Allen County, IN LWCF Project List

objectid	State	County	Grant ID Element	Type	Grant Element Title	Grant Sponsor	Fiscal Year	Amount
47478	Indiana	Allen	369	C	D/FOX ISLAND PARK - PHASE III	ALLEN COUNTY PARK BOARD	1980	$137,184.93
47481	Indiana	Allen	369	A	FRANKE PARK - FOX ACQUISITION	FORT WAYNE PARK BOARD	1980	$40,000.00
47487	Indiana	Allen	392	D	HAVENHURST PARK DEVELOPMENTS	NEW HAVEN-ADAMS TWP. PARK BOARD	1981	$50,000.00
47680	Indiana	Allen	465	D	ST. MARY'S RIVERGREENWAY	FORT WAYNE PARK BOARD	1988	$48,877.00
47697	Indiana	Allen	526	C	BUCKNER FARM PARK	FORT WAYNE PARK BOARD	2002	$178,300.00
47708	Indiana	Allen	570	D	KREAGER PARK BOUNDLESS PLAYGROUND	FORT WAYNE PARK BOARD	2010	$200,000.00
51313	Indiana	Allen	105	A	FRANKE PARK-AFRICAN VELDT	FORT WAYNE PARK BOARD	1972	$49,297.50
51340	Indiana	Allen	201	D	FOSTER PARK LIGHTED TENNIS COURTS	FORT WAYNE PARK BOARD	1975	$39,603.98
51414	Indiana	Allen	527	D	METEA PARK NATURE CENTER	ALLEN COUNTY PARK BOARD	2002	$200,000.00
60674	Indiana	Allen	67	A	FOX ISLAND NATURAL PARK	ALLEN COUNTY PARK BOARD	1970	$97,213.65
60694	Indiana	Allen	153	D	MOSER PARK LIGHTING PROJECT	NEW HAVEN-ADAMS TWP. PARK BOARD	1973	$11,535.12
60761	Indiana	Allen	396	D	SHERMAN ST. RIVERGREENWAY	FORT WAYNE PARK BOARD	1981	$280,000.00
60765	Indiana	Allen	408	D	ALLEN COUNTY ROADSIDE PARKS	ALLEN COUNTY PARK BOARD	1983	$5,782.14
60768	Indiana	Allen	419	D	FT. WAYNE RIVERGREENWAY-PHASE II	FORT WAYNE PARK BOARD	1984	$75,000.00
60815	Indiana	Allen	577	C	RIVERSIDE GARDEN PARK	LEO-CEDARVILLE PARK BOARD	2012	$199,550.00
78870	Indiana	Allen	30	A	FRANKE PARK	FORT WAYNE PARK BOARD	1968	$3,750.00
78871	Indiana	Allen	32	A	KREAGER PARK	FORT WAYNE PARK BOARD	1968	$54,110.00
78886	Indiana	Allen	97	D	JURY PARK DEVELOPMENT	NEW HAVEN-ADAMS TWP. PARK BOARD	1971	$24,640.91
78903	Indiana	Allen	188	A	LAND ACQ. FOR FRANKE PARK	FORT WAYNE PARK BOARD	1975	$13,150.00
78940	Indiana	Allen	315	A	D/FOX ISLAND PARK ACQ.	ALLEN COUNTY PARK BOARD	1978	$62,500.00
78954	Indiana	Allen	369	R	MOSER PARK POND	NEW HAVEN-ADAMS TWP. PARK BOARD	1980	$12,500.00
78955	Indiana	Allen	371	C	JEHL PARK	FORT WAYNE PARK BOARD	1980	$40,074.50
78973	Indiana	Allen	469	D	ST. MARY'S RIVERGREENWAY-PHASE II	FORT WAYNE PARK BOARD	1989	$100,000.00
78983	Indiana	Allen	500	C	GRABILL COMMUNITY PARK EXPANSION	GRABILL PARK BOARD	1994	$34,200.00
79001	Indiana	Allen	602	D	SHOAFF PARK SPRAY PARK ENHANCEMENTS	FORT WAYNE PARK BOARD	2017	$200,000.00

PROJECT INTENT ADDENDUM
I-69 at SR 14/Illinois Road Interchange Modification
Allen County, Indiana

I. INTRODUCTION

The purpose of this document is to outline the changes and additions to the interchange modification at I-69 and SR 14/Illinois Road that have occurred during the project development process. Des. No. 1401828, the "short-term" solution to this project outlined in the alternatives analysis, entails removing the southwest loop (exiting traffic from I-69 southbound (SB) to SR 14/Illinois Road eastbound (EB)) and routing that traffic onto the northwest ramp. Two left-turn lanes will be added to the ramp, and the signal will be modified to accommodate that turning movement. Des. No. 1800091, the second phase of the alternatives analysis recommendations, involves similar work on the other side of the interchange. The northeast loop will be removed, and the southeast ramp will be converted from a free-flow ramp to a signalized intersection with SR 14/Illinois Road. Additionally, as part of this project, the acceleration lanes will be lengthened now that the weaving movements and loop ramps will be removed, improving the merge level of service (LOS) on I-69.

The project schedule is as follows:

- Stage 1 Plans: October 15, 2019
- Preliminary Field Check: December 1, 2019
- Stage 2 Plans: February 1, 2020
- Public Hearing: April 15, 2020
- Stage 3 Plans: July 15, 2020
- Tracings: August 30, 2020
- Letting: December 9, 2020

These two Des. Nos. are also bundled in Contract No. R-41809 with Des. No. 1600115, a hot mix asphalt (HMA) overlay on SR 14, and will also be bundled with a separate Des. No. for the new signal required at SR 14/Illinois Road and the southeast ramp.

A stakeholder meeting was held on June 11, 2019, and the meeting minutes are provided as an attachment. Attendees included representatives from INDOT Fort Wayne District, INDOT Corridor Development, the City of Fort Wayne (City), Northeastern Indiana Regional Coordinating Council (NIRCC), and Strand Associates, Inc.®. The City requested dual left turns not be provided at Illinois Road and Magnavox Way. No improvements at this intersection are included in the project. NIRCC expressed some concern regarding the growth rates but ultimately agreed that they did not need to be changed.

II. TRAFFIC ANALYSIS

A. Signal Warrant

Traffic counts were acquired from the Traffic Count Database System (TCDS) and adjusted to match the same month and year. Ramp A and Loop F volumes were assumed to be northbound (NB) right and NB left movements, respectively. The proposed intersection met the warrants for 8-hour volume, 4-hour volume, and peak-hour volume. The warrant is attached to this document.

B. Highway Capacity Software (HCS) Merge Analysis

Because the acceleration lanes are being extended for the loop ramps as they merge with I-69, these merge LOS values were updated. Table IX-4 in the alternatives analysis and Table VII-3 in the Interstate Access Document (IAD) can be referenced for all other merge and diverge segments that are unaffected by this work. In accordance with instructions in the HCS, the new length of the acceleration lane should be measured from the intersection of the freeway and ramp to the downstream merge point (i.e., the end of the merging taper). Table II-A shows the amount of improvement in the LOS for both merge sections in both peak hours. Printouts from HCS are also attached to this document.

Road	Type	Peak	Existing Acceleration Length		Additional Acceleration Length	
			Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
I-69 and Loop E SE	Merge	AM	22.1	C	17.6	B
		PM	16.5	B	11.8	B
I-69 and Loop G NW	Merge	AM	17.5	B	13.0	B
		PM	23.4	C	18.9	B

Table II-A 2040 HCS7 Merge Analysis

III. MAINTENANCE OF TRAFFIC

The maintenance of traffic phases will be coordinated with the phases for Des. No. 1401828. Phase 1 will consist of construction of the new ramp pavement and have little effect on traffic. Phase 2 will consist of installation of the signal and work in the median to remove the barrier wall. Phase 3 will include removal of the ramp and extension of the acceleration lanes along I-69. It is anticipated that all three lanes of traffic in each direction will be able to be maintained using a lane shift and temporary barrier wall.

IV. OTHER IMPACTS

No other significant changes to anticipated impacts are expected as a result of a change in project scope. No additional right-of-way or utility impacts are expected; however, a light pole that is currently along Ramp A may need to be removed or relocated, and an additional signal service point will need to be added. A Rule 5 permit will be needed, and a Section 404 United States Army Corps of Engineers Regional General Permit will possibly be required if any wetlands are impacted.

V. COST ESTIMATE

The cost has increased since the first estimate three years ago, primarily because of higher unit prices and the additional work on I-69 to extend the acceleration lanes. A new cost estimate is provided in Table V, and a more detailed estimate is attached to this document.

	I-69 at SR 14
Preliminary Engineering	$ 140,000
Environmental	$ 27,000
Topographic Survey	$ 47,000
Utility Relocation	$ 25,000
Construction (w/ 25 percent contingency)	$ 2,328,249
Total Cost	**$ 2,567,249**

Table V Estimated Costs

The construction cost may vary depending on the final pavement design. For this estimate, a 14-inch concrete section was used for the work on I-69 to match the adjacent pavement, and a 12-inch asphalt section was used for the ramp work.

VI. PUBLIC INVOLVEMENT

No views or opinions other than those of the officials of the highway organizations and the affiliated workers have been expressed in this report. An opportunity for a public hearing will be advertised during the design phase.

IX. CONCURRENCE

The Fort Wayne District Technical Services group shall be consulted if deviation from this document is determined to be necessary during a later phase of project development. The person initiating the change should send a memo to the Fort Wayne District Technical Services Director for concurrence. This memo should be routed through the Fort Wayne District Technical Services Director, System Asset Manager, and Project Manager. It should include justification for the change and estimated cost difference.

Andrea L Bland — 9/24/19

Andrea L. Bland, P.E.
Project Manager — Date

Susan J. Doell — 9/24/19

Susan Doell, P.E.
Scoping Manager — Date

Randall Post, P.E.
System Asset Manager — Date

Damien N. Perry — 9/25/2019

Damien Perry
Project Manager — Date

Attachments

Stakeholder Meeting Minutes
Signal Warrant
HCS Merge Analysis
Cost Estimate

ATTACHMENTS

HCS7 Freeway Merge Report

Project Information			
Analyst	Andrea Bland	Date	7/1/2019
Agency	Strand Associates	Analysis Year	2019
Jurisdiction		Time Period Analyzed	2040 AM Peak
Project Description	I-69 at SR 14 Interchange Modification		

Geometric Data	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	75.4	35.0
Segment Length (L) / Acceleration Length (LA),ft	1500	1360
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1872	1061
Peak Hour Factor (PHF)	0.87	0.87
Total Trucks, %	10.00	3.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.909	0.971
Flow Rate (vi),pc/h	2367	1256
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.50	0.63

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	807.4	Number of Outer Lanes on Freeway (NO)	1
Distance to Upstream Ramp (LUP), ft	1200	Speed Index (MS)	0.285
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	909
Distance to Downstream Ramp (LDOWN), ft	1730	On-Ramp Influenece Area Speed (SR), mi/h	65.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	0.616	Outer Lanes Freeway Speed (SO), mi/h	73.9
Flow in Lanes 1 and 2 (v12), pc/h	1458	Ramp Junction Speed (S), mi/h	67.7
Flow Entering Ramp-Infl. Area (vR12), pc/h	2714	Average Density (D), pc/mi/ln	17.8
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	17.6

HCS7 Freeway Merge Report

Project Information			
Analyst	Andrea Bland	Date	7/1/2019
Agency	Strand Associates	Analysis Year	2019
Jurisdiction		Time Period Analyzed	2040 PM Peak
Project Description	I-69 at SR 14 Interchange Modification		

Geometric Data		
	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	75.4	35.0
Segment Length (L) / Acceleration Length (LA),ft	1500	1360
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	1478	664
Peak Hour Factor (PHF)	0.88	0.88
Total Trucks, %	13.00	3.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.885	0.971
Flow Rate (vi),pc/h	1898	777
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.37	0.39

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	604.5	Number of Outer Lanes on Freeway (NO)	1
Distance to Upstream Ramp (LUP), ft	1200	Speed Index (MS)	0.253
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	729
Distance to Downstream Ramp (LDOWN), ft	1730	On-Ramp Influenece Area Speed (SR), mi/h	66.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	0.616	Outer Lanes Freeway Speed (SO), mi/h	74.6
Flow in Lanes 1 and 2 (v12), pc/h	1169	Ramp Junction Speed (S), mi/h	68.8
Flow Entering Ramp-Infl. Area (vR12), pc/h	1946	Average Density (D), pc/mi/ln	13.0
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	11.8

HCS7 Freeway Merge Report

Project Information			
Analyst	Andrea Bland	Date	7/1/2019
Agency	Strand Associates	Analysis Year	2019
Jurisdiction		Time Period Analyzed	2040 AM Peak
Project Description	I-69 at SR 14 Interchange Modification - Loop G Merge w/I-69 SB		

Geometric Data	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	75.4	35.0
Segment Length (L) / Acceleration Length (LA),ft	1500	1400
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	2474	116
Peak Hour Factor (PHF)	0.87	0.87
Total Trucks, %	11.00	2.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.901	0.980
Flow Rate (vi),pc/h	3156	136
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.46	0.07

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	754.3	Number of Outer Lanes on Freeway (NO)	1
Distance to Upstream Ramp (LUP), ft	1260	Speed Index (MS)	0.254
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	1209
Distance to Downstream Ramp (LDOWN), ft	1730	On-Ramp Influenece Area Speed (SR), mi/h	66.9
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	0.617	Outer Lanes Freeway Speed (SO), mi/h	72.8
Flow in Lanes 1 and 2 (v12), pc/h	1947	Ramp Junction Speed (S), mi/h	69.0
Flow Entering Ramp-Infl. Area (vR12), pc/h	2083	Average Density (D), pc/mi/ln	15.9
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	13.0

HCS7 Freeway Merge Report

Project Information			
Analyst	Andrea Bland	Date	7/1/2019
Agency	Strand Associates	Analysis Year	2019
Jurisdiction		Time Period Analyzed	2040 PM Peak
Project Description	I-69 at SR 14 Interchange Modification - Loop G Merge w/I-69 SB		

Geometric Data	Freeway	Ramp
Number of Lanes (N), ln	3	1
Free-Flow Speed (FFS), mi/h	75.4	35.0
Segment Length (L) / Acceleration Length (LA),ft	1500	1400
Terrain Type	Level	Level
Percent Grade, %	-	-
Segment Type / Ramp Side	Freeway	Right

Adjustment Factors		
Driver Population	All Familiar	All Familiar
Weather Type	Non-Severe Weather	Non-Severe Weather
Incident Type	No Incident	-
Final Speed Adjustment Factor (SAF)	1.000	1.000
Final Capacity Adjustment Factor (CAF)	1.000	1.000
Demand Adjustment Factor (DAF)	1.000	1.000

Demand and Capacity		
Demand Volume (Vi)	3171	364
Peak Hour Factor (PHF)	0.86	0.86
Total Trucks, %	7.00	2.00
Single-Unit Trucks (SUT), %	-	-
Tractor-Trailers (TT), %	-	-
Heavy Vehicle Adjustment Factor (fHV)	0.935	0.980
Flow Rate (vi),pc/h	3944	432
Capacity (c), pc/h	7200	2000
Volume-to-Capacity Ratio (v/c)	0.61	0.22

Speed and Density			
Upstream Equilibrium Distance (LEQ), ft	986.3	Number of Outer Lanes on Freeway (NO)	1
Distance to Upstream Ramp (LUP), ft	1260	Speed Index (MS)	0.291
Downstream Equilibrium Distance (LEQ), ft	-	Flow Outer Lanes (vOA), pc/mi/ln	1511
Distance to Downstream Ramp (LDOWN), ft	1730	On-Ramp Influenece Area Speed (SR), mi/h	65.7
Prop. Freeway Vehicles in Lane 1 and 2 (PFM)	0.617	Outer Lanes Freeway Speed (SO), mi/h	71.8
Flow in Lanes 1 and 2 (v12), pc/h	2433	Ramp Junction Speed (S), mi/h	67.7
Flow Entering Ramp-Infl. Area (vR12), pc/h	2865	Average Density (D), pc/mi/ln	21.5
Level of Service (LOS)	B	Density in Ramp Influence Area (DR), pc/mi/ln	18.9

Minutes
Scoping Meeting
I-69 at SR 14 Interchange Modification (East Half)
Des. No. 1800091
Indiana Department of Transportation
June 11, 2019, 1 P.M.

Invitee	Representing	Phone	Email
Brian Bauermeister, Area Engineer	Indiana Department of Transportation (INDOT)	(260) 969-8247	bbauermeister@indot.in.gov
Cheryle Culler, Utility Engineer	Indiana Department of Transportation	(260) 969-8202	cculler@indot.in.gov
Susan Doell, Scoping Manager	Indiana Department of Transportation	(260) 969-8263	sdoell@indot.in.gov
Delaney Keirn	Indiana Department of Transportation	(260) 969-8276	dkeirn@indot.in.gov
Steven Lam	Indiana Department of Transportation	(260) 399-7349	slam@indot.in.gov
Brad McNair, Consultant Services Manager	Indiana Department of Transportation	(260) 399-7348	bmcnair@indot.in.gov
Karen Novak, Environmental Supervision	Indiana Department of Transportation	(260) 969-8202	knovak@indot.in.gov
Damien Perry, Project Manager	Indiana Department of Transportation	(260) 969-8266	dperry1@indot.in.gov
Dana Plattner, District Traffic Engineer	Indiana Department of Transportation	(260) 969-8233	dplattner@indot.in.gov
Matt Sagstetter	Indiana Department of Transportation	(260) 969-8217	msagstetter@indot.in.gov
Patrick Zaharako, City Engineer	City of Fort Wayne	(260) 427-1172	patrick.zaharako@cityoffortwayne.org
Hoang Nam Pham	City of Fort Wayne		hoang.nam.pham@cityoffortwayne.org
Jeff Bradtmiller, Senior Transportation Planner	Northeastern Indiana Regional Coordinating Council (NIRCC)	(260) 449-7309	jeff.bradtmiller@co.allen.in.us
*Joiner Lagpacan, Transportation Engineer	Federal Highway Administration (FHWA)	(317) 226-5617	joiner.lagpacan@dot.gov
*Dan McCoy, Traffic Mobility Engineer	INDOT	(317) 233-3943	dmccoy@indot.in.gov
*Jeremy Vanvleet, Traffic Engineer	INDOT	(317) 232-2788	jvanvleet@indot.in.gov
*Kyle Winling, Traffic Engineer	City of Fort Wayne	(260) 427-1172	kyle.winling@cityoffortwayne.org
Marc Rape, Project Manager	Strand Associates, Inc.® (Strand)	(812) 372-9911	marc.rape@strand.com
Andrea Bland, Project Engineer	Strand Associates, Inc.®	(812) 372-9911	andrea.bland@strand.com

**Present via conference call*

1. Project Information and Schedule

This project is scheduled for a December 9, 2020 letting and is bundled with Des. No. 1401828 (the west half of this interchange) and Des. No. 1600115 (SR 14 HMA Overlay) in Contract No. R-41809. Damien will send Strand other projects in the area to include in the scoping document and to coordinate maintenance of traffic, if applicable.

The possibility of skipping or modifying the Stage 2 submittal to only include traffic items was discussed. If a Stage 2 submittal is desired, the schedule will be amended from March 1 to February 1, 2020. Strand will coordinate the status of this submittal with Damien.

Time should also be allocated for Central Office to review these plans. Damien is planning on requesting expedited reviews.

It was mentioned that the new signal may need its own Des. No. *Following the meeting Damien confirmed that this was the case.*

2. Project Intent Addendum and Interstate Access Document (IAD)

Dana would like to include a signal warrant analysis in the addendum to have the formal documentation. Strand will use the newest counts from the Traffic Count Database System Web site to complete the warrant. Strand will also confirm that the given growth rates for the study completed in 2016 are still accurate for current counts. *After the meeting, Jeff contacted Andrea regarding the growth rates. NIRCC believes the rates are low but there is not a need to update the report.*

In addition to the signal warrant, this addendum will include updates to the cost estimate, the merge level of service (LOS) on I-69 because of the longer acceleration lanes, and maintenance of traffic schemes. An updated conceptual drawing will be sent to Dan in Corridor Development to review.

The addendum will then be attached as an appendix to the IAD. The IAD will also be updated after approval of the CE document with a paragraph stating that there were no additional impacts.

3. Environmental Documentation

The environmental document for Des. No. 1401828 is a CE-4 and is nearly complete, pending public involvement. Meghan Hinkle from Central Office Environmental Services was interested in combining the two environmental documents. However, they are being completed by two different subconsultants; Metric Environmental on Des. No. 1401828 and Burgess & Niple on Des. No. 1800091. Strand will coordinate with both subconsultants, Central Office Environmental Services, and District Environmental Services to determine a course of action.

A public hearing will be required for this project. Damien prefers to plan on having a hearing rather than just advertising to avoid any potential lost time. Dan recommended that we really emphasize the safety improvements of the partial cloverleaf at the hearing. At times, people have been very attached to full cloverleafs because they like the free-flow movements. NIRCC will provide Strand with updated crash data to use for the public hearing.

4. Miscellaneous

While proprietary material documentation for the signal controllers had been previously discussed, Dana and Matt are not sure whether this is necessary anymore with their new modems. Matt will look into the signal equipment and let Strand know what will be required.

No changes to turn-lane geometry is proposed at Illinois Road and Magnavox Way. A dual eastbound left movement had been discussed but would require split phasing, which the City of Fort Wayne does not want.

There is a sanitary sewer line that runs under the north side of the interchange. This is expected to be deep enough that it will not affect any project operations.

It was discussed that a brief ramp closure may be needed to tie in the new pavement with the existing southeast diagonal ramp; however, the INDOT would prefer that the ramp remain open, if possible.

The District has a project letting in July to install CCTV equipment. It does not appear that anything will be in conflict with this contract as the CCTV work is in the northeast quadrant.

If there are any additions or comments, please e-mail me or call me at 812-372-9911 ext. 4416.

Prepared and respectfully submitted by Andrea Bland.

c: All Participants

Indiana Department of Transportation Traffic Signal Warrant Summary Worksheet

70%

The Worksheet(s) attached are provided as an attachment to the Engineering Investigation Study for:

Intersection: I-69 Ramp A at SR 14/Illinois Road
County: Allen County
City: Fort Wayne

Major Street: SR 14/Illinois Road
Critical Approach Speed: 45 mph
Lanes: 2 or more lanes

Minor Street: Ramp A
Critical Approach Speed: 30 mph
Lanes: 2 or more lanes

% Right Turns Included
From North (SB) 0%
From East (WB) 0%
From South (NB) 0%
From West (EB) 0%

In built-up area of isolated community of < 10,000 population? No
Total number of approaches at intersection? 3
If it is a "T" intersection, inflate minor threshold to 150%? No
Manually set volume level? No

Analysis based on EXISTING volume data.

Date	Day of the Week	Time (HH:MM)			
		From	AM / PM	To	AM / PM
14-May-19	Tuesday				
27-Feb-19	Tuesday				

Warrant Evaluation Summary	Warrant Met:
Warrant 1: Eight - Hour Vehicular Volume	**Yes**
Condition A: Minimum Vehicular Volume	No
Condition B: Interruption of Continuous Traffic	Yes
Condition C: Combination: 80% of A and B	No
Warrant 2: Four-Hour Volume	**Yes**
Warrant 3: Peak Hour Volume	**Yes**
Warrant 4: Pedestrian Volume	**N/A**
Criterion A: Four-Hour	
Criterion B: Peak-Hour	
Warrant 5: School Crossing	**N/A**
Warrant 6: Coordinated Signal System	**No**
Warrant 7: Crash Experience	**N/A**
Warrant 8: Roadway Network	**Yes**
Warrant 9: Intersection Near a Grade Crossing	**N/A**

Warrant Analysis Conducted By:

Name: Andrea Bland
Agency: Strand Associates, Inc.
Date: 7/9/2019

Warrant 1: Eight - Hour Vehicular Volume 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

Condition A : Min. Veh. Volume		
Volume Level	70%	56%
Major Rd. Req	420	336
Minor Rd. Req	140	112
Number of Hours	4	7

Satisfied? No

Condition B: Interruption of Continuous Traffic		
Volume Level	70%	56%
Major Rd. Req	630	504
Minor Rd. Req	70	56
Number of Hours	13	13

Satisfied? Yes

Condition C: Combination of A & B at 56%

Satisfied? No

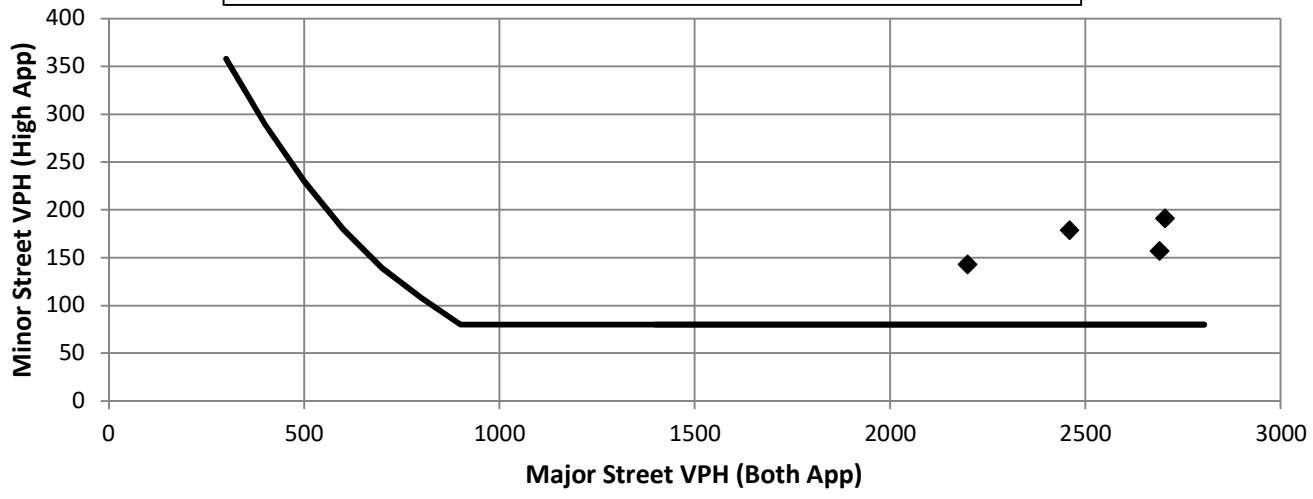
6:00 AM		Enter Start Time (Military Time) (HH:MM)			
Time Period	**From**	**To**	**Major Road: Both App. (VPH)**	**Minor Road: High App. (VPH)**	**Total**
1	6:00	7:00	1203	116	1319
2	7:00	8:00	2459	179	2638
3	8:00	9:00	2052	128	2180
4	9:00	10:00	1591	97	1688
5	10:00	11:00	1655	84	1739
6	11:00	12:00	1846	94	1940
7	12:00	13:00	2209	107	2316
8	13:00	14:00	1899	82	1981
9	14:00	15:00	1988	131	2119
10	15:00	16:00	2198	143	2341
11	16:00	17:00	2690	157	2847
12	17:00	18:00	2704	191	2895
13	18:00	19:00	1848	94	1942
14	19:00	20:00	1240	51	1291
15	20:00	21:00	0	0	0
16	21:00	22:00	0	0	0

Warrant 2: Four-Hour Volume 70%

Warrant Evaluated? Yes
Warrant Satisfied? Yes
Manually Set To:

Hour Start	17:00	16:00	7:00	15:00
Major Road Vol.	2704	2690	2459	2198
Minor Road Vol.	191	157	179	143

Figure 4C-2 Warrant 2, Four-Hour Vehicular Volume (70% Factor)



Warrant 3: Peak Hour Volume 70%

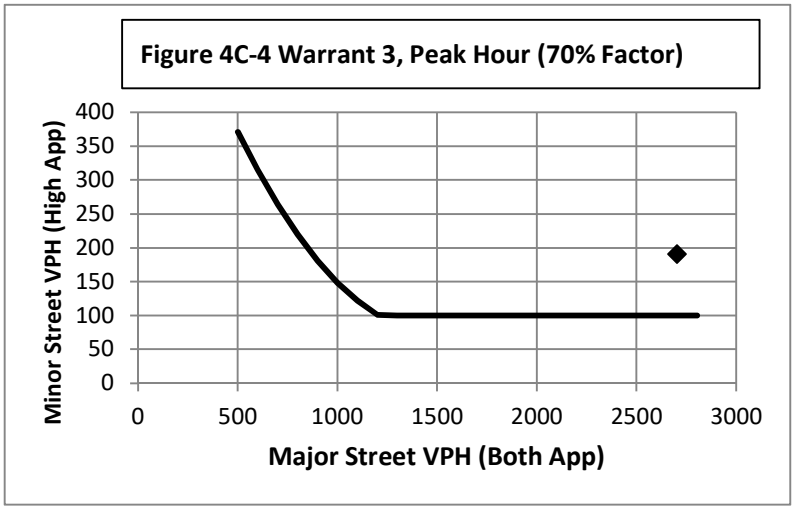
Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

Condition justifying use of warrant:

Criteria		Met?
Delay on Minor Approach	5	Yes
Volume on Minor Approach	150	Yes
Total Entering Volume (veh/h)	650	

Manually Set Peak Hour?

Peak Hour	Major Road Vol. (Both App.)	Minor Road Vol. (High App.)
17:00	2704	191



Warrant 4: Pedestrian Volume 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

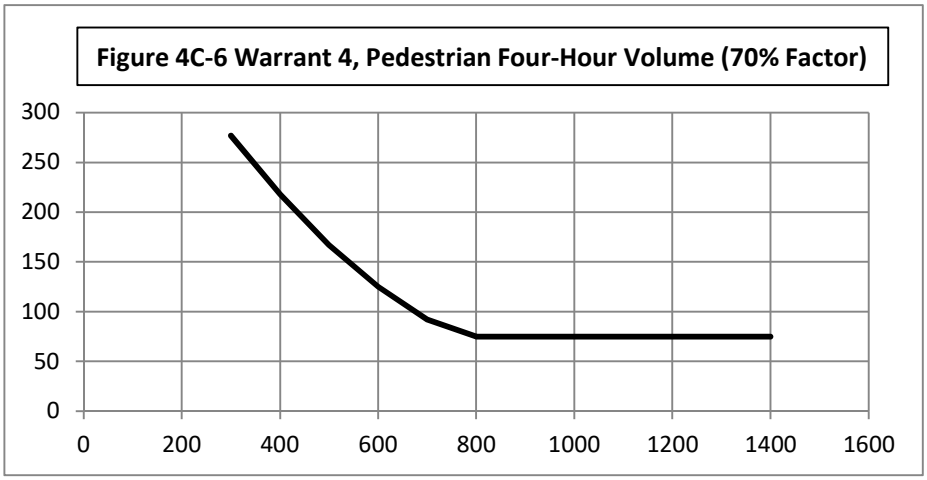
Criterion A: Four Hour

Hour (Start)	Pedestrian Volume	Major Road Vol.
		0
		0
		0
		0

Manually Set Major Rd Vol?

Avg. walk speed less than 3.5 ft/s?

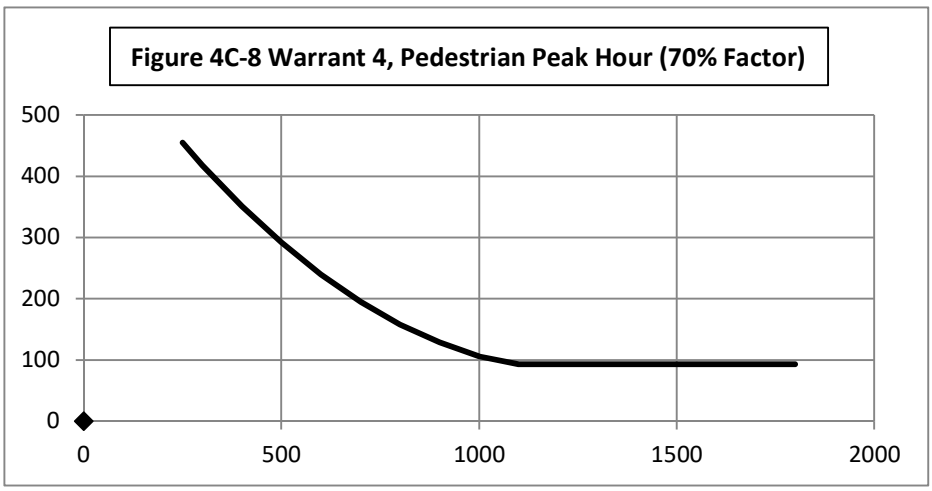
Criterion A Satisfied?



Criterion B: Peak Hour

Peak Hour	Pedestrian Vol.	Major Road Vol.
0:00	0	0

Criterion B Satisfied?



Warrant 5: School Crossing 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Criteria		Fulfilled?
1	There are a MINIMUM of 20 school children during the highest crossing hour.	
2	There are fewer adequate gaps in the major road traffic stream during the period when the school children are using the crossing than the number of minutes in the same period.	
3	The nearest traffic signal along the major road is located more than 300 ft away. Or, the nearest traffic signal is within 300 ft but the proposed traffic signal will not restrict the progressive movement of traffic.	

Warrant 6: Coordinated Signal System 70%

Warrant Evaluated? Yes **Warrant Satisfied? No** **Manually Set To:**

Criteria		Fulfilled?
1	Signal spacing > 1000 ft	Yes
2	On a one-way road or a road that has traffic predominantly in one direction, the adjacent signals are so far apart that they do not provide the necessary degree of vehicle platooning.	No
3	On a two-way road, adjacent signals do not provide the necessary degree of platooning and the proposed and the adjacent signals will collectively provide a progressive operation.	No

Warrant 7: Crash Experience 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Criteria			Met?	Fulfilled?
1	Adequate trial of other remedial measures has failed to reduce crash frequency.			
	Measures Tried:			
2	Five or more reported crashes, of types susceptible to correction by signal, have occurred within a 12 month period.	# of crashes per 12 months		
3	Warrant 1, Condition A (80%)		No	Yes
	Warrant 1, Condition B (80%)		Yes	
	Warrant 4, Criterion A (80%)		No	
	Warrant 4, Criterion B (80%)		No	

Warrant 8: Roadway Network 70%

Warrant Evaluated? Yes **Warrant Satisfied? Yes** **Manually Set To:**

Criteria					Met?	Fulfilled?
1	Total entering volume of at least 1,000 veh/h during typical weekday peak hour			2895	Yes	Yes
	Five-year projected volumes that satisfy one or more of Warrants 1, 2, or 3.			1, 2, 3	Yes	
2	Total entering vol. of at least 1,000 veh/h for each of any 5 hrs of non-normal business day (Sat. or Sun.)					
	Hour					
	Volume					

Characteristics of Major Routes - Select yes if all intersecting routes have characteristic		Fulfilled?
1	Part of the road or highway system that serves as the principal roadway network for through traffic flow	Yes
2	Rural or suburban highway outside of, entering, or traversing a city	Yes
3	Appears as a major route on an official plan	Yes

Warrant 9: Intersection Near a Grade Crossing 70%

Warrant Evaluated? No **Warrant Satisfied? N/A** **Manually Set To:**

Adjustment Factors			Manually Set Peak Hour?				
Rail Traffic per Day	% High Occupancy Buses on Minor Road	% Tractor-Trailer Trucks on Minor Road	D	Peak Hour	Major Road Vol.	Minor Road Vol.	Adjusted Minor Vol.
1	0	0% to 2.5%	660	17:00	2704	191	63.985

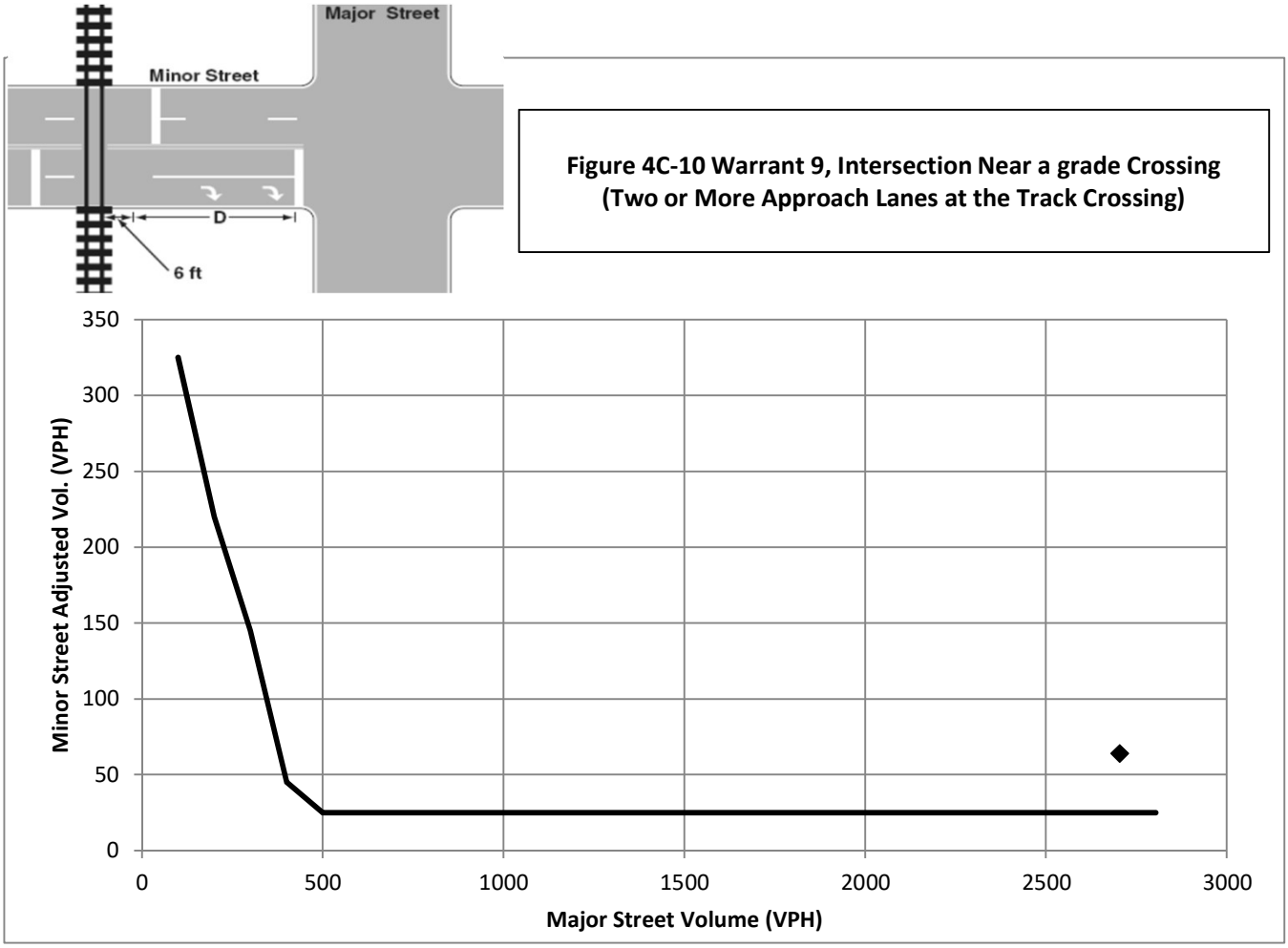


Figure 4C-10 Warrant 9, Intersection Near a grade Crossing (Two or More Approach Lanes at the Track Crossing)

Conclusions/Comments:

Updated: 12/6/2017

PRICING REPORT

Project: ***I-69 at SR 14 Interchange Modification - East***
Location:
County: ***ALLEN***
District: ***Fort Wayne***

Project ID: ***1800091***
Bid Date: ***/ /*** State: ***IN***
Route:

Project Settings

Primary County:	ALLEN	Urban/Rural:	URBAN ROUTE
Addl Counties:		Work Type:	INTERCHANGE MODIFICATION
District:	Fort Wayne	Function Class:	
Longitude:	89° 00' 00"	Season:	
Latitude:	35° 00' 00"	Estimator:	andreab
Log Mile:	Beg:	Constr Eng:	0.00 %
	End:	Priced Date:	/ /
Station:	Beg:	Create Date:	04/17/2019
	End:	Fed Projec No:	1800091
Project Length:	0.0000 miles		

Major Categories

MISC.	677,763.57	36.4%
GRADE/DRAIN	401,804.80	21.6%
BRIDGE	93,324.47	5.0%
PAVEMENT/BASE	689,785.70	37.0%
TOTALS:	**1,862,678.54**	**100.0%**

STIP Information

Project Cost	1,862,678.54	100.0%
PE	0.00	0.0%
CE	0.00	0.0%
R/W	0.00	0.0%
Utilities	0.00	0.0%
TOTALS:	**1,862,678.54**	**100.0%**

PRICING REPORT

Project: ***I-69 at SR 14 Interchange Modification - East***
Location:
County: ***ALLEN***
District: ***Fort Wayne***

Project ID: ***1800091***
Bid Date: ***/ /***
State: ***IN***
Route:

SortCd	Pay Item	Description	Quantity	Unit	Bid Price	Extension	#	Comparison #1	#	Comparison #2	#	Comparison
1	105-06845	construction engineering	1.000	L.S.	34,000.00	34,000.00	64	14,826.08	64	19,517.74	400	
2	110-01001	mobilization and demobilization	1.000	L.S.	88,200.00	88,200.00	67	82,928.81	67	86,344.13	406	
3	201-52370	clearing right of way	1.000	L.S.	34,000.00	34,000.00	48	23,106.35	48	29,466.75	320	
4	202-02240	pavement removal	9,220.000	S.Y.	14.91	137,470.20	6	14.91	6	11.81	57	
5	202-02279	curb and gutter, remove	200.000	L.F.	19.07	3,814.00	28	19.07	28	19.07	28	
6	202-93741	guardrail end treatment, remove	1.000	EACH	1,129.43	1,129.43	1	1,129.43	1	688.07	12	
7	202-94954	barrier wall, concrete, remove	120.000	L.F.	156.40	18,768.00	2	156.40	2	86.69	12	
8	203-02000	excavation, common	1,000.000	C.Y.	39.22	39,220.00	18	39.22	18	39.83	159	
9	203-02070	borrow	2,000.000	C.Y.	14.67	29,340.00	9	14.67	9	17.15	73	
10	205-12108	storm water management budget	20,000.000	$	1.00	20,000.00	59	1.00	59	1.00	351	
11	205-12109	swqcp preparation and implementation,	1.000	L.S.	28,000.00	28,000.00	35	15,654.17	35	16,570.09	241	
12	207-09935	subgrade treatment, type ic	10,520.000	SYS	26.24	276,044.80	16	26.24	16	23.66	74	
13	301-12234	compacted aggregate no 53	240.000	C.Y.	62.30	14,952.00	13	62.30	13	56.73	86	
14	302-06464	subbase for pccp	1,750.000	C.Y.	72.50	126,875.00	2	72.50	2	58.34	13	
15	303-01180	compacted aggregate, no. 53	250.000	TON	42.74	10,685.00	14	42.74	14	40.63	165	
16	401-07328	qc/qa-hma, 3, 70, surface, 9.5 mm	150.000	TON	111.88	16,782.00	10	111.88	10	154.16	53	
17	401-07398	qc/qa-hma, 3, 70, intermediate, 19.0 mm	250.000	TON	128.66	32,165.00	27	128.66	27	128.66	27	
18	401-07408	qc/qa-hma, 3, 64, base, 25.0 mm	500.000	TON	93.43	46,715.00	18	93.43	18	93.43	18	
19	401-10258	joint adhesive, surface	900.000	L.F.	0.78	702.00	19	0.78	19	1.21	155	
20	401-10259	joint adhesive, intermediate	900.000	L.F.	1.61	1,449.00	5	1.61	5	1.24	126	
21	401-11785	liquid asphalt sealant	900.000	L.F.	0.48	432.00	13	0.48	13	0.72	151	
22	401-12137	qc/qa-hma, 4, 76, intermediate, og, 19.	270.000	TON	79.41	21,440.70	6	79.41	6	79.41	6	

PRICING REPORT

Project: ***I-69 at SR 14 Interchange Modification - East***
Location:
County: ***ALLEN***
District: ***Fort Wayne***

Project ID: ***1800091***
Bid Date: ***/ /***
Route:
State: ***IN***

SortCd	Pay Item	Description	Quantity	Unit	Bid Price	Extension	#	Comparison #1	#	Comparison #2	#	Comparison
23	406-05521	asphalt for tack coat	3,600.000	S.Y.	0.33	1,188.00	18	0.33	18	0.36	125	
24	501-06325	qc/qa-pccp, 14 in	6,940.000	S.Y.	60.00	416,400.00	0	60.00	0	***60.00***	0	
25	601-02241	guardrail, remove	37.500	L.F.	9.50	356.25	1	9.50	1	13.40	6	
26	601-09146	impact attenuator, cr1, w1, tl-2	2.000	EACH	27,310.00	54,620.00	2	27,310.00	2	27,310.00	2	
27	601-12289	guardrail mgs, height transition	1.000	EACH	1,042.77	1,042.77	10	1,042.77	10	980.64	88	
28	601-94689	guardrail end treatment, os	1.000	EACH	3,873.75	3,873.75	5	3,873.75	5	3,361.80	93	
29	605-06150	curb and gutter, c, concrete	200.000	L.F.	46.00	9,200.00	3	46.00	3	46.00	3	
30	610-07788	hma for approaches, type d	205.000	TON	122.00	25,010.00	2	122.00	2	110.90	4	
31	621-06570	topsoil	1,535.000	C.Y.	27.02	41,475.70	4	27.02	4	38.69	21	
32	628-09402	field office, b	12.000	MONTH	1,958.86	23,506.32	65	1,958.86	65	1,996.50	523	
33	628-11977	computer system	1.000	EACH	943.75	943.75	39	943.75	39	1,368.28	239	
34	715-05048	pipe, type 4 circular 6 in	3,600.000	L.F.	11.94	42,984.00	2	11.94	2	8.32	73	
35	715-05053	pipe, underdrain, outlet 6 in	420.000	L.F.	20.65	8,673.00	2	20.65	2	18.97	21	
36	715-05152	pipe, type 2 circular 18 in	110.000	L.F.	63.75	7,012.50	5	63.75	5	58.87	55	
37	718-06531	outlet protector, 3	14.000	EACH	812.97	11,381.58	7	812.97	7	812.97	7	
38	718-12308	geotextile for underdrain, type 2b	1,133.000	SYS	2.13	2,413.29	8	2.13	8	2.13	8	
39	718-52610	aggregate for underdrains	324.000	C.Y.	59.44	19,258.56	2	59.44	2	50.75	69	
41	720-45030	inlet, e7	1.000	EACH	1,601.54	1,601.54	4	1,601.54	4	2,149.76	70	
42	801-06640	construction sign, a	10.000	EACH	147.74	1,477.40	25	147.74	25	171.13	323	
43	801-06775	maintaining traffic	1.000	L.S.	100,000.00	100,000.00	67	42,242.68	67	56,478.67	395	
44	802-74080	overhead sign structure, cantilever, remove	1.000	EACH	1,496.00	1,496.00	3	1,496.00	3	1,496.00	3	
45	805-01815	signal pole foundation, 36 in x 144 in	4.000	EACH	3,004.64	12,018.56	46	3,004.64	46	3,004.64	46	

PRICING REPORT

Project: ***I-69 at SR 14 Interchange Modification - East***
Location:
County: ***ALLEN***
District: ***Fort Wayne***

Project ID: ***1800091***
Bid Date: ***/ /***
State: ***IN***
Route:

SortCd	Pay Item	Description	Quantity	Unit	Bid Price	Extension	#	Comparison #1	#	Comparison #2	#	Comparison
46	805-01842	handhole, signal, type 1	3.000	EACH	1,251.76	3,755.28	28	1,251.76	28	1,251.76	28	
47	805-01844	conduit, steel, galvanized, 2 in	1,500.000	L.F.	13.95	20,925.00	2	13.95	2	20.07	24	
48	805-02445	controller and cabinet, p1	1.000	EACH	18,661.30	18,661.30	45	18,661.30	45	18,661.30	45	
49	805-78205	traffic signal head, 3 section, 12 in	9.000	EACH	756.71	6,810.39	55	756.71	55	756.71	55	
50	805-78415	span, catenary, and tether	1.000	EACH	2,481.82	2,481.82	13	2,481.82	13	2,481.82	13	
51	805-78420	disconnect hanger	9.000	EACH	307.04	2,763.36	7	307.04	7	307.04	7	
52	805-78445	signal service	1.000	EACH	1,068.10	1,068.10	59	1,068.10	59	1,068.10	59	
53	805-78925	controller cabinet foundation, p1	1.000	EACH	1,000.00	1,000.00	1	1,000.00	1	1,390.81	58	
54	805-81060	signal strain pole, steel, 36 ft	4.000	EACH	7,973.74	31,894.96	17	7,973.74	17	7,973.74	17	
55	808-06703	line, thermoplastic, solid, white, 4 in.	900.000	L.F.	1.24	1,116.00	5	1.24	5	0.89	74	
56	808-06714	line, paint, solid, yellow, 4 in	350.000	L.F.	1.32	462.00	15	1.32	15	1.39	66	
57	808-75297	transverse marking, thermoplastic, stop line, 24 in	124.000	L.F.	5.86	726.64	8	5.86	8	6.99	123	
58	808-75320	pavement message marking, thermoplastic, lane indication arrow	6.000	EACH	126.24	757.44	15	126.24	15	133.30	94	
59	808-75998	snowplowable raised pavement marker	15.000	EACH	142.61	2,139.15	13	142.61	13	137.48	84	
	TOTALS					**1,862,678.54**		**1,757,236.63**		**1,717,135.79**		

LOADED PRICES

Alternate #1: DOT District 2/Low 3 Prices/Last 12 Months

Quantity Range from 50.00% under to 100.00% over and job size from $800,000.00 up to $2,500,000.00/Project Prefix: Multiple

Alternate #2: State Averages/Low 3 Prices/Last 12 Months

Quantity Range from 50.00% under to 100.00% over and job size from $800,000.00 up to $2,500,000.00/Project Prefix: Multiple

Alternate #3: User Entered Prices

INDIANA DEPARTMENT OF TRANSPORTATION

MEMORANDUM

To: Trevor Mills, Engineering & Asset Management Deputy Commissioner

From: Brad Steckler, Traffic Engineering Division Director 11-13-2017

Cc: Daniel McCoy, Corridor Development Traffic Engineer

Date: November 13th, 2017

Re: Interstate Access Determination of Engineering and Operational Acceptability at I-69 and SR 14

According to the Programmatic Agreement between FHWA and INDOT permitting our internal review and approval of specific types of changes in Interstate-System access, only the INDOT Deputy Commissioner of Engineering and Asset Management has the authority to make a determination that an Interstate Access Request (IAR) meets or does not meet Engineering and Operational Acceptability, and that a request to change Interstate-System access has met all FHWA criteria. Only the INDOT Director of Traffic Engineering has the authority and responsibility to make a recommendation to the Deputy Commissioner.

The Corridor Development Office of the Traffic Engineering Division has reviewed, on behalf of INDOT, the Interstate Access Request regarding the proposal to modify access at I-69 and SR 14 (Exit 305) in Allen County. The project was originally programmed to remove the southwest loop ramp thereby converting the west half of the interchange to a Partial Cloverleaf Type A. The IAR and associated documents fully evaluate the interchange, not just the short-term plan. The report details the demands of projected traffic and determines that the proposed modification of the interchange is necessary and appropriate. The proposed modification will improve traffic operations at the interchange in a cost effective and safe manner.

Your signature below signifies your determination that the proposed change in Interstate access meets Engineering and Operational Acceptability. I recommend this action.

Trevor Mills 11/13/17

Trevor Mills, Engineering & Asset Management Deputy Commissioner Date

Report for
Indiana Department of Transportation, Fort Wayne District

Draft Interstate Access Document
I-69 at SR 14/Illinois Road Interchange Modification

Prepared by:

STRAND ASSOCIATES, INC.®
629 Washington Street
Columbus, IN 47201
www.strand.com

October 2017

STRAND ASSOCIATES®

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or Following

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APPENDIX B-1–ALTERNATIVE SELECTION REPORT

INTERSTATE ACCESS DOCUMENT
I-69 at SR 14/Illinois Road Interstate Modification

I. INTRODUCTION

The purpose of this interchange modification is to improve safety and mobility at the interchange of I-69 at SR 14/Illinois Road. Currently, there are mobility and safety problems with the weaving segment on SR 14/Illinois Road and the two loops on the south side of the road.

The project schedule is as follows:

- Stage 1 Plans: July 31, 2017
- Preliminary Field Check: September 15, 2017
- Stage 2 Plans and Categorical Exclusion completed: April 27, 2018
- Stage 3 Plans: June 1, 2019
- Tracings: August 1, 2019
- Letting: November 14, 2019

The layout of the proposed design from the *Alternative Selection Report* is shown in Appendix A-1, and the *Alternative Selection Report* can be found in Appendix B-1.

II. PROJECT AND STUDY AREAS

This project is located at the I-69 and SR 14/Illinois Road interchange in Allen County within the Indiana Department of Transportation (INDOT)–Fort Wayne District. The project site is located at I-69 from Reference Post 305+18 to Reference Post 305+37. With the proposed geometrics, the project will begin west of the southwest ramp and end at the concrete bridge approach on SR 14/Illinois Road. A project location map is provided in Appendix A–2.

The study area will include intersections along the SR 14/Illinois Road corridor on each side of I-69, from Hadley Road to the west through Magnavox Way, Getz Avenue, and Avenue of Autos to the east. Each of these signalized intersections will be included in the Synchro model network. Segments of I-69 immediately north and south of the interchange will be analyzed for capacity, along with each merging, diverging, and weaving segment on I-69 and SR 14/Illinois Road. A study area map is provided in Appendix A-3.

III. EXISTING CONDITIONS

The current interchange layout is a full cloverleaf. All loops and ramps are single-lane and free-flow, with the exception of a signal at the northwest ramp (Ramp C) to control the dual right-turn lanes and westbound SR 14/Illinois Road traffic. SR 14/Illinois Road has two through lanes in each direction, while I-69 has three through lanes in each direction. Direction of travel on both roads is separated by median barrier wall. The weaving sections between loops measure approximately 580 feet on SR 14/Illinois Road and 390 feet on I-69. Another weave is created by northbound traffic on Hadley Road, just west of the interchange, having a free-flow right turn into the lane on SR 14/Illinois Road that terminates into the I-69 southbound ramp

IV. STATEMENT OF NEED AND PURPOSE

The need for this project is evidenced by the high traffic volumes on loop ramps H southwest (SW) and E southeast (SE), weaving with eastbound (EB) through traffic on Illinois Road. Drivers experience confusion when merging and it has led to a higher rate of crashes. The volume on these adjacent ramps far exceeds the recommendation of American Association of State Highway and Transportation Officials (AASHTO) for a full cloverleaf design. A Highway Capacity Software (HCS) analysis shows that the weaving segment on EB SR 14/Illinois Road under existing conditions in the AM peak hour is Level of Service (LOS) F; it is currently LOS C for the PM peak hour, but worsens to LOS D in 2040. Additionally, a RoadHAT analysis showed that Loop H had an index of crash frequency and cost significantly higher than expected.

To eliminate this deficiency, the southwest ramp will be closed in order to eliminate the weaving conflict with the southeast ramp. This traffic will use the northwest ramp, to which left-turn lanes will be added to accommodate eastbound traffic on SR 14/Illinois Road. Signal modification will also be required because of the additional phases.

V. FRAMEWORK

The existing conditions, a short-term solution, and a long-term solution were studied in the *Alternative Selection Report*. The short-term alternatives were analyzed for opening year (2020), interim design year (2030), and horizon year (2040). Long-term alternatives were analyzed for 2020 and 2040. A capacity analysis was performed for the no-build condition and each alternative in the AM and PM peak hours. Level of service and density were determined for each merge, diverge, and weave segment using Highway Capacity Software. Level of service and delay were determined for signalized intersections using Synchro. Safety was studied at this interchange using RoadHAT 3.0 for each road segment.

VI. ALTERNATIVES

For the short-term analysis, three alternatives were evaluated: no-build, modified loop, and closed loop. The no-build alternative was quickly eliminated because it would not solve the safety or capacity problems as defined in the purpose and need statement. The modified loop would possibly be slightly more operationally effective because of having a two-phase signal, and it would require less pavement removal. However, it would require more pavement construction, risked queuing back on the interstate, and did not transition easily into the long-term design. Some of the difference in intersection delay could be accounted for by the different methodology used. The recommended “closed loop” alternative is discussed in more detail in the subsequent section, and a comparison of the alternatives is shown in Table V-1. Although the delay and LOS at the signalized intersection are better under the no build condition, the proposed alternatives eliminate a weaving segment currently operating at LOS F as seen in Table V-2.

Alternative	Peak	SB Ramp Terminal		Cost
		Delay (s)	LOS	
No Build	AM	8.1	A	
	PM	18.9	B	
Modified Loop*	AM	34.8	C	N/A
	PM	27.8	C	
Closed Loop	AM	36.1	D	$892,000
	PM	36.6	D	

*Uses HCM 2000 because of non-NEMA phasing.

Table V-1 Short-Term Alternatives Comparison (Design Year 2040)

Road	Peak	2015		2040	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
I-69 NB	AM	13.7	B	15.4	B
	PM	9.9	A	11.0	B
I-69 SB	AM	12.0	B	13.5	B
	PM	16.0	B	17.7	B
SR 14/Illinois Rd. EB	AM	--	F	--	F
	PM	22.9	C	29.7	D
SR 14/Illinois Rd. WB	AM	6.5	A	8.1	A
	PM	14.2	B	21.4	C

Table V–2 Existing Weaving Operations

The long-term alternatives evaluated were a diverging diamond interchange (DDI), a partial cloverleaf Type B, and a partial cloverleaf Type A. A diverging diamond, while it operated well, was not worth the significantly higher cost when compared to the Partial Cloverleaf Type A. The Parclo B was eliminated based on poor operation at the southbound ramp terminal. The Partial Cloverleaf Type A was recommended based on a combination of LOS and project cost; additionally, this alternative is halfway completed by constructing the “closed loop” alternative as the short-term solution. Information about each long-term alternative can be found in Table V-3.

Alternative	Peak	NB Ramp Terminal		SB Ramp Terminal		Cost
		Delay (s)	LOS	Delay (s)	LOS	
Diverging Diamond*	AM	17.9	B	28.2	C	$8,960,000
	PM	21.2	C	26.0	C	
Partial Cloverleaf Type A	AM	20.0	B	36.4	D	$1,008,000
	PM	18.8	B	33.2	C	
Partial Cloverleaf Type B*	AM	18.8	B	108.5	F	N/A
	PM	48.1	D	64.3	E	

*Uses HCM 2000 because of clustered intersections (DDI) and non-NEMA phasing (Parclo B).

Table V-3 Long-Term Alternatives Comparison (Design Year 2040)

VII. INTERSTATE SYSTEM ACCESS POLICY POINTS

A. POLICY POINT 1: OPERATIONAL AND SAFETY ANALYSIS

An operational and safety analysis has concluded that the proposed change in access does not have a significant adverse impact on the safety and operation of the Interstate facility (which includes mainline lanes, existing, new, or modified ramps, and ramp intersections with crossroad) or on the local street network based on both the current and the planned future traffic projections. The analysis should, particularly in urbanized areas, include at least the first adjacent existing or proposed interchange on either side of the proposed change in access (Title 23, Code of Federal Regulations (CFR), paragraphs 625.2(a), 655.603(d) and 771.111(f)). The crossroads and the local street network, to at least the first major intersection on either side of the proposed change in access, should be included in this analysis to the extent necessary to fully evaluate the safety and operational impacts that the proposed change in access and other transportation improvements may have on the local street network (23 CFR 625.2(a) and 655.603(d)). Requests for a proposed change in access should include a description and assessment of the impacts and ability of the proposed changes to safely and efficiently collect, distribute, and accommodate traffic on the Interstate facility, ramps, intersection of ramps with crossroad, and local street network (23 CFR 625.2(a) and 655.603(d)). Each request should also include a conceptual plan of the type and location of the signs proposed to support each design alternative (23 U.S.C. 109(d) and 23 CFR 655.603(d)).

This section provides an analysis of the recommended short-term solution, the closed loop, and the recommended long-term solution, the Partial Cloverleaf Type A. Information about traffic counts, growth rates, peak-hour factors, and other assumptions can be found in the Alternative Selection Report (Appendix B-1).

Short-Term Recommended Alternative: Closed Loop

The “closed loop” alternative consists of closing and removing the southwest loop and expanding the northwest ramp to accommodate southbound, left-turning vehicles. Two left-turn lanes will be added, median barrier removed, and the signal modified. Additionally, a third eastbound lane on SR 14/Illinois Road will be added beginning at the southwest ramp, making the lane for that ramp a shared through/right lane, and terminating at the southeast loop. Table VI-1 shows the intersection delay and LOS for the construction year, interim design year, and design year at the signalized SB ramp terminal.

		2020		2030		2040	
Intersection	**Peak**	**Delay (s)**	**LOS**	**Delay (s)**	**LOS**	**Delay (s)**	**LOS**
SB Ramp Terminal	AM	29.5	C	33.5	C	36.1	D
	PM	25.4	C	28.1	C	36.6	D

Table VII-1 SB Ramp Terminal Operations for Closed Loop Alternative

An additional recommendation is to coordinate signals for this arterial. Currently, the intersections at Hadley Road and the southbound (SB) ramp terminal operate separately from Magnavox Way, Getz Avenue, and Avenue of Autos because they fall under different jurisdictions (INDOT and the Northeastern Indiana Regional Coordinating Council, respectively). Information about improvements to adjacent signals can be found in the “Local Improvements” section.

Some sign modifications would be required at the interchange. Signs to be removed include: the 305A “Illinois Road 1/4 Mile” exit on the box truss on I-69 SB, the cantilever

sign for the exit on I-69 SB, the ground-mounted exit sign near the removed loop; and the merging lane sign on eastbound SR 14/Illinois Road. The sign on the box truss and the ground-mounted sign near Ramp C would need to be modified to show “Exit 305” instead of “Exit 305B.” However, the majority of sign modifications would occur well in advance of the intersection; all the guide signs and service signs would need to be changed to reflect the new exit number and configuration. A conceptual signing plan can be found in Appendix A-4.

Long-Term Recommended Alternative: Partial Cloverleaf Type A

Partial Cloverleaf Type A was analyzed because of its similarity with the recommended short-term “Closed Loop” alternative. The short-term alternative would have already closed the SW loop, so a Partial Cloverleaf Type A would already be partially built. One of the primary benefits of a partial cloverleaf is that it would entirely eliminate weaving conflicts along SR 14/Illinois Road and along I-69.

Improvements for this alternative would consist of widening the arterial to six lanes between Hadley Road and Magnavox Way and adding a deceleration lane for westbound traffic using Ramp B NE to access I-69 northbound (NB). It would also include closing the northeast (NE) loop, reconstructing Ramp A SE to intersect perpendicularly with SR 14/Illinois Road, and adding a signal at that intersection. This configuration also eliminates weaving associated with the EB right turns onto Magnavox Way. Operations of each ramp terminal are shown in Table VI-2.

Ramp	Peak	2020		2040	
		Delay (s)	LOS	Delay (s)	LOS
SB Ramp Terminal	AM	29.5	C	36.4	D
	PM	21.7	C	33.2	C
NB Ramp Terminal	AM	12.9	B	20.0	B
	PM	8.6	A	18.8	B

Table VII–2 Partial Cloverleaf Type A

Merge, Diverge, and Weave Analysis

To ensure adequate safety and operation on I-69, HCS 2010 was used to analyze merging, diverging, and weaving segments. Free-flow speeds for I-69 and SR 14/Illinois Road were taken as 5 miles per hour (mph) over the posted speed limit and loops and ramps were taken as 10 mph over the posted speed limit, all of which are generally consistent with the 85th percentile speed according to the Traffic Count Database System (TCDS). Table VI-3 shows that each segment has an acceptable level of service in 2040. The only segment with LOS D is the diverging segment of SR 14/Illinois Road and Loop E. However, this is a safety improvement over the existing configuration; the weaving segment on SR 14/Illinois Road between Loop H and Loop E operated at LOS F during the AM peak hour in 2015.

Road	Type	Peak	Density (pc/mi/ln)	LOS
SR 14/Illinois Road and Ramp D SW	Diverge	AM	23.4	C
		PM	16.5	B
I-69 and Ramp D SW	Merge	AM	11.6	B
		PM	12.6	B
SR 14/Illinois Road and Ramp B NE	Diverge	AM	10.0	B
		PM	25.2	C
I-69 and Ramp B NE	Merge	AM	18.8	B
		PM	19.5	B
I-69 and Ramp C NW + Loop H SW	Diverge	AM	20.5	C
		PM	25.4	C
I-69 and Ramp A SE + Loop F NE	Diverge	AM	12.2	B
		PM	9.1	A
SR 14/Illinois Road and Loop E SE	Diverge	AM	32.8	D
		PM	14.4	B
I-69 and Loop E SE	Merge	AM	22.1	C
		PM	16.5	B
SR 14/Illinois Road and Loop G NW	Diverge	AM	5.9	A
		PM	15.0	B
I-69 and Loop G NW	Merge	AM	17.5	B
		PM	23.4	C

Table VII-3 2040 HCS 2010 Freeway Operations

The 2040 results for the “closed loop” alternative that differ from the Partial Cloverleaf Type A recommendation are shown in Table VI-4. All movements perform at LOS D or better, so leaving the closed loop as a long-term solution would be acceptable. However, the Partial Cloverleaf Type A is still recommended as the long-term solution because of its operational and safety benefits, particularly the removal of the weaving section.

Road	Type	Peak	Density (pc/mi/ln)	LOS
I-69 NB and Loop E/Loop F	Weave	AM	15.4	B
		PM	11.0	B
SR 14/Illinois Road WB and Loop F/Loop G	Weave	AM	8.1	A
		PM	21.4	C
I-69 NB and Ramp A	Diverge	AM	10.9	B
		PM	8.0	A
SR 14/Illinois Road and Ramp A	Merge	AM	26.7	C
		PM	13.3	B

Table VII-4 2040 HCS 2010 Freeway Operations for Closed Loop Alternative

Local Improvements

Local improvements are recommended to ensure the network functions properly. An EB right-turn lane is recommended at Magnavox Way; otherwise, the right-turning vehicles risk queuing back near the interstate ramps during the morning peak hour. This improvement is the most time-sensitive because this intersection operates at LOS E in 2020 and LOS F in 2030. It is also recommended that the northbound lanes be reconfigured to provide for dual left-turn lanes and a NB shared through and right-turn lane. At Hadley Road, an additional left-turn lane and a separate right turn lane are also recommended because of NB and SB approaches having LOS F in the no-build scenario. LOS and delay for the existing, no-build, and proposed scenarios are shown in Table VI-5.

Road	Peak	2015		2040 (No Build)		2040 (Proposed)	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Hadley Road	AM	38.8	D	46.1	D	34.4	C
	PM	29.7	C	50.3	D	35.2	D
Magnavox Way	AM	42.7	D	99.0	F	56.6	E
	PM	33.5	C	38.0	D	24.6	C

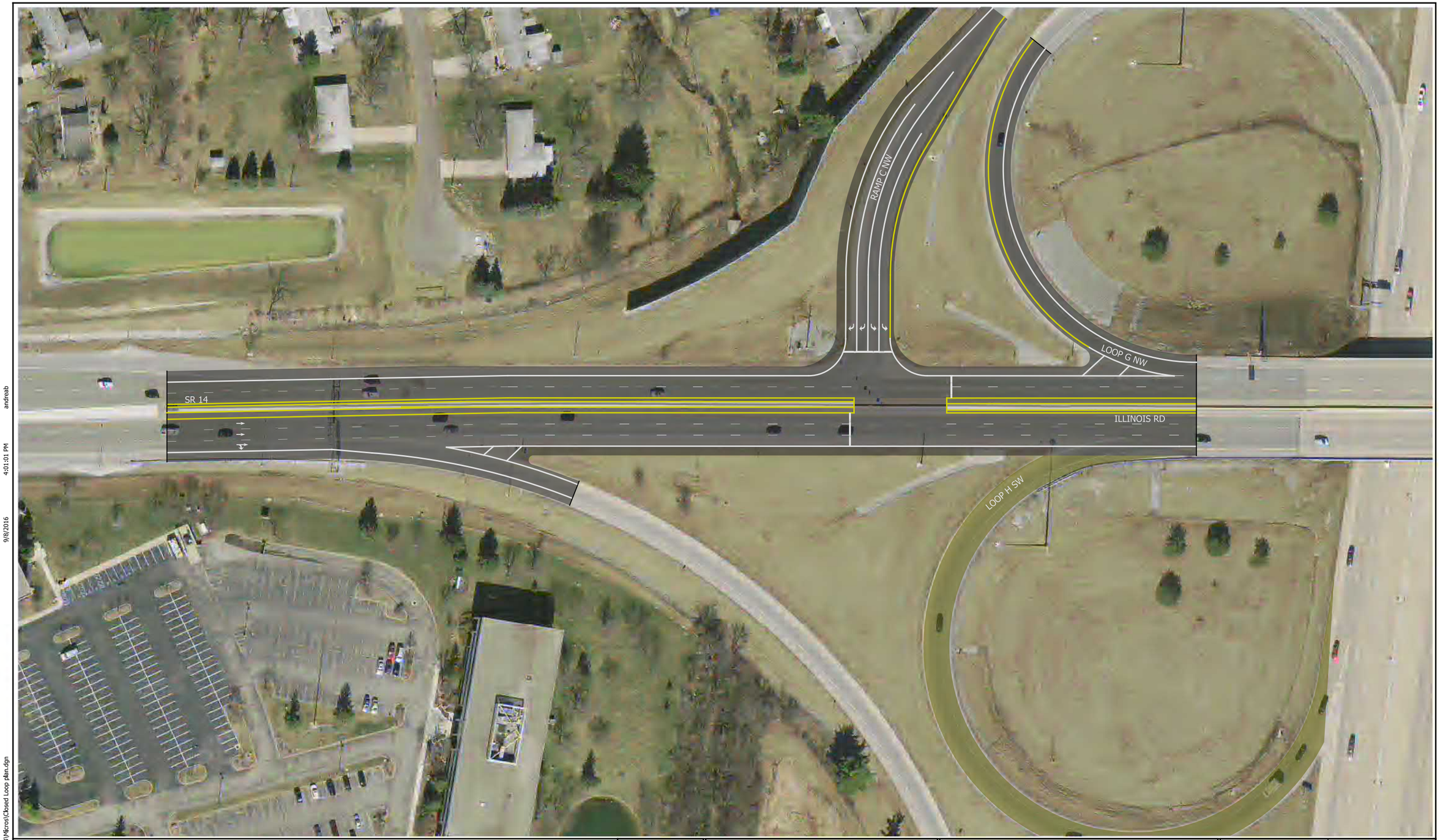
Table VII-5 Intersection Operations at Adjacent Intersections

B. POLICY POINT 2: FULL ACCESS TO PUBLIC ROADWAY

The proposed access connects to a public road only and will provide for all traffic movements. Less than "full interchanges" may be considered on a case-by-case basis for applications requiring special access, such as managed lanes (e.g., transit or high occupancy vehicle and high occupancy toll lanes) or park and ride lots. The proposed access will be designed to meet or exceed current standards (23 CFR 625.2(a), 625.4(a)(2), and 655.603(d)). In rare instances where all basic movements are not provided by the proposed design, the report should include a full-interchange option with a comparison of the operational and safety analyses to the partial-interchange option. The report should also include the mitigation proposed to compensate for the missing movements, including wayfinding signage, impacts on local intersections, mitigation of driver expectation leading to wrong-way movements on ramps, etc. The report should describe whether future provision of a full interchange is precluded by the proposed design.

The preferred alternative design, just as with the current interchange layout, provides full access to and from I-69 at SR 14/Illinois Road. After the interchange modifications, it will still provide for all traffic movements. Although one loop will be removed, its movements will be diverted to a different ramp. SR 14 to the west is under State jurisdiction while Illinois Road to the east is a public road under Fort Wayne jurisdiction. The design will satisfy all design standards for an interchange according to the Indiana Design Manual and AASHTO policy.

APPENDIX A–1
CLOSED LOOP PLAN



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		DESIGNED: _____ DRAWN: _____	CLOSED LOOP SB RAMP TERMINAL	SURVEY BOOK NO.	SHEETS $PAGE_NUM$ of
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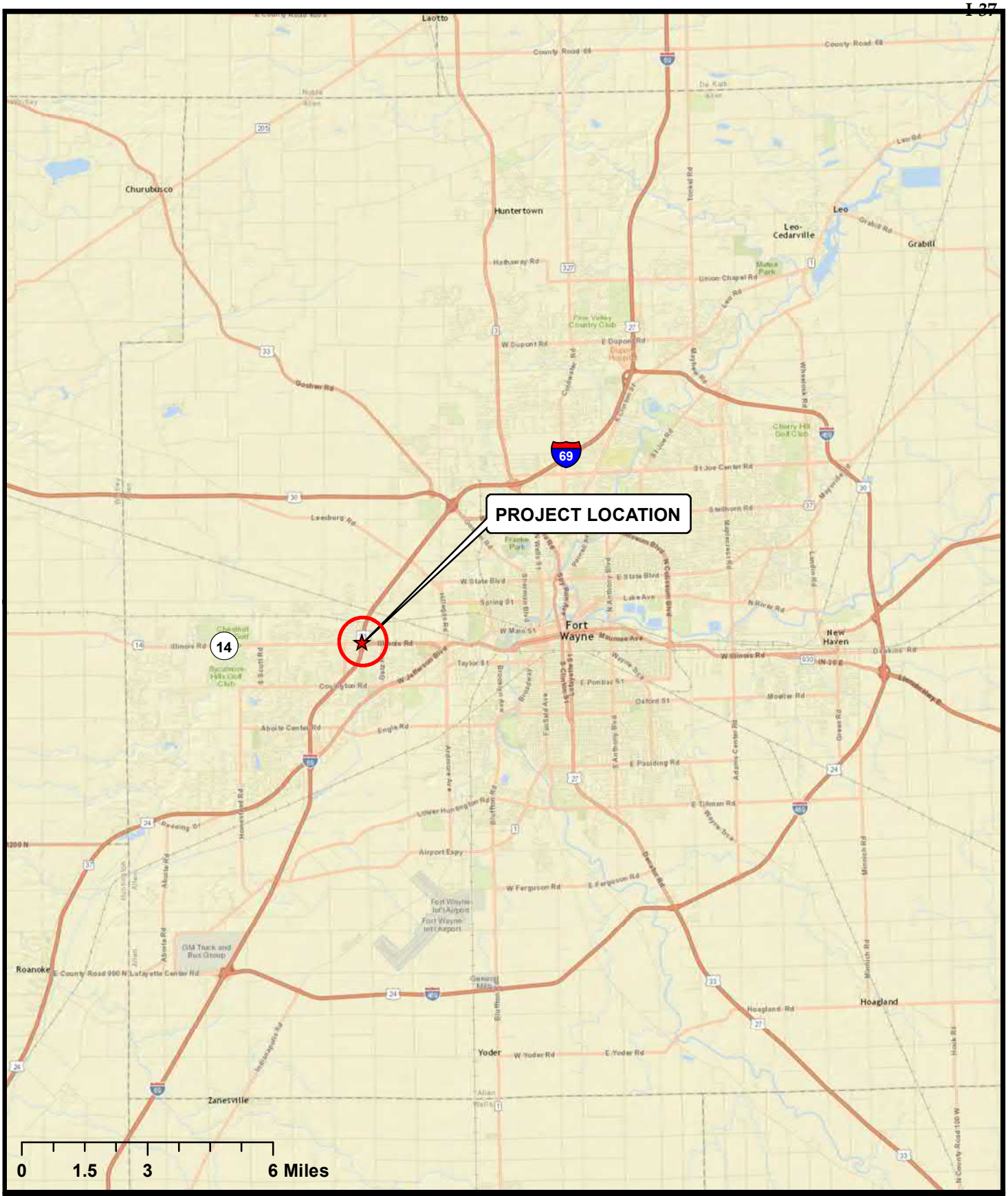
APPENDIX A–2
PROJECT LOCATION



I69 AND SR14/ILLINOIS RD. INTERCHANGE IMPROVEMENTS LOCATION MAP

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ALLEN COUNTY, INDIANA

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A-1
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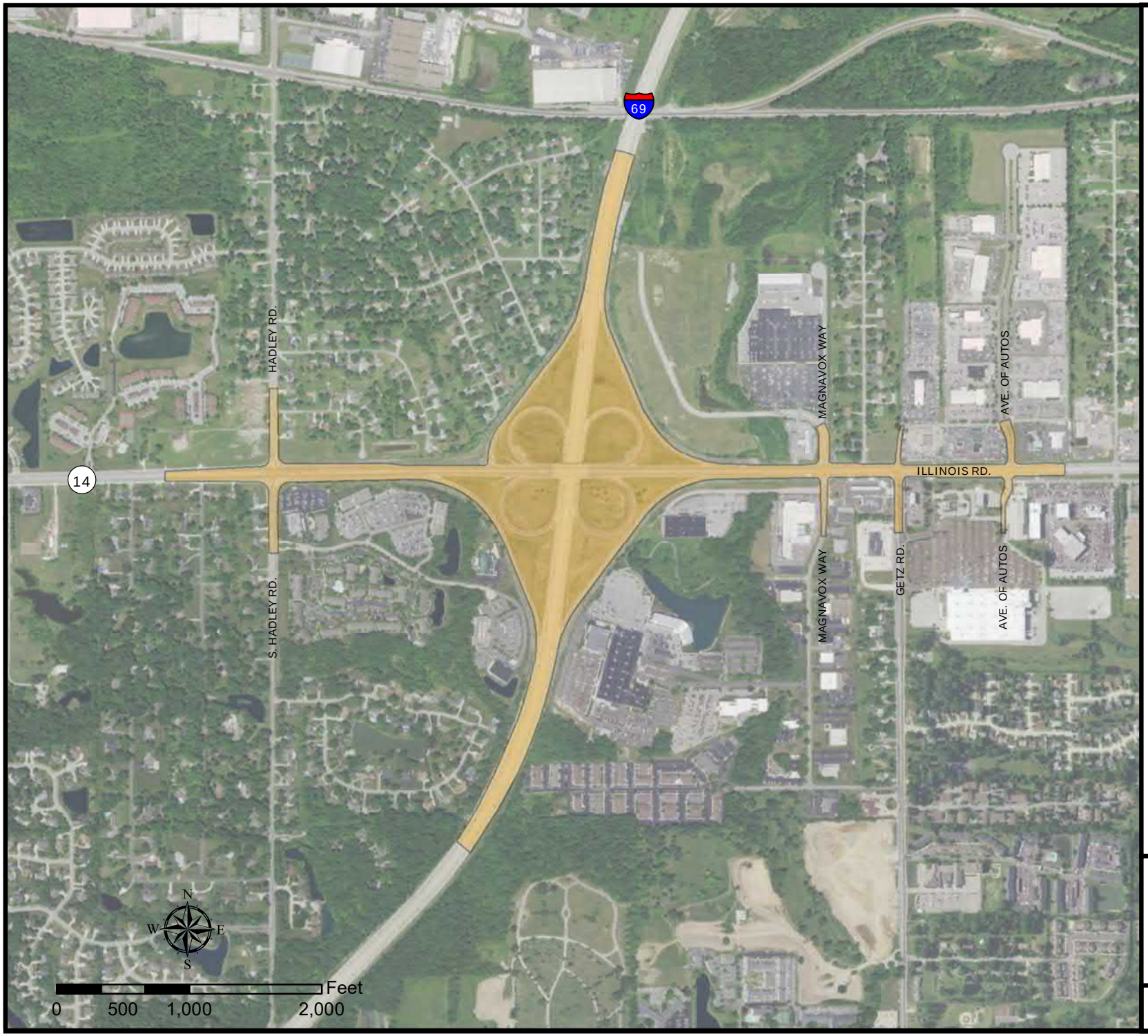
APPENDIX A–3
AREA OF INFLUENCE



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STUDY AREA LIMITS

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I-69 AT SR 14 INTERCHANGE MODIFICATION
INDIANA DEPARTMENT OF TRANSPORATATION
ALLEN COUNTY, INDIANA

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APPENDIX A-3
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APPENDIX A–4
CONCEPTUAL SIGN PLAN

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APPENDIX B–1
ALTERNATIVE SELECTION REPORT

Report for

INDOT, Fort Wayne District

Engineering Assessment Report

I-69 at SR 14 Interchange Modification

Des. No. 1401828

Allen County–Fort Wayne District

Prepared by:

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April 2017

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ENGINEER'S REPORT
I-69 at SR 14/Illinois Road Interchange Modification
Des. No. 1401828

I. PURPOSE OF REPORT

The purpose of this Engineer's Report is to outline the proposal to improve safety at the interchange of I-69 at SR 14/Illinois Road. This Engineer's Report is intended to serve as a guide for the ongoing development of the environmental document and succeeding site survey and design.

II. PROJECT LOCATION

This interchange modification project is located at I-69 at the SR 14/Illinois Road interchange in Allen County within the Fort Wayne District. The project site is located at I-69 from Reference Post 305+18 to Reference Post 305+37. Project location maps are provided in Appendices A–1 and A–2.

III. PROJECT PURPOSE AND NEED

The need for this project is evidenced by the high traffic volumes on loop ramps H southwest (SW) and E southeast (SE), weaving with eastbound (EB) through traffic on Illinois Road. Drivers have reported confusion over how to legally merge and who should yield to whom. American Association of State Highway and Transportation Official's (AASHTO) *A Policy on Geometric Design of Highways and Streets* (Green Book) does not recommend adjacent loops when the sum of the volumes on those two ramps exceeds 1,000 because of the weaving problem and its effect on mainline traffic. Current counts show a combined morning peak-hour volume of nearly 1,800 vehicles per hour (vph) on the two loops previously mentioned.

IV. EXISTING FACILITY

A. ROADWAY HISTORY AND CONDITION

This urban section of I-69 has a Functional Classification of Interstate Highway. The current alignment of I-69 was constructed in 1960 (69-4(13)105) as a four-lane freeway with a full cloverleaf interchange at SR 14/Illinois Road. In 2003, travel lanes were added on I-69 and Ramp C (northwest) was converted from a free-flow ramp into a signalized intersection to minimize weaving conflict (R-26484). SR 14/Illinois Road is classified as Principal Arterial 3.

The I-69 typical cross section features three lanes in each direction, 12 feet in width, consisting of 14-inch concrete pavement (PCCP). The outside shoulders are 12 feet and the median shoulders are 14 feet wide. Underdrain pipes 6 inches in diameter were also included in the construction. The concrete median barrier is 2 foot 6 inches in width and 45 inches in height. Ramps were originally constructed as 10 inch PCCP with 13.5-inch asphalt shoulders but were overlaid with 4 inches of asphalt in 2003.

SR 14/Illinois Road consists of two through lanes in each direction, 12 feet in width, with 12 foot auxiliary lanes. The pavement consists of approximately 16 inches of asphalt. West

of the interchange, the typical cross section features a 10 foot outside shoulder and a 2 foot curbed median shoulder. Throughout the interchange, the 10 foot outside shoulders continue and the median curb is replaced by 6- to 8-foot median shoulders and concrete barrier wall. East of the interchange, both shoulders have 2-foot curbed sections. Underdrains that are 6 inches in diameter also exist on the outside shoulder in both directions.

B. HORIZONTAL ALIGNMENT

Both SR 14/Illinois Road and I-69 are on tangent sections at the interchange. SR 14/Illinois Road has a generally east-west alignment, and I-69 intersects at an angle of approximately 83 degrees. The loops have radii of 208.4 feet.

C. VERTICAL ALIGNMENT

The alignment for both I-69 and for SR 14/Illinois Road is generally level. SR 14/Illinois Road has a crest curve to account for the grade separation with the freeway.

D. ADJACENT LAND USE

The adjacent land use is primarily residential west of I-69 and commercial east of I-69, causing this interchange to experience heavy commuter traffic.

E. EXISTING UTILITIES IN THE PROJECT AREA

A design ticket was completed for the utilities within the project limits, and it is likely that utilities exist in the area. The design ticket is included in Appendix B–1.

V. FIELD INVESTIGATION

A project kickoff meeting was held at the Indiana Department of Transportation (INDOT) Fort Wayne District Office on June 2, 2016, to discuss the various alternatives to analyze in this report. Minutes from this meeting can be found in Appendix B–2. Photos taken the day of the kickoff meeting are included in Appendix A–3.

VI. TRAFFIC DATA AND CAPACITY ANALYSIS

The Northeastern Indiana Regional Coordinating Council (NIRCC) and INDOT Traffic Engineering Division agreed on a 1.1 percent growth rate for SR 14/Illinois Road, 0.2 percent for I-69, and 0.7 percent for the interstate ramps. Traffic counts for Illinois Road, I-69, and the interstate ramps were acquired from the Traffic Count Database System. INDOT provided turning movement counts at the Hadley Road intersection, and NIRCC provided counts for the Magnavox, Getz Road, and Avenue of Autos intersections.

Table VI-1 shows traffic projections for each approach using data from the Traffic Count Database System (TCDS) and its respective growth rate. Table VI-2 shows the current and design-year signal operations for the existing facility at Hadley Road, the southbound ramp terminal, and Magnavox Way. Typically, Highway Capacity Manual (HCM) 2010 is used, but HCM 2000 is used for the southbound ramp terminal because HCM 2010 does not support non-NEMA (National Electrical Manufacturers Association) phasing. Table VI-3 shows the results of a weaving analysis

for the cloverleaf interchange. More information about the existing facility's signal operations and highway operations can be found in Appendices B–3 and B–4, respectively. Additionally, as agreed upon with Indiana Department of Transportation (INDOT), the AM design-year peak hour factor was relaxed. As development increases, traffic will likely be more evenly distributed throughout the peak hour. This change was assumed to be linear and also applicable to adjacent intersections. The PM peak hour factor is assumed to remain unchanged because traffic is already distributed much more evenly. The peak hour factors used in the Synchro models are shown in Table VI-4.

Road Segment	2015 AADT	Projected 2040 AADT
I-69 North of Illinois Road	70,395	73,915
I-69 South of Illinois Road	50,047	52,549
Illinois Road West of I-69	30,749	39,205
Illinois Road East of I-69	37,938	48,371

Table VI–1 Current and Projected Average Annual Daily Traffic (AADT)

Road	Peak	2015		2040	
		Delay (s)	LOS	Delay (s)	LOS
Hadley Road	AM	38.8	D	46.1	D
	PM	29.7	C	50.3	D
SB Ramp Terminal*	AM	7.1	A	8.1	A
	PM	20.1	C	18.9	B
Magnavox Way	AM	42.7	D	99.0	F
	PM	33.5	C	38.0	D

*uses HCM 2000

Table VI–2 Existing Facility Intersection Operations

Road	Peak	2015		2040	
		Density (pc/mi/ln)	LOS	Density (pc/mi/ln)	LOS
I-69 NB	AM	13.7	B	15.4	B
	PM	9.9	A	11.0	B
I-69 SB	AM	12.0	B	13.5	B
	PM	16.0	B	17.7	B
SR 14/Illinois Rd. EB	AM	--	F	--	F
	PM	22.9	C	29.7	D
SR 14/Illinois Rd. WB	AM	6.5	A	8.1	A
	PM	14.2	B	21.4	C

Table VI–3 Existing Weaving Operations

	Existing	2030	2040
Hadley Road	0.78	0.82	0.85
Ramp Terminals	0.78	0.82	0.85
Magnavox Way	0.73	0.77	0.80

Table VI-4 AM Peak Hour Factors

VII. CRASH DATA AND ANALYSIS

As mentioned in the project need section of this report, many crashes in this area of influence are caused by merging or weaving scenarios. Crashes at Hadley Road and Magnavox Way along SR 14/Illinois Road are included because of the current weaving patterns caused by free-flow movements between Hadley Road and the southbound (SB) On Ramp as well as between the northbound (NB) Off Ramp and Magnavox Way. The nearest intersection listed (I-69 or SR 14/Illinois Road) in the crash report was used to determine the type of crash for the loops and ramps. Crashes were excluded for the following primary factors listed in the crash report: animal/object in roadway; roadway surface condition, provided speed was not a contributing issue; and driver asleep or fatigued.

A total of 201 intersection-related crashes occurred in the 5-year period from 2012 through 2016. They involved 347 vehicles, 37 total injuries, and one fatality. These crashes are summarized in Table VII-1.

			Crash Severity			Crash Type			
Year	Crashes	Vehicles Involved	Property Damage Only	Injury	Fatal	Rear End	Ran off Road	Same-direction Sideswipe	Other
2012	33	56	26	6	1	11	11	8	3
2013	37	61	30	7	0	14	15	8	0
2014	37	65	33	4	0	16	14	7	0
2015	49	83	39	10	0	21	17	9	2
2016	45	82	38	7	0	20	14	10	1
Total	201	347	166	34	1	82	71	42	6
% Total			**82.6%**	**16.9%**	**0.5%**	**40.8%**	**35.3%**	**20.9%**	**3.0%**

Table VII–1 Summary of Crash Types and Severities

The crash type distribution shows three primary types: rear end, ran off road, and same-direction sideswipe. These three types often have lower severity levels, which corresponds with the large majority of crashes that are classified as property damage only. Additionally, there is a relatively high proportion of same-direction sideswipe crashes, and all three of those crash types are frequently found in congested areas with high merging volumes.

Table VII-2 shows the Index of Crash Frequency (ICF) and Index of Crash Cost (ICC) for each interchange road segment, diagonal ramp, and loop. The annual average daily traffic (AADT) value used was the average of the AADT for 2012 through 2016 from the TCDS (for both directions, if applicable). The positive values for SR 14/Illinois Road, Loop E, and Loop H are

indicative of the observed weaving problem involving those loops, and the ICF for Loop H is particularly high. The short-term solution will directly address these higher crash indexes. Other segments with higher-than-average crash frequencies include Ramps A and C, although their crash costs are relatively low. Some crashes at Ramp C may be influenced by this project, but the crashes at Ramp A would not be addressed until the second phase of the project. The RoadHAT reports can be found in Appendix B-5.

2012 Through 2016 Crashes								
Segment Name	**Length**	**Average AADT**	**PDO***	**Non-Incap. Injury**	**Incap. Inj./Fatal**	**Total**	**ICF**	**ICC**
I-69	1.09	57,071	53	9	1	63	-0.89	-1.33
SR 14/Illinois Rd	--	33,431	35	7	2	44	0.32	0.87
Ramp A	0.35	2,678	10	2	1	13	1.06	-4.27
Ramp B	0.35	7,578	10	1	0	11	-0.99	-40.89
Ramp C	0.29	6,967	26	4	1	31	1.93	-9.09
Ramp D	0.35	1,769	1	0	0	1	-1.97	-37.74
Loop E	0.20	6,733	7	2	0	9	0.62	0.22
Loop F	0.20	1,577	3	0	0	3	0.16	-0.63
Loop G	0.20	2,732	2	1	0	3	-0.06	-0.16
Loop H	0.20	7,086	23	3	0	26	2.73	1.55

*Property Damage Only (PDO)

Table VII–2 RoadHAT Analysis

VIII. DISCUSSION OF SHORT-TERM ALTERNATIVES/IDENTIFICATION OF PROPOSAL

Currently, money is programed to construct a short-term solution to the operations at this interchange. The alternatives evaluated in this section of the report are the “No Build” alternative, the “Modified Loop” alternative, and the recommended “Closed Loop” alternative. The short-term alternatives have been analyzed with an interim design year of 2030.

Certain assumptions were made for the analysis of these alternatives. First, count data were limited for SR 14/Illinois Road. The TCDS had comprehensive data for the interstate and ramps; however, counts for SR 14/Illinois Road were only available at points west and east of the interchange, and no truck information was available. A peak hour factor (PHF) was estimated for all ramp intersections by adding 15-minute counts from SR 14/Illinois Road and each ramp to determine an approximate PHF for the interchange. Heavy vehicle percentages were estimated for EB and westbound (WB) Illinois Road by comparing percentages from counts at Hadley Road and Magnavox Way. For the A.M. peak hour, the EB and WB percentages at each intersection were the same. For the P.M. peak hour, the WB percentages were the same but EB differed by 2 percent, so the average of the two percentages was used for the interchange intersections.

To project traffic counts to design year, a 1.1 percent linear annual growth rate (LGR) was used for Illinois Road, 0.2 percent for I-69, and 0.7 percent for the freeway ramps. Traffic operations were analyzed using Synchro 9.1 and Highway Capacity Manual (HCM) 2010 wherever possible. Similar to the existing condition, HCM 2000 was used for the modified loop alternative because of its phasing structure; HCM 2010 shows no delays for the right-turning ramp movements. If the optimal network signal timing was greater than 120 seconds, the network was set to a cycle length of 120 seconds consistent with IDM 41-5.0.

A. NO-BUILD ALTERNATIVE

Since the No-Build Alternative does nothing to address the underlying safety issue, this alternative was considered to not be prudent.

B. MODIFIED LOOP

Instead of expanding the existing ramp in the northwest (NW) quadrant, the modified loop alternative would leave most of the southwest loop in place and construct a tangent section to connect Loop H SW to SR 14/Illinois Road perpendicularly at the existing signal, opposite of Ramp C NW. Although this would require less pavement removal, this alternative also requires more pavement construction. It would also allow the signal to essentially operate as two separate 2-phase signals for efficient traffic flow. Although the I-69 SB weaving segment is not a primary concern, the weaving conflict between the northwest and southwest loops would still exist. This alternative also would not easily transition into the long-term design. Additionally, although the modified loop alternative seems to operate slightly better than the closed loop alternative, the difference is likely negligible. Some variance may be accounted for by different methodology; the modified loop alternative uses HCM 2000 due to the non-NEMA phasing structure. The HCM results can be found in Appendix B–6 for the modified loop alternative.

		Closed Loop		Modified Loop*	
Year	**Peak**	**Delay (s)**	**LOS**	**Delay (s)**	**LOS**
2020	AM	29.5	C	26.9	C
	PM	25.4	C	18.5	B
2030	AM	33.5	C	33.0	C
	PM	28.1	C	21.4	C
2040	AM	36.1	D	34.8	C
	PM	36.6	D	27.8	C

*uses HCM 2000

Table VIII–1 SB Ramp Terminal Operations

C. CLOSED LOOP (RECOMMENDED)

The closed loop alternative consists of closing Loop H SW and routing that traffic onto Ramp C NW. This traffic would turn left at the signal to continue eastbound on SR 14/ Illinois Rd, requiring the median barrier to be removed in that location. This solves the primary weaving conflict with the two loops on the south side of Illinois Road Additionally, although the volumes on Loop G NW are not has high as the SW and southeast (SE) loops, closing the SW loop would eliminate a weaving conflict with the NW loop. Another reason for the recommendation of this alternative is that it is a necessary step to the recommended long-term solution, discussed in the next section.

This alternative can be accomplished by the construction of two left-turn lanes in addition to the two existing right-turn lanes on Ramp C NW. In order to accommodate the heavy eastbound traffic in the A.M. peak hour that is no longer uninterrupted flow, the eastbound

segment of SR 14/Illinois Road from Ramp D SW to the bridge will need to be expanded to three lanes. This will make Ramp D SW a shared through/right lane.

Additionally, the addition of an exclusive EB right-turn lane at Magnavox Way is recommended; without it, this intersection operates at level of service (LOS) E during a 2020 construction year and LOS F during the 2030 interim design year with queuing back near the interstate ramps. However, this improvement should be funded locally and is not included in the opinion of probable cost. Although the intersection at Hadley Road operates at LOS E during the long-term design year (2040), it is recommended that any improvements to that intersection are constructed as part of the long-term alternative because of budget restrictions. Intersection operations for the construction year and interim design year can be found in Table VIII-2. Full HCM 2010 reports for 2020, 2030, and 2040 are provided in Appendix B–7.

Year	Peak	Hadley Road		SB Ramp Terminal		Magnavox Way	
		Delay (s)*	LOS	Delay (s)	LOS	Delay (s)	LOS
2020	AM	38.6	D	29.5	C	39.3	D
	PM	33.2	C	25.4	C	27.7	C
2030	AM	40.8	D	33.5	C	42.7	D
	PM	38.8	D	28.1	C	28.1	C
2040	AM	47.9	D	36.1	D	49.1	D
	PM	49.2	D	36.6	D	36.5	D

*seconds (s)

Table VIII–2 Short-Term Signalized Intersection Operations (HCM 2010)

Highway Capacity Software (HCS) 2010 was used to analyze merging, diverging, and weaving segments. Free-flow speeds for the freeway and arterial were taken as 5 mph over the posted speed limit and loops and ramps were taken as 10 mph over the posted speed limit, all of which are generally consistent with the 85th percentile speed according to the TCDS. For the interim design year, any point that had been changed in the short-term design alternative or would be changed in the long-term alternative was examined. Important freeway operation changes for the short term are as follows:

- Ramp D SW is converted into a shared through/right lane.
- Ramp C NW now carries traffic from Loop H SW in addition to its original volume.
- Loop G now is a merging segment with I-69 rather than a weaving segment.
- Loop F, although it will be eliminated in the long-term design alternative, still has weaving with both Loop E and Loop G.

HCS 2010 results for those listed previously are shown in Table VIII-3 and full reports can be found in Appendix B–8. Freeway operations for all points in 2040 can be found in the next section.

Road	Type	Peak	Density (pc/mi/ln)	LOS
SR 14/Illinois Road and Ramp D SW	Diverge	AM	21.7	C
		PM	15.4	B
I-69 & Ramp C NW + Loop H SW	Diverge	AM	19.8	B
		PM	24.7	C
I-69 SB and Loop G NW	Merge	AM	11.5	B
		PM	19.3	B
I-69 NB and Loop E/Loop F	Weave	AM	15.8	B
		PM	11.4	B
SR 14/Illinois Road WB and Loop F/Loop G	Weave	AM	7.5	A
		PM	16.6	B

Table VIII–3 2030 HCS 2010 Freeway Operations Results

With all the improvements detailed previously, an estimated project cost can be found in Table VIII–4 below. An itemized opinion of probable construction cost can be found in Appendix B–9.

Construction	$755,942
Engineering	$117,000
Utilities	$ 35,000
Environmental	$ 30,000
Total	**$891,942**

Table VIII–4 Estimated Total Project Cost

IX. DISCUSSION OF LONG-TERM ALTERNATIVES/IDENTIFICATION OF PROPOSAL

Several long-term alternatives were investigated to further help traffic operations at this interchange once a larger project could be programmed. Although the short-term solution will address the immediate safety issue, the congestion at this interchange will require additional modifications in the future. The alternatives of “Diverging Diamond,” “Partial Cloverleaf Type B,” and the recommended “Partial Cloverleaf Type A” are described in the following.

A. DIVERGING DIAMOND INTERCHANGE (DDI)

DDIs have a crossover point on each side of the interchange that eliminate many conflict points when compared to a traditional diamond interchange. In many instances, it can be retrofit to an existing bridge and can lead to more efficient operations. The first DDI in the United States opened in June 2009; since the interchange type is so new, only recently have studies begun to have enough data after the implementation of a DDI to examine its effects. A study published by Edara, et al.[1] calculated that the conversion of a traditional diamond to a DDI could reduce crashes of all crash types and severity types by more than 40 percent over the interchange footprint (ramp terminals, ramps, speed-change lanes, crossroad, and freeway). Although this crash reduction factor is not directly applicable

[1] Edara, P., C. Sun, B. Claros, and H. Brown. "Safety Evaluation of Diverging Diamond Interchanges in Missouri." Report No. cmr 15-006. Missouri Department of Transportation. Jefferson City, Missouri. (January 2015).

because its current configuration is a cloverleaf rather than a diamond, it gives an indication of the kind of effect this interchange design can have.

This interchange reconfigured to a diverging diamond operated fairly efficiently, and the HCM results can be found in Appendix B–10. This alternative would entail expanding the corridor to six lanes and using a three-stage split with overlap timing scheme. The DDI signals were not coordinated with surrounding intersections because of their complexity. Under these conditions all ramp terminals met the level of service requirements (Table IX-1); however, when the operations and cost are compared to the recommended alternative, the much higher cost of the DDI is not justified. A diverging diamond would require reconstruction of a significant portion of the roadway to accommodate the crossovers. The recommended crossover angle is 40 to 50 degrees to avoid driver confusion, and the narrow existing median and requires a longer project length to accommodate the recommended minimum radius. The estimated project cost is shown in Table IX-2, and an itemized opinion of probable cost can be found in Appendix B–11.

Ramp	Peak	2020 Operations		2040 Operations	
		Delay (s)	LOS	Delay (s)	LOS
SB Ramp Terminal	AM	19.0	B	28.2	C
	PM	19.1	B	26.0	C
NB Ramp Terminal	AM	15.0	B	17.9	B
	PM	19.4	B	21.2	C

*Uses HCM 2000 methodology because intersections are clustered.

Table IX–1 Diverging Diamond Operations*

Construction	$8,261,796
Engineering	$600,000
Utilities	$50,000
Environmental	$50,000
Total	**$8,961,796**

Table IX–2 Estimated Total DDI Project Cost

B. PARTIAL CLOVERLEAF TYPE B (PARCLO B)

Because of the existing full cloverleaf configuration, A Parclo B was also considered as an alternative. This Parclo B would leave loops F northeast (NE) and H SW in place as exit ramps onto SR 14/Illinois Road and construct signalized left turns on to the freeway. The high volume on the SW loop combined with a low PHF in the AM peak hour led to the elimination of this alternative. As a single-lane, free-flow loop, the heavy traffic runs the risk of queuing onto the freeway. Additionally, EB through capacity of the SB ramp terminal intersection would be restricted to two lanes because the third lane across the bridge would be used as the loop's "add" lane. Making the loop signalized instead of free-flow was also analyzed, but even triple right-turn lanes still resulted in LOS F for that intersection. This alternative was eliminated due to poor LOS.

C. PARTIAL CLOVERLEAF TYPE A (PARCLO A) (RECOMMENDED)

Parclo A was analyzed because of its similarity with the recommended short-term "Closed Loop" alternative. The short-term alternative would have already closed the SW loop, so a Parclo A would already be partially built. One of the primary benefits of a partial cloverleaf is that it eliminates weaving conflicts along the mainline and along the freeway, which have been cited as a significant reason for crashes at this interchange.

Improvements for this alternative would consist of widening the arterial to six lanes between Hadley Road and Magnavox Way and adding a deceleration lane for westbound traffic using Ramp B NE to access I-69 NB. It would also include closing the NE loop, reconstructing Ramp A SE to intersect perpendicularly with SR 14/Illinois Road, and adding a signal at that intersection. This configuration also eliminates weaving associated with the EB right turns onto Magnavox Way HCM 2010 results for the intersections at ramp terminals are shown in Table IX-3. All 2020 and 2040 HCM 2010 reports are provided in Appendix B–12.

Ramp	Peak	2020		2040	
		Delay (s)	LOS	Delay (s)	LOS
SB Ramp Terminal	AM	29.5	C	36.4	D
	PM	21.7	C	33.2	C
NB Ramp Terminal	AM	12.9	B	20.0	B
	PM	8.6	A	18.8	B

Table IX–3 Partial Cloverleaf Type A

Highway Capacity Software (HCS) 2010 was used to check freeway operations for 2040. All weaving movements have been eliminated, so Table IX-4 shows merging and diverging segments. Results from the new configuration can be found in Table IX-4, and reports are provided in Appendix B–13. Although no LOS F segments exist, the LOS could be improved in some locations by extending an existing auxiliary lane (such as Loop G NW or Loop E SE merging with I-69).

Road	Type	Peak	Density (pc/mi/ln)	LOS
SR 14/Illinois Road and Ramp D SW	Diverge	AM	23.4	C
		PM	16.5	B
I-69 and Ramp D SW	Merge	AM	11.6	B
		PM	12.6	B
SR 14/Illinois Road and Ramp B NE	Diverge	AM	10.0	B
		PM	25.2	C
I-69 and Ramp B NE	Merge	AM	18.8	B
		PM	19.5	B
I-69 and Ramp C NW + Loop H SW	Diverge	AM	20.5	C
		PM	25.4	C
I-69 and Ramp A SE + Loop F NE	Diverge	AM	12.2	B
		PM	9.1	A
SR 14/Illinois Road and Loop E SE	Diverge	AM	32.8	D
		PM	14.4	B
I-69 and Loop E SE	Merge	AM	22.1	C
		PM	16.5	B
SR 14/Illinois Road and Loop G NW	Diverge	AM	5.9	A
		PM	15.0	B
I-69 and Loop G NW	Merge	AM	17.5	B
		PM	23.4	C

Table IX–4 2040 HCS 2010 Freeway Operations

Another alternative would be to do nothing in the long term, having completed the short-term recommendation. In this scenario, key operations would be as shown in Table IX-5 (all others would be as shown in Table IX-4). All movements exceed the minimum level of service, so leaving the closed loop as a long-term solution would be acceptable. However, the Parclo A is still recommended as the long-term solution because of its operational and safety benefits, particularly the removal of the weaving section.

Road	Type	Peak	Density (pc/mi/ln)	LOS
I-69 NB and Loop E/Loop F	Weave	AM	15.4	B
		PM	11	B
SR 14/Illinois Rd WB and Loop F/Loop G	Weave	AM	8.1	A
		PM	21.4	C
I-69 NB and Ramp A	Diverge	AM	10.9	B
		PM	8	A
SR 14/Illinois Rd and Ramp A	Merge	AM	26.7	C
		PM	13.3	B

Table IX-5 2040 HCS 2010 Freeway Operations for Closed Loop Alternative

Other Improvements

Improvements are also recommended for Hadley Road and Magnavox Way. Their proximity to the ramp terminals necessitates improvements to ensure their operations do not negatively impact the operations of the interchange. At Hadley Road, improvements include an additional SB left-turn lane and an exclusive SB right-turn lane. At Magnavox Way, recommended improvements at this stage are converting the current left/through/right NB configuration to a dual left and a shared through/right. Similar to the short-term recommendations, these improvements at the Magnavox Way intersection would also be funded locally.

Signal timing along the arterial was also updated. Previously, two separate timing systems existed: INDOT controlled the intersections at Hadley Road and the SB ramp terminal, and NIRCC controlled the intersections east of the interstate. With the addition of a signalized NB ramp terminal, the arterial will operate more smoothly with coordinated signals throughout. Table IX-6 shows the level of service at each intersection with and without improvements.

Road	Peak	Existing (2015)		No Build (2040)		Modified (2040)	
		Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
Hadley Road	AM	38.8	D	46.9	D	34.4	C
	PM	29.7	C	50.3	D	35.2	D
Magnavox Way	AM	42.7	D	99.0	F	56.6	E
	PM	33.5	C	38.0	D	24.6	C

Table IX–6 Intersection Operations for Adjacent Intersections

Table IX–4 shows that the Magnavox Way intersection during the AM peak, although significantly improved from the No-Build alternative, still experiences a LOS worse than recommended by the IDM. However, since the threshold between LOS D and LOS E is 55 seconds, it is recommended to accept the design at LOS E because of the costs of additional improvements. Retiming the signal to a 130-second cycle length did not have significant improvements on the intersection operations.

The present value of improvements for the interchange and the Hadley Road intersection are shown in Table IX–7. An opinion of probable construction cost can be found in Appendix B–14.

Construction	$822,757
Engineering	$120,000
Utilities	$ 35,000
Environmental	$ 30,000
Total	**$1,007,757**

Table IX–7 Estimated Total Project Cost

These segments of I-69 and SR 14/Illinois Road will follow the INDOT 3R Geometric Design Criteria for an urban freeway and urban arterial (four or more lanes), respectively, as detailed in Table 54-2A and Figure 55-3E in the IDM.

Functional Classification	Freeway	Urban Arterial, 4+ lanes
Design Class	3R	3R
Design Speed	Original Design Speed (70 mph)	Posted Speed Limit (45 mph)
Access Control	Full	None
Through Travel Lane Width	12 feet (ft)	11 ft
Paved Shoulder	10 ft	Curbed: 1 ft Rt*., 2 ft Lt*. Uncurbed: 8 ft Rt., 3 ft Lt.
Usable Shoulder	11 ft	Same as paved
Guardrail	2 ft from edge of usable shoulder	2 ft from edge of usable shoulder
Obstruction Free Zone	30 ft from edge of travelway	18 ft from edge of travelway
Cross Slope	2% (match existing)	2% to 3%

*Right (Rt) *Left (Lt)

Table IX-8 Design Guidelines for I-69 and SR 14/Illinois Road

X. ENVIRONMENTAL ISSUES

Since all proposed improvements are to occur on previously disturbed right-of-way, no significant environmental impacts are expected. During completion of the environmental document, the project area will need to be investigated for the presence of wetlands. All environmental issues will be addressed in greater detail in the Environmental Phase and listed in the Environmental Document.

Because no structure work is currently anticipated, the only likely permit required for this project will be a Rule 5 permit.

XI. SURVEY REQUIREMENTS

A full topographic survey will be required prior to design. The survey along SR 14/Illinois Road should begin approximately 500 feet west of the intersection with Hadley Road and end at the west edge of the concrete bridge approach over I-69. It should also extend 200 feet to the north and south. Additionally, the survey should include 750 feet along Ramp C NW and 8- feet to either side.

XII. RIGHT-OF-WAY IMPACT

No permanent or temporary right-of-way impacts are anticipated.

XIII. TRAFFIC MAINTENANCE DURING CONSTRUCTION

Phased construction with shoulder closures and temporary lane closures will be used for all construction, and the Indiana Manual on Uniform Traffic Control Devices should be followed (IMUTCD).

XIV. RELATED PROJECTS, CONSISTENCY

This project is currently the only one planned in the area for fiscal year 2020.

XV. COORDINATION, MEETINGS, CONCURRENCE

Development of this report included coordination and concurrence with Fort Wayne District representatives of the INDOT, Federal Highway Administration, and the NIRCC.

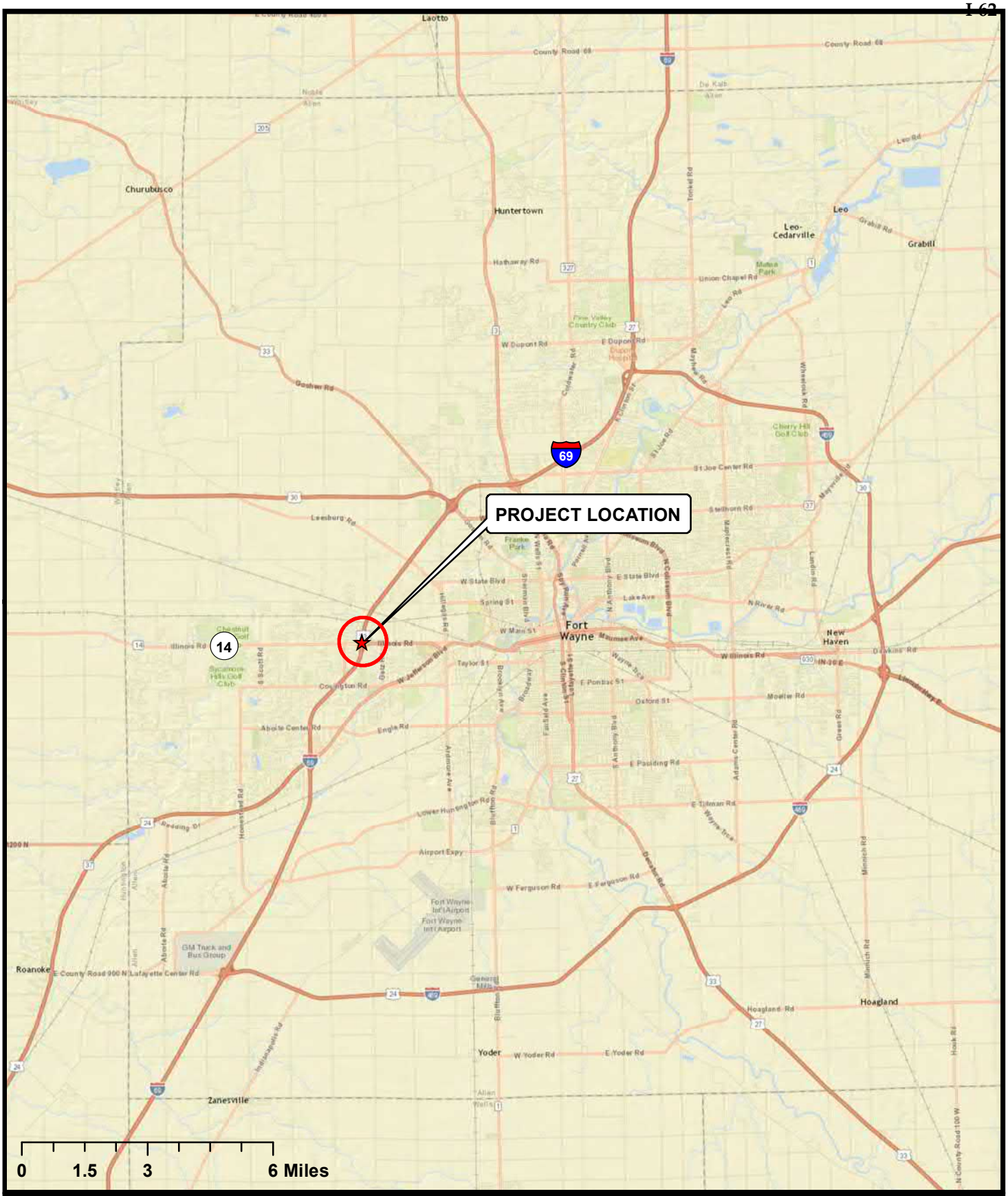
Prepared by: _____ 4/12/17
Marc A. Rape, P.E. — Date
Strand Associates, Inc.®

Concur: Jason A Kaiser 2017.04.28 15:35:40 -04'00'
Jason Kaiser, P,E. — Date
Technical Services Director

_____ 4/18/2017
Lew Kreger — Date
Systems Assessment Engineer

Susan J. Doell, P.E. 4/18/2017
Susan Doell, P.E. — Date
Project Manager

APPENDIX A–1
PROJECT LOCATION MAP



I69 AND SR14/ILLINOIS RD. INTERCHANGE IMPROVEMENTS LOCATION MAP

DES. 1401828
ALLEN COUNTY, INDIANA

STRAND ASSOCIATES®

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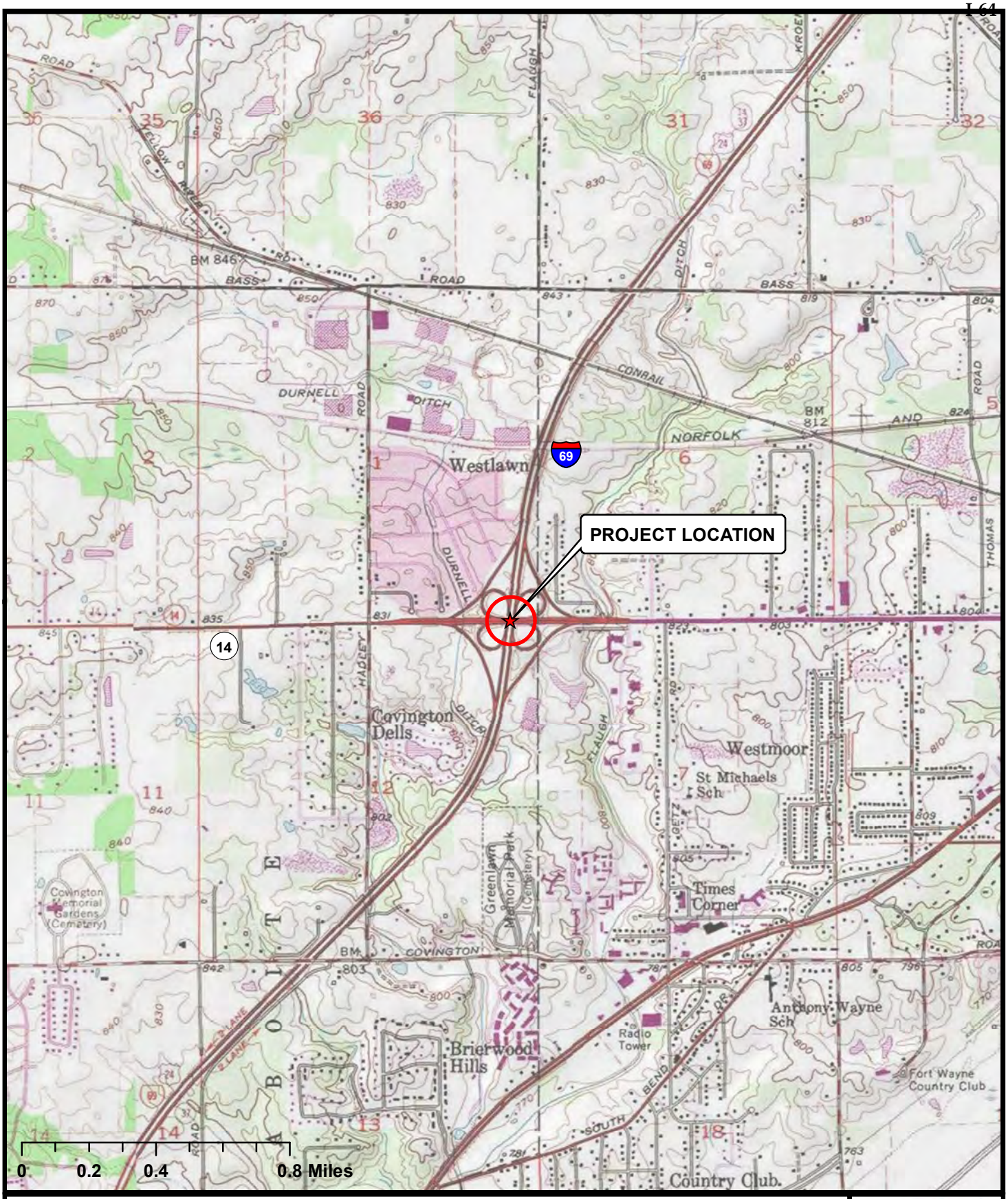
APPENDIX A–2
USGS QUAD MAP



I69 AND SR14/ILLINOIS RD.
INTERCHANGE IMPROVEMENTS
LOCATION MAP

DES. 1401828
ALLEN COUNTY, INDIANA

STRAND ASSOCIATES®

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APPENDIX A–3
PHOTOS

Date: June 2, 2016

Time: 10:00 A.M.

Photo Number: P1010413

Description:
Typical Loop Superelevation

Date: June 2, 2016

Time: 10:00 A.M.

Photo Number: P1010416

Description:
View of Loop H SW merging with eastbound Illinois Rd.

APPENDIX A-3

I-69 @ SR 14 INTERCHANGE IMPROVEMENTS
INDIANA DEPARTMENT OF TRANSPORTATION
FORT WAYNE, IN
SITE PHOTOGRAPHS

STRAND ASSOCIATES®

Date: June 2, 2016

Time: 10:00 A.M.

Photo Number: P1010417

Description:
Existing concrete median barrier and signal for Ramp C NW and westbound Illinois Rd. traffic (looking northwest)

APPENDIX A–4
CLOSED LOOP PLAN

	RECOMMENDED FOR APPROVAL _____ DESIGN ENGINEER DATE	INDIANA DEPARTMENT OF TRANSPORTATION	HORIZONTAL SCALE 1" = 50' / BRIDGE FILE NO.
	DESIGNED: _____ DRAWN: _____ CHECKED: _____ CHECKED: _____	CLOSED LOOP SB RAMP TERMINAL	VERTICAL SCALE / DESIGNATION NO.
			SURVEY BOOK NO. / SHEETS $PAGE_NUM$ of
			CONTRACT NO. / PROJECT NO.

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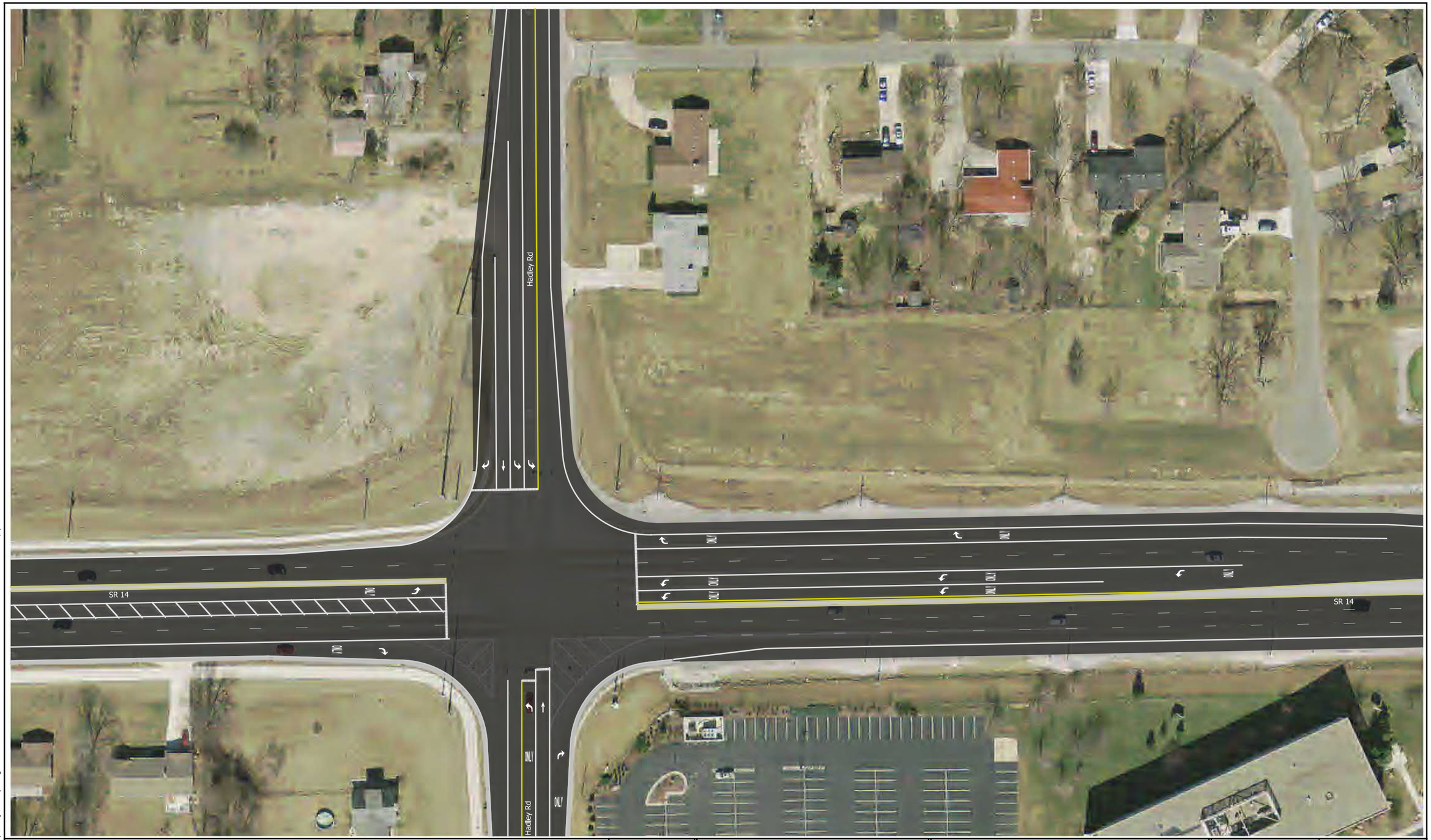
APPENDIX A–5
PARCLO A PLAN



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		DESIGNED: _____ DRAWN: _____ CHECKED: _____ CHECKED: _____	SR 14 & HADLEY RD	SURVEY BOOK NO. / SHEETS: $PAGE_NUM$ of / CONTRACT NO. / PROJECT NO.

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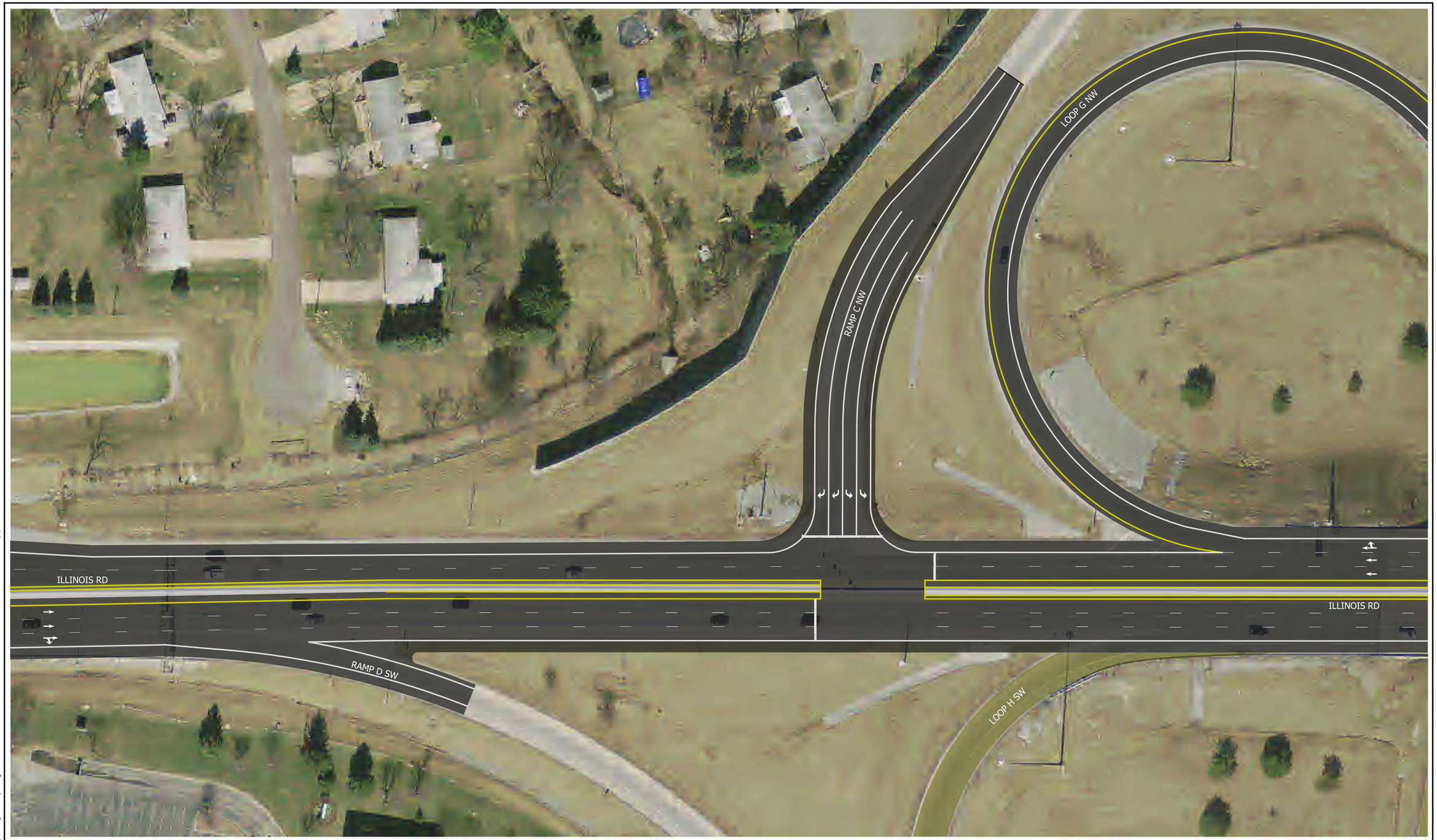

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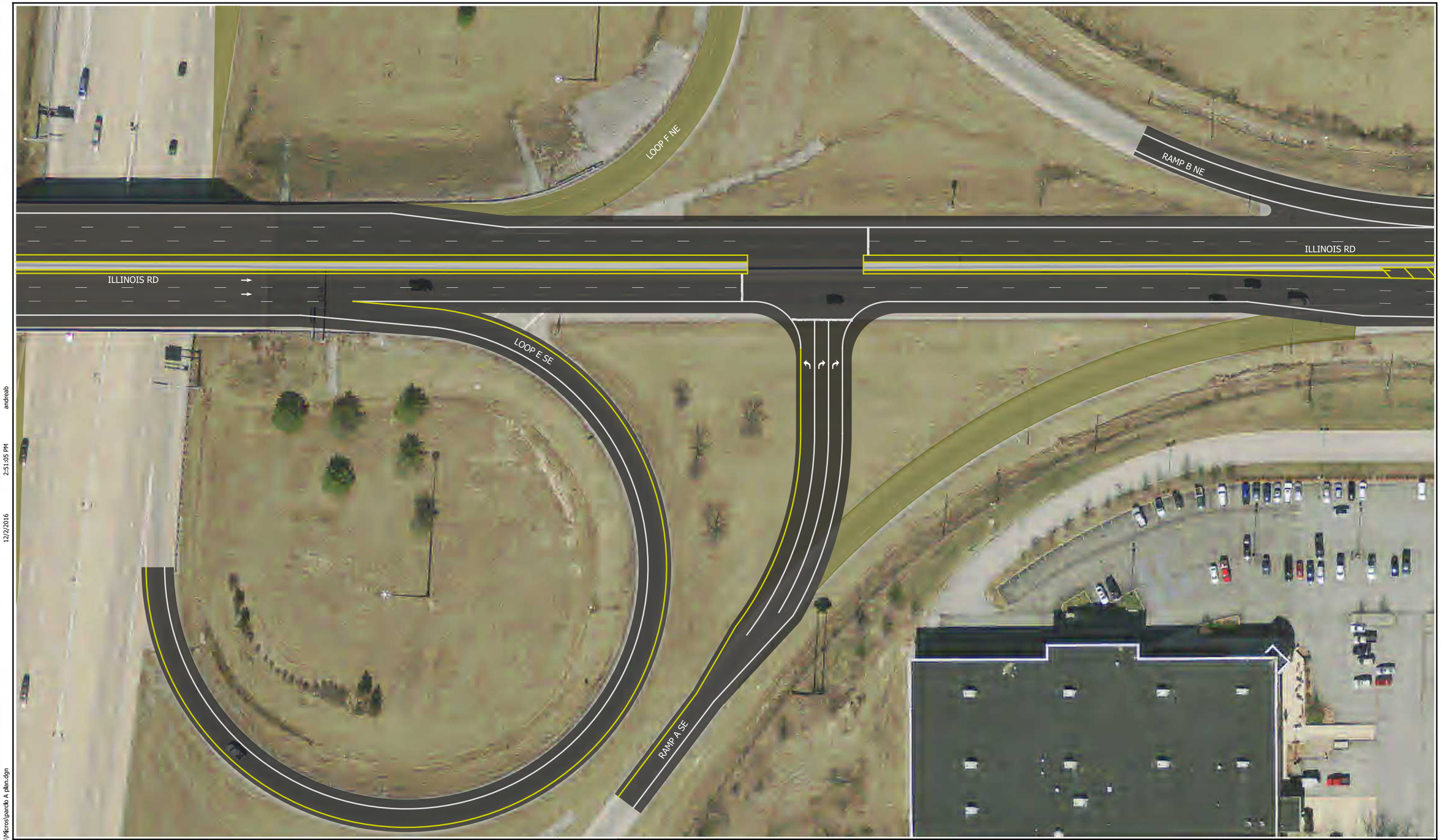
		VERTICAL SCALE	DESIGNATION NO.
DESIGNED: _____ DRAWN: _____	ILLINOIS RD AND SB RAMPS	SURVEY BOOK NO.	SHEETS $PAGE_NUM$ of
CHECKED: _____ CHECKED: _____		CONTRACT NO.	PROJECT NO.



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RECOMMENDED FOR APPROVAL _____ DESIGN ENGINEER DATE

DESIGNED: _____ DRAWN: _____

CHECKED: _____ CHECKED: _____

INDIANA
DEPARTMENT OF TRANSPORTATION

ILLINOIS RD AND NB RAMPS

HORIZONTAL SCALE	BRIDGE FILE NO.
1" = 40'	
VERTICAL SCALE	DESIGNATION NO.
SURVEY BOOK NO.	SHEETS
	$PAGE_NUM$ of
CONTRACT NO.	PROJECT NO.

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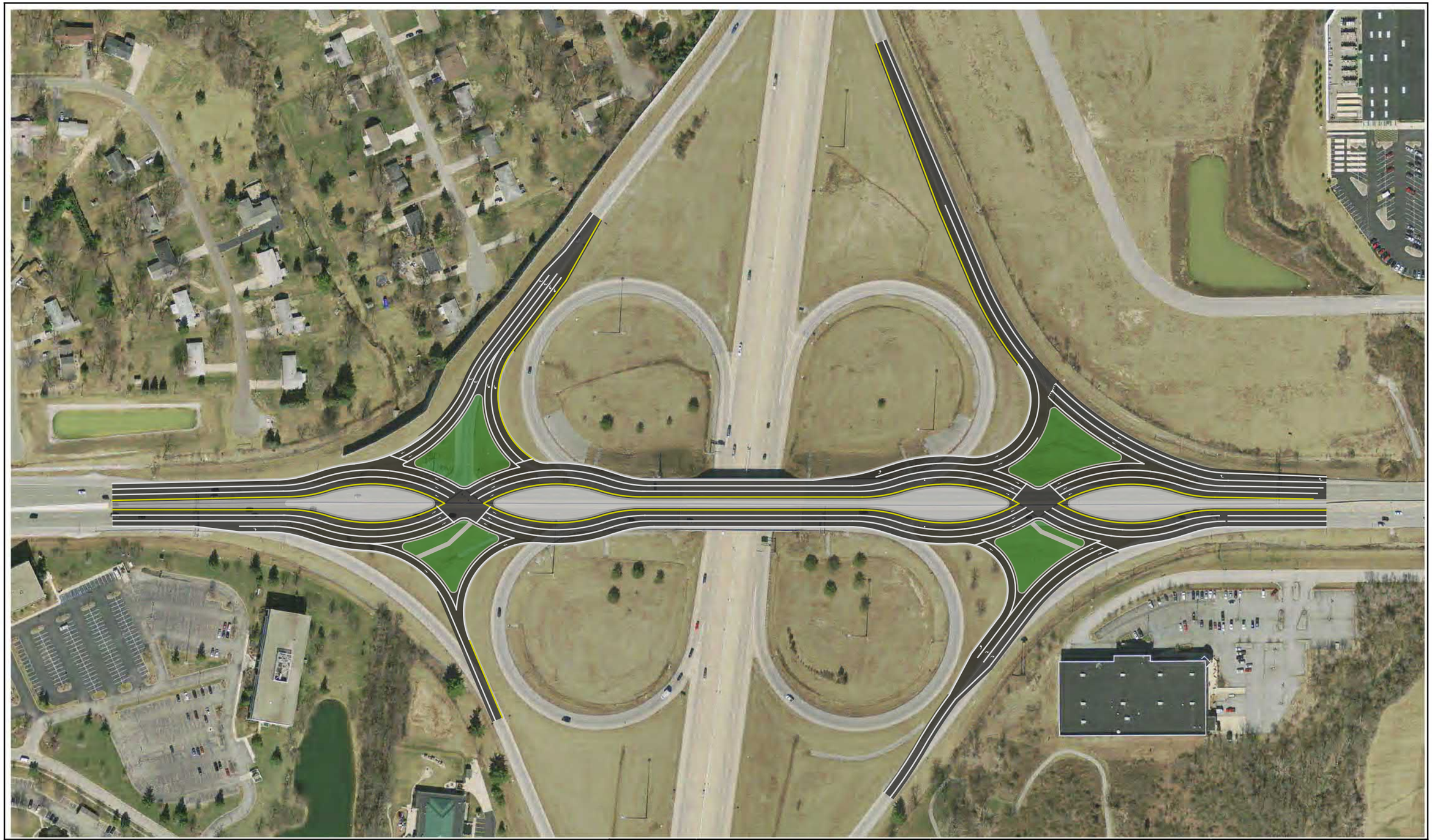
	DESIGNED: _____ DRAWN: _____ CHECKED: _____ CHECKED: _____	ILLINOIS RD AND MAGNAVOX	SURVEY BOOK NO. / CONTRACT NO. / SHEETS $PAGE_NUM$ of / PROJECT NO.

APPENDIX A–6
DDI PLAN



RECOMMENDED FOR APPROVAL _____ DESIGN ENGINEER DATE

DESIGNED: _____ DRAWN: _____

CHECKED: _____ CHECKED: _____

INDIANA
DEPARTMENT OF TRANSPORTATION

DIVERGING DIAMOND ALTERNATIVE

HORIZONTAL SCALE	BRIDGE FILE NO.
1" = 100'	
VERTICAL SCALE	DESIGNATION NO.
	1401828
SURVEY BOOK NO.	SHEETS
	$PAGE_NUM$ of
CONTRACT NO.	PROJECT NO.