

# APPENDIX T-1

## *Planning Study Report (Final) for the I-69 Ohio River Crossing Project, Henderson: Section 1*

**Clarification Note:** This document was completed before the development of Central Alternative 1B Modified (Selected); therefore, the alternative is not included in the document. Applicable information regarding Central Alternative 1B Modified (Selected) is provided in the FEIS.



# OHIO RIVER CROSSING

**HENDERSON: SECTION 1**

## Planning Study Report Final

I-69 Ohio River Crossing Section 1  
Henderson, KY

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# CHAPTER 1 - INTRODUCTION

The purpose of this document is to evaluate refinements to the conceptual designs presented in the project's Draft Environmental Impact Statement (DEIS) and Value Engineering (VE) Report and further design considerations to improve operations and/or reduce the project's cost. This planning effort will narrow and identify the interchange options and other critical design features that will move forward into Preliminary Design and be incorporated into the project's Final Environmental Impact Statement (FEIS).

## 1.1 PROJECT OVERVIEW

The DEIS, published December 2018, identified two Preferred Alternatives – Central Alternative 1A and Central Alternative 1B. These alternatives are identical, except for the proposed toll scenario. Central Alternatives 1A and 1B would both construct a new roadway and Ohio River bridge to connect existing I-69 near Weinbach Avenue in Indiana to US 41 near Van Wyk Road in Kentucky. South of Van Wyk Road, modifications would be made to bring existing US 41 up to interstate standards.

The project consists of two construction sections shown in Figure 1-1. Section 1 begins at KY 425 and extends to US 60 in Kentucky, while Section 2 includes the balance of the I-69 ORX project to complete the river crossing and tie into Veterans Memorial Parkway in Indiana. Section 1 involves two major components: the Pennyryle Conversion and I-69 cross-country alignment.

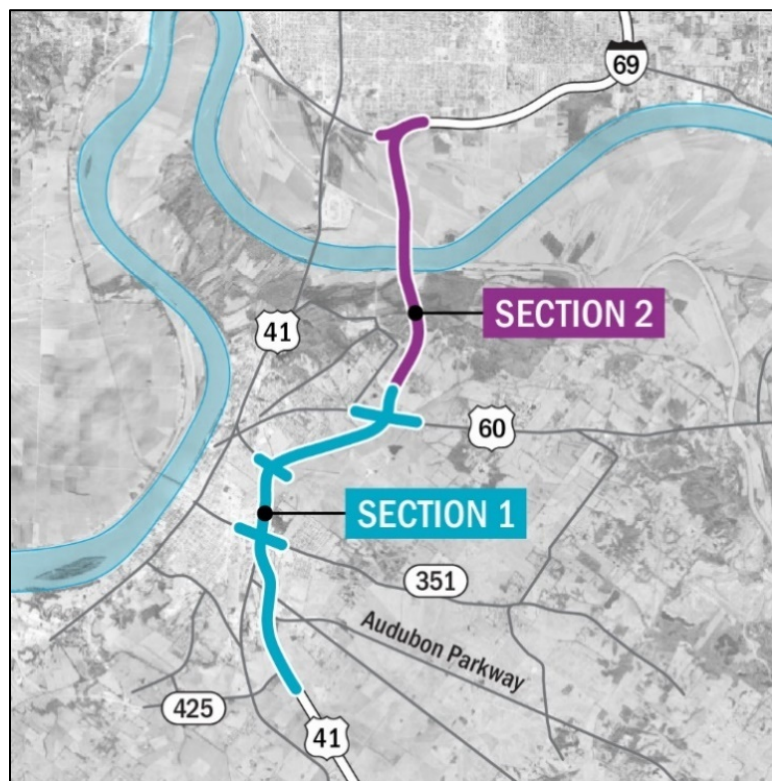


Figure 1-1 – I-69 ORX Construction Sections

This planning study examined in greater detail the previous conceptual design assumptions to refine critical design elements. The study categorized these critical design elements into six specific workshops listed below:

1. **KY 351/I-69 INTERCHANGE:** Modifications to the existing KY 351 Interchange to address the traffic displaced by the elimination of the KY 2084 partial interchange to meet interstate design standards.
2. **US 41/I-69 INTERCHANGE:** Refine interchange options where I-69 departs from the existing US 41 alignment to extend cross-country between US 41 and US 60.
3. **US 60/I-69 INTERCHANGE AND US 60 REALIGNMENT:** Involves the 1-mile realignment of US 60, a new interchange and a CSX Railroad crossing.
4. **I-69 CROSS-COUNTRY GRADING:** Develop an earthwork management strategy to optimize grading and address detention needs.
5. **ROUTE NUMBERING:** Establishing revised signing and potential address changes required as a result of the I-69 ORX project.
6. **PENNYRILE CONVERSION:** Involves upgrading US 41 to I-69 designation standards from KY 425 to the new US 41 Interchange. This will be a standalone document and not included within this report.

Refer to Figure 1-2 for the geographic focus of each planning workshop location and study corridor. Also refer to Appendix A – Workshop Meeting Minutes for additional details.



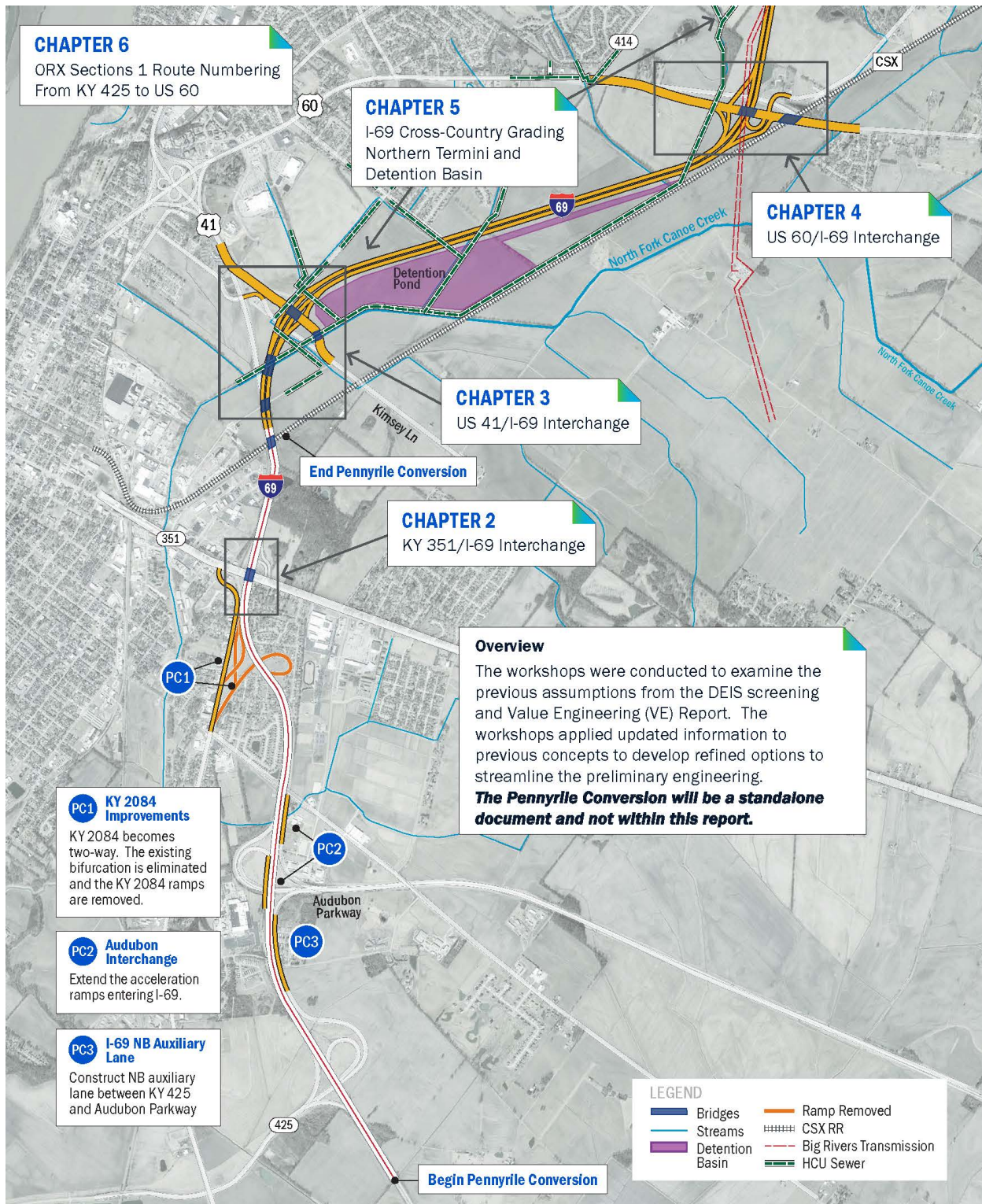


Figure 1-2 – Planning Workshop Focus Areas

## 1.2 DESIGN ASSUMPTIONS

The I-69 mainline design speed will be based on an Urban Design Speed. The options developed for the workshops utilized a 60 MPH design speed.

## 1.3 EVALUATION CRITERIA

Each of the previous concepts were compared to refined options on a range of criteria including traffic, safety, cost, and environmental factors. For each applicable criterion, the options were qualitatively or quantitatively evaluated and then compared to identify the highest performing option(s) to move forward to a Preliminary Line and Grade (PL&G) Inspection and inclusion in the FEIS.

A high-moderate-low rating system was used, with a green rating given to the highest performing concept(s) for that criterion and an orange rating given to the lowest performing concept(s). A yellow rating was given to the concepts that performed between the highest and lowest performing concepts.

A	Highest Performing Option(s)
B	Moderate Performing Option(s)
C	Lowest Performing Option(s)

The sections that follow describe the evaluation for each interchange and critical design element to identify the option(s) recommended to be carried forward.



## CHAPTER 2 – KY 351/I-69 INTERCHANGE

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An existing interchange provides access between US 41, KY 351, and KY 2084. Full access to KY 351 from US 41 is provided via a modified partial cloverleaf (parclo) diamond interchange; it is similar to a traditional diamond interchange except that a loop ramp is utilized to provide the US 41 northbound exit. From the KY 351/US 41 interchange, KY 351 provides a direct route into downtown Henderson. North Middle School is located west of the interchange and Henderson County High School is located east of the interchange.

The interchange between KY 2084 and US 41 is immediately to the south of KY 351 and provides access only from southbound US 41 to southbound KY 2084 and from northbound KY 2084 to northbound US 41. Vehicles traveling northbound on US 41 can only access KY 2084 via the KY 351 interchange and KY 2084 southbound traffic cannot access US 41. Currently, KY 2084 is bifurcated, with northbound KY 2084 crossing over the US 41 southbound exit ramp. The existing KY 2084 interchange has three challenges:

- Existing configuration is a partial interchange. FHWA does not typically approve the implementation of “partial” interchanges (those that do not provide all movements) on the Interstate Highway System.
- Substandard spacing between the KY 351 and KY 2084 interchange ramps.
- Existing safety and operation issues.

Therefore, the options developed include the removal of the KY 2084 partial interchange and reconfiguration or reconstruction of the KY 351 to accommodate the resulting change in traffic patterns.

As part of the workshop analysis, the project team presented the interchange options to the Henderson City-County Planning Commission to gather feedback. Refer to Appendix B – Henderson City-County Planning Commission Meeting Summary for more details.

### 2.1 INTERCHANGE OPTIONS

Three base interchange configurations were developed and evaluated at this location. The options focused on minimizing R/W impacts, optimizing traffic operation, and addressing community expectations. Below are the three interchange configurations considered:

- **SPUI CONFIGURATION:** These options would convert the existing interchange to a Single Point Urban Interchange (SPUI). This concept was developed to address concerns raised by local officials regarding the safety and operations of the existing loop ramp for the northbound exit and its intersection with KY 351.
- **PARCLO CONFIGURATION:** These interchange options utilize the existing loop ramp. This configuration avoids right-of-way impacts in the southeast quadrant of the interchange.
- **TIGHT DIAMOND CONFIGURATION:** This service interchange includes shifting the I-69 alignment west within the existing right of way and eliminates the existing loop ramp.

### 2.1.1 OPTION 1 – SHIFTED SPUI

This option would construct a SPUI interchange at KY 351 with a slight shift of I-69 to the west to reduce right of way impacts and the complexity of the maintenance of traffic during construction. This option would signalize the existing KY 351 and KY 2084 intersection.

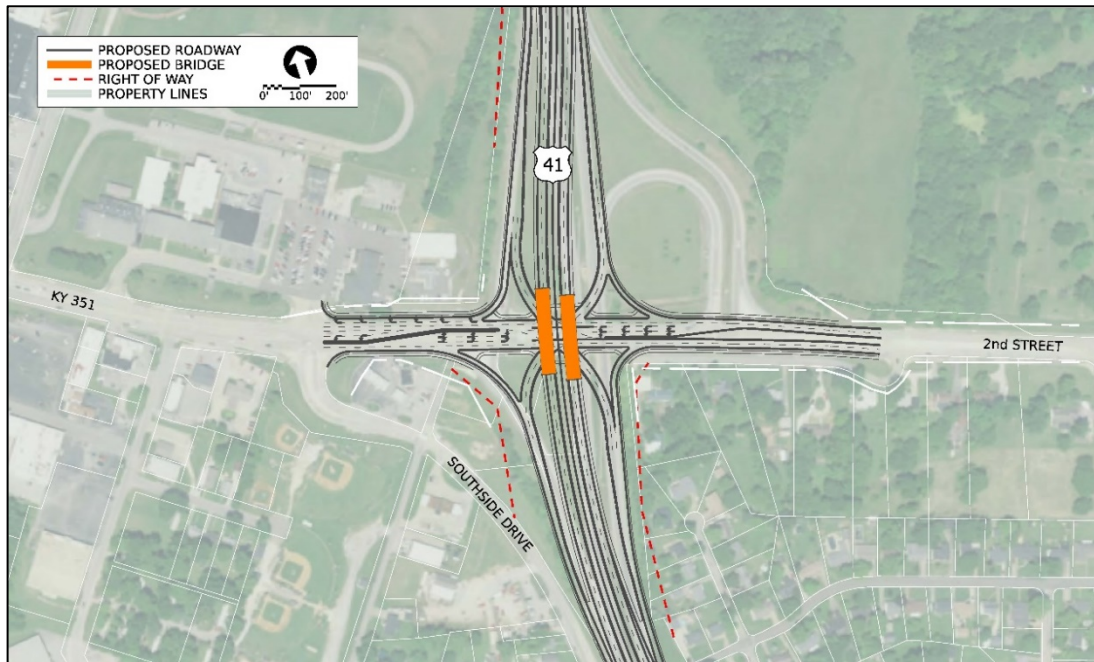


Figure 2-1 – Option 1 Shifted Single Point Urban Interchange (SPUI)

### 2.1.2 OPTION 1A – SHIFTED SPUI WITH KY 351/KY 2084 ROUNDABOUT

Similar to Option 1, I-69 would shift to the west and the existing KY 351/KY 2084 intersection would be converted to a roundabout-type intersection, in-lieu of the signalization in Option 1.

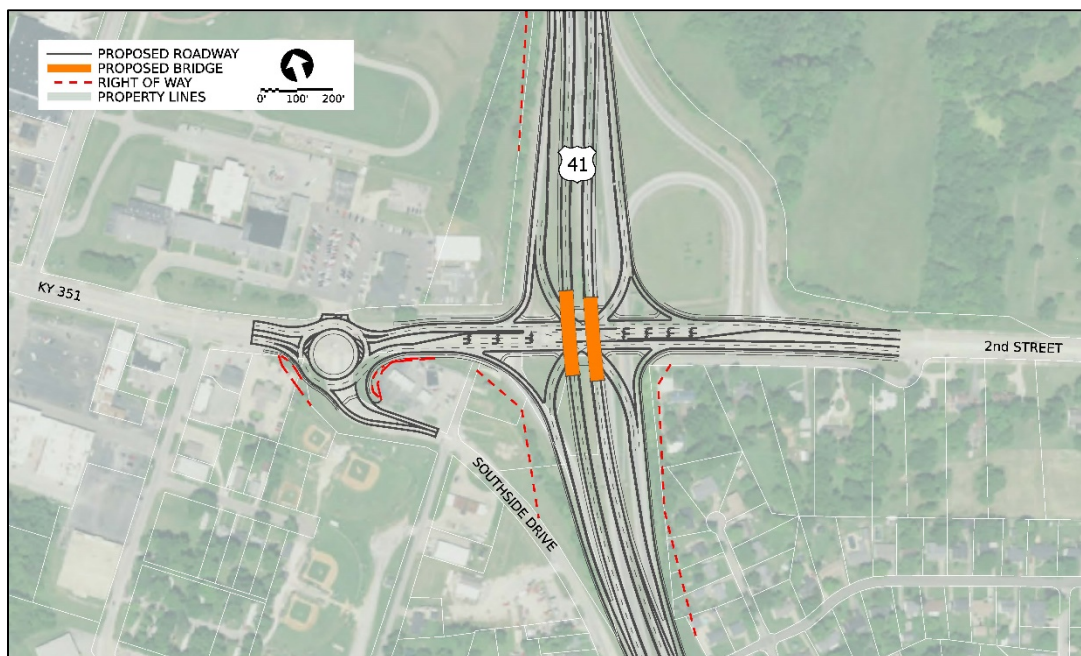


Figure 2-2 – Option 1A Shifted SPUI with KY 2084 Roundabout



### 2.1.3 OPTION 2 - PARCLO DOUBLE ROUNDABOUT

This option would utilize a roundabout intersection at the eastern ramp intersection combined with a roundabout at the KY 351/KY 2084 intersection with a raised median between the roundabouts to prohibit left turn movements.



Figure 2-3 – Option 2 Parclo Double Roundabout

### 2.1.4 OPTION 2A - PARCLO TRIPLE ROUNDABOUT

This option includes a roundabout configuration at the ramp intersections with KY 351 and a roundabout at the KY 351/KY 2084 intersection.



Figure 2-4 – Option 2A Parclo Triple Roundabout

### 2.1.5 OPTION 3 - TIGHT DIAMOND TRIPLE ROUNDABOUT

This interchange option includes shifting the I-69 alignment west within the existing right of way and utilizing a compressed diamond ramp configuration. The ramp intersections at KY 351 would utilize a roundabout and the existing KY 351/ KY 2084 intersection would be converted to a roundabout. This eliminates the loop ramp and reduces right of way impacts.



Figure 2-5 – Option 3 Tight Diamond Triple Roundabout

### 2.1.6 OPTION 3A - TIGHT DIAMOND 5-LEG ROUNDABOUT

Similar to Option 3, this interchange would utilize a “dog bone” roundabout at the ramp intersections, but bring KY 2084 into the western roundabout, creating a 5-legged roundabout. The segment of existing KY 2084 between Lincoln Avenue and KY 351 would be removed.



Figure 2-6 – Option 3A Tight Diamond 5-Leg Roundabout

## 2.1.7 PREVIOUSLY DISMISSED OPTIONS

There were interchange concepts eliminated early on due to fatal flaws. Prior to the workshop, a status review meeting was held to discuss the multiple interchange configurations under consideration. Please refer Appendix A – Workshop Meeting Minutes for reference. During this meeting, the Double Cross-Over Diamond (DCD) option was eliminated from further consideration due to significant right-of-way impacts and relocations.

## 2.2 GEOMETRY

Each of the interchange options meet current design standards. Table 2-1 is a summary of the geometric features.

**Table 2-1 - KY 351 Interchange Geometry Summary**

CRITERIA	OPTION 1 SPUI	OPTION 1 A SPUI SHIFTED	OPTION 2 PARCLO TRIPLE	OPTION 2A PARCLO DOUBLE	OPTION 3 TD	OPTION 3A TD 5-LEG
Minimum Ramp Design Speed	45	45	25	25	45	45
Loop Ramps (Y/N)	N	N	Y	Y	N	N
KY 351 Lane Width (FT)	>=11'	>=11'	>=12'	12'	11'	12'
Minimum Control Access	100	100	100	100	100	100
Support Community Expectation of Gateway, Traffic Calming (Y/N)	Y	Y	Y	Y	Y	Y

## 2.3 PERFORMANCE

Performance assessments were applied to the accessibility, safety, and traffic operations.

### 2.3.1 ACCESS

The Federal Highway Administration (FHWA) typically requires a minimum of 100 feet between the ramp terminal intersection and the nearest access point (driveway or local street). Likewise, the removal of existing access points is typically discouraged, except where safety concerns are unavoidable. Each of the options at this interchange would maintain access to all existing properties as shown in Table 2-2.

### 2.3.2 SAFETY

Conflict points occur where vehicle travel paths intersect and create opportunities for crashes. There are three categories of conflict points: crossing, merging, and diverging. In general, merging and diverging conflict points – where vehicles are moving in the same direction – are associated with less severe crash types than crossing conflict points where vehicles are moving in perpendicular directions. Where ramps enter a roadway in a dedicated lane (i.e., no merge is required), it was not counted as a conflict point. Conflict points for each of the options are shown in Table 2-2.

Driver expectancy relates to a driver's readiness to respond to situations, features, and information in predictable and successful ways. The more predictable the roadway, the less



chance of human errors. This criterion compares the conventional interchange configurations and operations to new innovative interchange designs. While the concerns associated with innovative operations can often be mitigated through advanced signage, they are still less preferable to traditional interchange configurations.

### 2.3.3 TRAFFIC

Traffic operations at the KY 351 Interchange was compared based on forecasted traffic volumes and associated level of service at the interchange. Traffic performance at the KY 351 Interchange was analyzed based on forecasted traffic volumes and predicted level of service at the two ramp terminal intersections (See Appendix C for 2045 forecasted traffic volumes). Level of service was determined using Highway Capacity Manual procedures and traffic projections derived using the Evansville Metropolitan Planning Organization's travel demand model. As shown in Table 2-2 each of the interchange options would operate at level of service C or better.

**Table 2-2 – KY 351 Interchange Performance Summary**

CATEGORY	OPTION 1 SPUI	OPTION 1 A SPUI SHIFTED	OPTION 2 PARCLO TRIPLE	OPTION 2A PARCLO DOUBLE	OPTION 3 TD	OPTION 3A TD 5-LEG
<b>ACCESS</b>						
Minimum Control Access Spacing (ft)	100	100	100	100	100	100
Direct Access to KY 2084	Y	Y	Y	Y	Y	Y
Direct Access to Middle School	Y	Y	Y	Y	Y	Y
Direct Access to Palmer's Market	Y	Y	Y	Y	Y	Y
<b>SAFETY</b>						
Ramp terminal stop conditions	4	4	0	0	0	0
Conflict Points	24	24	16	16	16	18
Driver Expectancy A-Best, B-Avg, C-Worst	A	A	C	C	B	C
<b>TRAFFIC</b>						
Traffic Operations (A-Best, B-Avg, C-Worst)	B	B	B	B	B	B
Level of Service	C	C	C	C	C	C

## 2.4 IMPACTS

At this interchange, the environmental and utility impacts are comparable among each of the options; therefore, only right-of-way impacts were evaluated. The significant differences are in the southeast quadrant of the interchange.

### 2.4.1 RIGHT-OF-WAY

The SPUI options are similar in number of parcels impacted but differ considerably on the number of relocations. The Parclo options result in the fewest number of impacts compared to

the other options and require no relocations. The Tight Diamond options will involve only one relocation in the southeastern quadrant of the interchange.

Table 2-3 – KY 351 Interchange Impact Summary

CATEGORY	OPTION 1 SPUI	OPTION 1 A SPUI SHIFTED	OPTION 2 PARCLO TRIPLE	OPTION 2A PARCLO DOUBLE	OPTION 3 TD	OPTION 3A TD 5-LEG
<b>RIGHT-OF-WAY</b>						
Parcels Impacted (No.)	15	13	2	2	12	3
Relocation (No.)	7	1	0	0	2	0

## 2.5 COST

There are considerable cost differences between the three base interchange configurations. The Parco configurations generate the lowest construction costs compared to the others as they involve the least amount of rework to the existing interchange. The cost difference between the Parco and the SPUI and Tight Diamond configurations is due to the reconstruction required along I-69 due to the shifting of the alignment to the west. This shifting of I-69 allows for a more efficient maintenance of traffic during construction for the KY 351 interchange reconstruction. The increase in cost between the Tight Diamond as compared to the SPUI configurations is generated by the roundabout construction involved with the Tight Diamond option.

Table 2-4 – KY 351 Interchange Cost Summary

CATEGORY	OPTION 1 SPUI SERIES	OPTION 2 PARCLO SERIES	OPTION 3 TIGHT DIAMOND SERIES	COMMENTS
Retaining Walls Required (Y/N)	Y	N	Y	
Guardrail Required (Y/N)	Y	Y	Y	
Bridges (No.)	1	1	1	Parclo - the existing bridge would be widened.
MOT Complexity (A-Best, B-Avg, C-Worst)	C	A	B	
R/W Estimate	\$630,000	N/A	\$1.06 M	
Construction Cost	\$18.0 M	\$7.0 M	\$18.2 M	All estimates replace the I-69 bridges over KY 351.

## 2.6 KY 351/I-69 INTERCHANGE RECOMMENDATION

As described at the beginning of this section, the goal of this analysis is to identify the highest performing options, subject to additional evaluation during the Preliminary Line and Grade Inspection. The above documentation summarizes the evaluation of concepts at this interchange location. Based on the analysis and local input, **Option 3 Tight Diamond Triple Roundabout** has been recommended to be carried forward.

## CHAPTER 3 – US 41/I-69 INTERCHANGE

At the time the DEIS concept for this interchange was developed, it was anticipated that the entire project, including the new bridge across the Ohio River, would open to traffic at the same time. With the decision to develop the project in two construction phases, it was necessary to develop a concept for this interchange that met travel demands both in the interim condition after completion of Section 1, with the new roadway open only to US 60, and upon completion of the entire project. During the interim condition, the priority must be on providing a free-flow movement from northbound I-69 to northbound US 41, as the majority of traffic will utilize that route. Following completion of Section 2, however, travel patterns will change, with a more even distribution of vehicles utilizing I-69 and US 41. Table 3-1 provides the anticipated open to traffic timeframes for Section 1 and Section 2 and the anticipated travel patterns.

**Table 3-1 – Construction Section Summary**

CONSTRUCTION SECTION	OPERATIONAL TIMEFRAME	US 41 INTERCHANGE TRAFFIC PATTERNS
Section 1	2025-2031	The major traffic movements would be processed through the NB I-69 to NB US 41 ramp and SB US 41 to SB I-69 ramp.
Section 2	2031-beyond	The major traffic movements would be on the I-69 mainline through the interchange.

### 3.1 INTERCHANGE OPTIONS

Option 1 (see Figure 3-1) is a trumpet interchange configuration that provides free flow traffic operation for the major traffic movements for the Section 1 interim condition. Option 2 (see Figure 3-3) is a traditional diamond interchange configuration, previously Concept D from the VE Report. Option 2 corresponds with more traditional traffic movements within the interchange and the major traffic movement being the I-69 through traffic.

#### 3.1.1 OPTION 1: TRUMPET INTERCHANGE (FREE FLOW INTERCHANGE)

This option provides free-flow traffic operation for the major traffic movements within the interchange for the interim condition. Option 1 was developed specifically to address the traffic movements of the (NB I-69 to NB US 41) and (SB US 41 to SB I-69) ramps that would carry through traffic in the interim condition. Those ramps would be two-lanes to provide adequate capacity to address the peak-hour volumes. The objective of the option is to eliminate the potential for traffic backing up on the ramps during the peak-hour.

To maintain connectivity for Kimsey Lane (in 2 locations), Kimsey Lane would be re-routed onto a section of existing SB US 41 to Van Wyk Road. Van Wyk Road, which is currently a gravel road, would be upgraded between the rerouted Kimsey Lane and existing Kimsey Lane. The rerouted and existing Kimsey Lane currently does not have direct access to US 41, so there would be no change in connectivity and access. All existing local roadway connections and access would be maintained.



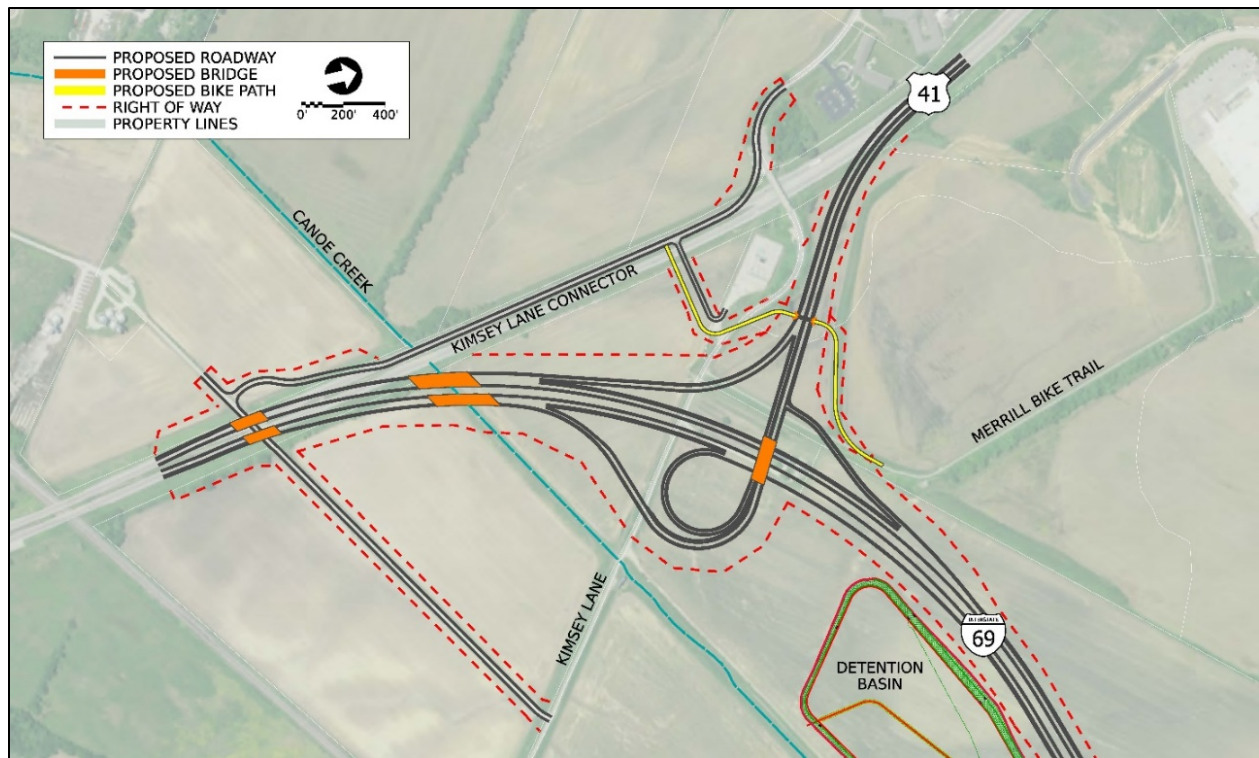
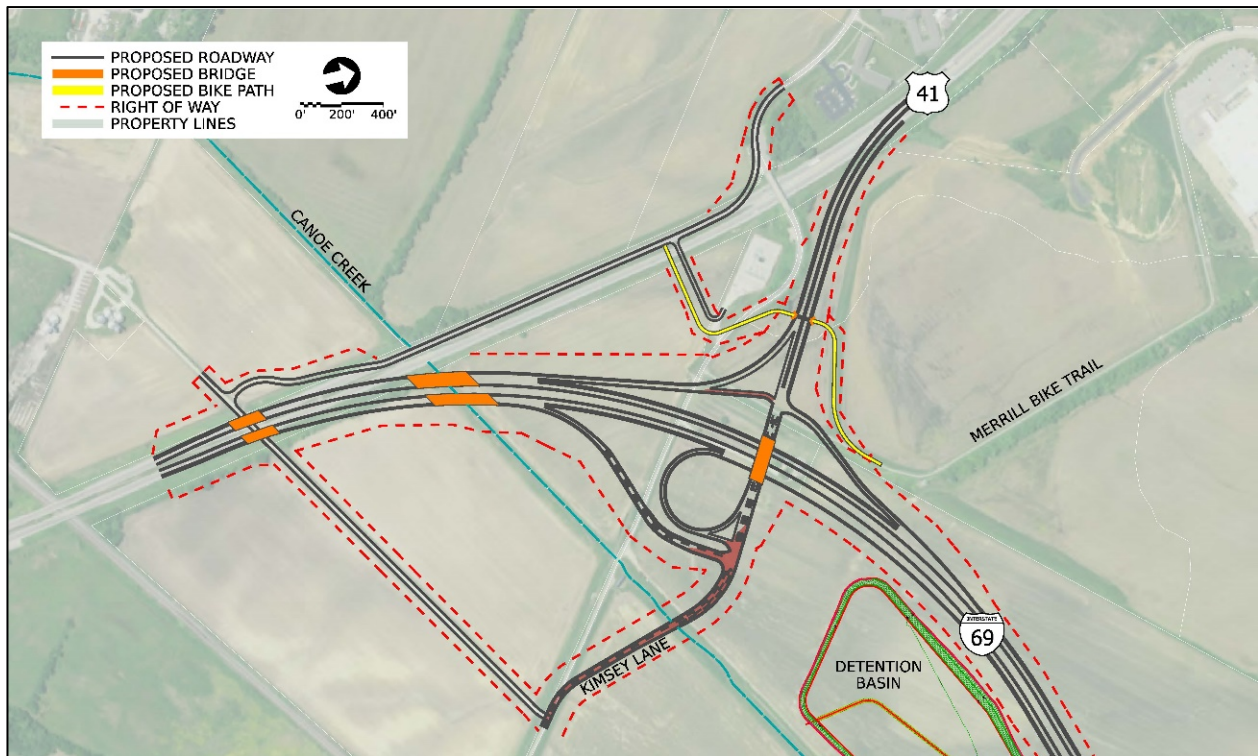


Figure 3-1 – Option 1 Trumpet Interchange

### 3.1.2 TRUMPET TO SERVICE INTERCHANGE RETROFIT

A Diamond Interchange retrofit option (see Figure 3-2) was developed to convert the trumpet into a diamond interchange with minimal rework. An interchange retrofit option was developed to demonstrate that the trumpet interchange, a system-type interchange that limits local access, could be converted to a service interchange at some point in the future with minimal rework. This option affords KYTC the option to address the free-flow traffic operational needs in the interim with the flexibility for direct access and support for local planning to the east of I-69 in the ultimate condition. This concept is presented for information only and would not be part of the I-69 ORX Section 1 construction; however, this retrofit option could be included as part of the Section 2 construction.



**Figure 3-2 – Interim Trumpet to Diamond Retrofit**

### 3.1.3 OPTION 2: DIAMOND INTERCHANGE (SERVICE INTERCHANGE)

This interchange (see Figure 3-3) is based on a conventional diamond configuration. Option 2 requires the realignment of both Kimsey Lane and US 41. As a result of the US 41 realignment, direct access from southbound US 41 to southbound I-69 and northbound I-69 to northbound US 41 would not be provided and all access between the two highways would occur via the diamond interchange.

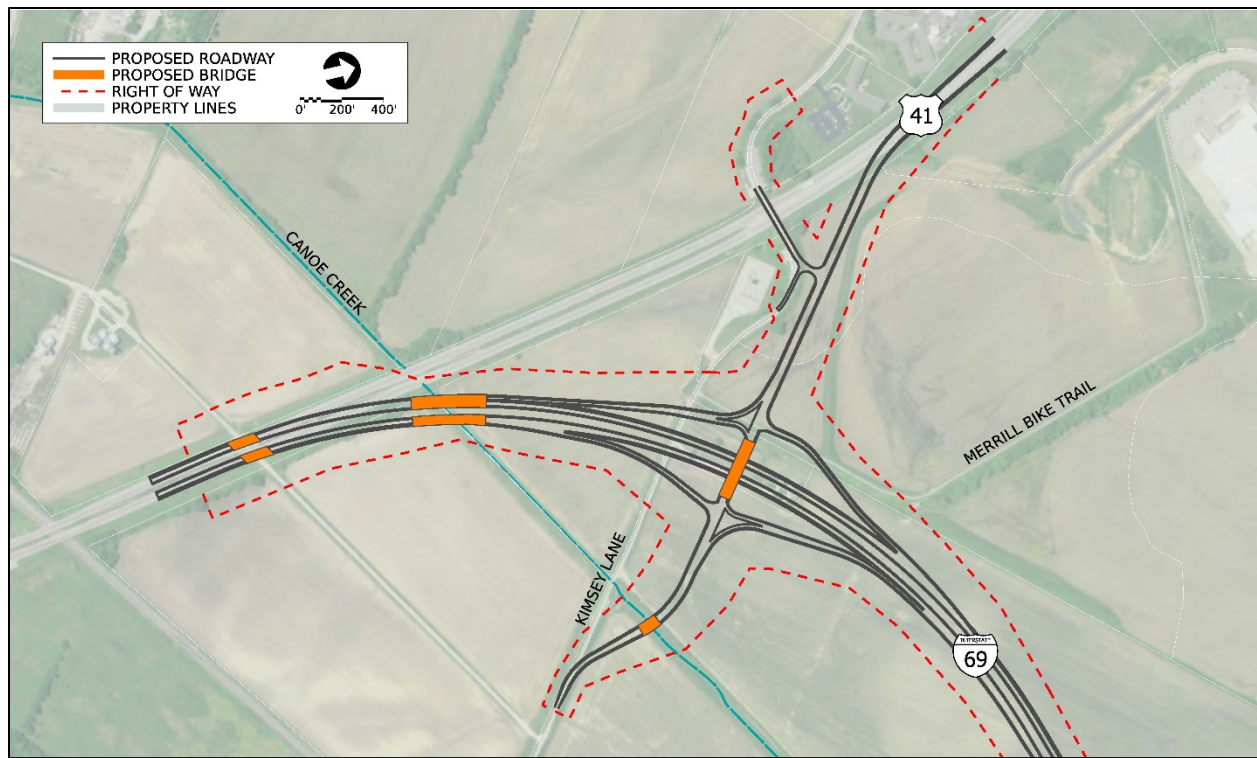


Figure 3-3 – Option 2 Diamond Interchange

## 3.2 GEOMETRY

### 3.2.1 OPTION 1: TRUMPET INTERCHANGE

With Option 1, the existing US 41 median barrier wall will be carried through the interchange and in between the trumpet ramps to the south of I-69. This would keep positive separation between the trumpet and loop ramps. Ramp A (SB I-69 to NB US 41) would be a conventional single lane ramp. Ramp B (SB US 41 to NB I-69) would be a single-lane loop ramp with a 25 MPH design speed. Ramp C (NB I-69 to NB US 41) would be a trumpet ramp with a 30 MPH curve with a single parallel ramp that widens to 2 lanes beyond the gore. Ramp D (SB US 41 to SB I-69) would have a 45 MPH curve with 2-lanes that drop to 1 lane before merging with SB I-69. Refer to Table 3-2 for a geometric summary.

### 3.2.2 OPTION 2: DIAMOND INTERCHANGE

Option 2 is a conventional diamond interchange. Refer to Table 3-2 for a geometric summary.



Table 3-2 – US 41 Interchange Geometry Summary

CRITERIA	US 41 INTERCHANGE OPTIONS		COMMENTS
	OPTION 1 TRUMPET	OPTION 2 DIAMOND	
Loop Ramps (No.)	1	none	Loop ramps provide free flow.
US 41 Design Speed (MPH)	Urban 60	Urban 60	
I-69 Design Speed (MPH)	Urban 60	Urban 60	
US 41 Median	Barrier wall	Barrier Wall	
I-69 Median	50' depressed	50' depressed	The transition from the existing Pennyrile median width to the new alignment 50' median width occurs south of the US 41 Interchange.
Ramp A (SB I-69 to NB US 41) Design Speed MPH Number of Lanes Terminal Condition	45 Single lane Stop Condition	45 Single Lane Stop Condition	Single lane ramp with stop condition ramp terminal for both Option 1 and Option 2. However, Option 1 has the option of being a free-flow merge from SB I-69 to NB US 41.
Ramp B (SB US 41 to NB I-69) Design Speed MPH Number of Lanes Terminal Condition	25 Single lane loop Stop Condition	45 Single lane Stop Condition	Option 1 is a single lane free-flow loop ramp. Option 2 is a single lane ramp with a stop condition terminal.
Ramp C (NB I-69 to NB US 41) Design Speed MPH Number of Lanes Terminal Condition	30 Two-lane trumpet Free-Flow	45 Single lane Stop Condition	Option 1 two-lane free-flow trumpet ramp. A single parallel ramp that widens to 2-lanes on the ramp proper past the gore with continuous flow. This ramp will require inside shoulder widening for sight distance. Option 2 is a single lane ramp with a stop condition terminal.
Ramp D (SB US 41 to SB I-69) Design Speed MPH Number of Lanes Terminal Condition	45 Two-lane Free-Flow	45 Single lane Stop Condition	Option 1 is a two-lane ramp that drops to 1 lane before merging with SB I-69. Option 1 is a free-flow terminal. Option 2 is a single lane ramp with a stop condition terminal.
US 41 Lane Width	12'	12'	
I-69 Lane Width	12'	12'	
Kimsey Lane Lane Width	12'	12'	

### 3.3 PERFORMANCE

The categories of accessibility, safety and traffic operations were evaluated for each interchange option and summarized in Table 3-3.

#### 3.3.1 ACCESS

Option 1 and 2 have distinctly different opportunities for the Kimsey Lane connection. To maintain the Kimsey Lane connection, Option 1 involves rerouting Kimsey Lane along existing roadways. Option 1 would use an abandoned section of SB US 41 and its bridge over Canoe Creek to extend to Van Wyk Road. The section of Van Wyk Road that runs underneath I-69 would be widened and paved from realigned Kimsey Lane to existing Kimsey Lane to the east of

I-69. Option 2 would provide direct access to Kimsey Lane via a diamond interchange and would provide direct access to areas east of I-69 for economic opportunities.

Option 1 would have no access points within the interchange influence area. Option 2 would construct a Kimsey Lane access point 700' to the west of the west ramp terminals.

### **3.3.2 SAFETY**

There are no considerable safety issues to differentiate between Options 1 and 2. There are operational and geometric differences; however, the differences do not make one option safer than the other.

### **3.3.3 TRAFFIC OPERATIONS**

Option 1 has less delay due to its free flow configuration when compared to Option 2 for the interim Section 1 construction. The Option 1 Trumpet interchange addresses the major traffic movements and peak-hour volume capacity needed to process traffic through the interchange prior to the river crossing being open. Option 2 provides free flow for major traffic movements along I-69 but requires the major traffic movement from NB I-69 to NB US 41 to use a standard intersection configuration.

Traffic forecasts have been prepared for the interim condition (2025) and the final build condition (2045). In the 2025 interim condition, 14,900 vpd are forecast to utilize the NB I-69 to NB US 41 ramp. In 2045, with Section 2 complete, that ramp is forecast to carry 14,000 vpd with 1,380 vehicles per hour (vph) in the a.m. peak and 980 vph in the p.m. peak. Regardless of the option selected, if the NB to NB ramp terminates at a signal-controlled intersection, the movement would require dual left turn lanes to limit queueing and delays on the ramp. Traffic performance at the US 41 Interchange was analyzed based on forecasted traffic volumes (See Appendix C for 2045 Traffic Volumes and Appendix D for 2025 Traffic Volumes). Level of service was determined using Highway Capacity Manual procedures and traffic projections derived using the Evansville Metropolitan Planning Organization's travel demand model.

Table 3-3 – US 41 Interchange Performance Summary

CATEGORY	US 41 INTERCHANGE OPTIONS		COMMENTS
	OPTION 1 TRUMPET	OPTION 2 DIAMOND	
ACCESS			
Minimum Control Access Spacing (ft)	N/A	700'	Option 1 Trumpet has no access points.
Kimsey Lane Accessibility (A-Best, B-Avg, C-Worst)	B	A	Option 2 Diamond would provide direct access to I-69 from Kimsey Lane.
SAFETY			
Ramp terminal stop conditions	1	4	
Crossing Conflicts	0	6	
TRAFFIC			
Traffic Operations in the interim condition (river crossing not open) (A-Best, B-Avg, C-Worst)	A	B	Option 1 Trumpet will provide free flow for the predominant traffic movements.
Interim Level of Service at ramp terminals	Free flow	A	Dual left required for NB to WB movement
Ultimate Level of Service at ramp terminals	NB Ramps – B SB Ramps – A	NB Ramps – C SB Ramps – A	Assumes connection across I-69; Dual left required for NB to WB movement

### 3.4 IMPACTS

At this interchange, the right-of-way and utility impacts are comparable among each of the options. There is one residential relocation due by the I-69 corridor and not influenced by either of the interchange options. A power substation is located in the southwest quadrant of the interchange that will be avoided by each interchange option.

Environmentally, impacts to the floodway and floodplain differ between Option 1 and Option 2. The Option 2 Diamond interchange would require the connection to Kimsey Lane to the east to span the Canoe Creek watershed, while the Option 1 Trumpet interchange would not involve construction or additional embankment and a structure that would cut across the Canoe Creek watershed. Refer to Table 3-4 for a summary of impacts.

**Table 3-4 – US 41 Interchange Impact Summary**

CATEGORY	US 41 INTERCHANGE OPTIONS		COMMENTS
	OPTION 1 TRUMPET	OPTION 2 DIAMOND	
ENVIRONMENTAL			
Canoe Creek Watershed Crossings (No.)	1	2	Option 1 only requires the I-69 crossing of Canoe Creek. Option 2 requires a Kimsey Lane Canoe Creek crossing in additional to the I-69 crossing.
Floodway/Floodplain Impacts (A-Best, B-Avg, C-Worst)	B	C	Option 2 requires additional embankment to cut across the Canoe Creek watershed for the Kimsey Lane connector.
RIGHT-OF-WAY			
Parcels Impacted (No.)	9	8	There is no R/W impact differentiator between the options.
Relocations (No.)	1	1	
UTILITIES			
Underground (A-Best, B-Avg, C-Worst)	B	B	There are no utility impact differentiators between the options.
Overhead (A-Best, B-Avg, C-Worst)	B	B	

### 3.5 COST

There is little cost difference between Option 1 and Option 2. The Option 1 Trumpet is slightly less expensive (\$32 M) compared to the Option 2 Conventional Diamond (\$34 M). The construction estimate for Option 1 is less than Option 2 due to elimination of an additional Kimsey Lane bridge over Canoe Creek. Option 1 maintenance of traffic is more complex than Option 2 because of the rerouting of Kimsey Lane.

Both options involve constructing a bike trail connection within the interchange. The intent is to connect the southwest residential areas to the northern commercial developments. The Option 1 plan is to end the bike trail at the rerouted Kimsey Lane (repurposed section of SB US 41). Option 2 would have the option of taking the bike trail over I-69 on the US 41/Kimsey Lane connector bridge. Option 1 would reduce the bike trail conflict points with interchange traffic over Option 2.

Table 3-5 – US 41 Interchange Cost Summary

CATEGORY	US 41 INTERCHANGE OPTIONS		COMMENTS
	OPTION 1 TRUMPET	OPTION 2 DIAMOND	
Retaining Walls Required (Y/N)	N	N	
Guardrail Required (Y/N)	Y	Y	
Bridges (No.)	5	6	Option 2 requires an additional structure for Kimsey Lane to span Canoe Creek.
MOT Complexity (A-Best, B-Avg, C-Worst)	B	A	Option 1 is slightly more complex due to the rerouting of the Kimsey Lane connection.
Bike trail connection	B	A	Option 1 takes the bike trail under US 41 to connect to the rerouted Kimsey Lane. Option 2 takes the bike trail over I-69 via the US 41/Kimsey Lane connector.
Construction Cost	\$32 M	\$34 M	

### 3.6 US 41/I-69 INTERCHANGE RECOMMENDATION

As discussed at the beginning of this section, the goal of this analysis is to identify the best interchange options to move forward into preliminary design. It is recommended that the **Option 1 Trumpet** move forward to a Preliminary Line and Grade Inspection and incorporation into the FEIS.



## CHAPTER 4 - US 60/I-69 INTERCHANGE

The US 60 Interchange would provide access for this east-west arterial to the new I-69 roadway. The north side of the interchange is flanked on either side by properties eligible for the National Register of Historic Places; land to the south of US 60 is agricultural. Additionally, a private cemetery was identified on the south side of US 60 at the west end of the new alignment. To minimize impacts to the historic properties, the US 60 roadway would be realigned to the south while avoiding the cemetery boundary. The goal of the evaluation is to select the single best concept at this interchange location.

### 4.1 INTERCHANGE OPTIONS

Two design options were evaluated for this interchange location, a flop diamond (Figure 4-1) and a conventional diamond (Figure 4-2).

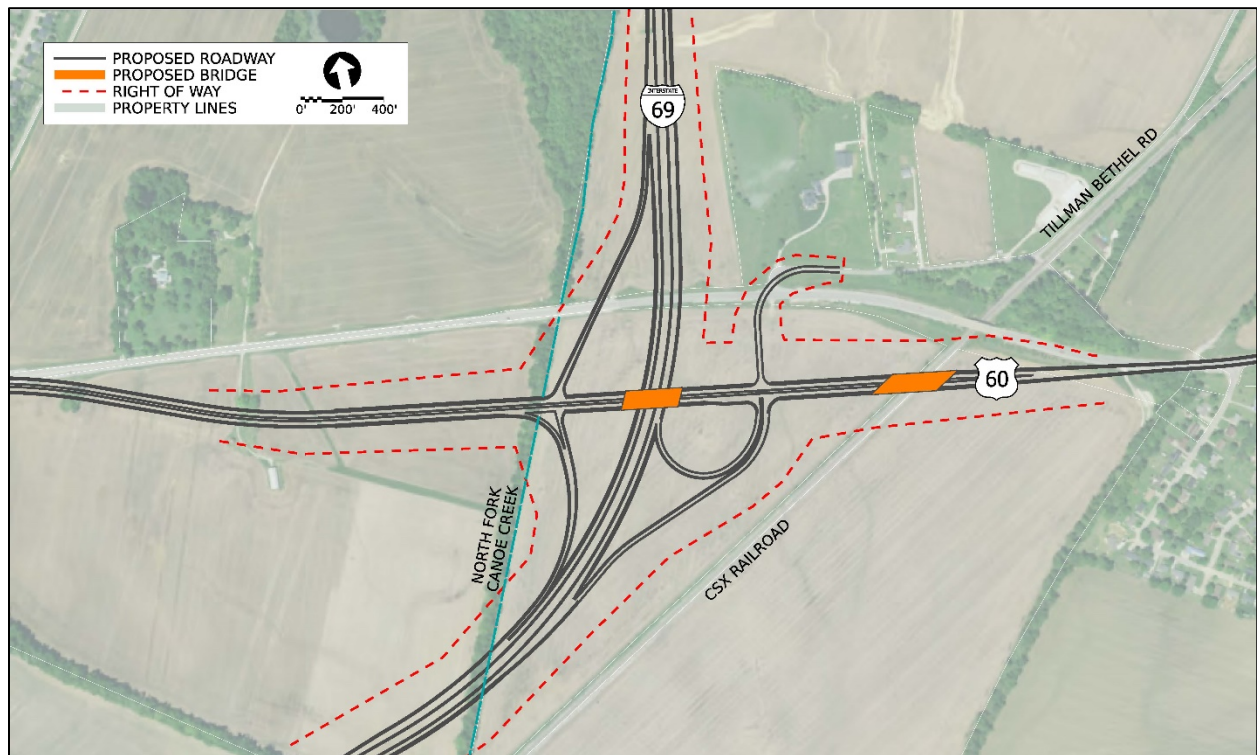


Figure 4-1 – Flop Diamond Interchange

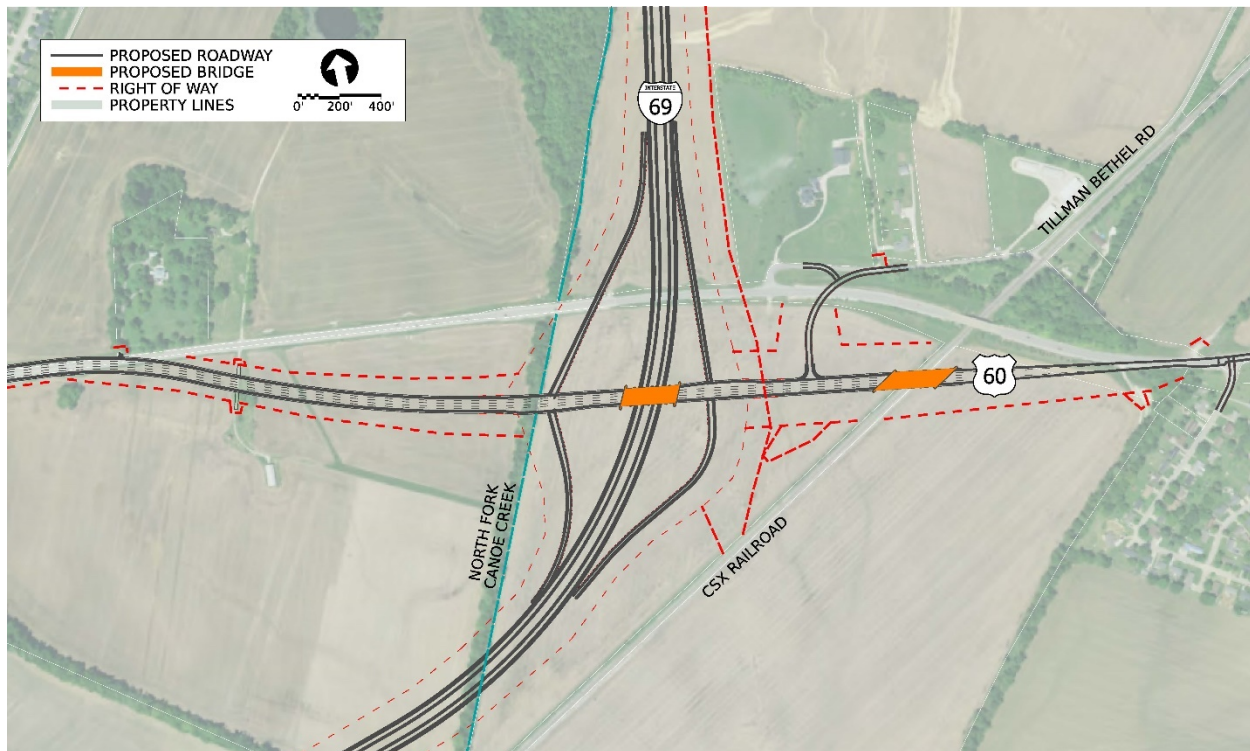


Figure 4-2 – Conventional Diamond Interchange

#### 4.1.1 US 60 PREFERRED OPTION: CONVENTIONAL DIAMOND INTERCHANGE

The DEIS presented a traditional diamond interchange concept at this location; however, due to the proximity of the northbound entrance ramp to the US 60 bridge over CSX Railroad, it was not possible to connect Tillman Bethel Road to the realigned US 60. The result was a circuitous route that utilized existing US 60 and its bridge over CSX.

Following the DEIS, a flop diamond configuration, shown in Figure 4-1, was developed with Tillman Bethel Road intersecting US 60 opposite of the I-69 ramp terminals. While this provided a more direct connection to Tillman Bethel Road and allowed for the removal of the existing US 60 bridge over CSX, the configuration was undesirable due to potential safety issues.

To address these concerns, a modified version of the conventional full diamond interchange, shown in Figure 4-2, was developed. The northbound off-ramp and on-ramp terminals were pulled closer to the I-69 mainline, providing sufficient space to safely connect Tillman Bethel Road and remove the US 60 bridge over CSX. The modified design also accommodates a 125-foot easement for an overhead electric transmission line that will need to be relocated as part of this project.

### 4.1.2 LANE TRANSITION OPTIONS

The US 60 alignment will tie into an urban 5-lane curb and gutter section on the west end. It is proposed that the 5-lane section will then extend east through the new interchange, over a new bridge over the CSX railroad and tie back into the existing US 60 alignment near Morris Drive. As US 60 is 2 lanes east of the project limits, there is a need to transition the 5-lane urban section to a 2-lane, rural typical section. The current approach will be to begin the transition from 5 lanes to 2 lanes immediately east of the CSX bridge, continue the urban section with sidewalks to Morris Drive, and then fully transition to the 2-lane rural section.

### 4.1.3 TILLMAN-BETHEL OPTIONS

The interchange concept and realignment of US 60 modifies the connection from US 60 to Tillman-Bethel Road on the north side of US 60. It was determined that given the urban 5-lane design of US 60 that urban access control spacing of 100 feet could be used for US 60. This, combined with the tightening of the ramps on the east side of I-69, allowed for a new connection from US 60 to Tillman-Bethel Road to be constructed between the ramps and the bridge over the CSX railroad. The new connection will tie back into existing Tillman-Bethel Road near the Laughary parcel.

## 4.2 PERFORMANCE

Traffic performance at the US 60 Interchange was analyzed based on forecasted traffic volumes and predicted level of service at the two ramp terminal intersections (See Appendix C for 2045 Traffic Volumes and 2045 Turning Movements and Appendix D for 2025 Traffic Volumes and 2025 Turning Movements). Level of service was determined using Highway Capacity Manual procedures and traffic projections derived using the Evansville Metropolitan Planning Organization's travel demand model. Each of the diamond interchange ramp terminal intersections would operate at level of service B or better in both the 2025 Interim Build (only Section 1 completed) and in the 2045 Ultimate Build (with I-69 Section 2 completed).

### 4.2.1 ACCESS

Both options for the new interchange maintain direct access to Tillman-Bethel Road. The standard diamond interchange creates a more desirable connection as the access point meets urban interstate access control standards. The flop diamond interchange configuration would place the Tillman-Bethel access directly across from the ramp terminals on the east side of the interchange. While this is allowable, it is not desirable.

## 4.3 IMPACTS

### 4.3.1 RIGHT-OF-WAY IMPACTS

The right-of-way impacts are similar for both concepts studied. One primary consideration for the interchange was the need to preserve a 125-foot corridor for the relocation of the Big Rivers electric transmission lines. The flop diamond leaves more area in the northeast quadrant to avoid the Hopper farm and preserve the easement. However, this puts a loop ramp in the southeast quadrant and requires more right of way. Additionally, the loop ramp would require access from the ramp for the utility company. This is not desirable by FHWA. The conventional diamond configuration still accommodates the 125-foot corridor without encroaching on the Hopper parcel and does not require direct access for the utility from the interstate or any ramps.

#### 4.4 COST

The flop diamond interchange requires a longer bridge over I-69 to accommodate the acceleration lane from the loop ramp. The conventional diamond has 21,410 square feet of bridge deck while the flop diamond has 22,700 square feet. This results in 1,290 square feet of additional bridge deck for the flop diamond option. These figures include the deck area for the US 60 bridge over CSX. However, this bridge has the same area for both interchange alternates.

#### 4.5 US 60 INTERCHANGE AND US 60 REALIGNMENT RECOMMENDATION

As described in Section 4.1, the goal of this analysis is to identify an interchange configuration and US 60 realignment that avoided impacts to historical properties, a cemetery, and provided a 125-foot corridor for utility relocation.

The conventional diamond interchange can accommodate all of these items and it also provides appropriate connection to Tillman-Bethel Road. Therefore, it is recommended that the **conventional diamond interchange** be carried forward with the US 60 realignment, as shown.

## CHAPTER 5 - I-69 CROSS-COUNTRY GRADING

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Section 1 will construct approximately 4.3 miles of new I-69 cross-country alignment. Portions of the cross-country alignment cut through the Canoe Creek watershed, an area that is known to contribute to flooding in downtown Henderson. To not exacerbate the flooding with the construction of I-69, opportunities were investigated to mitigate the existing flooding and reduce the structure cost associated with spanning the floodway. To address these concerns, a detention basin system was designed and evaluated as a cost-effective approach to flood control and providing embankment for I-69. With detention and embankment both needed for I-69, KYTC established a goal to optimize the detention system to balance the earthwork on Section 1.

There are three major design considerations to effectively manage the earthwork on Section 1:

1. **CROSS-COUNTRY ROADWAY PROFILE:** Refine the I-69 mainline profile to reduce the embankment required and remain sufficiently above the 100 yr. water surface elevation.
2. **NORTHERN TERMINI:** Establish a northern terminus for Section 1 to optimize the earthwork balance between the two construction sections.
3. **DETENTION BASIN:** Develop a detention basin design that would minimize utility impacts, provide a flood management asset to the Henderson Flood Control Board and supply the embankment for the roadway construction.

### 5.1 ROADWAY PROFILE

An alternative profile was developed to reduce the roadway embankment compared to the concept presented in the DEIS. The adjusted profile was refined to reduce the cost and the footprint within the Canoe Creek floodway.

#### 5.1.1 DEIS CONCEPTUAL CROSS-COUNTRY PROFILE

The I-69 cross-country alignment for Section 1 terminates approximately 1.0 mile north of US 60. The DEIS profile was developed to provide a conservative roadway profile well above the 100-year high-water elevation.

#### 5.1.2 ADJUSTED CROSS-COUNTRY PROFILE

The revised profile lowers the roadway to reduce the overall project embankment by 770,000 cubic yards (CY) compared to the DEIS concept. Refer to Table 5.1 for earthwork summary. The adjusted roadway profile requires 1.9 million CY of embankment to terminate approximately 1.0 mile north of US 60 at Sta 4005+00. The goal was to set a minimum roadway median profile 6' above the 100-year storm water surface elevation to prevent water from backing up into the median outfalls.



Table 5-1 – I-69 Cross-country Profile Summary

PROFILE	CRITERIA	I-69	KY 351 I/C	US 41 I/C	US 60	US 60 RAMPS	TILMAN- BETHEL	OVERALL
NEPA	Excavation	116,101	-	20,955	32,561	4,273	-	173,890
	Embankment	1,235,261	-	327,882	854,041	548,650	-	2,965,834*
	Net	(1,119,160)	-	(306,927)	(821,480)	(544,377)	-	(2,791,944)
Revised	Excavation	196,322	55,039	25,293	2,221	3,541	1,727	284,056
	Embankment	808,908	83,649	347,406	655,949	269,153	32,615	2,197,760*
	Net	(612,666)	(28,610)	(322,110)	(653,728)	(265,702)	(30,888)	(1,913,704)

Note: \* Embankment volumes used in equation below.

All values are measured in cubic yards (CY)

Overall reduction of embankment with revised profile:  $2,965,834 - 2,197,760 = 768,074$  CY.

## 5.2 NORTHERN TERMINUS

The workshop considered the earthwork balance between Section 1 and Section 2.

### 5.2.1 SECTION 1 AND SECTION 2 BALANCE

The original northern terminus for Section 1 was Sta 4005+00, approximately 1.0 mile north of existing US 60 and located to the north of the Braxton Subdivision and required 1.9 million CY of roadway embankment. A revised terminus option considered was to extend Section 1 an additional 2,500' north to Sta 4030+00, located just south of the Hatchett Property access road. This extension would require 1.7 million CY of embankment. Extending Section 1 into Section 2 reduced the embankment required by 200,000 CY compared to the shorter original terminus. This reduced the material needed from the detention basin and reduced overall waste from the Section 2 excavation. Section 2 was waste project with the previous NEPA concept but becomes fully balanced with the revised Section 1 terminus. Refer to Figure 5-1 for details.

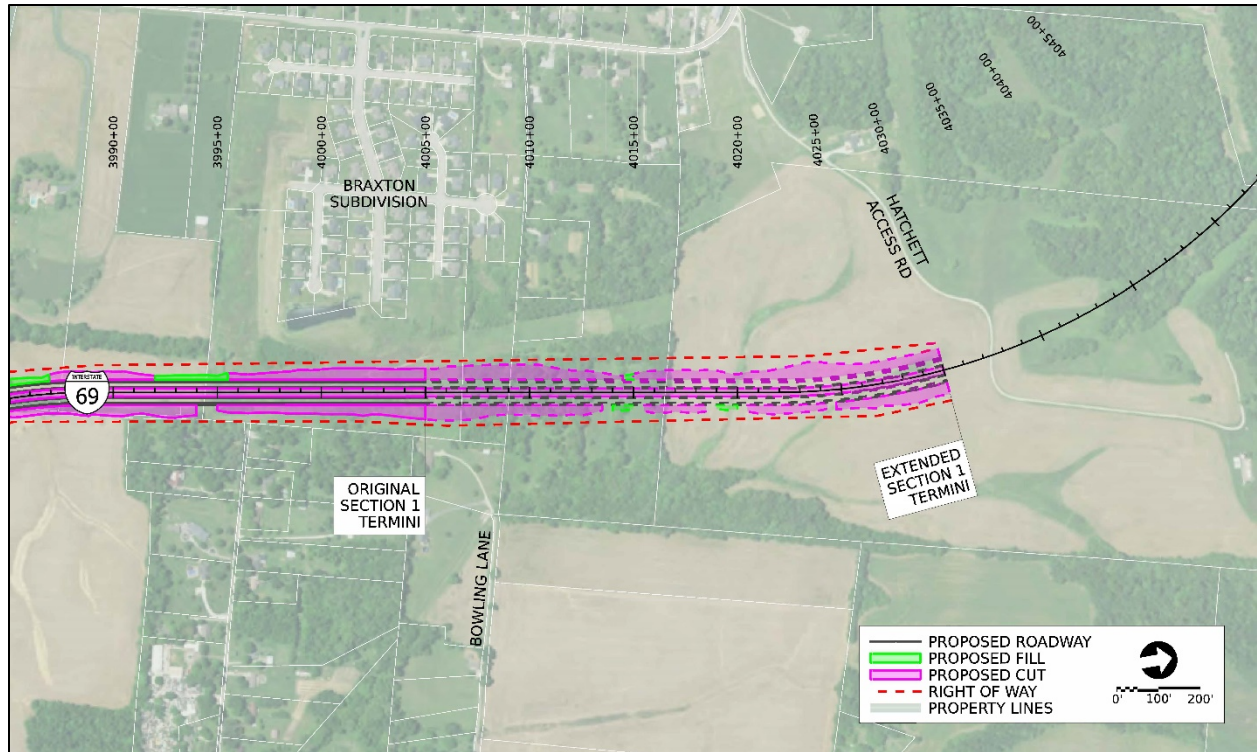


Figure 5-1 – Section 1 Northern Terminus Graphic

Table 5-2 – Section 1 Northern Terminus Summary

OPTIONS	TERMINI	EXCAVATION	EMBANKMENT	NET	COMMENT
Original Northern Terminus	Sta. 4005+00	284,056 CY	2,197,760 CY	1,913,704 CY	Initial Section 1 northern terminus
Extended Northern Terminus	Sta. 4030+00	474,745 CY	2,201,631 CY	1,726,886 CY	Extended 2,500'.
Difference =				186,818 CY	Extending Section 1 into Section 2 reduces the embankment required for Section 1 while independently balancing Section 2.

### 5.3 DETENTION BASIN

As mentioned previously, creating a detention system would benefit the existing flooding issues and the I-69 construction. The optimization of a detention basin design can reduce downstream flooding and provide the balance of the I-69 embankment. Investigations performed during the planning phase resulted in restrictions to the basins that will impact the location and storage volume available as compared to the original assumptions. Planning phase investigations which will impact basin design include:

1. **A HIGH GROUNDWATER TABLE.** Groundwater investigation continues and is discussed further in Section 5.3.1. Coordination with the Kentucky Division of Water and the Henderson Water Utility are ongoing to find a solution.
2. **UTILITIES.** As-builts from the Henderson Water Utility show existing sewer lines that cross through the basin area. Additionally, a proposed gas main is anticipated to be located at the western most (downstream) end of the basin area. The basin footprints for the planning phase were re-worked in order to provide clearance for these utilities. The detention basin was segmented into 3 basins to avoid utility impacts. See Figure 5-2.

Based on the investigations described above, the current design of the basins includes:

- Basin 1 (southern basin): 570,000 CY
- Basin 2 (middle basin): 380,000 CY
- Basin 3 (northern basin): 710,000 CY

Coordination and analysis are ongoing to address uncertainties regarding groundwater. As a result, the design of these basins may change in the future.

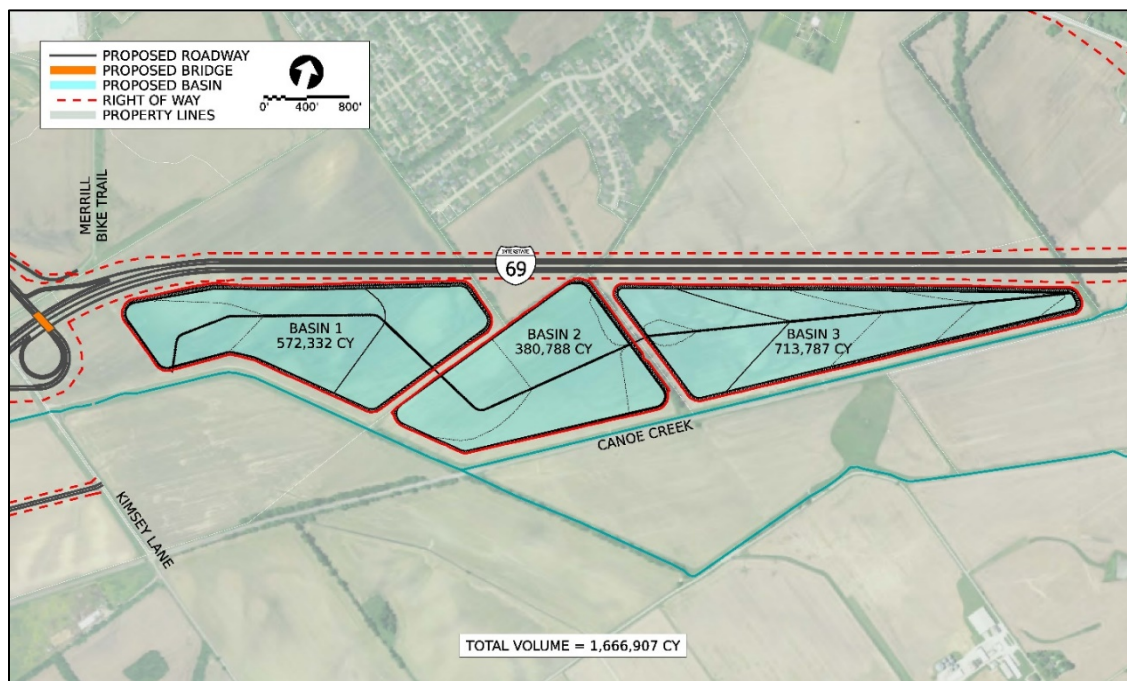


Figure 5-2 – Segmented Basin



### 5.3.1 GROUNDWATER

Ground water elevations appear to vary within the basin locations based on current data. The ground water elevation in the most northern basin area is 5' above the southern basin areas. The ground water seems to be a perched water table, not having consistent elevations. Ground water elevations vary from 374' to 393' above sea level. Based on the ground water readings it is likely the basin could be infiltrated by groundwater. The first step is to investigate if a liner is required and could keep ground water out of the basins. If a liner is required, an assessment of the appropriate material to line the basin will be required. The availability and cost of the liner material would need to be established. Refer to Appendix E - ORX Section 1 Geotechnical Report - Draft for details on groundwater measurements and monitoring locations.

### 5.3.2 LAYOUT AND DEPTH

Due to the ground water elevation concerns, options for basin arrangements and depths will be investigated. Additional potential basin locations have been identified and shown in Figure 5-3. The basin configurations will consider local flooding controls, generating adequate roadway embankment, and the basins' long-term maintenance and function. Basins located north of I-69 would require an equalizer pipe to operate properly for flood management. The depths of the basins could place the basin in a specific category having differing requirements and function based on depth. Preferred basin category options to be considered are listed below in order of desired function:

1. Dry basin.
2. Dry basin with liner.
3. Recreational pond/lake for flood control.
4. Wet basin.

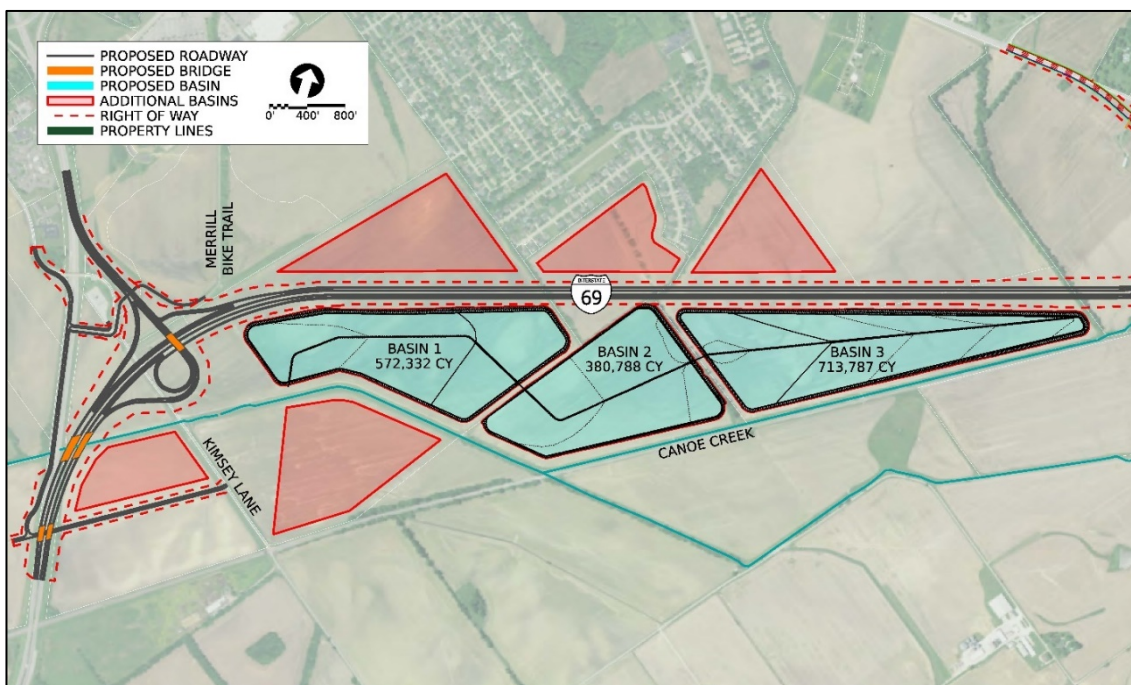


Figure 5-3 – Additional Potential Basin Locations

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## 5.4 I-69 CROSS-COUNTRY GRADING RECOMMENDATIONS

The recommendations for the three earthwork management strategies are summarized below:

1. **CROSS-COUNTRY ROADWAY PROFILE:** Use the revised cross-country roadway profile to reduce embankment by 770,000 CY.
2. **NORTHERN TERMINI:** Extend Section 1 an additional 2,500' to Sta 4030+00 to reduce the Section 1 embankment by 190,000 CY and make Section 2 fully balanced.
3. **DETENTION BASIN:** Develop a dry detention basin configuration within the ground water elevation, utility impact and material constraints.

# CHAPTER 6 - ROUTE NUMBERING

## 6.1 EXISTING MILE POINTS LAYOUT

Figure 6-1 Mile Point Overview Map provides an overview of the current highway system and freeway mile point numbering east of Henderson. Currently, the segment of I-69 from Western Kentucky Parkway to north of Madisonville ends southeast of Henderson at the KY 425 interchange at Mile Point 148. The existing freeway north of that point becomes US 41 near Mile Point 10. Northbound at the current I-69 northern terminus, Exit 148A provides access to US 41 South and KY 425. The freeway continues northbound as US 41 North (Exit 148B) through the Audubon Parkway (Exit 12), KY 2084 (Exit 13), KY 351 (Exit 14), and US 60 (Exit 15A/15B) interchanges before turning northeast toward Evansville. In the southbound direction near the existing I-69 northern terminus, the exit to US 41 and KY 425 is signed as Exits 10 B-A. Appendix E – I-69 ORX Section 1 Route Numbering Maps depict larger scale maps of the figure below and the following figures in this section for more detail.

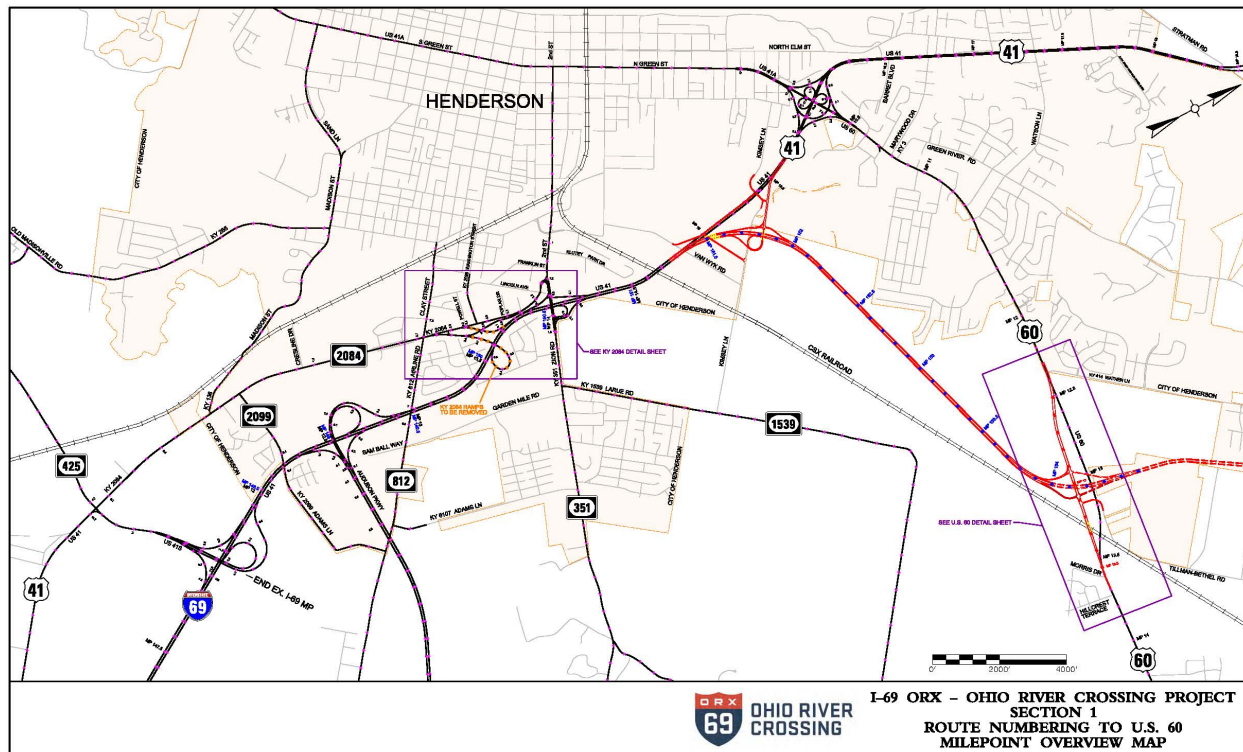


Figure 6-1 – Mile Point Overview Map



## 6.2 EXISTING GUIDE SIGNING

Maps showing the existing guide signing within the proposed I-69 Section 1 corridor were developed based on photographs taken during a site visit in December 2020. Figure 6-2 covers the southern portion of the corridor, including the KY 425 interchange and the Audubon Parkway Interchange. Figure 6-3 shows signing for the northern portion of the US 41 freeway, including the KY 2084 interchange, the KY 351 (Second Street) interchange and the US 60 interchange. The location of the proposed cross-country portion of the freeway and reconstruction of the US 41 interchange is shown in red. A detail sheet showing the area around KY 2084 is provided as Figure 6-4.



Figure 6-2 – Existing Guide Signs Sheet 1 of 3



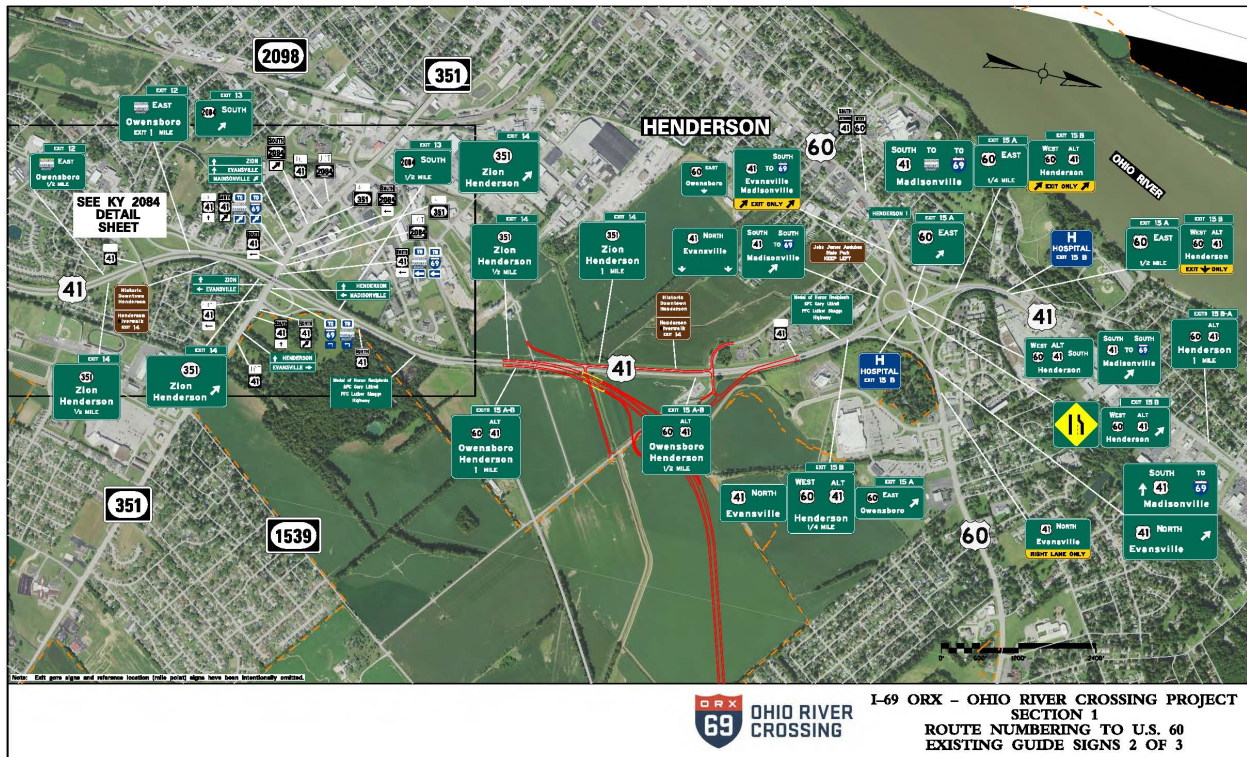


Figure 6-3 – Existing Guide Signs Sheet 2 of 3



Figure 6-4 – Existing Guide Signs Sheet 3 of 3



Exit gore signs and reference location (mile point) signs have been intentionally omitted from the existing guide sign graphics to avoid visual clutter. Existing signing along the crossroads is provided in the vicinity of the I-69 and US 41 freeway. These existing guide sign sheets provide a useful comparison to the proposed guide signing.

### 6.3 PROPOSED GUIDE SIGNING

Guide signing for the proposed condition was developed for the same type of signs shown in the existing signing plans. As with the existing signing plans, exit gore signs and reference location (mile point) signs have been intentionally omitted. The areas of coverage for Proposed Guide Signs (Figures 6-5 to 6-7) mirror the areas covered by the Existing Guide Signs (Figures 6-2 to 6-4). Figure 6-7 shows the signing condition in the area of KY 2084 after removal of the existing ramps to KY 2084. Figure 6-8 is added to show the cross-country freeway segment from the proposed US 41 interchange to the proposed interchange at US 60.

Beginning at the existing northern terminus of I-69 at Mile Point 148 (Figure 6-5), the I-69 route designation and mile points are extended northward concurrent with the existing US 41 freeway alignment. Previous Exits 148 A-B become Exit 148 to US 41 South and KY 425. Previous Exit 12 to Audubon Parkway becomes Exit 149. There are only minor anticipated changes to the exit guide signing on the Audubon Parkway approach. In Figure 6-6, the KY 2084 interchange has been eliminated, and previous Exit 14 to KY 351 becomes Exit 151. The proposed I-69 alignment departs the Existing US 41 alignment near the CSX Railroad crossing, and the mile points begin to follow the proposed cross-country alignment as an extension of the I-69 mile point numbering. A new I-69 temporary northern terminus is established at the new US 41 interchange, and the proposed freeway is extended beyond as KY 90XX. The XX represents a 9000-series Kentucky route number to be determined later. The new interchange at US 41 becomes Exit 152. Along the proposed US 41 west of the freeway, the Existing US 41 mile points are “backed down” from Exits 15 A-B at US 60 such that the exit number viewed by southbound US 41 motorists to northbound KY 90XX becomes Exit 14. Southbound US 41 continues along the proposed east to south outer ramp to merge with and become concurrent with the I-69 southbound route.

Figure 6-7 shows the guide signing after the KY 2084 ramps have been removed.

Figure 6-8 shows the new cross-country portion of the proposed freeway. Extension of the I-69 mile-point system ahead along the KY 90XX freeway causes the US 60 interchange to become Exit 154. KY 90XX in this area will become a future section of I-69 once the Ohio River bridge is completed and the I-69 route is opened to I-69 in Evansville.



Figure 6-5 – Proposed Guide Signs Sheet 1 of 4



Figure 6-6 – Proposed Guide Signs Sheet 2 of 4





Figure 6-7 – Proposed Guide Signs Sheet 3 of 4

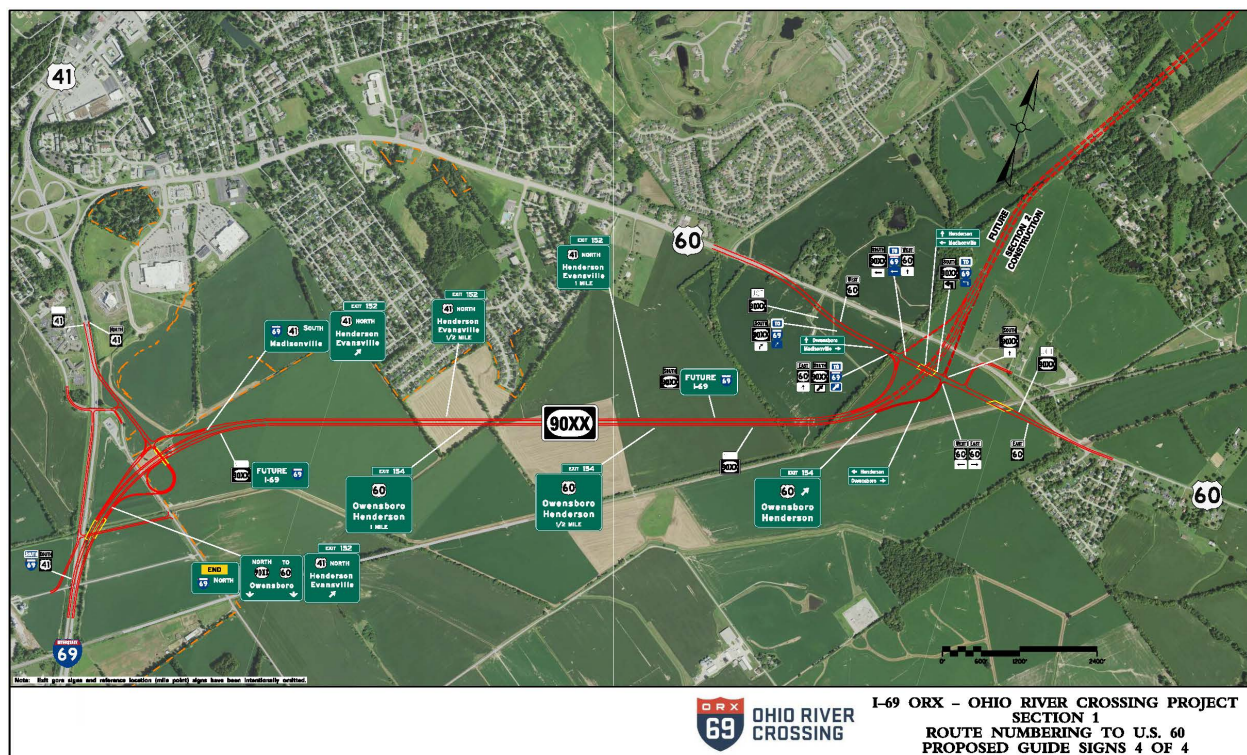


Figure 6-8 – Proposed Guide Signs Sheet 4 of 4



## 6.4 RE-ADDRESSING CONCERNS

### 6.4.1 KY 2084 CORRIDOR

I-69 Section 1 roadways were reviewed for properties that might need re-addressing after I-69 Section 1 construction is completed for emergency services response, etc. Figure 6-9 is a detail sheet for the KY 2084 area. The colorized parcels on Figure 6-9 are Property Valuation Administrator (PVA) parcels. The black numerals are the current property addresses shown in the PVA database. All of the existing addresses are Highway 2084 North or Highway 2084 South addresses, so no re-addressing is needed along KY 2084, assuming that KY 2084 is made two-directional after the KY 2084 freeway ramps are removed.

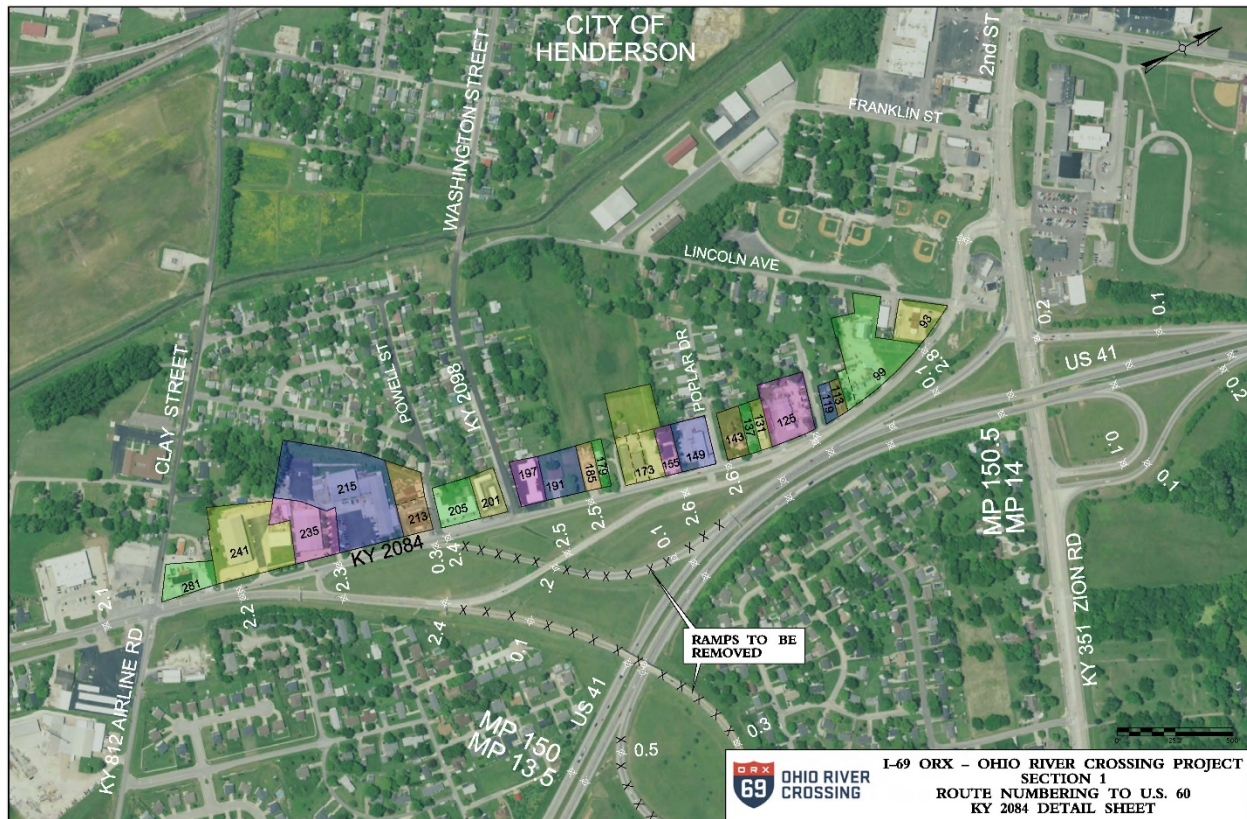


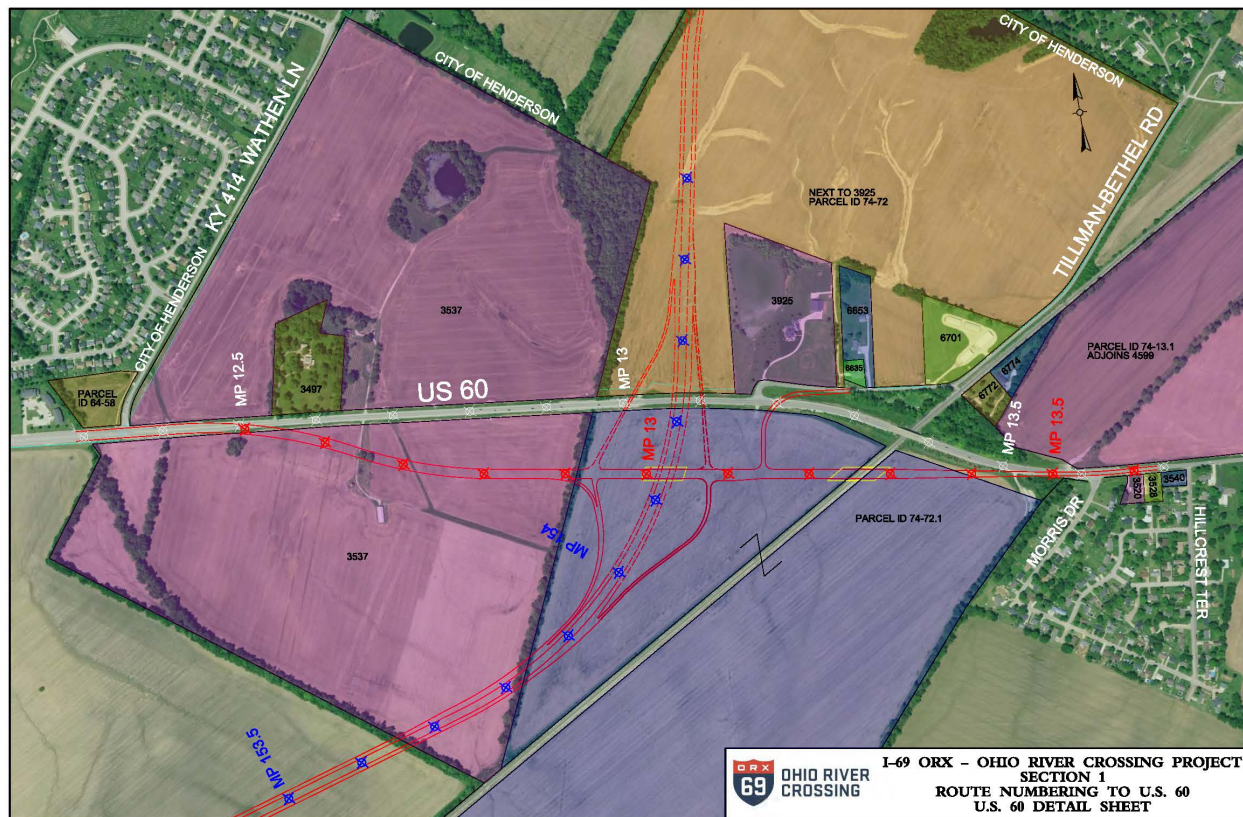
Figure 6-9 – KY 2084 Address Detail Sheet

### 6.4.2 US 60 CORRIDOR

In the proposed construction, US 60 is relocated south of Existing US 60 from east of Wathen Lane, across the proposed I-69 freeway alignment and CSX Railroad to near Morris Drive. A similar assessment of property addresses was conducted for properties along US 60 and Tillman-Bethel Road. Figure 6-10 shows the various US 60 area PVA properties in color and PVA addresses or PVA parcel numbers in black numerals. Review of the properties along US 60 revealed only one US 60 address at 3925 (Hopper property owner) that may need re-addressing post-construction due to becoming removed from the proposed US 60 frontage. A Tillman-Bethel Road address would be recommended as the nearest roadway address post-construction.



A similar review was conducted for the properties along Tillman-Bethel Road. All of the 6000-series addresses shown are currently Tillman-Bethel Road addresses that would not require re-addressing.



**Figure 6-10 – US 60 Address Detail Sheet**

## 6.5 TRANSFER OF ROADWAY MAINTENANCE RESPONSIBILITY

The proposed I-69 Section 1 construction causes some existing roadways or segments of existing roadways to cease serving their original function. Those highway segments are not needed as part of the state roadway system, and maintenance jurisdiction would need to be transferred to either the City of Henderson or Henderson County, depending upon the roadway location. Such roadway segments include parts of Kimsey Lane, Van Wyk Road and Old US 60. Additional roadway segments may be identified as the proposed design develops.

## CHAPTER 7 - SUMMARY

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The purpose of this analysis was to qualitatively and quantitatively evaluate the design options developed and presented in the workshops. Based on evaluations, the following options will be carried forward:

**KY 351/I-69 INTERCHANGE:** the following interchange option will be discussed and presented at the Preliminary Line and Grade inspection:

- Option 3 Tight Diamond Triple Roundabout

**US 41/I-69 INTERCHANGE:** the following interchange option will be refined and presented at the Preliminary Line and Grade inspection:

- Option 1 Trumpet with future diamond retrofit

**US 60/I-69 INTERCHANGE:** Conventional Diamond will move forward to Preliminary Line and Grade Inspection.

**I-69 CROSS-COUNTRY GRADING:** the earthwork design elements will move forward and be presented at the Preliminary Line and Grade inspection:

- Revised Roadway Profile
- Extended Section 1 to Sta 4030+00
- Dry Detention Basin sized to control flooding and provide roadway embankment to balance Section 1.

**ROUTE NUMBERING:** the mile point layouts, guide signing, and re-addressing issues will be finalized at the Preliminary Line and Grade Inspection.

# APPENDIX A

## Workshop Meeting Minutes

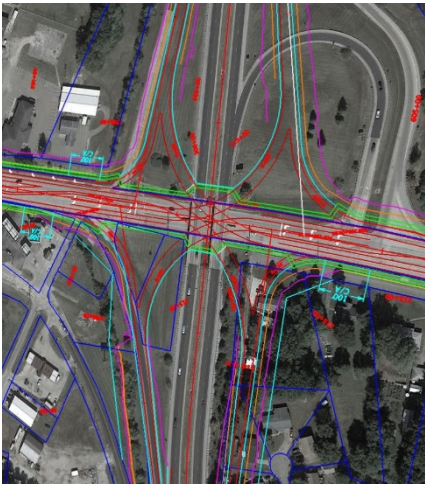
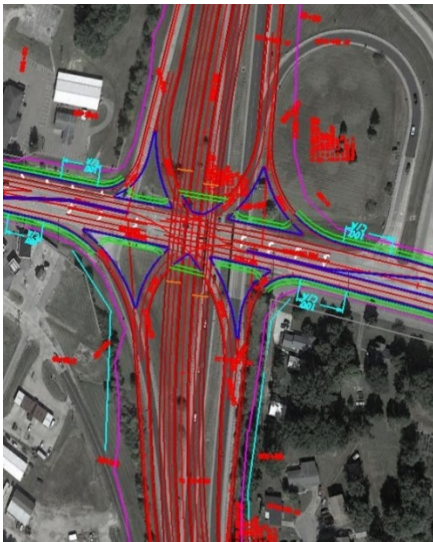
## MEETING SUMMARY – FINAL

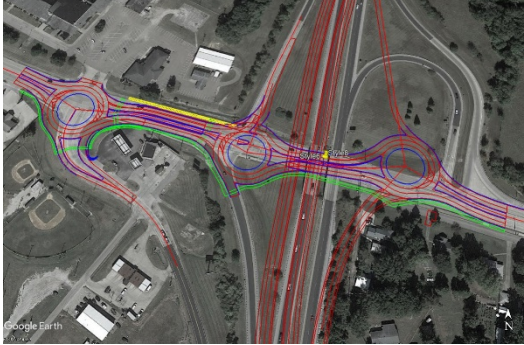
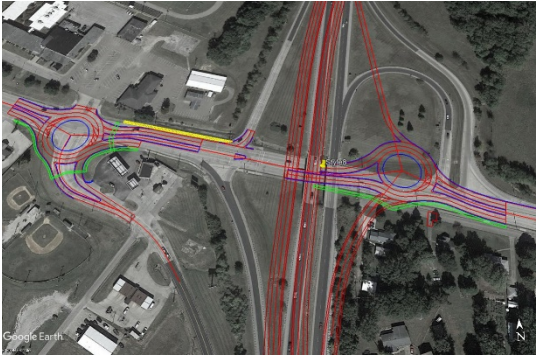
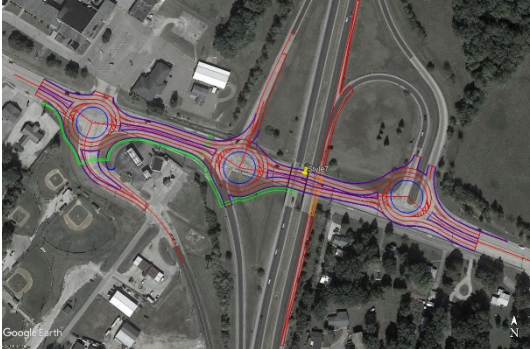
**Date:** December 21, 2020  
**Time:** 9:00 – 11:35 AM ET  
**Meeting:** I-69 ORX Weekly Roadway/Utility Task Force #6 – Options Review  
**Location:** Via Teams

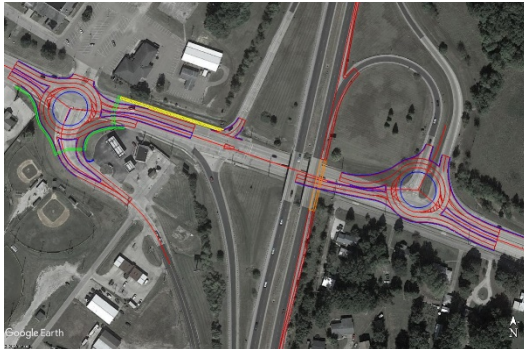
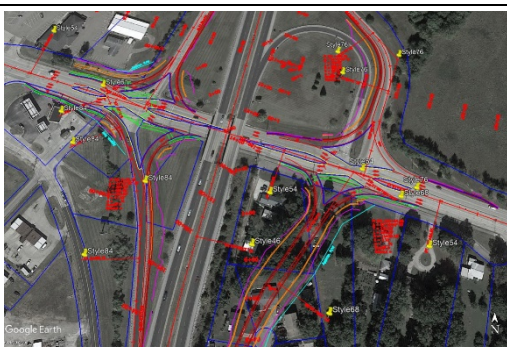
### Attendees:

NAME	ORGANIZATION	EMAIL	PHONE	ATTENDED
Marshall Carrier	KYTC PM	<a href="mailto:Marshall.Carrier@ky.gov">Marshall.Carrier@ky.gov</a>		X
Gary Valentine	KYTC Advisor	<a href="mailto:gvalentine@ky.gov">gvalentine@ky.gov</a>		X
Deneatra Henderson	KYTC D-2 CDE	<a href="mailto:Deneatra.Henderson@ky.gov">Deneatra.Henderson@ky.gov</a>		X
Larry Krueger	KYTC D-2 Design	<a href="mailto:Larry.Krueger@ky.gov">Larry.Krueger@ky.gov</a>		X
Jason Ward	KYTC D-2 Const.	<a href="mailto:Jason.Ward@ky.gov">Jason.Ward@ky.gov</a>		X
Steve Nicaise	Parsons	<a href="mailto:Steven.Nicaise@parsons.com">Steven.Nicaise@parsons.com</a>		X
Chuck Allen	Parsons	<a href="mailto:Chuck.Allen@parsons.com">Chuck.Allen@parsons.com</a>		X
Dan Prevost	Parsons	<a href="mailto:Daniel.Prevost@parsons.com">Daniel.Prevost@parsons.com</a>		X
Kyle Chism	Parsons	<a href="mailto:Kyle.Chism@parsons.com">Kyle.Chism@parsons.com</a>		X
Derek Barnes	Parsons	<a href="mailto:Derek.Barnes@parsons.com">Derek.Barnes@parsons.com</a>		X
Kenny Franklin	Parsons	<a href="mailto:Kenny.Franklin@parsons.com">Kenny.Franklin@parsons.com</a>		X
Corinna Goodwin	Parsons	<a href="mailto:Corinna.Goodwin@parsons.com">Corinna.Goodwin@parsons.com</a>		X
Ben Quinn, Jr.	AEI	<a href="mailto:Benq@aei.cc">Benq@aei.cc</a>		X
Kevin McClearn	AEI	<a href="mailto:KMccLearn@aei.cc">KMccLearn@aei.cc</a>		X
Jerry Leslie	AEI	<a href="mailto:JLeslie@aei.cc">JLeslie@aei.cc</a>		X
Paul Looney	EAP	<a href="mailto:PLooney@eapartners.com">PLooney@eapartners.com</a>		X
Clive Weller	EAP	<a href="mailto:CWeller@eapartners.com">CWeller@eapartners.com</a>		X
Ray Robison, Jr.	B&N	<a href="mailto:Ray.Robison@burgessniple.com">Ray.Robison@burgessniple.com</a>		X
Randy Kill	B&N	<a href="mailto:Randy.Kill@burgessniple.com">Randy.Kill@burgessniple.com</a>		X
Kevin McKeel	B&N	<a href="mailto:Kevin.McKeel@burgessniple.com">Kevin.McKeel@burgessniple.com</a>		X
Mike Robison	B&N	<a href="mailto:Michael.Robison@burgessniple.com">Michael.Robison@burgessniple.com</a>		X
Mark Askin	Strand	<a href="mailto:Mark.Askin@strand.com">Mark.Askin@strand.com</a>		X
Alex Daugherty	VS	<a href="mailto:ADaugherty@vsengineering.com">ADaugherty@vsengineering.com</a>		X
Amy Williams	TSW	<a href="mailto:AWilliams@tswdesigngroup.com">AWilliams@tswdesigngroup.com</a>		
Katie Clark	TSW	<a href="mailto:KClark@tswdesigngroup.com">KClark@tswdesigngroup.com</a>		X
Maria Wainscott	TSW	<a href="mailto:MWainscott@tswdesigngroup.com">MWainscott@tswdesigngroup.com</a>		

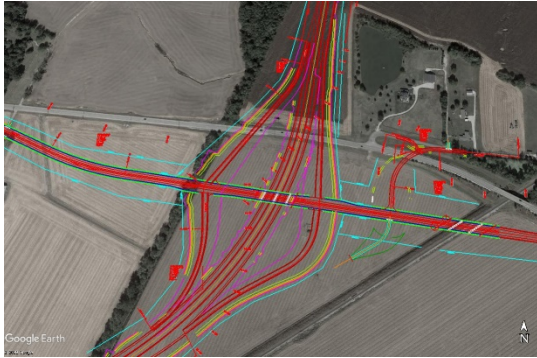
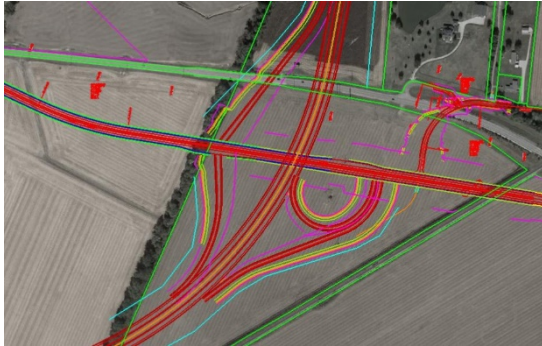


ITEM	TOPIC/DISCUSSION	ACTION ITEM/RESPONSIBILITY
<b>KY 351 Interchange Options Presentation</b>		
1.	<p>Standard SPUI.</p> <ul style="list-style-type: none"> <li>a. Keeps existing I-69 mainline alignment.</li> <li>b. 11-12 homes relocated (SE quadrant).</li> <li>c. New Bridge.</li> <li>d. Shared-use path on both sides.</li> <li>e. Removes loop ramp.</li> <li>f. Right-in/Right-out for Palmer Gas station.</li> <li>g. Continuous Right turn from SB off ramp for school.</li> </ul>	 <p>Move Forward.</p>
2.	<p>Shifted SPUI.</p> <ul style="list-style-type: none"> <li>a. Least impact to homes SE quadrant (no relocations).</li> <li>b. New Bridge.</li> <li>c. May require retaining wall to separate SB I-69 entrance ramp and KY 2084.</li> <li>d. Removes loop ramp.</li> <li>e. Could be place roundabout at KY 2084/KY 351 intersection? <ul style="list-style-type: none"> <li>i. Palmer's Gas Station may lose Rt in/Rt out option on KY 351.</li> <li>ii. 95% queues did not impact KY 2084. Roundabout should work.</li> <li>iii. Palmer's assumes there will be a Rt in/Rt out onto KY 351.</li> </ul> </li> </ul>	 <p>Move Forward.</p> <p>AEI (Jerry): consider roundabout at KY 2084/KY 351 intersection (maybe standalone with SPUI).</p>
3.	<p>Compressed Diamond - Double Roundabout</p> <ul style="list-style-type: none"> <li>a. KY 2084/KY 351 intersection is traditional stop condition – signalized.</li> <li>b. Shifts I-69 mainline to west.</li> <li>c. Removes loop ramp.</li> <li>d. May require relocation(s) in SE quadrant.</li> <li>e. Henderson has been pro-roundabout.</li> </ul>	<p>Move Forward.</p>

ITEM	TOPIC/DISCUSSION	ACTION ITEM/RESPONSIBILITY
4.	<p>Compressed Diamond - Triple Roundabout.</p> <ul style="list-style-type: none"> <li>a. Provides roundabout for KY 2084/KY 351 intersection.</li> <li>b. Shifts I-69 mainline to west.</li> <li>c. Removes loop ramp.</li> <li>d. May require relocation(s) in SE quadrant.</li> <li>e. With concerns with having signals placed closely together along this section of KY 351. The roundabouts offer an alternative for moving traffic through these conflict points.</li> </ul> 	Move Forward.
5.	<p>Compressed Diamond - Double Roundabout (with Median Barrier).</p> <ul style="list-style-type: none"> <li>a. Provides roundabout at KY 2084/KY 351 intersection.</li> <li>b. The western ramp terminals will use the KY 2084/KY 351 roundabout for displaced traffic movements.</li> </ul> 	Move Forward.
6.	<p>Parclo Double Roundabout.</p> <ul style="list-style-type: none"> <li>a. KY 2084/KY 351 intersection is traditional stop condition – signalized.</li> <li>b. Use existing SB and NB I-69 mainline alignments.</li> <li>c. Use existing loop ramp.</li> <li>d. May require relocation(s) in SE quadrant.</li> <li>e. Henderson has been pro-roundabout.</li> </ul>	Move Forward.
7.	<p>Parclo Triple Roundabout.</p> <ul style="list-style-type: none"> <li>a. Use existing SB for NB I-69 mainline alignments.</li> <li>b. Use existing loop ramp. Leaving the loop is not a deal breaker. However, locals would like to see the loop gone.</li> <li>c. Loop has 25 MPH design.</li> </ul> 	<p>Move Forward.</p> <p>KYTC (Deneatra): contact school officials about pedestrian traffic.</p> <p>AEI (Jerry): loop ramp safety history and evaluation.</p>

ITEM	TOPIC/DISCUSSION	ACTION ITEM/RESPONSIBILITY
	<ul style="list-style-type: none"> <li>d. Places roundabout at KY 2084/KY 351 intersection.</li> <li>e. No R/W impact in SE quad.</li> <li>f. Concerns with pedestrian traffic in school zone near KY 2084/KY 351 intersection. <ul style="list-style-type: none"> <li>i. It has been cited that roundabouts provide pedestrian refugee area having pedestrian only cross one direction of traffic at a time.</li> <li>ii. However, signalized intersections provide protected crossing.</li> </ul> </li> </ul>	
8.	<p>Parclo Double Roundabout (with Median Barrier).</p> <ul style="list-style-type: none"> <li>a. Uses existing loop ramp to eliminate R/W impacts in SE quad.</li> <li>b. Provides roundabout at KY 2084/KY 351 intersection.</li> <li>c. The western ramp terminals will use the KY 2084/KY 351 roundabout for displaced traffic movements.</li> </ul> 	Move Forward.
9.	<p>KY 2084 Roundabout Option. (KY 2084 enters western ramp terminals)</p> <ul style="list-style-type: none"> <li>a. This option ties KY 2084 into the west ramp terminal roundabout.</li> <li>b. KYTC good to abandon this option.</li> </ul>	Eliminate from further development.
10.	<p>DCD.</p> <ul style="list-style-type: none"> <li>a. Retains existing bridges.</li> <li>b. Significant impacts to homes in SE quadrant (13 parcels, 8 relocations).</li> <li>c. Removes loop ramp.</li> <li>d. Shared use path on south side only.</li> <li>e. Less construction cost, but more RW costs.</li> <li>f. Traffic analysis assumed signal at KY 2048, roundabout at KY 2084 was not analyzed and may not operate well with roundabout at KY 2084/KY 351.</li> <li>g. KYTC good to abandon this option.</li> </ul> 	Eliminate from further development.
<b>US 60 Interchange and Alignment Presentation</b>		
1.	<p>US 60 Realignment.</p> <ul style="list-style-type: none"> <li>a. Avoids 25' buffer surrounding cemetery.</li> <li>b. Show temporary easements for culvert and entrance construction on historic farm property.</li> <li>c. <b>Lane Transitions</b> between CSX crossing and Morris Drive.</li> </ul>	Recommendation is to carry urban typical to Morris Drive.



ITEM	TOPIC/DISCUSSION	ACTION ITEM/RESPONSIBILITY
	<ul style="list-style-type: none"> <li>i. Option 1 – 5-lane urban to 2-lane rural.</li> <li>ii. Option 2 – 5-lane urban to 3-lane urban (to Morris Drive) to 2-lane rural.</li> <li>iii. Investigate providing right lane drop into to Morris Drive rather than TWLTL.</li> <li>d. <b>Tillman-Bethel approaches.</b> <ul style="list-style-type: none"> <li>i. Option 1 – Simplest and requires least construction and R/W.</li> <li>ii. Option 2 – More complex and requires more R/W and reconstruction of roadway.</li> </ul> </li> </ul>	
2.	<p>Conventional Diamond.</p> <ul style="list-style-type: none"> <li>a. Compressed western ramps to allow for the Big Rivers easement.</li> <li>b. Provides over 100' control access spacing for Tillman-Bethel entrance.</li> <li>c. Bridge barrier considerations that separate lane and sidewalk for improved sight distance at interchange terminals. <ul style="list-style-type: none"> <li>i. Typical carries sidewalks across the I-69 and CSX bridges.</li> <li>ii. 45 mph along realigned US 60.</li> </ul> </li> <li>iii. Explore options to eliminate or reduce height of barrier wall between sidewalk and lane on the bridges.</li> </ul> 	B&N (Ray): investigate barrier wall options between the sidewalk and lanes on the bridges.
3.	<p>Flop Diamond.</p> <ul style="list-style-type: none"> <li>a. More impacts to SE quad with less remnant.</li> <li>b. Transmission tower may be relocated within SE quad.</li> <li>c. Requires larger bridge to accommodate the loop ramp underneath.</li> <li>d. Recommendation is to eliminate this option.</li> </ul> 	Eliminate from further development.
<b>US 41 Interchange and Alignment Presentation</b>		
1.	<p>DEIS Diamond.</p> <ul style="list-style-type: none"> <li>a. Conventional service interchange.</li> <li>b. May not operate well for the Section 1 interim condition when all traffic must flow through the interchange.</li> <li>c. Takes Kimsey through interchange. <ul style="list-style-type: none"> <li>i. New bridge needed for Kimsey.</li> </ul> </li> <li>d. Jason Ward brought up a dogbone option at this location (for diamond configuration).</li> </ul>	Move forward.



ITEM	TOPIC/DISCUSSION	ACTION ITEM/RESPONSIBILITY
2.	<p>Trumpet.</p> <ul style="list-style-type: none"> <li>a. I-69 NB Exit Ramp. NB to WB. (need to know peak hour traffic volumes) <ul style="list-style-type: none"> <li>i. Option 1 – Single Lane Parallel ramp that widens to 2-lanes on ramp proper. <ul style="list-style-type: none"> <li>1. 300-foot opening taper with 800 feet to first curve on ramp.</li> <li>2. 30 mph curve.</li> <li>3. Requires inside shoulder widening for sight distance.</li> </ul> </li> <li>i. Option 2 – 2-lane ramp. <ul style="list-style-type: none"> <li>1. Extends ramp and tapers to CSX Bridge, 2,300' from gore.</li> <li>2. 3-2-2 split.</li> <li>3. Requires NB I-69 bridge over Van Wyk to be widened.</li> </ul> </li> </ul> </li> <li>b. I-69 SB Entrance Ramp. EB to SB. <ul style="list-style-type: none"> <li>i. On ramp 45 mph curve.</li> <li>ii. 2-lanes drop to 1 lane on ramp before merging with I-69 SB.</li> </ul> </li> <li>c. I-69 NB Entrance Loop Ramp. EB to NB. <ul style="list-style-type: none"> <li>i. Loop Ramp with 25mph curve.</li> <li>ii. Requires large bridge to accommodate loop ramp underneath.</li> </ul> </li> <li>d. I-69 SB Exit Ramp. SB to WB. <ul style="list-style-type: none"> <li>i. Options for stop condition versus continuous left turn at ramp terminal.</li> </ul> </li> <li>e. Kimsey Connection. <ul style="list-style-type: none"> <li>i. Does not tie to US 41.</li> <li>ii. Uses existing SB US 41 and Van Wyk to reroute Kimsey Lane.</li> </ul> </li> </ul>	<p>Move Forward.</p> <p>Parsons: determine peak hour volumes for major traffic movements.</p>
<b>Detention Basin</b>		
1.	<p>Segmented Basin Option.</p> <ul style="list-style-type: none"> <li>a. 600,000 cubic yard material with revised design. <ul style="list-style-type: none"> <li>i. Doesn't include channel.</li> </ul> </li> <li>b. 6:1 side-slopes.</li> <li>c. Revised design as large in area as from NEPA design, but not as deep. <ul style="list-style-type: none"> <li>i. Ground water is anticipated to be 3' to 5' range from top of surface.</li> <li>ii. The revised design is below grade at 3' to 4' depth.</li> </ul> </li> <li>d. Segmented around existing sewer.</li> <li>e. Need to coordinate with D2 MS4 Coordinator. Pam Broadston (DEC)? <ul style="list-style-type: none"> <li>i. Larry Kreuger to provide MS4 contact.</li> </ul> </li> <li>f. Consider no constructing far west small detention basin due to relatively small volume and proximity to US 41 ramp embankments. May require</li> </ul>	<p>AEI (Ben): to provide ground water elevation.</p> <p>KYTC (Larry): to provide MS4 contact.</p>

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
	deepening the remaining segmented basin. With ground water discussion it may not be wise to eliminate until more geotech info is available.	
<b>Comparison Matrix</b>		
1.	<p>Development of Comparison Matrix to evaluate Interchange Options.</p> <ul style="list-style-type: none"> <li>a. The matrix has been separated into the following categories for evaluation: Geometry, Performance, Impacts, Features/Cost.</li> <li>b. KY 351 <ul style="list-style-type: none"> <li>i. Pedestrian movements need to be considered and quantified (particularly for near school and within the school zone).</li> <li>ii. Include all RUC costs for options.</li> <li>iii. Evaluate options relative to each other.</li> <li>iv. Construction cost estimate should consider simple bridge, pavement, earthwork, and MOT with high contingency.</li> <li>v. For options that don't require reconstruction of bridges, we'd like to understand costs of those options with and without replacement of the bridges.</li> </ul> </li> <li>c. US 41/I-69 <ul style="list-style-type: none"> <li>i. Similar metrics to be used for all. Each interchange has its specific issues to be evaluated and compared.</li> </ul> </li> </ul>	AEI (Ben): add pedestrian movement/conflicts category to matrix due to school zone at KY 351.
<b>Roadway Scope Items</b>		
1.	<p>KY 351 Streetscape.</p> <ul style="list-style-type: none"> <li>a. The meeting minutes from the December 10<sup>th</sup> Henderson meeting has been sent to attendees.</li> <li>b. The streetscape will depend on the KY 351 options selected to move forward. Not much can be done until we narrow the options.</li> </ul>	
2.	<p>US 41 Inventory.</p> <ul style="list-style-type: none"> <li>a. Most of the field work completed.</li> <li>b. KY 425 to Audubon need for auxiliary ramp? <ul style="list-style-type: none"> <li>i. Potential operational issue (anecdotal).</li> </ul> </li> <li>c. Will replace all guardrail. <ul style="list-style-type: none"> <li>i. Is this necessary to become crash compliant? We've been able to defer other sections of I-69 and I-165 until such time a 3R project was in area. Since this is only 3 miles, KYTC is fine with this as long as it is necessary to meet current crash criteria.</li> </ul> </li> <li>d. Bridge vertical clearance issues by inches. <ul style="list-style-type: none"> <li>i. Potentially mill to get clearance?</li> </ul> </li> </ul>	
3.	<p>Route Numbering.</p> <ul style="list-style-type: none"> <li>a. Working on existing signing plan (50%)</li> </ul>	

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
	<ul style="list-style-type: none"> <li>b. Started on new signing plan. <ul style="list-style-type: none"> <li>i. With the new signing plan, we'll need to understand how the "restaurant, hotel, gas station" signage can be incorporated for the US 41 interchange. This is a hot button issue for those establishments on the US41 corridor.</li> </ul> </li> </ul>	
4.	<p>Bike Trail.</p> <ul style="list-style-type: none"> <li>a. Still under development.</li> <li>b. Will be available for workshop in January.</li> </ul>	
5.	<p>Survey.</p> <ul style="list-style-type: none"> <li>a. CSX right-of-entry. <ul style="list-style-type: none"> <li>i. VS has documents and will try to finalize this week for submission.</li> </ul> </li> </ul>	
<b>Other Items</b>		
1.	<p>Marshall Carrier is leaving the KYTC PM role due to accept another opportunity.</p> <ul style="list-style-type: none"> <li>a. Gary Valentine will be point of contact for project until the KYTC PM role is assigned.</li> </ul>	
2.	<p>Geotech Items.</p> <ul style="list-style-type: none"> <li>a. Ground Water Elevations. <ul style="list-style-type: none"> <li>i. 2 piezometers in place now.</li> <li>ii. Currently 3-5 feet range.</li> <li>iii. Significant dewatering will be needed for excavation below 5 feet.</li> </ul> </li> <li>b. Soil Stabilization is underway. Should be completed after Christmas break.</li> </ul>	
3.	<p>Northern Termini.</p> <ul style="list-style-type: none"> <li>a. Need to investigate how to temporarily terminate at US 60 in an effective way for Section 2 to begin in future phases.</li> </ul>	
4.	<p>Summary of discussions.</p> <ul style="list-style-type: none"> <li>a. KY 351 Interchange. <ul style="list-style-type: none"> <li>i. Investigate Shifted SPUI, Compressed Diamond Roundabouts and Parclo Roundabouts.</li> </ul> </li> <li>b. US 60 Realignment. <ul style="list-style-type: none"> <li>i. Investigate Options for lane transitions between CSX and Morris Drive.</li> <li>ii. Move Option 1 forward for Tillman-Bethel approach.</li> </ul> </li> <li>c. US 41 Interchange. <ul style="list-style-type: none"> <li>i. Investigate Trumpet Option but take Conventional Diamond forward in event the project can be let with Section 2 being advanced.</li> </ul> </li> </ul>	

**ACTION ITEMS**

<b>ACTION ITEM</b>	<b>RESPONSIBILITY</b>	<b>DUE</b>	<b>STATUS</b>
<b>Wish Marshall best on new opportunity!</b>	Project Team	12-23-2020	In process
<b>KY 351 Interchange – investigate placing roundabout at KY 2084/KY 351 Interchange with Shifted SPUI option.</b>	Jerry Leslie	12-28-2020	In process
<b>Provide crash history/analysis on existing KY 351 Interchange loop ramp.</b>	Jerry Leslie	12-28-2020	In process
<b>Follow up with Middle School principal/superintendent on KY 351 pedestrian activity and needs within the school zone.</b>	Deneatra Henderson	1-4-2021	In process
<b>Investigate bridge barrier wall options between the sidewalk and lanes on I-69 and CSX crossing to improve sight distance at ramp terminals.</b>	Ray Robison	12-28-2020	In process
<b>Determine peak hour volumes for major traffic movements at US 41/I-69 interchange.</b>	Parsons	12-28-2020	In process
<b>Provide MS 4 contract.</b>	Larry Krueger	12-23-2020	In process
<b>Add pedestrian traffic/conflict category to KY 351 comparison matrix.</b>	Ben Quinn Jr.	12-28-2020	In process

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## MEETING SUMMARY – FINAL

**Date:** January 5, 2021  
**Time:** 9:00 – 10:30 AM ET  
**Meeting:** I-69 ORX KY 351 Workshop  
**Location:** Via Teams

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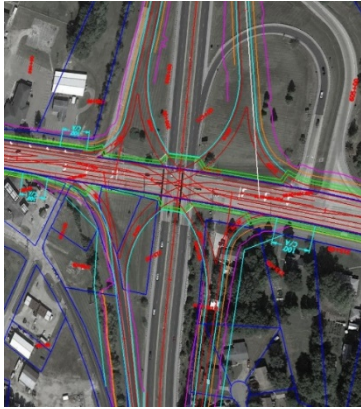
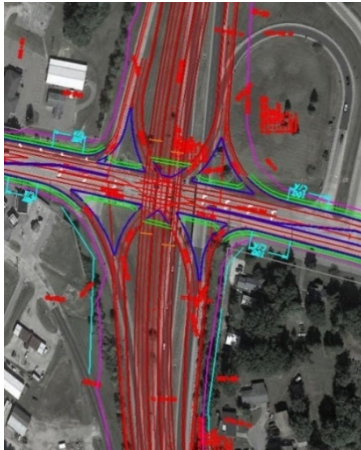
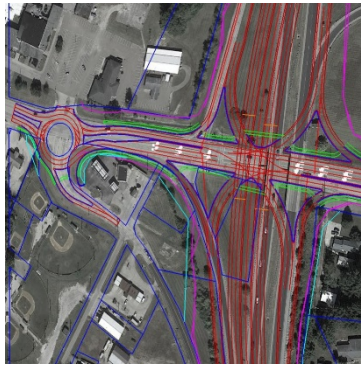
### Attendees:

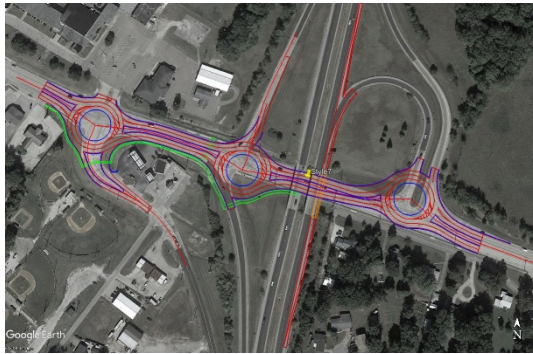
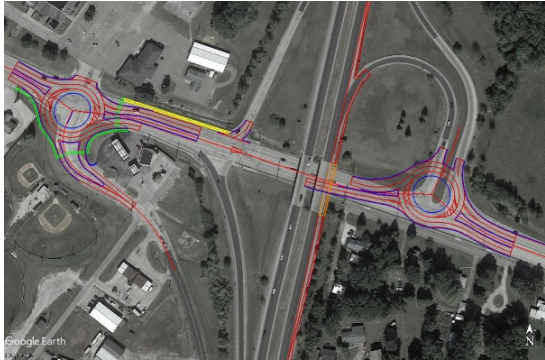
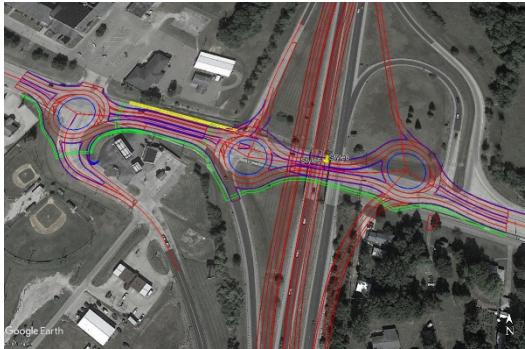
NAME	ORGANIZATION	EMAIL	PHONE	ATTENDED
Gary Valentine	KYTC Advisor	<a href="mailto:gvalentine@ky.gov">gvalentine@ky.gov</a>		X
Deneatra Henderson	KYTC D-2 CDE	<a href="mailto:Deneatra.Henderson@ky.gov">Deneatra.Henderson@ky.gov</a>		X
Larry Krueger	KYTC D-2 Design	<a href="mailto:Larry.Krueger@ky.gov">Larry.Krueger@ky.gov</a>		X
Jason Ward	KYTC D-2 Const.	<a href="mailto:Jason.Ward@ky.gov">Jason.Ward@ky.gov</a>		X
Renee Boucherie	KYTC D-2	<a href="mailto:Renee.Boucherie@ky.gov">Renee.Boucherie@ky.gov</a>		X
Michael Loyselle	FHWA	<a href="mailto:Michael.Loyselle@ky.gov">Michael.Loyselle@ky.gov</a>		X
Steve Nicaise	Parsons	<a href="mailto:Steven.Nicaise@parsons.com">Steven.Nicaise@parsons.com</a>		X
Chuck Allen	Parsons	<a href="mailto:Chuck.Allen@parsons.com">Chuck.Allen@parsons.com</a>		X
Dan Prevost	Parsons	<a href="mailto:Daniel.Prevost@parsons.com">Daniel.Prevost@parsons.com</a>		X
Kyle Chism	Parsons	<a href="mailto:Kyle.Chism@parsons.com">Kyle.Chism@parsons.com</a>		X
Kenny Franklin	Parsons	<a href="mailto:Kenny.Franklin@parsons.com">Kenny.Franklin@parsons.com</a>		X
Ben Quinn, Jr.	AEI	<a href="mailto:Benq@aei.cc">Benq@aei.cc</a>		X
Kevin McClearn	AEI	<a href="mailto:KMcClearn@aei.cc">KMcClearn@aei.cc</a>		X
Jerry Leslie	AEI	<a href="mailto:JLeslie@aei.cc">JLeslie@aei.cc</a>		X
Paul Looney	EAP	<a href="mailto:PLooney@eapartners.com">PLooney@eapartners.com</a>		X
Ray Robison, Jr.	B&N	<a href="mailto:Ray.Robison@burgessniple.com">Ray.Robison@burgessniple.com</a>		X
Mark Askin	Strand	<a href="mailto:Mark.Askin@strand.com">Mark.Askin@strand.com</a>		X
Amy Williams	TSW	<a href="mailto:AWilliams@tswdesigngroup.com">AWilliams@tswdesigngroup.com</a>		X
Katie Clark	TSW	<a href="mailto:KClark@tswdesigngroup.com">KClark@tswdesigngroup.com</a>		X

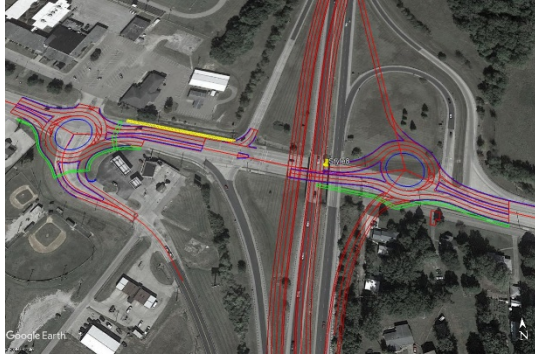
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# KY 351 INTERCHANGE WORKSHOP MEETING SUMMARY

ITEM	TOPIC/DISCUSSION	ACTION ITEM/RESPONSIBILITY
<b>Opening Statements</b>		
1.	<p>Gary Valentine opened the meeting with high-level discussion of needs at the KY 351 interchange.</p> <p>a. Reconstructing the KY 351 interchange is a result of eliminating the KY 2084 half interchange for Pennyrile Conversion requirements.</p>	
<b>SPUI Options</b>		
1.	<p>Standard SPUI.</p> <p>a. Keeps existing I-69 mainline alignment.</p> <p>b. 11-12 homes relocated (SE quadrant).</p> <p>c. New Bridge.</p> <p>d. Shared-use path on both sides.</p> <p>e. Removes loop ramp.</p> <p>f. Continuous Right turn from SB exit ramp for school.</p>	 <p>Not to move forward to PL&amp;G due to R/W impacts.</p>
2.	<p>Shifted SPUI.</p> <p>a. Shifts Least impact to homes SE quadrant (no relocations).</p> <p>b. New Bridge.</p> <p>c. Will require retaining wall to separate SB I-69 entrance ramp and KY 2084.</p> <p>d. Removes loop ramp.</p>	 <p>Move Forward.</p>
3.	<p>Shifted SPUI with KY 2084 Roundabout.</p> <p>a. FHWA reports demonstrate pedestrian crossing at roundabout could be safer than signalized crossing.</p> <p>b. Safety is enhanced by Smart Street Concepts for both vehicles and pedestrians.</p> <p>c. Need to educate and develop methods to aid the public's knowledge of innovative concepts.</p> <p>d. Deneatra Henderson has reached out to local officials and still working to get input from the middle school on pedestrian traffic.</p>	 <p>Move Forward.</p> <p>KYTC (Deneatra): to reach out to school on pedestrian traffic within the school zone.</p>

ITEM	TOPIC/DISCUSSION	ACTION ITEM/RESPONSIBILITY
<b>Parclo Options</b>		
1.	<p>Parclo Triple Roundabout.</p> <ul style="list-style-type: none"> <li>a. Use existing SB for NB I-69 mainline alignments.</li> <li>b. Least R/W impacts compare to other options.</li> <li>c. Loop has 25 MPH design.</li> <li>d. Places roundabout at KY 2084/KY 351 intersection.</li> <li>e. No R/W impact in SE quad.</li> <li>f. Reduces Ramp capacity on loop ramp due to roundabout at eastern ramp terminal.</li> <li>g. Design speed for the roundabouts are 35mph.</li> </ul>	 <p>Not to move forward to PL&amp;G due to use of existing loop ramp.</p>
2.	<p>Parclo Double Roundabout (with Median Barrier).</p> <ul style="list-style-type: none"> <li>a. Uses existing loop ramp to eliminate R/W impacts in SE quad.</li> <li>b. Provides roundabout at KY 2084/KY 351 intersection.</li> <li>c. The western ramp terminals will use the KY 2084/KY 351 roundabout for displaced traffic movements.</li> </ul>	 <p>Not to move forward to PL&amp;G due to use of existing loop ramp</p>
<b>Compressed Diamond Roundabout Options</b>		
1.	<p>Compressed Diamond - Triple Roundabout.</p> <ul style="list-style-type: none"> <li>a. Provides roundabout for KY 2084/KY 351 intersection.</li> <li>b. Shifts I-69 mainline to west.</li> <li>c. Removes loop ramp.</li> <li>d. May require relocation(s) in SE quadrant.</li> <li>e. With concerns with having signals placed closely together along this section of KY 351. The roundabouts offer an alternative for moving traffic through these conflict points.</li> </ul>	 <p>Move Forward.</p>

ITEM	TOPIC/DISCUSSION	ACTION ITEM/RESPONSIBILITY
5.	<p>Compressed Diamond - Double Roundabout (with Median Barrier).</p> <ul style="list-style-type: none"> <li>a. Provides roundabout at KY 2084/KY 351 intersection.</li> <li>b. The western ramp terminals will use the KY 2084/KY 351 roundabout for displaced traffic movements.</li> </ul> 	Move Forward.
<b>Comparison Matrix</b>		
1.	<p>Cost Estimate.</p> <ul style="list-style-type: none"> <li>a. Parclo Options have the lowest construction cost (\$3/\$7M), followed by standard SPUI on alignment (\$11M). <ul style="list-style-type: none"> <li>i. Not inclusive of RW costs.</li> </ul> </li> <li>b. Shifted SPUI and Compressed Diamond Options are highest cost (~\$18M).</li> <li>c. Need to include RW costs for refined estimates.</li> <li>d. Update parcels impacted to reflect the minimum based on use of retaining walls to reduce R/W impacts.</li> </ul>	Strand (Mark): Provide R/W estimates.
2.	<p>Matrix table.</p> <ul style="list-style-type: none"> <li>a. Remove color coding within table inputs.</li> <li>b. Remove DCD column.</li> </ul>	
<b>Other Items</b>		
1.	<p>I-69 Mainline Design Speed.</p> <ul style="list-style-type: none"> <li>a. Urban 70 MPH Design Speed was used to develop the KY 351 options.</li> </ul>	
2.	<p>Design Executive Summary (DES).</p> <ul style="list-style-type: none"> <li>a. DES will be for Section 1 to include all interchanges and mainline.</li> <li>b. Will be one document.</li> </ul>	
3.	Need to eliminate the mid-block pedestrian crossing on KY 351 east of I-69.	
4.	<p>Local Officials Interchange Workshop Review.</p> <ul style="list-style-type: none"> <li>a. Gary Valentine to contact Brian Bishop to schedule a meeting with Planning Commission.</li> <li>b. Provide operational videos or examples of similar interchange concepts in operation. <ul style="list-style-type: none"> <li>i. Dan to work with Mindy Petersen to find similar operational examples.</li> </ul> </li> </ul>	KYTC (Gary): to contact Brian Bishop from Planning Commission to review interchange options.



ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
<b>Recommendations</b>		
1.	Remove Parclo Options from further consideration.	
2.	Minimize R/W impacts with walls.	
3.	Interchange options to present for Local Officials Interchange Workshop Review. <ul style="list-style-type: none"> <li>Shifted SPUI with KY 2084 roundabout.</li> <li>Compressed Diamond Triple Roundabout.</li> </ul>	

**ACTION ITEMS**

ACTION ITEM	RESPONSIBILITY	DUE	STATUS
<b>Schedule Local Officials Interchange Review with Planning Commission for January 26<sup>th</sup> or 27<sup>th</sup>.</b>	Gary Valentine Steve Nicaise	1-11-2021	In process
<b>Follow up with Middle School principal/superintendent on KY 351 pedestrian activity and needs within the school zone.</b>	Deneatra Henderson	1-15-2021	In process
<b>Work with C2 to be engaged to develop messaging for Interchange reviews.</b>	Dan Prevost Mindy Petersen	1-11-2021	In process
<b>Provide R/W estimates for Comparison Matrix.</b>	Jerry Leslie Mark Askins	1-11-2021	In process

## MEETING SUMMARY – FINAL

**Date:** January 5, 2021  
**Time:** 1:00 – 2:00 PM ET  
**Meeting:** I-69 ORX US 41 Interchange Workshop  
**Location:** Via Teams

### Attendees:

NAME	ORGANIZATION	EMAIL	PHONE	ATTENDED
Gary Valentine	KYTC Advisor	<a href="mailto:gvalentine@ky.gov">gvalentine@ky.gov</a>		X
Deneatra Henderson	KYTC D-2 CDE	<a href="mailto:Deneatra.Henderson@ky.gov">Deneatra.Henderson@ky.gov</a>		X
Larry Krueger	KYTC D-2 Design	<a href="mailto:Larry.Krueger@ky.gov">Larry.Krueger@ky.gov</a>		X
Jason Ward	KYTC D-2 Const.	<a href="mailto:Jason.Ward@ky.gov">Jason.Ward@ky.gov</a>		X
Renee Boucherie	KYTC D-2	<a href="mailto:Renee.Boucherie@ky.gov">Renee.Boucherie@ky.gov</a>		X
Michael Loyselle	FHWA	<a href="mailto:Michael.Loyselle@ky.gov">Michael.Loyselle@ky.gov</a>		X
Steve Nicaise	Parsons	<a href="mailto:Steven.Nicaise@parsons.com">Steven.Nicaise@parsons.com</a>		X
Chuck Allen	Parsons	<a href="mailto:Chuck.Allen@parsons.com">Chuck.Allen@parsons.com</a>		X
Dan Prevost	Parsons	<a href="mailto:Daniel.Prevost@parsons.com">Daniel.Prevost@parsons.com</a>		X
Kyle Chism	Parsons	<a href="mailto:Kyle.Chism@parsons.com">Kyle.Chism@parsons.com</a>		X
Ben Quinn, Jr.	AEI	<a href="mailto:Benq@aei.cc">Benq@aei.cc</a>		X
Kevin McClearn	AEI	<a href="mailto:KMccLearn@aei.cc">KMccLearn@aei.cc</a>		X
Paul Looney	EAP	<a href="mailto:PLooney@eapartners.com">PLooney@eapartners.com</a>		X
Ray Robison, Jr.	B&N	<a href="mailto:Ray.Robison@burgessniple.com">Ray.Robison@burgessniple.com</a>		X

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
<b>Overview</b>		
1.	<p>Kyle Chism provide a high-level overview of the US 41 interchange.</p> <ul style="list-style-type: none"> <li>a. Concerns the Value Engineering Option D Diamond Interchange would not operate effectively within the Section 1 Project with the river crossing not being open.</li> <li>b. Proposed Trumpet interchange was developed to address the major traffic US 41 through traffic prior to the river crossing. This Trumpet Option provides free flow for major traffic movements.</li> </ul>	

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
	c. The updated 2025 traffic assignments for the Section 1 interim condition depict the NB to WB movement being 14,900 vpd. The 2045 ultimate condition depict the NB to WB traffic as 14,000 vpd with a 1,380 am peak and 980 pm peak.	
<b>US 41 Interchange Options</b>		
1.	VE Study Option D – Conventional Diamond. a. Conventional service interchange. b. May not operate well for the Section 1 interim condition when all traffic must flow through the interchange. c. Takes Kimsey through interchange. i. New bridge over Canoe Creek needed for Kimsey.	Move forward.
2.	Trumpet. a. I-69 NB Exit Ramp. NB to WB. (need to know peak hour traffic volumes) i. Single Lane Parallel ramp that widens to 2-lanes on ramp proper past the gore with continuous flow. 1. 300-foot opening taper with 800 feet to first curve on ramp. 2. 30 mph curve. 3. Requires inside shoulder widening for sight distance. 4. A dual-lane exit can be accommodated without impacting the NB bridge over CSX railroad b. US 41 is barrier separated through the interchange and in between the trumpet ramps to the east of I-69. i. Will keep positive separation between the trumpet ramps. c. I-69 SB Entrance Ramp. EB to SB. i. On ramp 45 mph curve. ii. 2-lanes drop to 1 lane on ramp before merging with I-69 SB. d. I-69 NB Entrance Loop Ramp. EB to NB. i. Loop Ramp with 25mph curve. ii. Requires large bridge to accommodate loop ramp underneath. e. I-69 SB Exit Ramp. SB to WB. i. Options for stop condition versus continuous left turn at ramp terminal. f. Kimsey Connection. i. Does not tie to US 41. ii. Uses existing SB US 41 and Van Wyk to reroute Kimsey Lane. g. Maintains Shared-Use Path. i. Public path. ii. Crosses realigned US 41 through a culvert/tunnel underneath US 41.	Move Forward.
<b>Comparison Matrix</b>		



ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
1.	R/W Impacts. a. 8 to 9 parcels impacted with one relocation for both options.	
2.	Cost Estimates. a. Trumpet Option is slightly less (\$32 M) compared to the Conventional Diamond (\$34). b. Construction estimate for Trumpet Option is less than Diamond due to elimination of an additional Kimsey Lane bridge over Canoe Creek.	
<b>Recommendations</b>		
1.	Trumpet Option better suits traffic operations in the interim for Section 1 over an ultimate Diamond Option prior to completion of the new river crossing. a. The Trumpet Option can be expanded to a convention diamond with little rework for an ultimate configuration when the new river crossing is open to traffic.	
2.	Take the following options to the Planning Commission for a Local Officials Interchange Workshop Review <ul style="list-style-type: none"> <li>Trumpet Option for the interim with additional display depicting the trumpet expanded/revised to a diamond for the ultimate.</li> <li>Initial DEIS Flyover Option</li> </ul>	

**ACTION ITEMS**

ACTION ITEM	RESPONSIBILITY	DUE	STATUS
<b>Schedule meeting for January 26<sup>th</sup> or 27<sup>th</sup> with Planning Commission for Local Officials Interchange Workshop Review.</b>	Gary Valentine Steve Nicaise	1-11-2021	In process
<b>Prepare Display for Local Officials Interchange Workshop Review.</b>	Kyle Chism	1-15-2020	In process

## MEETING SUMMARY – FINAL

**Date:** January 15, 2021  
**Time:** 9:00 – 10:00 AM ET  
**Meeting:** I-69 ORX US 60 Interchange Workshop  
**Location:** Via Teams

### Attendees:

NAME	ORGANIZATION	EMAIL	PHONE	ATTENDED
Gary Valentine	KYTC Advisor	<a href="mailto:gvalentine@ky.gov">gvalentine@ky.gov</a>		X
Deneatra Henderson	KYTC D-2 CDE	<a href="mailto:Deneatra.Henderson@ky.gov">Deneatra.Henderson@ky.gov</a>		X
Larry Krueger	KYTC D-2 Design	<a href="mailto:Larry.Krueger@ky.gov">Larry.Krueger@ky.gov</a>		X
Jason Ward	KYTC D-2 Const.	<a href="mailto:Jason.Ward@ky.gov">Jason.Ward@ky.gov</a>		X
Renee Boucherie	KYTC D-2	<a href="mailto:Renee.Boucherie@ky.gov">Renee.Boucherie@ky.gov</a>		X
Michael Loyselle	FHWA	<a href="mailto:Michael.Loyselle@ky.gov">Michael.Loyselle@ky.gov</a>		X
Renne Boucherie	FHWA	<a href="mailto:Renee.Boucherie@ky.gov">Renee.Boucherie@ky.gov</a>		X
Steve Nicaise	Parsons	<a href="mailto:Steven.Nicaise@parsons.com">Steven.Nicaise@parsons.com</a>		X
Chuck Allen	Parsons	<a href="mailto:Chuck.Allen@parsons.com">Chuck.Allen@parsons.com</a>		X
Dan Prevost	Parsons	<a href="mailto:Daniel.Prevost@parsons.com">Daniel.Prevost@parsons.com</a>		X
Kyle Chism	Parsons	<a href="mailto:Kyle.Chism@parsons.com">Kyle.Chism@parsons.com</a>		X
Ben Quinn, Jr.	AEI	<a href="mailto:Benq@aei.cc">Benq@aei.cc</a>		X
Kevin McClearn	AEI	<a href="mailto:KMccLearn@aei.cc">KMccLearn@aei.cc</a>		X
Jerry Leslie	AEI	<a href="mailto:JLeslie@aei.cc">JLeslie@aei.cc</a>		X
Wes Cooper	AEI	<a href="mailto:WCooper@aei.cc">WCooper@aei.cc</a>		X
Paul Looney	EAP	<a href="mailto:PLooney@eapartners.com">PLooney@eapartners.com</a>		X
Clive Weller	EAP	<a href="mailto:PCWeller@eapartners.com">PCWeller@eapartners.com</a>		X
Lindsay Griggs	EAP	<a href="mailto:LGriggs@eapartners.com">LGriggs@eapartners.com</a>		X
Ray Robison, Jr.	B&N	<a href="mailto:Ray.Robison@burgessniple.com">Ray.Robison@burgessniple.com</a>		X
Kevin McKeel	B&N	<a href="mailto:Kevin.McKeel@burgessniple.com">Kevin.McKeel@burgessniple.com</a>		X

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
<b>US 60 Interchange Options</b>		
1.	VE Study Flop Diamond. a. Flop Diamond was developed to accommodate concerns associated with impacting the historic Hopper property (P 618).	

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
	<ul style="list-style-type: none"> <li>b. With a better defined and reduced historic boundary within the Hopper property, the project team began investigating more traditional interchange configurations that would fit within the revised constraints.</li> </ul>	
2.	<p>Compressed Diamond.</p> <ul style="list-style-type: none"> <li>a. It is a hybrid compressed diamond configuration to avoid the Hopper Property while also allowing the Big Rivers Transmission relocation.</li> <li>b. Big Rivers Transmission Line. <ul style="list-style-type: none"> <li>i. Provides 100' wide corridor/easement adjacent Hopper Property.</li> <li>ii. Meeting with Big Rivers next week to verify the 100' easement and line layout will work for them.</li> </ul> </li> <li>c. Continue 5-lane urban typical from Wathen Lane to east of CSX RR crossing.</li> <li>d. US 60 realignment avoids cemetery buffer boundary.</li> <li>e. Connection to Tillman-Bethel Road was developed to have adequate sight distance and meet the control of access requirements at interchange.</li> <li>f. Intent is to abandon and remove the existing CSX Structure when new US 60 CSX structure is completed and open to traffic.</li> <li>g. Access to utilities will not be from mainline or interchange. <ul style="list-style-type: none"> <li>i. Big Rivers access the switches located at the northwest quad of existing US 60 and Tillman-Bethel once every 2 months.</li> </ul> </li> <li>h. Technical refinements will be addressed at PL&amp;G.</li> <li>i. Traffic Operations 2025 <ul style="list-style-type: none"> <li>i. US 60 LOS A</li> <li>ii. Ramps LOS C</li> <li>iii. NB exit ramp may need to be evaluated for signalization with initial construction.</li> <li>iv. SB entrance would be stop control.</li> </ul> </li> <li>j. Traffic Operations 2045 <ul style="list-style-type: none"> <li>i. US 60 LOS A</li> <li>ii. Ramps LOS C</li> <li>iii. SB exit will have to be reevaluated.</li> </ul> </li> <li>k. Evaluate need for signals at ramp terminals as we move to PL&amp;G.</li> </ul>	
<b>Planning Report</b>		
1.	<p>Design Speed.</p> <ul style="list-style-type: none"> <li>a. Tell the story on the expected design speed on the conversion and I-69 Cross-country section. Need to articulate expectation.</li> </ul>	



ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
<b>KY 351 Interchange Additional Discussion</b>		
1.	<p>Michael Loyselle Comments.</p> <ul style="list-style-type: none"> <li>a. Mike has reached out and spoken to Colorado counterparts on 5-leg roundabout.</li> <li>b. Two questions. <ul style="list-style-type: none"> <li>i. Are there any concerns with operation of multi-leg roundabout.</li> <li>ii. Access Control question.</li> </ul> </li> <li>c. Local government designed and constructed the Vail I-70 Interchange project in conjunction with Colorado DOT. Involved frontage roads as interstate access.</li> <li>d. May pursue the KY 351 interchange 5-leg roundabout through PL&amp;G dependent on local feedback.</li> </ul>	
2.	<p>Traffic Operations for 5-leg roundabout.</p> <ul style="list-style-type: none"> <li>a. B&amp;N did operation analysis. <ul style="list-style-type: none"> <li>i. Will need full two-lane roundabout all the way around.</li> <li>ii. Requires separate third lane (slip ramp) to go directly into middle school in SB to WB ramp movement.</li> <li>iii. Also requires separate lane (slip ramp) from EB KY 351 to SB KY 2084. This may be a driver expectation concern.</li> </ul> </li> </ul>	
3.	<p>Consideration of Fatal Flaws with 5-leg.</p> <ul style="list-style-type: none"> <li>a. Dedicated right turn lanes (slip ramps) on west quads of roundabout could be a significant R/W impact.</li> <li>b. Would be first roundabout introduced to this area. That needs to be a consideration from an operational and driver expectation perspective.</li> <li>c. Risk would be high in comparison to conventional and existing KY 2084 intersection.</li> <li>d. The traffic calming provided by the roundabouts may be better than multiple signalized intersection for operation and safety.</li> </ul>	
4.	<p>Other Items.</p> <ul style="list-style-type: none"> <li>a. Goal is to get I-69 in place, do not let the challenges of KY 351 interchange hold-up I-69. May need to look to options with less challenges and obstacles.</li> <li>b. Locals will have input on options.</li> <li>c. Will need median barrier wall on I-69 for shifted alignment.</li> </ul>	

**ACTION ITEMS**

ACTION ITEM	RESPONSIBILITY	DUE	STATUS
<b>Set up meeting to discuss the details and specifics of the KY 351 interchange 5-leg option.</b>	Gary Valentine Steve Nicaise	1-20-2021	In process

ACTION ITEM	RESPONSIBILITY	DUE	STATUS
Prepare Display for Planning Commission Interchange Workshop Review.	Paul Looney	1-20-2020	In process

## MEETING SUMMARY – FINAL

**Date:** January 12, 2021  
**Time:** 9:00 – 10:55 AM ET  
**Meeting:** I-69 ORX Section 1 Grading Workshop  
**Location:** Via Teams

### Attendees:

NAME	ORGANIZATION	EMAIL	PHONE	ATTENDED
Gary Valentine	KYTC Advisor	<a href="mailto:gvalentine@ky.gov">gvalentine@ky.gov</a>		X
Deneatra Henderson	KYTC D-2 CDE	<a href="mailto:Deneatra.Henderson@ky.gov">Deneatra.Henderson@ky.gov</a>		X
Larry Krueger	KYTC D-2 Design	<a href="mailto:Larry.Krueger@ky.gov">Larry.Krueger@ky.gov</a>		X
Jason Ward	KYTC D-2 Const.	<a href="mailto:Jason.Ward@ky.gov">Jason.Ward@ky.gov</a>		X
Michael Loyselle	FHWA	<a href="mailto:Michael.Loyselle@ky.gov">Michael.Loyselle@ky.gov</a>		X
Steve Nicaise	Parsons	<a href="mailto:Steven.Nicaise@parsons.com">Steven.Nicaise@parsons.com</a>		X
Chuck Allen	Parsons	<a href="mailto:Chuck.Allen@parsons.com">Chuck.Allen@parsons.com</a>		X
Dan Prevost	Parsons	<a href="mailto:Daniel.Prevost@parsons.com">Daniel.Prevost@parsons.com</a>		X
Kyle Chism	Parsons	<a href="mailto:Kyle.Chism@parsons.com">Kyle.Chism@parsons.com</a>		X
Corinna Goodwin	Parsons	<a href="mailto:Corinna.Goodwin@parsons.com">Corinna.Goodwin@parsons.com</a>		X
Ben Quinn, Jr.	AEI	<a href="mailto:Benq@aei.cc">Benq@aei.cc</a>		X
Kevin McClearn	AEI	<a href="mailto:KMccLearn@aei.cc">KMccLearn@aei.cc</a>		X
Paul Looney	EAP	<a href="mailto:PLooney@eapartners.com">PLooney@eapartners.com</a>		X
Ray Robison, Jr.	B&N	<a href="mailto:Ray.Robison@burgessniple.com">Ray.Robison@burgessniple.com</a>		X

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
<b>Project Overview</b>		
1.	<p>Canoe Creek.</p> <p>a. Gary Valentine started the meeting by describing I-69 going through the Canoe Creek watershed, an area that is known to contribute to flooding in downtown Henderson. Local Government has studied opportunities to mitigate this problem over the last several years. To not exacerbate the flooding with the construction of I-69, a detention system is required. With detention and embankment both needed for I-69, KYTC established the following goal:</p>	

## Section 1 Grading Workshop Meeting Minutes

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
	i. Optimize the detention system to balance the earthwork on Section 1.	
2.	<p>Earthwork Balance.</p> <ul style="list-style-type: none"> <li>a. Steve Nicaise explained the original earthwork balance from the NEPA conceptual studies.</li> <li>b. The objective of this workshop is to keep Section 2 balanced and adjust and optimize Section 1 with the detention basin. <ul style="list-style-type: none"> <li>i. Section 2 has independent balance from Section 1.</li> </ul> </li> <li>c. Ground water elevations will impact the amount of excavation and depths of detention basin.</li> </ul>	
<b>Roadway Earthwork</b>		
1.	<p>Revised Section 1 Roadway Profile from US 41 Interchange to Braxton Park.</p> <ul style="list-style-type: none"> <li>a. The revised profile lowers the roadway to reduce the embankment by 800,000 CY compared to the NEPA concept.</li> <li>b. The adjusted roadway profile requires 1.9 million CY of embankment to terminate at Braxton Park north of US 60 (Sta 4005+00).</li> <li>c. Goal was to set minimum the roadway profile 6' above 100 yr. storm water surface elevation to accommodate median drainage.</li> </ul>	
2.	<p>Extending Section 1 Termini into Section 2. (Sta 4005+00 to 4030+00 some 2500')</p> <ul style="list-style-type: none"> <li>a. Extending Section 1 an additional 2,500' from Braxton Park to the Hatchett driveway requires 1.7 million CY of embankment. This is 200,000 CY less compared to the shorter termini.</li> <li>b. Constructing the roadway farther north into Section 2 will reduce the material needed from the detention basin and reduce overall waste from Section 2 excavation.</li> <li>c. Section 2 is currently a waste project, however extending the additional 2500' to the north makes Section 2 fully balanced.</li> <li>d. Parcels north of US 60 to Braxton Park are now in the process of early acquisition: however, there are only 6 parcels remaining in Section 2 to reach the river.</li> <li>e. At the Hatchett driveway, the underpass access option has significant challenges. Should investigate a public road option.</li> <li>f. Any structure over or under I-69 for the Hatchett property would have to be maintained by the individual property owner or local government.</li> </ul>	
<b>Detention Basin</b>		
1.	<p>Detention Basin Design.</p> <ul style="list-style-type: none"> <li>a. The basin was segmented into 3 basins to avoid sewer utility impacts. <ul style="list-style-type: none"> <li>• Basin 1 (southern basin): 570,000 CY</li> </ul> </li> </ul>	



## Section 1 Grading Workshop Meeting Minutes

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
	<ul style="list-style-type: none"> <li>Basin 2 (middle basin): 380,000 CY</li> <li>Basin 3 (northern basin): 710,000 CY</li> </ul> <p>b. Maintain the 6 to 1 slide slopes to prevent fencing and for maintenance operations.</p> <p>c. Channel that threads through the basin will be constructed to maintain positive flow.</p>	
2.	<p>Ground Water Elevation.</p> <p>a. Ground water elevations seem to be fluctuating along the basins based on current data. The ground water elevation in the most north basin #3 is 5' above the southern basin #1.</p> <ul style="list-style-type: none"> <li>The ground water seems to be a perched water table, not having consistent elevations.</li> <li>Ground water elevations vary from 374' to 393'.</li> <li>Not a true static ground water elevation.</li> </ul> <p>b. Explore the need to dig test pits to determine accurate ground water elevations.</p> <ul style="list-style-type: none"> <li>Depth of test pit will be 20' deep due to reach of equipment.</li> <li>Need permission from property owner to dig pit of that size.</li> </ul> <p>c. Based on the ground water readings it is likely the basin could be infiltrated by groundwater.</p> <ul style="list-style-type: none"> <li>The first step is to investigate if a liner is required and could keep ground water out of the basins.</li> <li>If a liner is required, the team needs to assess the appropriate material to line the basin.</li> <li>The availability and cost of the liner material would need to be established.</li> </ul>	

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
3.	<p>Options for basin depth and layout.</p> <ul style="list-style-type: none"> <li>a. Can we build berms around the basins to create more storage? <ul style="list-style-type: none"> <li>i. Needs to be evaluated to assess the excavation needed for flood management compared to volume needed for roadway embankment.</li> </ul> </li> <li>b. Increase number of basins to areas near Kimsey Lane south of I-69 and north of I-69. <ul style="list-style-type: none"> <li>i. Will need ground water measurements/monitoring in areas for additional basins.</li> <li>ii. Areas north of I-69 may not help from a flood management perspective as they are separated from the Canoe Creek watershed by the I-69 embankment and would require an equalizer pipe under I-69.</li> </ul> </li> <li>c. Do the basins have to be dry or wet basins? <ul style="list-style-type: none"> <li>i. Wet basin will have certain depth requirements and mitigation measures to offset any problematic stagnate water issues, such as mosquitoes.</li> </ul> </li> </ul>	
<b>Recommendations</b>		
1.	<p>Move forward with 1.7 million CY earthwork option to extend Section 1 into Section 2 that would terminate grading at Hatchett driveway (Sta 4030+00).</p> <ul style="list-style-type: none"> <li>a. Extend to balance both Section 1 and Section 2 independently.</li> </ul>	
2.	<p>Investigate additional basin areas.</p> <ul style="list-style-type: none"> <li>a. Additional basins can be located within the Dempewolf Parcel near Kimsey Lane and north of I-69.</li> <li>b. Additional basins will need additional archaeology and geotechnical investigations.</li> <li>c. Basins north of I-69 would require an equalizer pipe to operate properly for flood management.</li> </ul>	<p>Parsons (Dan Prevost): check on archaeology on additional basin locations.</p> <p>Ben Quinn Jr.): evaluate geotech and ground water on additional basins.</p>
3.	<p>Develop game plan for more exploratory measures to monitor ground water elevations.</p> <ul style="list-style-type: none"> <li>a. Mobilize as quickly as possible.</li> <li>b. Monitor the existing wells to get some certainty.</li> <li>c. Work with Central Office Geotechnical Division.</li> </ul>	<p>AEI (Dennis Mitchell): contact KYTC Geotech to develop plan for evaluating ground water elevations.</p>
4.	<p>Right-of-Way considerations.</p> <ul style="list-style-type: none"> <li>a. Roadway will be fee simple.</li> <li>b. Basins will be acquired by permanent easement to be transferred to the Henderson Floodplain Mitigation Board or City of Henderson.</li> </ul>	

## Section 1 Grading Workshop Meeting Minutes

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
5.	<p>Evaluate possibility of constructing wet basins/lakes.</p> <ul style="list-style-type: none"> <li>a. Review similar basins constructed in I-164/I-69 in Indiana.</li> <li>b. Corinna Goodwin will reach out to the Kentucky Division of Water on requirements for a wet basin/lake.</li> <li>c. Investigate recreation options for deeper wet basins.</li> </ul>	Parsons (Corinna Goodwin): reach out to the Division of Water on wet basin requirements.
6.	<p>Preferred basin options in order:</p> <ul style="list-style-type: none"> <li>a. Dry Basin.</li> <li>b. Dry Basin with liner.</li> <li>c. Recreational Pond/Lake for flood control.</li> <li>d. Wet Basin.</li> </ul>	
<b>Recap of Grading Workshop with Michael Loyselle</b>		
1.	<p>Overview.</p> <ul style="list-style-type: none"> <li>a. Gary Valentine provided a thorough overview of the Section 1 Grading Workshop.</li> <li>b. I-69 between US 41 and US 60 cuts across watershed of Canoe Creek.</li> <li>c. Canoe Creek has been problematic with flooding and the Henderson Flood Mitigation Board was established to develop solutions to address the issues.</li> <li>d. The basins will provide a two-fold benefit in addressing the flooding issues and provide embankment for the I-69 cross-country alignment.</li> </ul>	
2.	<p>Northern Termini.</p> <ul style="list-style-type: none"> <li>a. Michael Loyselle agreed with recommendation to balance Section 1 and Section 2 independently by extending Section 1 into Section 2 by 2,500 feet.</li> <li>b. The US 60 Interchange be a partial interchange in the Section 1 interim.</li> <li>c. Ramps on north side would most likely only be graded, no roadway surface.</li> <li>d. I-69 north of US 60 would only be graded with no roadway surface.</li> </ul>	
3.	<p>NEPA discussion.</p> <ul style="list-style-type: none"> <li>a. Only one NEPA document with two construction sections. <ul style="list-style-type: none"> <li>i. Anticipated Section 1 will be open and operate within 2025 – 2031.</li> <li>ii. Anticipated Section 2 will be online in 2031.</li> </ul> </li> </ul>	

## ACTION ITEMS

ACTION ITEM	RESPONSIBILITY	DUE	STATUS
Contact KYTC Geotech to develop plan for evaluating ground water elevations.	Dennis Mitchell	1-18-2021	In process
Reach out to the Division of Water on wet basin requirements.	Corinna Goodwin	1-18-2021	In process
Check on archaeology investigation for additional basin locations.	Corinna Goodwin	1-18-2021	In process
Evaluate geotech and ground water elevations for additional basin areas.	Ben Quinn Jr.	1-18-2021	In process



## MEETING SUMMARY - FINAL

**Date:** January 12, 2021  
**Time:** 1:00 – 2:30 PM ET  
**Meeting:** I-69 ORX Section 1 Route Numbering Workshop  
**Location:** Via Teams

### Attendees:

NAME	ORGANIZATION	EMAIL	PHONE	ATTENDED
Michael Loyselle	FHWA	<a href="mailto:Michael.Loyselle@dot.gov">Michael.Loyselle@dot.gov</a>		X
Gary Valentine	KYTC PM/Advisor	<a href="mailto:gvalentine@ky.gov">gvalentine@ky.gov</a>		X
Deneatra Henderson	KYTC D-2 CDE	<a href="mailto:Deneatra.Henderson@ky.gov">Deneatra.Henderson@ky.gov</a>		X
Larry Krueger	KYTC D-2 Design	<a href="mailto:Larry.Krueger@ky.gov">Larry.Krueger@ky.gov</a>		X
Jason Ward	KYTC D-2 Const.	<a href="mailto:Jason.Ward@ky.gov">Jason.Ward@ky.gov</a>		X
Nick Hall	KYTC D-2 Planning	<a href="mailto:Nick.Hall@ky.gov">Nick.Hall@ky.gov</a>		X
Ramsey Quarles	KYTC CO Planning	<a href="mailto:Ramsey.Quarles@ky.gov">Ramsey.Quarles@ky.gov</a>		
Beth Niemann	KYTC CO Planning	<a href="mailto:Elizabeth.Niemann@ky.gov">Elizabeth.Niemann@ky.gov</a>		
Jason Hyatt	KYTC CO Planning	<a href="mailto:Jason.Hyatt@ky.gov">Jason.Hyatt@ky.gov</a>		
Steve Nicaise	Parsons	<a href="mailto:Steven.Nicaise@parsons.com">Steven.Nicaise@parsons.com</a>		X
Chuck Allen	Parsons	<a href="mailto:Chuck.Allen@parsons.com">Chuck.Allen@parsons.com</a>		X
Dan Prevost	Parsons	<a href="mailto:Daniel.Prevost@parsons.com">Daniel.Prevost@parsons.com</a>		X
Kyle Chism	Parsons	<a href="mailto:Kyle.Chism@parsons.com">Kyle.Chism@parsons.com</a>		X
Ben Quinn, Jr.	AEI	<a href="mailto:Benq@aei.cc">Benq@aei.cc</a>		X
Kevin McClearn	AEI	<a href="mailto:KMcClearn@aei.cc">KMcClearn@aei.cc</a>		X
Paul Looney	EAP	<a href="mailto:PLooney@eapartners.com">PLooney@eapartners.com</a>		X
Ray Robison, Jr.	B&N	<a href="mailto:Ray.Robison@burgessniple.com">Ray.Robison@burgessniple.com</a>		X
Mike Robison, Jr.	B&N	<a href="mailto:Michael.Robison@burgessniple.com">Michael.Robison@burgessniple.com</a>		X

ITEM	TOPIC/DISCUSSION	ACTION ITEM/ RESPONSIBILITY
<b>Route Numbering Workshop Presentation</b>		
1.	Section 1 Features affecting route numbering and signing: <ul style="list-style-type: none"> <li>a. Conversion of freeway to I-69 up to US 41 Interchange</li> <li>b. Removal of KY 2084 Interchange</li> <li>c. New cross-country freeway segment to US 60</li> </ul>	
2.	Review of Existing Mile Point Overview Map: <ul style="list-style-type: none"> <li>a. I-69 current northern terminus ends at the KY 425 interchange at Mile Point 148 <ul style="list-style-type: none"> <li>a. Exit 148A to KY 425</li> </ul> </li> </ul>	

<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>b. Exit 148B straight ahead to US 41</li> </ul> </li> <li>b. US 41 current path reviewed           <ul style="list-style-type: none"> <li>a. Enters from the west (beginning Mile Point 10 on the freeway)</li> <li>b. Follows freeway alignment north to US 60 (Exit 15) and on to Indiana</li> </ul> </li> <li>c. KY 2084 west of and parallel to US 41</li> </ul> <p>3. Existing Guide Signing Concept Plans:</p> <ul style="list-style-type: none"> <li>a. Existing guide signing developed from site photographs taken in December 2020. Exit gore signs and reference location (mile point) signs intentionally omitted on graphics for clarity.</li> <li>b. Sheet 1 of 3 covers the southern end of the I-69/US 41 corridor:           <ul style="list-style-type: none"> <li>a. KY 425 Interchange (Exits 148 A-B) in the northbound direction. Signed as Exits 10 B-A in the southbound direction.</li> <li>b. Audubon Parkway Interchange (Exit 12)</li> </ul> </li> <li>c. Sheet 2 of 3 covers the remainder of the existing US 41 freeway:           <ul style="list-style-type: none"> <li>a. KY 2084 Interchange is Exit 13</li> <li>b. KY 351 Interchange is Exit 14</li> <li>c. US 60 Interchange is Exit 15 A-B</li> </ul> </li> <li>d. Sheet 3 of 3 is a detail sheet for the KY 2084 area</li> </ul> <p>4. Proposed Guide Signing Concept Plans:</p> <ul style="list-style-type: none"> <li>a. Previous stated goal was to extend the I-69 Mile Points ahead through the existing freeway and cross-country to US 60. I-69 and US 41 will be concurrent routes from Mile Point 148 north to the Proposed US 41 Interchange.</li> <li>b. Proposed Guide Signs sheets match the same area of coverage for the Existing Guide Signs sheets for direct comparison of existing and proposed signing.</li> <li>c. Sheet 1 of 4:           <ul style="list-style-type: none"> <li>a. KY 425 Interchange becomes only Exit 148</li> <li>b. Audubon Parkway becomes Exit 149               <ul style="list-style-type: none"> <li>i. No guide sign changes anticipated on the Audubon Parkway approach</li> </ul> </li> </ul> </li> <li>d. Sheet 2 of 4:           <ul style="list-style-type: none"> <li>a. KY 2084 Interchange eliminated</li> <li>b. KY 351 Interchange becomes Exit 151</li> <li>c. Proposed freeway alignment departs Existing US 41 freeway just north of the CSX Railroad bridges. New alignment shown in red.</li> <li>d. I-69 Mile Points carried forward on new alignment</li> <li>e. New temporary I-69 northern terminus established at the Proposed US 41 Interchange. Freeway signed as KY 90XX ahead of the new I-69 terminus. 90XX is a 9000-series route number to be determined later. KY 90XX is a temporary route assignment that will change to I-69 once Section 2 is completed across the Ohio River. I-69 ENDS proposed signing mimics similar signing in Indiana.</li> <li>f. New US 41 Interchange becomes Exit 152.</li> </ul> </li> </ul>	
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<ul style="list-style-type: none"> <li>g. Existing US 41 Mile Points west of the freeway are backed-down from Exits 15 A-B at the US 60 Interchange to create Exit 14B to southbound I-69 and Exit 14A to northbound KY 90XX.</li> <li>e. Sheet 3 of 4: <ul style="list-style-type: none"> <li>a. KY 2084 area detail shows the removal of several guide signs and modifications to those that remain after KY 2084 interchange ramps removal.</li> <li>b. KY 351 signing is shown for the existing interchange configuration but can be updated for the selected interchange reconstruction option.</li> </ul> </li> <li>f. Sheet 4 of 4: <ul style="list-style-type: none"> <li>a. Illustrates the new cross-country freeway segment to US 60.</li> <li>b. Extending I-69 Mile Points along KY 90XX makes the US 60 Interchange Exit 154.</li> </ul> </li> <li>g. Proposed guide signing in Kentucky for Section 1 will have no effect on existing guide signing in Indiana. I-69 mile point numbering starts anew at the state line. Completion of Section 2 will require signing changes in both Kentucky and Indiana.</li> <li>h. Proposed exit numbers for I-69 Section 1 will not change with future completion of I-69 Section 2.</li> <li>i. Jason Hyatt in Central Office Planning should review the proposed guide signing. He will be included on the meeting summary distribution.</li> <li>j. The graphics will be included with the draft and final Workshop meeting summaries. These graphics may prove useful for the conversion agreement, for review by the FHWA Resource Center staff, for coordination with INDOT and for coordination with the AASHTO Committee for Route Signing.</li> </ul> <p>5. Re-Addressing Concerns:</p> <ul style="list-style-type: none"> <li>a. KY 2084 Detail Sheet: <ul style="list-style-type: none"> <li>a. Colored parcels are PVA-listed properties fronting on the west side of KY 2084</li> <li>b. Black numerals are PVA address numbers</li> <li>c. All parcels have KY 2084 addresses, so no re-addressing is needed on KY 2084, assuming that KY 2084 is made two-directional at its current location.</li> </ul> </li> <li>b. US 60 Detail Sheet: <ul style="list-style-type: none"> <li>a. Black numerals represent street addresses or PVA parcel numbers.</li> <li>b. PVA address lists reviewed for US 60 and Tillman-Bethel Road properties.</li> <li>c. Shift of Proposed US 60 south of Existing US 60 affects only one US 60 property (Hopper at 3925 Highway 60 East). Hopper parcel will no longer have frontage on US 60. Change to a Tillman-Bethel Road address may be needed.</li> </ul> </li> <li>c. Possible transfer of certain roadways to City or County maintenance jurisdiction was discussed. Potential roadways include: <ul style="list-style-type: none"> <li>a. Kimsey Lane segments</li> <li>b. Van Wyck Road</li> <li>c. Old US 60</li> </ul> </li> </ul>	
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## SECTION 1 ROUTE NUMBERING WORKSHOP MEETING SUMMARY

d. New access to the electric substation from Kimsey Lane	
<b>Next Steps</b>	
a. Route Numbering meeting with Henderson city officials will be scheduled sometime after the Planning Commission meeting scheduled for January 26. b. Map and letter preparation for the Hopper parcel on Old US 60 eventually for address change.	KYTC (Gary)  B&N
<b>Recap of I-69 Terminus and Detention Basin Workshop</b>	
a. After the Route Numbering Workshop presentation and discussion, the Team recapped the key points of the Workshop held the same morning as the Route Numbering Workshop for those who were unable to attend the morning Workshop. See the ORX Section 1 Grading Workshop meeting summary for that discussion.	
<b>Attachments</b>	
1. Meeting materials and displays <ul style="list-style-type: none"> <li>a. Meeting agenda PDF</li> <li>b. Composite PDF containing:               <ul style="list-style-type: none"> <li>i. Mile Point Overview Map</li> <li>ii. Existing Guide Signs (3 sheets)</li> <li>iii. Proposed Guide Signs (4 sheets)</li> <li>iv. KY 2084 Detail Map</li> <li>v. KY 2084 Parcels Existing Addresses</li> <li>vi. US 60 Detail Maps</li> <li>vii. US 60 Parcels Existing Addresses</li> <li>viii. Tillman-Bethel Road Existing Addresses</li> </ul> </li> </ul>	

### ACTION ITEMS

ACTION ITEM	RESPONSIBILITY	DUE	STATUS
Review of Proposed Guide Signs Graphics	<ul style="list-style-type: none"> <li>• KYTC (Jason Hyatt)</li> </ul>	2-01-2021	In process
	<ul style="list-style-type: none"> <li>•</li> </ul>		
Meeting with Henderson officials	<ul style="list-style-type: none"> <li>• KYTC (Gary)</li> </ul>	After 1-26-2021 Planning Commission Meeting	In process



# **APPENDIX B**

## **Henderson City-County Planning Commission Meeting Summary**



## MEETING SUMMARY

**Date:** Jan. 26, 2021

**Time:** 6:00 – 7:30 PM CT

**Meeting:** Henderson City-County Planning Commission

**Location:** By Zoom and Facebook Live

**Attendees:**

Henderson City – County Planning Commission

Brian Bishop, executive director

David Dixon, chairman

David Williams, vice-chairman

Bobbie Jarrett, treasurer

Mac Arnold

Dickie Johnson

Gray Hodge

Gary Gibson

Bart Boles

Stacy Denton

Doug Bell

X.R. Royster

Heather Lauderdale

Local officials

Brad Schneider, judge-executive

Steve Austin, mayor

Buzzy Newman, city manager

Charles McCollum, Henderson County magistrate, District 5

Doug Boom, city engineer

Tom Williams, Henderson Water Utility

Tara Barney, president, Southwest Indiana Chamber

Evan Gorman, 14 News

John Martin, The Gleaner and Courier & Press

Chuck Stinnett

Beth Moran

Kevin Hearin

Tommy Joe Fridy  
Warner Mattingly  
TJ Gilpin  
Key Modi  
Ron Faupel  
David McGan  
Bill Stark  
Bill Bercaw  
Jonathan McQuinn  
Paul Rideout  
Jeff Troxel  
Julie Hauser  
Other attendees via Facebook Live

Project Team

Gary Valentine, KYTC  
Deneatra Henderson, KYTC  
Jason Ward, KYTC  
Steve Nicaise, Parsons  
Dan Prevost, Parsons  
Chuck Allen, Parsons  
Kyle Chism, Parsons  
Corinna Goodwin, Parsons  
Jerry Leslie, AEI  
Kevin McClearn, AEI  
Ben Quinn, AEI  
Amy Williams, TSW  
Paul Looney, EA Partners  
Clive Weller, EA Partners  
Ray Robison, Jr, Burgess & Niple  
Berry Craig, C2 Strategic  
Mindy Peterson, C2 Strategic

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1. Project Presentation

Gary Valentine, KYTC executive advisor, presented interchange refinements for the US 60 and US 41 interchanges and innovative ideas for the KY 351 interchange with I-69. He first provided an I-69 ORX project overview and update and outlined the preferred alternative, Central Alternative 1B, that includes a tolled, 4-lane I-69 crossing and a non-tolled US 41 bridge. G. Valentine also outlined the anticipated schedule for construction of Section 1 and Section 2 and funding needs. Construction on Section 1 (KY 425 to US 60) is expected to begin in 2022 and conclude in 2025. Construction of Section 2, which includes the river crossing, is expected to begin in 2027 and conclude in 2031, although G. Valentine indicated the states are looking for ways to accelerate the schedule.

The US 60 refined interchange would extend a 5-lane urban arterial through the interchange (similar to US 60 to the west of Wathen Lane) with improved access to the NE quadrant of the

interchange and Tillman Bethel Road.

The US 41 refined interchange shifts the interchange to the north and includes a detention basin for Canoe Creek. Benefits include reducing the number of bridges needed, reducing downtown flooding and providing needed fill material to build I-69. It also provides the opportunity for several development opportunities after Section 2 construction.

Three innovative interchange options were provided for the KY 351 interchange with the Project Team's Jerry Leslie outlining that all would create gateway, streetscaping and landscaping opportunities for the city of Henderson. They include a single-point urban interchange (SPUI), a double roundabout and a triple roundabout option. The presentation included short video excerpts to better explain traffic movement for a SPUI and roundabouts.

G. Valentine also outlined the project timeline and indicated the environmental study is expected to be complete this year with a Record of Decision from Federal Highway. The team will be developing a formal cost estimate and financial plan. KYTC has already started acquiring some properties with full acquisition to begin in April. Construction on Section 1 is expected to begin in 2022.

The full presentation can be viewed here: <https://i69ohiorivercrossing.com/wp-content/uploads/2021/01/Henderson-City-County-Planning-Commission-Meeting-Presentation-January-2021.pdf>.

## 2. Questions and Answers

Q: This is a high traffic corridor, especially for school buses. Would that pose challenges, especially with the triple roundabout option? Would it be designed for buses and semi-trucks?

A: Yes, the roundabouts will be designed to carry buses and semi-trucks. S. Nicaise referenced a roundabout interchange at US 62 in Clark County, Indiana that is close to the Amazon distribution center and carries a high volume of truck traffic.

Comment: Dave Williams also expressed concerns about the triple roundabout option near the school and congestion and safety issues.

Response: Traffic studies have been conducted and more detailed traffic studies will be conducted.

Comment: Tommy Joe Fridy thought the triple roundabout option may be a better way to efficiently move school buses in and out of the middle school in the morning and afternoon. He suggested getting input from school officials as detailed traffic analysis is gathered.

Comment: Dickie Johnson indicated he was initially skeptical of the options but believes the triple roundabout may be the best option to efficiently move traffic.

Comment: Tom Williams thinks the double roundabout may be the best solution. He referenced roundabouts that work well elsewhere, such as I-70 in Vail, CO. He believes the double roundabout would be a signature interchange that could provide a gateway to Henderson and draws attention to 2<sup>nd</sup> Street. He applauded KYTC and the Project Team for its efforts.



Question: Brian Bishop (Planning Commission) suggested the Planning Commission consider a preference on landscaping vs. streetscaping.

Response: G. Valentine indicated the Project Team is working with a design firm and will be getting feedback from the Planning Commission through Brian Bishop's participation in a streetscape workgroup.

Comment: D. Williams asked how much traffic is expected to continue to use US 41 after the I-69 bridge is constructed.

Response (confirmed post meeting): Traffic modeling shows a fairly even split in traffic on the river crossings in 2045, with about 27,000 vehicles per day expected on the US 41 bridge and about 24,000 vehicles per day expected on the I-69 crossing.

Comment: B. Bishop asked for a copy of the presentation to share. It was shared that evening and posted to the project website.

Question: (Gray Hodge) Will plans be available?

Answer: G. Valentine will work with the Project Team to share drawings through the project website.

Question: (Bill Stark/Facebook): Is the main goal traffic safety or saving money by having to purchase less land?

Answer: G. Valentine says the goal is to complete I-69 safely and efficiently while being fiscally responsible.

Question: (Tom Williams): Are US 41 improvements and sidewalks included?

Answer: The existing US 41 strip is not part of this project. Sidewalks are part of the 351 project and sidewalks work well with roundabouts.

Comment: (B. Schneider): Local community leaders, advocates and officials will be key to enhancing opportunities for the US 41 strip. B. Schneider also praised the Project Team for its efforts.

Question: Central Alternative 1B calls for retaining one US 41 bridge, correct?

Answer: Yes, but both US 41 bridges will be in use until I-69 ORX is constructed and the decision could be revisited should circumstances change.

Comment: (Ron Faupel/Facebook): He's excited about the 351 options and indicated Kimsey Lane is the main route for cyclists so bike paths on the new road would be a great addition.

Response: G. Valentine thanked him for his comments.

Comment: (Tara Barney/Facebook): This is a very exciting project for the Henderson region. She thanked the Project Team for the information.

Comment (D. Williams): Commented on possible future development south of Henderson to Webster County and asked about future interchanges planned to the south.

Answer: (D. Henderson): Nothing is currently planned.

Question (E. Gorman/Facebook): When are results of the more detailed traffic studies expected?

Answer: Preliminary models are done. There's no timetable yet for the more detailed analysis.

Question (D. McGan/Facebook): Does Section One impact the proposed development of the Sports Complex in any way?

Answer: There is no impact.

Comment: (D. McGan/Facebook): He commented the type of signage used will have a significant impact on the amount of traffic coming to US 41.

Comment: C. McCollum mentioned the opportunities for incorporating horse trails and mentioned access to Green River Forest and a bike path behind Walmart and an opportunity to tie these items together.

Response: The Project Team's D. Prevost was asked to take a closer look and has since responded to B. Bishop to reiterate that a section of the Merrill Way Trail will be affected by the project but will be relocated and its connection to Kimsey Lane restored. Central Alternative 1B would maintain all existing roadway connections, allowing those routes to remain options for trails/bike routes in the future and the Project Team communicates with the City regarding opportunities to support its long-term multi-modal goals.

Question: (J. Troxel/Facebook): Was the presentation recorded?

Answer: Yes, it will be available on the Henderson City-County Planning Commission Facebook page.

Question: (J. Hauser/Facebook): Is there a map of this crossing?

Response: Maps will be posted on the project website: [I69OhioRiverCrossing.com](http://I69OhioRiverCrossing.com).

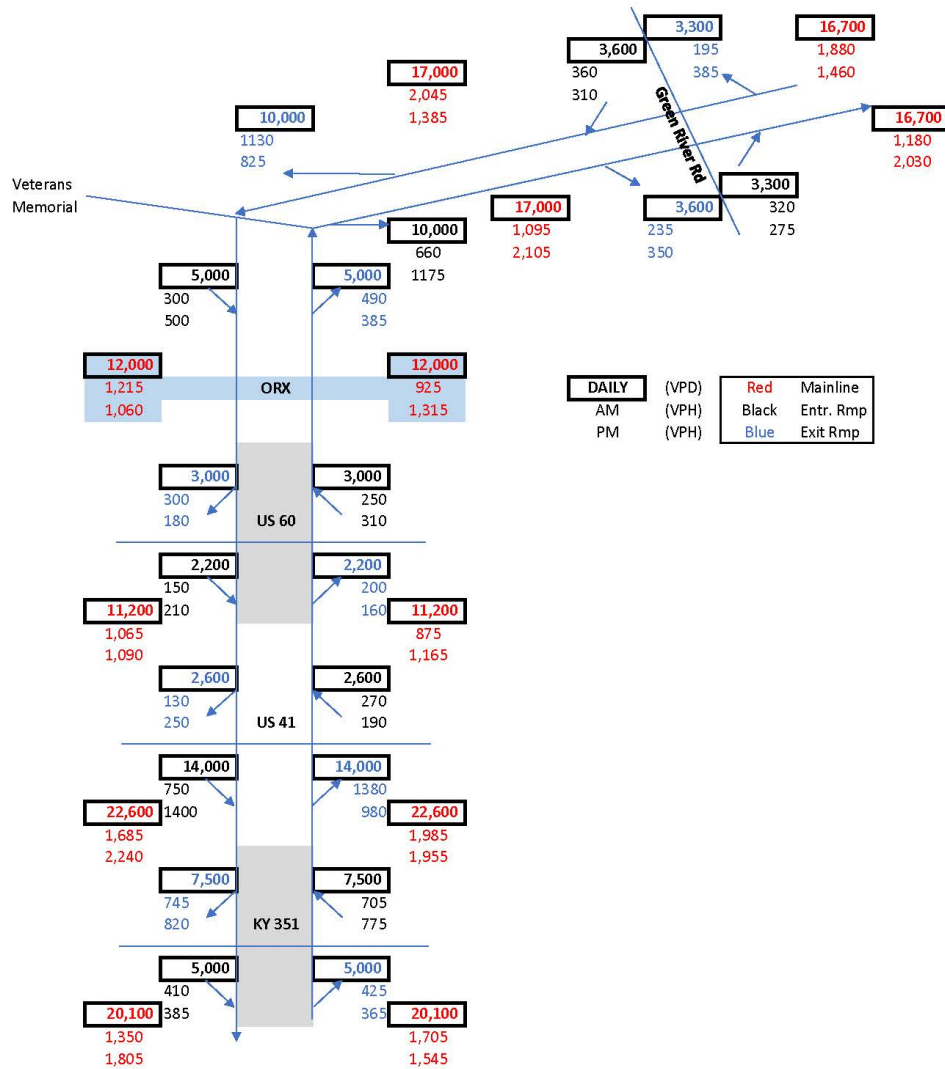
The interchange refinement maps have since been posted: <https://i69ohiorivercrossing.com/wp-content/uploads/2021/01/Interchange-Refinement-Maps-January-2021.pdf>.

# APPENDIX C

## Forecasted Traffic Volumes (2045)

Note: A single concept is shown for each interchange location; traffic volumes are not anticipated to change substantially based on the interchange concept selected.

**2045 Traffic Forecast Estimates**  
I-69 ORX Preferred Alternative

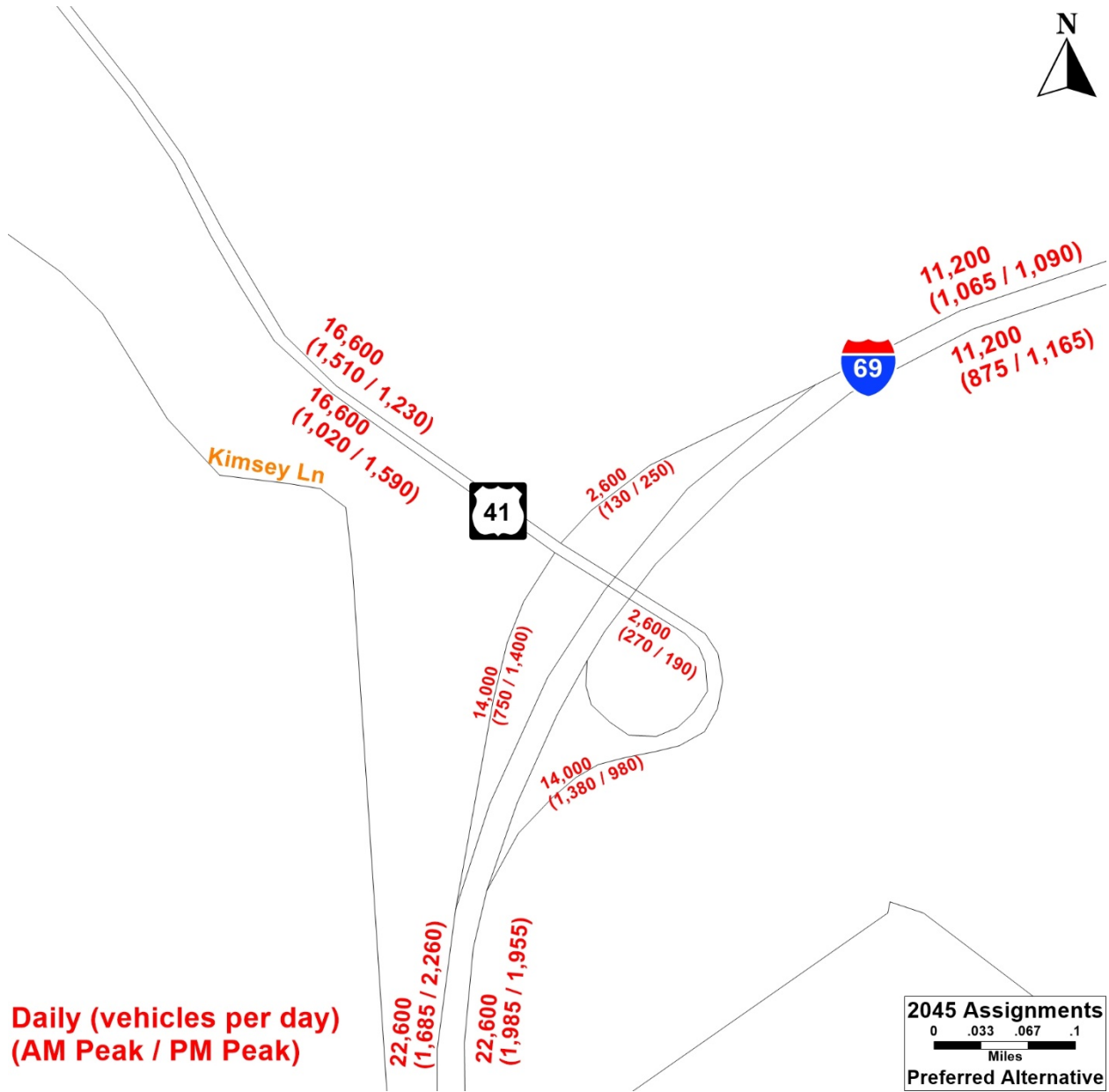




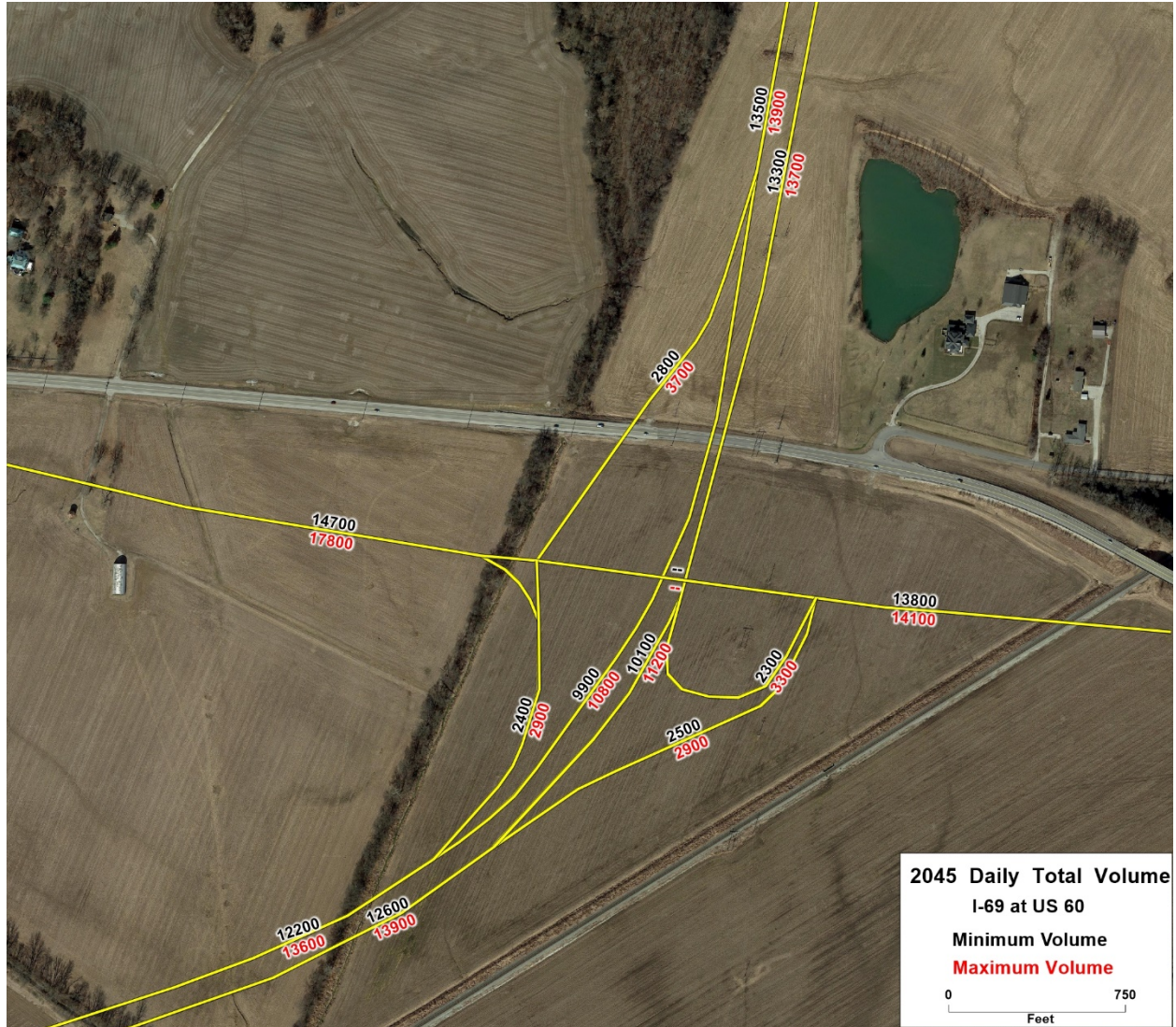


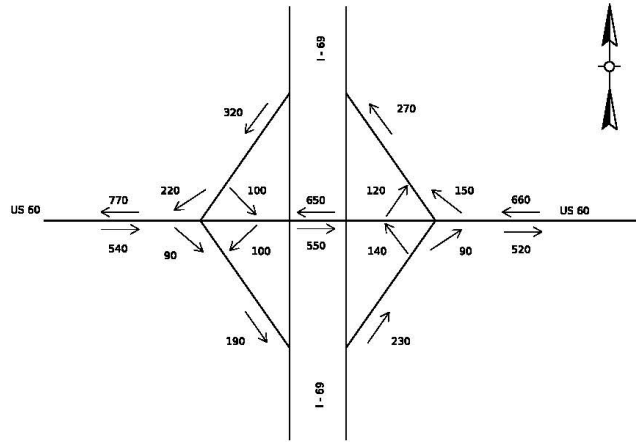






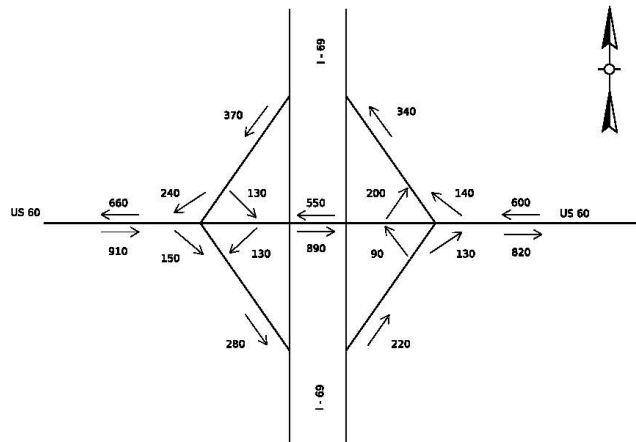






**2045 FULL BUILD AM DESIGN HOUR VOLUMES**

**US 60 @ I-69 Interchange - Henderson County**



**2045 FULL BUILD PM DESIGN HOUR VOLUMES**

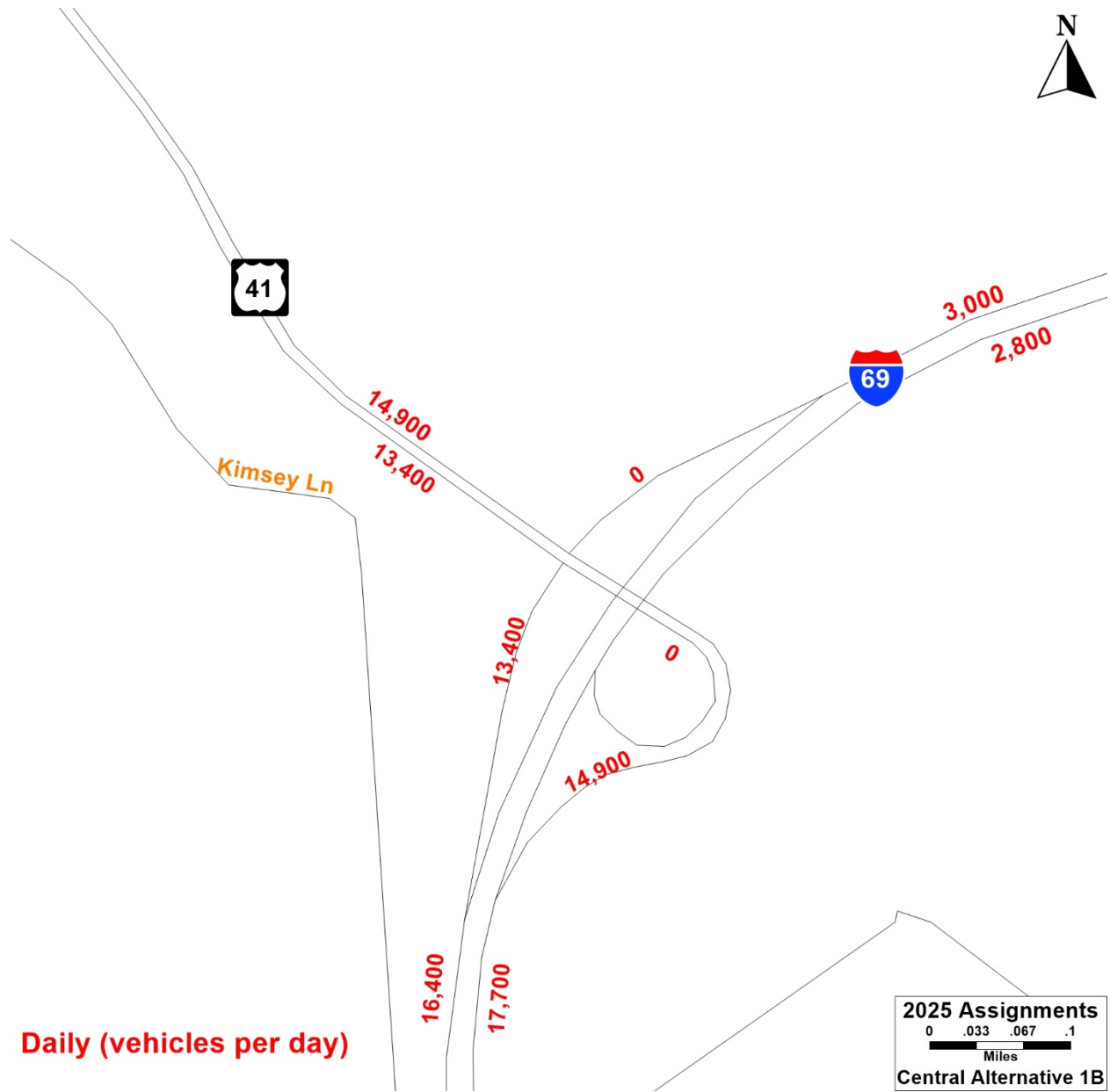
**US 60 @ I-69 Interchange - Henderson County**

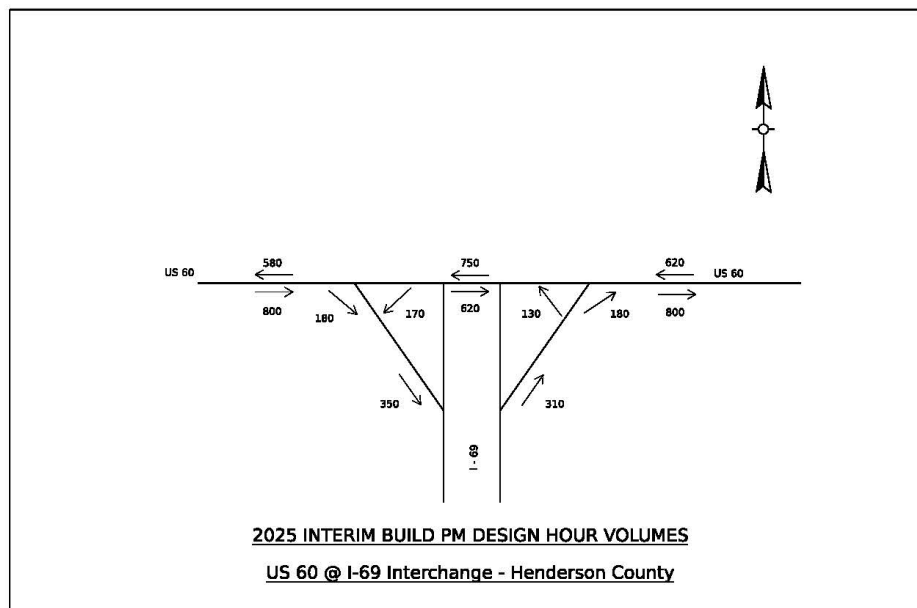
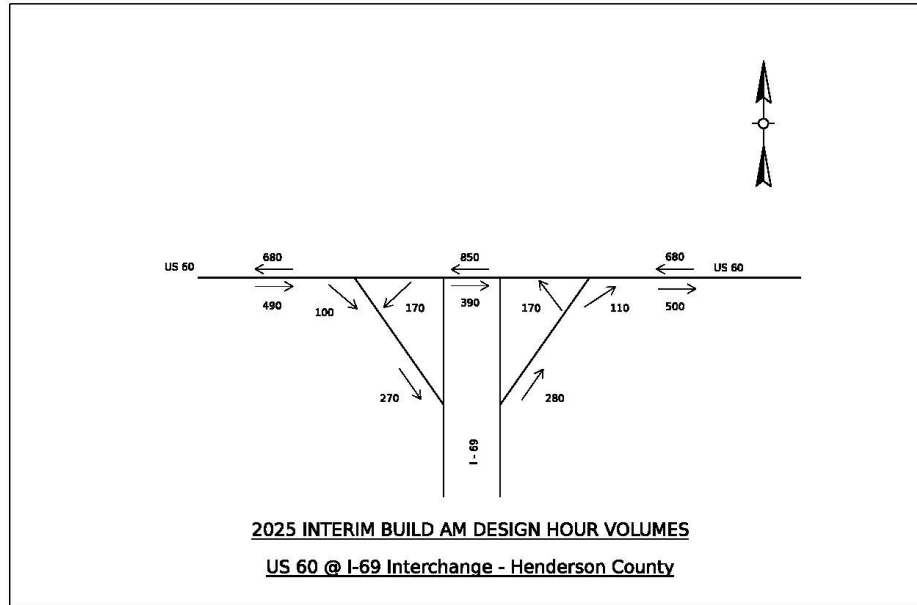


# APPENDIX D

## Forecasted Traffic Volumes (2025)

Note: A single concept is shown for each interchange location; traffic volumes are not anticipated to change substantially based on the interchange concept selected.





# APPENDIX E

## I-69 ORX Section 1 Geotechnical Report - Draft

Note: The purpose of this investigation was to define the subsurface conditions for the detention basin for the I-69 Cross-country alignment between US 41 and US 60.





January 21, 2021

Mr. Erik Scott, PE  
Kentucky Department of Highways  
Division of Structural Design  
Geotechnical Branch  
1236 Wilkinson Boulevard  
Frankfort, KY 40601-1200

RE: Geotechnical Memo  
I-69 Drainage Basin  
P-010-2020  
Item 2-1088.2  
Henderson, Kentucky

Dear Mr. Scott:

American Engineers, Inc. (AEI) is pleased to submit this geotechnical report that summarizes the results of our geotechnical exploration performed at the above referenced site.

## **I. Location and Description**

A geotechnical summary report has been completed for the subject project. The purpose of this investigation was to define the subsurface conditions for the detention basin for the I-69 Ohio River Crossing (I69 ORX) between US-41 and US-60.

## **II. Drilling and Sampling**

A boring plan was developed by AEI for the proposed basin footprint in relative accordance with the KYTC Geotechnical Manual. Borings were positioned at approximate 800-ft spacing to cover the entire footprint of the proposed basin. The borings were terminated at depths of about five feet below the maximum anticipated excavation limits of the basin. Five (5) piezometers were installed to obtain static groundwater levels. The piezometer borings were advanced beyond the initial estimated groundwater table encountered in the field. One boring was advanced to a depth of 60 feet near the proposed roadway alignment to collect data to inform slope stability analyses to be performed by the design-build team. Field staking of the borings was performed by AEI.

Drilling and sampling took place during December 2020 and was performed by AEI personnel utilizing track-mounted drilling equipment.

Soil test borings were completed within the basin footprint to provide information concerning the types and thicknesses of the residual soils. The borings were performed using 3 ¼-inch continuous flight hollow stem augers. A Graduate Geologist logged the soil cuttings sampled from the auger flights, undisturbed tube samples and recovered split-spoon samplers. Two (2) continuous standard penetration tests (SPTs) were performed at the existing ground surface to provide a more definitive topsoil thickness. Undisturbed thin-walled tube samples were obtained from critical cut sections, specifically where the basin is proximate to the proposed roadway alignment in the vicinity of B-1. Particular attention was given to the color, textures, plasticity's, relative moisture contents and consistencies of the recovered materials. Bag samples of the predominant soil horizons were obtained in each boring and transported to our laboratory for moisture-density and soil classification tests. Five (5) piezometers were installed to obtain static groundwater level. Typed drillers logs are provided in the appendices of this report.

Topsoil thickness was measured in the field and verified through loss on ignition (LOI) testing in the laboratory. The topsoil as measured in the field is recorded on the drillers logs in Appendix B. The topsoil thicknesses measured in the field ranged from 8 to 32 inches in depth. Results of LOI testing indicate low organic content, contrary to the field measurements of topsoil. The actual topsoil thickness is anticipated to be less than the amounts indicated on the driller's logs. We suggest an average design topsoil thickness of 12 inches. Near the bottom of the layers shown in the table below, the material is likely to be agriculturally disturbed, low organic content, highly aeriated silts and clays. The material in the upper 12 inches may be used as topsoil for dressing slopes in respect to Section 827.10 of the Standard Specifications for Road and Bridge Construction, current edition. Typically, the soil below 12 inches can be placed as fill material for embankment construction. In general, the soils from one (1) to two (2) feet below the ground surface should not be used within the upper two feet of subgrade due to the silty texture of material and the potential for dilatancy to cause pumping and rutting from cyclical construction traffic.

Groundwater was encountered in the borings at elevations ranging from 392.1 to 367.6 feet at the completion of drilling. Piezometers were installed in five (5) borings to provide a long-term indication of the groundwater level. Subsequent groundwater readings were obtained from 12/11/2020 to 1/14/2021. These readings indicate groundwater elevations that range from 393.6 to 371.9 feet. In the piezometers that were installed adjacent to canoe creek, water levels were above the adjacent natural channel elevation. This indicates that groundwater tends to flow toward the intersecting swales and creeks in the area. A summary of the groundwater readings is included Table 1 below.

**Table 1: Groundwater Elevations**

Boring Number	Surface Elevation (ft)	Groundwater Elevation (ft) (ATD)	Groundwater Elevation (ft) (12/11/2020)	Groundwater Elevation (ft) (1/7/2021)	Groundwater Elevation (ft) (1/14/2021)
PZ-1	381.1	367.6	375.3	374.4	371.9
PZ-2	388.0	375.8	383.8	384.1	384.6

**Table 1: Groundwater Elevations (Continued)**

Boring Number	Surface Elevation (ft)	Groundwater Elevation (ft) (ATD)	Groundwater Elevation (ft) (12/11/2020)	Groundwater Elevation (ft) (1/7/2021)	Groundwater Elevation (ft) (1/14/2021)
PZ-3	386.4	382.1	383.0	381.8	381.8
PZ-4	390.6	386.1	387.5	387.3	387.3
PZ-5	396.2	392.1	391.5	393.6	393.1

Refusal, as would be indicated by the Engineer or Driller on the field boring logs, indicates a depth where either essentially no downward progress can be made by the auger or where the N-value indicates essentially no penetration of the split-spoon sampler. It is normally indicative of a very hard or very dense material such as large boulders or the upper bedrock surface. Auger refusal was encountered in Boring B-1 at a depth of 60.5 feet. The remainder of the borings did not encounter refusal prior to reaching the boring termination depth. Typically, rock coring is required to determine the lithology of the underlying bedrock. Rock coring was beyond the scope of this investigation. However, rock coring was performed as a part of the preliminary investigation performed by Stantec dated, 1/9/2020. During the previous exploration shale and sandstone were encountered in the borings at similar refusal depths. Auger refusal data is shown in the following table.

**Table 2: Auger Refusal**

Boring No.	Auger Refusal (feet)
B-1	60.5

### **III. Laboratory Testing**

Laboratory testing performed by AEI was completed in accordance with applicable AASHTO and Kentucky Methods soil testing specifications. The laboratory testing results are summarized in this section and are included in the appendices of this report.

Natural moisture content determinations were performed on select samples from each five-foot drilling interval. The moisture content results of the samples are summarized in Table 3 below.

**Table 3: Natural Moisture Content**

Boring No.	Top Depth (ft)	Moisture Content (%)	Boring No.	Top Depth (ft)	Moisture Content (%)	Boring No.	Top Depth (ft)	Moisture Content (%)
B-1	2	26.4	B-11	1.5	27.1	B-21	10	26.7
B-1	4	26.5	B-11	1.8	25.8	B-21	12	26.7
B-1	9	38.2	B-11	7	25.8	B-22	0	23.5
B-1	14	27.9	B-11	10	27.3	B-22	1.5	24.8
B-1	19	37.3	B-11	12	27.3	B-22	1.9	26.3
B-1	24	35.7	B-12	0	25.2	B-22	7	26.3
B-1	29	26.4	B-12	1.4	26.0	B-22	10	26.3
B-1	34	26.3	B-12	1.5	24.1	B-22	12	26.3
B-1	39	21.9	B-12	7	26.0	B-23	0	20.5
B-1	44	23.6	B-12	10	32.3	B-23	1.5	23.1
B-1	49	39.0	B-12	12	32.3	B-23	1.6	26.9
B-1	54	48.7	B-13	0	25.6	B-23	7	26.9
B-1	59	25.9	B-13	1.4	24.5	B-23	10	27.9
B-2	4	23.9	B-13	1.5	24.5	B-23	12	27.9
B-2	9	29.8	B-13	8	30.4	B-101	0.8	31.1
B-2	14	28.4	B-13	9	24.5	B-101	2	26.4
B-2	19	33.0	B-13	12	30.4	B-101	4	26.5
B-2	24	43.0	B-14	0	24.6	B-101	9	38.2
B-3	2	20.2	B-14	1.4	28.6	B-101	14	27.9
B-3	9	25.8	B-14	1.5	28.6	B-101	19	37.3
B-3	14	26.8	B-14	7	28.5	B-101	24	35.7
B-3	19	31.1	B-14	9	26.5	B-101	29	26.4
B-3	24	24.4	B-14	12	30.5	B-101	34	26.3
B-4	0	22.3	B-15	0	25.3	B-101	39	21.9
B-4	1.5	26.3	B-15	1.5	25.7	B-101	44	23.6
B-4	1.6	26.7	B-15	1.6	25.7	B-101	49	39.0
B-4	7	26.7	B-15	7	30.4	B-101	54	48.7
B-4	12	29.7	B-15	9	25.7	B-101	59	25.9
B-4	12.5	25.6	B-15	14	30.4	B-102	0.7	31.6
B-4	17	33.8	B-16	0	26.6	B-102	4	23.9
B-5	0	17.7	B-16	1.5	27.0	B-102	9	29.8
B-5	1.5	18.0	B-16	1.7	27.0	B-102	14	28.4
B-5	1.6	25.9	B-16	7	31.0	B-102	19	33.0
B-5	7	25.7	B-16	9	27.0	B-102	24	43.0
B-5	12	24.8	B-16	12	31.0	B-103	0.7	25.7
B-5	17	27.1	B-17	0	26.1	B-103	2	20.2
B-6	0	30.0	B-17	1.3	26.1	B-103	9	25.8
B-6	1.5	23.1	B-17	1.5	26.1	B-103	14	26.8
B-6	9	27.6	B-17	7	27.1	B-103	19	31.1

**Table 3: Natural Moisture Content (Continued)**

Boring No.	Top Depth (ft)	Moisture Content (%)	Boring No.	Top Depth (ft)	Moisture Content (%)	Boring No.	Top Depth (ft)	Moisture Content (%)
B-6	14	98.1	B-17	7.5	27.2	B-103	24	24.4
B-7	0	17.2	B-17	12	27.0	PZ-1	0	32.8
B-7	1.5	24.1	B-18	0	25.9	PZ-1	1.5	23.4
B-7	2.1	29.3	B-18	1.5	25.2	PZ-1	1.6	24.3
B-7	7	30.1	B-18	1.7	25.2	PZ-1	7	27.9
B-7	12	28.5	B-18	7	27.6	PZ-1	12	20.7
B-8	0	30.6	B-18	7.5	25.4	PZ-2	0	23.3
B-8	1.5	34.0	B-18	12	29.9	PZ-2	1.5	26.1
B-8	2.7	28.0	B-19	0	22.8	PZ-2	1.9	20.8
B-8	7	27.4	B-19	1.5	25.8	PZ-2	7	4.1
B-8	12	28.6	B-19	7	25.8	PZ-2	12	27.4
B-9	0	24.0	B-19	10	26.8	PZ-2	17	30.9
B-9	1.5	25.5	B-19	12	26.8	PZ-3	0	25.3
B-9	2.5	26.1	B-20	0	23.5	PZ-3	1.5	25.2
B-9	7	25.8	B-20	1.5	25.1	PZ-3	1.6	27.7
B-9	12	26.5	B-20	1.7	27.2	PZ-3	7	27.7
B-10	0	29.8	B-20	7	27.2	PZ-4	0	28.0
B-10	1.4	42.4	B-20	10	26.1	PZ-4	1.5	26.4
B-10	1.5	26.5	B-20	12	26.1	PZ-4	1.6	27.3
B-10	7	42.4	B-21	0	23.9	PZ-4	7	27.3
B-10	9	29.7	B-21	1.4	27.2	PZ-5	0	28.1

The soils classify primarily as lean clay, CL, silt, ML and silty clay CL-ML according to the Unified Soil Classification System (USCCS). The soils classify primarily as A-6 and A-4, with one occurrence of A-7-6 in accordance with the AASHTO classification system. Results of classification testing are included the table below. The laboratory testing results are included in the appendices of this report.

**Table 4: Classification Test Results**

Boring No.	Top Depth (ft)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	LL	PL	PI	SG	AASHTO	USCS
B-1	0.8	0	1	78	22	33	14	19	2.67	A-6(18)	CL
B-2	0.7	0	2	72	28	38	19	19	2.72	A-6(19)	CL
B-3	1.6	0	1	81	19	32	19	13	2.63	A-6(13)	CL
B-4	0.7	0	1	82	18	34	20	14	2.69	A-6(14)	CL
B-5	1.6	0	1	74	26	35	19	16	2.66	A-6(16)	CL



**Table 4: Classification Test Results (Continued)**

Boring No.	Top Depth (ft)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	LL	PL	PI	SG	AASHTO	USCS
B-6	12.0	0	1	82	17	29	21	8	2.68	A-4(8)	CL
B-7	1.6	0	2	72	28	40	22	18	2.80	A-6(19)	CL
B-8	2.1	0	1	76	24	35	13	22	2.64	A-6(21)	CL
B-9	1.9	0	1	85	15	28	22	6	2.63	A-4(6)	CL-ML
B-10	2.7	0	2	82	18	30	21	9	2.68	A-4(9)	CL
B-11	2.5	0	2	79	21	34	23	11	2.64	A-6(12)	CL
B-12	1.4	0	1	69	31	44	21	23	2.66	A-7-6(25)	CL
B-13	9.0	0	1	80	20	32	20	12	2.63	A-6(12)	CL
B-14	1.6	0	1	78	22	34	20	14	2.64	A-6(14)	CL
B-15	1.4	0	2	73	27	37	18	19	2.72	A-6(19)	CL
B-16	10.0	0	1	79	21	31	20	11	2.65	A-6(11)	CL
B-17	1.8	1	1	77	23	30	20	10	3.19	A-4(9)	CL
B-18	10.0	0	1	86	14	29	20	9	2.68	A-4(8)	CL
B-19	1.6	0	1	82	18	32	23	9	2.62	A-4(9)	CL
B-20	1.4	0	1	75	25	37	21	16	2.69	A-6(17)	CL
B-21	8.0	0	1	77	22	36	18	18	2.66	A-6(18)	CL
B-22	1.4	0	1	67	32	40	26	14	2.66	A-6(16)	ML
B-23	7.0	0	1	76	23	37	20	17	2.66	A-6(18)	CL
B-24	1.6	0	1	75	24	31	15	16	2.76	A-6(15)	CL
B-25	7.0	0	1	76	23	32	22	10	2.61	A-4(10)	CL
B-26	1.7	0	1	75	24	36	21	15	2.67	A-6(16)	CL
B-27	7.0	0	1	83	16	29	22	7	2.67	A-4(7)	CL-ML
B-28	1.3	0	1	74	25	35	22	13	2.63	A-6(14)	CL
B-29	7.0	0	1	78	21	36	20	16	2.78	A-6(16)	CL
B-30	1.7	0	1	80	19	37	23	14	2.64	A-6(15)	CL
B-31	7.0	0	0	86	14	28	22	6	2.66	A-4(6)	CL-ML
B-33	10.0	0	1	82	17	30	21	9	2.72	A-4(9)	CL
B-34	1.7	1	1	77	21	34	22	12	2.63	A-6(13)	CL
B-35	10.0	1	2	83	14	30	19	11	2.73	A-6(10)	CL
B-36	1.9	0	1	79	20	31	20	11	2.72	A-6(11)	CL
B-37	10.0	0	1	80	19	19	17	2	2.63	A-4(0)	ML
B-38	1.4	0	1	78	21	32	19	13	2.65	A-6(13)	CL
B-39	10.0	0	1	75	24	33	22	11	2.65	A-6(11)	CL
B-40	2.0	0	1	76	23	36	23	13	2.74	A-6(14)	CL
B-41	1.6	1	1	85	13	29	20	9	2.73	A-4(8)	CL
B-42	10.0	0	1	80	19	30	21	9	2.67	A-4(9)	CL

CBR and Standard Proctor tests were performed on samples obtained from soils from the proposed basin excavation. Standard Proctor testing was performed in general accordance to KM 64-511 and CBR testing was performed in general accordance to KM 64-501. Results of Standard Proctor testing indicate maximum dry density values ranging from 104 to 110 pounds per cubic foot (pcf) with corresponding optimum moisture contents ranging from 14 to 17 percent. Results of CBR testing indicate a range of values from 6.7 to 14.3. When using Yoder's 90<sup>th</sup> percentile model a CBR of 7.3 is calculated and recommended for design purposes. Only 1 data point was less than the design value provided. The results of Standard Proctor and CBR testing are also reported in the table below.

**Table 5: CBR and Proctor Test Results**

Boring No.	Top Depth (ft)	CBR	Max Dry Density (pcf)	Max Optimum Moisture (%)	Natural Moisture Content (%)	NMC Percent Wet of Opt.
B-101	0.8	9.4	107.3	15.6	26.4	+10.8
B-4	1.6	9	108.6	15.2	26.7	+11.5
B-10	1.4	9.9	104.1	16.9	42.4	+25.5
B-10	9	7.7	107.1	16.2	29.7	+13.5
B-12	1.4	11.2	106.5	14.9	26.0	+11.1
B-14	7	10	107.3	17.3	28.5	+11.2
B-15	7	8.2	109.5	14.3	30.4	+16.1
B-16	1.7	8.8	103.7	16.1	27.0	+10.9
B-20	1.7	11.5	107.4	15.1	27.2	+12.1
B-21	1.4	6.7	104.8	17.0	27.2	+10.2
B-23	1.6	14.3	103.5	16.2	26.9	+10.7
B-23	10	12.3	110.2	14.3	27.9	+13.6
PZ-1	1.6	10.6	110.3	15.8	24.3	+8.5
PZ-2	1.9	14.2	108.2	14.8	20.8	+6.0
PZ-4	1.6	9.1	108.6	15.3	27.3	+12.0

Loss on ignition testing was performed on samples from the near surface material to better determine the topsoil thickness. Loss on ignition testing was performed in general accordance with ASTM D 2974. Results of LOI testing are included in the table below.

**Table 6: Loss on Ignition Results**

Boring No.	Depth (ft)	Organic Content (%)
B-5	0.0-1.5	2.8
B-5	1.5-3.0	1.8
B-6	1.5-3	1.6
B-8	0.0-1.5	2.8
B-8	1.5-3.0	1.9

**Table 6: Loss on Ignition Results (Continued)**

Boring No.	Depth (ft)	Organic Content (%)
B-10	1.5-3.0	3.0
B-11	1.5-3.0	2.9
B-12	0.0-1.5	3.1
B-12	1.5-3.0	2.3
B-14	0.0-1.5	2.8
B-14	1.5-3.0	2.6
B-18	1.5-3.0	3.3
B-19	0.0-1.5	3.4
B-20	1.5-3.0	2.6
B-22	1.5-3.0	3.3
B-23	1.5-3.0	1.7
PZ-2	1.5-3.0	2.4
PZ-5	1.5-3.0	3.0

Loss on ignition results are indicative of low organic content material. Per Section 827.10 of the Standard Specification for Road and Bridge Construction, current edition this material meets the minimum requirements for use as topsoil. We suggest that the upper 12 inches of excavation should be stockpiled to be used as topsoil for dressing fill slopes, etc. However, due to the low organic content of the material, the material below the upper 12 inches is suitable to be used as fill material for embankment construction, provided it is not placed in the upper two (2) feet of subgrade due to the silty texture of the material and the potential for dilatancy to cause pumping and rutting from cyclical construction traffic.

Unconfined compressive strength testing was performed on select undisturbed tube samples in general accordance with KM 64-522 and AASHTO T 208. Results of unconfined compressive strength testing is summarized in the table below.

**Table 7: Unconfined Compressive Strength Test Results**

Boring No.	Top Depth (ft)	Unconfined Compressive Strength (psf)	Dry Density (pcf)
B-1	2	888	92.7
B-2	9	2283	98.4
B-3	2	2332	98.7

Consolidated undrained triaxial compression testing was performed on in-situ and remolded samples in general accordance with KM 64-502 and AASHTO T 297. Unconsolidated undrained triaxial compression testing was performed in accordance with KM 64-521 and AASHTO T 296. Results of triaxial testing are included in the appendices of this report and summarized in the table below.

**Table 8: Consolidated Undrained Compressive Test Results**

Boring No.	Top Depth (ft)	Total Undrained Shear Strength (psf)	Effective Undrained Shear Strength (psf)	Effective Friction Angle
B-1	2.0	970	612	33.2°
B-1	24.0	875	792	17.5°
*B-12	1.4	215	670	23.0°

\*Remolded Sample

**Table 9: Unconsolidated Undrained Compressive Test Results**

Boring No.	Top Depth (ft)	Undrained Shear Strength (psf)
B-1	14.0	696
B-1	29.0	2,802
B-2	19.0	778
B-3	14.0	2,010

#### IV. Conclusions

The conclusions provided in this report are preliminary. The results of this investigation are not conclusive and should be verified through further exploration by the design build team. We provide the following conclusions to aid in the preliminary design and cost estimate.

Loss on ignition results are indicative of low organic content material. Per Section 827.10 of the Standard Specification for Road and Bridge Construction, current edition this material meets the minimum requirements for use as topsoil. We suggest that the upper 12 inches of excavation should be stockpiled to be used as topsoil for dressing fill slopes, etc. However, due to the low organic content of the material, the material below the upper 12 inches is suitable to be used as fill material for embankment construction, provided it is not placed in the upper two (2) feet of subgrade due to the silty texture of the material and the potential for dilatancy to cause pumping and rutting from cyclical construction traffic.

**The subgrade soils at the basin are six to 25 percent wet of the anticipated optimum moisture content for compaction.** The material should be dried prior to being utilized as fill. If schedule does not dictate, then farming and aeration can be utilized to allow the material to dry naturally. If faster drying times are required, chemical modification can be utilized such as lime or cement.

Dewatering methods will likely be necessary to facilitate basin excavation. The choice of dewatering method should be determined by the design-build team with the understanding that the basin excavation could extend well below the natural water table.

Chemical stabilization does not appear to be necessary based on the CBR results. However, chemical modification may be necessary to dry the soil.

It is our opinion that a “dry” basin can be designed provided that adequate positive drainage can be constructed throughout the basin toward the outlet. It should be expected however that depending on the slope within the basin many areas will be wet at different times of the year due to the basin being constructed below the water table as measured in the area.

During the preliminary investigation, the ramp at US-41 was proximate to the basin excavation. If the basin excavation is anticipated to impact the roadway construction slope stability analyses should be performed using the triaxial results from Boring B-1. If there are slope instability concerns, the basin excavation may be modified to create a larger bench from the toe of the roadway embankment to the top of the basin excavation. Maximum 2H:1V slopes are anticipated for the basin excavation provided that the saturation of the toe of the excavation does not create slope instability concerns. The basin slopes should be further evaluated for rapid drawdown conditions during design flood events.

We appreciate the opportunity to be of service to you on this project and hope to provide further support on this and other projects in the future. Please contact us if you have any questions regarding this report.

Respectfully submitted,

***American Engineers, Inc.***



Jackson Daugherty, PE, PMP  
Geotechnical Engineer



Dennis Mitchell, PE, PMP  
Senior Geotechnical Engineer



# APPENDIX A

## Boring Layout



Transportation



Geotechnical



Bridge & Structural



Site Design

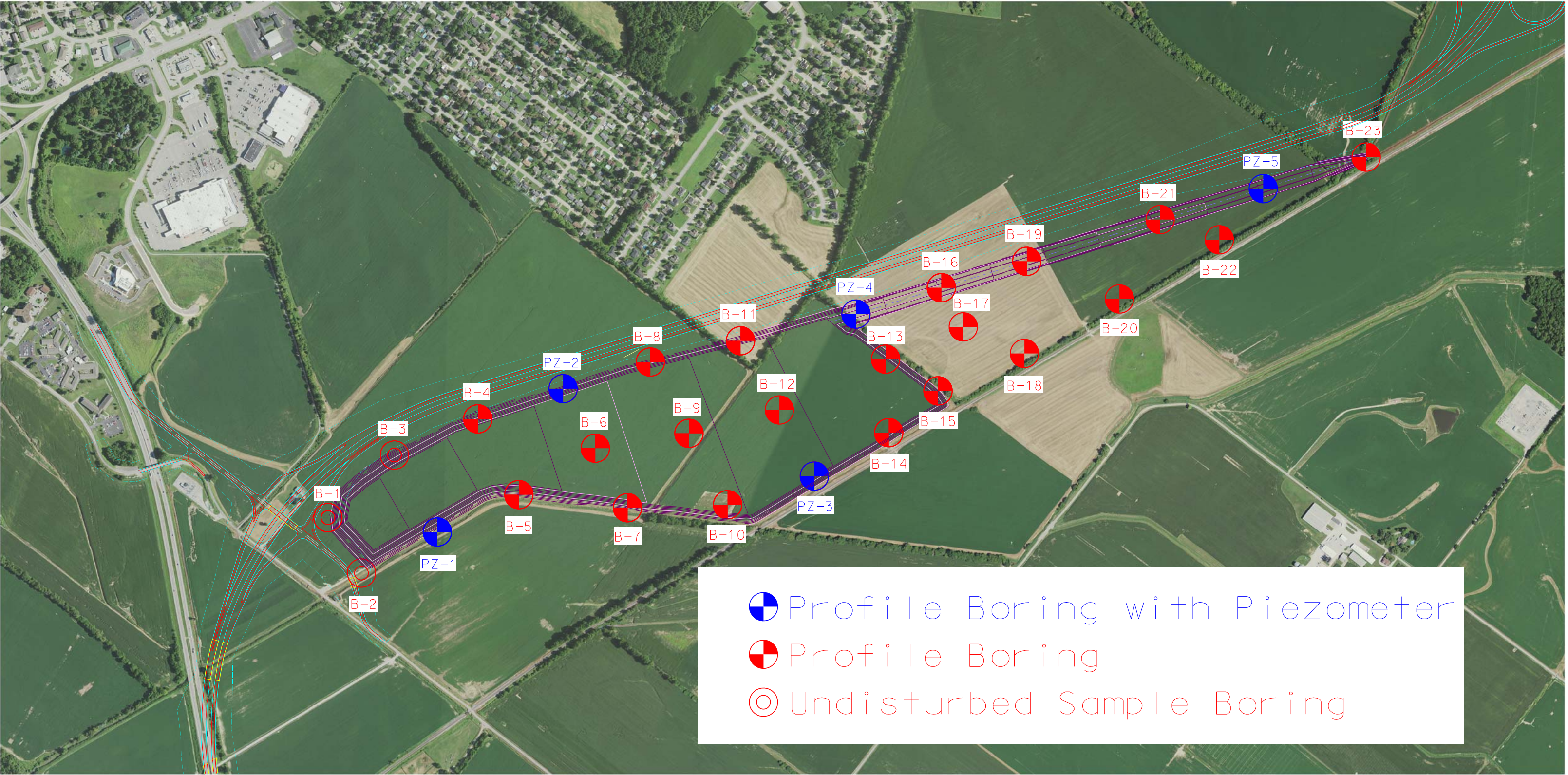


Geospatial



Environmental





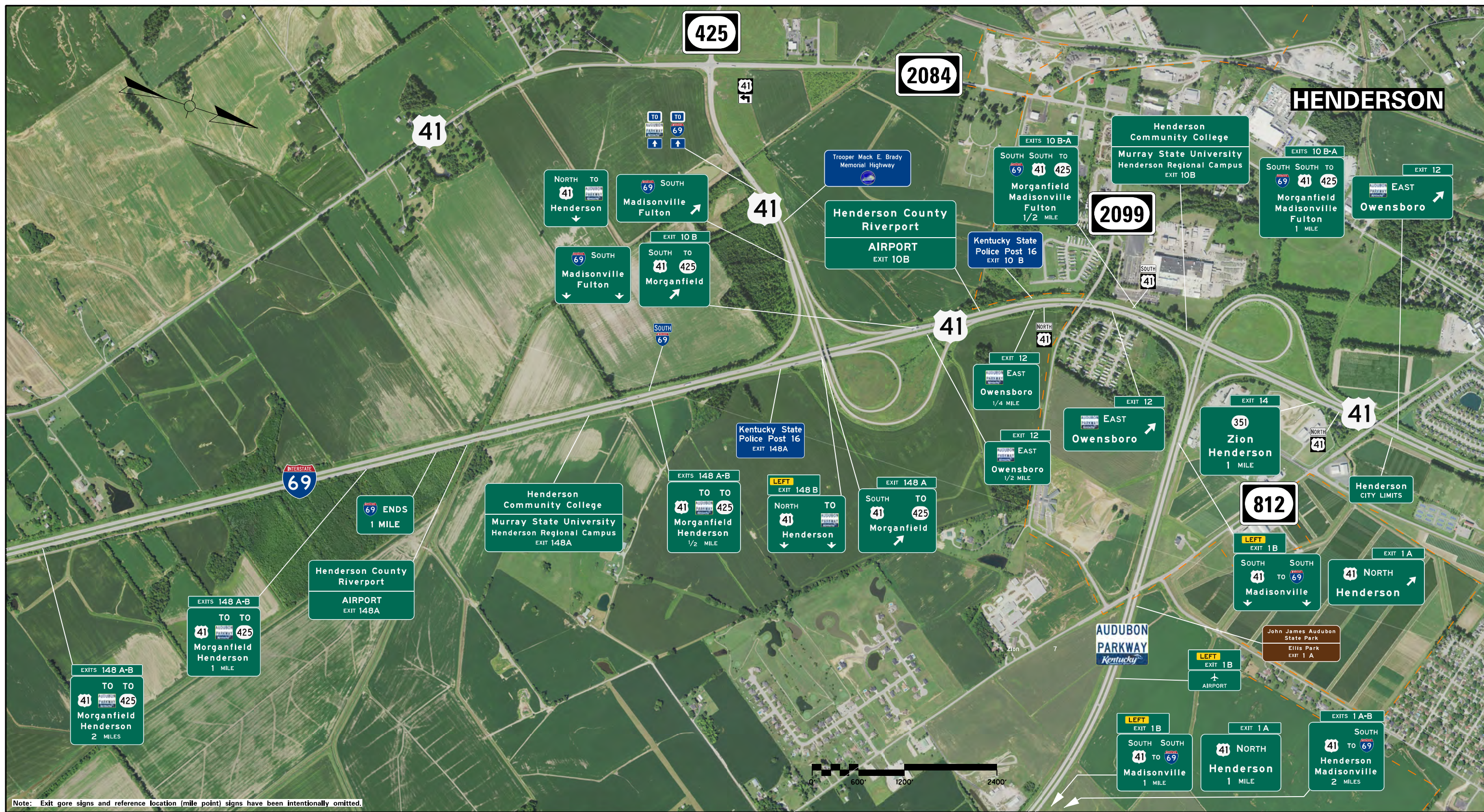


# APPENDIX F

## I-69 ORX Section 1 Route Number Maps







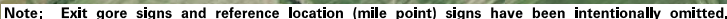












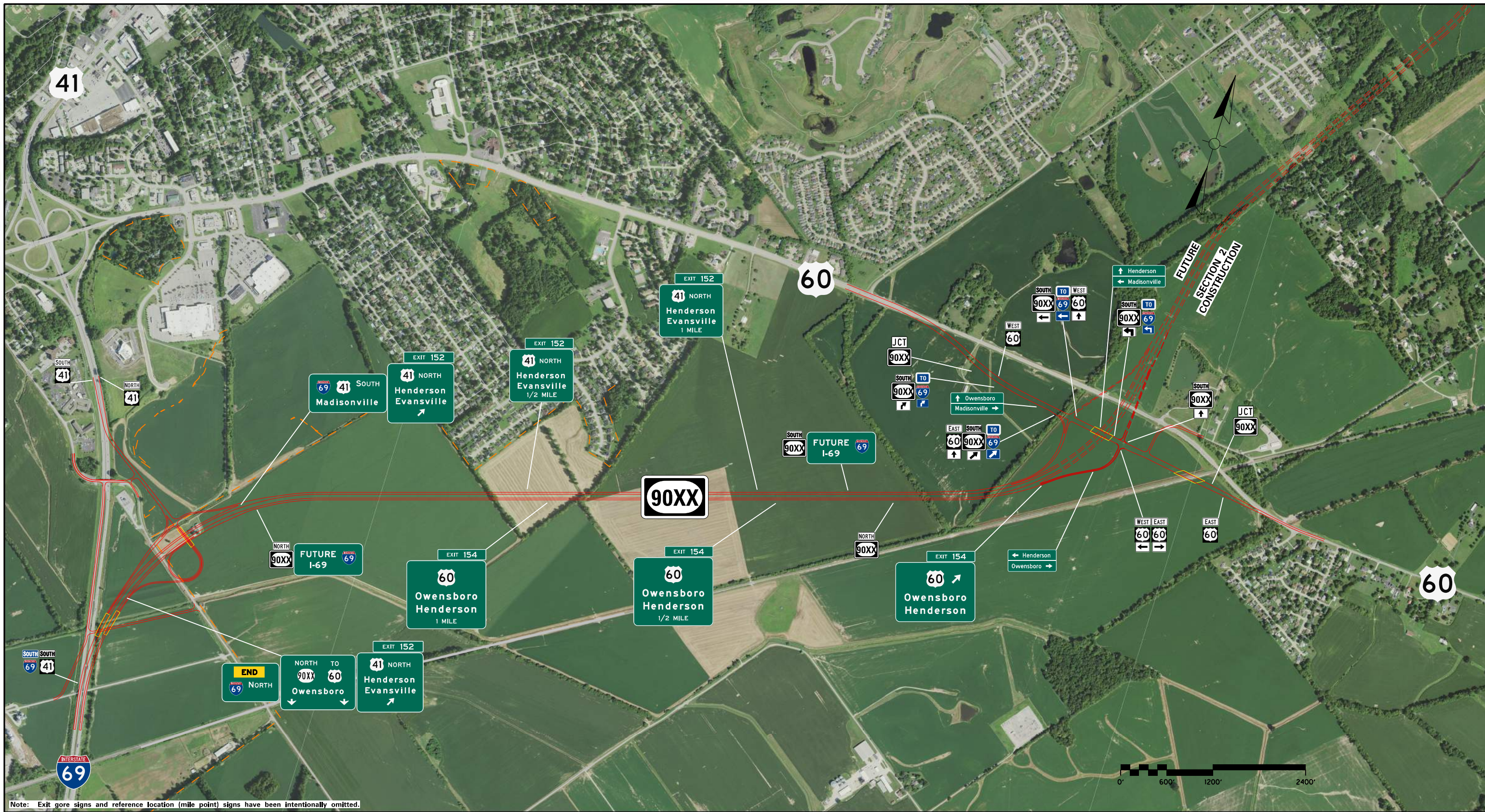












Note: Exit gore signs and reference location (mile point) signs have been intentionally omitted.





2nd ST

An aerial photograph of a residential street, Powell St, with a red location pin marking a specific spot on the road. The street is lined with houses and greenery.

May 2098

DOPLAR DR

US 41

MP 150.5  
MP 14

KY 351 ZION RD

TY 812 AIRLINE RD

KY 2084

## RAMPS TO BE REMOVED



**I-69 ORX - OHIO RIVER CROSSING PROJECT**  
**SECTION 1**  
**ROUTE NUMBERING TO U.S. 60 F-10**  
**KY 2084 DETAIL SHEET**







**PROJECT OFFICE**

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HENDERSON, KY 42420  
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