3.6 MURRAY TRAIL CONNECTION
**SEGMENT DESCRIPTION**

This segment will continue the Murray Trail south along Red Bank Road to the Columbia Parkway ramps. The trail will cross from the west side of Red Bank Road to the east side at Woodland Road.

**CONSTRAINTS AND OBSERVATIONS**

**A1: Major Highway Crossing**

The trail will need to cross Red Bank Road at the intersection with Woodland Road.

Red Bank Road is five lanes wide in this location with two through lanes in each direction and a left turn lane. The roadway is curbed without shoulders. The crossing width is approximately 70 feet. The ADT of Red Bank Road was 15,062 vehicles per day in 2013. The speed limit is 35 mph and the roadway is classified as an urban principal arterial.

Woodland Road has two lanes with curbs. There is extra space striped with transverse markings on the north side of the road to accommodate the swing of a turning truck. The crossing width is approximately 40 feet. The ADT is not known but expected to be very low since the road only accesses about 20 homes on Old Red Bank Road. The speed limit is 25 mph.

The existing intersection is signalized but there are no existing crosswalks or pedestrian signals. Right turn on red is unrestricted. Left turns have both a protected and permitted phase.

The existing signal will need to be modified to include a pedestrian phase, pedestrian signal heads and pushbuttons to cross both Woodland Drive and Red Bank Road. The crosswalk should be designated with high visibility markings. Right turns on red should be prohibited for the movements that will cross the path. The permitted left turn from Red Bank northbound to Woodland westbound should also be prohibited during the opposing traffic green phase. Restricting these two movements will remove conflicts to the shared use path green phase. A traffic analysis will need to be performed to assess the impact on the level of service at the intersection by restricting these two movements.

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1. OKI Traffic Counts GIS Database
2. Ohio Department of Transportation Functional Classification Maps, Hamilton County, 2004
A2: Private Property

Right of way or trail easements may be needed on property east of Red Bank Road between Woodland Road and the Columbia Parkway ramps. The property is owned by Salt Creek Development, LLC and Highland Fairfax, LLC, both manufacturing companies. A 200 foot width of land parallel to the east side of Red Bank Road is currently unused. The trail could be located immediately adjacent to Red Bank Road and would only require a small strip of additional right of way. However, if the property owners are willing, the trail could be located further from the road to improve safety and comfort by distancing traffic from trail users.

A3: Major Ramp Crossing

The trail will have to cross the Columbia Parkway ramps at Red Bank Road. Ramps for all directions on Columbia Parkway are combined into one roadway with one intersection. There are four lanes to cross with a width of approximately 80 feet. There are two “island” areas, one between the left and right turns onto Red Bank Road from Columbia Parkway and another between the exit and entrance ramps. Both are approximately 8 feet in width. The ADT was estimated to be 21,874 vehicles per day in 2013. There is no posted speed limit on the ramps. Vehicles would be transitioning from the 35 mph speed limit on Red Bank Road to the 50 mph speed limit on Columbia Parkway. Since the crossing location would be near the intersection, the speed would be expected to be on the lower range, particularly since all vehicles have to make a turn at the intersection.

The existing signal would need to be modified to include a pedestrian phase, pedestrian signal heads and pushbuttons. The pedestrian phase would need to occur simultaneous with the Red Bank Road through movements. The pedestrian phase may require 30 seconds. If the length of the Red Bank Road through movement is currently less than 30 seconds, the pedestrian phase could have a negative impact on the intersection level of service when it is called. A full traffic analysis will need to be performed to estimate the impact.

Permitted turns to and from the ramp (those that must yield to other traffic) are of particular concern for the safety of trail users. Drivers may be unaware of bicyclists and pedestrians on the trail as they scan for traffic before making their turns. The AASHTO Guide for the Development of Bicycle Facilities describes multiple scenarios that could result in a crash at sidepath/roadway intersections.

Safety could be improved by restricting right turns on red to and from the ramp. Again, a traffic analysis will need to be performed to estimate the impact to the intersection level of service by restricting this movement. The crossing distance could also be shortened by creating raised pedestrian refuge islands at the two painted islands. Turning radii could be sharpened but this may have an impact on truck turning movements.

3 OKI Traffic Counts GIS Database
ALTERNATIVE A
SEGMENT A: 13-14

SEGMENT DESCRIPTION
This segment will connect the trail from Red Bank Road to the Wasson Way Trail via the existing right of way along the Columbia Parkway ramps.

CONSTRAINTS AND OBSERVATIONS
A6: Columbia Parkway Underpass
The trail will go between the piers adjacent to the ramp and the bridge abutment. There is an existing slope from the abutment to a point behind the piers. There is a level area present behind the piers with an approximate width of 12’. A small retaining wall may be needed to retain the slope.

A7: Topography
The Wasson Way Trail is approximately 30 feet higher than the Columbia Parkway Ramp. The trail will need approximately 600 feet to ascend the slope at a 5% grade. Approximately 750 feet is available to make the connection.

ALTERNATIVE A
Engineer’s Estimate of Cost

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SEGMENT DESCRIPTION
This segment would provide an alternative to Segment A12-13 and would eliminate the safety constraints noted in A1 and A3 as well as the property constraint noted in A2. The trail would continue along the west side of Red Bank between Woodland Road and the Columbia Parkway ramps and would cross to the east side of Red Bank on the south side of the ramp intersection. The trail would be squeezed into a narrow space between the roadway and a retaining wall adjacent to Duck Creek.

CONSTRAINTS AND OBSERVATIONS

General: Highway Lighting and Signing
One highway light pole and one highway sign would need to be relocated to accommodate the trail within this segment.

A4: Horizontal Width from Roadway to Retaining Wall
The trail would be squeezed into a narrow space between Red Bank Road and a retaining wall adjacent to Duck Creek. The space from curb to face of retaining wall is approximately 14 feet minimum to 20 feet maximum. There is guardrail mounted on posts adjacent to the back of the retaining wall which reduces the available width by approximately 3 feet. Pedestrian railing is mounted directly atop the retaining wall. Near the intersection with the Columbia Parkway ramps, the guardrail is relocated to the back of curb and the guardrail and railing at the retaining wall is terminated.

If the guardrail adjacent to the curb near the southern end is extended northward, the guardrail adjacent to the back of the retaining wall could be removed to gain 3 feet of width. A 9 foot trail could be constructed immediately adjacent to the back of retaining wall which would leave approximately 5 feet of space to the curb. The 9 foot trail would have 1 foot of buffer space to the pedestrian railing mounted atop the retaining wall.
The outside curb lane on Red Bank Road has a width of approximately 15 feet. The minimum lane width permitted is 11 feet. An additional 4 feet of space could be obtained by reducing the outside lane width.

**A5: Red Bank Road Crossing**
The trail would cross Red Bank Road on the south side of the intersection with the Columbia Parkway ramps. There is one lane of traffic in each direction with a wide painted median between the lanes. The total width of the crossing is approximately 50 feet but half of that width is the painted median. The ADT on this portion of Red Bank was 7351 in 2005. The speed limit is 35 mph.

The existing intersection is signalized. See Constraint A3 for the signal details.

The signal will need to be modified to include a pedestrian phase, pedestrian signal heads and pushbuttons. The pedestrian phase of the signal would need to occur simultaneously with the Red Bank Road southbound double left turn to the Columbia Parkway ramps. The Red Bank Road southbound through phase would have to be dropped when the pedestrian phase is called. The southbound through movement would only occur simultaneous with the northbound through. This may reduce the level of service of the intersection. A full traffic analysis will need to be performed.

The trail crossing should have a highly visible crosswalk. The painted island could be replaced with a raised island which may provide some additional comfort for users.

### ALTERNATIVE A1

**Engineer’s Estimate of Cost**

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4 OOI Traffic Counts GIS Database
**SEGMENT DESCRIPTION**

This trail segment will connect the Murray Trail to the Wasson Way Trail and the Duck Creek Trail (Alternative A) via Red Bank Road. Bicyclists would likely need to use the roadway within this segment because of the constraints noted below.

The ADT on this segment of Red Bank Road was 10,200 in 2013\(^5\). The roadway is classified as an Urban Collector. Truck traffic is unknown but assumed to be 1.5%\(^6\). The preliminary Bicycle Level of Service is E, very low. The OKI Bike Route Guide rates the road as “Use with Caution”. There may be little that can be done to improve the Bicycle Level of Service (such as widening the roadway, adding bike lanes or shoulders) given the narrow width of the corridor and significant constraints on either side of the roadway. Lowering the speed limit to 25 mph would only slightly improve the level of service to D, moderately low.

**CONSTRAINTS AND OBSERVATIONS**

**B1: Trestle, Retaining Wall & Utilities**

The footing of the existing trestle over Red Bank Road is approximately 11 feet from the edge of roadway. South of the trestle, an existing retaining wall has a similar offset from the road. Utility poles occupy the narrow space.

A minimum of 15 feet of horizontal width is required to meet the trail criteria (5 foot roadway buffer, 8 foot trail and 2 foot buffer to the pier footing/retaining wall). There is sufficient space to construct a 5 foot wide sidewalk with a 2 to 5 foot roadway buffer.

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\(^5\) Ohio Department of Transportation, Transportation Information Mapping System, Traffic Count Database System, 2013

\(^6\) The Bicycle Compatibility Index: A Level of Service Concept, Implementation Manual, Table 4. Recommended truck percentages by functional classification, FHWA, 1998
It may be possible to accommodate a trail within this very constrained segment of Red Bank Road with major investments in infrastructure. The existing retaining wall could be reconstructed further from the roadway and the utilities could also be relocated. However, the trestle footing is immovable.

The existing right of way is located approximately 30’ from the eastern edge of Red Bank Road. Norfolk Southern currently owns the property beyond the right of way from a point 50 feet north of the trestle to a point 185 feet south of the trestle. That property is planned to be transferred to the City of Cincinnati prior to construction of the Wasson Way Trail.

One possibility would be to route the trail behind the trestle on the east side and reconstruct the retaining wall at a greater offset from the roadway. The height of the retaining wall would be approximately 25 feet at its highest point and the total length may be 200 feet. The cost for a cast in place wall could be in the range of $875,000. A mechanically stabilized earth wall could be nearly $200,000 cheaper but a more detailed analysis would need to be performed to ensure the stability of the trestle abutment foundation during excavation for and construction of the MSE wall geogrid straps. The wall could be approximately 60 feet shorter but would require more extensive earthwork on the southern end which could be graded out rather than constructing a wall. This could save about $250,000.

B2: Columbia Parkway Bridge

The underpass is free from piers on the east side but there is an embankment sloping up to the Columbia Parkway abutment. The embankment begins approximately 8 to 14 feet from the edge of Red Bank Road.

A 5 foot sidewalk with 2 to 5 foot buffer could likely be constructed here without any major reconstruction. However, if a trail would be considered here, a short retaining wall may be needed so that the embankment slope can be excavated out to a point 15 feet from the edge of Red Bank Road. The maximum height of the wall may be 3 to 4 feet with a length of approximately 75 feet. The wall cost would likely be less than $50,000.

B3: Utility Conflicts

From the Columbia Parkway eastwards toward Wooster Pike there are 7 utility poles that are between 8 and 12 feet from the edge of Red Bank Road. A sidewalk can likely be routed around the poles. These utility poles would probably need to be relocated if a trail were considered for the corridor.

Utility poles can cost nearly $10,000 each to relocate, based on previous project costs. The utility relocation for this segment of the corridor may therefore be $70,000 if a trail were constructed.

B4: Topography

Little Duck Creek enters a 12’ wide culvert on the north side of the intersection of Red Bank Road and Wooster Pike. An embankment slope is located on the north side of the intersection of Red Bank Road and height separates the roadway from the creek. The slope is protected by a guardrail which is located approximately 10 to 12 feet from the curb. There is already an existing 5 foot wide sidewalk at the intersection.

The minimum horizontal width needed to accommodate a trail and a roadway buffer is 14 feet in this location (5 foot buffer, 8 foot trail, 1 foot buffer to guardrail).

If a trail were considered for this corridor, the embankment may need to be widened. Widening the embankment might entail constructing a new 50 foot long retaining wall to avoid lengthening the large culvert and reconstructing its headwalls. The retaining wall height may be four to five feet. The retaining wall cost would likely be less than $50,000.

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*Ohio Department of Transportation, Transportation Information Mapping System, Traffic Count Database System, 2013*
BS: Wooster Pike Crosswalk

To link into the Duck Creek Trail and Wasson Way Trail, the sidewalk should cross Wooster Pike on the east side of the intersection so there is only one roadway crossing. Maintaining the existing crossing on the west side of the intersection would require crossing Red Bank Road and Wooster Road. There are three lanes of traffic to cross on the east side: one westbound to Red Bank Road, one southbound to Wooster Road and one northbound to Wooster Pike. The length of the crossing would be 60 feet but 15 feet of that length would be through an island. The ADT on this segment of the roadway was 7,438 in 2013. The speed limit is 35 mph. There is an existing crosswalk on the west side of the intersection across Red Bank Road.

The existing signal is three phase. All movements have a protected phase. Right turn on red is permitted except for the right turn from Wooster Road northbound to Wooster Pike. The existing pedestrian phase is called by pushbuttons at the curb ramps.

The existing signal would need to be modified to move the pedestrian crossing to the east side. The right turn on red prohibition for northbound Wooster Road to Wooster Pike provides a measure of protection for a crossing on the east side that does not exist on the west side. A full signal analysis will need to be performed to estimate if the level of service would be affected by changing the pedestrian phase.

Alternatives Considered:

There are fewer constraints to building a trail on the west/south side of Red Bank Road versus the east/north side. The south side of Red Bank Road is unencumbered by development, utilities, driveways, piers or retaining walls for 1,200 feet between Wooster Pike and west of Columbia Parkway. However, between the Columbia Parkway bridge and the ramps leading from Red Bank Road to Columbia Parkway, the west side of Red Bank Road has major constraints to trail development. Two retaining walls separate the roadway from Duck Creek, the first of which is at an offset of approximately five feet from the curb. The trestle supporting Wasson Way is located about 12 feet from the curb. The right of way line is located five feet or less from the roadway, the adjacent property owner from which land would be acquired for a trail is owned by the Norfolk Southern Railroad. The right of way line remains near the roadway north of the trestle where a business operates. The narrow depth of the commercial lot requires the business owner to utilize the space they own near the roadway for parking, leaving no space for a trail.

Constructing a trail on the west side of Red Bank Road would require major infrastructure investments which may include constructing new retaining walls adjacent to Duck Creek for a length of over 400 feet and a height of 15 feet. The cost of such a structure would likely be over $1 million. A trail bridge or boardwalk could also be constructed but would also be expensive, also likely over $1 million.

The trestle is immovable so a trail would either need to go through it or around it. Going around on the road side may be possible but there would be a reduced width adjacent to the roadway which may need to be protected by a barrier. Going through the trestle could be challenging and it’s not known if there would be sufficient vertical clearance (a minimum vertical clearance of 8 feet is required).

Finally, property acquisition from the railroad and private business owner could be challenging.

It may be possible to construct a trail on the east side of Red Bank Road between the Columbia Parkway ramps and the Columbia Parkway bridge and then cross to the south side of Red Bank Road for the remainder of this segment to Wooster Pike. There would then be only one major constraint to resolve at B1 however, there would also be a mid-block crossing within a highway curve. The sight distance for the crossing may be limited which would require appropriate warning devices and potentially a pedestrian signal.

ALTERNATIVE B

Engineer’s Estimate of Cost

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9 Ohio Department of Transportation, Procedure for Construction Budget Estimating, Retaining Walls, $175/sf, 2013
10 Ohio Department of Transportation, Procedure for Construction Budget Estimating, Multi-Span Bridges >4000 SF, $250/sf, 2013
11 AASHTO Guide for the Development of Bicycle Facilities, Chapter 5: Design of Shared Use Paths, Section 5.2.1 Width and Clearance
MURRAY TRAIL CONNECTION RECOMMENDED ALIGNMENT

CONNECTING TO AULT PARK
During the analysis of the Murray Trail Connect a link to Ault Park was identified. To make this connection the existing “Valley Trail” in Ault Park would be utilized and improvements to Old Red Bank Road would connect Ault Park to the existing terminus of the Murray Trail. The connection to Ault Park can be seen in the recommend alignment graphic below:
Project Partners:
Groundwork Cincinnati-Mill Creek
AECOM
City of Cincinnati
Human Nature, Inc
Interact for Health
Kolar Design
Little Duck Creek Trail
Ohio River Trail - Oasis Line
Ohio River Trail (Riverfront Parks)
Ohio River Trail West
Queen City Bike
Tri-State Trails
Wasson Way

This project made possible by the generous support of Interact for Health. Project Management and Leadership provided by Groundwork Cincinnati-Mill Creek.
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