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## 2.0 ALTERNATIVES

This section describes the alternatives development process including early conceptual studies and early agency coordination; alternatives considered and eliminated from further consideration; and the alternatives carried forward. The No-Build Alternative is also considered.

### 2.1. Conceptual Studies and Early Agency Coordination

#### *Conceptual Engineering Studies*

During conceptual studies undertaken in 2008, many possible river crossing locations and their possible connections with WV 2 and OH 7 were sketched. Engineering workshops were held with WVDOH and the design team to determine concepts that had the best potential of becoming viable crossing locations in terms of cost effectiveness and traffic flow during and after construction. As a result of these studies, multiple river crossing locations were considered to have a possibility of making cost effective connections with WV 2 and OH 7 (see Exhibit 2-1).

Of these crossing locations, three Build Alternatives were further refined and identified to have the most apparent cost effective WV 2 and OH 7 connections. Build Alternatives 2, 4A and 7 were selected for further engineering study and were presented to the public in September 2009. Engineering studies associated with these three locations are fully described in *Ohio River Bridge Design Report Field Review Submission* (HDR, June 2009) and *Ohio River Bridge Design Report Office Review Submission* (HDR, December 2009).

The remaining crossing locations identified during the conceptual engineering studies were not carried forward for the following reasons:

- **River Crossing Location 1** - This concept was eliminated from further consideration due to anticipated high construction costs associated with the combination of a 1000 foot main river span, large earthwork volume, and potential impacts to electrical and cell towers in West Virginia.
- **River Crossing Location 3** - This concept was eliminated from further consideration due to the impact to the ballfield in Brilliant and anticipated high construction costs associated with 1000 foot main river span, curved bridges over OH 7 and high walls between OH 7, ramps and the railroad tracks.
- **River Crossing Location 5** - With significant impacts to the school property in Ohio, this concept was eliminated from further consideration and replaced with Build Alternative 7.
- **River Crossing Location 6** - With significant impacts to the school property and public swimming pool in Ohio and close proximity to the elementary school, this concept was eliminated from further consideration and replaced with Build Alternative 7.

### ***Coordination to Develop Traffic Projections***

The BHJ Regional Travel Demand Model developed for their fiscally constrained 2030 LRTP includes this project. BHJ was engaged to develop traffic projections for the 2012 (opening day) and 2030 No-Build and Build scenarios. Table 2-1 identifies the assumptions utilized regarding the operation of key transportation facilities in the region.

**Table 2-1: Travel Demand Modeling Assumptions**

<b>Scenario</b>	<b>Market Street Bridge Disposition</b>	<b>US 22 EB Ramps, University Blvd. and OH 7 Intersection Improvements</b>
<b>2012 No-Build</b>	Open	Incomplete
<b>2012 Build</b>	Closed	Incomplete
<b>2030 No-Build</b>	Closed	Complete
<b>2030 Build</b>	Closed	Complete

The projected 2012 (opening day) ADT for the proposed bridge is 9,000 vpd and the 2030 ADT is 10,000 vpd. The development of traffic projections is further detailed in the *Traffic Study* (HDR, July 2009) and *Traffic Study Addendum* (HDR, April 2011).

### ***Coordination for River Navigation Requirements***

In letters, telephone conversations and meetings with the U.S. Coast Guard (USCG) staff in late 2008 and early 2009, specific Ohio River navigational requirements were determined for various river crossing locations. Six of the eight river crossing locations shown on Exhibit 2-1, which were labeled Alternate Crossing Locations A through F for correspondence with the USCG, were submitted to the USCG to request navigational requirements in the study area. A letter received from the USCG dated February 27, 2009 (see Appendix A), stated that regardless of which alternative is selected, the minimum vertical clearance shall be 55 feet above the 2% flowline or 69 feet above normal pool, whichever is greater. For River Crossing Locations 5 (USCG Alt. D) and 6 (USCG Alt. C), a minimum horizontal clearance of 700 feet would be acceptable while a minimum horizontal clearance of 1,000 feet would be required for River Crossing Locations 1 (USCG Alt. F), 2 (USCG Alt. E), 3 (USCG Alt. B) and 4 (USCG Alt. A).

Subsequent to the correspondence with the USCG, WVDOH engaged Seamen's Church Institute (SCI) to develop river navigation simulation models for the study area. The intent of the modeling was to determine if the navigational clearances provided by the USCG could be optimized. A coordination meeting with WVDOH, ODOT, USCG, Wells Township, SCI, river industry representatives and others was held on November 9, 2010 to develop the scope of the simulation process. On January 4 and 5, 2011, the simulation runs were performed by river boat pilots with varied experience levels and independent interviews were conducted after the simulation runs. The USCG attended both meetings

held at SCI's facility in Paducah, Kentucky. Based on SCI's report, it is possible that Build Alternatives 2, 2B, 8 and 8B navigational clearance can be reduced to 750-800 feet (SCI, August 2011). Build Alternative 7 appears to require a clearance of 750-800 feet or greater. Although Build Alternative 4A was not simulated, the river boat pilots commented that it was the least preferable alternative due to the bend in the river and proximity to the Buffalo Creek confluence. On October 4, 2011, the USCG notified WVDOH that Build Alternatives 2/2B and 8/8B require a minimum 800 foot navigational clearance.



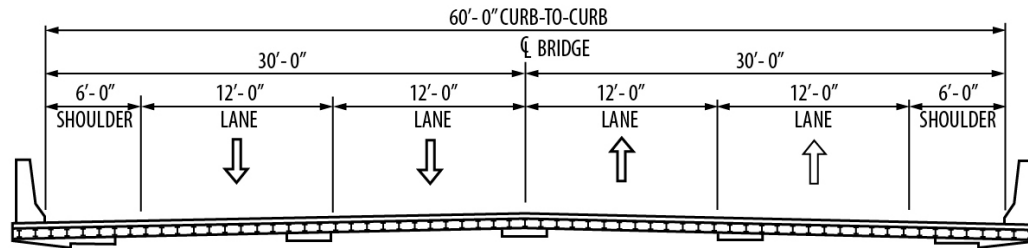
Figure 2-1: SCI Simulation Wheel House

## 2.2. Alternatives Development

To meet the objective of connecting WV 2 with OH 7, multiple alternatives were developed and studied. Each of these alternatives, shown in Exhibit 2-2, is discussed in more detail as follows. The following design criteria were utilized in the development of the alternatives (HDR, June 2009 and December 2009):

- River bridge typical section includes four 12 foot lanes with 6 foot shoulders for a total width of 60 feet. Maximum grade is 10%.
- River vertical clearance of 69 feet above normal pool.
- Minimum vertical clearance above railroads is 23 feet.
- Minimum vertical clearance above WV 2 and OH 7 is 16.5 feet.
- WV 2 lane width is 12 feet with 8 foot paved shoulders. Maximum grade is 6%. Assumed cut slope of 1.5:1. The grading for WV 2 will include provisions for a future four-lane roadway with auxiliary lanes.
- 3<sup>rd</sup> Street lane width is 12 feet with 4 foot paved shoulders. Maximum grade is 12%.
- OH 7 ramp lane width is 16 feet with 3 foot left and 6 foot right paved shoulders. Maximum grade is 5%.

The river bridge typical section, shown in Figure 2-2, was developed to allow for future flexibility of lane configurations; enhance safety for bridge inspectors and maintain traffic flow during lane closures; and accommodate future traffic generated by regional development and growth. At this time it is undecided if sidewalks and/or bicycle facilities will be included on the proposed bridge. During the preliminary and final design process, the option of sidewalks and/or bicycle facilities will be evaluated.



**Figure 2-2: Bridge Typical Section (NTS)**

Initially, three Build Alternatives were developed and presented at the September 2009 public workshop meetings. These were designated as Build Alternatives 2, 4A and 7. Subsequent to the public workshops, three additional alternatives, known as Build Alternatives 2B, 8 and 8B (see Exhibit 2-2), were developed to address comments from both the public and agencies. Descriptions of the No-Build Alternative, Transportation System Management Alternative, and six Build Alternatives are provided below. A preliminary assessment of the environmental impacts associated with each Build Alternative is summarized in Tables 2-2, 2-3 and 2-4 for Combined, West Virginia and Ohio, respectively.

#### ***No-Build Alternative***

The No-Build Alternative will involve taking no action other than the routine maintenance activities normally associated with WV 2, OH 7, the US 22 Veterans Memorial Bridge and the Market Street Bridge.

Under the No-Build Alternative, WV 2, OH 7 and the two remaining Ohio River bridges in the region would continue to operate under existing conditions. However, as deterioration to the Market Street Bridge continues to occur over time, it is anticipated the bridge will be permanently closed at some time in the future. The eventual closing of the Market Street Bridge will require additional traffic to be carried by the Veterans Memorial Bridge and will require all vehicles to encounter longer travel times.

The No-Build Alternative will not meet the stated needs of the project. The No-Build Alternative does not improve traffic operations, access or the flexibility of the existing transportation system. It does not enhance regional safety or stimulate economic growth and development. Furthermore, it does not improve the transportation infrastructure system that existing residents and businesses in the area need. The lack of an improved transportation system would not encourage new owners to open businesses in the area, nor encourage existing businesses to expand. Thus, the No-Build Alternative would not create new employment opportunities.

#### ***Transportation System Management (TSM)***

The TSM Alternative involves taking limited actions to improve traffic operations in the region beyond the routine maintenance activities normally associated with WV 2, OH 7, the



US 22 Veterans Memorial Bridge and the Market Street Bridge. These actions could involve adding turning lanes to WV 2 and at some of the connecting routes where traffic conditions warrant a specific need for increased capacity. It is assumed under the TSM Alternative all signalized intersections along WV 2 in the region, including those in Wellsburg and Follansbee and those on OH 7 in Steubenville would be upgraded and optimized using the most modern signal devices available including video detection and advanced signal timing controllers and the addition of intelligent transportation system (ITS) devices at critical locations.

### ***Build Alternative 2***

This alternative is located at the southern end of the study area and provides a direct connection between WV 2 and the township street system in the southern most section of Brilliant. The proposed bridge connects to WV 2 approximately 1.25 miles south of Buffalo Creek. On the Ohio side, the proposed bridge connects to 3<sup>rd</sup> Street in Brilliant approximately 600 feet northwest of the existing Riddles Run Interchange with OH 7.

Build Alternative 2, shown in Exhibit 2-3, uses a simple and straight horizontal alignment for the proposed bridge by forming a signalized “T” intersection with WV 2. At the proposed bridge connection with 3<sup>rd</sup> Street, a standard four-leg intersection is formed with Clark Way. 3<sup>rd</sup> Street would be widened to the east to provide a NB right-turn lane and SB left-turn lane. No major improvements are proposed for Clark Way, other than resurfacing. Traffic to/from OH 7 would utilize the existing Riddles Run interchange to access the proposed bridge via 3<sup>rd</sup> Street. It is anticipated that minor modifications, such as turn lanes or signalization, may be required on 3<sup>rd</sup> Street and at the Riddles Run ramp termini.

Build Alternative 2 results in an increase in traffic between the existing interchange and Clark Way of approximately 7,000 vpd. No appreciable increase in traffic on Clark Way is anticipated.

### ***Build Alternative 2B***

As shown in Exhibit 2-4, Build Alternative 2B is located at the same river crossing location as Build Alternative 2. The connection with WV 2 is the same as Build Alternative 2; however, on the Ohio side, a new diamond interchange with OH 7 would be constructed in addition to the connection to 3<sup>rd</sup> Street at Clark Way. As a result, the existing Riddles Run interchange ramps would be removed. It is anticipated that minor modifications, such as turn lanes or signalization, may be required on 3<sup>rd</sup> Street.

Since this alternative is essentially Build Alternative 2 with a new interchange, it could be constructed in phases. As the first phase, the connections to WV 2 and 3<sup>rd</sup> Street could be constructed along with the main river bridge and independent bridge over OH 7. Traffic would utilize 3<sup>rd</sup> Street and the existing Riddles Run Interchange to access OH 7. The proposed ramps could be added at a later time when either funding is available or traffic increases.

Build Alternative 2B results in an increase in traffic between the existing interchange and Clark Way of approximately 6,700 vpd. No appreciable increase in traffic on Clark Way is anticipated.

Build Alternative 2B was developed subsequent to the September 2009 public workshops to provide a direct connection to OH 7.

***Build Alternative 4A***

This alternative is located at the northern end of the study area and provides a direct connection to WV 2. Access to OH 7 utilizes a combination of two existing OH 7 southbound ramps, existing local roadways, two proposed OH 7 northbound ramps and new connector roadways. As shown in Exhibit 2-5, the Build Alternative 4A alignment would flyover WV 2 approximately 1,000 feet south of Buffalo Creek and loop around to the north providing access to WV 2 approximately 200 feet south of the creek.

In Ohio, this alternative's alignment begins in the more industrial/commercial section of Brilliant immediately south of a group of commercial buildings. To provide access to northbound OH 7, entrance and exit ramps are proposed between OH 7 and the Wheeling & Lake Erie Railway. These ramps intersect with a proposed connector road that spans over OH 7. This intersection is located in a localized gap of land between OH 7 and the railroad. Access to southbound OH 7 utilizes the existing entrance and exit southbound ramps, as well as, the existing local access road which parallels OH 7. A short connector road is used to provide access to the bridge and northbound connector. An at-grade intersection will be created between the southbound connector, OH 7 southbound entrance ramp, a local access road and the access road connecting the OH 7 southbound exit ramp.

***Build Alternative 7***

This alternative is located in the middle of the study area and is shown in Exhibit 2-6. Similar to Build Alternative 2, it provides a direct connection between WV 2 and 3rd Street in Brilliant. The proposed bridge connects to WV 2 approximately 0.87 miles south of Buffalo Creek. To provide access to and from OH 7, the proposed bridge connects to 3<sup>rd</sup> Street about 0.45 miles northwest of the existing Riddles Run Interchange.

The West Virginia approach to the proposed bridge has a straight alignment which connects at a signalized "T" intersection with WV 2. The connection with 3<sup>rd</sup> Street forms a standard four-leg intersection with Hudson Street. 3<sup>rd</sup> Street would be widened to the east to provide a NB right-turn lane and SB left-turn lane. No major improvements are proposed for Hudson Street, other than resurfacing. This alternative is closer to the middle section of Brilliant and is adjacent to the Buckeye Local School District's North Elementary school, Wells Township Community Park and Pool, Allen Hawkey Courts and other recreational facilities associated with the school. It is anticipated that minor modifications, such as turn lanes or signalization, may be required on 3<sup>rd</sup> Street and at the Riddles Run ramp termini.

Build Alternative 7 results in an increase in traffic between the existing interchange and Hudson Street of approximately 7,000 vpd. No appreciable increase in traffic on Hudson Street is anticipated.

***Build Alternative 8***

This alternative is located approximately 400 feet north of Build Alternative 2 as shown in Exhibit 2-7. Similar to Build Alternative 2, it provides a direct connection between WV 2 and 3rd Street in Brilliant. The proposed bridge connects to WV 2 approximately 1.20 miles south of Buffalo Creek. To provide access to and from OH 7, the proposed bridge connects to 3rd Street about 0.50 miles northwest of the existing Riddles Run Interchange.

The West Virginia approach to the proposed bridge has a straight alignment which connects at a signalized “T” intersection with WV 2. The Ohio approach connects to 3rd Street at a standard four-leg intersection with Cleaver Street. 3<sup>rd</sup> Street would be widened to the east to provide a NB right-turn lane and SB left-turn lane at Cleaver Street. No major improvements are proposed for Cleaver Street, other than resurfacing. It is anticipated that minor modifications, such as turn lanes or signalization, may be required on 3rd Street and at the Riddles Run ramp termini.

Build Alternative 8 was developed subsequent to the September 2009 public workshops to address comments regarding the proximity of Build Alternative 7 to the schools, park and residential areas of Brilliant.

Build Alternative 8 results in an increase in traffic between the existing interchange and Cleaver Street of approximately 7,000 vpd. No appreciable increase in traffic on Cleaver Street is anticipated.

***Build Alternative 8B***

As shown in Exhibit 2-8, Build Alternative 8B is located at the same river crossing location as Build Alternative 8. The connection with WV 2 is the same as Build Alternative 8; however, on the Ohio side, a new diamond interchange with OH 7 would be constructed in addition to the connection to 3rd Street at Cleaver Street. As a result, the existing Riddles Run interchange ramps would be removed. It is anticipated that minor modifications, such as turn lanes or signalization, may be required on 3rd Street.

Since this alternative is essentially Build Alternative 8 with a new interchange, it could be constructed in phases. As the first phase, the connections to WV 2 and 3<sup>rd</sup> Street could be constructed along with the main river bridge and independent bridge over OH 7. Traffic would utilize 3<sup>rd</sup> Street and the existing Riddles Run Interchange to access OH 7. The proposed ramps could be added at a later time when either funding is available or traffic increases.

Build Alternative 8B results in an increase in traffic between the existing interchange and Cleaver Street of approximately 6,700 vpd. No appreciable increase in traffic on Cleaver Street is anticipated.

Build Alternative 8B was developed subsequent to the September 2009 public workshops to address comments regarding the proximity of Build Alternative 7 to the schools, park and residential areas of Brilliant. Additionally, it was developed to provide a direct connection to OH 7.

Table 2-2: Impact Assessment of Build Alternatives, Combined

Screening Criteria	Build Alternative					
	2	2B	4A ELIMINATED <sup>1</sup>	7 ELIMINATED <sup>1</sup>	8	8B PREFERRED ALTERNATIVE
Navigational Clearance	800 feet	800 feet	1,000 feet	700 feet	800 feet	800 feet
Section 4(f) Impacts	1	1	2	3	1	1
Residential Displacements	0	0	2	0	0	0
Business Displacements	1	1	5	0	0	0
Historic Resources	0	0	0	0	0	0
Waste Sites	4	4	16 <sup>2</sup>	10 <sup>2</sup>	4	4
Farmland Impacts (acres)	0.37	0.37	4.71	0.00	0.00	0.00
100-year Floodplain Impacts <sup>3</sup> (acres)	6.58	10.88	50.61	4.10	4.69	11.18
Wetlands Impacts <sup>4</sup> (acres)	0.00	1.77	0.00	0.00	0.82	2.95
Cost Estimate	\$96.0 M	\$116.8 M	\$132.0 M	\$83.0 M	\$96.4 M	\$124.6 M

Table 2-3: Impact Assessment of Build Alternatives, West Virginia

Screening Criteria	Build Alternative					
	2	2B	4A ELIMINATED <sup>1</sup>	7 ELIMINATED <sup>1</sup>	8	8B PREFERRED ALTERNATIVE
Section 4(f) Impacts	1	1	1	1	1	1
Residential Displacements	0	0	2	0	0	0
Business Displacements	0	0	1	0	0	0
Historic Resources	0	0	0	0	0	0
Waste Sites	0	0	6 <sup>2</sup>	0 <sup>2</sup>	0	0
Farmland Impacts (acres)	0.37	0.37	4.71	0.00	0.00	0.00
100-year Floodplain Impacts <sup>3</sup> (acres)	0.54	0.54	7.31	0.39	0.21	0.21
Wetlands Impacts <sup>4</sup> (acres)	0.00	0.00	0.00	0.00	0.00	0.00

Table 2-4: Impact Assessment of Build Alternatives, Ohio

Screening Criteria	Build Alternative					
	2	2B	4A ELIMINATED <sup>1</sup>	7 ELIMINATED <sup>1</sup>	8	8B PREFERRED ALTERNATIVE
Section 4(f) Impacts	0	0	1	2	0	0
Residential Displacements	0	0	0	0	0	0
Business Displacements	1	1	4	0	0	0
Historic Resources	0	0	0	0	0	0
Waste Sites	4	4	10 <sup>2</sup>	10 <sup>2</sup>	4	4
Farmland Impacts (acres)	0.00	0.00	0.00	0.00	0.00	0.00
100-year Floodplain Impacts <sup>3</sup> (acres)	6.04	10.34	43.40	4.71	4.48	10.97
Wetlands Impacts <sup>4</sup> (acres)	0.00	1.77	0.00	0.00	0.82	2.95

Note 1: See Section 2.3 for Alternatives Eliminated from Further Consideration.  
Note 2: Value represents number of potential waste sites based on database serach. Alternative was eliminated prior to ESA Screening and Phase I ESA studies.  
Note 3: Based on conservative estimate. See Section 3.3.1 for details.  
Note 4: Wetland Impacts do not include the Ohio River which is considered a Water of the United States and is listed on the National Wetland Inventory (1971)

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### **2.3. Alternatives Eliminated from Further Consideration**

Based on the preliminary assessment of the alternatives shown in Tables 2-2, 2-3 and 2-4 for Combined, West Virginia and Ohio, respectively and comments received during the public involvement process, three alternatives were eliminated from further consideration. The reasons for elimination are documented below.

#### ***TSM Alternative***

Although the TSM Alternative will improve travel times along WV 2 and OH 7 in the more urban communities of the region, it will not achieve the project objectives and the Purpose and Need will not be met. The limited improvements associated with TSM do not significantly improve traffic operations and access in the region or the flexibility of the total transportation system. Highway safety may be improved at limited locations, but regional safety would not be improved when comparing response times and expanded emergency routes to the other Build Alternatives. Since the TSM Alternative does not significantly improve the transportation infrastructure system to a point that regional businesses in the area need, it does not stimulate economic growth and development. The transportation system would only improve at very specific locations and therefore, it is expected these improvements would not encourage new owners to open businesses in the area, nor encourage existing businesses to expand. Thus, the TSM Alternative is not expected to create new employment opportunities.

#### ***Build Alternative 4A***

This alternative is feasible and meets the project's Purpose and Need. However, this alternative would adversely impact one business in West Virginia and four businesses in Ohio, resulting in displacements. Due to the industrial/commercial nature of this Build Alternative 4A area, this alternative impacts sixteen identified waste sites which is more than any other alternative. Build Alternative 4A also adversely affects the activities, features and attributes of the Rich Lewis Memorial Park and Danny Duda Field. With consideration to the navigational clearance, this alternative has the longest span of 1,000 feet and the highest construction costs of any alternative. Also, during the river navigational simulation runs, the pilots noted this alternative is least preferable from their perspective due to the bend in the river and proximity to the Buffalo Creek confluence. Therefore, Build Alternative 4A was eliminated from further consideration.

#### ***Build Alternative 7***

This alternative is feasible and meets the project's Purpose and Need. However, this alternative would adversely affect the activities, features and attributes of the Wells Township Community Park/Pool and Allen Hawkey Courts which are protected under Section 4(f). Additionally, the proposed connection to 3<sup>rd</sup> Street at Hudson Street is adjacent to the Buckeye North Elementary School building and associated facilities including a track and football field. Of the alternatives presented at the September 2009 public workshops, this alternative received the most comments regarding the location and potential impacts,

such as increased traffic near a school, decreased safety and increased noise and pollution in a residential area. Of the fifty-two comments received, twenty-one comments specifically had negative comments about the project terminus being located near the schools, parks and residential area. Therefore, Build Alternative 7 was eliminated from further consideration.

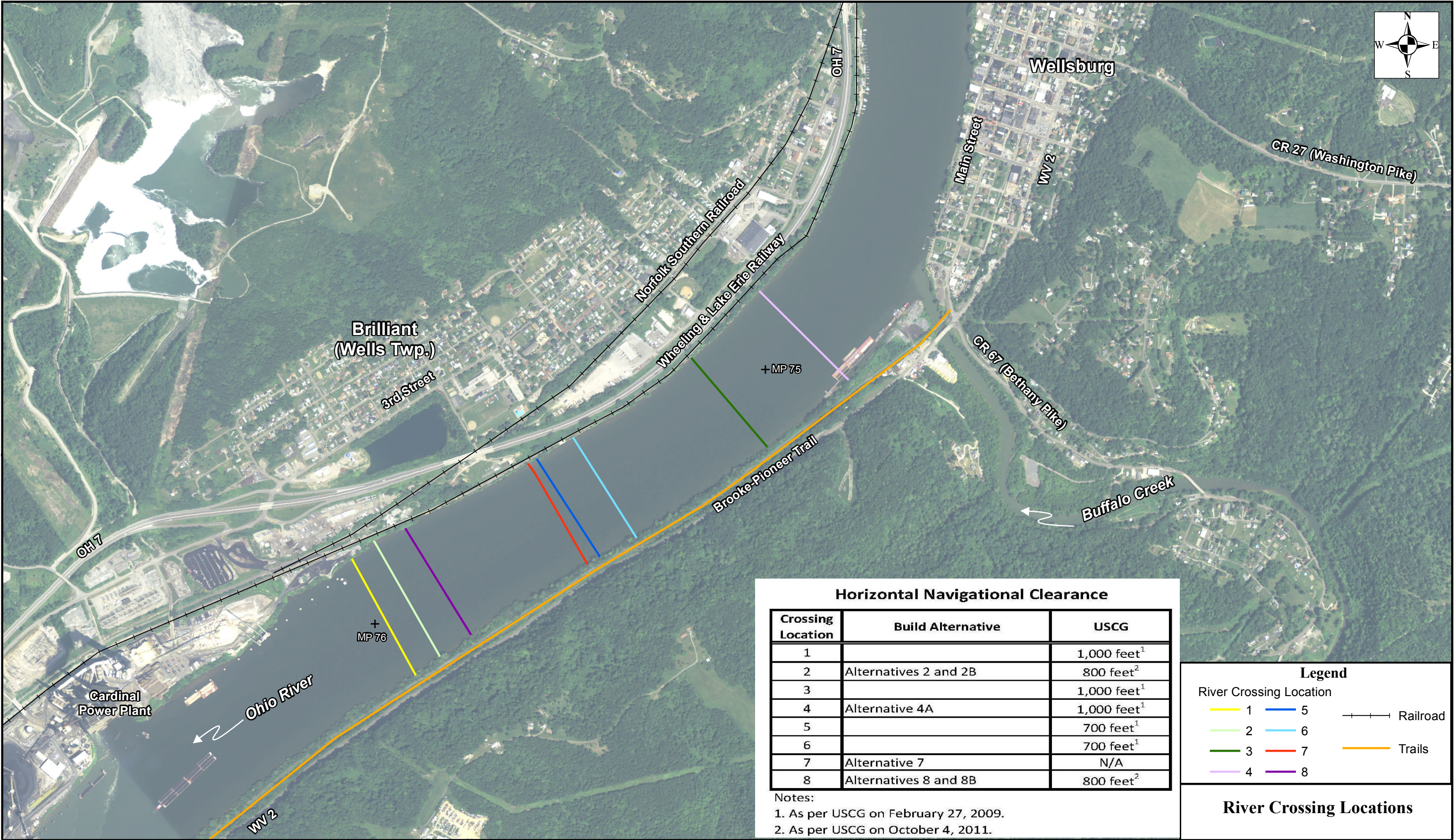
#### **2.4. Alternatives Carried Forward**

The No-Build Alternative along with Build Alternatives 2, 2B, 8 and 8B were carried forward into the Alternatives Impact Analysis process.

The No-Build Alternative does not meet the needs of the project, but is carried forward for comparison purposes. Although all Build Alternatives which are being carried forward meet the needs of the project, Build Alternative 8B has been designated as the Preferred Alternative. The selection of Build Alternative 8B as the Preferred Alternative is summarized below:

- Build Alternative 8B has no displacements of existing businesses and includes a direct connection to OH 7. When compared to Build Alternatives 2 and 2B, Build Alternative 8B has less impact to the Southeastern Equipment (Case) building, resulting in a right-of-way acquisition, but not a business displacement.
- Build Alternative 8B is further north than Build Alternatives 2 and 2B, which allows for more distance between the existing Riddles Run Interchange and proposed project.
- The proposed connection to 3rd Street is at Cleaver Street, which is a preferable location to Clark Way since it is an improved roadway with a paved surface with 18-foot width. Clark Way is a gravel surface with 14-foot width.
- Build Alternative 8B could be constructed in phases. As the first phase, the connections to WV 2 and 3rd Street could be constructed along with the main river bridge and independent bridge over OH 7. Traffic would utilize 3rd Street and the existing Riddles Run Interchange to access OH 7. The bridge and connection to 3rd Street has independent utility and will function without the ramps as a separate construction project. The proposed ramps could be added at a later time when either funding is available or traffic increases.





Horizontal Navigational Clearance		
Crossing Location	Build Alternative	USCG
1		1,000 feet <sup>1</sup>
2	Alternatives 2 and 2B	800 feet <sup>2</sup>
3		1,000 feet <sup>1</sup>
4	Alternative 4A	1,000 feet <sup>1</sup>
5		700 feet <sup>1</sup>
6		700 feet <sup>1</sup>
7	Alternative 7	N/A
8	Alternatives 8 and 8B	800 feet <sup>2</sup>

Notes:  
1. As per USCG on February 27, 2009.  
2. As per USCG on October 4, 2011.

Legend

River Crossing Location

1

2

3

4

5

6

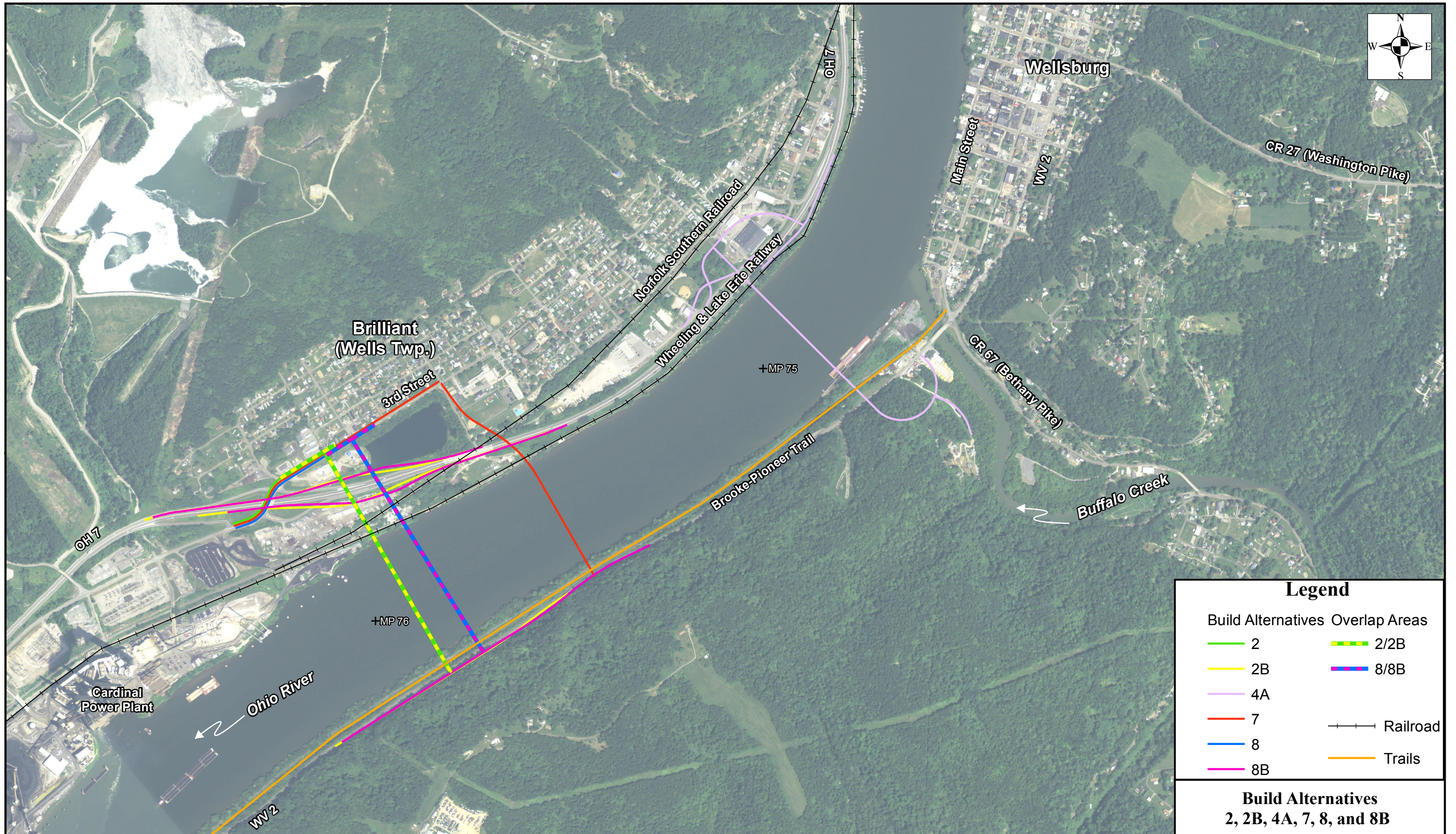
7

8

Railroad

Trails





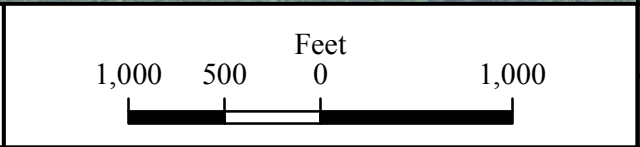
**Legend**

Build Alternatives		Overlap Areas
2		2/2B
2B		8/8B
4A		
7		
8		
8B		
	---+---	Railroad
	—	Trails

Build Alternatives 2, 2B, 4A, 7, 8, and 8B		
Job No.	Date	Exhibit
83938	12/02/11	2-2



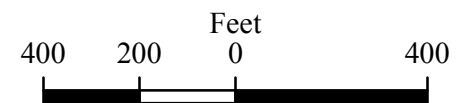
**PROPOSED OHIO RIVER BRIDGE**  
**BROOKE COUNTY, WV AND JEFFERSON COUNTY, OH**  
 STATE PROJECT: S205-2/23-0.00 00; FEDERAL PROJECT: HPP-0223(003)D; PID:79353





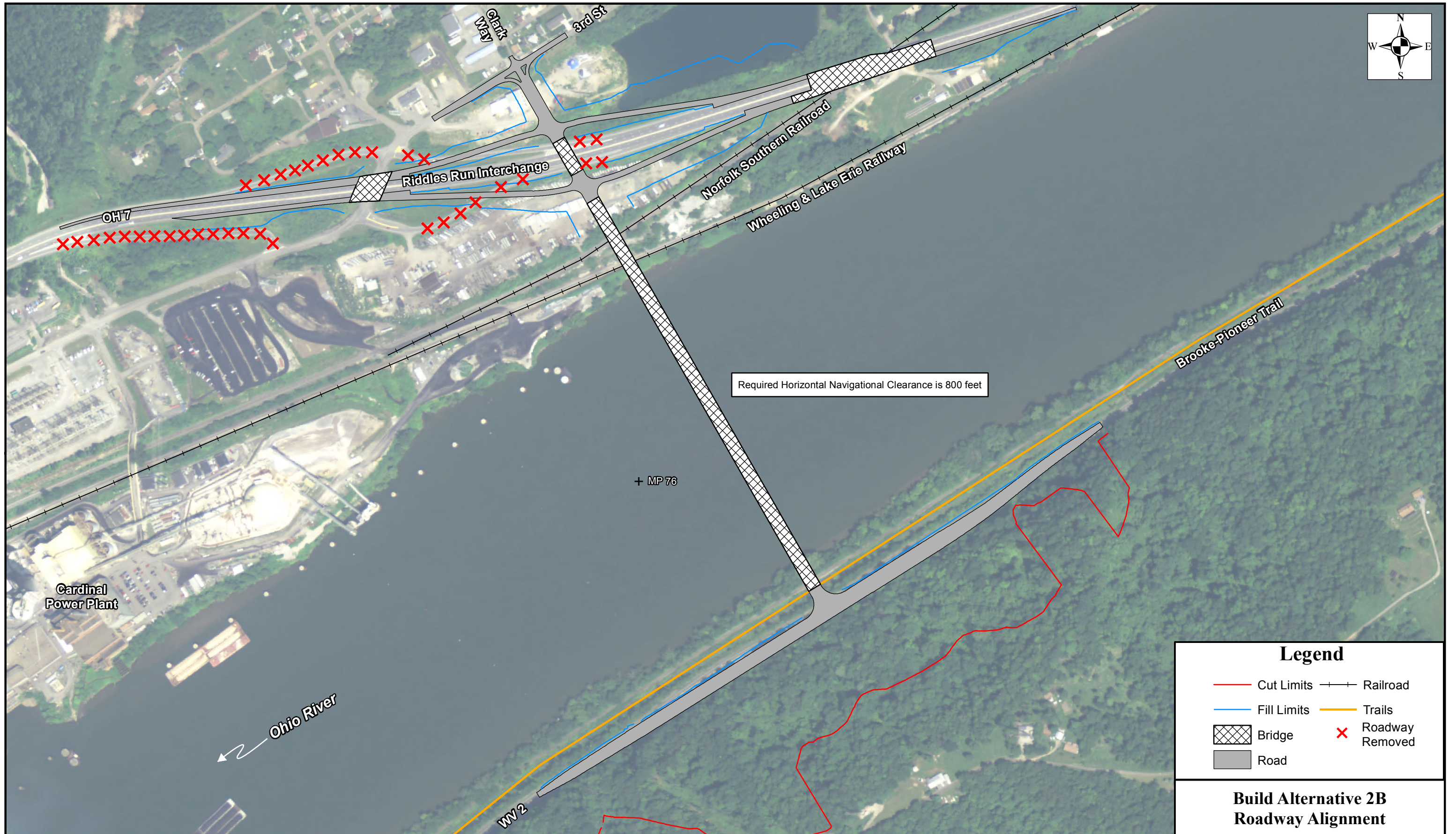


**PROPOSED OHIO RIVER BRIDGE**  
**BROOKE COUNTY, WV AND JEFFERSON COUNTY, OH**  
STATE PROJECT: S205-2/23-0.00 00; FEDERAL PROJECT: HPP-0223(003)D; PID:79353



Legend		
	Cut Limits	Railroad
	Fill Limits	Trails
	Bridge	
	Road	
Build Alternative 2 Roadway Alignment		
Job No.	Date	Exhibit
83938	12/02/11	2-3



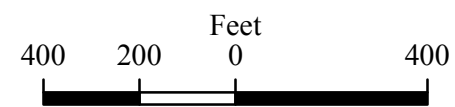


Legend			
<span style="color: red;">—</span>	Cut Limits	<span style="color: black;">—+—</span>	Railroad
<span style="color: blue;">—</span>	Fill Limits	<span style="color: orange;">—</span>	Trails
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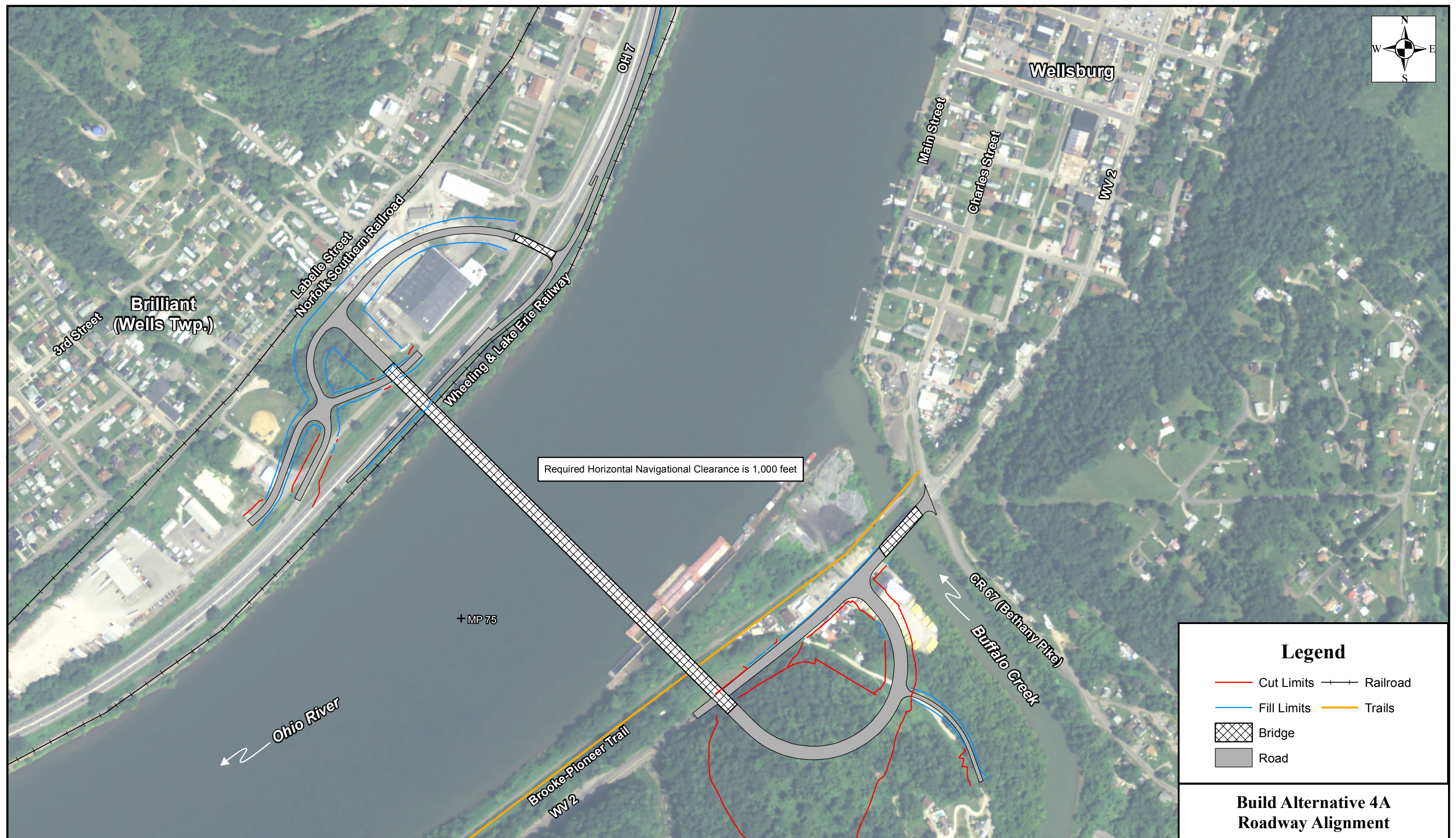
Build Alternative 2B Roadway Alignment		
Job No.	Date	Exhibit
83938	12/02/11	2-4



**PROPOSED OHIO RIVER BRIDGE**  
**BROOKE COUNTY, WV AND JEFFERSON COUNTY, OH**  
 STATE PROJECT: S205-2/23-0.00 00; FEDERAL PROJECT: HPP-0223(003)D; PID:79353







**Legend**

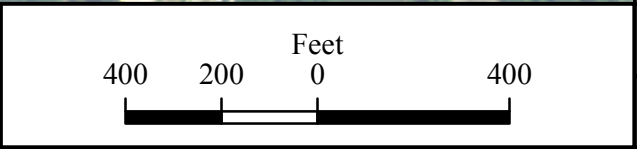
	Cut Limits		Railroad
	Fill Limits		Trails
	Bridge		
	Road		

**Build Alternative 4A  
Roadway Alignment**

Job No.	Date	Exhibit
83938	12/02/11	2-5



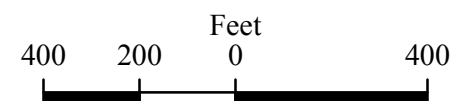
**PROPOSED OHIO RIVER BRIDGE**  
**BROOKE COUNTY, WV AND JEFFERSON COUNTY, OH**  
STATE PROJECT: S205-2/23-0.00 00; FEDERAL PROJECT: HPP-0223(003)D; PID:79353



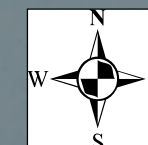
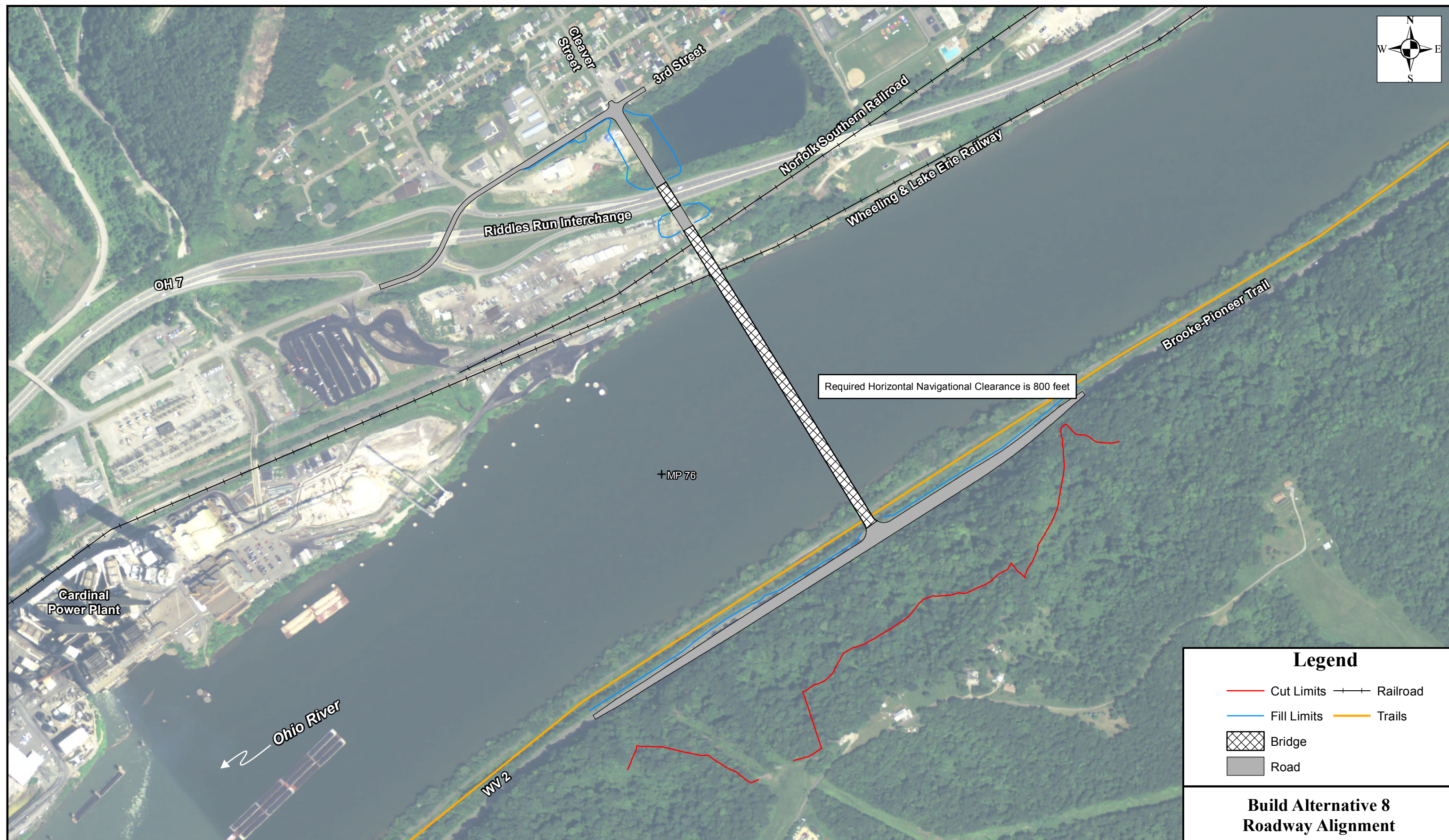






**PROPOSED OHIO RIVER BRIDGE**  
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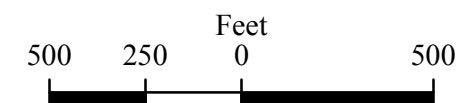


Legend	
<span style="color: red;">—</span> Cut Limits	<span style="color: black;">+ + +</span> Railroad
<span style="color: blue;">—</span> Fill Limits	<span style="color: orange;">—</span> Trails
 Bridge	
 Road	

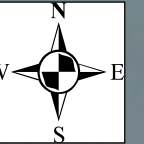
Build Alternative 8 Roadway Alignment		
Job No.	Date	Exhibit
83938	12/28/2011	2-7



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Legend			
<span style="color: red;">—</span>	Cut Limits	<span style="color: black;">+ + +</span>	Railroad
<span style="color: blue;">—</span>	Fill Limits	<span style="color: orange;">—</span>	Trails
<span style="background-color: black; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span>	Bridge	<span style="color: red; font-size: 1.5em;">X</span>	Roadway Removed
<span style="background-color: gray; border: 1px solid black; display: inline-block; width: 15px; height: 10px;"></span>	Road		

Build Alternative 8B Roadway Alignment		
Job No.	Date	Exhibit
83938	12/02/11	2-8



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