PROJECT INTENT MEMO

I-70 from SR 1 to Ohio State Line
Wayne County
13 January 2021
Corridor Development Office
Traffic Engineering Division

PURPOSE

The Greenfield District has prepared scoping documents for an added travel lanes project on I-70 from west of the SR 1 interchange to the Indiana/Ohio State Line. This memo is intended to serve as a supplement to these scoping documents to provide additional traffic analysis information necessary to develop the project.

BACKGROUND & EXISTING CONDITIONS

Presently, I-70 has two mainline travel lanes in either direction through the majority of Indiana, except for the Indianapolis area. INDOT's plan for I-65 and I-70, throughout the entire state of Indiana, is to have three mainline lanes in each direction. This proposed project will add a third travel lane in each direction in the existing median from 0.5 miles west of the SR 1 interchange to the Ohio state line, passing through the Richmond area. Per Indiana Design Manual and AASHTO Green Book, added travel lanes are carried 2000'-3000' beyond the previous interchange's entry ramp taper before being dropped to avoid creating operational issues. In this case, due to the proximity of the I-70/US 40 interchange to the Indiana/Ohio state line, dropping the lanes in this manner would require construction to continue into Ohio. This is further complicated by the proximity of a weigh station and the US 35 interchange east of the Indiana/Ohio state line, meaning that the added travel lanes would have to be extended even further into Ohio. Additionally, the Ohio Department of Transportation presently has no plans to add travel lanes on this segment of I-70 in Ohio. For these reasons, alternatives to drop the added travel lane within Indiana are necessary. This memo will evaluate potential modifications to the I-70/US 40 interchange to allow for the lane drop to occur at that location.

The present I-70/US 40 interchange is a partial cloverleaf type B interchange, providing free-flowing movements from I-70 to US 40 using two diagonal and two loop ramps. Access from US 40 to I-70 is provided by two diagonal ramps. No signals are currently present at the interchange on US 40.

PROPOSED WORK / IMPROVEMENTS & ESTIMATED COST

Costs shown below are estimated construction costs only in June 2020 dollars.

See attached drawings.

The proposed work to add travel lanes on I-70 and the costs associated with that project are discussed in the project scoping documents prepared by the Greenfield District. At the US 40 interchange, options were evaluated to eliminate the existing loop ramps. Doing so provides enough distance along I-70 within the interchange to drop the added travel lanes without needing to construct additional lanes in Ohio.

The preferred alternative is to convert the existing partial cloverleaf interchange into a simple diamond interchange. This work will involve demolishing both loop ramps and realigning the remaining 4 ramps so that they meet US 40 perpendicularly, where new coordinated traffic signals will be installed at the two new ramp terminals. Each off-ramp will be widened to accommodate a dedicated left and

right turn lane. The existing left turn lanes on US 40 will be extended slightly to the new ramp terminal intersections, and new right turn lanes will be constructed on US 40 at each ramp terminal.

Additionally, the existing ramp merge and diverge points on I-70 will be lengthened to meet current design standards. To accomplish this, additional pavement and earthwork will be required. A retaining wall may be required along the EB off-ramp deceleration lane in order to keep the slopes within existing right of way.

I-70/US 40 Interchange Modification Construction Cost: **$ 9.8 million**

I-70 at US 40, Wayne County, Cost Summary Table

Alternatives	Construction	PE (13%)	Utilities & Environmental (3%)	ROW	**Total**
Convert to signalized diamond interchange	$ 9,758,936	$ 1,268,662	$ 292,768	$ -	**$ 11,320,365**

Completing the interchange modification at US 40 will allow the lane drop for the added travel lane to occur within the interchange, saving substantial cost over constructing the lane drop in Ohio. To construct the lane drop, the existing bridges carrying I-70 over US 40 will be widened, as they are anticipated to have approximately 10 years of service life left. The pavement for the third lane will be constructed all the way to the Ohio State line, allowing for easy extension of the travel lanes into Ohio in the future. The eastbound lane drop will begin 500’ after the US 40 exit ramp painted gore nose. The 840’ lane drop taper will continue across the bridge leaving approximately 650’ between the end of the lane drop taper and the US 40 entrance ramp gore nose. The westbound lane add will begin 500’ after the US 40 exit ramp painted gore nose. The 300’ lane add taper will leave 300’ between the end of the taper and the bridges over US 40.

GEOMETRIC DEFICIENCIES

Presently, several elements of existing I-70 do not meet present design standards as outlined in the Indiana Design Manual. Many of these relate to ramp acceleration and deceleration lanes. These issues should be corrected as part of the added travel lanes project to improve operations along the corridor. The table below lists several specific issues that were identified as not complying with present design standards.

Interchange	Direction	Element	IDM Figure	Approx. Existing Length (ft)	Min. required per IDM (ft)	Notes
SR 1	EB	Deceleration Lane Taper	48-4A	150	300	
SR 1	EB	Exit Ramp Gore	48-4A	200	400	May require ramp lane and taper modifications to address
SR 1	EB	Acceleration Lane Taper	48-4C	350	600	
SR 1	WB	Deceleration Lane Taper	48-4A	200	300	
SR 1	WB	Exit Ramp Gore	48-4A	200	400	May require ramp lane and taper modifications to address
SR 1	WB	Acceleration Lane Taper	48-4C	400	600	
Rest Area	WB	Deceleration Lane Taper	48-4A	100	300	
Rest Area	WB	Acceleration Lane Taper	48-4C	300	600	
Centerville Rd	EB	Deceleration Lane Taper	48-4A	100	300	
Centerville Rd	EB	Exit Ramp Gore	48-4A	200	400	May require ramp lane and taper modifications to address
Centerville Rd	EB	Entrance Ramp Gore	48-4C	150	200	May require ramp lane and taper modifications to address
Centerville Rd	EB	Acceleration Lane Taper	48-4C	200	600	
Centerville Rd	WB	Deceleration Lane Taper	48-4A	100	300	
Centerville Rd	WB	Exit Ramp Gore	48-4A	200	400	May require ramp lane and taper modifications to address
Centerville Rd	WB	Entrance Ramp Gore	48-4D	150	200	May require ramp lane and taper modifications to address
Centerville Rd	WB	Acceleration Lane Taper	48-4C	200	600	
Weigh Station	WB	Acceleration Lane Taper	48-4C	300	600	
US 35	EB	Deceleration Lane Taper	48-4A	100	300	
US 35	EB	Exit Ramp Gore	48-4A	200	400	May require ramp lane and taper modifications to address
US 35	EB	Loop Ramp Entrance Gore	48-4C	100	200	May require loop ramp to be realigned to join I-70 at shallower angle
US 35	EB	Loop Ramp Exit Gore	48-4A	100	400	May require loop ramp to be realigned to leave I-70 at shallower angle
US 35	EB	Acceleration Lane Taper	48-4C	300	600	
US 35	WB	Deceleration Lane Taper	48-4A	100	300	
US 35	WB	Exit Ramp Gore	48-4A	220	400	May require ramp lane and taper modifications to address
US 35	WB	Deceleration Lane Taper	48-4A	150	300	
US 35	WB	Deceleration Lane Length	48-4A	210	400	Will likely require US 35 SB bridge reconstruction to address
US 35	WB	Exit Ramp Gore	48-4A	70	400	May require loop ramp to be realigned to leave I-70 at shallower angle
US 35	WB	Entrance Ramp Gore	48-4E	160	300	
US 35	WB	Second ramp lane drop	48-4E	400	700	
US 35	WB	Second ramp lane drop taper	48-4E	340	600	
SR 27	EB	Deceleration Lane Taper	48-4A	100	300	
SR 27	EB	Acceleration Lane Taper	48-4C	350	600	
SR 27	WB	Deceleration Lane Taper	48-4A	100	300	
SR 27	WB	Acceleration Lane Taper	48-4C	200	600	
SR 227	EB	Deceleration Lane Taper	48-4A	200	300	
SR 227	EB	Exit Ramp Gore	48-4A	120	400	May require ramp lane and taper modifications to address
SR 227	EB	Entrance Ramp Gore	48-4C	75	200	May require loop ramp to be realigned to join I-70 at shallower angle
SR 227	EB	Acceleration Lane Taper	48-4C	200	600	
SR 227	WB	Deceleration Lane Taper	48-4A	200	300	
SR 227	WB	Deceleration Lane Length	48-4A	560	TBD	Potentially lengthen deceleration lane due to tight loop ramp?
SR 227	WB	Exit Ramp Gore	48-4A	100	400	May require loop ramp to be realigned to leave I-70 at shallower angle
SR 227	WB	Entrance Ramp Gore	48-4C	100	200	
SR 227	WB	Acceleration Lane Length	48-4C	250	400	
SR 227	WB	Acceleration Lane Taper	48-4C	175	300	

Additionally, many ramps carry high volumes of trucks. Lengthening the acceleration and deceleration lane lengths beyond the minimum required per the IDM should be considered to provide additional distance for acceleration and deceleration. Lastly, mainline shoulder widths are too narrow in many locations. This should be corrected as part of the larger project. In some locations, this may require additional bridge widening to allow for a proper width shoulder on both sides of the travel lanes.

One location of note is the US 35 interchange, and the westbound I-70 to southbound US 35 ramp. Currently this ramp has a very short deceleration lane and taper to avoid the adjacent bridge carrying US 35. This should be addressed by lengthening the gore, deceleration lane, and taper length to meet current IDM standards. To do this, it is likely that both bridges carrying US 35 over I-70 will need to be replaced. A preliminary cost of $ 4-5 million per bridge has been estimated by Central Office Bridge design staff. A more detailed cost estimate is pending from Greenfield district staff for replacing these bridges. Due to the unusual form of this interchange and the costs necessary just to address geometric deficiencies at one ramp, it may be beneficial to further evaluate an overall interchange modification project at this location.

TRAFFIC ANALYSIS

The traffic data was analyzed using Highway Capacity Manual methodology within Synchro and HCS traffic analysis software. Traffic data came from the INDOT Traffic Count Database. Traffic was projected to 2046 using a 0.7% growth rate on mainline I-70, and a 1% growth rate at the I-70/US 40 interchange. These growth rates were coordinated with INDOT's Technical Planning and Programming Division for forecasting the traffic to the design year 2046. Additionally, an additional 20% lump sum growth was applied to the I-70/US 40 interchange as a sensitivity analysis to ensure the proposed work is robust enough to handle additional growth. The adjusted and balanced data was then used for analysis to produce results in density, speed, delay, level of service, and queuing.

Analysis of I-70 from SR 1 to Ohio State Line

Mainline I-70 was analyzed using HCM methodology within HCS software. Existing conditions were analyzed, as were future year conditions under anticipated traffic growth. Finally, the proposed improvement (added travel lanes) was evaluated under anticipated future traffic conditions. These results are summarized in the tables below, broken into eastbound and westbound directions, and AM and PM peak hours. To accommodate the interchange modification at US 40, the 2nd diverge segment in each direction (representing the diverge to the existing loop ramps) was changed to a basic segment in the proposed conditions analysis.

AM PEAK I-70 EASTBOUND FROM SR 1 TO OHIO STATE LINE – DELAY (SEC/VEH) & LOS SUMMARY TABLE

TRAFFIC YEAR		BASE – EXISTING CONDITIONS			2046 –EXISTING CONDITIONS			2046 – PROPOSED CONDITIONS		
SEGMENT	TYPE	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO
I-70 BEFORE SR 1	BASIC	A / 10.5	74.1	0.33	B / 12.7	74.1	0.39	A / 8.4	74.1	0.26
I-70 TO SR 1	DIVERGE	B / 12.8	60.8	0.33	B / 15.4	60.7	0.39	A / 9.6	65.4	0.26
SR 1 INTERNAL	BASIC	A / 9.7	74.1	0.30	B / 11.7	74.1	0.36	A / 7.8	74.1	0.24
SR 1 TO I-70	MERGE	B / 11.8	65.9	0.32	B / 14.2	65.7	0.39	A / 9.0	69.0	0.26
I-70 FROM SR 1 TO CENTERVILLE	BASIC	A / 10.5	75.4	0.33	B /12.6	75.4	0.40	A / 8.4	75.4	0.26
I-70 TO CENTERVILLE	DIVERGE	B / 13.0	600.9	0.33	B / 15.6	60.9	0.40	B / 9.6	65.8	0.26
CENTERVILLE INTERNAL	BASIC	A / 10.3	74.1	0.32	B / 12.3	74.1	0.38	A / 8.2	74.1	0.25
CENTERVILLE TO I-70	MERGE	B / 12.0	65.9	0.33	B / 14.4	65.7	0.39	A / 9.1	69.1	0.26
I-70 FROM CENTERVILLE TO US 35	BASIC	B / 11.1	72.2	0.33	B / 13.3	72.2	0.40	A / 8.8	72.2	0.27
I-70 TO SB US 35	DIVERGE	B / 13.1	60.8	0.33	B / 15.7	60.8	0.40	A / 9.7	65.6	0.27
US 35 INTERNAL 1	BASIC	A / 10.2	73.1	0.31	B / 12.2	73.1	0.37	A / 8.1	73.1	0.25
I-70 EB WEAVE	WEAVE	A / 7.5	71.6	0.25	A / 9.1	70.8	0.30	A / 6.8	71.4	0.22
US 35 INTERNAL 2	BASIC	A / 10.9	73.1	0.33	B / 13.1	73.1	0.40	A / 8.8	73.1	0.27
US 35 NB TO I-70	MERGE	B / 12.9	65.8	0.35	B / 15.5	65.5	0.42	B / 9.8	69.0	0.28
I-70 FROM US 35 TO US 27	BASIC	B / 11.7	73.1	0.36	B / 14.0	73.1	0.43	A / 9.4	73.1	0.28
I-70 TO US 27	DIVERGE	B / 14.1	60.5	0.36	B / 20.4	60.4	0.51	B / 12.5	65.4	0.34
US 27 INTERNAL	BASIC	A / 10.0	73.1	0.31	B / 14.9	73.1	0.45	A / 9.9	73.1	0.30
US 27 TO I-70	MERGE	B / 12.9	65.7	0.35	B / 18.8	64.9	0.51	B / 11.8	68.6	0.34
I-70 FROM US 27 TO SR 227	BASIC	B / 12.0	73.1	0.37	B / 17.3	72.7	0.53	B / 11.5	73.1	0.35
I-70 TO SR 227	DIVERGE	B / 14.5	60.7	0.37	B / 20.8	60.6	0.53	B / 12.8	65.7	0.35
SR 227 INTERNAL	BASIC	A / 10.9	73.1	0.33	B / 15.9	73.0	0.48	A / 10.6	73.1	0.32
SR 227 TO I-70	MERGE	B / 12.2	65.9	0.34	B / 18.0	65.2	0.49	B / 11.3	68.9	0.33
I-70 FROM SR 227 TO US 40	BASIC	B / 11.2	72.2	0.34	B / 16.3	72.2	0.49	A / 10.9	72.2	0.33
I-70 TO US 40 WB	DIVERGE	B / 13.4	60.4	0.34	C / 19.5	60.3	0.49	B / 12.0	65.1	0.33
I-70 TO US 40 EB	DIVERGE	A / 10.8	60.8	0.27	B / 16.4	60.7	0.41	A / 10.1	65.5	0.28
US 40 INTERNAL	BASIC	A / 8.3	73.6	0.26	B / 12.8	73.6	0.39	A / 8.5	73.6	0.26
US 40 TO I-70	MERGE	B / 10.1	66.0	0.28	B / 15.3	65.6	0.42	B / 9.7	69.0	0.28
I-70 FROM US 40 TO OHIO	BASIC	A / 9.2	73.6	0.28	B / 13.8	73.6	0.42	A / 9.2	73.6	0.28

PM PEAK I-70 EASTBOUND FROM SR 1 TO OHIO STATE LINE – DELAY (SEC/VEH) & LOS SUMMARY TABLE										
TRAFFIC YEAR		BASE – EXISTING CONDITIONS			2046 – EXISTING CONDITIONS			2046 – PROPOSED CONDITIONS		
SEGMENT	TYPE	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO
I-70 BEFORE SR 1	BASIC	B / 11.8	74.1	0.37	B / 14.2	74.1	0.44	A / 9.5	74.1	0.29
I-70 TO SR 1	DIVERGE	B / 14.5	60.5	0.37	B / 17.4	60.4	0.44	B / 10.8	65.2	0.29
SR 1 INTERNAL	BASIC	A / 10.5	74.1	0.32	B / 12.6	74.1	0.39	A / 8.4	74.1	0.26
SR 1 TO I-70	MERGE	B / 13.2	65.8	0.36	B / 15.9	65.5	0.43	B / 10.1	68.8	0.29
I-70 FROM SR 1 TO CENTERVILLE	BASIC	B / 11.8	75.4	0.37	B / 14.1	75.3	0.44	A / 9.4	75.4	0.30
I-70 TO CENTERVILLE	DIVERGE	B / 14.5	60.9	0.37	B / 17.4	60.9	0.44	B / 10.7	65.9	0.30
CENTERVILLE INTERNAL	BASIC	B / 11.4	74.1	0.35	B / 13.7	74.1	0.42	A / 9.1	74.1	0.28
CENTERVILLE TO I-70	MERGE	B / 13.6	65.8	0.37	B / 16.5	65.4	0.45	B / 10.4	68.9	0.30
I-70 FROM CENTERVILLE TO US 35	BASIC	B / 12.7	72.2	0.38	B / 15.2	72.2	0.46	A / 10.1	72.2	0.30
I-70 TO SB US 35	DIVERGE	B / 15.0	60.8	0.38	B / 18.0	60.8	0.46	B / 11.1	65.8	0.30
US 35 INTERNAL 1	BASIC	B / 11.8	73.1	0.36	B / 14.1	73.1	0.43	A / 9.4	73.1	0.29
I-70 EB WEAVE	WEAVE	A / 8.8	70.7	0.29	B / 10.7	69.7	0.35	A / 8.0	70.6	0.26
US 35 INTERNAL 2	BASIC	B / 12.6	73.1	0.38	B / 15.2	73.1	0.46	A / 10.1	73.1	0.31
US 35 NB TO I-70	MERGE	B / 15.2	65.6	0.41	B / 18.3	65.1	0.50	B / 11.6	68.8	0.33
I-70 FROM US 35 TO US 27	BASIC	B / 13.8	73.1	0.42	B / 16.6	72.9	0.50	A / 11.0	73.1	0.34
I-70 TO US 27	DIVERGE	B / 16.6	60.6	0.42	C / 23.9	60.5	0.60	B / 14.7	65.8	0.40
US 27 INTERNAL	BASIC	B / 12.2	73.1	0.37	C / 18.1	72.5	0.55	B / 12.0	73.1	0.36
US 27 TO I-70	MERGE	B / 16.5	65.3	0.45	C / 24.2	63.6	0.64	B / 15.1	67.9	0.43
I-70 FROM US 27 TO SR 227	BASIC	B / 15.6	73.1	0.47	C / 23.0	69.9	0.67	B / 14.7	73.1	0.45
I-70 TO SR 227	DIVERGE	B / 18.8	60.6	0.47	C / 26.6	60.4	0.67	B / 16.3	65.9	0.45
SR 227 INTERNAL	BASIC	B / 14.0	73.1	0.42	C / 20.5	71.4	0.61	B / 13.4	73.1	0.41
SR 227 TO I-70	MERGE	B / 15.9	65.5	0.43	C / 23.3	64.0	0.62	B / 14.5	68.4	0.41
I-70 FROM SR 227 TO US 40	BASIC	B / 14.5	72.2	0.44	D / 29.5	64.9	0.80	B / 17.7	71.9	0.53
I-70 TO US 40 WB	DIVERGE	B / 17.4	60.1	0.44	C / 25.0	59.9	0.62	B / 15.3	65.1	0.42
I-70 TO US 40 EB	DIVERGE	B / 13.6	60.6	0.34	B / 20.4	60.5	0.51	B / 12.5	65.5	0.34
US 40 INTERNAL	BASIC	A / 10.3	73.6	0.32	B / 15.6	73.5	0.48	A / 10.4	73.6	0.32
US 40 TO I-70	MERGE	B / 12.8	65.8	0.35	B / 19.3	64.9	0.52	B / 12.2	68.6	0.35
I-70 FROM US 40 TO OHIO	BASIC	B / 11.6	73.6	0.36	B / 17.4	73.1	0.53	B / 11.5	73.6	0.35

The eastbound analysis shows that this segment of I-70 presently performs well and doesn't experience any major slowdowns or bottlenecks. Under projected traffic, some operational issues are expected, particularly in the segments around Richmond. Speeds dip slightly, and density and V/C ratios increase noticeably. The added travel lane project is projected to correct these issues and ensure continued good operational performance for the whole segment in the eastbound direction.

AM PEAK I-70 WESTBOUND FROM OHIO STATE LINE TO SR 1 – DELAY (SEC/VEH) & LOS SUMMARY TABLE										
TRAFFIC YEAR		BASE – EXISTING CONDITIONS			2046 – EXISTING CONDITIONS			2046 – PROPOSED CONDITIONS		
SEGMENT	TYPE	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO
I-70 FROM OHIO TO US 40	BASIC	B / 11.8	73.6	0.36	B / 14.1	73.6	0.43	A / 9.4	73.6	0.29
I-70 TO US 40 EB	DIVERGE	A / 9.2	60.9	0.23	A / 11.1	60.9	0.28	A / 6.9	65.4	0.19
I-70 TO US 40 WB	DIVERGE	A / 8.9	60.7	0.23	A / 10.7	60.7	0.27	A / 6.7	65.0	0.18
US 40 INTERNAL	BASIC	A / 6.6	73.6	0.20	A / 7.9	73.6	0.24	A / 5.3	73.6	0.16
US 40 TO I-70	MERGE	B / 9.7	66.1	0.27	A / 11.7	65.9	0.32	A / 7.5	68.7	0.21
I-70 BETWEEN US 40 AND SR 227	BASIC	A / 8.6	72.2	0.26	A / 10.3	72.2	0.31	A / 6.9	72.2	0.21
I-70 TO SR 227	DIVERGE	A / 10.2	61.0	0.26	B / 12.2	61.0	0.31	A 7.6	65.7	0.21
SR 227 INTERNAL	BASIC	A / 8.4	73.1	0.26	A / 73.1	73.1	0.31	A / 6.7	73.1	0.21
SR 227 TO I-70	MERGE	B / 10.0	65.2	0.27	B / 12.1	65.1	0.33	B / 7.6	68.8	0.22
I-70 BETWEEN SR 227 AND US 27	BASIC	A / 8.9	73.1	0.27	A / 10.7	73.1	0.33	A / 7.1	73.1	0.22
I-70 TO US 27	DIVERGE	A / 10.8	60.4	0.27	B / 13.0	60.3	0.33	A / 8.1	64.5	0.22
US 27 INTERNAL	BASIC	A / 7.5	73.1	0.23	A / 9.0	73.1	0.27	A / 6.0	73.1	0.18
US 27 TO I-70	MERGE	B / 9.5	66.1	0.26	B / 11.5	65.9	0.32	A / 7.3	69.1	0.21
I-70 BETWEEN US 27 AND US 35	BASIC	A / 8.6	73.1	0.26	A / 10.3	73.1	0.31	A / 6.8	73.1	0.21
I-70 TO US 35 NB	DIVERGE	A / 10.3	60.5	0.26	B / 14.9	60.4	0.38	A / 9.3	64.9	0.25
I-70 TO US 35 SB	DIVERGE	A / 9.1	60.9	0.23	B / 13.4	60.9	0.34	A / 8.3	65.6	0.23
US 35 INTERNAL	BASIC	A / 7.3	72.6	0.22	A / 10.9	72.6	0.33	A / 7.2	72.6	0.22
US 35 TO I-70	MERGE	A / 3.5	75.4	0.11	A / 5.2	75.4	0.16	A / 4.2	75.4	0.13
I-70 FROM US 35 TO SCALES	BASIC	A / 5.3	72.6	0.16	A / 7.7	72.6	0.23	A / 5.8	72.6	0.18
I-70 TO SCALES	DIVERGE	A / 5.1	75.4	0.16	A / 7.4	75.4	0.23	A / 5.6	75.4	0.18
SCALES INTERNAL	BASIC	A / 7.8	71.7	0.23	B / 11.5	71.7	0.34	A / 7.6	71.7	0.23
SCALES TO I-70	MERGE	A / 9.0	66.1	0.25	B / 13.1	65.8	0.36	A / 8.3	69.2	0.24
I-70 FROM SCALES TO CENTERVILLE	BASIC	A / 8.0	71.7	0.24	B / 11.7	71.7	0.35	A / 7.8	71.7	0.23
I-70 TO CENTERVILLE	DIVERGE	A / 9.5	61.0	0.24	B / 13.8	60.9	0.35	A / 8.5	65.7	0.23
CENTERVILLE INTERNAL	BASIC	A / 7.6	72.2	0.23	B / 11.3	72.2	0.34	A / 7.5	72.2	0.23
CENTERVILLE TO I-70	MERGE	A / 9.0	66.1	0.25	B / 13.2	65.8	0.36	A / 8.3	69.2	0.24
I-70 FROM CENTERVILLE TO REST AREA	BASIC	A / 8.1	72.6	0.25	B / 11.8	72.6	0.36	A / 7.9	72.6	0.24
I-70 TO REST AREA	DIVERGE	A / 9.7	60.7	0.25	B / 14.2	60.6	0.36	A / 8.8	65.2	0.24
REST AREA INTERNAL	BASIC	A / 7.6	73.1	0.23	B / 11.1	73.1	0.34	A / 7.4	73.1	0.23
REST AREA TO I-70	MERGE	B / 9.4	66.1	0.26	B / 13.6	65.8	0.37	A / 8.6	69.1	0.25
I-70 FROM REST AREA TO SR 1	BASIC	A / 8.0	74.1	0.25	B / 11.6	74.1	0.36	A / 7.7	74.1	0.24
I-70 TO SR 1	DIVERGE	A / 9.7	60.9	0.25	B / 14.1	60.8	0.36	A / 8.7	65.5	0.24
SR 1 INTERNAL	BASIC	A / 7.5	74.1	0.23	A / 11.0	74.1	0.34	A / 7.4	74.1	0.23
SR 1 TO I-70	MERGE	B / 9.4	66.1	0.26	B / 13.6	65.8	0.37	A / 8.7	69.0	0.25
I-70 AFTER SR 1	BASIC	A / 8.2	74.1	0.25	B / 11.8	74.1	0.37	A / 7.9	74.1	0.24

PM PEAK I-70 WESTBOUND FROM OHIO STATE LINE TO SR 1 – DELAY (SEC/VEH) & LOS SUMMARY TABLE										
TRAFFIC YEAR		BASE – EXISTING CONDITIONS			2046 – EXISTING CONDITIONS			2046 – PROPOSED CONDITIONS		
SEGMENT	TYPE	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO	LOS/DENSITY (PC/MI/LN)	SPEED (MI/HR)	V/C RATIO
I-70 FROM OHIO TO US 40	BASIC	B / 14.0	73.6	0.43	B / 17.0	73.2	0.52	B / 11.2	73.6	0.34
I-70 TO US 40 EB	DIVERGE	A / 11.0	60.9	0.28	B / 13.2	60.8	0.34	A / 8.2	65.4	0.22
I-70 TO US 40 WB	DIVERGE	A / 10.7	60.6	0.27	B / 12.8	60.5	0.32	A / 8.0	64.9	0.22
US 40 INTERNAL	BASIC	A / 7.8	73.6	0.24	A / 9.3	73.6	0.29	A / 6.2	73.6	0.19
US 40 TO I-70	MERGE	B / 11.7	65.9	0.32	B / 14.1	65.7	0.39	B / 9.0	68.6	0.26
I-70 BETWEEN US 40 AND SR 227	BASIC	A / 10.3	72.2	0.31	B / 12.4	72.2	0.37	A / 8.2	72.2	0.25
I-70 TO SR 227	DIVERGE	B / 12.2	61.0	0.31	B / 14.6	61.0	0.37	A / 9.0	65.8	0.25
SR 227 INTERNAL	BASIC	A / 9.9	73.1	0.30	B / 11.9	73.1	0.36	A / 8.0	73.1	0.24
SR 227 TO I-70	MERGE	B / 12.0	65.1	0.32	B / 14.4	64.9	0.39	B / 9.1	68.6	0.26
I-70 BETWEEN SR 227 AND US 27	BASIC	A / 10.6	73.1	0.32	B / 12.7	73.1	0.39	A / 8.5	73.1	0.26
I-70 TO US 27	DIVERGE	B / 12.9	60.2	0.32	B / 15.5	60.1	0.39	A / 9.6	64.4	0.26
US 27 INTERNAL	BASIC	A / 8.8	73.1	0.27	A / 10.6	73.1	0.32	A / 7.0	73.1	0.21
US 27 TO I-70	MERGE	B / 11.9	65.9	0.33	B / 14.4	65.7	0.39	B / 9.1	68.8	0.26
I-70 BETWEEN US 27 AND US 35	BASIC	A / 10.6	73.1	0.32	B / 12.8	73.1	0.39	A / 8.5	73.1	0.26
I-70 TO US 35 NB	DIVERGE	B / 12.9	60.2	0.32	B / 18.7	60.0	0.47	B / 11.6	64.6	0.31
I-70 TO US 35 SB	DIVERGE	A / 10.9	60.9	0.28	B / 16.2	60.8	0.41	A / 10.0	65.7	0.27
US 35 INTERNAL	BASIC	A / 8.7	72.6	0.26	B / 13.0	72.6	0.39	A / 8.7	72.6	0.26
US 35 TO I-70	MERGE	A / 4.2	75.4	0.13	A / 6.3	75.4	0.20	A / 5.0	75.4	0.16
I-70 FROM US 35 TO SCALES	BASIC	A / 6.3	72.6	0.19	A / 9.3	72.6	0.28	A / 7.0	72.6	0.21
I-70 TO SCALES	DIVERGE	A / 6.1	75.4	0.19	A / 9.0	75.4	0.28	A / 6.7	75.4	0.21
SCALES INTERNAL	BASIC	A / 9.4	71.7	0.28	B / 13.9	71.7	0.42	A / 9.3	71.7	0.28
SCALES TO I-70	MERGE	B / 10.7	66.0	0.29	B / 15.8	65.5	0.43	B / 10.0	69.0	0.29
I-70 FROM SCALES TO CENTERVILLE	BASIC	A / 9.7	71.1	0.29	B / 14.2	71.7	0.42	A / 9.5	71.7	0.28
I-70 TO CENTERVILLE	DIVERGE	A / 11.4	60.6	0.29	B / 16.8	60.5	0.42	B / 10.4	65.3	0.28
CENTERVILLE INTERNAL	BASIC	A / 8.5	72.2	0.26	B / 12.8	72.2	0.38	A / 8.5	72.2	0.26
CENTERVILLE TO I-70	MERGE	B / 10.1	66.0	0.28	B / 15.0	65.6	0.41	B / 9.5	69.0	0.27
I-70 FROM CENTERVILLE TO REST AREA	BASIC	A / 9.1	72.6	0.27	B / 13.4	72.6	0.41	A / 9.0	72.6	0.27
I-70 TO REST AREA	DIVERGE	A / 10.8	60.7	0.27	B / 16.1	60.7	0.41	B / 9.9	65.5	0.27
REST AREA INTERNAL	BASIC	A / 8.5	73.1	0.26	B / 12.8	73.1	0.39	A / 8.5	73.1	0.26
REST AREA TO I-70	MERGE	B / 10.4	66.0	0.29	B / 15.4	65.6	0.42	B / 9.7	69.0	0.28
I-70 FROM REST AREA TO SR 1	BASIC	A / 8.9	74.1	0.27	B / 13.2	74.1	0.41	A / 8.8	74.1	0.27
I-70 TO SR 1	DIVERGE	A / 10.9	60.5	0.27	B / 16.2	60.4	0.41	B / 10.0	65.0	0.27
SR 1 INTERNAL	BASIC	A / 7.7	74.1	0.24	B / 11.7	74.1	0.36	A / 7.8	74.1	0.24
SR 1 TO I-70	MERGE	B / 9.7	66.1	0.27	B / 14.5	65.7	0.40	A / 9.2	69.0	0.27
I-70 AFTER SR 1	BASIC	A / 8.4	74.1	0.26	B / 12.6	74.1	0.39	A / 8.4	74.1	0.26

The westbound analysis shows that this segment of I-70 also performs well in the present and doesn't experience any major slowdowns or bottlenecks. Further, under projected traffic, no operational issues are anticipated with this segment of I-70. The added travel lane project is projected to improve operations to an even higher level, ensuring continued good operational performance for the whole segment in the westbound direction.

An additional analysis was done to determine the effects of a work zone or incident on operations. Work zones with single lane closures were added to the HCS analysis in two locations along the corridor. An incident that closes a single lane would likely have similar operational characteristics as well. Operations through the work zone degrade significantly, in most cases LOS drops to E or F, and speeds drop significantly, even below the work zone speed limit. In some cases, including a work zone also causes similar operational issues on the upstream segment as vehicles are forced into a single lane to pass through the work zone.

Analysis of I-70 and US 40 Interchange

The I-70 at US 40 interchange was analyzed using HCM methodology within Synchro traffic analysis software. Existing conditions were analyzed, as were future year conditions under anticipated traffic growth. Finally, several proposed improvements were evaluated under anticipated future traffic conditions, including an additional 20% traffic growth applied as a sensitivity analysis. Due to the desire to provide space within the interchange to drop the added travel lane, only diamond interchange forms were evaluated, and it was found that a simple diamond with traffic signal control at the ramp terminals will provide adequate operation through the design year. Additionally, this design will allow for modifications to be made in the future if additional traffic growth warrants the need for additional improvements (e.g. additional turning lanes). The results of this analysis are summarized in the tables below for each ramp terminal.

I-70 (EASTBOUND RAMP TERMINAL) AT US 40- DELAY (SEC/VEH) & LOS SUMMARY TABLE

CONDITION	TRAFFIC YEAR	AM PEAK HOUR			PM PEAK HOUR		
		I-70 RAMP	US 40 EB	US 40 WB	I-70 RAMP	US 40 EB	US 40 WB
PROPOSED APPROACH LOS	2046	B	A	A	C	B	A
PROPOSED APPROACH DELAY	2046	13.3	8.9	7.5	24.8	11.9	0.6
PROPOSED QUEUE (95TH PERCENTILE)	2046	45	18	22	64	21	13
PROPOSED APPROACH LOS	2046 + 20%	B	A	A	D	A	B
PROPOSED APPROACH DELAY	2046 + 20%	13.5	5.6	7.1	44.1	4.7	17.0
PROPOSED QUEUE (95TH PERCENTILE)	2046 + 20%	48	20	4	116	59	65

I-70 (WESTBOUND RAMP TERMINAL) AT US 40 - DELAY (SEC/VEH) & LOS SUMMARY TABLE

CONDITION	TRAFFIC YEAR	AM PEAK HOUR			PM PEAK HOUR		
		I-70 RAMP	US 40 EB	US 40 WB	I-70 RAMP	US 40 EB	US 40 WB
PROPOSED APPROACH LOS	2046	B	B	B	B	A	B
PROPOSED APPROACH DELAY	2046	14.4	10.4	13.1	15.2	8.1	13.5
PROPOSED QUEUE (95TH PERCENTILE)	2046	56	40	7	66	99	10
PROPOSED APPROACH LOS	2046 + 20%	B	A	B	C	A	C
PROPOSED APPROACH DELAY	2046 + 20%	14.9	8.5	13.3	27.9	3.8	26.5
PROPOSED QUEUE (95TH PERCENTILE)	2046 + 20%	63	4	13	123	34	64

The analysis results show that the proposed diamond interchange will operate well, with no operational issues projected, even under an additional 20% traffic scenario. The longest queue expected is only 123 feet, or approximately 5 vehicles. all approaches operate at or well above LOS D, with a

maximum approach delay of 44.1 seconds, observed only under the additional 20% traffic sensitivity scenario. Stop control would be viable for the ramp terminals in this case, however signals are proposed for safety reasons as US 40 is a high speed divided facility.

POTENTIAL PROJECT ISSUES

Right of way may be a concern in the northwest quadrant of the interchange, where deceleration lane lengthening is recommended, due to the steep grade adjacent to the interchange. This may be avoided by using retaining walls. Public opposition may occur due to the removal of the free-flowing movements created by the existing loop ramps; however, the new configuration is not expected to add significant extra travel time to these movements. High tension utility transmission lines currently cross I-70 and US 40 at this interchange, with towers currently located in both loop ramp infields. Care will need to be taken to avoid disrupting these during construction.

Please contact the Corridor Development Office should you have questions or need additional information.

Attachment: Drawings

ABBREVIATED ENGINEERS REPORT

Pavement Replacement with Added Travel Lanes

I-70
I-70: 0.47 mi W of SR 1 to 7.65 mi E of SR 1

PK 3419

Greenfield District

Cambridge City Sub-District

Wayne County, Indiana

~~December 9, 2019~~

July 13, 2020

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Greenfield District
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1.0 Project Location

This project begins on I-70 in Wayne County at a point 0.47 miles west of SR 1 (RP 136+87) and extends easterly to an end point 7.65 miles east of SR 1 (RP 144+99).

	RP	Coordinates
Begin Project	136+87	39°51'11.0"N 85°09'11.8"W
End Project	144+99	39°51'33.8"N 85°00'05.9"W

2.0 Purpose and Need

This project was initiated because the pavement along this section of roadway has reached the end of its intended life cycle, with common deficiencies, such as joint failures, subbase failures, and edge cracking throughout the length of the project. The purpose of this pavement replacement project is to restore the pavement condition along the I-70 corridor and extend the service life of this roadway another 30 years, improve the drainage system and bring the guardrail and other structures up to the current standard. In addition, mobility has identified this section for added capacity.

This report includes relevant background data, analyses, conclusions and recommendations at the preliminary level. This Abbreviated Engineers Report guides the ongoing environmental succeeding design phases. The recommended alternative contained herein is intended to serve as an initial basis for design. However, detailed analyses conducted by the designer may result in changes to certain facets of this scoping report. Any changes to the recommended alternative should be coordinated with the Greenfield District Scoping Engineer.

3.0 Existing Conditions and Roadway History

Roadway

The project, located along I-70 in Wayne County, begins on I-70 at a point 0.47 miles west of SR 1 and extends easterly to an end point 7.65 miles east of SR 1. According to record plans, I-70 is a four-lane divided highway with a typical section consisting of two 12-foot wide travel lane, a 4-foot wide inside shoulder, and a 10-foot outside shoulder in each direction. The eastbound and westbound lanes are separated by a grassed median.

I-70 is functionally classified as an Interstate. See Attachment I – Roadway Functional Classification for more information. This section is part of the National Highway System (NHS) and the National Truck Network (NTN). The roadway has a posted speed limit of 70 miles per hour for passenger vehicles and 65 miles per hour for trucks over 13 ton. I-70 has full access control with one interchange within the project limits at Exit 137. The terrain is flat, and the adjacent land usage is

generally agricultural within the project limits. See Attachment B – Location Map for additional information.

This stretch of I-70 was originally constructed in 1962 with a 10-inch reinforced cement concrete pavement (RCCP) structure. In 1981, the concrete was overlaid with a functional hot asphalt emulsion mix. A two-mile section from Greensfork to Mineral Springs received a partial 3-R treatment in 1985. The entire stretch was again resurfaced in 1991 and in 2001. An HMA overlay was again performed in 2015 under Contract R-30433 and included extensive partial and full depth patching. The existing pavement structure is approaching its useful lifespan since it is approximately 60 years old and will continue to rapidly deteriorate and require increasingly frequent maintenance if it is not replaced with a new full-depth pavement section.

Per the geotechnical investigation performed in 2019 (Attachment K), the following field check observations of the pavement condition were noted:

- Minor transverse cracking was observed in the eastbound and westbound driving and passing lanes of I-70 throughout the project section.
- Moderate pavement distress was observed in the right wheel path of the westbound drive lane the left wheel path of the eastbound passing lane of I-70 from approximately RP 143+50 to 144+00 (near the I-70 westbound rest area).

The geotechnical investigation revealed an existing composite pavement section consisting of 2.00 to 9.75 inches of HMA with PCC pavement beneath ranging from 9.75 to 16.50 inches. Sand & gravel, as well as crushed limestone was present at the base of the pavement for most driving lane core locations with thicknesses ranging from 4.0 to 12.0 inches. For more information, refer to Attachment K.

Drainage

Underdrains were last replaced in 2015 under Contract R-30433. The underpasses along the project corridor are exhibiting drainage issues and should be evaluated in the design process. Ditching should be included for roadside and median ditch lines as this was not performed under the previous overlay projects.

The bridges and culverts that carry I-70 within the project limits are summarized in Table 1.

Table 1:

Asset Name	RP	Feature Crossed
I70-137-04969 CEBL	137+0.858	Martindale Creek
I70-137-04969 CWBL	137+0.858	Martindale Creek
I70-139-04970 CEBL	139+0.408	Jacksonburg Road
I70-139-04970 CWBL	139+0.408	Jacksonburg Road
I70-139-04971 CEBL	139+0.778	Plum Creek
I70-139-04971 CWBL	139+0.777	Plum Creek
I70-141-04972 DWBL	141+0.147	Greens Fork

Asset Name	RP	Feature Crossed
I70-141-04972 DEBL	141+0.137	Greens Fork

Culverts	Condition Rating
CV-I70-089-137.13	7 – Good
CV-I70-089-142.19	6 - Satisfactory
CV-I70-089-143.12	6 - Satisfactory
CV-I70-089-144.08	6 - Satisfactory

Right-of-Way

INDOT's Research and Archive unit was contacted about the existing R/W along I-70. Upon investigation, R/W plans indicated that there is approximately a minimum of 100' of Limited Access R/W on each side of the centerline of I-70 for the entire project. See Attachment J for further details.

Utilities and Railroads

According to the INDOT Rail Crossing Locator, there are no rail crossings within the project limits.

The 811 reports the following providers along this portion of I-70:

- Town of Cambridge City
- Duke Energy
- Frontier
- Intercarrier Networks LLC
- Vectren (Richmond)
- Whitewater Valley R.E.M.C.
- Windstream

The providers are located overhead and below this portion of roadway. See Attachment F – Utility Information for additional details. There are no anticipated utility relocations resulting from this construction, as the construction will be limited to the existing roadway, public road approaches and private drives. All construction will be within the existing ROW.

In addition to the utility providers listed above, this section of I-70 has a system of Intelligent Transportation Systems (ITS), Road Weather Information Systems (RWIS), and Weigh-in-Motion (WIM) sensors.

Traffic

The INDOT Traffic Count Database System (TCDS) was used to provide current and past traffic data along I-70, from 0.47 mi W of SR 1 to 7.65 mi E of SR 1. Listed below is a summary of the results. The AADT for 2025 and 2049 has been estimated based on a growth factor of 0.32%.

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2049	*41,297*						
2025	*38,249*						
2019	37,523				17,454 (47%)	20,068 (53%)	
2018	36,108		7	52	17,553 (49%)	18,554 (51%)	Grown from 2017
2017	36,144	2,434	7	52	17,571 (49%)	18,572 (51%)	
2016	34,430		7	52	17,654 (51%)	16,775 (49%)	Grown from 2015
2015	33,988		7	52	17,427 (51%)	16,560 (49%)	Grown from 2014

Crash Information

Crash information will not be requested or addressed within this assessment.

Environmental and Historic Considerations

A cursory review for potential red flags was completed for the project area utilizing IndianaMAP, National Park Service data, Indiana StreamStats, and the Indiana Historic Buildings, Bridges, and Cemeteries (IHBBCM) Map (formerly the SHAARD Map). Environmental Red Flag Maps created as part of this review are found in Attachment G. According to the work type for this project (Pavement Replacement), a Programmatic Categorical Exclusion (PCE) document is warranted. Work of this type, involving repair or replacement of the existing facility without involvement of regulated resources, will not meet a threshold requiring further environmental documentation.

However, the project will likely require further environmental investigations, if structural work is required within jurisdictional waters or wetlands at the location of drainage structures or within ditch lines along the length of the project. According to Categorical Exclusion Level Thresholds, any impacts to a jurisdictional "Waters of the U.S." requires a Level 1 CE document. There are six 'blue-line' stream environmental concerns mapped within the existing R/W or immediately adjacent to the facility, four of which are carried under I-70 by culverts.

- Beard Run of Martindale Creek, located at approx. RP 137+17 , has a drainage area of approx. 1.195 square miles.
- College Corner Branch, located at approx. RP 142+20 , has a drainage area of approx. 0.226 square mile.
- Black Water Branch, located at approx. RP 143+13 , has a drainage area of approx. 0.216 square mile.
- Far Run of Nolands Fork, located at approx. RP 144+08, has a drainage area of approx. 0.098 square mile.

If the project involves jurisdictional waterways, ditches, or wetlands and due to the likely area of disturbed ground the project, the following permits may be required:

- Section 401/404 Permits– Small culvert replacement or ditch maintenance may impact jurisdictional waters and/or wetlands, requiring a Section 401/404 permit for dredging/fill in these features.
- Indiana Department of Natural Resources (IDNR) Construction in a Floodway Permits are not required for College Corner Branch, Black Water Branch, and Far Run, as these waterways have drainage areas less than 1.0 square mile. Bear Run, though greater than 1.0 square mile is less than 50.0 square mile drainage, is a state crossing and is located in a rural area. Therefore this structure meets the Rural Bridge Exemption.
- Rule 5 – Due to work within ditches and replacement of small culverts, the project may disturb more than 1.0 acre of ground. Therefore, a Rule 5 permit may be needed.
- If side slopes are corrected along with the drainage improvements, and there is more than 0.5 acre of right-of-way needed, a Level 2 CE document will be required.

The following features may also warrant further investigation, though do not pose an immediate concern for the proposed work type, if conducted within existing R/W:

- Martindale Public Fishing Area (an IDNR property) abuts I-70 eastbound from RP 139+15 to 139+19 on the south side. This property is considered a Section 4(f) property and should be avoided.
- Leaking Underground Storage Tank records for the southeast quadrant of I-70/SR 1, which appear to belong to the INDOT Cambridge City Unit, maintenance facility. There is a concern of contaminate migration, if nearby drainage improvements or excavation deeper than the existing roadbed are proposed.
- One cemetery is noted adjacent to I-70 R/W. The Kepler Family Cemetery (CR-89-48) is located adjacent to I-70 to the south at approx. RP 142+62.

4.0 Design Considerations

Table 2 provides a summary of the relevant design parameters:

Table 2:

Design Data	I-70
Contract Number	TBD
Functional Classification	Interstate
District	Greenfield
Sub-District	Cambridge City
Beginning Reference Post	136+87
Ending Reference Post	144+99
Work Type	Pavement Replacement

Design Data	I-70
Net Length (Miles)	8.12
AADT	37,523
% Trucks, AADT	53%, 20,068
Posted Speed (MPH)	70
Crash Record	N/A
Existing Pavement Type	HMA/Concrete Composite
No. Lanes	2 EB, 2 WB
Lane Width	12'0"
Shoulder Width	11'0" OS, 4'0" IS
Proposed Pavement Section	Full Depth Reconstruction

Miscellaneous

All existing guardrail is to be replaced with MASH compliant systems. All existing guardrail is to be replaced with MASH compliant systems. The existing side slopes appear to be non-standard in certain locations throughout the corridor. A Level 2 design exception may be required if the desirable slope values described in IDM Chapter 49 for freeway reconstruction cannot be achieved. Roadside ditching should be performed along with median ditching and replacement of cable rail. Existing drainage patterns should also be evaluated in the vicinity of the underpasses. During the field check, ponding and silting issues were observed in the median near underpasses.

Maintenance of Traffic

The Maintenance of Traffic (MOT) for this project is guided by the Pavement Replacement construction operation. Since I-70 is comprised of two lanes in both directions, it is anticipated that there will be single lane closures and signage present for the directing of traffic during paving operations. The preliminary MOT recommendation is to maintain traffic on the existing roadway during construction. In order to maintain the existing capacity during construction, the existing shoulders will be strengthened and temporarily widened, and crossovers should be constructed to avoid costly delays caused by closing lanes of traffic. Construction could be phased by crossing one lane of traffic over to the opposing side and separating opposing directions with temporary traffic barrier. It does not appear that there are any existing crossovers that could be utilized. If interchange access is not feasible, ramps should be closed using proper detour signing for alternative routes and coordination should be conducted with local officials having jurisdiction over the affected crossroad or street. The MOT plan will be further refined during the design process.

Per IDM Section 503-2.02, this project qualifies as a mobility significant project as determined by federal rule. The designer shall prepare a Transportation Management Plan (TMP) for this project to

ensure that the work zone activity and maintenance of traffic plan is integrated with project stakeholders.

ADA Compliance.

There are no pedestrian facilities within the project limits, therefore there are no concerns regarding ADA compliance.

Adjacent INDOT Project(s)

Programmed projects on I-70 are summarized in the following table. See Attachment H a full listing of recent and upcoming projects.

Des #	Work Type	Location	Letting Date
1593214	Bridge Deck Overlay	I 70 EB over Round Barn Road	10/7/2020
1593215	Bridge Deck Overlay	I 70 WB over Round Barn Road	10/7/2020
1701038	Bridge Deck Overlay	I 70 EB over N&S RR, 01.97 W US 35	10/7/2020
1701040	Bridge Deck Overlay	I 70 WB over N&S RR, 01.97 W US 35	10/7/2020
1900219	Small Structure Pipe Lining	I 70 I over , 3.929 E WAYNE/HENRY LINE	11/15/2023
1900184	Replace Superstructure	I 70 over PLUM CREEK, 02.44 E SR 1	11/15/2023
1900185	Replace Superstructure	I 70 over PLUM CREEK, 02.44 E SR 1	11/15/2023
1900137	Replace Superstructure	I 70 over SYMONDS CREEK, 03.00 W SR 1	2024 Call
1900179	Replace Superstructure	I 70 over SYMONDS CREEK, 03.00 W SR 1	2024 Call
1900163	Auxiliary Lanes	I 70 at US 35 Interchange Loop Ramp from SB US 35 to EB I-70	2024 Call

5.0 Analysis and Alternatives

This project will provide a full-depth reconstructed pavement section including subbase, new guardrail, underdrain, and other highway related items in accordance with INDOT Standards and Specifications. In addition, drainage conditions in the vicinity of the underpasses should be evaluated and improvements designed as needed to alleviate ponding issues. Median and roadside ditching should also be considered. This analysis compared the life cycle costs of four build Alternatives: full depth HMA, PCCP, and Continuously Reinforced Concrete Pavement (CRCP), and a Do Nothing alternative. Detailed itemized cost estimates for each of the three build alternatives is presented in Attachment C. A life cycle cost analysis comparing just the pavement costs only for each alternative was also completed and can be found in Attachment D. The summary below presents the life cycle costs for the pavement structure only for the three build alternatives. Note that the pay items used for the purposes of life cycle cost analysis are only the major pay items prescribed by the INDOT guidelines to be used for life cycle cost analysis.

Alternative 1: Full Depth HMA

This Alternative would involve removing all the existing asphalt and underlying concrete and replacing with a full depth HMA section. For the purposes of cost comparison, the following typical section was assumed:

220 lb/sy QC/QA HMA, 4, 76, Surface, 12.5 mm – SMA
275 lb/sy QC/QA HMA, 4, 76, Intermediate, 19.0 mm
1155 lb/sy QC/QA HMA, 4, 76, Base, 19.00 mm
300 lb/sy QC/QA HMA, 4, 76, Intermediate, OG 19.0 mm
6 in Compacted Aggregate No. 53
Geotextile for Pavement, Type 1B
Subgrade Treatment, Type 1B

This paving Alternative would have an initial pavement cost of approximately $40,060,000. HMA would have the lowest initial construction cost of the three Alternatives presented. The initial construction would have an estimated lifespan of 12-15 years with joint sealing taking place every three years. A mill and overlay operation would be required at year 15, followed by a mill and resurface operation on a 9-year cycle following that. The present worth of Alternative 1, including initial pavement cost and subsequent maintenance activities is approximately $48,090,000.

Alternative 2: PCCP

This Alternative would involve construction of Portland Cement Concrete Pavement for the proposed project length. The following typical section was assumed for the full width of the roadway, including shoulders:

QC/QA - PCCP, 14 in – 14 ft widened slab w/tied PCCP shoulders
300 lb/sy QC/QA HMA, 4, 76, Intermediate, OG 19.0 mm
6" Dense Graded Subbase
Geotextile for Pavement, Type 1B
Subgrade Treatment, Type 1B

This paving Alternative would have an initial pavement cost of approximately $39,420,000. Long term maintenance would involve a CPR construction operation at approximately year 16 and 24, a mill and HMA overlay at approximately year 30, followed by a similar cycle of joint sealing and repaving as described in Alternative 1. The present worth of Alternative 2, including initial pavement cost and subsequent maintenance activities is approximately $47,320,000.

Alternative 3: CRCP

This Alternative would involve construction of Continuously Reinforced Concrete Pavement for the proposed project length. The following typical section was assumed for CRCP:

Mainline, Inside Shoulder, & First 2 ft of Outside Shoulder:
QC/QA – CRCP, 12.5 in
300 lb/sy QC/QA HMA, 4, 76, Intermediate, OG 19.0 mm
6" Dense Graded Subbase
Geotextile for Pavement, Type 1B

Subgrade Treatment, Type 1B

Outside Shoulder and Ramps:
QC/QA - PCCP, 12.5 in
300 lb/sy QC/QA HMA, 4, 76, Intermediate, OG 19.0 mm
6" Dense Graded Subbase
Geotextile for Pavement, Type 1B
Subgrade Treatment, Type 1B

This Alternative would carry the highest initial construction cost but could potentially demonstrate superior long-term performance and minimal vertical movement compared to jointed PCCP due to the reinforcing. The maintenance costs are also potentially lower than for HMA or PCCP due to less frequent preventative maintenance activities and maintenance of traffic costs. The initial pavement cost for CRCP would be approximately $45,730,000. When factoring in maintenance over the pavement life cycle, the total present worth of Alternative 3 is $51,760,000.

Alternative 4: Do Nothing Alternative

The do-nothing alternative was considered and rejected, as it would not improve the conditions for this segment of I-70 as outlined above. The do-nothing alternative does not address the Purpose and Need; therefore, it is not considered feasible nor prudent.

6.0 Conclusions

The cost difference between Build Alternative 1, Full Depth HMA, Build Alternative 2, PCCP, and Build Alternative 3, CRCP is less than 10%. In accordance with INDOT IDM 304-7.0, an alternate bidding process should be used since the project is equal to or greater than 10,000 square yards of pavement area. There may be exceptions to this criterion if a Geotechnical Report ultimately recommends one type of pavement over the other due to on site soil conditions or other considerations. Greenfield District recommends the CRCP option due to maintenance and life cycle cost. It is also anticipated there will be one additional travel lane in each direction.

7.0 Changes to Proposal

The Greenfield District Scoping Engineer should be contacted if changes from this document are determined to be necessary during a later phase of the project development, including but not limited to scope of work or letting changes. Any desired changes should include justification for the change and the estimated cost.

CONCURRENCE

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EXCERPTS

Engineering Assessment

Pavement Replacement with Added Travel Lanes

I-70
I-70: 7.65 mi E of SR 1 to 0.62 mi W of US 27

PK 3424

Greenfield District

Cambridge City Sub-District

Wayne County, Indiana

~~December 9, 2019~~

July 13, 2020, 2020

Prepared by:

Doug Dagley, P.E.

CHA Consulting, Inc.

Reviewed by:

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Greenfield Scoping Manager

Amended by:
Ryan Moore, P.E.
Greenfield Senior Scoping Engineer

Indiana Department of Transportation

Greenfield District
32 South Broadway Greenfield IN 46140

1.0 Project Location

This Pavement Replacement project begins on I-70 at a point 7.65 miles east of SR 1 (RP 144+99) and extends easterly to an end point 0.62 miles west of US 27 (RP 150+52) in Wayne County.

	RP	Coordinates
Begin Project	144+99	39°51'33.8"N 85°00'05.9"W
End Project	150+52	39°52'16.6"N 84°53'46.4"W

2.0 Purpose and Need

This project was initiated because the pavement along this section of roadway is deteriorating, with common deficiencies, such as various modes of cracking, age related failures, and poor rideability of the concrete pavement. The purpose of this pavement replacement project is to restore the pavement condition along the I-70 corridor and extend the service life of this roadway another 30 years, improve the drainage system and bring the guardrail and other structures up to the current standard. In addition, mobility has identified this section for added capacity.

This report includes relevant background data, analyses, conclusions and recommendations at the preliminary level. This Engineering Assessment guides the ongoing environmental succeeding design phases. The recommended alternative contained herein is intended to serve as an initial basis for design. However, detailed analyses conducted by the designer may result in changes to certain facets of this assessment. Any changes to the recommended alternative should be coordinated with the Greenfield District Scoping Engineer.

3.0 Existing Conditions and Roadway History

Roadway

The project, located along I-70 in Wayne County, begins on I-70 at a point 7.65 miles east of SR 1 and extends easterly to an end point 0.62 miles west of US 27. According to record plans, I-70 is a two-lane divided highway with a typical section consisting of two 12' wide travel lane, a 4-foot wide inside shoulder, and 10-foot wide outside shoulder in each direction. The eastbound and westbound lanes are separated by a grassed median.

I-70 is functionally classified as an Interstate. See Attachment I – Roadway Functional Classification for more information. This section is part of the National Highway System (NHS) and the National Truck Network (NTN). The roadway has a posted speed limit of 70 miles per hour for passenger vehicles and 65 miles per hour for trucks over 13 ton. I-70 has full access control with two interchanges within the project limits at Exit 145 and Exit 149A/B. The terrain is flat, and the adjacent land usage is generally agricultural within the project limits. See Attachment B – Location Map for additional information.

This stretch of I-70 was originally constructed in 1963 with a 10-inch reinforced cement concrete pavement (RCCP) structure. The roadway was rehabilitated to 3R/4R standards in 1988. The most recent project on this stretch was a CPR performed in 2015.

The existing concrete pavement is showing age-related distresses since it is 60 years old such as joint failure, polishing, faulting, and cracking. The HMA shoulders are also showing reflective transverse cracking and longitudinal joint cracking.

Drainage

Underdrain was last replaced in 2015. The underpasses along the project corridor are exhibiting ponding issues and should be evaluated in the design process. Ditching should be included for roadside and median ditch lines.

The bridges and culverts that carry I-70 within the project limits summarized in Table 1.

Table 1:

Asset Name	RP	Feature Crossed
I70-145-04521 BEBL	145+0.108	Nolands Fork
I70-145-04521 BWBL	145+0.108	Nolands Fork
I70-147-02259 CEBL	147+0.069	N&S RR
I70-147-02259 CWBL	147+0.067	N&S RR
I70-147-04523 BEBL	147+0.289	Round Barn Rd
I70-147-04523 CWBL	147+0.291	Round Barn Rd
I70-148-04525 CEBL	148+0.631	Clear Creek
I70-148-04525 JCWB	148+0.641	Clear Creek
I70-149-02260 BWBL	149+0.798	Cardinal Greenway
I70-149-02260 BEBL	149+0.797	Cardinal Greenway
I70-150-04527 BEBL	150+0.110	CR 500 E
I70-150-04527 BWBL	150+0.110	CR 500 E
I70-150-04528 CEBL	150+0.688	Whitewater River
I70-150-04528 CWBL	150+0.688	Whitewater River

Culverts	Condition Rating
CV I70-089-145.60	7 – Good
CV I70-089-149.61	6 – Satisfactory

Right-of-Way

INDOT's Research and Archives unit was contacted about the existing R/W along I-70. Upon investigation, R/W plans indicated that there is approximately a minimum of 100' of Limited Access

R/W on each side of the centerline of I-70 for the entire project. See Attachment J – Right-of-Way Information for further details.

Utilities and Railroads

According to the INDOT Rail Crossing Locator, there are two locations in which I-70 crosses above a railroad for this project. The Federal Crossing IDs are 958966P and 527896M and are operated by Norfolk Southern. There are no signals, gates, signs or markings for this crossing.

The 811 reports the following providers along this portion of I-70:

- Comcast Cable (Indianapolis)
- Duke Energy
- Frontier
- In American Water
- Richmond Power & Light
- Richmond Sanitary District
- Vectren (Richmond)
- Whitewater Valley R.E.M.C.

As referenced in the Environmental and Historical Consideration portion of this assessment, the Ohio Valley Gas Corp. possesses a 4-inch natural gas line underneath this section of I-70.

The providers are located overhead and below this portion of roadway. See Attachment F – Utility Information for additional details. There are no anticipated utility relocations resulting from this construction, as the construction will be limited to the existing roadway, public road approaches and private drives. All construction will be within the existing ROW.

In addition to the utility providers listed above, this section of I-70 has a system of Intelligent Transportation Systems (ITS), Road Weather Information Systems (RWIS), and Weigh-in-Motion (WIM) sensors. There is also fiberoptic within the project limits.

Traffic

The INDOT Traffic Count Database System (TCDS) was used to provide current and past traffic data along I-70, from 7.65 mi E of SR 1 to 0.62 mi W of US 27. Listed below is a summary of the results. The AADT for 2025 and 2049 has been estimated based on a growth factor of 0.32%.

Year	AADT	DHV-30	K %	D %	PA	BC	Src
2049	*41,957*						
2025	*38,860*						
2019	38,122				18,147 (48%)	19,974 (52%)	
2018	36,306		7	52	17,929 (49%)	18,377 (51%)	Grown from 2017
2017	36,343	2,398	7	52	17,947 (49%)	18,395 (51%)	
2016	34,000		7	54	19,029 (56%)	14,970 (44%)	Grown from 2015
2015	33,563		7	54	18,785 (56%)	14,778 (44%)	Grown from 2014

Crash Information

Crash information will not be requested or addressed within this assessment.

Environmental and Historic Considerations

A cursory review for potential red flags was completed for the project area utilizing IndianaMAP, National Park Service data, Indiana StreamStats, and the Indiana Historic Buildings, Bridges, and Cemeteries (IHBBCM) Map (formerly the SHAARD Map). Environmental Red Flag Maps created as part of this review are found in Attachment G. According to the work type for this project (Pavement Replacement), a Programmatic Categorical Exclusion (PCE) document is warranted. Work of this type, within existing right-of-way and repair or replacement of the existing facility without involvement of regulated resources, will not meet a threshold requiring further environmental documentation.

However, the project will likely require further environmental investigations due to potential impacts to waterway resources. There are eight 'blue-line' streams mapped within the existing right-of-way, five of which are carried under I-70 by culverts. According to Categorical Exclusion Level Thresholds, any impacts to a jurisdictional "Waters of the U.S." requires a Level 1 CE document. However, if there is more than 300 linear feet of stream impacts to Clear Creek (per the CE Threshold Chart) from either the Teardrop Interchange Alternative at the I-70 and US 35 Interchange then a Level 2 CE document is required; or if it is determined that an acre or more of wetlands impacts and/or an Individual 404 Permit is required, then a Level 4 CE document is required. The drainage areas for each waterway can be found below:

- Nolands Fork – 49.27 square miles
- UNT of Nolands Fork – 1.23 square miles
- Lick Creek – 1.01 square miles
- UNT 1 of Clear Creek – 0.04 square mile
- Clear Creek – 1.61 square miles
- UNT 2 of Clear Creek – 0.16 square mile
- UNT of West Fork East Fork Whitewater River – 0.30 square mile
- West Fork of East Fork Whitewater River – 17.76 square miles

Four floodplains, five National Wetland Inventory (NWI) wetland line, three impaired streams, and multiple wetlands were also identified within or directly adjacent to the project area. Due to involvement with jurisdictional waterways, ditches, or wetlands and likely area of disturbed ground the project may require the following permits:

- Section 401/404 Permits- Small culvert replacement or ditch maintenance may impact jurisdictional waters and/or wetlands, requiring Section 401/404 permits for dredging/fill in these features.
- Rule 5 Permit may be needed, if the work extends beyond pavement, and disturbs more than 1.0 acre of ground.
- Indiana Department of Natural Resources (IDNR) Construction in a Floodway (CIF) Permit- Work within the floodplains of UNT of Nolands Fork, Lick Creek, or the West Fork East Fork Whitewater River may require a CIF Permit. INDR CIFs are not required for Nolands Fork as the drainage area is less than <50 square miles, and therefore meets the rural bridge exemption. A maintenance exemption is available for paving if it doesn't increase the vertical profile of the road by more than 3 inches.
- If side slopes are corrected along with the drainage improvements, and there is more than 0.5 acre of right-of-way needed, a Level 2 CE document will be required.

The following features may also warrant further investigation, though do not pose an immediate concern for the proposed work type, if conducted within existing right-of-way:

- Norfolk Southern Railroad was identified traversing the project area at RP-147+06. Coordination with the railroad will be required.
- A 4-inch natural gas pipeline owned by Ohio Valley Gas Corp. was identified traversing the project area. Coordination with the gas company may be required if the scope of work increases to include excavation.
- One historic resource was located directly adjacent to the project area on the south side of I-70 directly west of Union Pike Road. The historic resource was identified as a house (IHSSI# 177-536-40055) with a "Contributing" rating. Contributing resources are not normally individually eligible for the National Historic Register of Historic Places. This historic resource may need to be taken into consideration during project planning. The project will likely fall under the Section 106 Minor Projects Programmatic Agreement (MPPA), so long as right-of-way is not required from a historic resource.
- Leaking Underground Storage Tank records for Pecan Shoppe of Centerville (Agency ID 55214), 2351 North Centerville in Centerville Indiana, 237 ft. north of the proposed project area. IDEM issued a No Further Action (NFA) on August 5, 2014.
- Brownfield site and Institutional Control Site (Agency ID 56770) at the former Carpenter Manufacturing Company at the interchange of I-70 and U.S. Hwy 35 (1304 Rose City Blvd, Richmond, IN). There is groundwater contamination that appears to flow away from the project site. If excavation is required, the IDEM project manager should be contacted.
- Pentecost Airport is a private airport located 0.27 mile south of I-70 at RP-146+57. Coordination with the airport may be required.

- The portion of the project located east of Round Barn Rd. is located within the Urban Area Boundary (UAB) of Richmond. Coordination with the MS4 will be required.
- Cardinal Greenways Trail traverses the project area at RP-149+80. Coordination with Cardinal Greenways may be required.

4.0 Design Considerations

Table 2 provides a summary of the relevant design parameters:

Table 2:

Design Data	I-70
Contract Number	TBD
Functional Classification	Interstate
District	Greenfield
Sub-District	Cambridge City
Beginning Reference Post	144+99
Ending Reference Post	150+52
Work Type	Pavement Replacement
Net Length (Miles)	5.60
AADT	37,295
% Trucks, AADT	50%, 19,974
Posted Speed (MPH)	70
Crash Record	N/A
Existing Pavement Type	HMA/Concrete Composite
No. Lanes	2 EB, 2 WB
Lane Width	12'0"
Shoulder Width	11'0" OS, 4'0" IS
Proposed Pavement Section	Full Depth Reconstruction

Miscellaneous

All existing guardrail is to be replaced with MASH compliant systems. The existing side slopes appear to be non-standard in certain locations throughout the corridor. A Level 2 design exception may be required if the desirable slope values described in IDM Chapter 49 for freeway reconstruction

cannot be achieved. Roadside ditching should be performed along with median ditching and replacement of cable rail. Existing drainage patterns should also be evaluated in the vicinity of the underpasses. During the field check, ponding and silting issues were observed in the median near underpasses.

There was an ongoing shoulder strengthening/paving operation during the field check.

Maintenance of Traffic

The Maintenance of Traffic (MOT) for this project is guided by the Pavement Replacement construction operation. Since I-70 is comprised of two lanes in both directions, it is anticipated that there will be single lane closures and signage present for the directing of traffic during paving operations. The preliminary MOT recommendation is to maintain traffic on the existing roadway during construction. In order to maintain the existing capacity during construction, temporary shoulder widening, and crossovers should be constructed to avoid delays caused by closing lanes of traffic. Construction could be phased by crossing one lane of traffic over to the opposing side and separating opposing directions with temporary traffic barrier. It does not appear that there are any existing crossovers that could be utilized. If interchange access is not feasible, ramps should be closed using proper detour signing for alternative routes and coordination should be conducted with local officials having jurisdiction over the affected crossroad or street. The MOT plan will be further refined during the design process.

Per IDM Section 503-2.02, this project qualifies as a mobility significant project as determined by federal rule. The designer shall prepare a Transportation Management Plan (TMP) for this project to ensure that the work zone activity and maintenance of traffic plan is integrated with project stakeholders.

ADA Compliance.

There are no pedestrian facilities within the project limits, therefore there are no concerns regarding ADA compliance.

Adjacent INDOT Project(s)

Programmed projects on I-70 are summarized in the following table. See Attachment H for additional information.

Des #	Work Type	Location	Letting Date
1593214	Bridge Deck Overlay	I 70 EB over Round Barn Road	10/7/2020
1593215	Bridge Deck Overlay	I 70 WB over Round Barn Road	10/7/2020
1701038	Bridge Deck Overlay	I 70 EB over N&S RR, 01.97 W US 35	10/7/2020
1701040	Bridge Deck Overlay	I 70 WB over N&S RR, 01.97 W US 35	10/7/2020
1900219	Small Structure Pipe Lining	I 70 I over , 3.929 E WAYNE/HENRY LINE	11/15/2023
1900184	Replace Superstructure	I 70 over PLUM CREEK, 02.44 E SR 1	11/15/2023
1900185	Replace Superstructure	I 70 over PLUM CREEK, 02.44 E SR 1	11/15/2023

1900137	Replace Superstructure	I 70 over SYMONDS CREEK, 03.00 W SR 1	2024 Call
1900179	Replace Superstructure	I 70 over SYMONDS CREEK, 03.00 W SR 1	2024 Call
1900163	Auxiliary Lanes	I 70 at US 35 Interchange Loop Ramp from SB US 35 to EB I-70	2024 Call

5.0 Analysis and Alternatives

This project will provide a full-depth reconstructed pavement section including subbase, new guardrail, underdrain, and other highway related items in accordance with INDOT Standards and Specifications. In addition, drainage conditions in the vicinity of the underpasses should be evaluated and improvements designed as needed to alleviate ponding issues. Median and roadside ditching should also be considered. The through lane pavement at the weight station on I-70 will also be replaced and is included in the cost estimates. The adjacent parking lot should be patched as necessary.

This assessment compares the life cycle costs of four build Alternatives: full depth HMA, PCCP, and Continuously Reinforced Concrete Pavement (CRCP), and a Do Nothing alternative. Detailed itemized cost estimates for each of the three build alternatives is presented in Attachment C. A life cycle cost analysis comparing just the pavement costs only for each alternative was also completed and can be found in Attachment D. The summary below presents the life cycle costs for the pavement structure only for the three build alternatives. Note that the pay items used for the purposes of life cycle cost analysis are only the major pay items prescribed by the INDOT guidelines to be used for life cycle cost analysis.

Alternative 1: Full Depth HMA

This Alternative would involve removing all the existing asphalt and underlying concrete and replacing with a full depth HMA section. For the purposes of cost comparison, the following typical section was assumed:

220 lb/sy QC/QA HMA, 4, 76, Surface, 12.5 mm – SMA
275 lb/sy QC/QA HMA, 4, 76, Intermediate, 19.0 mm
1155 lb/sy QC/QA HMA, 4, 76, Base, 19.00 mm
300 lb/sy QC/QA HMA, 4, 76, Intermediate, OG 19.0 mm
6 in Compacted Aggregate No. 53
Geotextile for Pavement, Type 1B
Subgrade Treatment, Type 1B

This paving Alternative would have an initial pavement cost of approximately $31,510,000. HMA would have the lowest initial construction cost of the three Alternatives presented. The initial construction would have an estimated lifespan of 12-15 years with joint sealing taking place every three years. A mill and overlay operation would be required a year 15, followed by a mill and resurface operation on a 9-year cycle following that. The present worth of Alternative 1, including initial pavement cost and subsequent maintenance activities is approximately $37,840,000.

Alternative 2: PCCP

This Alternative would involve construction of Portland Cement Concrete Pavement for the proposed project length. The following typical section was assumed for the full width of the roadway, including tied PCCP shoulders with D-1 Contraction Joints spaced 15'0":

QC/QA - PCCP, 14 in – 14 ft widened slab w/tied PCCP shoulders
300 lb/sy QC/QA HMA, 4, 76, Intermediate, OG 19.0 mm
6" Dense Graded Subbase
Geotextile for Pavement, Type 1B
Subgrade Treatment, Type 1B

This paving Alternative would have an initial pavement cost of approximately $30,880,000. Long term maintenance would involve a CPR construction operation at approximately year 16 and 24, a mill and HMA overlay at approximately year 30, followed by a similar cycle of joint sealing and repaving as described in Alternative 1. The present worth of Alternative 2, including initial pavement cost and subsequent maintenance activities is approximately $37,670,000.

Alternative 3: CRCP

This Alternative would involve construction of Continuously Reinforced Concrete Pavement for the proposed project length. The following typical section was assumed for CRCP:

Mainline, Inside Shoulder, & First 2 ft of Outside Shoulder:
QC/QA – CRCP, 12.5 in
300 lb/sy QC/QA HMA, 4, 76, Intermediate, OG 19.0 mm
6" Dense Graded Subbase
Geotextile for Pavement, Type 1B
Subgrade Treatment, Type 1B

Outside Shoulder and Ramps:
QC/QA - PCCP, 12.5 in
300 lb/sy QC/QA HMA, 4, 76, Intermediate, OG 19.0 mm
6" Dense Graded Subbase
Geotextile for Pavement, Type 1B
Subgrade Treatment, Type 1B

This Alternative would carry the highest initial construction cost but could potentially demonstrate superior long-term performance and minimal vertical movement compared to jointed PCCP due to the reinforcing. The maintenance costs are also potentially lower than for HMA or PCCP due to less frequent preventative maintenance activities and maintenance of traffic costs. The initial pavement cost for CRCP would be approximately $34,760,000. When factoring in maintenance over the pavement life cycle, the total present worth of Alternative 3 is approximately $39,490,000.

Alternative 4: Do Nothing Alternative

The do-nothing alternative was considered and rejected, as it would not improve the conditions for this segment of I-70 as outlined above. The do-nothing alternative does not address the Purpose and

Need; therefore, it is not considered feasible nor prudent.

I-70 at US-35 Interchange Analysis

This engineering assessment also evaluated preliminary alternatives for reconfiguring the cloverleaf interchange at I-70 and US-35 to improve safety and mobility. INDOT Greenfield District has previously documented unsafe merging conditions between vehicles merging onto I-70 eastbound from US-35 southbound and vehicles exiting I-70 to US-35 northbound. There is an existing auxiliary lane that acts dually as an acceleration lane for the SB to EB entrance ramp and as a deceleration lane for traffic exiting onto the EB to NB ramp. This lane currently lacks the appropriate acceleration distance for incoming traffic to safely merge onto I-70 eastbound. This has resulted in an operationally inefficient and unsafe weaving condition that contributes to an elevated Index of Crash Frequency and Cost (Attachment L) as well as an increase in Run Off Road and Same Direction Sideswipe crashes. The INDOT mini scope prepared in 2018 proposed extending the auxiliary lane to an appropriate distance east of the southeast loop ramp to provide adequate acceleration distance for incoming traffic to reach highway speed. This alternative is relatively low cost and is not expected to have a significant effect on mobility. This alternative is also supported by AASHTO guidelines which recommends a collector distributor lane be considered for cloverleaf interchanges if the combined exit/enter traffic volumes for adjacent segments exceeds 1,000 vehicles per day. Based on the exhibit shown in the miniscope, it is expected that a Level 2 Design Exception would be required for the length of the freeway acceleration lane. According to INDOT IDM Figure 48-4H, a minimum acceleration length of 1520 feet is required since the existing SB to EB ramp is designed for 20 mph. It should be noted that these are the minimum lengths for passenger vehicles. Since there is a high percentage of trucks utilizing this entrance ramp, IDM 48-4.02(03) recommends contacting the Traffic Engineering Division of Corridor Development to determine if the larger acceleration distances provided in Figure 48-4J should govern ramp design. The INDOT mini scope is attached as Attachment M and a preliminary figure showing the proposed extension is included in Attachment K-1. As shown in the figure, the INDOT proposed design would provide an increased but still sub-standard acceleration length as well as insufficient merge taper.

As an alternative to the auxiliary lane extension, the EB to NB loop ramp could be removed altogether in addition to making the improvements to the auxiliary lane discussed above. Under this scenario, traffic exiting I-70 eastbound would share a single exit. Traffic proceeding to US-35 northbound would have a stop-controlled crossover at US-35 southbound before continuing northbound. This alternative is relatively low cost and reduces weaving related safety issues by decreasing the number of vehicles that are required to weave as well as improving the acceleration distance for the southbound to eastbound vehicles. This alternative is illustrated in Attachment K-2. This alternative also includes the auxiliary lane extension for the SB to EB entrance cloverleaf but has been shown in Attachment K-3 with standard acceleration length and taper. With regards to the proposed stop-controlled intersection, the EB to NB loop ramp has an existing AADT of 350. This low volume is expected to operate efficiently at the stop controlled crossing mentioned above and is expected to have a minimal effect on mobility through the interchange. For an overview of AADT values for each existing ramp, see Attachment N.

An additional need was identified for improving mobility through the interchange for tractor trailers. Due to the percentage of trucks at the interchange, alternatives were evaluated for improving the

geometry of the interchange by eliminating the existing cloverleaf configuration. Diamond interchange configurations were considered in order to eliminate the 20-mph cloverleaf ramps that creates mobility issues for tractor trailers.

A teardrop roundabout interchange was considered as shown in Attachment K-3. Based on existing AADT, left turns are expected to be relatively high during peak hours for a diamond interchange configuration. Roundabout interchanges are considered when there is a high proportion of left-turn flows from the off-ramps and to the on-ramps during certain peak periods, combined with limited queue storage space on the bridge crossing, off-ramps, or arterial approaches. As compared to a conventional signalized diamond interchange, the roundabout interchange also reduces queue length and the number of conflict points. As compared to the existing interchange, this alternative is expected to have an effect on mobility as travel times through the interchange will increase due to changing from an uninterrupted free-flowing facility to a yield controlled intersection. This alternative is expected to improve safety along I-70 by removing the cloverleaf ramps but may increase crash rates along US 35 due to removing free-flowing conditions and potentially decrease any high severity crash issues related to weaving along US 35. A more detailed analysis of crashes along US 35 would be warranted to determine the exact effects on crash rates. This alternative is relatively high cost due to the amount of pavement removal that would be required.

A diverging diamond interchange (DDI) was also considered as shown in Attachment K-4. The advantage of a DDI compared to a conventional signalized diamond interchange include the potential for free flowing left and right turns onto the freeway, reduced delay due to two-phase signaling, and eliminating left turning lane storage problems for drivers wishing to enter the freeway. The effects on mobility and safety for this interchange alternative as compared to the existing interchange are similar to that as described for the teardrop roundabout interchange previously discussed. This alternative is relatively high cost due to the amount of pavement removal that would be required.

6.0 Conclusions

The cost difference between Build Alternative 1, Full Depth HMA Build Alternative 2, PCCP, and Build Alternative 3, CRCP is less than 10%. In accordance with INDOT IDM 304-7.0, an alternate bidding process should be used since the project is equal to or greater than 10,000 square yards of pavement area. There may be exceptions to this criterion if a Geotechnical Report ultimately recommends one type of pavement over the other due to in situ soil conditions or other considerations. Greenfield District recommends the CRCP option due to maintenance and life cycle cost. It is also anticipated there will be one additional travel lane in each direction.

7.0 Changes to Proposal

The Greenfield District Scoping Engineer should be contacted if changes from this document are determined to be necessary during a later phase of the project development, including but not limited to scope of work or letting changes. Any desired changes should include justification for the change and the estimated cost.

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Attachment K-1: INDOT Aux. Lane Extension


1330'
300'

Attachment K-2: Stop-Crossover Alternative

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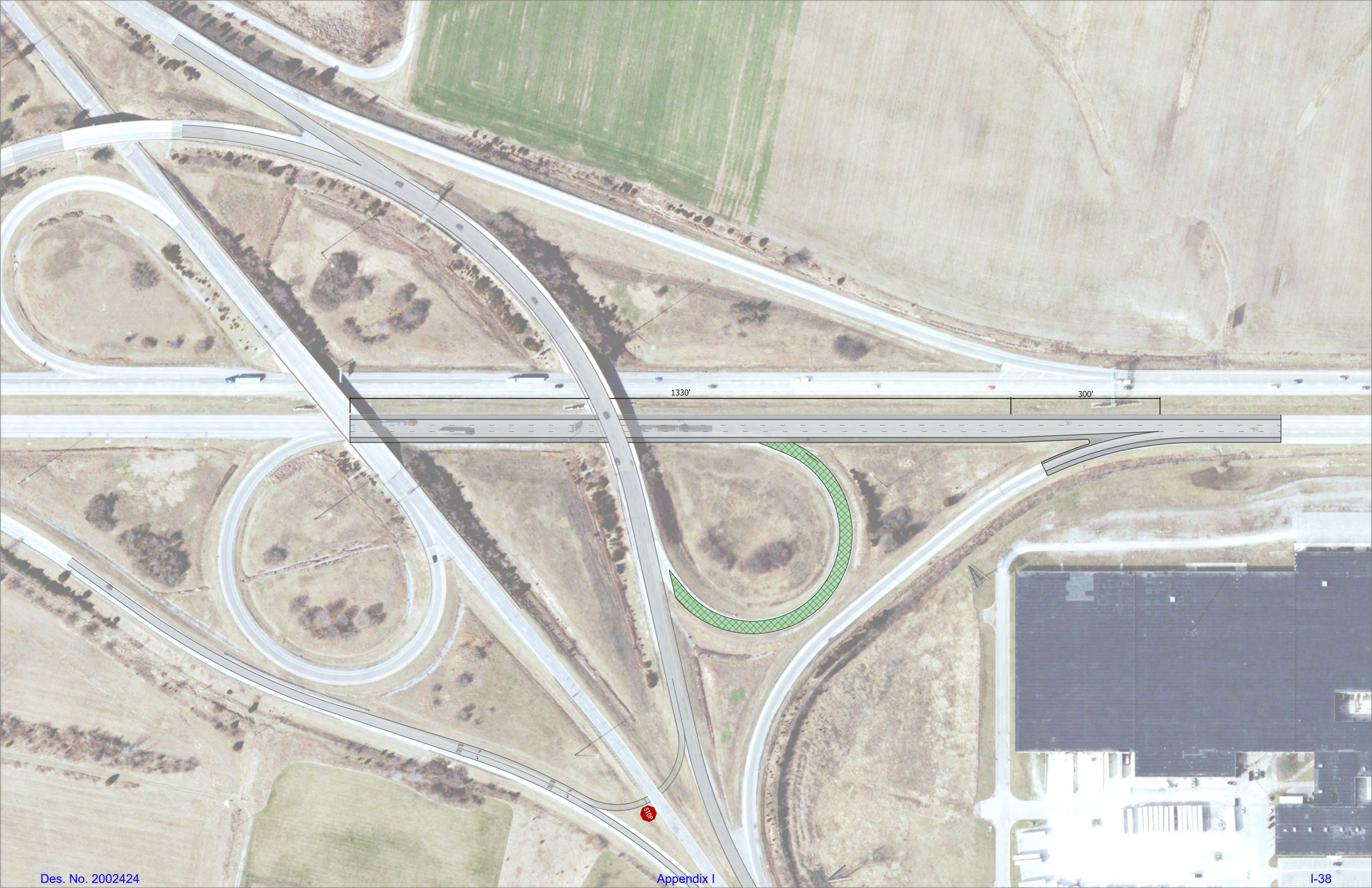
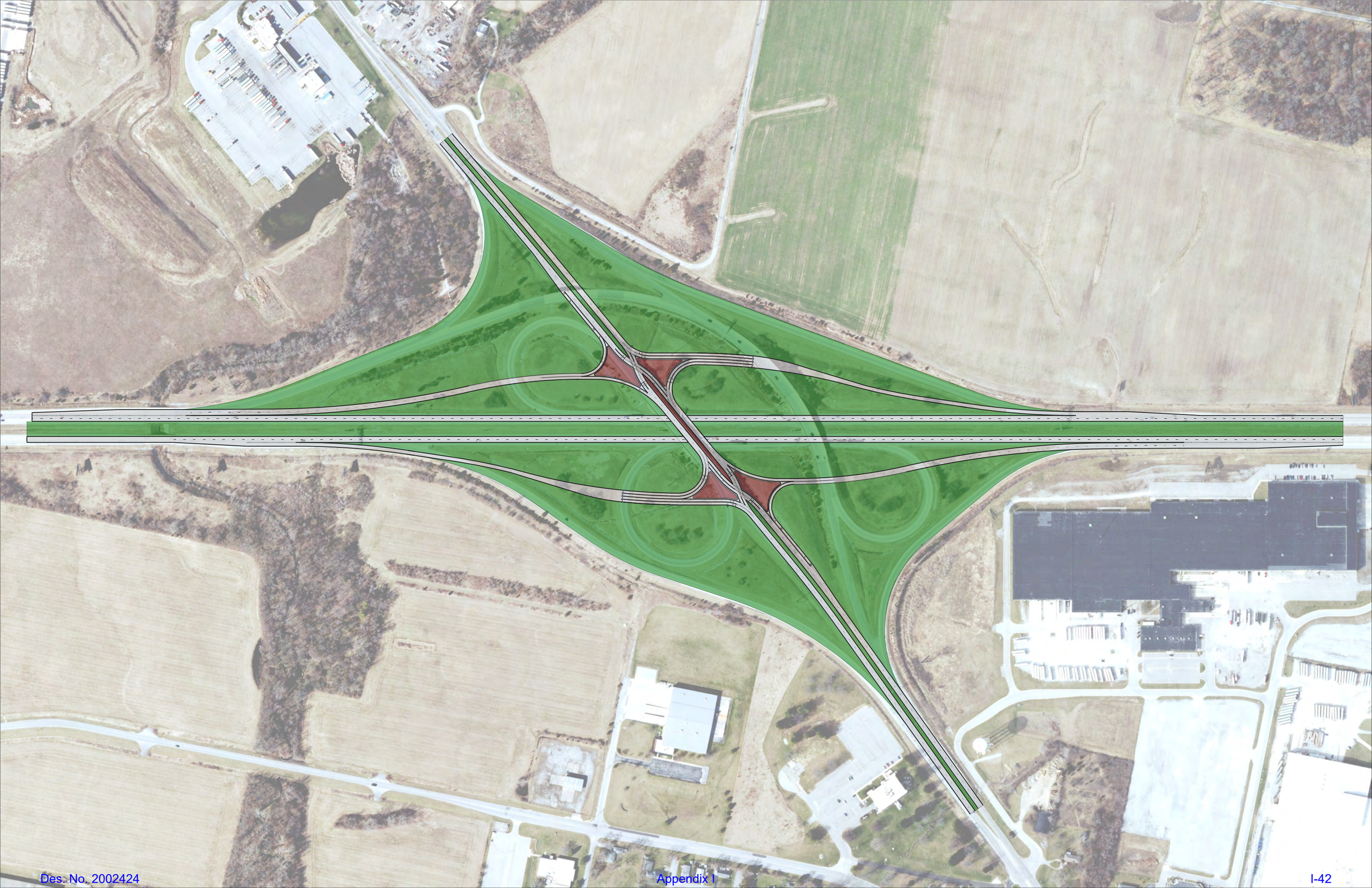

1330'
300'
STOP

Attachment K-3: Teardrop Interchange

Attachment K-4: Diverging Diamond Interchange



ENGINEER'S REPORT

REVIVE I-70 MORE LANES, SAFER TRAVEL

I-70 PAVEMENT REPLACEMENT, WAYNE COUNTY, DESIGN BUILD PROJECT
DES. NO. 2002424 (LEAD), CONTRACT NO. R-43375

FINAL SUBMISSION
May 9, 2023

PREPARED FOR:

INDIANA DEPARTMENT OF TRANSPORTATION – GREENFIELD DISTRICT

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PURPOSE OF REPORT

The purpose of this report is to document the engineering assessment phase of project development, including all coordination that has been completed in preparation for this road and bridge project. This document outlines the proposal and is intended to serve as a guide for subsequent survey, design, environmental, right-of-way, and other project activities leading to construction. The preferred alternative identified in this document is considered pre-decisional, pending the outcome of environmental studies.

PROJECT LOCATION

This project is located within the INDOT Greenfield District along Interstate 70 (I-70) in Harrison, Center, and Wayne Townships of Wayne County, Indiana. The roadway improvements begin approximately 1.5 miles west of the I-70/State Road (SR) 1 interchange (R.P. 135+0.865) and end at the Indiana/Ohio State Line (R.P. 156+0.234) which is equivalent to approximately 21-miles. The project setting is primarily rural, with a suburban area near the City of Richmond that has a mixture of residential and commercial uses.

Additionally, two interchange modifications will be analyzed within the aforementioned project limits. These two interchanges are located along I-70 at US 35 and US 40.

Project location map(s) are included in Appendix A.

EXISTING FACILITIES

ROADWAY

The project setting is primarily rural, with a suburban area near the City of Richmond that has a mixture of residential and commercial uses. There are six interchanges within the project area:

- I-70 and SR 1;
- I-70 and Centerville Road;
- I-70 and US 35/Williamsburg Pike;
- I-70 and US 27 (locally known as Chester Boulevard);
- I-70 and SR 227; and
- I-70 and US 40 (also known as National Road).

Additionally, along westbound I-70, there is a rest area between SR 1 and Centerville Road, and a weigh station between Centerville Road and US 35. Within the project area, I-70 is a divided highway classified as principal arterial freeway. The typical cross section has two 12-foot wide travel lanes in each direction with auxiliary lanes at the interchanges, weigh station, and rest area, and an existing 60-foot wide median. Guardrail, bridge rails, median barriers, and interchange lighting are present throughout most of the corridor. Existing inside and outside shoulders range from 4 to 12 feet wide.

There are 47 bridges and multiple culverts included in the project area. Stormwater is primarily managed by sheet flow to roadside ditches. Multiple streams and rivers intersect the corridor, including the Whitewater River, Martindale Creek, Dry Branch, Greens Fork, College Corner Branch, Black Water Branch, Far Run, Nolands Fork, Plum Creek, and Clear Creek.

Pedestrian facilities are present at three locations within the project area. The Cardinal Greenway Trail crosses the project area via an underpass west of US 27. There are sidewalk segments along US 27 south of the I-70 interchange, which terminate at the project area boundary and do not connect to other pedestrian facilities within the project area. There is a 200-foot long sidewalk segment along US 40 which does not connect to other pedestrian facilities.

Furthermore, there are no existing noise abatement measures along this section of I-70.

STRUCTURES

I-70 over Whitewater River (DES 2200762/220763)

The existing facility over Whitewater River is a three-span composite continuous steel beam bridge built in 1965 and last rehabilitated in 2015. Currently the bridge has concrete railings on the deck and the approaches. The existing bridge clear roadway width is 39'-10", consisting of two 12'-0" lanes and 5'-10" inside and 10'-0" outside shoulders. The existing structure is built on a 0.122% constant grade (per existing plans).

I-70 over Cardinal Greenway Trial (DES 2002447/2002448)

The existing facility over the Cardinal Greenway trail is a three-span composite continuous steel beam bridge built in 1960 and last rehabilitated in 2019. Currently the bridge has concrete railings on the deck and the approaches. The existing bridge clear roadway width is 40'-0", consisting of two 12'-0" lanes and 5'-9" inside and 10'-3" outside shoulders. The existing structure is built on a 1000' vertical curve (per existing plans).

I-70 over East Fork/East Fork of Whitewater River (DES 2002455/2002456)

The existing facility over East Fork/East Fork (E. Fk./E. Fk.) of Whitewater River is a five-span composite continuous steel beam bridge built in 1959 and widened in 1990. Currently the bridge has concrete railings on the deck and the approaches. The existing bridge clear roadway width is 39'-4", consisting of two 12'-0" lanes and 4'-8" inside and 10'-8" outside shoulders. The existing structure is built on a 0.52% constant grade (per existing plans).

I-70 over Access Road (DES 2002484/2002485)

The existing facility over Access Rd. is a three-span composite continuous steel beam bridge built in 1959 and widened in 1997. Currently the bridge has concrete railings on the deck and the approaches. The existing bridge clear roadway width is 40'-7", consisting of two 12'-0" lanes and 5'-11" inside and 10'-8" outside shoulders. The existing structure is built on a 1000' vertical curve (per existing plans).

Remaining Rehabilitation and Preventive Maintenance Bridges

For discussions regarding the existing facilities of the bridges scoped for rehabilitation or preventive maintenance, please refer to their respective inspection reports.

DRAINAGE

The I-70 corridor uses multiple methods to perpetuate the existing drainage patterns and needs. The mainline utilizes ditches in both the median and outside grading limits to control flow. In addition to the ditches in the median, inlet structures and outlet pipes collect the runoff and redistribute the water to the outside ditch line. A total of 86 culverts have been located all varying in shape, size, and material. A table summary of the culverts can be found in Appendix B. There are two legal drains crossing under I-70 which are identified as Russell Ditch (CV I70-089-145.60) and O'Brien Ditch (CV I-70-089-147.41).

The project's existing drainage limits fall into the purview of three different entities: INDOT (Greenfield District), City of Richmond, and Wayne County Surveyors Office.

RAILROAD

One railroad crossing is located within the I-70 project area. This is a grade-separated crossing that carries I-70 over a rail line operated by Norfolk Southern (NSRR). The existing facility over Norfolk Southern RR (NSRR) is a three-span composite continuous steel beam bridge built in 1959 and was widened in 2000. Currently the bridge has concrete railings on the deck and the approaches. The existing bridge clear roadway width is 39'-0½", consisting of two 12'-0" lanes and 4'-8¾" inside and 10'-3¾" outside shoulders. The existing structure is built on a 1500' vertical curve (per existing plans).

Queuing Due to Maintenance of Traffic: Excessive queuing occurs on I-70 when there are lane closures due to crashes, maintenance work, and other events. Lane closures on this four-lane section of I-70 result in traffic back-ups beyond INDOT policy limits. The Indiana Highway Congestion Policy (IHCP) defines acceptable queuing at interstate work zones, based on the length of the queue and the time it remains in place. According to INDOT's 2022 *I-65 and I-70 Safety and Mobility Needs Summary,* on about 85 percent of the I-70 four-lane sections, a lane closure will result in queues beyond INDOT policy limits more than 50 percent the time. Work zones requiring lane closure are common since routine maintenance is required on I-70. INDOT's queue analysis tool was used to identify expected queues from closing one lane in each direction on four-lane segments of I-70. The queue analysis determined that the traffic backups exceed INDOT's policy limits 98 to 100 percent of the time within the project area. It is important to note that work zone lane closures are only allowed at night. The queue analysis is equally applicable for crashes and other incidents where lane closure is required.

Travel time reliability for trucks is also a concern on I-70. The *Indiana Multimodal Freight Plan Update 2018* assessed truck travel time reliability (TTTR), which is an indicator of a highway system's ability to consistently meet demand for travel. The TTTR index (TTTRI) is a measure of how much additional time shippers must plan for in order to arrive on-time 95 percent of the time. FHWA defines TTTRI as "the consistency or dependability in travel times, as measured from day-to-day and/or across different times of day". Federal performance measures require states to report the worst TTTI across five times of day. The segment of I-70 through Richmond is documented as unreliable in the Multimodal Freight Plan.

The purpose of the Revive I-70 project is to:

- Restore the pavement to extend the service life of these sections of roadway to at least 30 years, and provide a ride quality with an IRI of at least 95 in/mi;
- Correct geometric deficiencies to meet current IDM standards;
- Reduce the frequency and severity of crashes;
- Fulfill state and federal long-range plans for increasing mobility; and
- Improve truck travel time reliability.

ALTERNATIVE & ANALYSIS

I-70 GENERAL DISCUSSION

Revive I-70 Richmond in Wayne County will be divided into three contracts, per direction from INDOT's PMG dated March 31, 2023. Contract 1 will be from 0.8 miles west of US 35 to the IN/OH State Line (approximately 8 miles). Contract 2 will be from the Whitewater River Bridge, approximately 1.5 miles west of SR 1, to 7.5 miles east of SR 1 (approximately 8.7 miles). Contract 3 will be from 7.5 miles east of SR 1 to 0.8 miles west of US 35 (approximately 3.7 miles).

Below is a summary of the scope of work for each contract:

1) Contract 1:
    a. Pavement replacement, added travel lane in the median, and concrete median barrier for entire length
    b. Alternate bid will be used for Continuously Reinforced Concrete Pavement "CRCP" and Perpetual Hot Mix Asphalt "PHMA"
    c. Pavement patching within the limits of Contract 3
    d. Letting of February 2024.
2) Contract 2:
    a. Two pavement treatment types will be considered based on the bid results from contract 1
        i. Pavement replacement, added travel lanes in the median, and concrete median barrier for the entire length with alternate bid of CRCP or PHMA
        ii. Pavement rehabilitation of the existing travel lanes to achieve pavement life extension of 25-30 years, in addition to:
            1. Full depth shoulders of sufficient width in order to maintain 2 lanes of traffic in each direction during construction

2. A widening inside shoulder
3. Drainage improvements necessary to promote positive drainage

b. All currently scoped bridge work (including widening of the inside)
c. An anticipated Letting of September 2024

3) Contract 3:
   a. Scope of services will match contract 2
   b. Procurement type TBD based on development needs
   c. Letting will either be 2026 or 2027

Alternatives considered for Revive I-70 were presented in the *Abbreviated Engineers Report Pavement Replacement with Added Travel Lanes* dated July 13, 2020. A no-build alternative and three build alternatives were evaluated. The build alternatives would provide a full-depth reconstructed pavement section including subbase, new guardrail, underdrains, and other highway related items in accordance with INDOT Standards and Specifications.

The "build" alternatives include: reconstructing and widening I-70; analyzing with the possibility of reconfiguring the I-70 and US 35/Williamsburg Pike and I-70 and US 40 interchanges; modifying acceleration/deceleration lengths of the ramps at the other four interchanges, weigh station, and rest area; replacing the I-70 bridges over East Fork Whitewater River; and updating drainage to meet INDOT and local requirements. Additionally, existing lighting, signage, and guardrail/barrier systems would be upgraded.

The work for this project will mostly be contained within the existing, previously disturbed right-of-way (ROW), but there are a couple locations which will require the acquisition of ROW.

The maintenance of traffic is expected occur in several phases with an anticipated five (5) mile long maximum length work zone. Three (3) alternatives will be considered and provided in the draft Transportation Management Plan (TMP) included with the final submittal package; however, will be designed and detailed by the Design Build Teams. At least two travel lanes in each direction of I-70 will be maintained at all times. Short-term ramp and local road closures are expected to occur during construction.

Roadway

The proposed scope of work is provide an added travel lane, in each direction, in the median and to close the median with a widened inside 14' shoulder and concrete median barrier. The existing pavement will be removed and replaced by two pavement alternatives. The mainline (travel lane) pavement and shoulder pavement types will be determined through the use of alternative bid and based on the contracts' scope as stated in the above section.

The ramps located at the following interchanges: SR 1, the rest area, Centerville Rd, the weigh station, US 35, US 27, SR 227, and US 40 will be reconstructed up to the gore nose at a minimum. Final design will determine the exact limits of ramp construction. It is anticipated that existing HMA ramps will be mill-and-overlayed while existing concrete ramps will be patched.

Drainage

The proposed drainage will involve new inlets and storm sewers along the closed median barrier, that will outlet to the outside ditch. In specified locations, the outside ditch will be regraded to provide positive drainage. Detention areas will be added in the infield areas and ditches for the increase in impervious area. No detention will be allowed in the median, however, there may be locations for in-line detention under the outside shoulders. The existing culverts will be replaced with new culverts unless otherwise specified in the scope of services. A list of the existing culverts and the recommended proposed changes can be found in Appendix B.

INDOT maintenance and construction has identified drainage issues within the I-70 and US 35 interchange that is also affecting the condition of pavement. Regrading and additional culverts are anticipated within the interchange to correct the drainage patterns and to carry water away from the roadway pavement.

There are two legal drain outfalls for the project, Russell Ditch and O'Brien Ditch. The detention design for the outfalls will be required to be approved by the Wayne County Drainage Board.

DESIGN CRITERIA

I-70 Mainline

I-70 is classified as a Rural/Urban Freeway within the limits of this project. Mainline I-70 will be designed in accordance with the Indiana Design Manual (IDM) Chapter 40-6.01(02) and IDM Figure 53-1 Geometric Design Criteria for Freeways (4R Project). In addition, design will conform to INDOT's standard details, specifications, policies, and procedures in U.S. Customary Units. Current INDOT design criteria will also be used for design of the ramp modifications where required. All remaining level one design requirements will be incorporated into the Scope of Services. The proposed design criteria for mainline I-70 is included in Appendix E.

The cross-sectional elements for the I-70 typical section will consist of a concrete median barrier, a 14 foot inside shoulder (12 foot shoulder with a 2' barrier offset), 3-12 foot travel lanes, and a 12 foot outside shoulder. Per IDM Design Memo 17-02, a minimum 1-foot offset will be allowed based on the fact the project will be utilizing a 12 foot outside shoulder. The intent for this project is to utilize two slightly different typical sections with the only difference being a crown shift for approximately the first 4 miles of the project. The design speed and posted speed for I-70 is 70 mph.

US 35

US 35 is classified as a Principal Arterial (Suburban) Highway. The existing roadway consists of two lanes in both the Northbound and Southbound directions with a grass median dividing traffic. The typical section for both NB and SB consists of 2-12' lanes, 10' right shoulder, and 4' left shoulder. US 35 also consists of auxiliary lanes and ramp junctions to provide free-flow access to Interstate 70. The posted speed for the roadway is 45 mph.

The proposed design criteria for US 35 are included in Appendix E.

US 40

US 40 is classified as a Principal Arterial (Suburban) Highway. The existing roadway consists of two lanes in both the Eastbound and Westbound directions with a grass median dividing traffic. The existing typical section consists of 2-12' lanes, 10' right shoulder, and 4' left shoulder. The corridor also consists of turn lanes, auxiliary lanes, and ramp junctions to provide full access to the interchange with Interstate 70. The posted speed for the roadway is 45 mph.

The proposed design criteria for US 40 are included in Appendix E.

DESIGN EXCEPTIONS

The following Level 1 Design Exceptions have been identified for I-70 within the Project Limits:

- I-70 EB/WB Outside Shoulder Width near the US 40 Bridges
- I-70 EB/WB Inside Shoulder Width near the US 40 Bridges
- I-70 EB/WB Superelevation Rate near the US 40 Bridges and Ohio State Line
- I-70 EB/WB Superelevation Transition Rate near the US 40 Bridges and Ohio State Line
- I-70 EB/WB Travel Lane Cross-Slope near the US 40 Bridges
- Horizontal Stopping Sight Distance for Maintenance of Traffic

The level 1 design exceptions are required because the existing I-70 over US 40 bridges are remaining in place, and therefore, I-70 will need to tie into the existing structures. Maintaining the existing bridge conditions affects the travel lane cross slopes, shoulder widths, and superelevation transition rates. The final horizontal curve on I-70 extends into Ohio, but the proposed work is to occur with IN State limits. As the proposed construction will not extend beyond the Ohio Border, the existing curvature and substandard superelevation rate will need to be maintained.

The following Level 2 Design Exceptions (see appendix F for supporting documentation) have been identified for design elements within the Project Elements:

- Minimum Grade for Drainage
- I-70 EB/WB Bridge Railing Test Level at the US 40 Bridges
- Maintaining existing side slopes and clear zone deficiencies along I-70 and ramps

The design exceptions listed above will have a formal submittal which will identify the justification for each design exception.

INTERCHANGE ALTERNATIVES

I-70 and US 35

The alternatives considered and analyzed for the I-70 and US 35 Interchange are described below.

No-Build

The I-70 and US 35 No-Build Alternative consists of the following characteristics:

Figure 5: US 35 No Build Alternative

Northbound US 35

Existing northbound US 35, from Enterprise Drive to Flatley Road, is part of a divided highway consisting of two lanes. There is one entrance ramp and two exit ramp movements which branch off northbound US 35. The first ramp movement is the exiting ramp to eastbound I-70. The second movement in an entrance from eastbound I-70 that merges with US 35 just south of the bridge over I-70. A third movement is a semi-directional ramp which includes a flyover bridge over southbound US 35 and directs traffic from northbound US 35 to westbound I-70. Northbound US 35 also includes an option lane allowing vehicles traveling in the middle lane of the three-lane configuration to either go left and take the exit ramp to westbound I-70 or continue heading north along US 35.

Southbound US 35

Existing southbound US 35, from Enterprise Drive to Flatley Road, is part of a divided highway consisting of two lanes. An auxiliary lane, is added between the two loop ramps. There are two ramp movements which branch off southbound US 35. The first ramp movement is the exiting ramp which delivers traffic from southbound US 35 to westbound I-70. The second movement is a loop ramp which directs traffic from southbound US 35 to eastbound I-70.

Eastbound I-70

Existing eastbound I-70 carries two lanes of traffic up to the I-70 and US 35 Interchange. A parallel ramp lane exit opens just past the Clear Creek Bridge and directs traffic from eastbound I-70 to southbound US 35. A little further east, the southbound US 35 loop ramp merges with the I-70 traffic and creates a short (840') auxiliary lane to the exiting loop ramp for eastbound I-70 to northbound US 35. Within the shortened auxiliary lane, a weaving condition exists between vehicles trying to enter and exit I-70. Further to the east and a parallel ramp from northbound US 35 merges with I-70 before dropping and continuing to normal traffic.

Westbound I-70

Existing westbound I-70 carries two lanes of traffic up to the I-70 and US 35 Interchange. At the far eastern end of the interchange, a parallel ramp lane opens up for traffic exiting westbound I-70 and heading to northbound US 35. Just past the southbound US 35 bridge, a loop ramp exit lane begins allowing for traffic to exit and head to southbound US 35. Due to the proximity of the southbound US 35 bridge abutment, the ramp lane length is shortened (approximately 250 feet), and a proper deceleration length is not provided. Further to the west, a parallel multi-lane ramp from southbound US 35 merges with I-70 before it becomes an auxiliary lane used for the weigh station.

Summary

The US 35 No-Build Alternative will maintain its current level of traffic operations equating to a LOS C but does not address the geometric and safety deficiencies associated with this interchange. As stated in the above text and in the crash analysis section of this report, there is a weaving movement between the entering and exiting loop ramps for Eastbound I-70, which will remain and has been proven to have a higher rate of crashes compared to the rest of the interchange and surrounding area. Regarding the geometric deficiencies, all the ramp movements do not geometrically conform to INDOT's standard, especially in terms of the gore lengths and ramp divergences. Additionally, the acceleration and deceleration lengths for the loop ramps are not being corrected to meet INDOT's current design standards and to provide the necessary distance (acceleration minimum length of 600 feet, deceleration minimum length of 800 feet) to safely exit or enter I-70.

Alternative 1: Acceleration/Deceleration Ramp Lane Modifications

The I-70 and US 35 Acceleration/Deceleration Ramp Lane Modifications Alternative consists of the following characteristics:

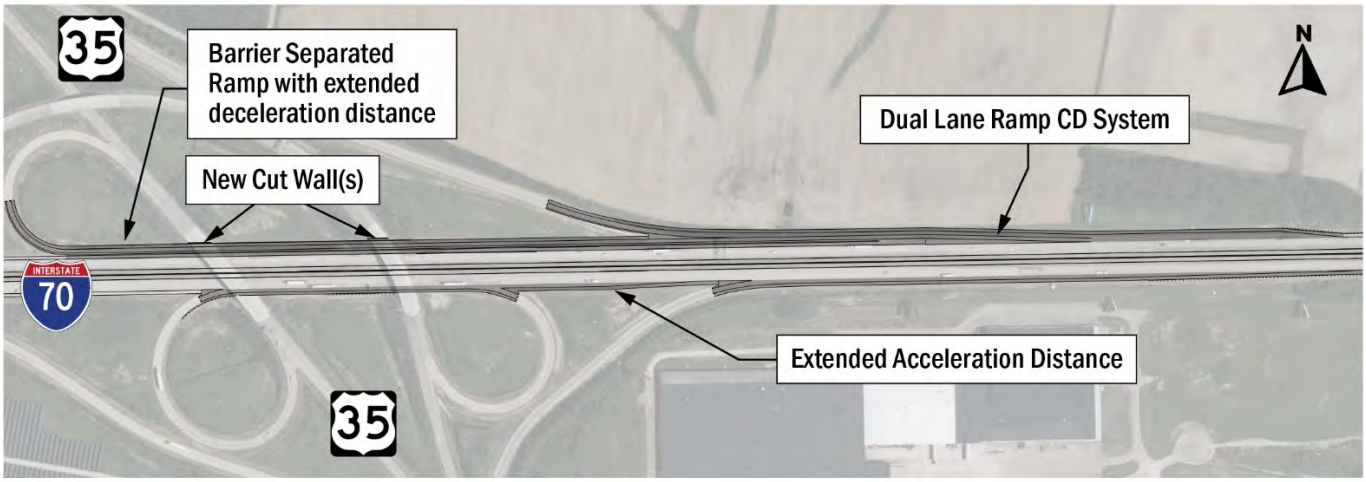


Figure 6: US 35 Acceleration/Deceleration Ramp Lane Modification Alternative

Northbound/Southbound US 35

There is no change for the northbound and southbound US 35 movements compared to the No Build Option above.

Eastbound I-70

Eastbound I-70 matches the aforementioned "No Build Alternative" discussion except for one modification, the acceleration length, of approximately 300 feet, will be added to the merging loop ramp coming from US 35 southbound. The added length will extend beyond the exiting loop ramp for eastbound I-70 to northbound US 35.

Westbound I-70

Westbound I-70 will be modified by introducing a dual lane collector-distributor (CD) road to guide and eliminate weaving between the exiting I-70 traffic when trying to access US 35. The barrier separated CD roadway will provide proper deceleration lengths and meet INDOT's design standards for both exiting ramps. Additionally, the existing northern slopes walls for the SB and NB bridges for US 35 over I-70 will be removed and replaced with new cut walls.

Summary

The US 35 Ramp Modification Alternative addresses only a few of the operational, geometric, and safety deficiencies associated with this interchange. The geometric design of the remaining ramps untouched by the modification do not conform to INDOT's standard. A weaving movement coupled with the limited deceleration length between the entering and exiting loop ramps from Eastbound I-70 will remain and has been proven to have higher rate of crashes compared to the rest of the interchange and surrounding area.

The interchange modification does correct some of the current deficiencies. The WB I-70 exiting ramps will have a new 'CD' lane created providing the necessary lengths required to decelerate and add an element of safety. The acceleration length for the Eastbound I-70 entrance ramp will be extended by having additional pavement constructed just beyond the exit loop ramp. With the proposed changes, the interchange traffic operations will improve from a LOS C to a LOS B.

Alternative 2: Diamond Interchange with Roundabout Termini

The I-70 and US 35 Diamond Interchange with Roundabout Termini consists of the following characteristics:

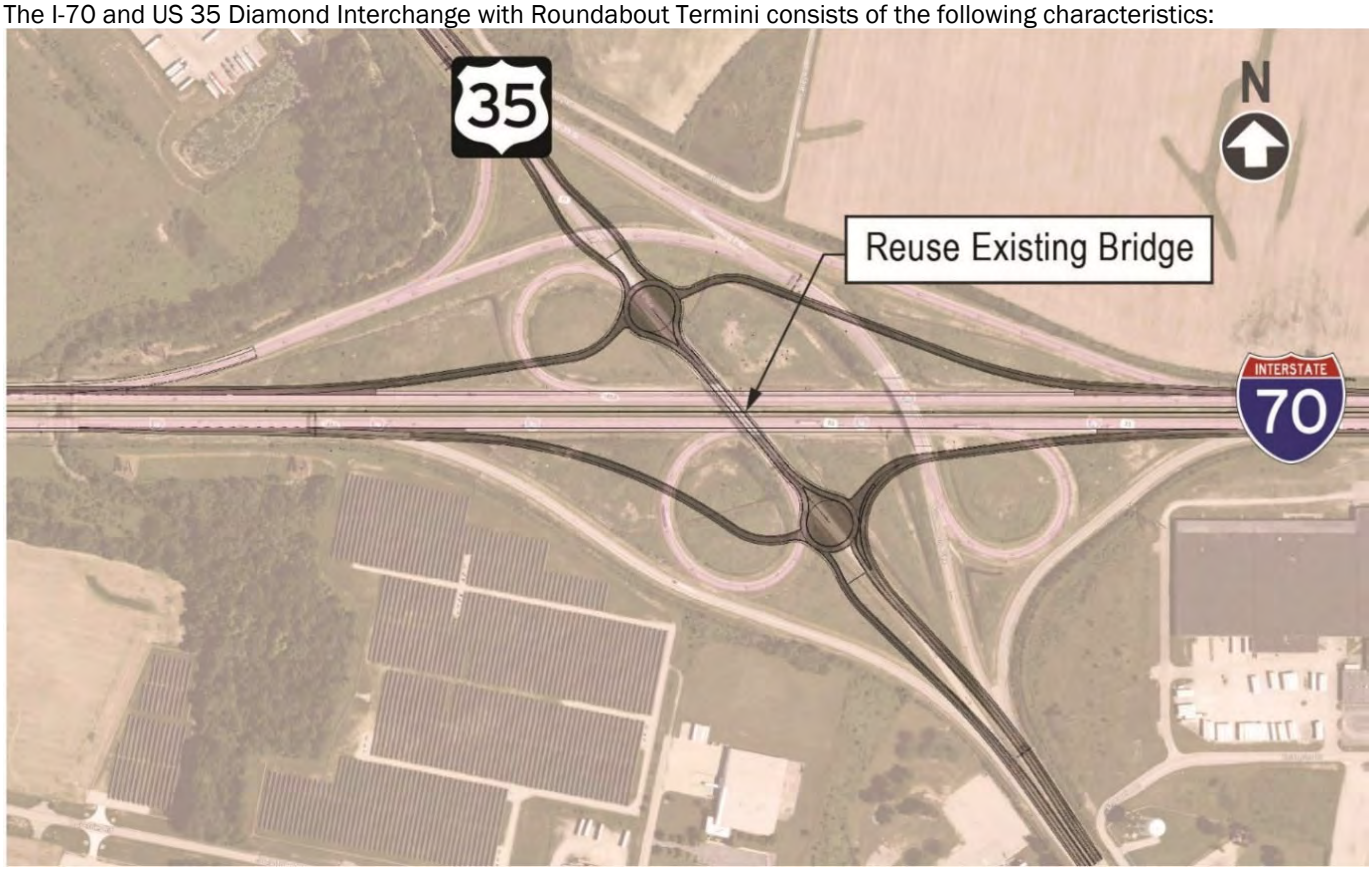


Figure 7: US 35 Diamond Interchange with Roundabout Termini

Northbound US 35

Northbound US 35 carries two lanes of traffic to a tear-drop style roundabout intersection at the southern end of the interchange. As the lanes approach the roundabout, the right lane turns into an exit only by-pass (slip lane) directing traffic to eastbound I-70. The slip lane provides a logical merge for the right northbound lane; otherwise a merge before the roundabout is required. The left lane will direct traffic to a single lane circulating roadway where traffic is given the option of continuing north along US 35 or taking the exit ramp to reach westbound I-70 when it reaches the northern roundabout intersection of the interchange. Northbound US 35 will continue with a single lane and tie-in to the existing condition.

Southbound US 35

Existing southbound US 35 carries a single lane of traffic from the truck stop on the northern end, which will be directed to a tear-drop style roundabout intersection at the northern end of the interchange. The existing second lane will be eliminated. At the roundabout, the single lane will be given the option to take the exit to reach westbound I-70 or travel through before reaching the next roundabout intersection at the southern end. At the southern end, southbound traffic will be given the option of continuing south or taking the exit ramp to reach eastbound I-70. Southbound US 35 will add an extra lane just south of the roundabout and carry those two travel lanes before tying into the existing configuration of US 35.

Eastbound I-70

Eastbound I-70 carries three lanes of traffic up to the I-70 and US 35 Interchange. There are two ramp access points along this segment of I-70. At the western end of the interchange, a parallel ramp lane exit opens and directs traffic from eastbound I-70 to US 35 where a tear-drop roundabout style intersection will further control. At the eastern end of the

interchange, a parallel entrance ramp from US 35 will merge with eastbound I-70 before dropping and following normal conditions.

Westbound I-70

Westbound I-70 carries three lanes of traffic up to the I-70 and US 35 Interchange. There are two ramp access points along this segment of I-70. At the eastern end of the interchange, a parallel ramp lane exit opens and directs traffic from westbound I-70 to US 35 where a tear-drop roundabout style intersection will further control. At the western end of the interchange, a parallel entrance ramp from US 35 will merge with westbound I-70 and turn into an auxiliary lane before providing an exit to the weigh station.

Summary

The US 35 Diamond Interchange with Roundabouts allows for the interchange to be fully reconstructed (excluding the US 35 southbound bridge) and decrease the amount of assets located in this area. The ramps will be designed to meet INDOT's design standards, and the existing loop ramps will be completely removed. Based on the traffic analysis it was determined a single lane is sufficient based on current growth rate projections for 30+ years. With this determination, the existing US 35 bridge can be reused with minor widening. The reconstruction will also provide pedestrian facilities for this location. A LOS B will be provided at this interchange based on the reconstruction.

Alternative 3: Diamond Interchange with Signal Termini

The I-70 and US 35 Diamond Interchange with Signal Termini consists of the following characteristics:

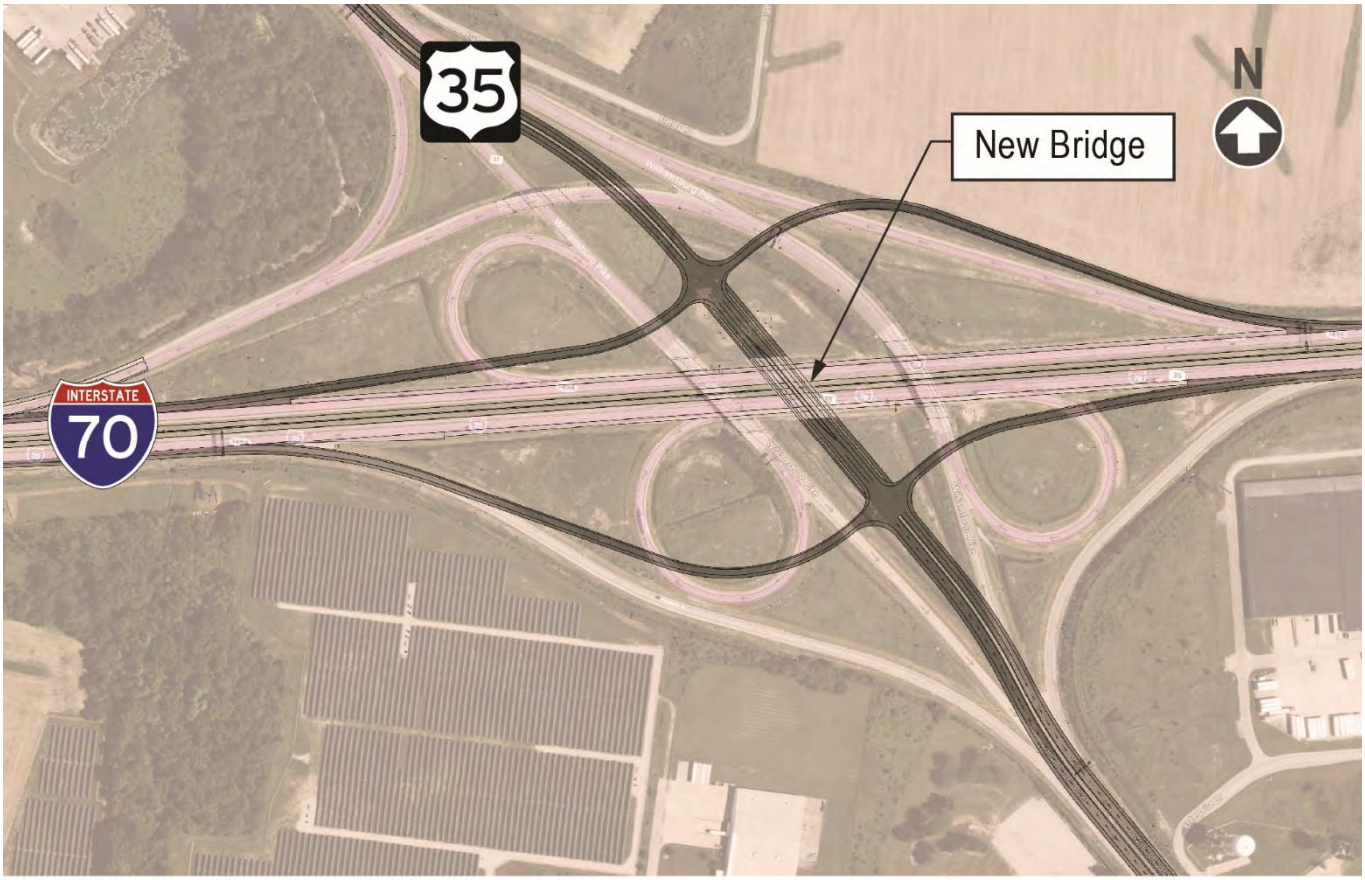


Figure 8: US 35 Diamond Interchange with Signals

Northbound US 35

Northbound US 35 will maintain two lanes of traffic, similar to the existing conditions, which will be directed to signalized intersection at the southern end of the interchange. As the lanes approach the signal, the right lane turns into a right turn

exit only lane and will direct traffic to eastbound I-70 entrance ramp. The left lane (thru movement) will continue heading north before reaching the next signalized intersection as part of the new interchange. A Left turn lane will be provided in between the two signalized intersections allowing traffic to turn left onto the westbound I-70 entrance ramp. Northbound US 35 will continue with a single lane and tie-in to the existing condition.

Southbound US 35

Southbound US 35 carries a single lane of traffic which will be directed to a signalized intersection at the northern end of the interchange. At the intersection, a right turn lane will be added allowing for southbound traffic to turn right onto the exiting ramp to reach westbound I-70. The left lane (thru movement) will continue heading south before reaching the next signalized intersection as part of the new interchange. A Left turn lane will be provided in between the two signalized intersections allowing traffic to turn left onto the eastbound I-70 entrance ramp. Southbound US 35 will add an extra lane just south of the signal and carry those two travel lanes before tying into the existing configuration of US 35.

Eastbound I-70

Eastbound I-70 carries three lanes of traffic up to the I-70 and US 35 Interchange. There are two ramp access points along this segment of I-70. At the western end of the interchange, a parallel ramp lane exit opens and directs traffic from eastbound I-70 to US 35 where a signalized intersection will further control. As the ramp reaches the signalized intersection, right turn and left turn lanes will be provided. At the eastern end of the interchange, a parallel entrance ramp from US 35 will merge with eastbound I-70 before dropping and following normal conditions.

Westbound I-70

Westbound I-70 carries three lanes of traffic up to the I-70 and US 35 Interchange. There are two ramp access points along this segment of I-70. At the eastern end of the interchange, a parallel ramp lane exit opens and directs traffic from westbound I-70 to US 35 where a signalized intersection will further control. As the ramp reaches the signalized intersection, right turn and left turn lanes will be provided. At the western end of the interchange, a parallel entrance ramp from US 35 will merge with westbound I-70 and turn into an auxiliary lane before providing an exit to the weigh station.

Summary

The US 35 Diamond Interchange with signals allows for the interchange to be fully reconstructed and decrease the amount of assets located in this area. The ramps will be designed to meet INDOT's design standards, and the existing loop ramps will be completely removed. Based on the traffic analysis it was determined a single lane is sufficient based on current growth rate projections for 30+ years. A new bridge structure will be constructed providing a single lane of traffic for both northbound and southbound US 35, in addition to, a dedicated left turn lane at each intersection. The reconstruction can also accommodate pedestrian facilities. A LOS B will be provided at this interchange based on the reconstruction.

Recommended Alternative

Alternative 1 (acceleration/deceleration ramp modifications) is the recommended alternative for the I-70 and US 35 interchange (based on INDOT's direction on 3/28/2023). A Decision Matrix was developed to aid in the decision process with INDOT and the project team. Refer to Appendix G for the I-70 and US 35 Decision Matrix. Several factors were considered when recommending the alternative.

Level of Service (LOS): The LOS for Alternative 1, for the design year (30 years), is an acceptable LOS of B. When identifying the LOS, the lowest service level of all the movements was selected. All the movements were either "B" or "A." Please refer to the "Traffic Analysis" section of the report and Appendix C for traffic analysis details.

Cost:

- No-build: $7.6M
- Alternative 1: $11.7M
- Alternative 2: $22.5M
- Alternative 3: $26.8M

Cost items to note:

- Refer to Appendix G for cost additional information
- The cost is in 2023 dollars. INDOT will apply inflation to the construction amounts
- A contingency of 25% was applied at the end for miscellaneous items.
- Many of the Lump Sum items (such as construction engineering, clearing of R/W, etc.) are already included in the cost of the mainline work and therefore not added in again.
- All alternatives utilized pavement areas that included the ramps and US 35. I-70 pavement was not included because that pavement is due to be replaced regardless of the alternative selected, and the project team felt comparing only the ramps and US 35 would provide the most accurate side by side comparison of the interchange types.
- Traffic items, such as signage, markings, lighting, is scoped to be replaced as part of the overall contract, and therefore not included in the alternative costs.

Asset Management: The existing pavement and bridges within the US 35 interchange is in "good" condition. The two structures over I-70 have the next "major work" programmed for 2050 and the bridge over US 35 is scheduled for a painting and overlay in 2035. The ramp roadways are not scoped for work in the next 20 years. Due to the "good" condition of the existing interchange, it was deemed unnecessary to replace, or remove, all the existing infrastructure. Please refer to Appendix G for the bridge and pavement life cycle costs.

Safety: For the I-70 and US 35 interchange, the EB traffic experiences a crash rate that is higher than a "typical" interstate interchange due to the weaving movement between the loop ramps and mainline. Alternative 1 proposed to modify the acceleration distance for the SB US 35 to EB I-70 ramp by lengthening it an extra 300 feet. As an added benefit, the WB I-70 to SB US 35 ramp will be modified and placed behind a barrier to allow for the deceleration distance to be safely lengthened before accessing the loop ramp. These two proposed features should help reduce the number of crashes within the interchange. Please refer to the "Safety Analysis" section of the report and Appendix C for safety analysis details.

<u>Previously Dismissed Concepts</u>

Any concept dismissed was at the direction of INDOT which took place during the bi-weekly task force meetings or during the framework/alternative analysis meetings. The information below provides further details regarding the dismissed alternatives.

All the options listed below were eliminated based on the reasoning of being "hybrid" fixes resulting in a mixed-matched design of existing and proposed elements which INDOT deemed against their intent for this interchange.

- US 35 Southbound to I-70 Eastbound Fly Under Ramp
- US 35 Southbound to I-70 Eastbound Ramp and US 35 Northbound At-Grade Intersection
- US 35 Southbound to I-70 Eastbound Fly Over Ramp
- US 35 Diverging Diamond Interchange (DDI)
- US 35 Roundabout Intersections at Existing Ramp Terminals
- US 35 and I-70 PARCLO-AB

Based on the traffic analysis and being able to utilize a single lane in each direction, the alternative *Single Roundabout Interchange* was also dismissed.

I-70 and US 40

The alternatives considered and analyzed for the I-70 and US 40 Interchange are described below.

No-Build

The I-70 and US 40 No-Build Alternative consists of the following characteristics:

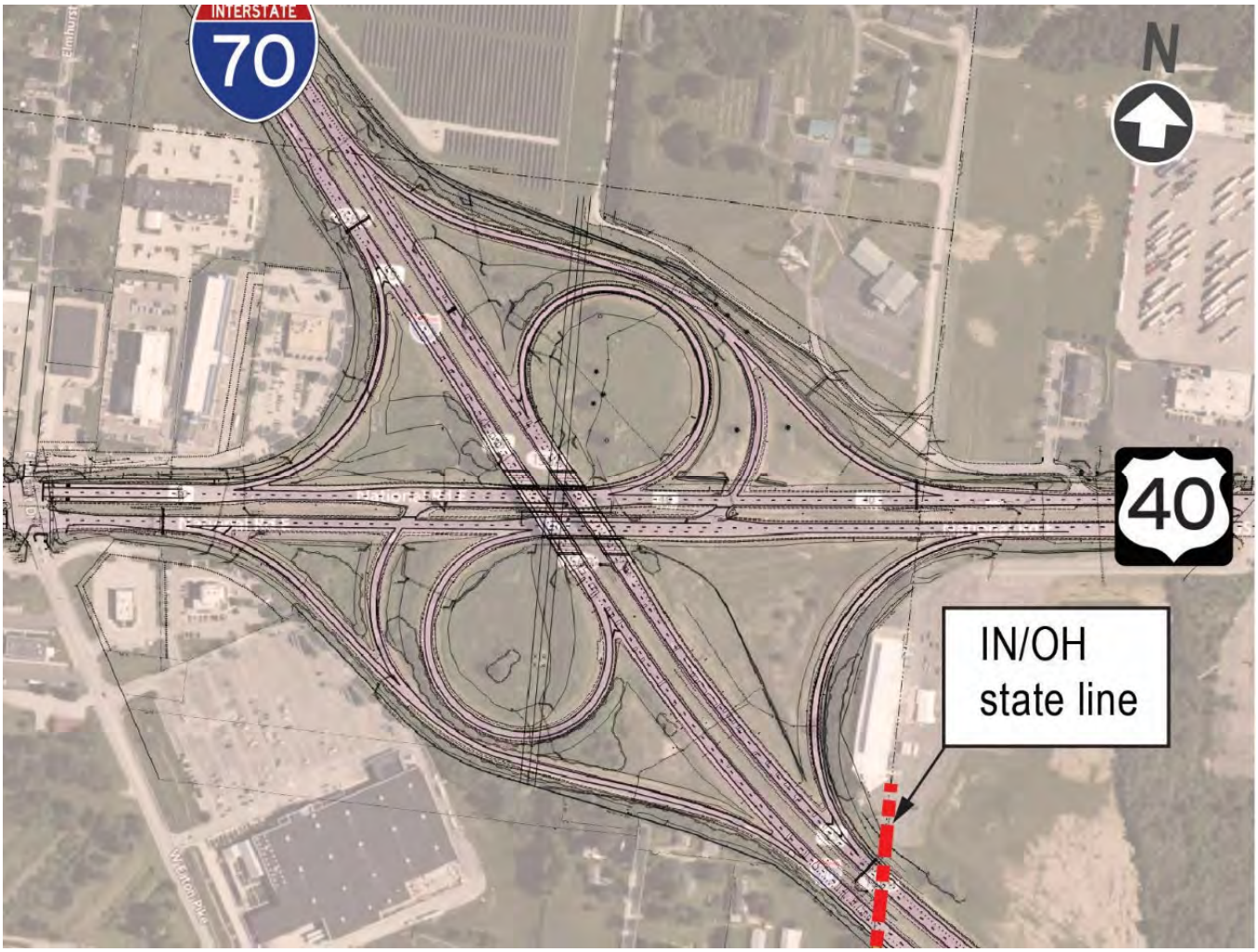


Figure 9: US 40 No Build Alternative

Eastbound US 40

Existing eastbound US 40, from Elmhurst Dr./Eaton Pike to the first full access commercial drive, is part of a divided highway consisting of two lanes. There are four ramp access points which interact with eastbound US 40, in addition to a signalized intersection just west of the first ramp junction. The first access point is for the exiting ramp from eastbound US 40 to eastbound I-70. The second access point is for the left turning movement from westbound US 40 to eastbound I-70. Approximately 350 feet from the second access point is the third which is for the loop ramp directing traffic from eastbound I-70 to eastbound US 40. A left turn bay is also introduced just under the I-70 bridges for vehicles exiting eastbound US 40 and entering westbound I-70. The final access point is for the parallel entering ramp for traffic leaving westbound I-70.

Westbound US 40

Existing westbound US 40, from Elmhurst Dr./Eaton Pike to the first full access commercial drive, is part of a divided highway consisting of two lanes. There are four ramp access points which interact with westbound US 40, in addition to, a signalized intersection just west of the last ramp junction. The first access point is for the exiting ramp from westbound US

40 to westbound I-70. The second access point is for the left turning movement from eastbound US 40 to westbound I-70. Approximately 350 feet from the second access point is the third which is for the loop ramp directing traffic from westbound I-70 to westbound US 40. The final access point is for the entering ramp for traffic leaving eastbound I-70 which turns into a right turn movement at the signalized intersection. Two left turn bays are also provided along this corridor. One is introduced just under the I-70 bridges for vehicles exiting westbound US 40 and entering eastbound I-70, and the other is introduced for the signalized intersection at the western limits.

Eastbound I-70

Existing eastbound I-70 carries two lanes of traffic up to the I-70 and US 40 Interchange. There are three ramp access points along this segment of I-70. A parallel ramp lane exit opens and directs traffic from eastbound I-70 to westbound US 40. A parallel ramp lane is provided before the exit loop ramp for traffic leaving eastbound I-70 and heading to eastbound US 40. Towards the southern end of the interchange footprint right before the Ohio Border, a parallel entrance ramp from US 40 (carrying both eastbound and westbound traffic) merges with I-70 before dropping and continuing to normal conditions.

Westbound I-70

Existing westbound I-70 carries two lanes of traffic up to the I-70 and US 40 Interchange. There are three ramp access points along this segment of I-70. On the Ohio state side just before the border, a parallel ramp lane exit opens and directs traffic from westbound I-70 to eastbound US 40. A parallel ramp lane is provided before the exit loop ramp for traffic leaving westbound I-70 and heading to westbound US 40. Towards the northern end of the interchange footprint, a parallel entrance ramp from US 40 (carrying both eastbound and westbound traffic) merges with I-70 before dropping and continuing to normal conditions.

Summary

The US 40 No-Build Alternative will maintain its current level of traffic operations equating to a LOS C but does not correct any of the geometric and safety deficiencies associated with this interchange. As identified in the crash analysis section of the report, the US 40 interchange has a higher rated ICF and ICC compared to other similar locations in the state and the surrounding area which would not be addressed with the no-build alternative. All the ramp movements do not geometrically conform to INDOT's current design standards, especially in terms of the gore lengths and ramp divergences. Also, the acceleration and deceleration lengths for the ramps are inadequate as they do not meet INDOT's current standard minimum lengths (acceleration minimum length of 600 feet, deceleration minimum length of 800 feet).

Alternative 1: Diamond Interchange with Roundabout Termini

The I-70 and US 40 Diamond Interchange with Roundabout Terminals consists of the following characteristics:

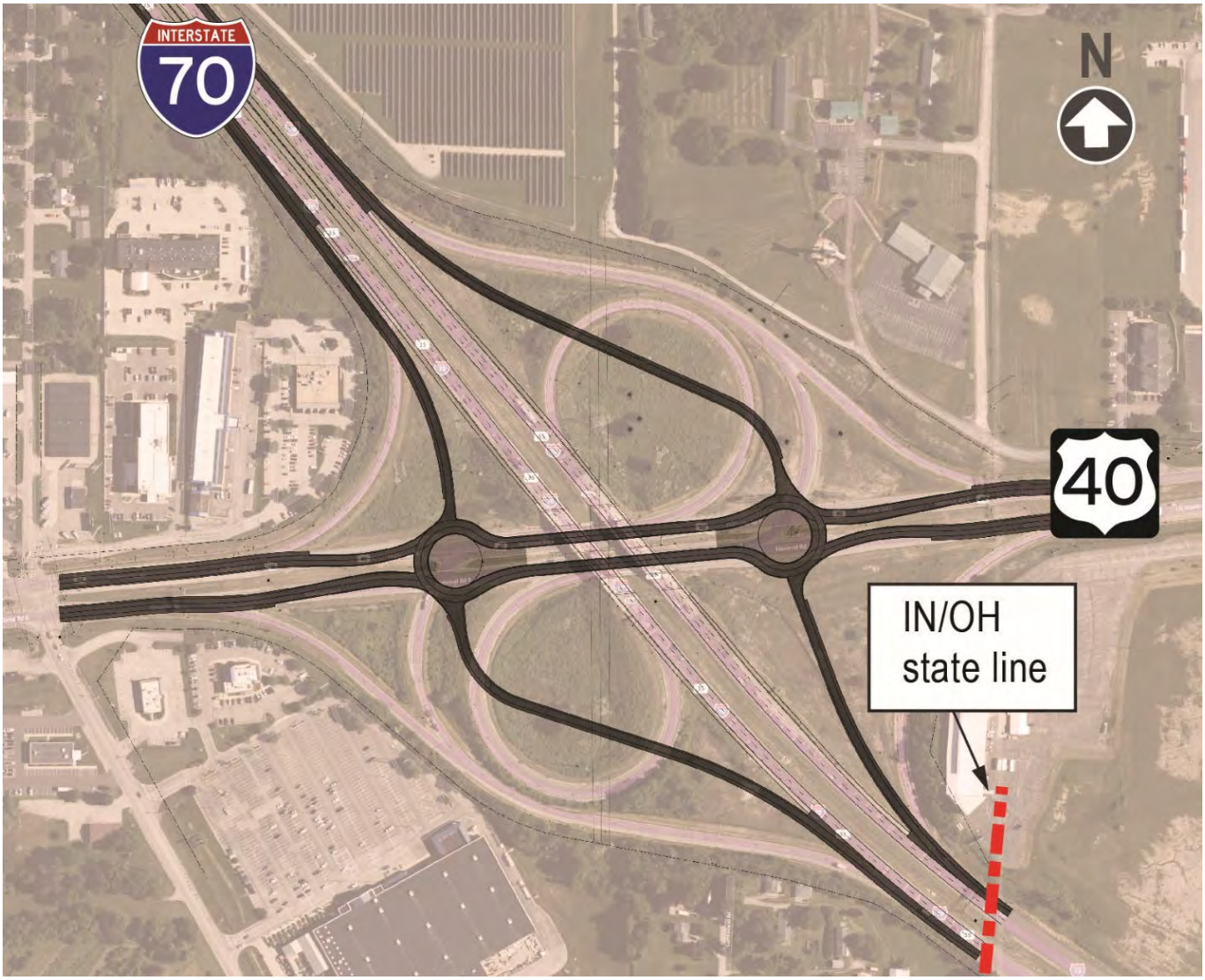


Figure 10: US 40 Diamond Interchange with Roundabouts

Eastbound/Westbound US 40

Similar to the existing condition, eastbound and westbound US 40 carries two lanes of traffic up to the I-70 and US 40 Interchange. The two travel lanes will be directed to a tear-drop style roundabout intersection at each termini of the interchange, allowing for yield controlled movements to access the eastbound and westbound I-70 single lane ramps and to continue along US 40. With maintaining the two lanes along US 40 and proposing single lane exit and entrance ramps, the roundabouts will be designed as a 2+1 configuration.

Eastbound I-70

Eastbound I-70 carries three lanes of traffic up to the I-70 and US 40 Interchange. There are two ramp access points along this segment of I-70. At the northern end of the interchange, a parallel ramp lane exit opens and directs traffic from eastbound I-70 to US 40 where a tear-drop roundabout style intersection will further control. The third travel lane drops beginning at/near the end of the existing bridge over US 40 and will end before the gore of the entrance ramp coming from US 40. Before the IN/OH State Line, a parallel entrance ramp will merge with eastbound I-70 and will carry into Ohio before dropping and following normal conditions.

Westbound I-70

Westbound I-70 carries two lanes of traffic up to the I-70 and US 40 Interchange with a third being added within the interchange limits. There are two ramp access points along this segment of I-70. At the southern of the interchange (and Ohio Border), a parallel ramp lane exit opens and directs traffic from westbound I-70 to US 40 where a tear-drop roundabout style intersection will further control. The third travel lane is added just past the gore of the exiting ramp lane and will be fully available to use before reaching the existing bridge over US 40. At the northern end of the interchange, a parallel entrance ramp will merge with westbound I-70 before dropping and converting to normal conditions.

Summary

The US 40 Diamond Interchange with Roundabouts (2+1 configuration) allows for the interchange to be partially reconstructed, decreases the number of access point by removing the loop ramps, and maintains the existing bridge structures. The ramps will be designed to meet INDOT's design standards. The proposed alternative also allows for the new ramps to be constructed closer to the interchange increasing the distance to the nearest intersections compared to the existing condition. US 40 will maintain two lanes in each direction for eastbound and westbound. The reconstruction will also provide pedestrian facilities for this location. A LOS B will be provided at this interchange based on the reconstruction.

Alternative 2: Diamond Interchange with Signalized Termini

The I-70 and US 40 Diamond Interchange with Signalized Terminals consists of the following characteristics:

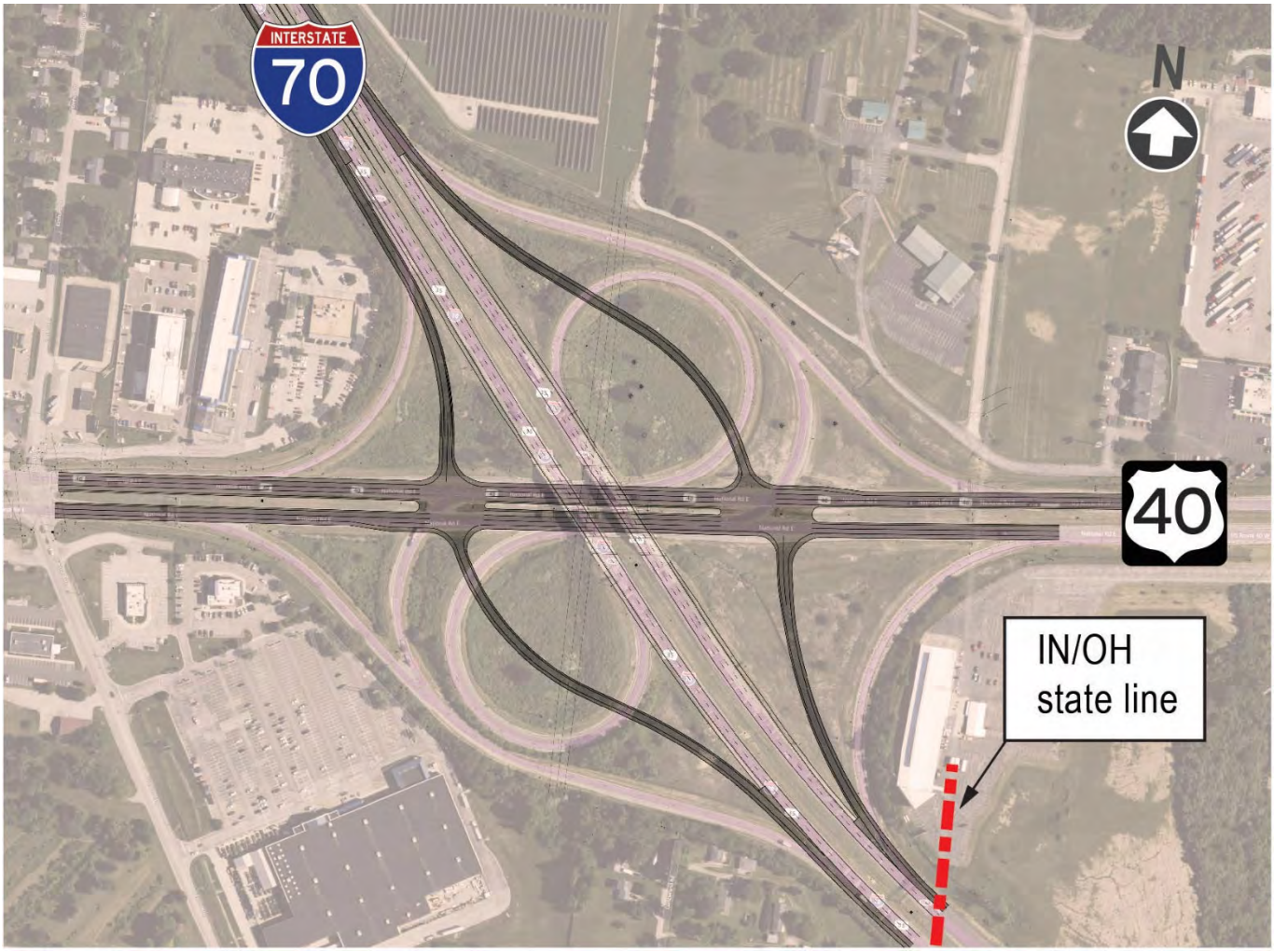


Figure 11: US 40 Diamond Interchange with Signals

Eastbound/Westbound US 40

Similar to the existing condition, eastbound and westbound US 40 carries two lanes of traffic up to the I-70 and US 40 Interchange. The two travel lanes will be directed to a signalized intersection at each end of the interchange. Dedicated right turn lanes will be provided at each intersection to aid in accessibility. A left turn bay will also be provided in-between the intersections underneath the existing US 40 bridges to provide access to the I-70 entrance ramps.

Eastbound I-70

Eastbound I-70 for alternative 2 matches the proposed alternative 1 condition. Please refer to alternative 1 for more details.

Westbound I-70

Westbound I-70 for alternative 2 matches the proposed alternative 1 condition. Please refer to alternative 1 for more details.

Summary

The US 40 Signalized Diamond Interchange allows for the interchange to be partially reconstructed, decreases the number of access point by removing the loop ramps, and maintains the existing bridge structures. The ramps will be designed to meet INDOT's design standards. The proposed alternative also allows for the new ramps to be constructed closer to the interchange increasing the distance to the nearest intersections compared to the existing condition. US 40 will maintain two lanes in each direction for eastbound and westbound and supplement the intersections with left and right turn movements for improved efficiency. The reconstruction will also provide pedestrian facilities for this location. A LOS B will be provided at this interchange based on the reconstruction.

Recommended Alternative

Alternative 1, diamond with roundabouts, is the recommended alternative for the I-70 and US 40 interchange. Several factors were considered when recommending the alternative and are described below:

Interchange type: INDOT desired for the loop ramps to be eliminated from the interchange while also providing a safe way to add/drop the third travel lane being provided along I-70. In order to accomplish this desire, the interchange needs to be reconfigured. Based on the available space by avoiding ROW impacts, the diamond interchange was the best alternative to fit within the space, aid in the lane drop/add of the third travel lane along I-70, keep within the IN/OH state line, and accommodate reusing the existing bridges.

Cost:

The construction cost difference between the two alternatives is "fairly negligible." Even though the RAB would require a large intersection area, it reduces the number of travel lanes and pavement asset area compared to a traditional signalized intersection, which would include the costs of new thru lanes, turn lanes, and signal equipment. Therefore, the cost was not a deciding factor between alternative 1 and 2.

- Alternative 1: $14.6M
- Alternative 2: $15.4M

Pedestrian access: There is a desire to provide pedestrian access through the interchange. By reconfiguring the interchange to a diamond, the loop ramps, and their access points, are eliminated providing extra space under the I-70 bridges to accommodate a pedestrian facility along both sides of US 40. The roundabout provides an added safety benefit for the pedestrian facilities as the number of travel lanes and conflict points would be reduced providing easier access and less width to cross. There will also be additional width along US 40 to accommodate pedestrians, under the I-70 bridge, by the removal of the existing ramp lanes.

Safety: WB I-70 at the US 40 interchange has the highest number of crashes in the westbound direction as detailed in the crash analysis section of this report. Removing the loop ramp to WB US 40 should help aid in the reduction of crashes for the interchange by eliminating the chance of rear-end collisions when vehicles are trying to slow down and maneuver to the exit in the short deceleration distance currently provided. For the ramp termini, utilizing roundabouts in lieu of a

traditional signalized intersection will also help improve safety. Roundabout intersections decrease the number of conflict points which can occur at a conventional stop-controlled intersection especially in terms of left turning movements. The EB I-70 exit ramp to WB US 40 contains a deceleration distance that does not meet current standards. Reconfiguring the interchange will allow for a design that will meet current deceleration and acceleration distances for all ramp movements. Please refer to the "Safety Analysis" section of the report and Appendix C for a more detailed conclusion of the safety analysis of each interchange alternative.

Other factors to note:

- The environmental impacts for both options are comparable, if not the same, so this is not a deciding factor.
- The existing condition of US 40 is free flowing. Roundabouts would provide a similar movement for US 40 except introduce a yield condition, whereas signals would require motorists to stop at the intersection.
- Both alternatives provide an acceptable level of service "LOS", but the roundabouts provide a slightly better LOS by reducing the delay time at each intersection (Sidra/Synchro results shown in Table 12 and 13). Please refer to the "Traffic Analysis" section of the report and Appendix C for traffic analysis details.
- Due to the alternatives being fairly similar, a decision matrix was not developed because the issue identification would be too similar to provide a recommendation.

Previously Dismissed Concepts

US 40 Diverging Diamond Interchange (DDI):

- The DDI was dismissed based on the traffic analysis. The traffic analysis determined a standard Diamond Interchange did not have any performance issues and a DDI was not warranted.

US 40 Single Point Urban Interchange (SPUI)

- The SPUI was dismissed based on design elements, construction costs, and traffic operations analysis. It was determined that the existing US 40 bridges are going to remain in place, and with this determination, the SPUI would not be constructable as it required a full reconstruction of the interchange for proper design to be completed. Also, from a traffic operations/capacity standpoint, the SPUI is not necessary because the lower-capacity diamond interchange configuration adequately serves the forecast traffic.

TRAFFIC ANALYSIS OF PRACTICAL INTERCHANGE ALTERNATIVES

Mainline Operations Analysis – HCS

The Mainline add-lane alternative was analyzed for the entire project length along I-70 with a third mainline lane extending from the POB to within the US 40 interchange. In addition to the added mainline lane, one design alternative at each of the US 35 and US 40 interchanges will be implemented. A combination of the Mainline add-lane alternative, US 35 Alternative 1 (improved acceleration and deceleration lanes), and a diamond interchange at US 40 was analyzed in HCS and the density and LOS results for EB I-70 and WB I-70 are presented in Table 8 and

Direction / Location	Mainline / Ramp	AM Peak		PM Peak	
		Density*	LOS	Density*	LOS
EB I-70 - POB to IN 1	Mainline – Basic	7.5	A	10.6	A
EB I-70 - OFF-Ramp to IN 1	Ramp – Diverge	8.2	A	12.0	B
EB I-70 - at IN 1	Mainline – Basic	6.3	A	8.9	A
EB I-70 - ON-Ramp from IN 1	Ramp – Merge	9.2	A	10.2	B
EB I-70 - IN 1 to Centerville	Mainline – Basic	8.7	A	11.3	B
EB I-70 - OFF-Ramp to Centerville	Ramp – Diverge	10.1	B	13.2	B
EB I-70 - at Centerville	Mainline – Basic	8.2	A	10.1	A
EB I-70 - ON-Ramp from Centerville	Ramp – Merge	10.6	B	11.0	B
EB I-70 - Centerville to US 35	Mainline – Basic	10.0	A	10.7	A
EB I-70 - OFF-Ramp to SB US 35	Ramp – Diverge	9.9	A	10.6	B
EB I-70 - at US 35	Mainline – Basic	8.5	A	10.0	A

STRUCTURES

All structures will be designed according to the Indiana Design Manual (IDM), Design Memos, and the Indiana Standard Specifications. The design code used will differ per alternative. See the details of each alternative below. In addition, design will conform to INDOT's standard details, specifications, policies, and procedures in U.S. Customary Units. All Level One criteria will be documented. This project is classified as 4R (Freeway) and will utilize IDM Fig. 53-1. For the checklist of the preferred alternative, see Appendix H.

Rehabilitation Scoping Reports have been submitted under separate cover for those bridges which meet the original project scope. However, some of those bridge scopes are hereby revised. Rehabilitations which deviate from the original contract scope are included in this report for informational and scoping purposes. Bridge Replacements and their associated structure size and type comparisons are included in this report. A summary of all bridge projects for the entire corridor, and their associated costs, are provided at the end of this section.

STRUCTURE I70-136-05159 DEBL & DWBL, I-70 OVER THE WHITEWATER RIVER (WEST FORK) (DES 2200762/2200763)

Inclusion with This Project

These bridges were not originally scoped to be included in this project. However, designation numbers already exist for a future corridor project to include this crossing. A summary of the bridge condition ratings can be found in Table 20. Inclusion of these bridges with *this* contract presents several advantages:

- Safer MOT
  - While the anticipated 3+1 MOT scheme can fit on the bridge, it can do so only by utilizing 11-foot lanes and 1-foot shoulders. Including the Whitewater bridge with this project will allow for the bridges to be widened to the median in the first phase prior to the implementation of the 3+1 scheme and therefore could support the preferred 12-foot lanes and 2- foot shoulders.
- Mobilization Efficiency
  - Given the proximity of this bridge to the Whitewater Overflow bridge, there will be a measure of efficiency in mobilization/demobilization if these bridges are included as they are separated by approximately 750 feet. The next closest mainline bridge is approximately 1.7 miles to the west.
- Condition of Joints/Diaphragms/End Bents
  - The XJS joints were replaced in 2002 and repaired in 2014. However, based on the photos provided in the 2022 routine inspection report the conditions of the joints show considerable deterioration, to wit, the report notes "sealant is missing or heavily debonded for the majority of length of both joints… Nosing has patches full width at both joints." Furthermore, the 2022 report notes a full height fracture in the web of the diaphragm in Beam 3 in Span A, at Bent 1 for both WB and EB bridges; and large cracks and spalls noted at several of the bearings at bent 1 for the WB bridge. These deficiencies can be corrected sooner if included with this project.
- Condition of Wearing Surface
  - The 2022 inspection makes special note of the deterioration of the wearing surface patching and recommends replacing the deck. The wearing surface for the WB bridge has been rated as a "4" or "Poor Condition" with numerous patches showing cracks developing around the patches themselves. A patching project may well be needed to extend the deck's life to last until a future project.
- Approved Inspection Report
  - If the Whitewater bridges are not included in this project, then an additional inspection scoping report would need to be conducted and approved. Since this project has already submitted a report and it has been approved, that would represent a sunk cost for INDOT.

Given the deterioration of these bridges, specifically the WB bridge, as well as the other items discussed above, the recommendation is to include the two bridges carrying I-70 over the Whitewater River with this project.

Table 20: I70 over Whitewater Bridges Condition Rating

CONDITION RATINGS	I70 WB OVER WHITEWATER RIVER (I70-136-05159 DWBL)	I70 EB OVER WHITEWATER RIVER (I70-136-05159 DEBL)
DECK	6	6
WEARING SURFACE	4	6
SUPERSTRUCTURE	6	6
SUBSTRUCTURE	6	7
CHANNEL/CHANNEL PROTECTION	7	6

Design Concept and Discussion of Alternatives

The existing superstructures for the I-70 bridges over West Fork of the Whitewater River are comprised of rolled steel beams with welded cover plates and steel diaphragms that are welded directly to the webs of the rolled steel beams. Both details are prone to fatigue cracking at lower stress levels (Category E for the cover plate terminal welds and D for the diaphragm connections). During the field check, INDOT requested a fatigue analysis to determine the estimated remaining life of these details. Even though the latest inspection report did not document any locations of suspected cracking, the analysis indicated that several locations have exceeded the anticipated design fatigue life and would require retrofits to ensure continued safe use throughout the design life of the structure.

For the purpose of this discussion, three alternatives were considered. The criteria listed in IDM Figures 402-5A, 402-8B, and 402-8C provided guidance in determining the viability of these options. These figures are attached in Appendix H for reference.

The three alternatives considered were:

- Alternative 1: Superstructure replacement and widening with steel beams
- Alternative 2: Deck replacement and widening with steel beams, and fatigue retrofitting
- Alternative 3: Complete replacement with rolled steel beams, matching existing spans (56’-6” – 71’-0” – 56’-6”)

Cost Comparison

The major items affecting the cost of the structure were computed for the three alternatives. A 10% contingency and a 5% allowance for design fees were added to each alternative. The construction costs listed below are for both bridges at the location and should be halved when considering one bridge at the crossing. For calculations of these costs, see Appendix I.

Table 21: Construction Cost Estimate - I-70 Over Whitewater River (West Fork)

ITEM	TYPE	CONSTRUCTION COSTS (2023 DOLLARS)
ALTERNATIVE 1	Superstructure Replacement and Widening	$ 7,901,000
ALTERNATIVE 2	Fatigue Retrofits, Deck Replacement and Widening	$ 7,493,000
ALTERNATIVE 3	Bridge Replacement	$ 8,723,000

Life Cycle Cost Comparison

In order to get the true cost of each alternative, life cycle costs must be analyzed. The net present value can then be calculated. The construction cost of each alternative was used for the life cycle cost analysis. These costs are summarized in Table 22. For detailed economic analysis, see Appendix I.

Table 22: Life Cycle Cost Analysis Summary - I-70 Over Whitewater River (West Fork)

ITEM	TYPE	TOTAL NET PRESENT VALUE (2023 DOLLARS)
ALTERNATIVE 1	Superstructure Replacement and Widening	$ 10,259,000
ALTERNATIVE 2	Fatigue Retrofits, Deck Replacement and Widening	$ 10,455,000
ALTERNATIVE 3	Bridge Replacement	$ 11,091,000

Conclusion

Although Alternative 2, fatigue retrofits and deck replacement/widening, is slightly less costly in terms of construction costs, the most cost-effective method in terms of Life Cycle Cost is Alternative 1, Superstructure Replacement and Widening. Removal of the existing fatigue details as part of a superstructure replacement will also help reduce fatigue cracking risk at these bridges as well as extend the life of the structure. For these reasons, **Alternative 1 is the preferred alternative**.

STRUCTURE 001-89-04968C, SR 1 OVER I-70

This bridge was originally included with this project and scoped as a thin deck overlay. However during the design phase, it was identified that a rigid deck overlay had been placed on the deck as part of the "C" rehabilitation performed in 2017. Since rigid deck overlays typically last 15-20 years, it is recommended that this bridge scope be removed from this project.

STRUCTURE 035-89-04526 JCNB & CSBL, US 35 NB & SB OVER I-70 (DES 2002445/2002446)

Currently, these structures are scoped as Preventive Maintenance, specifically beam painting and slopewall repair. However, their scopes are contingent upon the *Interchange Access Document*. Should a modification to the US 35 interchange be approved, the scopes of these bridges will be revised concurrently.

STRUCTURE I70-149-02260 CEBL & CWBL, I-70 OVER CARDINAL GREENWAY TRAIL (DES 2002447/2002448)

Structure Alternative Descriptions

Three alternatives were considered for this pair of structures. The following is a summary and description of each alternative.

Alternative 1: Bridge Deck Overlay with Widening

This alternative proposes to rehabilitate the existing bridges with a rigid deck overlay and widening, to account for the additional lane in each direction. The proposed typical cross section for this alternative is comprised of adding (3) new Grade 50, W30x108 beams spaced at 7'-0". This alternative will widen each structure by 22'-9" and allow for the addition of a travel lane. This bridge will have a clear roadway width of 62'-11", consisting of three 12'-0" travel lanes, 13'-0½" right shoulder, and a 13'-10½" left shoulder. The out-to-out coping width will be 65'-9" and the decks will have a cross slope of 2.0%. The bridges will match the existing skew of 19.91 degrees. A rigid overlay will be applied to the existing and the widened portions of the deck. Substructure units with spalling should be patched. The bridge approaches and terminal joints will be replaced and the proposed cross-section will meet all Level 1 Design Criteria. Type FT concrete bridge railings will be utilized to be MASH compliant.

Alternative 2: 14'-0" Rise Four-sided Concrete Structure Under Fill

This alternative proposes to replace the existing structures with a 240' long four-sided precast concrete box with a 14' rise x 14' span with full depth pavement over fill above the structure. The four-sided concrete box structure will be placed and buried under I-70 EB/WB for the width of the entire crossing with pavement placed at the surface. The height of 14 feet will permit access for standard vehicles and trucks. See Figure 13 for a sketch of the conceptual box replacement.

Alternative 3: Bridge replacement with MSE walls

This alternative proposes to replace the existing crossing with a single 120' span. The proposed typical cross section for this alternative is comprised of seven 54"X48" HBT beams spaced at 10'-0" with reinforced concrete deck and MSE walls at the end bents. This bridge will have a clear roadway width of 62'-11", consisting of three 12'-0" travel lanes, 13'-0½" right shoulder, and a 13'-10½" left shoulder. The out-to-out coping width will be 65'-9" and the decks will have a cross slope of 2.0%. The bridges will match the existing skew of 19.91 degrees. Bents 1 and 2 will be integral abutments supported on piles. Type FT concrete bridge railings will be utilized to be MASH compliant.

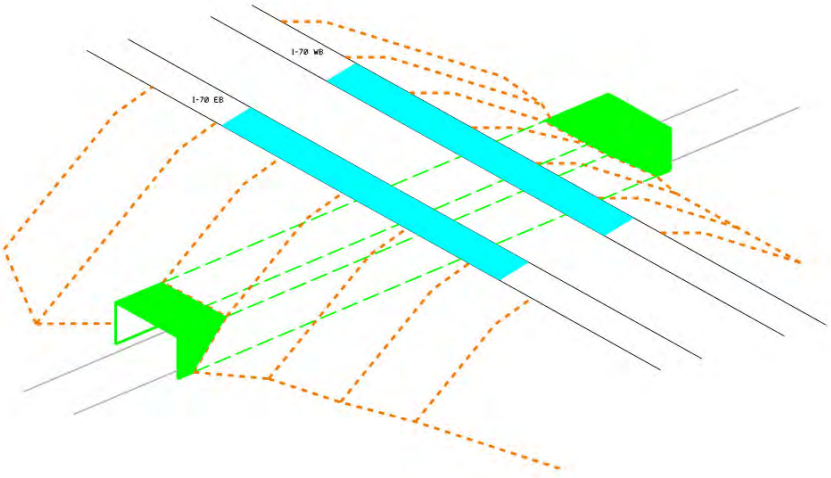


Figure 13: Conceptual Box Replacement

Design Concept and Discussion of Alternatives

Each alternative was not only analyzed for its associated cost, but also to ensure the structure type was a viable option for this specific site. The pros and cons of each alternative were compared to provide the most cost-effective solution, while striving to meet the design constraints of this location.

The life cycle cost of each alternative was analyzed to determine which alternative is the most economical. This analysis is shown in Appendix I.

Alternative 1 proposes to overlay the existing bridge deck and widen both structures. A rigid overlay will be applied to the entire deck including the widened portion with three new beams added to each structure. For the purpose of the life cycle analysis, it is assumed the bridge will be replaced 25 years after completion of the widening.

Alternative 2 proposes to replace the two existing bridges with a four-sided concrete box structure placed under I-70 EB/WB and the entire median width allowing for an added travel lane on I-70 to be constructed. Given the available vertical clearance currently beneath the existing structure, the box segments could be placed and buried up to a point without impacting the traffic above. The criteria listed in IDM Figures 402-8B, and 402-8C provided guidance in determining the viability of this option. These figures are attached in Appendix H for reference. Comparing Alternative 2 to the figures specified below, four-sided concrete box structure meets the criteria listed.

Alternative 3 proposes a complete structure replacement with a single span Hybrid Bulb Tee beam for both bridges. MSE walls will be placed at the end bents. The criteria listed in IDM Figures 402-5A, 402-8B, and 402-8C provided guidance in determining the viability of this option. Comparing Alternative 3 to these figures, prestressed bulb tee beams meet the criteria listed. These figures are attached in Appendix H for reference.

Figures 402-5A and 402-8B list other structure types that could be used for new structures. The structure types that were not considered are listed below and were eliminated by engineering judgement and the IDM.

Post Tensioned Concrete Slab: Not recommended for span lengths over 45' per IDM Fig. 402-5A.
Post Tensioned Bulb-Tee Beams: Not recommended for spans less than 140' per IDM Fig. 402- 5A.
Steel Plate Girder: This option was eliminated by engineering judgement with regards to economic and structural efficiency when compared to rolled steel plate girders.
Composite Steel Box Girders: These are rarely used and are not recommended by the IDM because of all the steel components and the high life cycle costs required.

Cost Comparison

The major items affecting the cost of the structure were computed for the three alternatives. A 20% contingency and a 5% allowance for design fees were added to each alternative. For calculations of these costs, see Appendix I.

Table 23: Construction Cost Estimate - Cardinal Greenway

ITEM	TYPE	CONSTRUCTION COSTS (2023 DOLLARS)
ALTERNATIVE 1	Bridge Deck Overlay with Widening	$4,953,915
ALTERNATIVE 2	Four-sided Concrete Box	$3,282,153
ALTERNATIVE 3	Bridge Replacement w/ MSE walls	$6,916,759

Life Cycle Cost Comparison

In order to get the true cost of each alternative, life cycle costs must be analyzed. The net present value can then be calculated. The construction cost of each alternative was used for the life cycle cost analysis. These costs are summarized in Table 24. For detailed economic analysis, see Appendix I.

Table 24: Life Cycle Cost Analysis Summary - Cardinal Greenway

ITEM	TYPE	TOTAL NET PRESENT VALUE (2023 DOLLARS)
ALTERNATIVE 1	Bridge Deck Overlay with Widening	$8,232,301
ALTERNATIVE 2	Four-sided Concrete Box	$3,282,153
ALTERNATIVE 3	Bridge Replacement w/ MSE walls	$8,165,064

Alternative Comparison Summary

Table 25: Alternative Comparison Summary - Cardinal Greenway

	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Structure Type	Composite Steel Beams W30x108 (Widened with semi-integral end bents)	Four-sided Concrete Box Structure	Composite Prestressed HBT 54"x48" (single span with semi-integral end bents)
Traffic Lanes	Three 12'-0" Travel Lanes 13'- 0½" RT Shoulders 13'-10½" LT Shoulders	Three 12'-0" Travel Lanes 13'- 0½" RT Shoulders 13'-10½" LT Shoulders	Three 12'-0" Travel Lanes 13'- 0½" RT Shoulders 13'-10½" LT Shoulders
Design Truck	HS-20	HL-93	HL-93
Structure Width	65'-9"	N/A	65'-9"
Number of Beams	11	N/A	7
Span Lengths	90'-0", 130'-0", & 90'-0"	14' Box	120'-0"

Structure Depth (approx.)	4'-8"	N/A	6'-8"
Skew	19.91 degrees	19.91 degrees	19.91 degrees
Type of Abutment	Semi-Integral on Piles	N/A	Integral on Piles w/ MSE Walls
Comparative Construction Cost *	$4,953,915	$3,282,153	$6,916,759
Constructability	The steel W-beams require splices, making this structure somewhat complex to construct.	Precast segments would make this structure simple to construct.	Precast HBT beams make this structure simple to construct.
Maintenance	Maintenance will increase as the steel structures approach the end of their design lives.	Maintenance of four-sided structure is relatively minimal.	Precast hybrid bulb-tee beams are resilient to the elements and require less maintenance.
Speed of Construction	Steel beams may have a long lead time. Staging and assembly of steel beams require more time than concrete beams.	Four-Sided structures take relatively less time for construction since majority of the work can occur without impacting traffic.	Precast Beams typically require less in-field construction time.

** - In 2023 Dollars*

Conclusion

Alternative 2, precast concrete 4-sided box, is the preferred alternative. This alternative uses a four-sided structure which are quicker to construct and require less maintenance than steel beams. Maintenance for the recommended alternative is minimal and elements can easily be inspected throughout the life of the structure. The four-sided concrete box structure has advantages over other structure types in cost, constructability, maintenance, inspection, and speed of construction, making it the preferred choice.

STRUCTURE I70-154-02262 CEBL & CWBL, I-70 OVER INDIANA AMERICAN WATER ACCESS ROAD (DES 2002457/2002458)

Structure Alternatives Description

Three alternatives were considered. The following is a summary and description of each alternative.

Alternative 1: Bridge Deck Overlay with Widening

This alternative considers rehabilitating the existing the bridge with a rigid deck overlay and widening to account for the additional lane. The proposed typical cross section for this alternative is comprised of adding (3) new W30x148 beams spaced at 8'-0". This alternative will widen each structure by 22'-7½" and allow for the addition of a travel lane. This bridge will have a clear roadway width of 63'-3½", consisting of three 12'-0" travel lanes, 13'-5" right shoulder, and a 13'-10½" left shoulder. The out-to-out coping width will be 66'-1½" and the decks will have a cross slope of 2.0%. The bridges will the existing skew of 27.47 degrees. A rigid overlay will be applied to the existing and the widened portions of the deck. The end bents will be converted to semi-integral. The bridge approaches and terminal joints will be replaced. The proposed cross-section will meet all Level 1 Design Criteria. Type FT concrete bridge railings will be utilized to be MASH compliant.

Alternative 2: 14'-0" Rise Four-sided concrete structure

This alternative proposes to replace the existing structures with a 240' long four-sided precast concrete box with a 14' rise x 14' span with full depth pavement over fill above the structure. The four-sided concrete box structure will be placed and buried under I-70 EB/WB for the width of the entire crossing with pavement placed at the surface. See Figure 13 for a sketch of the conceptual box replacement.

Alternative 3: Bridge Replacement with MSE Walls

This alternative proposes to replace the existing crossing with a single 120' span. The proposed typical cross section for this alternative is comprised of seven 54"X48" HBT beams spaced at 10'-0" with reinforced concrete deck and MSE walls at the end bents. This bridge will have a clear roadway width of 63'-3½", consisting of three 12'-0" travel lanes, 13'-5" right shoulder, and a 13'-0½" left shoulder. The out-to-out coping width will be 66'-1½" and the decks will have a cross slope of 2.0%. The bridges will match the existing skew of 27.47 degrees. Bents 1 and 2 will be integral end bents supported on piles. Type FT concrete bridge railings will be utilized to be MASH compliant.

Design Concept and Discussion of Alternatives

Each alternative was not only analyzed for its associated cost, but also to ensure the structure type was a viable option for this specific site. The pros and cons of each alternative were compared to provide the most cost-effective solution, while striving to meet the design constraints of this location.

The life cycle cost of each alternative was analyzed to determine which alternative is the most economical. This analysis is shown in Appendix I.

Alternative 1 proposes to overlay the existing bridge deck and widen both structures. A rigid overlay will be applied to the entire deck including the widened portion with three new beams added to each structure. For the purpose of the life cycle analysis, it is assumed the bridge will be replaced 25 years after completion of the widening.

Alternative 2 proposes to replace the two existing bridges with a four-sided concrete box structure placed under I-70 EB/WB and the entire median width allowing for an added travel lane on I-70 to be constructed. Given the available vertical clearance currently beneath the existing structure, the box segments could be placed and buried up to a point without impacting the traffic above. The criteria listed in IDM Figures 402-8B, and 402-8C provided guidance in determining the viability of this option. These figures are attached in Appendix H for reference. Comparing Alternative 2 to the figures specified below, four-sided concrete box structure meets the criteria listed.

Alternative 3 proposes a complete structure replacement with a single span Hybrid Bulb Tee beam for both bridges. MSE walls will be placed at the end bents. The criteria listed in IDM Figures 402-5A, 402-8B, and 402-8C provided guidance in determining the viability of this option. Comparing Alternative 3 to these figures, prestressed bulb tee beams meet the criteria listed. These figures are attached in Appendix H for reference.

Figures 402-5A and 402-8B list other structure types that could be used for new structures. The structure types that were not considered are listed below and were eliminated by engineering judgement and the IDM.

Post Tensioned Concrete Slab: Not recommended for span lengths over 45' per IDM Fig. 402-5A.
Post Tensioned Bulb-Tee Beams: Not recommended for spans less than 140' per IDM Fig. 402- 5A.
Steel Plate Girder: This option was eliminated by engineering judgement with regards to economic and structural efficiency when compared to rolled steel plate girders.
Composite Steel Box Girders: These are rarely used and are not recommended by the IDM because of all the steel components and the high life cycle costs required.

Cost Comparison

The major items affecting the cost of the structure were computed for the three alternatives. A 20% contingency and a 5% allowance for design fees were added to each alternative. For calculations of these costs, see Appendix I.

Table 26: Construction Cost Estimate - Access Road

ITEM	TYPE	CONSTRUCTION COSTS (2023 DOLLARS)
ALTERNATIVE 1	Bridge Deck Overlay with Widening	$6,132,253
ALTERNATIVE 2	Four-sided Concrete Box	$3,580,170
ALTERNATIVE 3	Bridge Replacement w/ MSE walls	$6,522,155

Life Cycle Cost Comparison

In order to get the true cost of each alternative, life cycle costs must be analyzed. The net present value can then be calculated. The construction cost of each alternative was used for the life cycle cost analysis. These costs are summarized in Table 27. For detailed economic analysis, see Appendix I.

Table 27: Life Cycle Cost Analysis Summary - Access Rd.

ITEM	TYPE	TOTAL NET PRESENT VALUE (2023 DOLLARS)
ALTERNATIVE 1	Bridge Deck Overlay with Widening	$9,366,256
ALTERNATIVE 2	Four-sided Concrete Box	$3,580,170
ALTERNATIVE 3	Bridge Replacement w/ MSE walls	$7,842,948

Alternative Comparison Summary

Table 28: Alternative Comparison Summary - Access Rd.

	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Structure Type	Composite Steel Beams W30x148 (Widened with semi-integral end bents)	Four-sided Concrete Box Structure	Composite Prestressed HBT 54"x48" (single span with integral end bents)
Traffic Lanes	Three 12'-0" Travel Lanes 13'- 5" RT Shoulders 13'-10½" LT Shoulders	Three 12'-0" Travel Lanes 13'- 5" RT Shoulders 13'-10½" LT Shoulders	Three 12'-0" Travel Lanes 13'- 5" RT Shoulders 13'-10½" LT Shoulders
Design Truck	HS-20	HL-93	HL-93
Structure Width	66'- 1½"	N/A	66'- 1½"
Number of Beams	11	N/A	7
Span Lengths	90'-0", 130'-0", & 90'-0"	14' Box	120'-0"
Structure Depth (approx.)	**4'-9"**	N/A	**6'-8"**
Skew	**27.475 degrees**	**27.475 degrees**	**27.475 degrees**
Type of Abutment	Semi-Integral on Piles	N/A	Integral on Piles w/ MSE Walls
Comparative Construction Cost *	$6,132,253	$3,580,170	$6,522,155
Constructability	The steel W-beams require splices, making this structure	Precast segments would make this	Precast HBT beams make this structure simple to construct.

	somewhat complex to construct.	structure simple to construct.	
Maintenance	Maintenance will increase as the steel structures approach the end of their design lives.	Maintenance of four-sided structure is relatively minimal.	Precast hybrid bulb-tee beams are resilient to the elements and require less maintenance.
Speed of Construction	Steel beams may have a long lead time. Staging and assembly of steel beams require more time than concrete beams.	Four-Sided structures take relatively less time for construction since majority of the work can occur without impacting traffic.	Precast Beams typically require less in-field construction time.

** - In 2023 Dollars*

Conclusion

Alternative 2, precast concrete 4-sided box, is the preferred alternative. This alternative uses a four-sided structure which are quicker to construct and require less maintenance than steel or concrete beams. Maintenance for the recommended alternative is minimal and elements can easily be inspected throughout the life of the structure. The four-sided concrete box structure has advantages over other structure types in cost, constructability, maintenance, inspection, and speed of construction, making it the preferred choice.

STRUCTURE I70-154-04534 BEBL & BWBL, I-70 OVER EAST FORK OF EAST FORK OF WHITEWATER RIVER (DES 2002455/2002456)

Structure Alternatives Description

Three alternatives were considered. The following is a summary and description of each alternative.

Alternative 1: Single-span, composite, prestressed bulb tee beam structures with reinforced concrete decks

This alternative consists of two single-span bridges with reinforced concrete bridge decks and a 35-degree skew carrying I-70 EB & WB over E. Fk. of the E. Fk Whitewater River. The proposed typical cross section for I-70 EB & WB structures is comprised of seven 72”X61” HBT beams spaced at 9’-11” with an 8” reinforced concrete deck. The bridges have a span length of 145’-0” and a proposed structure depth of approximately 7’-8 ¼”. Type FT concrete bridge railings will be utilized to be MASH compliant.

Alternative 2: Three-span, composite, prestressed bulb tee beam structures with reinforced concrete decks

The proposed typical cross section for this alternative is comprised of seven 54”X49” HBT beams spaced at 9’-11” with an 8” reinforced concrete deck for both structures. The span lengths will be 90’-0”, 130’-0”, and 90’-0” for each bridge. The proposed structure depth is approximately 6’-2”. The piers will be reinforced concrete wall piers on footings and piles. Type FT concrete bridge railings will be utilized to be MASH compliant.

Alternative 3: Three-span, composite, steel plate girder structures with a reinforced concrete deck

This alternative consists of two three-span steel plate girder bridges with reinforced concrete bridge decks. The proposed typical cross section for this alternative is comprised of six 57.4” deep plate girders spaced at 11’-9” with an 8” reinforced concrete deck for the structure. The proposed spans will be 90’-0”, 130’-0”, and 90’-0” for each bridge. The proposed structure depth is approximately 6’-5 ¾”. Type FT concrete bridge railings will be utilized to be MASH compliant.

Design Concept and Discussion of Alternatives

Each alternative was analyzed for its associated cost and to ensure the structure type is a viable option for this specific site. The pros and cons of each alternative were compared to provide the most cost-effective solution, while striving to meet the design constraints of this location.

Alternative 1 proposes single-span prestressed bulb tee beam structures with reinforced concrete decks. Prestressed HBT 72"x61" beams will be utilized. The structures are due for full replacement therefore the existing end bents and piers will be removed and replaced with new end bents. The new structures would match the skews of the existing bridges. The criteria listed in IDM Figures 402-5A, 402-8B, and 402-8C provide guidance in determining the viability of this option. Comparing Alternative 1 to these figures, HBT 72"x61" meet the criteria listed. These figures are attached in Appendix H for reference.

Alternative 2 would propose three-span prestressed bulb tee beam structures with reinforced concrete decks. The structures are due for full replacement therefore the existing end bents and piers will be removed and replaced with new piers and end bents. The new structures would match the skews of the existing bridges. The criteria listed in IDM Figures 402-5A, 402-8B, and 402-8C provided guidance in determining the viability of this option. These figures are attached in Appendix H for reference.

Alternative 3 proposes three-span steel plate girder structures with reinforced concrete decks. The structures are due for full replacement therefore the existing end bents and piers will be removed and replaced with new piers and end bents. The new structures would match the skews of the existing bridges. The criteria listed in IDM Figures 402-5A, 402-8B, and 402-8C provide guidance in determining the viability of this option. Comparing Alternative 3 to these figures, steel plate girders meet the criteria listed.

Figures 402-5A and 402-8B list other structure types that could be used for new structures. The structure types that were not considered are listed below and were eliminated by engineering judgement and the IDM.

Post Tensioned Concrete Slab: Not recommended for span lengths over 45' per IDM Fig. 402-5A.
Post Tensioned Bulb-Tee Beams: Would be less economical than prestressed Bulb-Tee beams of the same span.
Composite Rolled Steel Beams: This option was eliminated by engineering judgement with regards to economic and structural efficiency when compared to steel plate girders.
Composite Steel Box Girders: These are rarely used and are not recommended by the IDM because of all the steel components and the high life cycle costs required.

A subsurface investigation will be performed for this project. It is assumed that deep foundations (piling) will support the substructure units. Because the geotechnical report has not been completed at the time of this submittal, engineering judgement and past experience were utilized to estimate the number and length of piles.

Cost Comparison

The major items affecting the cost of the structure were computed for the three alternatives. A 20% contingency and a 5% allowance for design fees were added to each alternative. For calculations of these costs, see Appendix I.

Table 29: Construction Cost Estimate - E. Fk./E. Fk. Whitewater River

ITEM	TYPE	CONSTRUCTION COSTS (2023 DOLLARS)
ALTERNATIVE 1	Single-Span, Bulb-Tee Beams	$10,654,465
ALTERNATIVE 2	Three-Span, Bulb-Tee Beams	$15,688,218
ALTERNATIVE 3	Three-Span, Steel Plate Girder	$16,975,593

Life Cycle Cost Comparison

In order to get the true cost of each alternative, life cycle costs must be analyzed. The net present value can then be calculated. The construction cost of each alternative was used for the life cycle cost analysis. These costs are summarized in Table 30. For detailed economic analysis, see Appendix I.

Table 30: Life Cycle Cost Analysis Summary - E. Fk./E. Fk. Whitewater River

ITEM	TYPE	TOTAL NET PRESENT VALUE (2023 DOLLARS)
ALTERNATIVE 1	Single-Span, Bulb-Tee Beams	$12,277,402
ALTERNATIVE 2	Three-Span, Bulb-Tee Beams	$19,127,383
ALTERNATIVE 3	Three-Span, Steel Plate Girder	$20,414,758

Alternative Comparison Summary

Table 31: Alternative Comparison Summary - E. Fk./E. Fk. Whitewater River

	ALTERNATIVE 1	ALTERNATIVE 2	ALTERNATIVE 3
Structure Type	Composite Prestressed BT 72”x61” (single span with integral end bents)	Composite Prestressed BT 54”x49” (multi-span with integral end bents)	Composite Steel Plate Girder Structures (multi-span with integral end bents)
Traffic Lanes	Three 12’-0” Travel Lanes 13’-5” Shoulders	Three 12’-0” Travel Lanes 13’-5” Shoulders	Three 12’-0” Travel Lanes 13’-5” Shoulders
Design Truck	HL-93	HL-93	HL-93
Structure Width	66’-1½”	66’-1½”	66’-1½”
Number of Beams	7	7	6
Span Lengths	150’-0”	90’-0”, 130’-0”, & 90’-0”	90’-0”, 130’-0”, & 90’-0”
Structure Depth (approx.)	7’-8”	6’-2”	6’-3”
Skew	35 degrees	35 degrees	35 degrees
Type of Abutment	Integral on Piles w/ MSE Walls	Integral on Piles	Integral on Piles
Comparative Construction Cost*	$10,654,465.00	$15,688,218.00	$16,975,593.00
Constructability	Precast HBT 72”x61” beams make this structure simple to construct.	Precast HBT 54”x49” beams make this structure simple to construct.	Plate girders require splices, making this structure complex to construct.
Maintenance	Precast HBT 72”x61” beams are durable to the elements.	Precast HBT 54”x49” beams are durable to the elements.	Steel plate girders are susceptible to corroding in the elements. Scheduled painting and/or cleaning require more upkeep than concrete options.
Speed of Construction	Precast Beams typically require less in-field construction time.	Precast Beams typically require less in-field construction time.	Lead time for plate girder fabrication is greater than concrete beam fabrication. Staging and assembly of steel beams require more time than concrete beams.

** - In 2023 Dollars*

Conclusion

Alternative 1, single-span composite prestressed beam bridges, is the preferred alternative due to the lowest construction and life cycle cost. The durability of the composite prestressed bulb tees and their resistance against damaging weather conditions and other detrimental elements support the preference for this option. Alternative 1 has advantages over Alternatives 2 and 3 in cost, construction, maintenance, inspection, and impacts that make it the preferred choice.

Summary of Bridge Rehabilitation and Preventive Maintenance Costs

For more information, please refer to each bridge's rehabilitation report or preventive meeting minutes.

DES	NBI	STRUCTURE #	SCOPE	LOCATION/CROSSING	PROPOSED COST*
2200762	043300	I70-136-05159 DEBL	Deck Replacement & Widening	I-70 EB over Whitewater River	$7,901,000
2200763	043310	I70-136-05159 DWBL	Deck Replacement & Widening	I-70 WB over Whitewater River	
2002426	043330	I70-136-05252 CWBL	SS Replacement & Widening	I-70 WB over Whitewater River Overflow	$6,787,500
2002434	043320	I70-136-05252 CEBL	SS Replacement & Widening	I-70 EB over Whitewater River Overflow	
2002425	002100	001-89-04968 C	No work	SR 1 over I-70	No work
2002427	043350	I70-137-04969 DWBL	Thin Deck Overlay & Widening	I-70 WB over Martindale Creek	$2,510,888
2002567	043340	I70-137-04969 DEBL	Thin Deck Overlay & Widening	I-70 EB over Martindale Creek	$2,515,212
2002428	043360	I70-139-04970 CEBL	Rigid Deck Overlay & Widening	I-70 EB over Jacksonburg Rd.	$2,060,000
2002429	043370	I70-139-04970 CWBL	Rigid Deck Overlay & Widening	I-70 WB over Jacksonburg Rd.	$2,060,000
2002430	043380	I70-139-04971 CEBL	SS Replacement & Widening	I-70 EB over Plum Creek	$1,725,000
2002431	043390	I70-139-04971 CWBL	SS Replacement & Widening	I-70 WB over Plum Creek	$1,725,000
2002432	043400	I70-141-04972 DEBL	Rigid Deck Overlay & Widening	I-70 EB over Greens Fork	$3,880,000
2002433	043410	I70-141-04972 DWBL	Rigid Deck Overlay & Widening	I-70 WB over Greens Fork	$3,870,000
2002575	043420	I70-141-04973 A	SS Replacement	Washington Rd. over I70	$1,620,000
2002436	043440	I70-145-04521 CEBL	Rigid Deck Overlay & Widening	I-70 EB over Nolands Fork	$6,426,017
2002437	043450	I70-145-04521 CWBL	Rigid Deck Overlay & Widening	I-70 WB over Nolands Fork	
2002574	043460	I70-145-04522 C	Beam Painting	CR 40 over I-70	$805,759
2002438	043470	I70-147-02259 CEBL	Rigid Deck Overlay & Widening	I-70 EB over NSRR	$6,412,864
2002439	043480	I70-147-02259 CWBL	Rigid Deck Overlay & Widening	I-70 WB over NSRR	
2002440	043490	I70-147-04523 BEBL	SS Replacement & Widening	I-70 EB over Round Barn Rd.	$4,781,623
2002441	043500	I70-147-04523 CWBL	SS Replacement & Widening	I-70 WB over Round Barn Rd.	
2002442	043520	I70-148-04525 CEBL	SS Replacement & Widening	I-70 EB over Clear Creek	$4,129,146
2002443	043530	I70-148-04525 JCWB	SS Replacement & Widening	I-70 WB over Clear Creek	
2002445	011050	35-89-04526 JCNB	Beam Painting	US 35 NB over I-70	$2,192,808
2002446	011060	35-89-04526 CSBL	Beam Painting	US 35 SB over I-70	
2002449	043580	I70-150-04527 BEBL	SS Replacement & Widening	I-70 EB over CR 500 E Old SR 627 (Union Pike)	$5,580,375
2002450	043590	I70-150-04527 CWBL	SS Replacement & Widening	I-70 WB over CR 500 E Old SR 627 (Union Pike)	
2002451	043600	I70-150-04528 CEBL	SS Replacement & Widening	I-70 EB over W Fk/E Fk Whitewater River	$13,437,635
2002452	043610	I70-150-04528 CWBL	SS Replacement & Widening	I-70 WB over W Fk/E Fk Whitewater River	

Call Application Report (Mini Scope)

Date:	8/7/2018	**District:**	*GREENFIELD*	**SCORE**	**65**
DES:	-	**Sub-District:**	Cambridge		
Proposed FY:	2022	**Asset Group:**	SAFETY		
Work Type:	Auxiliary Lanes	**Work Category:**	Local Safety Project		

Project Location

Route:	I-70	**City/Town:**	Richmond		**County 1:**	Wayne			**County 2:**		
RP Start:	149+6				**LOS:**						
RP End:	149+38				LAT,LONG START:	39.867 N, 84.926 W			LAT,LONG END:	39.868 N, 84.921 W	
AADT FY:	2017	**Representative AADT:**		35755	**% Trucks:**	47.0%			**Icc:**		
Length:	0.25	**# Lanes:**		3	**Lane Mi:**	0.757			**Icf:**		
Functional Class:	Interstate				**NHS?:**	Yes					
Location Description:	I-70, I-70 & US 35 Interchange, Loop Ramp from SB US 35 to EB I-70										

CURRENT AND PROJECTED CONDITION

I-70, at the I-70 and US 35 interchange heading eastbound, is a 2-lane interstate highway with an existing auxiliary lane that acts as an acceleration lane for incoming traffic merging from US 35 South as well as a lane that approaches the interchange ramp to head onto US 35 North. Currently the auxiliary lane lacks acceleration distance for oncoming traffic to merge onto I-70 East with matching speed limit speeds, causing unsafe merging conditions.

Picture of Project Site

INTENT/ PURPOSE OF PROJECT

The purpose of this Highway Safety Improvement Project is to provide adequate acceleration distance in the auxiliary lane for traffic merging onto I-70 East.

PRELIMINARY ALTERNATIVES with Estimated Costs (Indicate Recommended Alternative)

Alternative #1 - Provide an extension to the auxiliary lane along I-70 East in accordance with Chapter 48-4.02(03) of the INDOT Design Manual. New PCCP Pavement will be required for the extension of the auxiliary lane to provide adequate shoulder width. Grooving of existing pavement markings, thermoplastic paint for new markings, and sign relocation are part of this project and no environmental concerns are anticipated. The estimated cost for this option is **$202,000.**

Alternative #2 - Do Nothing. This alternative does nothing to upgrade the crosswalks at the intersection in question. This alternative does not require any money, but it also does not allow for upgrades to INDOT's roadway assets.

Alternative #1 is the preferred Alternative. It is recommended Alternative #1 be constructed. This option will increase acceleration distance for traffic merging onto the I-70 East, providing safer conditions for merging and oncoming traffic.

Estimated Total Project Costs:		$202,000.00		COMMENTS
Right of Way Services (RW):	NA	COST:	$0.00	
Preliminary Engineering (PE):	NA	COST:	$0.00	
Railroad (RR):	NA	COST:	$0.00	
Utilities CN (UT):	NA	COST:	$0.00	
Construction (CN):	NA	COST:	$196,390.00	
Construction Engineering (CE):	NA	COST:	$5,610.00	
Relinquishment Payment (RQP):	NA	COST:	$0.00	
Total Cost for Additional Asset Improvements:	NA	COST:	$0.00	

Other Projects within Limits

DES:	1702792	FY:	2017	Work Type:	Patch & Rehab Pavement	Location:	I-70, EB at 148+15 to 149+50
DES:	1700868	FY:	2019	Work Type:	Bridge Thin Deck Overlay	Location:	On Salisbury Rd over I-70, 0.71 mi W of US 35
DES:	1700830	FY:	2019	Work Type:	Bridge Thin Deck Overlay	Location:	I-70, EB over Cardinal GRNWY, 0.63 mi E of US 35

Estimated Number of Fiscal Years to Complete Project:	1 FY	Estimated Number of Fiscal Years to Design Project:	1 FY

CALL HISTORY: First Submittal

Additional Comments

Other items relevant to the project not specifically listed elsewhere.

See attachments for more information

Report Prepared By and Approved By

Report Prepared By and Approved By		Title:	Signature		
Prepared by:	David Bracamontes	Greenfield Scoping Engineer			
Reviewed by:	Taylor Ruble	Traffic Planning Engineer	Taylor Ruble		
Approval by:	Luis Laracuente	District Traffic Engineer	Luis Laracuente	APPROVED ON:	DRAFT

NOTE: Any changes require a re-submittal of Call Application Report.

TSAM Team
Safety Project Scoring Sheet

DES:			Date:	9/21/2018
Analyst:	Taylor Ruble		Total Project Cost (today's dollars):	$202,000
District:	Greenfield		City:	Richmond
Route:	I-70		County:	Wayne
Location:	EB I-70 at US 35 Cloverleaf Interchange			
Treatment:	Accelleration Lane Extension			
LAT,LONG:	39.867528	-84.926001	Final Score:	**65**
Notes and CRF Source Information:	Extend acceleration lane by approx. 98 ft, 11% Reduction in All Crashes, Elvik, R. and Vaa, T. 2004			

Core Safety Factors	Rating (Type Number)	Score Received	Points Possible	Comments
#1 Crash Severity (I_{cc}-based)	1.29	13.10	40	*RoadHAT output PDF is required. Enter w/ two decimal places.*
#2 Crash Frequency (I_{cf}-based)	2.18	9.39	10	*RoadHAT output PDF is required. Enter w/ two decimal places.*
#3 Benefit-Cost Ratio (Imported from Factor 3 Tab)	5.98	35.00	35	*CRF source must be cited above. Enter Data into Factor 3 Tab.*
	Core Safety Factors Subtotal:	**57**	**85**	*Scores are rounded to the nearest integer.*

Supplemental Factors	Rating (Choose From Menu)	Score Received	Points Possible	Comments
#4 Mobility Improvement	2 Points: Neutral Effect on Mobility	2	5	*See business rules for more information. Must be documented with analysis: inputs and outputs. Design year is 20 years from construction. Growth rate is 1% by default.*
#5 Public and Other Interests	1 Point: No documented public concern, and no support of project	1	5	*Documentation from Elected Officials or Public is required.*
#6 Route Continuity and Corridor Completion	5 Points: Positive Effect on Uniformity	5	5	*See business rules for more information.*
#7 Earmarks & External Contributions	0 Points: No Earmarks or External Contributions	0	25	*See business rules for more information. Must be documented. Benefit/Cost Ratio must still be calculated using total project cost.*
	Supplemental Factors Subtotal:	**8**	**15**	
	Final Score:	**65**	**100**	*Scores greater than 100 will be lowered to 100*

Score Justifications:

Factor #4:	Type justification for selection here with all necessary background information. If points were received in this category, justification is required.
Factor #5:	Type justification for selection here with all necessary background information. If points were received in this category, justification is required.
Factor #6:	This is the only interchange on I-70 with a full cloverleaf design. Correcting the accelleration distance for this interchange will bring it in line with the rest of the route.
Factor #7:	Type justification for selection here with all necessary background information. If points were received in this category, justification is required.
Other Notes:	Provide other information in this space as needed.

USER INPUT	
Countermeasure: Accelleration Lane Extension	
Crashes (Total of 3 years only)	
Location Type	Rural Multilane Highway
Fatal and Incapacitating Injury Crashes	2
Non-Incapacitating Injury Crashes	8
PDO Crashes	23
Crash Reduction Factors (%, By Severity)	
$CRF_{KABC\ (Killed\ and\ Injury)}$	
CRF_{All}	11
Enter at least one CRF for either KABC or All Severities:	
Countermeasure 1 CRF_{KABC}	
Countermeasure 2 CRF_{KABC}	
Countermeasure 3 CRF_{KABC}	
Only enter CRF for "All Severities" if CRF's for KABC were not used:	
Countermeasure 1 $CRF_{All\ Severities}$	11
Countermeasure 2 $CRF_{All\ Severities}$	
Countermeasure 3 $CRF_{All\ Severities}$	
Project Information	
Current Year	2018
Project Build Year	2024
Inflation Rate (%, Do Not Change)	2
Project Life (Years, Default Value is 20)	20
Traffic Growth (%, Default Value is 1.0)	1
Yearly Upkeep Costs (Today's Dollars)	$1,000
Total Project Cost (Today's Dollars)	$202,000

RESULTS

Initial Annual Crash Costs
$570,317

Initial Annual Crash Costs Reduction
$62,735

Total Lifetime Crash Costs Reduction
$1,361,359

Build Year Project Cost
$227,485

Benefit Cost Ratio
5.98

NOTES

Crash totals by severity should be entered for the most recent consecutive three calendar year time period. No crash data for years prior to 2015 should be used.

Notes on CRF usage should be included on the first page of the worksheet. At least one CRF should be entered for either KABC crashes or all Crashes. If more than one countermeasure is being installed, enter additional CRF values as needed. Most projects will only enter one CRF value. Negative CRF's are permitted.

Traffic growth percent should be based on the TCDS data or on a projection from central office. Do not use a traffic growth factor greater than 1.0% without documentation . Do not enter a traffic growth factor of less than 0.1%.

Upkeep should include Pavement Marking Maintenance, Utility Payments, Amortized Refurbishments, and any other new yearly costs that will now be required. The default yearly upkeep cost is $1000. Total Project Cost is imported from the first sheet.

Land and Water Conservation Fund (LWCF) County Property List for Indiana (Last Updated March 2022)

ProjectNumber	SubProjectCode	County	Property
1800325	1800325	Wayne	Whitewater Valley Gorge Park & Trail
1800356	1800356	Wayne	Glen Miller Park & Golf Course
1800462	1800462	Wayne	Springwood Lake Park

*Park names may have changed. If acquisition of publically owned land or impacts to publically owned land is anticipated, coordination with IDNR, Division of Outdoor Recreation, should occur.

July 24, 2023

Environmental Justice (EJ) Analysis
Revive I-70 Project
Wayne County, Indiana
Des. No. 2002424

Introduction

The Indiana Department of Transportation (INDOT), with federal funding from the Federal Highway Administration (FHWA), intends to proceed with a roadway improvement project along a 21-mile section of Interstate 70 (I-70) in Wayne County, Indiana, from approximately 1.5 miles west of the I-70/State Road (SR) 1 interchange to the Indiana/Ohio State Line (Attachments, page 1). The project is within Jackson, Harrison, Center, Clay, and Wayne townships. The project setting is primarily rural, with an urban area near the City of Richmond that has a mixture of residential and commercial uses.

The project includes: adding two travel lanes (one eastbound and one westbound) in the grass median along I-70; reconfiguring the I-70/US 40 interchange; modifying acceleration/deceleration lengths of the ramps at five interchanges, weigh station, and rest area; replacing existing pavement with continuously reinforced concrete (CRC) pavement; placing continuous concrete barrier at the centerline of the median; replacing the I-70 bridges over the East Fork of the Whitewater River; widening and improving 40 bridges to accommodate the added travel lanes; rehabilitating and replacing culverts; and improving the stormwater drainage system. Additionally, existing lighting, signage, and guardrail/barrier systems will be upgraded. Most of the work will occur within existing, previously disturbed right-of-way (ROW). A noise study determined that noise abatement measures, such as noise walls are not feasible or reasonable for the project.

Under FHWA Order 6640.23A, FHWA and the project sponsor, as a recipient of funding from FHWA, are responsible to ensure that their programs, policies, and activities do not have a disproportionately high and adverse effect on minority or low-income populations. Per the current INDOT *Categorical Exclusion Manual*, an EJ Analysis is required for any project that has two or more relocations or 0.5 acre of additional permanent ROW. This project will require 1.48 acres of new ROW. Therefore, an EJ Analysis is required.

Identification of EJ Populations

Potential EJ impacts are detected by locating minority and low-income populations relative to a reference population to determine if populations of EJ concern exist, and whether there could be disproportionately high and adverse impacts to them. The reference population may be a county, city or town and is called the community of comparison (COC). In this project, the COC's are Wayne County, Indiana and Preble County, Ohio. The community that overlaps the project area is called the affected community (AC). An AC has an EJ population of concern if the population is more than 50% minority or low-income or if the low-income or minority population is 125% of the COC. Data from the 2020 American Community Survey (ACS) 5-year Estimates were obtained from the census.gov website on August 10, 2022, by Parsons. The data collected for minority and low-income populations within the ACs are summarized in Tables 1 and 2 below.

In Indiana, the ACs in this project consist of nine Census Track Block Groups (CTBGs): (AC-A) Block Group 2, CT 105; (AC-B) Block Group 1, CT 105; (AC-C) Block Group 1, CT 6; (AC-D) Block Group 2, CT 101; (AC-E) Block Group 2, CT 4; (AC-F) Block Group 1, CT 4; (AC-G) Block Group 1, CT 101; (AC-H) Block Group 1, CT 11.02; (AC-I) Block Group 2, CT 11.02 (Attachments, page 2).

In Ohio, the ACs in this project consist of two CTBGs: (AC-J) Block Group 3, CT 4001; (AC-K) Block Group 1, CT 4601 (Attachments, page 2).

Table1: Wayne County, Indiana (Block Groups AC-A through AC-I)

	COC	AC-A	AC-B	AC-C	AC-D	AC-E	AC-F	AC-G	AC-H	AC-I
	Wayne County Indiana	Block Group 2, Census Tract 105	Block Group 1, Census Tract 105	Block Group 1, Census Tract 6	Block Group 2, Census Tract 101	Block Group 2, Census Tract 4	Block Group 1, Census Tract 4	Block Group 1, Census Tract 101	Block Group 1, Census Tract 11.02	Block Group 2, Census Tract 11.02
Minority Population										
Percent Minority (%)	10.7	4.3	5.2	4.0	6.1	12.7	5.8	0.5	0.0	15.6
125 Percent of COC (%)	13.4									
Potential Minority EJ Population?		NO	NO	NO	NO	NO	NO	NO	NO	YES
Low-Income Population										
Percent Low-Income (%)	16.8	15.1	10.4	21.4	2.7	41.9	18.7	8.8	5.6	9.9
125 Percent of COC (%)	21.0									
Potential Low-Income EJ Population?		NO	NO	YES	NO	YES	NO	NO	NO	NO

Table 2: Preble County, Ohio (Block Groups AC-J and AC-K)

	COC	AC-J	AC-K
	Preble County Ohio	Block Group 3, Census Tract 4001	Block Group 1, Census Tract 4601
Minority Population			
Percent Minority (%)	3.4	1.9	11.7
125 Percent of COC (%)	4.2		
Potential Minority EJ Population?		NO	YES
Low-Income Population			
Percent Low-Income (%)	9.2	18.1	12.4
125 Percent of COC (%)	11.5		
Potential Low-Income EJ Population?		YES	YES

Based on the data presented in Tables 1 and 2, the project area contains populations of EJ concern. The census data sheets, map, and calculations can be found in the attachments.

Minority Populations: In Wayne County, Indiana, AC-I has a percent minority population of 15.6% (Table 1) (Attachments, page 3), which is below 50% but above the 125% COC threshold of 13.4%. Therefore, this AC is a minority population of EJ concern. In Preble County, Ohio, AC-K has a percent minority population of 11.7% (Table 2) (Attachments, page 5), which is below 50% but above the 125% COC threshold of 4.3%. Therefore, this AC is a minority population of EJ concern.

Low-Income Populations: In Wayne County, Indiana, AC-C and AC-E have a percent low-income of 21.4% and 41.9%, respectively, which are greater than the 125% COC threshold of 21.0% (Table 1) (Attachments, page 4). Therefore, AC-C and AC-E are low-income EJ populations of concern. In Preble County, Ohio, AC-J and AC-K have a percent low-income of 18.1% and 12.4%, respectively, which are greater than the 125% COC threshold of 11.5% (Table 2) (Attachments, page 6). Therefore, AC-J and AC-K are low-income EJ populations of concern.

Area Resources: The US Department of Housing and Urban Development (HUD) Resource Locator (https://resources.hud.gov/) was used to identify EJ housing resources and potential populations. Based on the site data available, one resource was identified within 0.5 mile of the project area (Attachments, page 7). This resource is the Carriage House Richmond Apartments, which is low-income housing located at 701 Dillon Drive in Richmond. No impacts to this resource are expected.

Impact Analysis

Access/Interchange Modifications: Within the project area there are various geometric deficiencies, including the existing ramp acceleration/deceleration lanes, and merge/diverge points, as well as acceleration/deceleration lanes and loop ramps at various interchanges, all of which do not meet current *Indiana Design Manual* (IDM) standards. There are also operational issues associated with the acceleration/deceleration lanes and loop ramps at both the I-70/US 35 and I-70/US 40 interchanges. To resolve these issues, modifications will be made to both interchanges and to I-70 on and off ramps throughout the project area.

The I-70/US 40 Interchange will be reconstructed to a Diamond Interchange with Roundabout Termini. The US 40 eastbound (EB) and westbound (WB) travel lanes will connect to a tear-drop style roundabout intersection at each end of the interchange allowing for yield-controlled movements to access the EB and WB I-70 single lane ramps and to continue along US 40. US 40 will maintain two lanes in each direction for EB and WB travel. The reconstruction will also provide pedestrian facilities at this location, which are described below. There will be no permanent change in access.

The I-70/US 35 Interchange will be partially modified to improve safety and to improve the acceleration and deceleration lengths of each ramp movement. The merging loop ramp from US 35 southbound (SB) to I-70 EB will be extended approximately 300 feet to provide additional length for acceleration. For the WB I-70 to US 35 exit ramps, a new barrier separated dual lane collector-distributor road will be constructed and provide proper deceleration lengths before accessing the existing US 35 NB and SB ramps. These ramp modifications will meet current INDOT design standards. There will be no permanent change in access.

The I-70 on and off ramps for the rest area, weigh station, and the SR 1, Centerville Road, US 35, US 27, and SR 227 interchanges will be reconstructed to the gore nose, which is where the ramps separate from the I-70 mainline. At some locations, reconstruction may extend further up a ramp due to profile or superelevation adjustments. Where possible, the acceleration/deceleration lengths of the ramps will be modified to meet current IDM standards. Sections of the ramps not reconstructed will have a mill and overlay preventative maintenance treatment.

A Transportation Management Plan (TMP) will be developed for the project, which will detail ramp closures and detours. This plan will include input obtained from meetings with stakeholders to ensure impacts to community services, transit routes, and community events are minimized. The proposed interchange modifications and ramp improvements are not anticipated to disproportionately impact EJ populations.

ROW and Relocations: Most of the work will occur within existing, previously disturbed ROW. A total of 1.48 acres of permanent ROW are required for this project, which are located in AC-C and AC-E containing EJ populations. The ROW impacts include a 1.42-acre strip along the I-70 WB exit ramp to US 35, which is agricultural and undeveloped land. This ROW is needed to construct a new dual lane exit ramp from I-70 WB to US 35. On the southside of I-70 between the Cardinal Greenway Trail and Union Pike, an undeveloped 0.06-acre parcel will be acquired to replace a culvert outside of the existing ROW. Locations of the ROW impacts are provided in Attachments, page 8. There will be no relocations of residences, businesses, or farms. Therefore, the proposed property acquisitions are not anticipated to disproportionately impact EJ populations.

Transit Service: The Rose View Transit System provides fixed-route and on-demand services in the project area. Currently, one fixed-route crosses the project area and AC-E containing EJ populations (Attachments, page 9). This is Route 3, which uses US 27 between downtown Richmond and Towers Medical Center located north of I-70. This medical center is the only stop on Route 3 north of the I-70/US 27 interchange. The first stop south of the I-70/US 27 interchange is at Benchmark Human Services. There are no transit stops within the interchange.

At the I-70/US 27 Interchange, the ramps and a 0.31-mile section of US 27 will require patching. Partial and full depth concrete patches will be placed on US 27 from approximately 850 feet north of the center of the interchange to approximately 800 feet south of the center of the interchange. One lane in the northbound (NB) and SB directions will remain open on US 27 during construction. The project will not affect Route 3 operations since US 27 and access to all stops along the transit line will remain open during construction. There will be ongoing coordination with the City of Richmond and Rose View Transit via phone calls, emails, and TMP meetings to minimize potential impacts to transit service. Therefore, the project is not anticipated to impact transit service.

Maintenance of Traffic (MOT): MOT will be conducted in three phases and detailed in the TMP. Two travel lanes will be maintained in the EB and WB directions of I-70 at all times. Construction zones will have a maximum length of 5 miles and a posted speed limit of 55 miles per hour (mph). Short-term ramp closures of no more than 60 calendar days with detours will occur as necessary at SR 1, Jacksonburg Road, Centerville Road, Round Barn Road, US 35, Union Pike, US 27, US 227, and SR 121. The Washington Road interchange will be closed for approximately 120 calendar days with a detour provided for motorists. One lane in the NB and SB directions will remain open on US 27 during construction. At the I-70/US 40 interchange, ramps will be closed for approximately 60 calendar days as they are constructed. One lane of travel in each direction will remain open on US 40 at all times. Access to all residences and businesses will be maintained throughout construction.

Coordination with the Wayne County Highway Department, Richmond Department of Public Works, first responders, schools, and Rose View Transit will occur throughout construction of the entire project. Coordination and outreach will include phone calls, emails, and TMP meetings. Therefore, the proposed MOT is not anticipated to disproportionately impact EJ populations.

Bicycle and Pedestrian Facilities: Pedestrian facilities are present at three locations within the project area containing AC-E and AC-I. The Cardinal Greenway Trail crosses the project area via an underpass west of US 27. There are sidewalk segments along US 27 south of the I-70/US 27 interchange, which terminate at the project area boundary and do not connect to other pedestrian facilities within the project area. There is a 200-foot-long sidewalk segment along US 40 which does not connect to other pedestrian facilities. No other bicycle or pedestrian facilities are located within the project area.

The Cardinal Greenway Trail will require a full closure in order to complete adjacent work, and due to the rural nature of the area, a detour will not be provided. Access to the trail north and south of the closed section will be available at existing trailheads. Pedestrian access will not be affected at US 27 since the sidewalks are outside of the project area. The sidewalk along US 40 within the project area will be closed during construction. New 5-foot wide sidewalks will be constructed on both the north and south sides of US 40 from the western project limits to the Ohio State Border. They will comply with the City of Richmond's *Americans with Disabilities Act (ADA) Transition Plan, 2017*. The new sidewalks will be ADA compliant and connect to a new sidewalk segment proposed by the City of Richmond along US 40. Therefore, the project is not anticipated to permanently impact pedestrian access or disproportionately impact EJ populations.

Conclusions

The purpose of the Revive I-70 project is to:

- Restore the pavement to extend the service life of these sections of roadway by at least 30 years, and provide a ride quality with an International Roughness Index of at least 95 inches per mile;
- Correct geometric deficiencies to meet current IDM standards;
- Reduce the frequency and severity of crashes;
- Fulfill state and federal long-range plans for increasing mobility; and
- Improve truck travel time reliability.

The project area contains four adjacent low-income EJ populations and two adjacent minority EJ populations. The project will provide transportation benefits to local and through travelers. A TMP will be developed for the construction in coordination with the Wayne County Highway Department, Richmond Department of Public Works, first responders, schools, Rose View Transit, and other stakeholders. This plan will be implemented throughout construction of the entire project to minimize impacts to motorists. There will be no change in access for transit service, motorized

vehicles and pedestrians. The Cardinal Greenway Trail will be restored and opened to the public after the new structure is constructed. The sidewalks along US 40 will be improved and ADA compliant. It will become part of a new sidewalk network along US 40. The lane and ramp closures will pose a temporary inconvenience to traveling motorists; however, no significant delays are anticipated, and all inconveniences and delays will cease upon project completion. The proposed ROW impacts are limited to strip takes from undeveloped parcels. Potential impacts to public transit during construction will be minimized through coordination with Rose View Transit and local governmental officials. Based on this analysis, the Revive I-70 project will not have a disproportionately high and adverse effect on low-income or minority populations.

Outreach

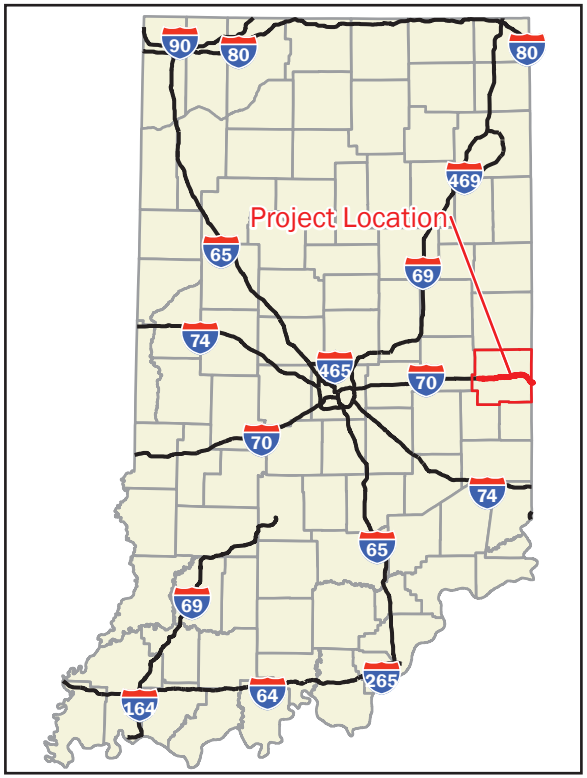
To ensure that EJ populations are engaged and informed, the project's Public Involvement Plan discusses outreach to EJ populations and individuals with limited English proficiency (LEP). Engagement activities include a variety of approaches to overcome language, cultural, economic, and other potential barriers to effective participation in the project development process. Engagement also includes stakeholders who represent EJ populations including elected officials, public transit, local housing authorities, public schools, religious institutions, and civic organizations.

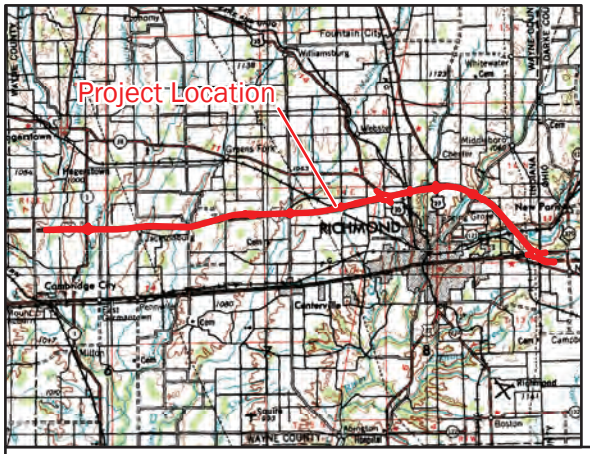
Two public information meetings (PIMs) have been held to date for the Revive I-70 project on January 23 and 24, 2023. The PIMs were advertised via Richmond local television stations, press releases in the *Palladium-Item*, project website, e-blasts, and advertisements on social media. Electronic fliers were sent to Forward Wayne County, Wayne County Foundation, and Bethel African Methodist Episcopal (AME) Church. Flier recipients were encouraged to share the PIM information with local residents. The flier offered the following special accommodations upon request:

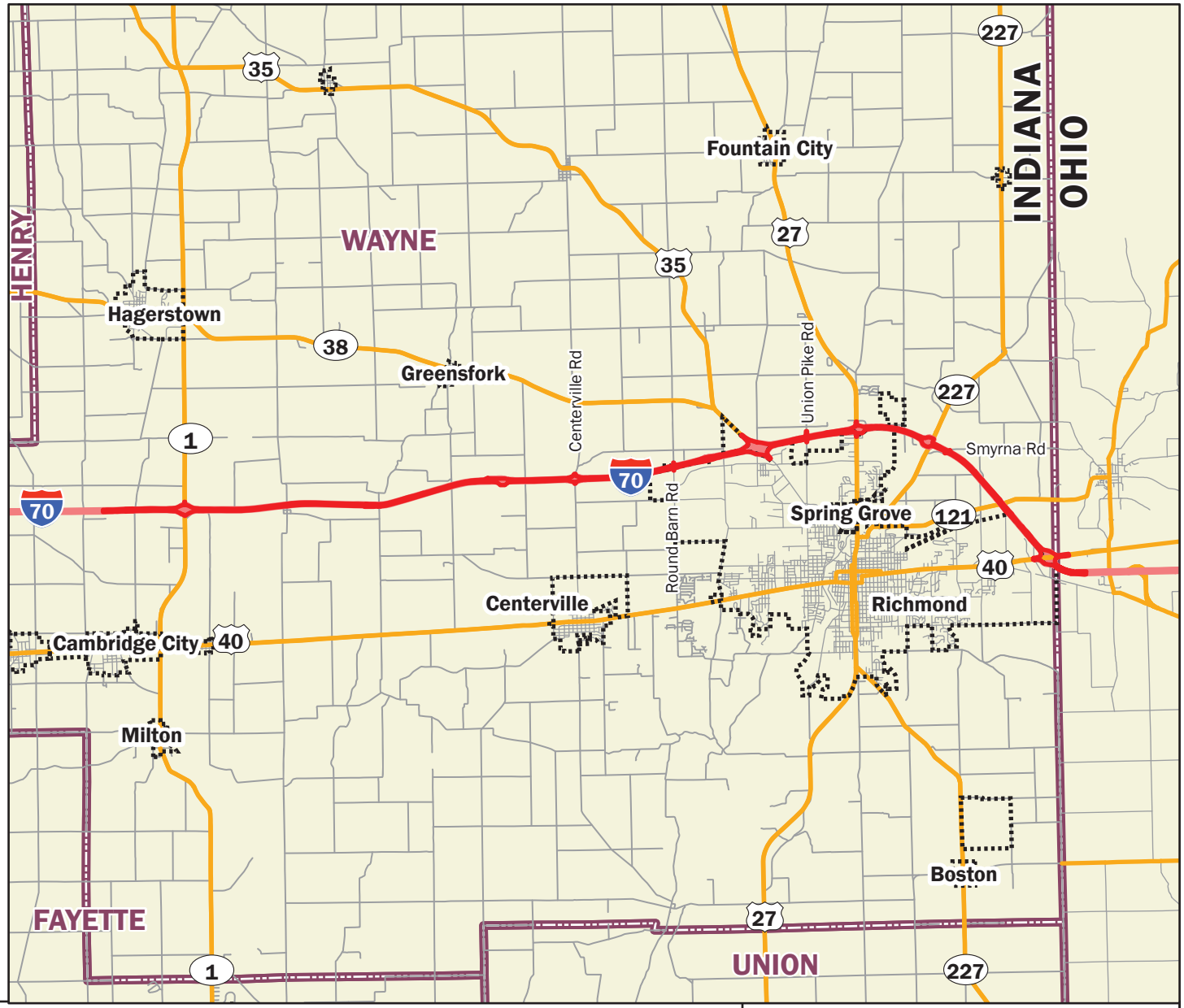
> *With advance notice, the Indiana Department of Transportation (INDOT) can provide special accommodation for persons with disabilities and/or limited English-speaking ability and persons needing auxiliary aids or services such as interpreters, signers, readers or large print. Should special accommodation be needed, please contact Berry Craig, public involvement specialist, Parsons, at berry.craig@parsons.com or 270-705-1640.*

The January 23, 2023, PIM was held at Whitewater Hall at Indiana University East, located at 2325 Chester Boulevard in Richmond. Indiana University East is a stop on the Rose View Transit Route 3 service. The PIM handout and comment sheet were provided in both English and Spanish. The January 24, 2023, meeting was held virtually on Microsoft Teams. Whitewater Community Television recorded the January 23rd PIM and broadcasted it on a local channel.

These outreach efforts will be applied to future PIMs and the public hearing for Revive I-70.







Study Area
Incorporated Areas
County Boundaries
Interstate
State Road
Local Road

0 1.5 3
Miles

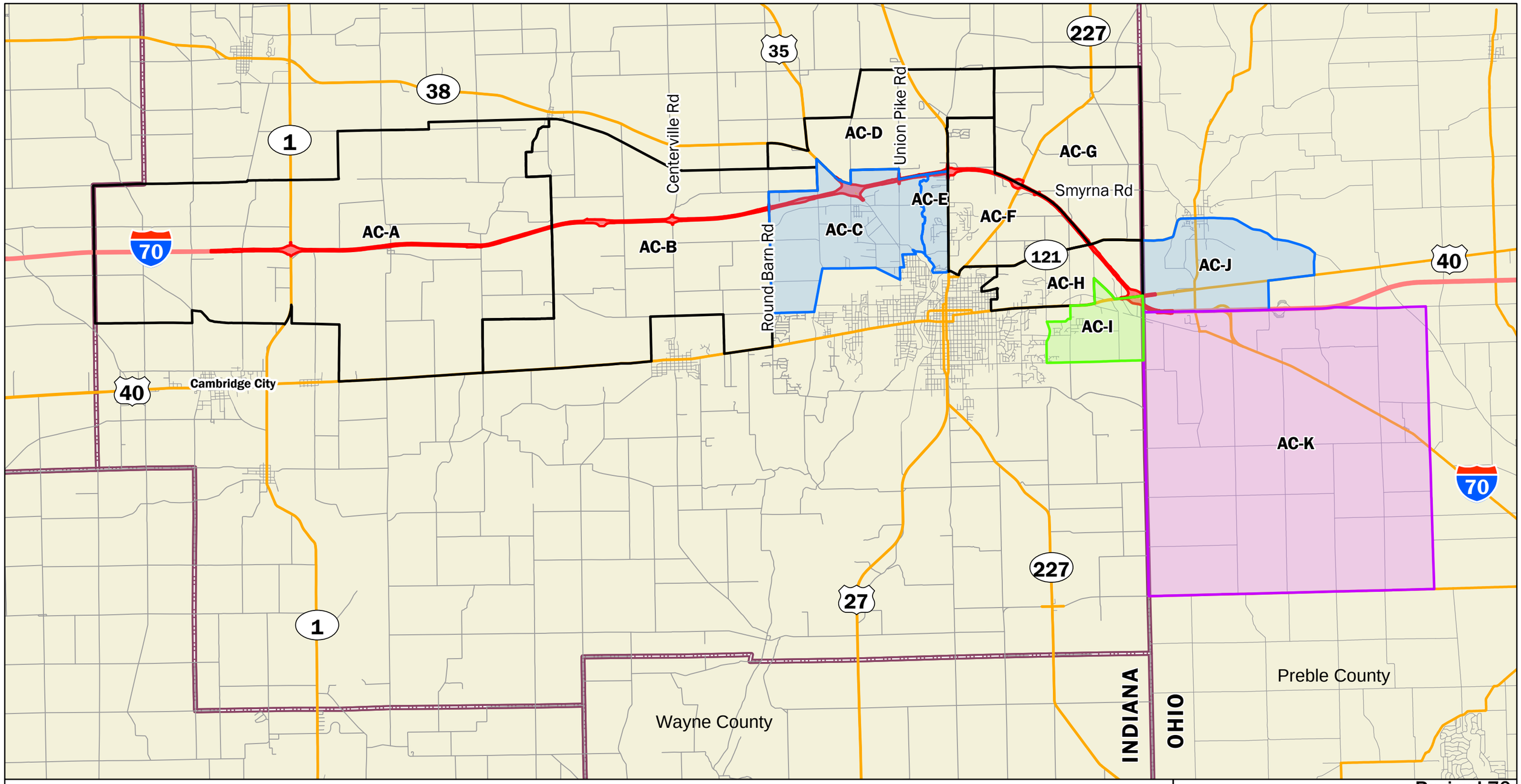
Sources:
Non Orthophotography Data - Obtained from the State of Indiana Geographical Information Office Library
Orthophotography - Obtained from Indiana Map Framework Data (www.indianamap.org)

Revive I-70
Wayne County, Indiana
Project Location

Des. 2002424
Date: 8/25/2022

PARSONS

Created by: KDV



Block Group EJ Status

- None
- Low-Income
- Minority
- Both

- Project Area
- Interstate
- State Road
- Local Road

0 10,000 20,000 Feet

1 Inch = 10,000 Feet

Sources:
Non Orthophotography Data - Obtained from the State of Indiana Geographical Information Office Library
Orthophotography - Obtained from Indiana Map Framework Data (www.indianamap.org)

Created by: CD

Revive I-70
Wayne County, Indiana
Preble County, Ohio
Environmental Justice Populations

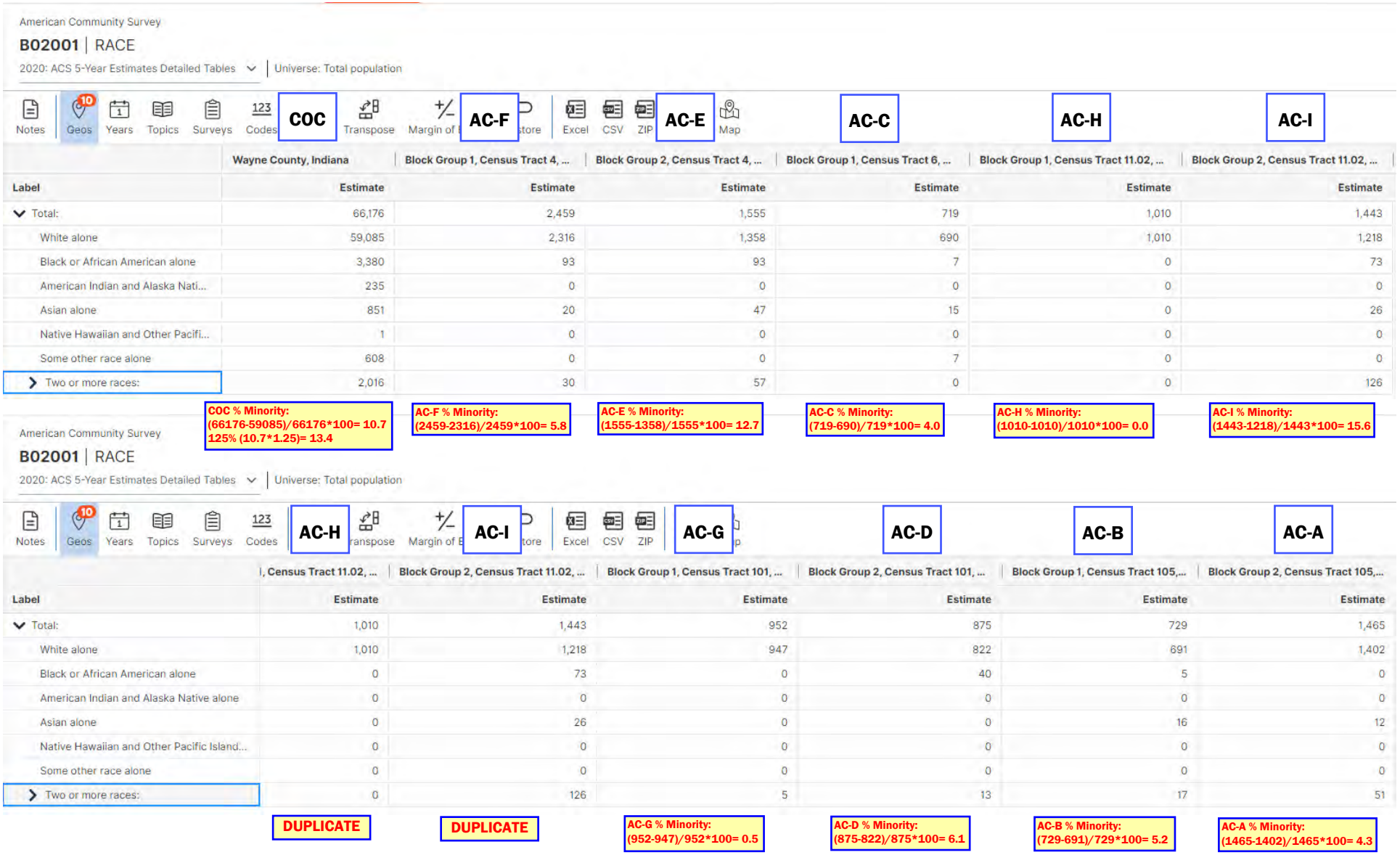
Des. 2002424

Date: 8/22/2022

PARSONS

Wayne County Race Data

https://data.census.gov/cedsci/table?q=B02001&g=0500000US18177_1500000US181770004001,181770004002,181770006001,181770011021,181770011022,181770101001,181770101002,181770105001,181770105002&tid=ACSDT5Y2020.B02001&moe=false&tp=false



American Community Survey

B02001 | RACE

2020: ACS 5-Year Estimates Detailed Tables | Universe: Total population

Notes | Geos | Years | Topics | Surveys | Codes | COC | Transpose | Margin of | AC-F | Excel | CSV | ZIP | AC-E | Map | AC-C | AC-H | AC-I

Label	Wayne County, Indiana	Block Group 1, Census Tract 4, ...	Block Group 2, Census Tract 4, ...	Block Group 1, Census Tract 6, ...	Block Group 1, Census Tract 11.02, ...	Block Group 2, Census Tract 11.02, ...
	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
Total:	66,176	2,459	1,555	719	1,010	1,443
White alone	59,085	2,316	1,358	690	1,010	1,218
Black or African American alone	3,380	93	93	7	0	73
American Indian and Alaska Nati...	235	0	0	0	0	0
Asian alone	851	20	47	15	0	26
Native Hawaiian and Other Pacifi...	1	0	0	0	0	0
Some other race alone	608	0	0	7	0	0
Two or more races:	2,016	30	57	0	0	126

COC % Minority: (66176-59085)/66176*100= 10.7
125% (10.7*1.25)= 13.4

AC-F % Minority: (2459-2316)/2459*100= 5.8

AC-E % Minority: (1555-1358)/1555*100= 12.7

AC-C % Minority: (719-690)/719*100= 4.0

AC-H % Minority: (1010-1010)/1010*100= 0.0

AC-I % Minority: (1443-1218)/1443*100= 15.6

American Community Survey

B02001 | RACE

2020: ACS 5-Year Estimates Detailed Tables | Universe: Total population

Notes | Geos | Years | Topics | Surveys | Codes | AC-H | ransport | Margin of E | AC-I | tore | Excel | CSV | ZIP | AC-G | p | AC-D | AC-B | AC-A

Label	, Census Tract 11.02, ...	Block Group 2, Census Tract 11.02, ...	Block Group 1, Census Tract 101, ...	Block Group 2, Census Tract 101, ...	Block Group 1, Census Tract 105,...	Block Group 2, Census Tract 105,...
	Estimate	Estimate	Estimate	Estimate	Estimate	Estimate
Total:	1,010	1,443	952	875	729	1,465
White alone	1,010	1,218	947	822	691	1,402
Black or African American alone	0	73	0	40	5	0
American Indian and Alaska Native alone	0	0	0	0	0	0
Asian alone	0	26	0	0	16	12
Native Hawaiian and Other Pacific Island...	0	0	0	0	0	0
Some other race alone	0	0	0	0	0	0
Two or more races:	0	126	5	13	17	51

DUPLICATE

DUPLICATE

AC-G % Minority: (952-947)/952*100= 0.5

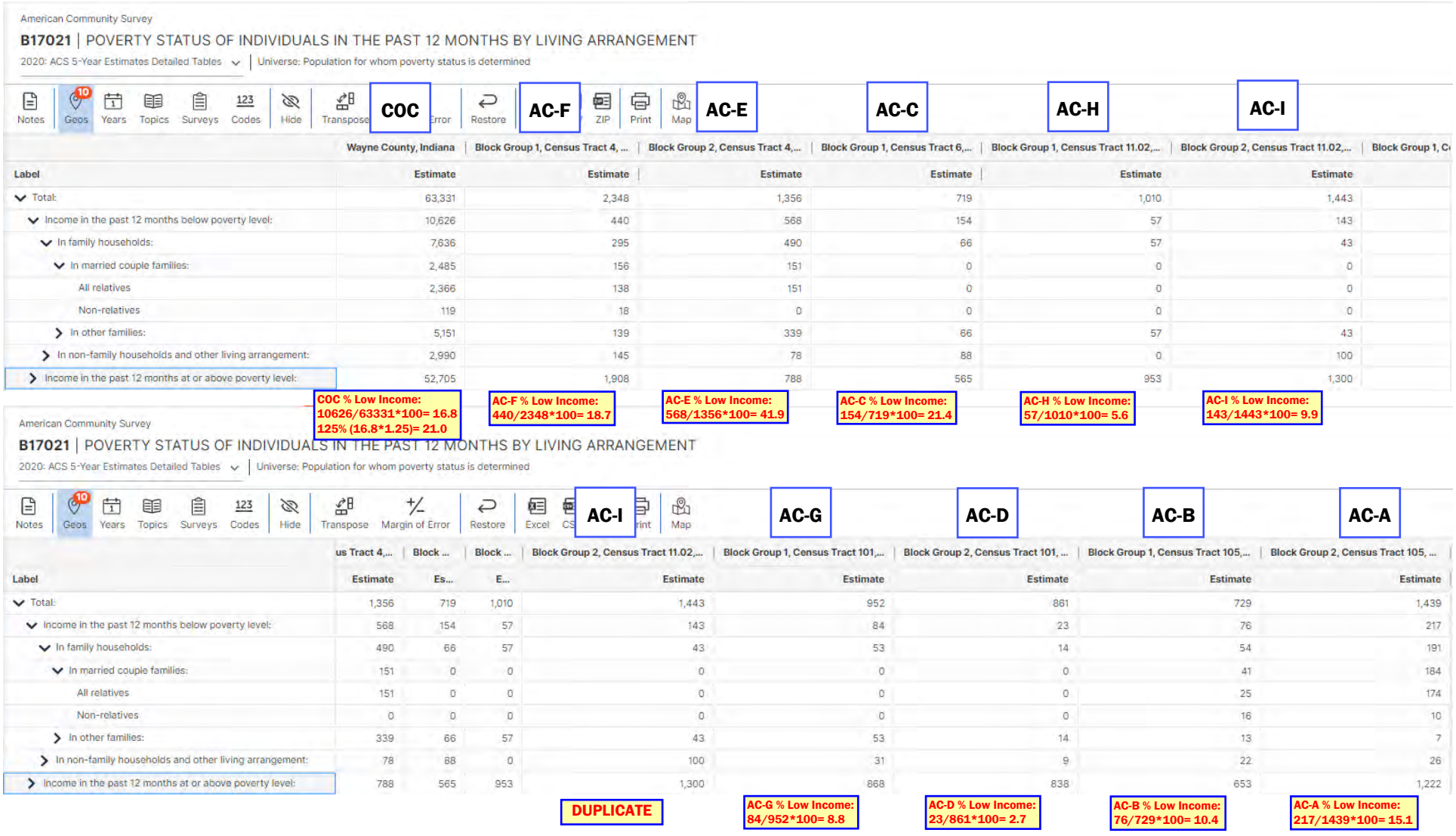
AC-D % Minority: (875-822)/875*100= 6.1

AC-B % Minority: (729-691)/729*100= 5.2

AC-A % Minority: (1465-1402)/1465*100= 4.3

Wayne County Income Data

https://data.census.gov/cedsci/table?q=B17021&g=0500000US18177_1500000US181770004001,181770004002,181770006001,181770011021,181770011022,181770101001,181770101002,181770105001,181770105002&tid=ACSDT5Y2020.B17021&moe=false



American Community Survey

B17021 | POVERTY STATUS OF INDIVIDUALS IN THE PAST 12 MONTHS BY LIVING ARRANGEMENT

2020: ACS 5-Year Estimates Detailed Tables | Universe: Population for whom poverty status is determined

Notes | Geos | Years | Topics | Surveys | Codes | Hide | Transpose | Error | Restore | ZIP | Print | Map

COC AC-F AC-E AC-C AC-H AC-I

Label	Wayne County, Indiana Estimate	Block Group 1, Census Tract 4, ... Estimate	Block Group 2, Census Tract 4,... Estimate	Block Group 1, Census Tract 6,... Estimate	Block Group 1, Census Tract 11.02,... Estimate	Block Group 2, Census Tract 11.02,... Estimate	Block Group 1, C...
Total:	63,331	2,348	1,356	719	1,010	1,443	
Income in the past 12 months below poverty level:	10,626	440	568	154	57	143	
In family households:	7,636	295	490	66	57	43	
In married couple families:	2,485	156	151	0	0	0	
All relatives	2,366	138	151	0	0	0	
Non-relatives	119	18	0	0	0	0	
In other families:	5,151	139	339	66	57	43	
In non-family households and other living arrangement:	2,990	145	78	88	0	100	
Income in the past 12 months at or above poverty level:	52,705	1,908	788	565	953	1,300	

COC % Low Income: 10626/63331*100= 16.8
125% (16.8*1.25)= 21.0

AC-F % Low Income: 440/2348*100= 18.7

AC-E % Low Income: 568/1356*100= 41.9

AC-C % Low Income: 154/719*100= 21.4

AC-H % Low Income: 57/1010*100= 5.6

AC-I % Low Income: 143/1443*100= 9.9

American Community Survey

B17021 | POVERTY STATUS OF INDIVIDUALS IN THE PAST 12 MONTHS BY LIVING ARRANGEMENT

2020: ACS 5-Year Estimates Detailed Tables | Universe: Population for whom poverty status is determined

Notes | Geos | Years | Topics | Surveys | Codes | Hide | Transpose | Margin of Error | Restore | Excel | CS... | Print | Map

AC-I AC-G AC-D AC-B AC-A

Label	us Tract 4,... Estimate	Block ... Es...	Block ... E...	Block Group 2, Census Tract 11.02,... Estimate	Block Group 1, Census Tract 101,... Estimate	Block Group 2, Census Tract 101, ... Estimate	Block Group 1, Census Tract 105,... Estimate	Block Group 2, Census Tract 105, ... Estimate
Total:	1,356	719	1,010	1,443	952	861	729	1,439
Income in the past 12 months below poverty level:	568	154	57	143	84	23	76	217
In family households:	490	66	57	43	53	14	54	191
In married couple families:	151	0	0	0	0	0	41	184
All relatives	151	0	0	0	0	0	25	174
Non-relatives	0	0	0	0	0	0	16	10
In other families:	339	66	57	43	53	14	13	7
In non-family households and other living arrangement:	78	88	0	100	31	9	22	26
Income in the past 12 months at or above poverty level:	788	565	953	1,300	868	838	653	1,222

DUPLICATE

AC-G % Low Income: 84/952*100= 8.8

AC-D % Low Income: 23/861*100= 2.7

AC-B % Low Income: 76/729*100= 10.4

AC-A % Low Income: 217/1439*100= 15.1

Preble County Race Data

https://data.census.gov/cedsci/table?q=B02001&g=0500000US39135_1500000US391354001003,391354601001&tid=ACSDT5Y2020.B02001&moe=false

American Community Survey

B02001 | RACE

2020: ACS 5-Year Estimates Detailed Tables | Universe: Total population

Notes | Geos | Years | Topics | Surveys | Codes | Hide | Transpo | COC | argin of Error | Restore | Ex | AC-J | V | ZIP | Print | Map | AC-K

Label	Preble County, Ohio Estimate	Block Group 3, Census Tract 4001, ... Estimate	Block Group 1, Census Tract 4601, P... Estimate
Total:	40,995	1,409	1,216
White alone	39,615	1,382	1,074
Black or African American alone	314	19	0
American Indian and Alaska Native alone	48	0	22
Asian alone	109	0	0
Native Hawaiian and Other Pacific Islander alone	3	0	0
Some other race alone	60	0	0
Two or more races:	846	8	120

COC % Minority:
(40995-39615)/40995*100= 3.4
125% (3.4*1.25)= 4.2

AC-J % Minority:
(1409-1382)/1409*100= 1.9

AC-K % Minority:
(1216-1074)/1216*100= 11.7

Preble County Income Data

https://data.census.gov/cedsci/table?q=B17021&g=0500000US39135_1500000US391354001003,391354601001&tid=ACSDT5Y2020.B17021&moe=false

American Community Survey

B17021 | POVERTY STATUS OF INDIVIDUALS IN THE PAST 12 MONTHS BY LIVING ARRANGEMENT

2020: ACS 5-Year Estimates Detailed Tables | Universe: Population for whom poverty status is determined

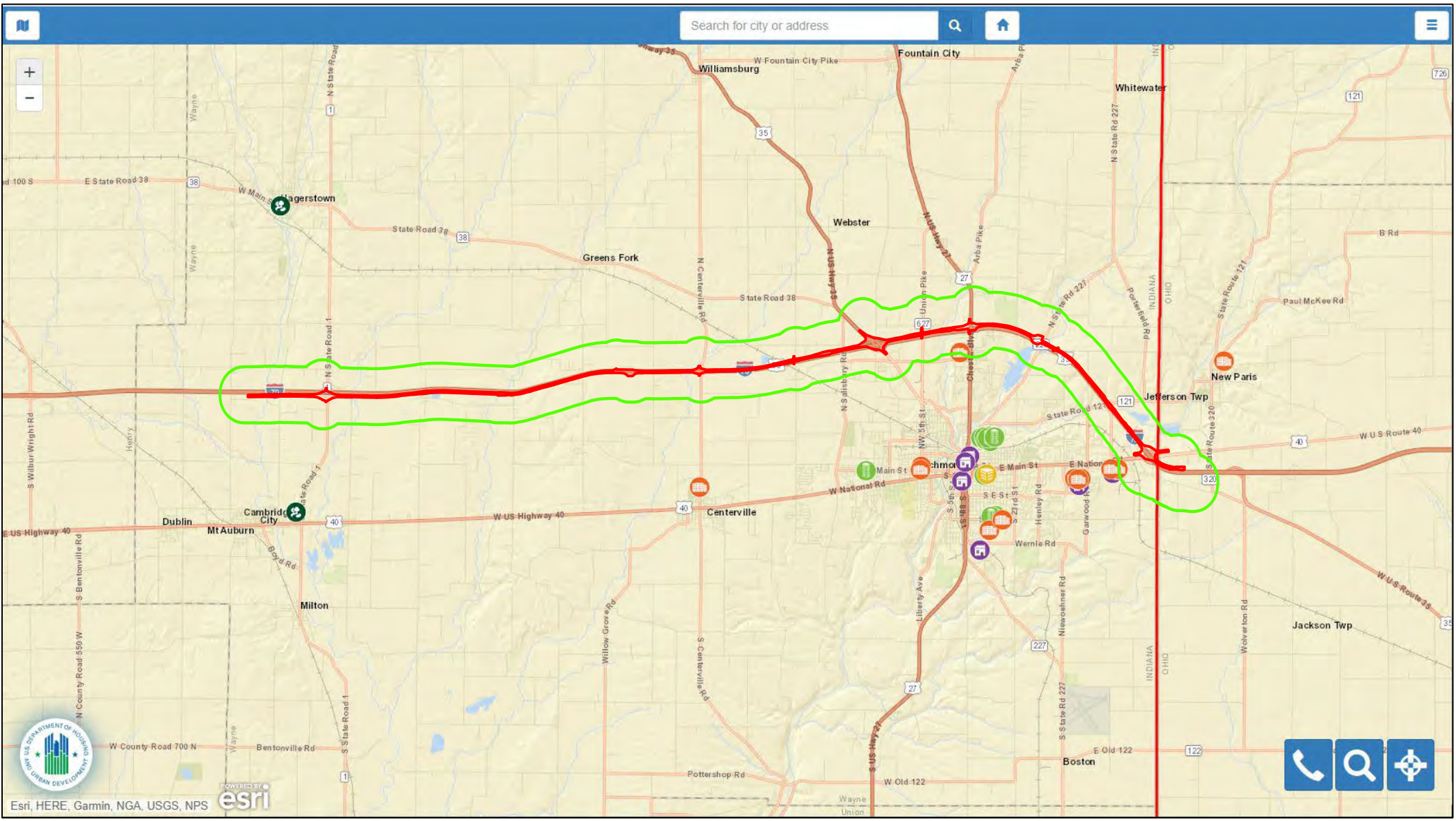
Notes | Geos 3 | Years | Topics | Surveys | Codes | Hide | Transpose | M | COC | Error | Restore | Excel | CSV | AC-J | Print | Map | AC-K

Label	Preble County, Ohio Estimate	Block Group 3, Census Tract 4001, Pr... Estimate	Block Group 1, Census Tract 4601, Pre... Estimate
Total:	40,357	1,371	1,216
Income in the past 12 months below poverty level:	3,697	248	151
Income in the past 12 months at or above poverty level:	36,660	1,123	1,065

COC % Low Income: 3697/40357*100= 9.2
125% (9.2*1.25)= 11.5

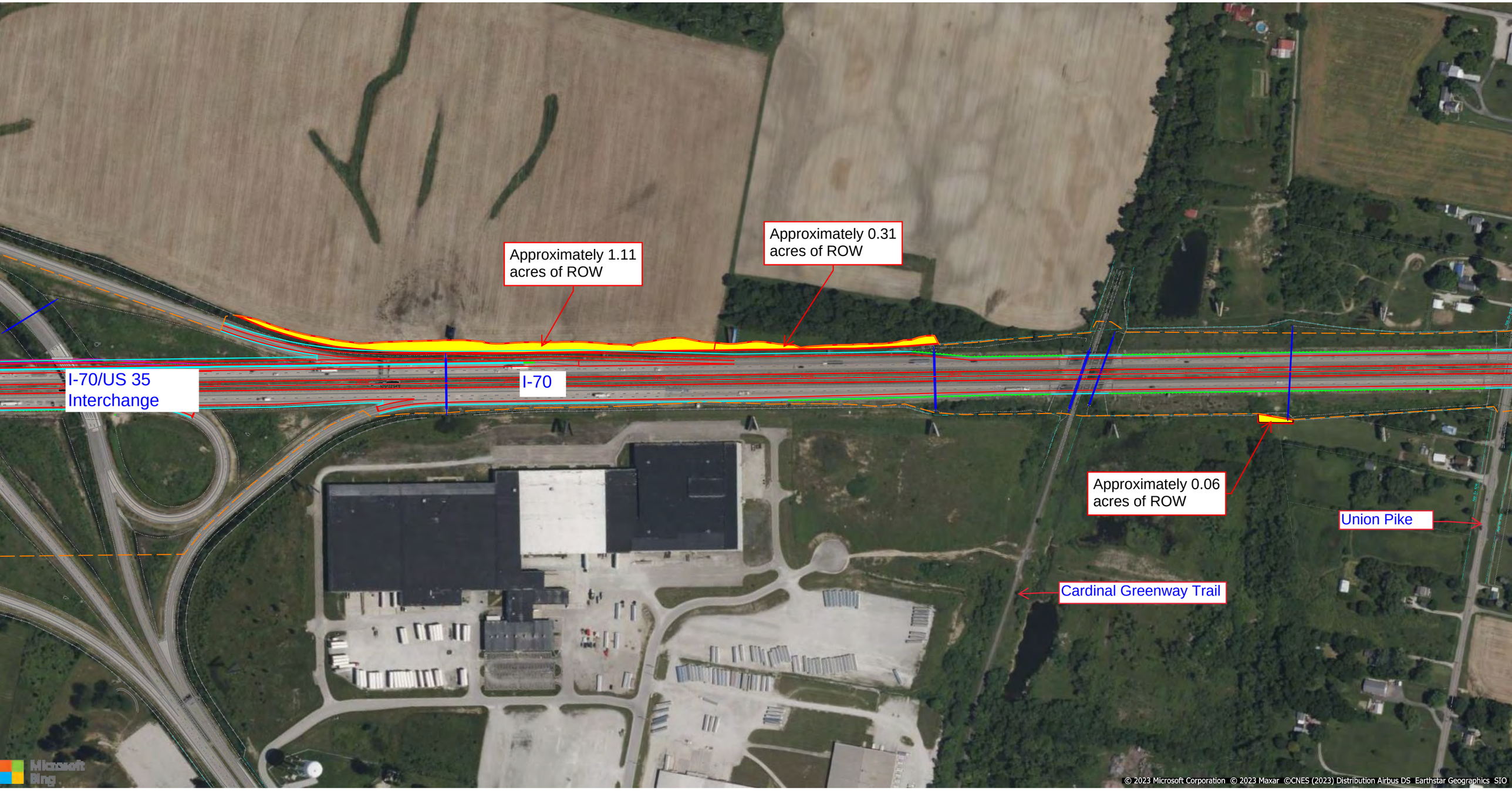
AC-J % Low Income: 248/1371*100= 18.1

AC-K % Low Income: 151/1216*100= 12.4

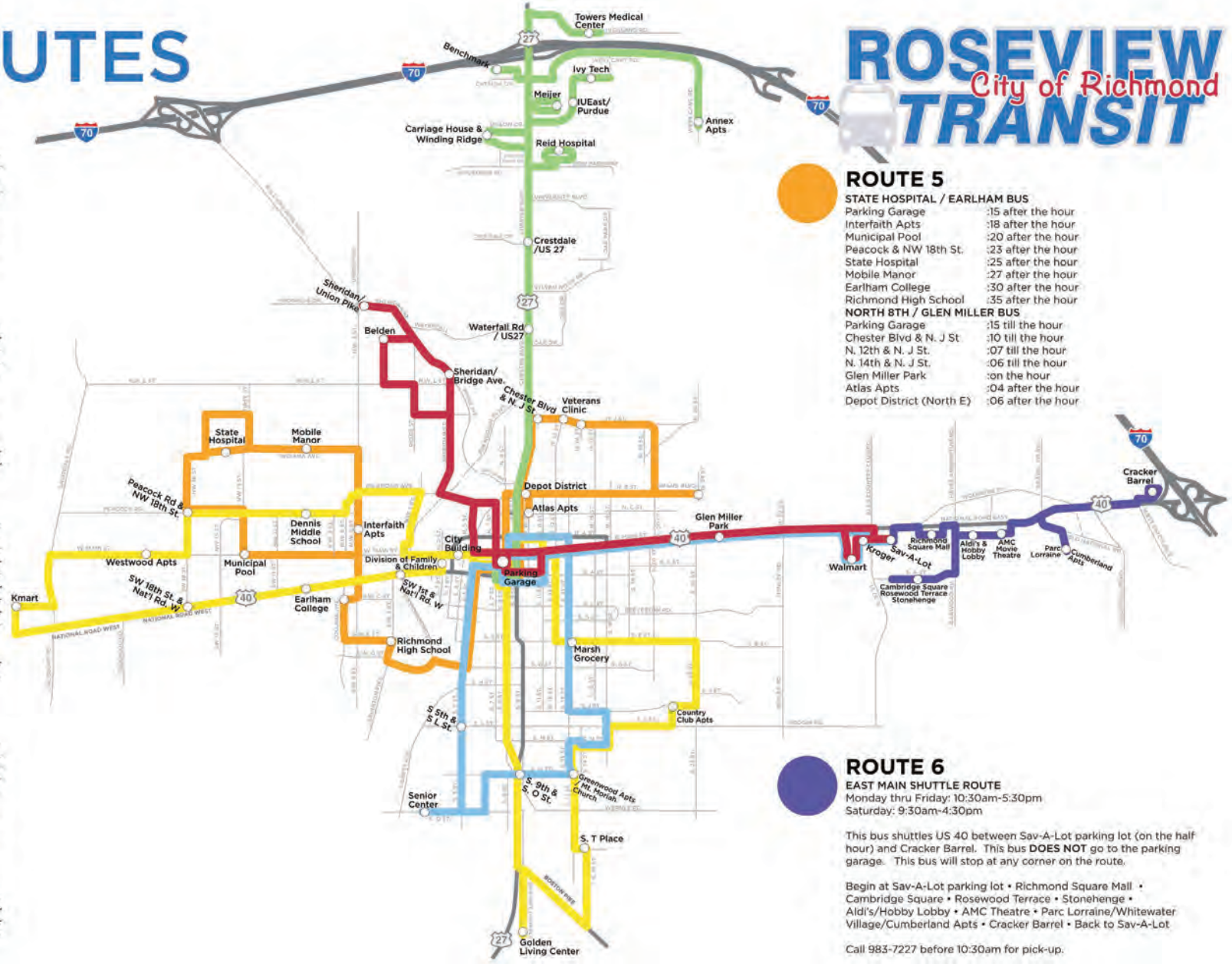


Obtained from: https://resources.hud.gov/ on July 12, 2023

Permanent Right of Way Impacts



BUS ROUTES



ROUTE 1

FAIRVIEW BUS :

Parking Garage	:15 after the hour
Sheridan/Bridge Ave.	:25 after the hour
Sheridan/Union Pike	:on the half hour
Belden	:32 after the hour

EAST MAIN STREET BUS:

Parking Garage	:15 till the hour
Glen Miller Park	:10 till the hour
Wal-Mart	:05 till the hour
Kroger	:03 till the hour
Sav-A-Lot	:on the hour

ROUTE 2

EAST MAIN STREET BUS:

Parking Garage	:15 after the hour
Glen Miller Park	:20 after the hour
Wal-Mart	:25 after the hour
Kroger	:27 after the hour
Sav-A-Lot	:on the half hour

SOUTH 13TH, 5TH & Q STREET BUS:

Parking Garage	:15 till the hour
Marsh Grocery	:10 till the hour
Greenwood Apts	:05 till the hour
S. 9th St & O St.	:02 till the hour
Senior Center	:03 after the hour
S. 5th St & L St.	:06 after the hour

ROUTE 3

REID HOSPITAL / IUEAST / IVY TECH BUS:

Parking Garage	:15 after the hour
Crestdale/US 27	:25 after the hour
Reid Hospital	:30 after the hour
IU EAST/Ivy Tech/Purdue	:35 after the hour
Meijer	:40 after the hour
Annex Apts	:45 after the hour
Towers Medical Center	:50 after the hour
Benchmark	:55 after the hour
Carriage House/ Winding Ridge	:On the hour
Waterfall Rd/US 27	:05 after the hour
Return to Parking Garage	:10 after the hour

ROUTE 4

SOUTH 8TH & COUNTRY CLUB BUS

Parking Garage	:15 after the hour
Golden Living Center	:22 after the hour
South T Place	:25 after the hour
Mt. Moriah Church	:28 after the hour
Country Club Apts	:On the half hour
Marsh Grocery	:25 till the hour

NATIONAL ROAD/WEST RICHMOND BUS

Parking Garage	:15 till the hour
Div. Family & Children	:13 till the hour
SW 1st & Nat'l Rd. West	:12 till the hour
Earlham College	:11 till the hour
SW 18th & Nat'l Rd. West	:07 till the hour
Kmart	:05 till the hour
Westwood Apts	:01 after the hour
Peacock Rd. & NW 18th	:04 after the hour
Dennis Middle School	:05 after the hour
City Building	:10 after the hour

REV AUG 2015

ROUTE 5

STATE HOSPITAL / EARLHAM BUS

Parking Garage	:15 after the hour
Interfaith Apts	:18 after the hour
Municipal Pool	:20 after the hour
Peacock & NW 18th St.	:23 after the hour
State Hospital	:25 after the hour
Mobile Manor	:27 after the hour
Earlham College	:30 after the hour
Richmond High School	:35 after the hour

NORTH 8TH / GLEN MILLER BUS

Parking Garage	:15 till the hour
Chester Blvd & N. J St	:10 till the hour
N. 12th & N. J St.	:07 till the hour
N. 14th & N. J St.	:06 till the hour
Glen Miller Park	:on the hour
Atlas Apts	:04 after the hour
Depot District (North E)	:06 after the hour

ROUTE 6

EAST MAIN SHUTTLE ROUTE

Monday thru Friday: 10:30am-5:30pm
Saturday: 9:30am-4:30pm

This bus shuttles US 40 between Sav-A-Lot parking lot (on the half hour) and Cracker Barrel. This bus **DOES NOT** go to the parking garage. This bus will stop at any corner on the route.

Begin at Sav-A-Lot parking lot • Richmond Square Mall • Cambridge Square • Rosewood Terrace • Stonehenge • Aldi's/Hobby Lobby • AMC Theatre • Parc Lorraine/Whitewater Village/Cumberland Apts • Cracker Barrel • Back to Sav-A-Lot

Call 983-7227 before 10:30am for pick-up.

Graf, Jennifer [US-US]

From: Fair, Terri <TFair@indot.IN.gov>
Sent: Tuesday, July 25, 2023 5:39 PM
To: Graf, Jennifer [US-US]
Cc: Passmore, Andrew D
Subject: [EXTERNAL] Des. No. 2002424 Revive I-70 EJ Analysis Memo for Review
Attachments: 2023_07_20 MEM EJ Analysis ReviveI70 Draft5.pdf

Sensitive

INDOT-Environmental Services Division (ESD) has reviewed the project information along with the Environmental Justice (EJ) Analysis for the above referenced project. With the information provided, the project may require minimal right-of-way, require no relocations, and would not disrupt community cohesion or create a physical barrier. With the information provided, INDOT-ESD would not consider the impacts associated with this project as causing a disproportionately high and adverse effect on minority and/or low-income populations of EJ concern relative to non-EJ populations in accordance with the provisions of Executive Order 12898 and FHWA Order 6640.23a. No further EJ Analysis is required.

Utility Coordination

Project Name: I-70 Wayne County
Route Number: I-70
INDOT DES NO: 2002424
Parsons Project Number: 684082
Project Description: I-70 Wayne County
Project Limits: I-70 from SR 1 to Ohio State Line
INDOT District: Greenfield
Parsons Utility Coordinator: Holliston Huhn
INDOT Oversight Agent: Lavon Marshall
INDOT Project Manager: Nathan Riggs
INDOT Construction Area Engineer: Clark Packer

Utility Name	Type	Comments
American Electric Power Telecom	Fiber Optic	Not Within Project Area
American Electric Power Distribution	Electric - Distribution	Not Within Project Area
American Electric Power Transmission	Electric - Transmission	Within Project Area
Centerpoint Energy	Gas Distribution	Within Project Area
Centerpoint Energy	Gas Transmission	Within Project Area
Town of Centerville	Electric, Storm Sewer, Water	Within Project Area
Comcast Cable Communications	Communication	Within Project Area
Duke Energy Inc	Electric Distribution	Within Project Area
Duke Energy Inc	Electric Transmission	Within Project Area
Frontier Communications	Communication	Within Project Area
Indiana American Water Co.	Water	Within Project Area
Panhandle Eastern Pipeline	Gas	Within Project Area
City of Richmond	Electric	Within Project Area
City of Richmond	Sanitary Sewer	Within Project Area
Whitewater Valley REMC	Electric	Within Project Area

JOINT USE AND MAINTENANCE AGREEMENT
Between
THE INDIANA DEPARTMENT OF TRANSPORTATION
And
CARDINAL GREENWAY, INC.
Concerning
THE CARDINAL GREENWAY MULTI-USE TRAIL

This Joint Use and Maintenance Agreement ("Agreement"), made by and between the State of Indiana, acting by and through the Indiana Department of Transportation (hereinafter referred to as "INDOT"), and Cardinal Greenway, Inc. (hereinafter referred to as "CGI "), jointly referred to as the "Parties," is executed pursuant to the terms and conditions set forth herein and shall be effective as of the date of approval by the Office of the Indiana Attorney General. In consideration of those mutual undertakings and covenants, the Parties agree as follows:

RECITALS

WHEREAS, CGI owns and operates the Cardinal Greenway Trail, a multi-use trail for bicyclists and pedestrians, which is located on the former CSX railroad property between Richmond and Muncie under Interstate 70 ("I-70"), near mile marker 149+80 just east of US 35, Exit 149 in Richmond, Wayne County, Indiana (the "Trail"); and

WHEREAS, the Trail is located within state-owned or controlled right-of-way; and

WHEREAS, the Parties desire to delineate responsibilities for the maintenance of the Trail and all associated costs therewith; and

WHEREAS, CGI shall be solely responsible for all costs associated with the maintenance of the Trail; and

WHEREAS, the maintenance of the Trail will occur within the state-owned or controlled right-of-way, under the jurisdiction of INDOT, as shown in **Exhibit A**; and

WHEREAS, it is of mutual interest for the Parties to cooperate in providing highway improvements for the safety of bicyclists and pedestrians;

NOW THEREFORE, in consideration of the promises and the mutually dependent covenants herein contained, the Parties hereto agree as follows:

ARTICLE I. PURPOSE AND TERM

1.1. Recitals. The Recitals recorded above are incorporated by reference into this Agreement. All captions, section headings, paragraph titles and similar items are provided for the purpose of reference and convenience and are not intended to be inclusive, definitive or to affect the interpretation of this Agreement.

1.2. Purpose. The purpose of this Agreement is to delineate costs and responsibilities for the maintenance, improvements, and removal of the Trail.

1.3. Term. This Agreement shall be for a twenty-five (25) year period, commencing as of the date approved as to form and legality by the Attorney General of Indiana, or an authorized representative, and shall be subject to renewal upon the same terms for two (2) successive twenty-five (25) year periods. This Agreement shall be subject to cancellation and termination by either party upon giving the other party thirty (30) days written notice of such action.

1.4. No Interest in the Land. The Parties understand that this Agreement does not: (1) grant any interest or other rights in the land, either temporarily or permanently; or (2) establish a shared-use facility which would require replacement if INDOT has a need to use the affected property for highway purposes in the future.

ARTICLE II. CGI 'S RESPONSIBILITIES

2.1. Financial Responsibilities. CGI shall have sole responsibility, including costs, for the maintenance, improvements, and removal of the Trail, within the state-owned or controlled right of way. To the extent permitted by law, in addition to the terms agreed upon pursuant to Section 4.22 of this Agreement, CGI shall indemnify and hold INDOT harmless for any claims arising out of the Trail within the state-owned or controlled right of way.

2.2. CGI Responsibilities. CGI shall have sole responsibility for the maintenance, improvements, and removal of the Trail. CGI understands and agrees that if the Trail conflicts with the operation, maintenance, regulation, or construction of any part of I-70, the Trail may be altered or removed entirely to accommodate use of the state-owned or controlled right-of-way for state transportation purposes at no cost to INDOT. INDOT shall be the sole and final decision maker on anything that is related to and/or may impact the quality and function of I-70.

2.3. Maintenance Responsibilities. CGI shall perform, or cause to be performed, all necessary routine maintenance for the Trail in accordance with all applicable state and federal laws, as well as INDOT standards, policies, and procedures relative to this Agreement. CGI shall conduct all maintenance, improvements, and removal of the Trail in accordance with all applicable federal and state laws as well as INDOT and FHWA standards and good engineering practices as set forth in the following: (1) Title 23, US Code, Highways, (2) the regulations issued pursuant thereto, (3) the Americans with Disabilities Act of 1990, (4) I.C. 36, and (5) the policies and procedures promulgated by INDOT and FHWA relative to the Agreement. All plans shall be completed in accordance with all requirements of the most recent edition of INDOT's Standard Specifications and the Indiana Design Manual.

CGI understands and agrees that if the Trail is damaged and needs to be repaired, it is CGI's responsibility to repair the Trail within ninety (90) days. If CGI has not repaired the Trail within ninety (90) days and INDOT deems it necessary that the Trail be repaired, INDOT will repair the Trail at CGI's expense. If the Trail is damaged beyond repair, and CGI has not planned the replacement of the Trail within ninety (90) days and the removal of the Trail within one (1) year, INDOT will remove the Trail at CGI's expense. Maintenance activities performed on any portion

of the Trail shall not create any adverse impact or interfere with the safety and travel of the motoring public.

2.3.1. Future maintenance shall include but not be limited to:

A. **Utility Services**. CGI shall be responsible for all costs relating to utility services serving the Trail within the state-owned or controlled right of way.

B. **Maintenance Plans**. Prior to the commencement of any maintenance activities performed within the state-owned or controlled right of way, CGI shall submit to the Greenfield District Permit Manager ("Permit Manager") a maintenance plan for approval prior to commencement of any maintenance activities within the state-owned or controlled right of way. The maintenance plan shall identify the types of maintenance activities to be completed and an estimated schedule of when these activities will occur. The plan shall include a Maintenance of Traffic ("MOT") plan if such activities will require lane closures or traffic restrictions on I-70. The Permit Manager shall promptly notify CGI of any concerns or deficiencies in the plan.

2.3.2. Modifications to Trail. CGI shall not erect any signs, sculptures, or structures within the state-owned or controlled right of way without the prior approval of INDOT. If CGI wishes to install additional improvements within the state-owned or controlled right of way, prior to installation, CGI shall apply for a permit, submit a design plan to the Permit Manager for review and approval, and enter into an amendment to this Agreement.

2.3.3. Removal of Trail.

A. Upon termination of the Agreement pursuant to Section 1.3, CGI may be required to remove the Trail upon INDOT's request. Failure to remove the Trail may result in INDOT removing the Trail and billing CGI for costs of removal.

B. In the event that INDOT determines, in its sole reasonable discretion, that CGI is not adequately maintaining the Trail within the state-owned or controlled right of way, or for any other justified reason (i.e., safety concerns for pedestrians, bicyclists or the motoring public, change in policy, requirement for compliance with federal law or other federal mandate, etc.), INDOT may order CGI to remove or modify the Trail at CGI's expense. Except in cases of emergency (i.e., eminent threat of harm to the traveling public), INDOT will provide ninety (90) days written notice to CGI that the Trail, or any portion thereof, must be removed or modified. If the Trail is not removed or modified to INDOT's satisfaction within ninety (90) days of issuance of notice under this section, INDOT may remove the Trail and bill CGI for the costs of removal.

C. CGI understands and agrees that it shall not be entitled to any damages, or any other compensation should INDOT require complete or partial removal of the Trail for any reason.

2.4. Use of State Right-of-Way.

2.4.1. Subject to the terms and conditions of this Agreement, INDOT grants permission to CGI, its employees, and contractors to enter upon the state-owned or controlled right of way for the sole and exclusive purposes of inspecting, maintaining, operating, and repairing the Trail. CGI shall notify INDOT of its intent of entering on to the state-owned or controlled right of way whenever doing so could affect flow of traffic or the safety of the traveling public on I-70 at least ten (10) business days before commencing any such work. This includes even routine maintenance and repair activities if traffic on I-70 may be affected. Pursuant to applicable state and federal law, for highway and limited access facilities, INDOT must grant written permission for each entry into the state-owned or controlled right of way, which must be based on specific traffic control and/or worker safety plans. Accordingly, as a condition precedent to giving effective notice, CGI shall provide to INDOT all such traffic control and worker safety plans and other information as INDOT shall request or require in connection with granting such permission. CGI shall not enter upon the state-owned or controlled right of way until CGI has received written approval via a permit from INDOT, which shall not be unreasonably withheld, to enter upon the state-owned or controlled right of way. INDOT shall only be required to approve CGI's request to enter upon state-owned or controlled right of way if CGI's request is consistent with all applicable federal and state laws and this Agreement.

2.4.2. Any use of the state-owned or controlled right of way permitted by this Agreement remains secondary to the interest of INDOT to use the state-owned or controlled right of way for highway or other transportation purposes. CGI agrees that it shall surrender the state-owned or controlled right of way upon which the Trail is located, whether in part or in its entirety, if, in INDOT's discretion, the state-owned or controlled right of way or any portion thereof, is required for future expansion, modification, or maintenance of I-70. The Parties understand that this Agreement does not: (1) grant any interest or other rights in the land, either temporarily or permanently; or (2) establish a shared-use facility which would require replacement if INDOT has a need to use the affected property for highway purposes in the future.

ARTICLE III. INDOT'S RESPONSIBILITIES

3.1. Financial Responsibilities. Under no circumstances shall INDOT be responsible for any costs associated with maintenance, improvement, removal of the Trail, or for utilities serving the Trail.

3.2. Trail Responsibilities. INDOT shall be the sole and final decision maker on anything that is related to and/or may impact the quality and function of I-70. INDOT shall have approval authority for CGI's maintenance of the Trail and for any improvements to the Trail located within the state-owned or controlled right of way. Such review and approval shall be completed within a reasonable period of time. Under no circumstances shall INDOT be responsible for any work associated with the maintenance, improvement, or removal of the Trail.

3.3. Future Maintenance. INDOT shall maintain any INDOT structures located within the state-owned or controlled right of way. INDOT shall have no maintenance responsibilities regarding the Trail. In the event CGI fails to timely complete any necessary repairs or maintenance to the Trail in the interest of the safety of the traveling public, INDOT may complete any necessary repairs or maintenance and invoice CGI for the total cost of the repair. CGI shall pay each invoice within thirty (30) days of issuance of the invoice. If INDOT or its contractors damage the Trail during maintenance activities that fall under this section, INDOT has no responsibility to repair or to compensate CGI for the cost of repairs.

ARTICLE IV. GENERAL PROVISIONS

4.1. Access to Records. CGI shall maintain all books, documents, papers, correspondence, accounting records and other evidence pertaining to the cost incurred under this Agreement, and shall make such materials available at their respective offices at all reasonable times during the period of this Agreement and for ten (10) years from the date of final payment under the terms of this Agreement, for inspection or audit by INDOT, or its authorized representative, and copies thereof shall be furnished free of charge, if requested by INDOT. CGI agrees that, upon request by any party or state or federal agency, INDOT may release or make available to the agency any working papers from an audit performed by INDOT of CGI in connection with this Agreement, including any books, documents, papers, accounting records and other documentation which support or form the basis for the audit conclusions and judgments.

4.2. Assignment; Successors. [OMITTED – NOT APPLICABLE.]

4.3. Assignment of Antitrust Claims. As part of the consideration for this Agreement, CGI assigns to the State all right, title and interest in and to any claims CGI now has, or may acquire, under state or federal antitrust laws relating to the products or services which are the subject of this Agreement.

4.4. Audits. CGI acknowledges that it may be required to submit to an audit of funds paid, if any, through this Agreement. Any such audit shall be conducted in accordance with IC §5-11-1, *et seq.*, and audit guidelines specified by the State.

4.5. Authority to Bind CGI. The signatories for CGI represent that they have been duly authorized to execute this Agreement on behalf of CGI and have obtained all necessary or applicable approvals to make this Agreement fully binding upon CGI when their signatures are affixed and accepted by the State.

4.6. Changes in Work. CGI shall not commence any additional work or change the scope of the work until authorized in writing by the State. This Agreement may only be amended, supplemented, or modified by a written document executed in the same manner as this Agreement.

4.7. Certification for Federal-Aid Contracts Lobbying Activities. CGI certifies, by signing and submitting this Agreement, to the best of its knowledge and belief that CGI has complied with Section 1352, Title 31, U.S. Code, and specifically, that:

A. No federal appropriated funds have been paid or will be paid, by or on behalf of CGI, to any person for influencing or attempting to influence an officer or employee of any federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any federal agreements, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal agreement, grant, loan, or cooperative agreement.

B. If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with such federal agreement, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

C. CGI also agrees by signing this Agreement that it shall require the language of this certification be included in all contractor agreements including lower tier subcontracts, which exceed $100,000, and that all such sub recipients shall certify and disclose accordingly. Any person who fails to sign or file this required certification shall be subject to a civil penalty of not less than $10,000 and not more than $100,000 for each failure.

4.8. Compliance with Laws.

A. CGI shall comply with all applicable federal, state, and local laws, rules, regulations, and ordinances, and all provisions required thereby to be included herein are hereby incorporated by reference. The enactment or modification of any applicable state or federal statute or the promulgation of rules or regulations thereunder after execution of this Agreement shall be reviewed by the State and CGI to determine whether the provisions of this Agreement require formal modification.

B. CGI and their agents shall abide by all ethical requirements that apply to persons who have a business relationship with the State as set forth in IC §4-2-6, *et seq.*, IC §4-2-7, *et seq.* and the regulations promulgated thereunder. **If CGI has knowledge, or would have acquired knowledge with reasonable inquiry, that a state officer, employee, or special state appointee, as those terms are defined in IC 4-2-6-1, has a financial interest in the Agreement, CGI shall ensure compliance with the disclosure requirements in IC 4-2-6-10.5 prior to the execution of this Agreement.** If CGI is not familiar with these ethical requirements, CGI should refer any questions to the Indiana State Ethics Commission or visit the Inspector General's website at http://www.in.gov/ig/. If CGI or its agents violate any applicable ethical standards, the State may, in its sole discretion, terminate this Agreement immediately upon notice to CGI. In addition, CGI may be subject to penalties under IC §§4-2-6, 4-2-7, 35-44.1-1-4, and under any other applicable laws.

C. **[OMITTED – NOT APPLICABLE.]**

D. **[OMITTED – NOT APPLICABLE.]**

E. **[OMITTED – NOT APPLICABLE.]**

F. CGI warrants that CGI and its contractors shall obtain and maintain all required permits, licenses, registrations, and approvals, and shall comply with all health, safety, and environmental statutes, rules, or regulations in the performance of work activities under this Agreement. Failure to do so may be deemed a material breach of this Agreement and grounds for immediate termination and denial of further work with the State.

G. **[OMITTED – NOT APPLICABLE.]**

H. As required by IC §5-22-3-7:

1. CGI and any principals of CGI certify that:

(A) CGI, except for de minimis and nonsystematic violations, has not violated the terms of:
(i) IC §24-4.7 [Telephone Solicitation of Consumers];
(ii) IC §24-5-12 [Telephone Solicitations]; or
(iii) IC §24-5-14 [Regulation of Automatic Dialing Machines]; in the previous three hundred sixty-five (365) days, even if IC §24-4.7 is preempted by federal law; and

(B) CGI will not violate the terms of IC §24-4.7 for the duration of the Agreement, even if IC §24-4.7 is preempted by federal law.

2. CGI and any principals of CGI certify that an affiliate or principal of the utilities and any agent acting on behalf of CGI or on behalf of an affiliate or principal of CGI, except for de minimis and nonsystematic violations,

(A) has not violated the terms of IC §24-4.7 in the previous three hundred sixty-five (365) days, even if IC §24-4.7 is preempted by federal law; and

(B) will not violate the terms of IC §24-4.7 for the duration of the Agreement, even if IC §24-4.7 is preempted by federal law.

4.9. Condition of Payment. [OMITTED – NOT APPLICABLE.]

4.10. Confidentiality of State Information. [OMITTED – NOT APPLICABLE.]

4.11. Continuity of Services. [OMITTED – NOT APPLICABLE.]

4.12. Debarment and Suspension.

A. CGI certifies by entering into this Agreement that neither it nor its principals nor any of its contractors are presently debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from entering into this Agreement by any federal agency or by any department, agency, or political subdivision of the State of Indiana. The term "principal" for purposes of this Agreement means an officer, director, owner, partner, key employee or other person with primary management or supervisory responsibilities, or a person who has a critical influence on or substantive control over the operations of CGI.

B. CGI certifies that it has verified the state and federal suspension and debarment status for all contractors receiving funds under this Agreement and shall be solely responsible for any recoupment, penalties or costs that might arise from use of a suspended or debarred contractor. CGI shall immediately notify INDOT if any contractor becomes debarred or suspended, and shall, at INDOT's request, take all steps required by INDOT to terminate its contractual relationship with the contractor for work to be performed under this Agreement.

4.13. Default by State. [OMITTED – NOT APPLICABLE.]

4.14. Disputes. [OMITTED – NOT APPLICABLE.]

4.15. Drug-Free Workplace Certification. As required by Executive Order No. 90-5 dated April 12, 1990, issued by the Governor of Indiana, CGI hereby covenants and agrees to make a good faith effort to provide and maintain a drug-free workplace. CGI will give written notice to the State within ten (10) days after receiving actual notice that CGI, or an employee of CGI, in the State of Indiana, has been convicted of a criminal drug violation occurring in the workplace. False certification or violation of this certification may result in sanctions including, but not limited to, suspension of contract payments, termination of this Agreement and/or debarment of contracting opportunities with the State for up to three (3) years.

In addition to the provisions of the above paragraph, if the total amount set forth in this Agreement is more than $25,000.00, CGI certifies and agrees that it will provide a drug-free workplace by:

A. Publishing and providing to all its employees a statement notifying them that the unlawful manufacture, distribution, dispensing, possession, or use of a controlled substance is prohibited in CGI's workplaces, and specifying the actions that will be taken against employees for violations of such prohibition;

B. Establishing a drug-free awareness program to inform its employees of (1) the dangers of drug abuse in the workplace; (2) CGI's policies of maintaining a drug-free workplace; (3) any available drug counseling, rehabilitation, and employee assistance programs; and (4) the penalties that may be imposed upon an employee for drug abuse violations occurring in the workplace;

C. Notifying all employees in the statement required by subparagraph (A) above that as a condition of continued employment, the employee will (1) abide by the terms of the

statement; and (2) notify CGI of any criminal drug statute conviction for a violation occurring in the workplace no later than five (5) days after such conviction;

D. Notifying the State in writing within ten (10) days after receiving notice from an employee under subdivision C. (2) above, or otherwise receiving actual notice of such conviction;

E. Within thirty (30) days after receiving notice under subdivision C.(2) above of a conviction, imposing the following sanctions or remedial measures on any employee who is convicted of drug abuse violations occurring in the workplace: (1) taking appropriate personnel action against the employee, up to and including termination; or (2) requiring such employee to satisfactorily participate in a drug abuse assistance or rehabilitation program approved for such purposes by a federal, state or local health, law enforcement, or other appropriate agency; and

F. Making a good faith effort to maintain a drug-free workplace through the implementation of subparagraphs A. through E. above.

4.16. Employment Eligibility Verification. As required by IC §22-5-1.7, CGI swears or affirms under the penalties of perjury that CGI does not knowingly employ an unauthorized alien. CGI further agrees that:

A. CGI shall enroll in and verify the work eligibility status of all its newly hired employees through the E-Verify program as defined in IC §22-5-1.7-3. CGI is not required to participate should the E-Verify program cease to exist. Additionally, CGI is not required to participate if CGI is self-employed and do not employ any employees.

B. CGI shall not knowingly employ or contract with an unauthorized alien. CGI shall not retain an employee or contract with a person that CGI subsequently learns is an unauthorized alien.

C. CGI shall require its subcontractors, who perform work under this Agreement, to certify to CGI that the subcontractor does not knowingly employ or contract with an unauthorized alien and that the subcontractor has enrolled and is participating in the E-Verify program. CGI agrees to maintain this certification throughout the duration of the term of a contract with a subcontractor.

The State may terminate for default if CGI fails to cure a breach of this provision no later than thirty (30) days after being notified by the State.

4.17. Employment Option. [OMITTED – NOT APPLICABLE.]

4.18. Force Majeure. In the event that any Party is unable to perform any of its obligations under this Agreement or to enjoy any of its benefits because of natural disaster or decrees of governmental bodies not the fault of the affected party (hereinafter referred to as a "Force Majeure Event"), the party who has been so affected shall immediately or as soon as is reasonably possible

under the circumstances give notice to the other party and shall do everything possible to resume performance. Upon receipt of such notice, all obligations under this Agreement shall be immediately suspended. If the period of nonperformance exceeds thirty (30) days from the receipt of notice of the Force Majeure Event, the Party whose ability to perform has not been so affected may, by giving written notice, terminate this Agreement.

4.19. Funding Cancellation Clause. As required by Financial Management Circular 3.3 and IC 5-22-17-5, when the Director of the State Budget Agency makes a written determination that funds are not appropriated or otherwise available to support continuation of the performance of this Agreement, this Agreement shall be canceled. A determination by the Director of State Budget Agency that funds are not appropriated or otherwise available to support continuation of performance shall be final and conclusive.

4.20. Governing Laws. This Agreement shall be governed, construed, and enforced in accordance with the laws of the State of Indiana, without regard to its conflict of laws rules. Suit, if any, must be brought in the State of Indiana.

4.21. HIPAA Compliance. [OMITTED – NOT APPLICABLE.]

4.22. Indemnification. CGI agrees to indemnify, defend, exculpate and hold harmless the State of Indiana, INDOT, and their officials and employees from any liability due to loss, damage, injuries, or other causalities of whatever kind, to the person or property of anyone arising out of, or resulting from the performance of this Agreement or the work connected therewith, or from the installation, existence, use, maintenance, condition, repairs, alteration or removal of any equipment or material, to the extent such liability is caused by the negligence of CGI, including any claims arising out of any law, ordinance, order or decree. INDOT shall not provide indemnification to CGI. CGI agrees to pay all reasonable expenses and attorney's fees incurred by or imposed on the State and INDOT in connection herewith if CGI shall default under the provisions of this Section.

4.23. Independent Entity; Workers' Compensation Insurance. CGI is performing as an independent entity under this Agreement. No part of this Agreement shall be construed to represent the creation of an employment, agency, partnership, or joint venture agreement between the Parties. No Party will assume liability for any injury (including death) to any persons, or damage to any property, arising out of the acts or omissions of the agents, employees, or subcontractors of another Party. CGI shall provide all necessary unemployment and workers' compensation insurance for CGI's employees and shall provide the State with a Certificate of Insurance evidencing such coverage prior to starting work under this Agreement.

4.24. Indiana Veteran Owned Small Business Enterprise Compliance. [OMITTED – NOT APPLICABLE]

4.25 Information Technology Enterprise Architecture Requirements. [OMITTED – NOT APPLICABLE.]

4.26. Insurance. CGI shall cause and require the contractors installing or maintaining the Trail to secure and keep in force during the term of this Agreement the insurance coverages specified in the 2022 INDOT Standard Specifications.

4.27. Key Person(s). [OMITTED – NOT APPLICABLE.]

4.28. Licensing Standards. [OMITTED – NOT APPLICABLE.]

4.29. Merger & Modification. This Agreement constitutes the entire agreement between the Parties. No understandings, agreements, or representations, oral or written, not specified within this Agreement will be valid provisions of this Agreement. This Agreement may not be modified, supplemented, or amended, except by written agreement signed by the necessary parties.

4.30. Minority and Women's Business Enterprises Compliance. [OMITTED - NOT APPLICABLE.]

4.31. Non-Discrimination.

A. Pursuant to the Indiana Civil Rights Law, specifically including IC 22-9-1-10, and in keeping with the purposes of the Civil Rights Act of 1964, the Age Discrimination in Employment Act, and the Americans with Disabilities Act, CGI covenants that it shall not discriminate against any employee or applicant for employment relating to this Agreement with respect to the hire, tenure, terms, conditions or privileges of employment or any matter directly or indirectly related to employment, because of the employee's or applicant's race, color, national origin, religion, sex, age, disability, ancestry, status as a veteran, or any other characteristic protected by federal, state or local law ("Protected Characteristics"). CGI certifies compliance with applicable federal laws, regulations and executive orders prohibiting discrimination based on the Protected Characteristics in the provision of services. Breach of this paragraph may be regarded as a material breach of this Agreement, but nothing in this paragraph shall be construed to imply or establish an employment relationship between the State and any applicant or employee of CGI or any subcontractor.

B. INDOT is a recipient of federal funds, and therefore, where applicable, CGI and any subcontractors shall comply with requisite affirmative action requirements, including reporting, pursuant to 41 CFR Chapter 60, as amended, and Section 202 of Executive Order 11246 as amended by Executive Order 13672.

CGI agrees that if CGI employs fifty (50) or more employees and does at least $50,000.00 worth of business with the State and is not exempt, CGI will comply with the affirmative action reporting requirements of 41 CFR 60-1.7. CGI complies with Section 202 of executive order 11246, as amended, 41 CFR 60-250, and 41 CFR 60-741, as amended, which are incorporated herein by specific reference. Breach of this covenant may be regarded as a material breach of Agreement.

It is the policy of INDOT to assure full compliance with Title VI of the Civil Rights Act of 1964, the Americans with Disabilities Act and Section 504 of the Vocational Rehabilitation Act and related statutes and regulations in all programs and activities. Title VI and related statutes require that no person in the United States shall on the grounds of race, color or national origin be excluded from participation in, be denied

the benefits of, or be subjected to discrimination under any program or activity receiving Federal financial assistance. (INDOT's nondiscrimination enforcement is broader than the language of Title VI and encompasses other State and Federal protections. INDOT's nondiscrimination enforcement shall include the following additional grounds: sex, sexual orientation, gender identity, ancestry, age, income status, religion, disability, income status, limited English proficiency, or status as a veteran.)

C. During the performance of this Agreement, CGI, for itself, its assignees, and successors in interest (hereinafter referred to as "CGI") agrees to the following assurances under Title VI of the Civil Rights Act of 1964:

1. Compliance with Regulations: CGI shall comply with the regulations relative to nondiscrimination in Federally assisted programs of the Department of Transportation, Title 49 CFR Part 21, as they may be amended from time to time (hereinafter referred to as the Regulations), which are herein incorporated by reference and made a part of this Agreement.

2. Nondiscrimination: CGI, regarding the work performed by it during the Agreement, shall not discriminate on the grounds of race, color, sex, sexual orientation, gender identity, national origin, religion, disability, ancestry, or status as a veteran in the selection and retention of subcontractors, including procurements of materials and leases of equipment. CGI shall not participate either directly or indirectly in the discrimination prohibited by section 21.5 of the Regulation, including employment practices when the Agreement covers a program set forth in Appendix B of the Regulations.

3. Solicitations for Subcontracts, Including Procurements of Materials and Equipment: In all solicitations either by competitive bidding or negotiation made by CGI for work to be performed under a subcontract, including procurements of materials or leases of equipment, each potential subcontractor or supplier shall be notified by CGI of CGI's obligations under this Agreement, and the Regulations relative to nondiscrimination on the grounds of race, color, sex, sexual orientation, gender identity, national origin, religion, disability, ancestry, income status, limited English proficiency, or status as a veteran.

4. Information and Reports: CGI shall provide all information and reports required by the Regulations, or directives issued pursuant thereto, and shall permit access to its books, records, accounts, other sources of information, and its facilities as may be determined by the Indiana Department of Transportation and Federal Highway Administration to be pertinent to ascertain compliance with such Regulations, orders, and instructions. Where any information required of CGI is in the exclusive possession of another who fails or refuses to furnish this information, CGI shall so certify to the Indiana Department of Transportation or the Federal Highway Administration as appropriate and shall set forth what efforts it has made to obtain the information.

5. Sanctions for Noncompliance: In the event of CGI's noncompliance with the nondiscrimination provisions of this Agreement, the Indiana Department of Transportation shall impose such contract sanctions as it or the Federal Highway Administration may determine to be appropriate, including, but not limited to: (a) withholding payments to CGI under the Agreement until CGI complies, and/or (b) cancellation, termination or suspension of the Agreement, in whole or in part.

6. Incorporation of Provisions: CGI shall include the provisions of paragraphs 1. through 5. in every subcontract, including procurements of materials and leases of equipment, unless exempt by the Regulations, or directives issued pursuant thereto.

4.32. Notice to Parties. Whenever any notice, statement or other communication is required under this Agreement, it shall be sent to the following addresses, unless otherwise specifically advised:

A. **For INDOT:**

Nathaniel Sturdevant
Greenfield District Special Projects Engineer
32 South Broadway Street
Greenfield, IN, 46140
Phone: 317-467-3445
Email: nsturdevant@indot.in.gov

With Copy To:

Chief Legal Counsel and Deputy Commissioner
Indiana Department of Transportation
100 North Senate Avenue, Room N758
Indianapolis, IN 46204
Email: kshelby@indot.in.gov

B. **For CGI:**

Angie Pool, CEO
Cardinal Greenway, Inc.
700 E. Wysor Street
Muncie, IN 47305
Phone: 765-287-0399
Email: angie@cardinalgreenways.org

4.33. Order of Precedence; Incorporation by Reference. [OMITTED – NOT APPLICABLE.]

4.34. Ownership of Documents and Materials. [OMITTED – NOT APPLICABLE.]

4.35. Payments. [OMITTED – NOT APPLICABLE.]

4.36. Penalties, Interest and Attorney's Fees. INDOT will in good faith perform its required obligations hereunder, and does not agree to pay any penalties, liquidated damages, interest, or attorney's fees, except as required by Indiana law in part, IC §5-17-5, IC §34-54-8, and IC §34-13-1. Notwithstanding the provisions contained in IC §5-17-5, any liability resulting from the State's failure to make prompt payment shall be based solely on the amount of funding originating from the State and shall not be based on funding from federal or other sources.

4.37. Progress Reports. [OMITTED – NOT APPLICABLE.]

4.38. Prohibited Telecommunications and Video Surveillance Equipment and Services. In accordance with federal regulations (including 2 CFR 200.216 and 2 CFR 200.471), CGI is prohibited from purchasing, procuring, obtaining, using, or installing any telecommunication or video surveillance equipment, services, or systems produced by: (A) Huawei Technologies Company or ZTE Corporation (or any subsidiary or affiliate of such entities), OR (B) Hytera Communications Corporation, Hangzhou Hikvision Digital Technology Company, or Dahua Technology Company (or any subsidiary or affiliate of such entities), for any purpose to fulfill its obligations under this Agreement. CGI shall be responsible to ensure that any contractors or subcontractors are bound by and comply with the terms of this provision. Breach of this provision shall be considered a material breach of this Agreement.

4.39. Public Record. CGI acknowledges that the State will not treat this Agreement as containing confidential information and will post this Agreement on its website as required by Executive Order 05-07. Use by the public of the information contained in this Agreement shall not be considered an act of the State.

4.40. Renewal Option. This Agreement may be renewed under the same terms and conditions, subject to the approval of the Commissioner of the Department of Administration and the State Budget Director in compliance with IC §5-22-17-4. The term of the renewed Agreement may not be longer than the term of the original Agreement.

4.41. Severability. The invalidity of any section, subsection, clause, or provision of this Agreement shall not affect the validity of the remaining sections, subsections, clauses, or provisions of this Agreement.

4.42. Status of Claims. CGI shall be responsible for keeping INDOT currently advised as to the status of any claims made for damages against the LPA resulting from services performed under this Agreement.

4.43. Substantial Performance. [OMITTED – NOT APPLICABLE.]

4.44. Taxes. The State is exempt from most state and local taxes and many federal taxes. The State will not be responsible for any taxes levied on CGI or its contractors because of this Agreement.

4.45. Termination for Convenience. This Agreement may be terminated, in whole or in part, by INDOT whenever, for any reason, INDOT determines that such termination is in its best

interest. Termination is affected by delivery to CGI of a Termination Notice at least thirty (30) days prior to the termination effective date, specifying the extent to which performance of services under such termination becomes effective.

4.46. Termination for Default. [OMITTED – NOT APPLICABLE.]

4.47. Travel. [OMITTED – NOT APPLICABLE.]

4.48. Waiver of Rights. No right conferred on either party under this Agreement shall be deemed waived, and no breach of this Agreement excused, unless such waiver is in writing and signed by the party claimed to have waived such right. Neither the State's review, approval or acceptance of, nor payment for, the work performed under this Agreement shall be construed to operate as a waiver of any rights under this Agreement or of any cause of action arising out of the performance of this Agreement, and CGI shall be and remain liable to the State in accordance with applicable law for all damages to the State caused by the CGI's negligent performance of any of the services furnished under this Agreement.

4.49. Work Standards. [OMITTED – NOT APPLICABLE.]

4.50. State Boilerplate Affirmation Clause. I swear or affirm under the penalties of perjury that I have not altered, modified, changed, or deleted the State's standard contract clauses (as contained the *2022 SCM Template*) in any way except as follows: None.

[REMAINDER OF PAGE INTENTIONALLY LEFT BLANK]

Non-Collusion and Acceptance

The undersigned attests, subject to the penalties for perjury, that the undersigned is the Party, or that the undersigned is the properly authorized representative, agent, member, or officer of the Party. Further, to the undersigned's knowledge, neither the undersigned nor any other member, employee, representative, agent, or officer of the Party, directly or indirectly, has entered into or been offered any sum of money or other consideration for the execution of this Agreement other than that which appears upon the face hereof. **Furthermore, if the undersigned has knowledge that a state officer, employee, or special state appointee, as those terms are defined in IC 4-2-6-1, has a financial interest in the Agreement, the Party attests to compliance with the disclosure requirements in IC 4-2-6-10.5.**

Agreement to Use Electronic Signatures

I agree, and it is my intent, to sign this Agreement by accessing State of Indiana Supplier Portal using the secure password assigned to me and by electronically submitting this Agreement to the State of Indiana. I understand that my signing and submitting this Agreement in this fashion is the legal equivalent of having placed my handwritten signature on the submitted Agreement and this affirmation. I understand and agree that by electronically signing and submitting this Agreement in this fashion I am affirming to the truth of the information contained therein. I understand that this Agreement will not become binding on the State until it has been approved by the Office of the Attorney General, which approvals will be posted on the Active Contracts Database: https://fs.gmis.in.gov/psp/guest/SUPPLIER/ERP/c/SOI_CUSTOM_APPS.SOI_PUBLIC_CNTRCTS.GBL

In Witness Whereof, the Parties have, through their duly authorized representatives, entered into this Agreement. The Parties, having read and understood the foregoing terms of this Agreement, do by their respective signatures dated below agree to the terms thereof.

CARDINAL GREENWAY, INC.

Angie Pool, Chief Executive Officer

Date: April 14, 2023

STATE OF INDIANA
Indiana Department of Transportation

Recommended for approval by:

Patrick Szewczak
Acting District Deputy Commissioner

Date: 4/27/2023

Executed By:

(for)
Michael Smith, Commissioner
Indiana Department of Transportation

Date: 5/7/2023

APPROVALS

STATE OF INDIANA
Budget Agency

By: (FOR)
Zachary Q. Jackson, Director

Date:

STATE OF INDIANA
Department of Administration

By: (FOR)
Rebecca Holwerda, Commissioner

Date:

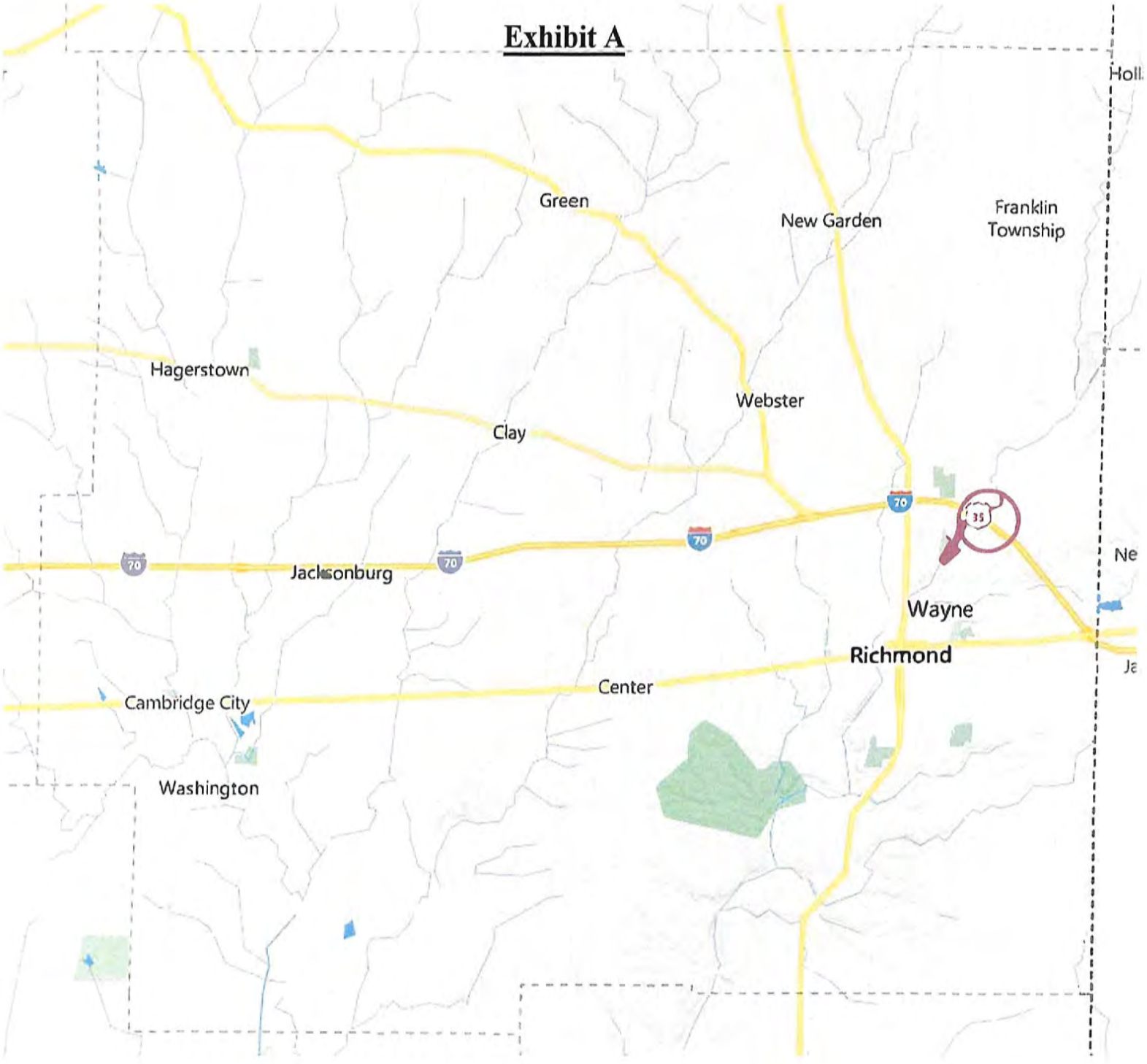
Approved as to Form and Legality:
Office of the Attorney General

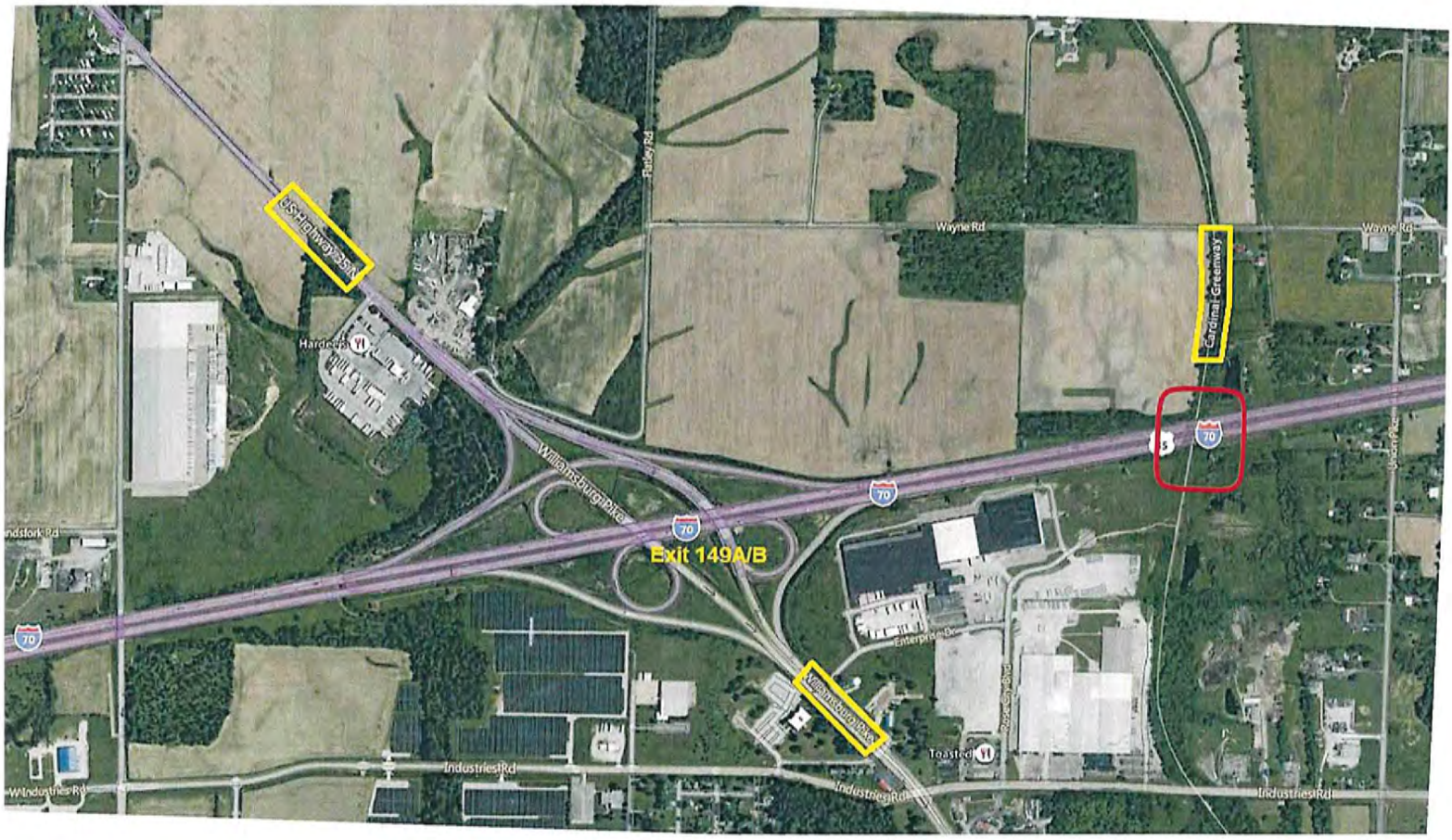
By: (FOR)
Theodore E. Rokita
Attorney General

Date:

This instrument was prepared for the Indiana Department of Transportation, 100 N. Senate Avenue, Indianapolis, IN 46204, by the undersigned attorney.

Marjorie Millman
Marjorie A. Millman, Attorney No. 21748-36





Document Approval Status

SetID	STIND	Contract ID	00000000000000000000073354
Supplier	CARDINAL GREENWAY, INC		

Review/Edit Approvers

Agency Fiscal Approval

STIND/00000000000000000000073354:**Approved**

Agency Fiscal Approval

Approved
Michael Hopper-00800
Agency Fiscal Approval for SCM
06/26/23 - 2:55 PM

IDOA Approval

STIND/00000000000000000000073354:**Approved**

IDOA Legal Approval

Approved
Redding,Sandra-061-Procq
IDOA Legal Approval for SCM
06/26/23 - 3:14 PM

SBA Approval

STIND/00000000000000000000073354:**Approved**

SBA Approval

Approved
Sharp,Cara-00057
SBA Analyst Approval for SCM
07/13/23 - 10:34 AM

Attorney General Approval

STIND/00000000000000000000073354:**Approved**

Attorney General Approval

Approved
Celeste Michelle Croft - 00046
Deputy Atty General Appr SCM
07/13/23 - 4:24 PM

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Approved
Clarence Benjamin Leatherbury
Inserted Approver
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