
<td>Drainage / E&amp;S – $0.05 to $0.10</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Defining who is responsible for ownership / maintenance.</td>
<td>Design/Permitting – $0.05 to $0.60</td>
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<td></td>
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<td>• Minimal additional roadway maintenance procedures required by PennDOT/Borough along Allegheny Street &amp; other local streets.</td>
<td>CM/CI – $0.30 to $0.35</td>
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<td>• Will require routine inspection and maintenance of the pedestrian bridge and ramps.</td>
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<td>• Coordination required with Norfolk Southern to conduct maintenance.</td>
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<td>• Possible flooding along bicycle facility.</td>
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<td></td>
<td>• Cost of pedestrian bridge, ramps, and cantilever/boardwalk structure, as well as constructability challenges associated with the all structures.</td>
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<td>• Impacts to vehicular traffic along 322/22 during construction.</td>
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<td>• Requires coordination with Norfolk Southern and approvals by NS for construction within their right-of-way.</td>
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<td>• Defining who is responsible for ownership / maintenance.</td>
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</tbody>
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<table>
<thead>
<tr>
<th>Option 4: Two-Way Route Via 322/22 Flyover</th>
<th>Advances</th>
<th>Disadvantages</th>
<th>Project Costs Range</th>
<th>Maintenance Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Two-Way option which shifts Bike Route J off of eastbound and westbound Route 322/22 near the Park &amp; Ride to avoid Norfolk Southern Rail Overpass.</td>
<td>• Eliminates approx. 2.3 miles of existing bike facility along Route 322, including pinch points through existing overpass in both directions.</td>
<td>• Minimal private property coordination required.</td>
<td>TOTAL: $15.0 to $17.0</td>
<td>5-Lowest Maintenance Requirements</td>
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<td>• On-road facility from Park &amp; Ride through Dauphin Borough via Allegheny Street and Allegheny Street.</td>
<td>• Eliminates key concern of limited sight-line of bicyclists along Route 322/22 @ the overpass pinch point.</td>
<td></td>
<td>Roadway/Trail – $2.00 to $2.50</td>
<td>1-Highest Maintenance Requirements</td>
</tr>
<tr>
<td>• Two-Way off-road structure over Norfolk Southern Rail Overpass and Route 322/22 which ties into a Cantilever/Boardwalk bike facility.</td>
<td>• Creates a pedestrian/ bicycle facility which provides a safer link from Dauphin Borough / Middle Paxton Township to Fort Hunter Park and future connections to Capital Greenbelt.</td>
<td></td>
<td>Pedestrian Bridge – $7.75 to $8.50</td>
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<td>• Off-road segment continues as a cantilever/boardwalk structure which parallels Route 322/22 for approximately 1,500 feet.</td>
<td>• Minimal private property coordination required.</td>
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<td>Cantilever – $2.60 to $3.10</td>
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<td>• Off-road segment continues to the east, adjacent to Route 322/22 and transitions to a two way on-road (cycle-track) facility along Front Street until just east of the Fishing Creek Valley Road intersection, where the facility would transition back to the existing Bike Route J (shoulders of eastbound and westbound Front Street).</td>
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<td>Drainage/E&amp;S – $0.05 to $0.10</td>
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<td>Design/Permitting – $1.70 to $1.80</td>
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<td>CM/CI – $0.90 to $1.00</td>
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