



COMBINED DESIGN REPORT

Volume 1 of 3

ILLINOIS ROUTE 47 (FAP 326)

Reed Road to U.S. Route 14

P-91-101-07

McHenry County, Illinois

IDOT – Division of Highways – District One

September 2017



Key Route: FAP 0326 Marked Route/Road Name: Illinois Route 47

Job No.: P-91-101-07 Contract No.: PTB 142/033

Section: Reed Road to US 14 Project Length: 7.6 miles (40,425 feet)

PPS No.: 1-75135-0000 County(ies): McHenry

Location/Limits: Grafton and Dorr Township/Reed Road to US 14

General Description of Existing Facility: 2-lane undivided highway

Need for Proposed Improvement: Vehicular/pedestrian safety, enhance traffic mobility/capacity, & facilitate growth

Scope of Project: New Construction Reconstruction 3R 3P
 SMART Other _____

General Description of Proposed Improvement: Reconstruction and widening to 4-lane divided highway

Environmental Processing: EIS EA Federal Approved CE
 State Approved CE Other _____

Approximate Amount of ROW to be Purchased: 157 Parcels Totaling 140.8 Acres.

Number of Businesses 2 and Residences 3 to be Acquired. ROW Cost: \$ 18,500,000

Estimated Program Cost: \$ 122,100,000 (in FY NP) Fund Type: Federal

Construction Cost: \$ 78,620,900 Utility Reloc. Cost: \$ 1,000,000 Consultant PE Cost: \$ 3,300,131

Design Exceptions:

- Level One Required? Yes No
- Level Two Required? Yes No
- If yes, note date approved: 8/22/2016

Type of Public Involvement Activity:

- Public Hearing Offered? Yes No
- Informational Meeting Held? Yes No
- Property Owners Contacted? Yes No

Regional Design Approval

Anthony J. Dingley / AS
IDO Regional Engineer Signature

Date: 12/8/2017

Contact Information

Job Number: P-91-101-07

Project: IL 47 (FAP 326)

Location: Reed Road to U.S. 14

IDOT Unit Head: Steve Schilke, P.E.

Phone: (847) 705-4125

Email: Steven.Schilke@illinois.gov

IDOT Manager: Corey Smith, P.E.

Phone: (847) 705-4103

Email: Corey.Smith@Illinois.gov

IDOT Engineer: Cary Lewis

Phone: (847) 705-4724

Email: Cary.Lewis@illinois.gov

Consultant:

PTB: 142-033

FIRM: AECOM

Project Manager: Stan Wang, P.E., PTOE

Phone: (312) 373-6714

Email: stan.wang@aecom.com

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1. INTRODUCTION

Illinois Route 47 (IL 47) is important to the north-south transportation linkage because it provides access to residential, retail, commercial, agricultural, and recreational lands throughout the region including Wisconsin. Illinois Department of Transportation (IDOT) initiated the project study in the fall of 2007. This project is included in the Fiscal Year 2014-2019 Transportation Improvement Program (TIP) endorsed by the Metropolitan Planning Organization Policy Committee of the Chicago Metropolitan Agency for Planning (CMAP) for the region in which the project is located for Phase II contract plan preparation. ROW and construction funding is also identified in the TIP for a portion of the project: the Kishwaukee Bridge replacement.

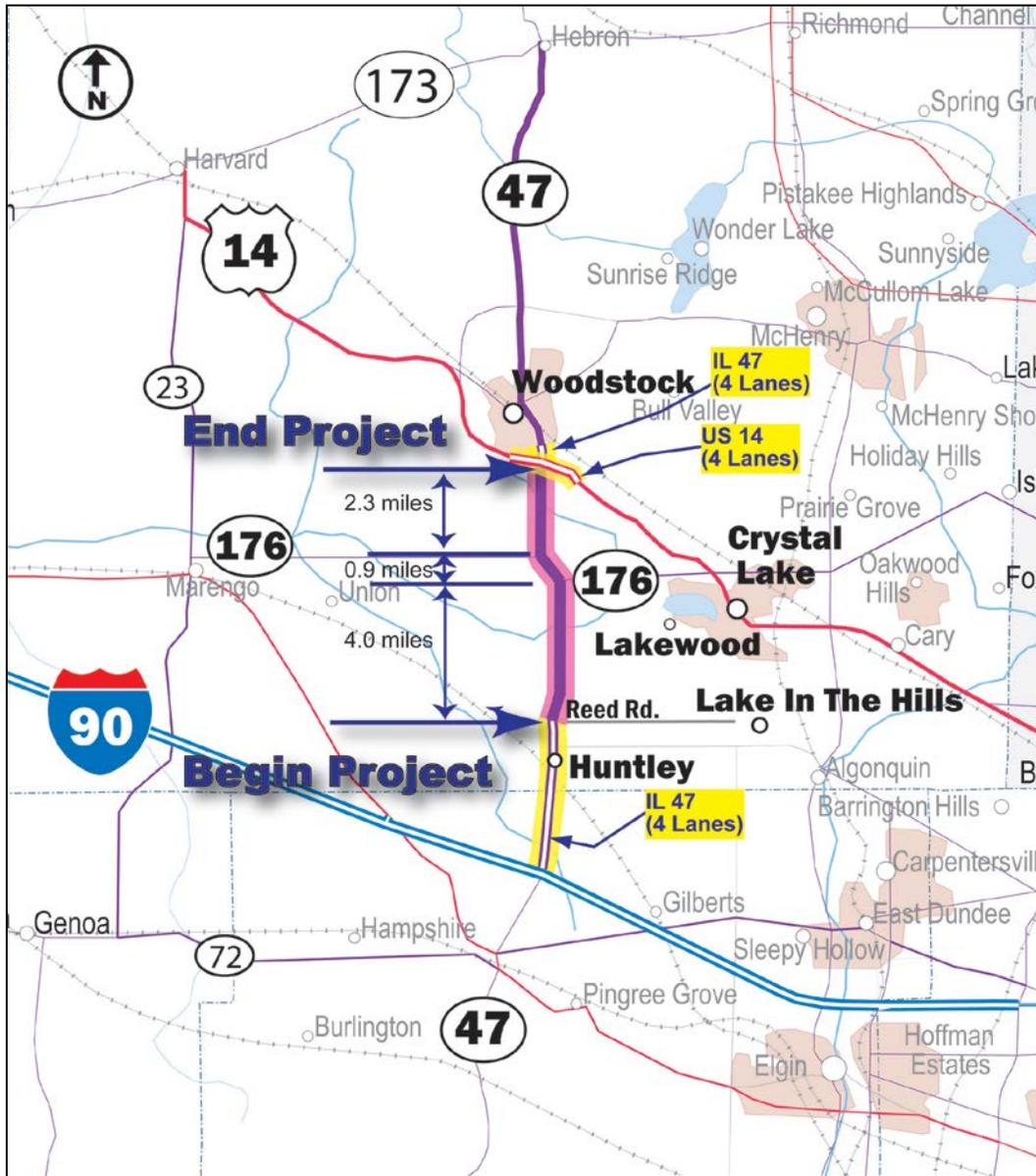
1.1 Project Location and Termini

The study area extends approximately eight miles along IL 47 (FAP 326) from Reed Road to U.S. Route 14 (U.S. 14) through the communities of Huntley, Woodstock, Lake in the Hills, Crystal Lake, Lakewood; townships of Dorr and Grafton; and unincorporated McHenry County. See Figure 1-1, Location Map. It is located within the Kishwaukee River Watershed, an ecologically diverse watershed that contains sensitive plant and animal species, as well as highly permeable soils.

IL 47 is classified as Class II Truck Route and a rural Strategic Regional Arterial (SRA) and is included as part of the National Highway System (NHS). The nearest parallel state highway is Illinois Route 31 (IL 31), located seven miles east of IL 47.

The logical termini for this project was set as the five lane section just north of Reed Road and five lane section just south of U.S. 14 to match the limits of other projects along IL 47. Other transportation studies along IL 47 have taken place or are ongoing. South of Reed Road, a Phase I Study/Categorical Exclusion was previously completed in 2006. The proposed improvements consisted of widening and reconstruction of the existing two-lane road to a four-lane facility with a raised median and turn lanes at major intersections. These improvements were completed in the summer of 2011. North of U.S. 14, a separate Phase I Study/Environmental Assessment is currently on-going that is evaluating potential improvements to IL 47 from U.S. 14 to Charles Road.

Figure 1-1 - Location Map



2. DESCRIPTION OF EXISTING CONDITIONS

The project extends approximately 8 miles from Rainsford Drive, just north of Reed Road to Davis Street, just south of U.S. Route 14 (U.S. 14). The roadway serves to connect the Village of Huntley on the south end to the City of Woodstock at the north end with few intersecting roadways and access points. The project area is currently rural in nature being primarily farm land with isolated pockets of residential, commercial, local shopping, light industrial, and restaurants. While the current land use is primarily farm land, future land use maps indicate that the majority of the land is intended to be developed for residential, retail or commercial purposes.

Roadways affected by the improvement include Illinois Route 47 (IL 47), Illinois Route 176 (IL 176) and various cross streets, which are affected for several hundred feet as they connect to IL 47. Existing conditions along IL 47 and IL 176 roadways are described in this section. See Table 2-1 and Table 2-2 for detailed information on the IL 47 and IL 176 intersections. Existing typical sections for each of the subject roadways are shown in Volume 2, Appendix A-7.

2.1 IL 47

At the project's southern limit, IL 47 connects to an existing 4 lane section. For the first ¼ mile (south of Rainsford Drive) it has a posted speed limit of 45 mph and the existing pavement consists of 2 lanes in each direction separated by a raised barrier median. For the next 6.3 miles IL 47 (Rainsford Drive and Hercules Road) has a posted speed limit of 55 mph and the existing pavement consists of one 12 foot wide lane in each direction. A painted median with turn lanes exists between Rainsford Drive and Ackman Road. A concrete median separates the IL 47 lanes at the IL 176 intersections. For the final mile (north of Novean Parkway) of the project, IL 47 has a posted speed limit of 40 mph and the existing pavement consists of two lanes in each direction separated by a painted two way left turn lane (TWLTL) median.

The existing right-of-way is 80 feet throughout the project area except near U.S. 14, where the right-of-way expands to 200 feet. There are four signalized intersections throughout the project area which are located at Reed Road, U.S. 14, and both intersections with IL 176. In addition to these intersections, there are a number of intersecting roads that are controlled by stop signs on the local approaches.

Left turn channelization is provided at Talamore Boulevard, Ackman Road, IL 176 East Leg, and IL 176 West Leg. Right turn channelization is provided at IL 176 East Leg and IL 176 West Leg.

Table 2–1 Illinois Route 47 at Illinois Route 176 (West Leg) Existing Conditions

	North Leg	South Leg	West Leg
Design Element	IL Route 47 (FAP 326)	IL Route 47 (FAP 326)	IL Route 176 (FAP 533)
Highway Functional Classification	Other Principal Arterial	Other Principal Arterial	Other Principal Arterial
Truck Route Classification	Class II	Class II	Class II
On NHS (yes/no)	Yes	Yes	Yes
Jurisdiction	IDOT	IDOT	IDOT
Current ADT	14,300	18,700	9,700
% Trucks	7% (a.m. peak hour) 10% (p.m. peak hour)	8% (a.m. peak hour) 6% (p.m. peak hour)	Not available
Posted Speed	55 mph	55 mph	55 mph
Design Speed	60 mph	60 mph	60 mph
Number of through lanes and widths	One (12')	One (12')	None
Turn lanes and widths	Right-turn lane (12')	Left-turn lane (12')	Right-turn lane (12') Left-turn lane (12')
Shoulder or Curb Type	Paved and aggregate shoulder	Paved and aggregate shoulder	Paved and aggregate shoulder
Shoulder Width	Varies	Varies	Varies
Clear Zone Width	32'-40'	32'-40'	32'-40'
Pavement Surface Condition in CRS (year)			
Sidewalks	None	None	None
Parking	None	None	None

Table 2–2 Illinois Route 47 at Illinois Route 176 (West Leg) Existing Conditions

	North Leg	South Leg	East Leg
Design Element	IL Route 47 (FAP 326)	IL Route 47 (FAP 326)	IL Route 176 (FAP 533)
Highway Functional Classification	Other Principal Arterial	Other Principal Arterial	Other Principal Arterial
Truck Route Classification	Class II	Class II	Class II
On NHS (yes/no)	Yes	Yes	Yes
Jurisdiction	IDOT	IDOT	IDOT
Current ADT	20,800	16,300	10,300
% Trucks	7% (a.m. peak hour) 3% (p.m. peak hour)	9% (a.m. peak hour) 6% (p.m. peak hour)	Not available
Posted Speed	55 mph	55 mph	55 mph
Design Speed	60 mph	60 mph	60 mph
Number of through lanes and widths	One (12')	One (12')	None
Turn lanes and widths	Left-turn lane (12')	Right-turn lane (12')	Right-turn lane (12') Left-turn lane (12')
Shoulder or Curb Type	Paved and aggregate shoulder	Paved and aggregate shoulder	Paved and aggregate shoulder
Shoulder Width	Varies	Varies	Varies
Clear Zone Width	32'-40'	32'-40'	32'-40'
Pavement Surface Condition in CRS (year)			
Sidewalks	None	None	None
Parking	None	None	None

Bridge Structures

Structure Number 056-0025 carrying IL 47 over Kishwaukee River is located between Union Road/Foster Road and Ballard Road. The structure is a concrete slab bridge deck with two continuous spans and measures 37 feet in length, back to back of abutment, and 47 feet in width, out to out of deck.

A Bridge Condition Survey and Analysis (BCSA) was prepared in June 2013 and concluded that the structure was built in 1936 and is in poor condition. The superstructure has been identified as needing to be replaced due to its deteriorated condition.

Alignment and Profile Deficiencies

In general, the existing horizontal alignment meets current design standards for the existing posted speed limits and proposed design speeds. IL 47 contains two horizontal curves, one at the IL 176 East Leg and the second at the IL 176 West Leg. Both horizontal curves on IL 47 have radii of approximately 1,600 feet. The curves are super-elevated.

Existing Drainage Deficiencies

All vertical curves within the study area meet current design standards; however, the existing profile of IL 47 north of Union Road/Foster Road, at the Kishwaukee River crossing, does not provide adequate freeboard between the edge of pavement at the low grade point in a floodplain area. Policy indicates a minimum of three feet shall be provided above design headwater elevation.

There are no reported roadway flooding problems. During the public involvement process, a drainage concern was noted from the owner of the property located at the northwest corner of IL 47 and Dieckman Street (near Station 758+50). The owner reported to IDOT that large ponding within the infield area located in front of his property has created a wetland. This infield area is currently drained via a catch basin with a 12"/15" diameter pipe that outlets into the Kishwaukee River. Per hydraulic analysis, it was determined that the existing 12"/15" diameter pipe does not have adequate capacity to convey the 10-year storm event.

After a field visit and further investigation, it was determined that the existing pond located north of the property, frequently overtops onto the owner's property creating a wetland. This pond also serves as an outlet for several lateral pipes draining the IL 47 pavement. Unfortunately, since an outlet pipe was not found for this existing basin/pond, these IL 47 lateral pipes are constantly blocked from backwater impacts. This information was provided to the property owner explaining that the cause of flooding on the property adjacent to the roadway is attributed to the adjacent pond not having a designated outlet, which results in it constantly overtopping.

2.2 IL 176

IL 176 is classified as a SRA and is important to the east-west transportation network because it provides access to similar communities and land uses as IL 47 and is one of the few east-west routes in the area.

IL 176 intersects with IL 47 at two “T” intersections offset from each other by approximately 0.9 miles. Both legs of IL 176 consist of two 12 foot wide approach lane providing dedicated right and left turn lanes and one 12 foot wide receiving lane.

2.3 Land Use

In the southern and northern portions of the project corridor, located within the Village of Huntley and the City of Woodstock (respectively), land use is composed primarily of residential and commercial development. In the central portion of the corridor, land use is primarily agricultural at this time, but is either zoned or planned for development.

Within the Village of Huntley, their 2004 Land Use Plan indicates the Village intends to incorporate land on the west side of IL 47, north of the current Village limits, to be developed as either residential or retail. In the central portion of the corridor, within the Village of Lake in the Hills, most land is currently under agricultural production but is zoned “Business – Transitional”. Unincorporated McHenry County, also in the central portion of the corridor, is primarily agricultural with scattered farmsteads or open space. The McHenry County Future Land Use Plan indicates that unincorporated areas are planned for retail development and estate residential development (lots between one and five acres) in the southern portion of the corridor and residential and retail development in the northern portion of the project corridor.

Land south of Foster Road is located within the Village of Lakewood. The Village’s Future Land Use Plan calls for the annexation of properties adjacent to IL 47 south of the current Village limits. Land use planning for the new properties annexed by Lakewood includes residential, mixed use, and commercial/office development.

The City of Woodstock’s southern city limits begin in the vicinity of Lucas Road. Properties within the city limits currently in agricultural production but are zoned residential. Intermixed with properties within Woodstock’s city limits are parcels of unincorporated McHenry County. The McHenry County properties are in agricultural production or are open space. The City of Woodstock Comprehensive Land Use Plan (2008) indicates that the City intends to annex these properties within McHenry County, which will then be zoned for commercial uses.

2.4 Public Facilities and Services

Two Fire Protection Districts cover the project limits. The Huntley Fire Protection District covers Huntley, Lake in the Hills and portions of unincorporated McHenry County. The Woodstock Fire Protection District covers Woodstock, Lakewood, and portions of unincorporated McHenry County.

The Huntley Fire Station, Village Hall, and Police Department are all located one mile from the project corridor. The Contegra Immediate Care Clinic in Huntley is located 1.2 miles from the project corridor. The Grafton Township Offices are located 0.25 mile west of IL 47 within Huntley. Within the City of Woodstock, the Fire Station, Village Hall, and Police Department are all located considerably outside of the project corridor. The Mercy

Woodstock Medical Center, which contains an Immediate Care Clinic, is located 0.6 mile east of IL 47.

There is no bus service or Metra commuter rail service within the project corridor. Pace Bus Route #808 is adjacent to the study area and travels on IL 47 north of U.S. 14, and on U.S. 14 east of IL 47. The nearest Metra commuter rail service is the Union Pacific/Northwest line station located in downtown Woodstock, approximately two miles from the project corridor.

Few public and private utilities exist within the project limits. Public utilities are primarily located near each end of the project in the municipalities of Huntley and Woodstock. The utilities include water main, storm sewer, and sanitary sewer systems. Private utility facilities were identified both above and below ground. Utility poles with ComEd (electric), AT&T, and cable television exist throughout the project area. Underground conduits, ducts, cables, fiber optics, and pipelines also exist throughout the project area. ComEd, AT&T, Nicor (gas), SBC, and Comcast all have facilities underground throughout the project area. ComEd also has several high voltage lines, which cross IL 47.

Mail delivery is limited from IL 47. Most of the developed properties along the corridor are accessed via side streets or consist of commercial development within strip malls.

2.5 Environmental Resources

The following sections provide a synopsis of the environmental issues and areas addressed or investigated as part of the project. A complete discussion is provided in the Environmental Assessment. See CDR Volume 3, D-1, Environmental Coordination, for documentation and clearances.

2.5.1 Agricultural

The current land use in many places along the project corridor is agricultural, particularly in the central portion of the corridor. Long term land use plans, however, indicate most of this will be developed as residential, retail, or commercial. See Section 2.3 – Land Use, for details.

2.5.2 Cultural

IDOT conducted research into the potential for archaeological sites or historic structures in the project corridor that could be impacted by the proposed improvements.

Per the responses from the State Historic Preservation Officer (SHPO) dated November 17, 2009, November 24, 2010; and December 3, 2013 the SHPO concurred with IDOT's determination that no sites subject to protection under Section 106 of the National Historic Preservation Act of 1966 would be affected by the proposed improvements.

2.5.3 Natural Resources

The project corridor is composed primarily of developed or agricultural land; there are only small amounts of natural habitat left in the area.

There are some former cropland fields in the project corridor that have been out of production for multiple years. These fields range in size from approximately 20 acres to 160 acres and are scattered throughout the project corridor and have begun to undergo succession. Most are in the early successional stages and are dominated by invasive species. There is also some low quality riparian habitat associated with several creek and tributary crossings in the project corridor. Wetlands are scattered throughout the project corridor, some are interspersed with upland habitats within the complexes. There are no forested blocks of trees 20 acres in size or larger adjacent to the project corridor, although there are landscape trees scattered throughout the project corridor in association with development. Wildlife habitat present is minimal and consists of crops, mowed lawn, and ornamental plantings due to the fact that land use in the corridor is primarily developed or under agricultural production.

The project corridor crosses the Kishwaukee River headwaters, the Kishwaukee River, four unnamed tributaries to the Kishwaukee River, and the Kishwaukee Creek in two locations. The Kishwaukee River has been identified as a Biologically Significant Stream in Illinois. Within the project corridor, however, habitat associated with the river and its tributaries is of low quality.

IDOT prepared a Biological Resources Review (BRR) dated July 23, 2010. The review determined that there is no suitable habitat for federally protected species in the project corridor. IDOT prepared a second BRR dated August 30, 2011 for additional right-of-way. This review also determined that there is no suitable habitat for federally protected species within the extended roadway footprint.

Assessments related to State-protected species were conducted through the Illinois Department of Natural Resources (IDNR) Ecological Compliance Assessment Tool (EcoCAT). An EcoCAT report conducted on September 24, 2008 identified several state protected species in project corridor. The IDOT Bureau of Design and Environment (BDE) determined that the project will not affect the state-protected species and documented this in BRRs dated July 23, 2010, August 30, 2011, and September 13, 2013. Although habitat for these species may be found in the project vicinity, habitat is not found immediately adjacent to IL 47 where the proposed improvements will occur.

2.5.4 Surface Water Resources

The project corridor contains several streams which are crossed by IL 47: the Kishwaukee River, unnamed tributaries to the Kishwaukee River, unnamed tributaries to the South Branch of the Kishwaukee River, and Kishwaukee Creek.

IL 47 crosses the Kishwaukee River twice. There are no known monitoring stations identified in the project corridor. The U.S. Environmental Protection Agency (USEPA) indicates that the Kishwaukee River did not meet water quality standards in 2010. The Kishwaukee River's impaired designated uses include primary contact recreation, aquatic life, and fish consumption. The primary contact recreation function is impaired due to fecal coliform. The aquatic life function is impaired because of sedimentation/siltation. Causes include municipal point discharges, contaminated

sediments, crop production, and channelization. The fish consumption function is impaired because of high polychlorinated biphenyls. The source of this contaminant is unknown.

Several unnamed tributaries to the Kishwaukee River are crossed by IL 47, IL 176, and Pleasant Valley Road. No known monitoring stations were identified on these watercourses. The USEPA indicates that these watercourses did meet water quality standards in 2008.

Kishwaukee Creek is crossed twice in the project corridor. No known monitoring stations were identified on Kishwaukee Creek. The USEPA's Enviromapper for Water indicates that this watercourse met water quality standards in 2008.

Per 35 Ill. Adm. Code 303.206, the Illinois Pollution Control Board has not designated any Outstanding Resource Waters in the State of Illinois.

2.5.5 Groundwater Recharge

Groundwater depth data is available from only one groundwater monitoring station in the vicinity of the project corridor, monitoring station 421747088270701. Groundwater depth varied from approximately 76.2 feet below ground surface to approximately 80.1 feet below ground surface for samples obtained from September 2009 through November 2011.

The project corridor is located in several zones for groundwater recharge potential, where Zone 1 indicates the highest potential for groundwater recharge and Zone 7 indicates the lowest potential, as mapped by Keefer and Berg (1990). The groundwater recharge potential moves in and out of Zones 3 and 4 in the southern portion of the project corridor, but becomes a Zone 1 at the northern project limit.

Per the McHenry County Water Resources Action Plan, portions of the project corridor are located within recharge areas that have a moderately high potential for aquifer contamination.

2.5.6 Aquifers

According to the USEPA list of Designated Sole-Source Aquifers in (Illinois) USEPA Region 5, there are no sole-source aquifers in Illinois as defined by Section 11424(e) of the Safe Drinking Water Act.

2.5.7 Floodplains

Regulatory floodplains within the project corridor are associated with the Kishwaukee River, the South Branch of the Kishwaukee River, Kishwaukee Creek, and several unnamed tributaries to these waterways. All of these floodplains are located within the HUC watershed 7090006, the Kishwaukee River.

Regulatory Floodway

The 5 waterway crossings described above do not have a mapped floodway by FEMA.

2.5.8 Wetlands

Wetland delineations were performed by INHS May 9-12, June 23-24, and Aug 6, 2009. Additional delineations were done in June 2011 and June/July 2013 for select portions of the corridor. In total, INHS investigated 74 locations and determined that 63 of the areas are wetlands. One additional ADID wetland is located in the project corridor that was not investigated by INHS.

Several of the wetlands have been identified by McHenry County as ADID wetlands, most for having high functional value (stormwater storage). Two ADID wetlands were identified by McHenry County as having high habitat value. Floristic Quality Index (FQI)s range from 0.5 to 17.1; mean Cs range from 0.2 to 3.4. The first, INHS Wetland 27, coincides with ADID wetland K1008. The second, IHNS Wetland 42, coincides with ADID Wetland K984.

The Environmental Assessment (EA) summarizes the wetlands identified by INHS and provides information on the community type, functions performed, dominant vegetation, and floristic quality. For those wetlands that were also identified on the National Wetland Inventory map, the EA provides the code for the wetland type as defined by Cowardin (Cowardin, L. M., V. Carter, F. C. Golet, E. T. LaRoe. 1979. *Classification of wetlands and deepwater habitats of the United States*. U.S. Department of the Interior, Fish and Wildlife Service, Washington, D.C.).

2.5.9 Special Waste

The Illinois State Geological Survey (ISGS) performed Preliminary Environmental Site Assessments (PESAs) for the project corridor. Several Recognized Environmental Concerns (RECs) were identified. The ISGS performed PESA 1789 for IL 47 from Reed Rd to U.S. 14; the report was issued on Feb. 3, 2009. One property was identified with a REC. Per PESA 1789, Benoy Motor Sales at 1790 S. Eastwood Dr, Woodstock had one underground storage tank (UST), one leaking underground storage tank (LUST) and two aboveground storage tanks (AST).

The ISGS performed PESA 1839 for Intersections IL 47 at IL 176; the report was issued on March 30, 2009. Two properties were identified with RECs. A dairy farm at 11802 Pleasant Valley Rd has an AST. Craig Woods Executive Golf Course at 5900 IL 47 has an AST.

The ISGS performed PESA 1789V for IL 47 Reed Road to U.S. 14 for additional ROW or easements added since the original PESA was conducted; the report was issued on October 28, 2013. A total of 32 properties were identified with RECs; these included the RECs identified in earlier PESAs. On August 18, 2016, ISGS performed a review of PESA 1789V. An additional 5 properties were identified with RECs for a total of 37 properties.

2.5.10 Section 4(f)

The project corridor does not contain any properties that would require Section 4(f) evaluation. There are no publicly owned parks, recreational areas, wildlife and waterfowl refuges, or any land from a historic site of national, State, or local significance.

2.5.11 Section 6(f)

Section 6(f) lands are those lands that have Land and Water Conservation (LAWCON) funds involved in their purchase or development. There are no State Designated Lands in the project corridor.

The project corridor does not contain any lands that have funds involved in their purchase or development that was obtained from Open Space Lands Acquisition and Development (OSLAD) funding.

2.5.12 Other Publicly Owned Land

The Village of Lakewood, which owns 45-acres of property on the west side of the intersection of IL 47 and IL 176 (East Leg), indicated that the area is to be developed and not used for recreational purposes (See Volume 3, Appendix B-4 Agency Correspondence). The Village is coordinating with the District to provide access to the site and possibly align Pleasant Valley Road with IL 176 (East Leg). See Volume 3, Appendix B-3, Local Agency Meetings and Coordination.

2.6 Other Transportation Studies

Other transportation studies along IL 47 have taken place or are ongoing. South of Reed Road, roadway improvements were constructed in the summer of 2011. North of U.S. 14, a separate Phase I Study/Environmental Assessment has been initiated to study improvements to IL 47 from U.S. 14 to Charles Road. In addition, an “Illinois Tomorrow” grant was awarded that provides a land use based study of the IL 47 corridor from within Kane County northward to the Wisconsin State line. This latter study is intended to evaluate current land use and provide a planning document that combines the comprehensive planning efforts of the communities along the corridor.

3. PURPOSE AND NEED FOR IMPROVEMENT

3.1 Project Purpose

The purpose of the proposed action is to provide an improved transportation system for Illinois Route 47 (IL 47) from Reed Road to U.S. Route 14 (U.S. 14). Improvements to this route are needed to address vehicular and pedestrian safety, enhance traffic mobility and capacity, and facilitate planned economic growth.

3.2 Project Need

3.2.1 Safety Analysis

Vehicular Crash Data

The crashes within the project area have been recorded using the Illinois Traffic Crash Report. During the five year study period from 2008-2012, a total of 368 crashes occurred along IL 47 (see Figure 3–1).

Figure 3–1 - Total Crashes 2008 – 2012

Table 3–1 shows the total crash types. The predominant crash types for the five year study period were rear-end followed by turning, fixed object, animal, angle, and sideswipe same direction crashes. Other crash types accounted for less than 13% of total crashes. Lighting, weather, and wet pavement conditions do not appear to be a primary influence of the crashes within the project area.

Table 3–1 - IL 47 Corridor Crashes by Crash Type over 5-Year Timeframe

CRASH TYPE	TOTAL	%
REAR END	143	38.9%
TURNING	63	17.1%
FIXED OBJECT	38	10.3%
ANIMAL	34	9.2%
ANGLE	25	6.8%
SIDESWIPE-SAME DIR.	18	4.9%
SIDESWIPE-OPPOSITE DIR.	14	3.8%
OVERTURNED	8	2.2%
OTHER	7	1.9%
OTHER NON-COLLISION	6	1.6%
HEAD ON	6	1.6%
OTHER OBJECT	4	1.1%
PEDESTRIAN	1	0.3%
PARKED VEHICLE	1	0.3%
<i>TOTALS:</i>	<i>368</i>	<i>100%</i>

During 2008-2012, a total of 191 injuries and three fatalities were recorded. Table 3–2 presents the crash severity data for the five year period. One crash involving a fatality occurred in 2008 between Conley Road and Foster/Union Road. A second crash involving 2 fatalities occurred in 2012 at the IL 47 and Illinois Route 176 (IL 176) (West Leg) intersection.

Table 3–2 - IL 47 Corridor Crashes by Crash Injury over 5-Year Timeframe

CRASH INJURY	TOTAL	%
TYPE A - INCAPACITATING	27	14.1%
TYPE B - NON-INCAPACITATING	97	50.8%
TYPE C - REPORTED/NOT-EVIDENT	64	33.5%
TYPE K - FATALITY	3	1.6%
<i>TOTALS:</i>	<i>191</i>	<i>100.0%</i>

Signalized Intersection of IL 47 and IL 176 (Split Intersection)

IDOT listed this split intersection in the 2010 Selected Arterial 5% Segments due to the high number of crashes that have occurred at the south (East Leg) and north (West Leg) intersections. The majority of the crashes occurring at these locations are rear-end crashes and turning crashes. See Table 3–3 for information on these crashes.

Table 3–3 - IL 47 at IL 176 Intersections Crashes by Crash Type over 5-Year Timeframe

CRASH TYPE	<u>South</u>	<u>North</u>	<u>Combined</u>	<u>%</u>
	<u>Intersection</u>	<u>Intersection</u>	<u>TOTAL</u>	
	<u>TOTALS</u>	<u>TOTALS</u>		
REAR END	20	33	53	52.5%
TURNING	18	21	39	38.6%
ANIMAL	1	0	1	1.0%
FIXED OBJECT	1	2	3	2.9%
SIDESWIPE-SAME DIR.	1	1	2	2.0%
ANGLE	1	1	2	2.0%
SIDESWIPE-OPPOSITE DIR.	0	1	1	1.0%
<i>TOTALS:</i>	<i>42</i>	<i>59</i>	<i>101</i>	<i>100.0%</i>

Potential contributory factors to rear-end crashes include heavy approach traffic volumes, and high vehicle approach speeds. Potential contributory factors to turning crashes include heavy turning volumes and high vehicle approach speeds, which result in the misjudgment of gaps in opposing through movements.

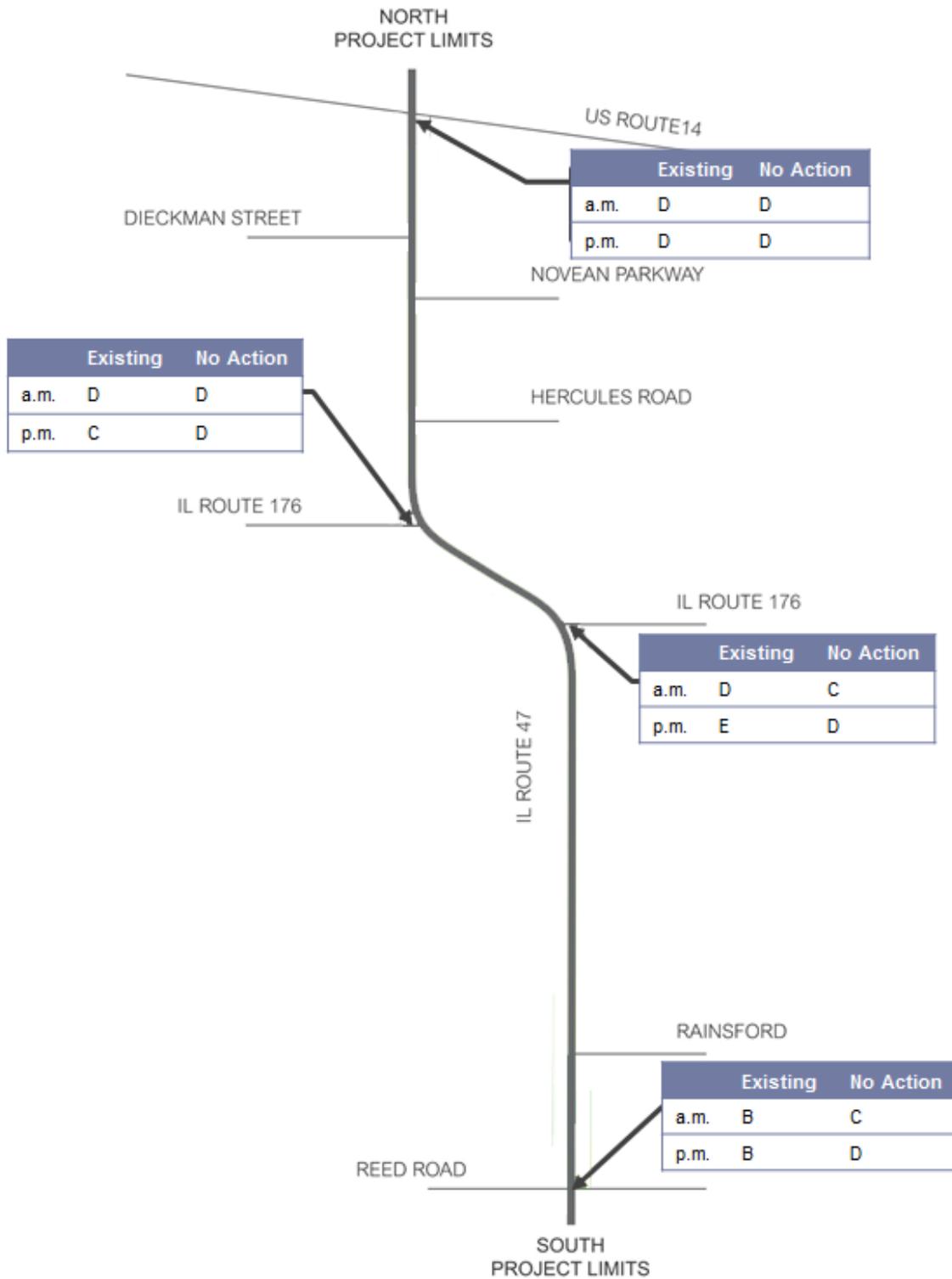
3.2.2 Operational Analysis

Level of Service

Level-of-Service (LOS) classification is used to classify how well traffic flows. LOS A describes operations with very low delay, up to an average of 10 seconds per vehicle, while LOS F describes operations with very high delay, in excess of 80 seconds. In general, IDOT targets a minimum LOS C for roadways with a SRA classification such as IL 47.

For the No-Action alternative, the design year 2040 LOS at the signalized intersections range from C to D and individual movements experience LOS E and F, that indicates poor intersection operations. The intersection of IL 47/Reed Road, a four-legged intersection, will have a LOS of C in both the a.m. and p.m. peak periods. IL 47/IL 176 (West Leg), a three legged intersection, will have a LOS of D in both the a.m. and p.m. peak periods. The intersection of IL 47/IL 176 (East Leg), a three legged intersection, will have an a.m. LOS of C and p.m. LOS of D, LOS E occurs on the left turn movement from southbound IL 47 to IL 176 (East Leg), and LOS F occurs on the northbound IL 47 through movement. Under these conditions, the backups along IL 47 will extend approximately 1,550 feet in the northbound direction. These backups block safe access to side streets and retail establishments. IL 47/U.S 14, a four-legged intersection, will have a LOS of D in both the a.m. and p.m. peak periods. Figure 3–3 shows the a.m. and p.m. peak LOS for these intersections.

Figure 3–2 Existing and No Build LOS at Signalized Intersections

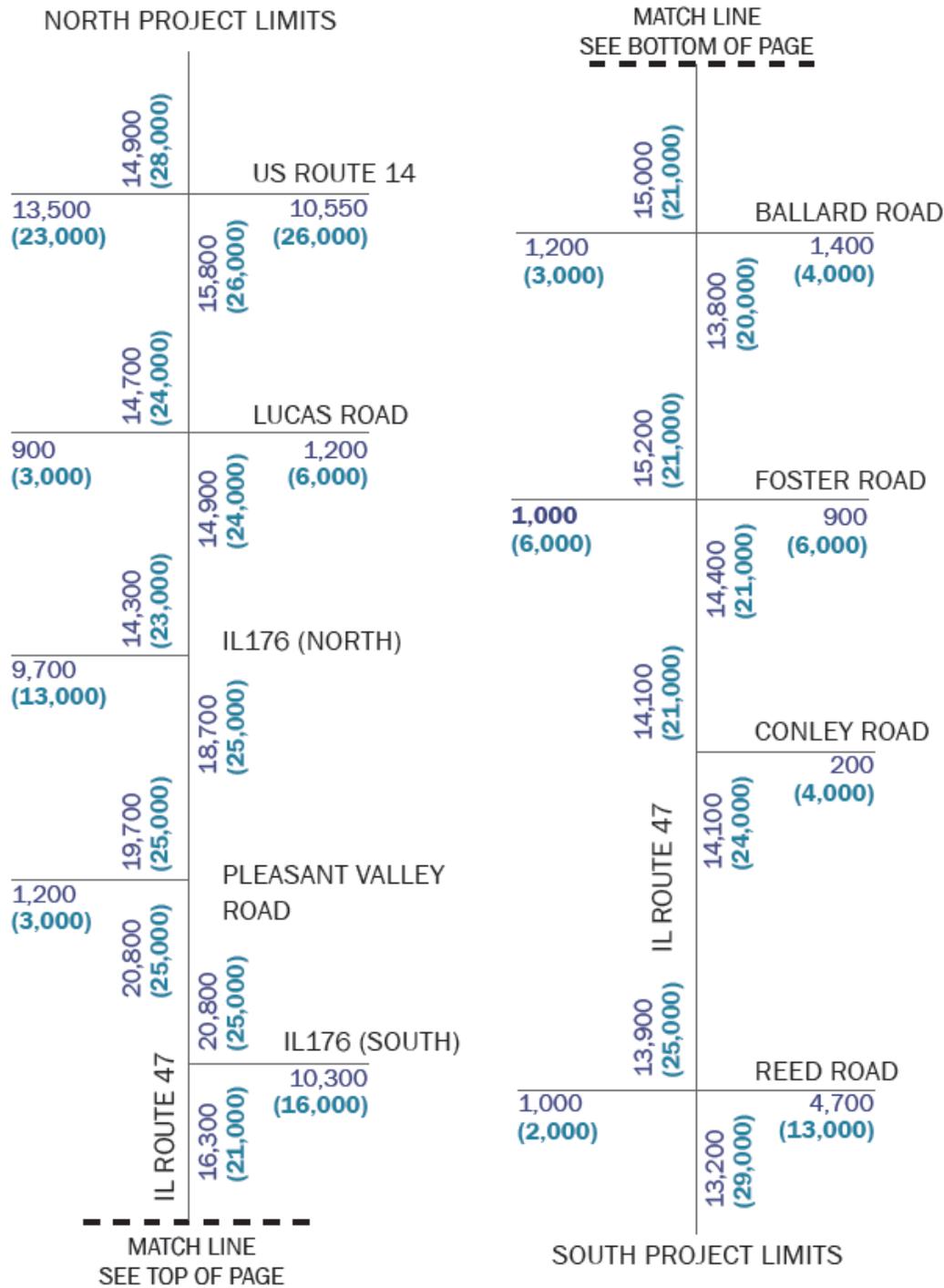


Capacity

In 2011 the route carried between 14,300 and 22,300 vehicles per day, averaging 17,100 vehicles per day over the length of the project. In 2040 the projected traffic levels are between 21,000 and 29,000 vehicles per day, averaging 24,600 vehicles per day

over the length of the project. A two lane roadway can safely and efficiently accommodate between 14,000 and 18,000 vehicles per day depending upon the number and frequency of access points. Current traffic volumes are approaching that level and projected levels will exceed that level at every intersection along the project. See Figure 3-3 for existing and projected traffic volumes.

Figure 3–3 Existing (2011) and Projected (2040) Traffic Volumes



LEGEND:
 EXISTING 2011 AVERAGE DAILY TRAFFIC VOLUME
(FUTURE 2040) AVERAGE DAILY TRAFFIC VOLUME
 24 HOUR TRAFFIC VOLUMES

Crashes throughout the study area appear to be caused primarily by a lack of capacity and safe turning accommodations. The existing two lane roadway typically does not provide channelized turn lanes. During peak hours, lengthy queues are formed when vehicles attempt to make left turns at unsignalized intersections. The congestion and stopped traffic results in driver frustration and an increased potential for rear-end and turning type crashes. Slow moving vehicles from adjacent agricultural and quarrying activities further compound the turning deficiencies. These slow moving vehicles, which create the potential for collisions, are concentrated near the intersections of Conley Road, Ballard Road, and Foster/Union Road.

Mobility

The northern most mile of the project is characterized by numerous existing commercial properties with additional commercial properties in the planning stages. These properties generate turning vehicles which slow the flow of traffic. Access to the properties should be consolidated to reduce conflict points. The lack of pedestrian and bicycle accommodations do not afford alternate means to travel between the commercial properties, increasing the number of vehicles entering and exiting the roadway. Separating the pedestrians and bicycles from vehicular traffic would reduce conflicts between them.

The southern end of the project is much more rural in nature. Access points are spread out with few vehicles entering or exiting the roadway. There are few destinations for pedestrians or bicycles in this portion of the project. Adding separate pedestrian and/or bicycle accommodations does not appear to be warranted, but are required by current policy.

3.2.3 Economic Development

Locally, IL 47 serves as a transportation corridor in the Cities and Villages of Huntley, Woodstock, Lake in the Hills, Crystal Lake, and Lakewood which consist of mixed use, residential, public/institutional, and commercial land uses. The current traffic queues and LOS contribute to poor and unsafe access for the land uses that exist throughout the project area. Left turn channelization is sporadic throughout the project area and access to adjacent properties is limited. These problems will continue to increase as more residential and commercial facilities are built.

The communities along the corridor have tools in place, such as formal comprehensive plans and zoning restrictions, to allow for planned residential and commercial growth. IDOT has worked and will continue to work with the local communities to select the most appropriate places for access points to IL 47. Currently, two major residential developments are planned within the project area; the Huntley Village Center North, located between Talamore Blvd. and Ackman Road, and the properties formally known as Apple Creek Estates, located between Lucas Road and Hercules Road. Commercial centers are planned for areas near both IL 176 and IL 47 intersections. Smaller commercial and residential developments are planned as well throughout the corridor. In summary, the generation of traffic by these planned future developments will compound the current conditions. The local communities are cooperating with IDOT's access permitting efforts which will help to maintain thoughtful growth.

IL 47 also serves travelers who use the route to travel to Wisconsin and the Lake Geneva area. The viability of current and future economic development along the IL 47 corridor is restricted under current traffic operations. A safe and efficient transportation system would better serve and maintain the viability of current land uses in and around the business areas along the route.

4. ALTERNATIVES CONSIDERED

This chapter describes three major system alternatives and their related improvement strategies. The No-Action Alternative, Congestion Management System (CMS) Alternative, and the Build Alternative are alternatives that could be applied along the entire corridor.

4.1 Non-Build Alternatives

4.1.1 No-Action Alternative

Throughout the development of this project, consideration has been given to the No-Action Alternative as a base condition against which resulting effects of the preferred build alternative may be measured. The No-Action Alternative is the retention of the present roadway configuration and the performance of routine maintenance to keep the roadway operational.

Selection of the No-Action Alternative would result in:

- continued high crash potential resulting from a lack of roadway capacity and safe turning accommodations
- continued heavy congestion (reduced mobility)
- continued poor and unsafe access for the land uses that exist throughout the project area
- continued restriction on the viability of current and future economic development along the Illinois Route 47 (IL 47) corridor

If problems associated with traffic congestion and crash potential remain unaddressed, IL 47 from Reed Road to U.S. Route 14 (U.S. 14) would continue to be at a high risk for crashes and experience congestion.

The No-Action Alternative does not meet the Purpose and Need of the project and is neither feasible nor prudent.

4.1.2 Congestion Management Process Alternative

The provisions of 23 CFR 450.320 place restrictions on the use of Federal funds for projects in Transportation Management Areas (TMAs) designated as nonattainment for carbon monoxide and/or ozone. In these areas, Federal funds may not be programmed for any project that will significantly increase capacity for single-occupancy vehicles (SOVs) unless the project is addressed through a Congestion Management Process (CMP). The CMP is required to provide an appropriate analysis of alternatives to the proposal for adding SOV capacity, including all reasonable congestion management strategies. If the analysis demonstrates that other alternatives and/or congestion management strategies cannot fully satisfy the need for additional capacity and that, therefore, the additional SOV capacity is warranted, the CMP must identify all

reasonable strategies that will maintain the functional integrity of the additional lanes. All identified reasonable strategies must be incorporated into the project. The CMP for each affected TMA is addressed in materials available from the Metropolitan Planning Organization responsible for the area.

Individual projects involving the addition of SOV capacity were evaluated, selected, and prioritized in the course of developing the Fiscal Year 2014-2019 Transportation Improvement Program (TIP) and the long-range *Go To 2040* Regional Transportation Plan (RTP) for Northeastern Illinois. The Northeastern Illinois CMP is documented via various materials that are available through the Chicago Metropolitan Agency for Planning (CMAP). The following are examples:

- Congestion Mitigation Handbook, September 1998
- Congestion Management System for Northeastern Illinois, July 2006 Annual Status Report
- *Go to 2040* Regional Transportation Plan for Northeastern Illinois
- Arterials and Streets Infrastructure and Operations for Mobility, Access, and Community in Metropolitan Chicago, January 2009
- Travel Demand Management, Strategy Paper, March 2009
- Congestion Reduction Demonstration for Northeastern Illinois A Proposal for Direct Highway Pricing, Transit, Technology, and Supporting Strategies, December 31, 2007

The development process for the TIP and Regional Transportation Plan constitutes the CMP for Northeastern Illinois. This process documents warranted projects for adding SOV capacity and, as applicable, also documents that regional and/or project-specific alternatives (e.g., Transportation Demand Management measures, High-Occupancy Vehicle measures, Transit Capital Improvements, Congestion Pricing, Growth Management, Incident Management) would not obviate the need for adding SOV capacity. Planned projects resulting from the CMP are documented in the annual CMP status report referenced above. For this project, it has been determined that stand-alone CMP alternatives will not satisfy the project purpose and need and, therefore, this undertaking is a warranted project for adding SOV capacity.

Reasonable project-specific CMP strategies, including Traffic Operational Improvements, Transit Operational Improvements, Non-motorized modes/measures (Pedestrian/Bicycle), Intelligent Transportation System (ITS), and Access Management, have been incorporated into this project to the extent practical. Specific strategies incorporated include:

- increased turn lane storage capacities
- traffic signal modernization
- consolidation of access points, street and driveways
- channelized intersections with left and right turn lanes

- barrier medians for access control
- right-in and right-out access control

With respect to Transit Operational Improvements, there are no existing transit services along IL 47 and none are currently proposed.

As documented in the above information, this project results from the CMP for Northeastern Illinois as a warranted project for adding SOV capacity and all reasonable congestion management strategies have been incorporated into the project to sustain its effectiveness.

4.1.3 Public Transit

Pace, the suburban bus division of the Regional Transportation Authority (RTA), operates public bus service in suburban northeastern Illinois. Pace Bus Route 808 travels along U.S. 14 and on IL 47 north of U.S. 14.

Metra, the suburban commuter rail division of the RTA, provides commuter rail service in suburban northeastern Illinois. Metra does not directly service the IL 47 project area. There is no feeder or dedicated connecting Metra Commuter Stations within the project limits. The closest Metra Stations are Woodstock Station located approximately 2 miles north of the project limits and Crystal Lake Station located approximately 5 ½ miles east of the project.

Public transit service does not presently, nor would it in the near future, offer an effective means of reducing the traffic along IL 47. Increasing public transit capacity or improving safety would not independently satisfy the Purpose and Need for the project.

4.2 Low Cost Build Alternatives: Traffic Operational Improvements

4.2.1 Intersection Improvements

Both legs of Illinois Route 176 (IL 176) at IL 47 were improved in the summer of 2010. The improvements added a dedicated right turn lane to separate left and right turning vehicles. While this improvement relieved some congestion and reduced crashes at the IL 176 intersections, travelers at other locations on IL 47 continue to experience heavy congestion and delay. The congestion and delays can only be reduced by adding lanes over the entire project length.

4.2.2 Access Management

Access management could improve safety and traffic flow by reducing or eliminating potential conflicts from traffic entering, exiting, or crossing IL 47. Access management includes use of cul-de-sacs, consolidation of driveways and/or street access, barrier medians, frontage road systems, or any combination of these treatments.

4.2.3 Pedestrian/Bicycle Facilities

Isolated pieces of pedestrian/bicycle facilities exist within the project corridor. A bicycle path exists on the east side of IL 47 between Reed Road and Rainsford Drive. This asphalt path is approximately six feet in width. Three short pieces of sidewalk exist in the

northern portion of the project corridor: (1) on the west side of IL 47 across from Novean Parkway, (2) on the east side of IL 47 north of Cobblestone Way, and (3) on the west side of IL 47 south of U.S. 14. Pedestrian and bicycle facilities also exist along some of the cross streets within the study area including Reed Road, Rainsford Drive, Talamore Boulevard, Ackman Road, and Cobblestone Way.

4.3 CMP Alternative Summary

The result of the CMP alternative analysis is that this project is warranted in Northeastern Illinois as a single occupancy vehicle (SOV), capacity adding project. Reasonable congestion management strategies, such as increased turn lane storage capacities, traffic signal installation and modernization, and access management strategies have been incorporated into the preferred alternative to sustain its effectiveness.

The result of the analysis of the various and cumulative elements within the CMS alternative analysis is that while useful and somewhat helpful in improving operations and safety, do not meet the Purpose and Need as standalone improvements.

4.4 Build Alternatives

The Build Alternative would be undertaken to fulfill the purpose and need of the project, as described in Sections 1 and 3.2, to construct a roadway that complies with roadway criteria as set forth by AASHTO and IDOT Bureau of Design and Environment (BDE). This alternative best fulfills the Project Purpose and Need and is preferred over other system alternatives.

The Build Alternatives are described in Chapter 6.

5. DISCUSSION AND ANALYSIS OF BUILD ALTERNATIVES

This chapter describes the alternatives that were developed during this study. A build scenario must meet the purpose and need of the project, as described in Sections 1 and 3.2, before it is studied in detail. A summary discussion of the analysis of each build alternative, and the extent to which they meet the planning and design objectives, is provided in this chapter.

The alternative development process followed a Context Sensitive Solutions (CSS) approach. Public input and consensus was obtained on various project elements and treatments evaluating their effectiveness for meeting the project purpose and need. From these project elements, the build alternatives were developed. Pedestrian and bicycle accommodations will be provided regardless of which alternative is selected as the preferred alternative as per “Complete Streets Law”. The type of accommodations will be dependent upon local participation. Typical Section Renderings of the build alternatives can be found in Sections 5.2 and 5.3.

The project elements, as derived from the CSS approach and stakeholder involvement process, were incorporated into a range of alternatives. Preliminary design variations of the build alternatives were carried forward and separated into three distinct roadway sections as follows:

Section 1: Reed Road to Rainsford Drive

- Minimal roadway changes to construction completed in summer of 2011

Section 2: Rainsford Drive to Hercules Road

- South Alternative 1: 50 Foot Median - Retain Existing Centerline
- South Alternative 2: 50 Foot Median - Shift Centerline 37 Feet East
- Revised South Alternative 1: 30 Foot Median – Retain Existing Centerline
- Revised South Alternative 2: 30 Foot Median – Shift Centerline 27 Feet East
- Illinois Route 47 (IL 47) at Illinois Route 176 (IL 176) Intersection Realignment Alternatives

Section 3: Hercules Road to U.S. Route 14 (U.S. 14)

- North Alternative 1: 22 Foot Median
- North Alternative 2: 18 Foot Median

Each of the build alternatives meets the Project Purpose and Need as follows:

- *Improve vehicle and pedestrian safety* – Vehicle safety is improved by adding shoulders, center medians, turn lanes, and through lanes. Pedestrian and bicycle safety is improved by adding sidewalks and shared-use paths. Improvements to pedestrian and bicycle accommodations is contingent upon local agencies

agreeing to paying their share of construction cost and agreeing to maintain the improvements after construction.

- *Improve mobility/capacity* – Vehicle mobility/capacity is improved by adding turn lanes and through lanes. Pedestrian and bicycle mobility is improved by adding sidewalks and shared-use paths.
- *Facilitate planned economic growth* – Planned economic growth is facilitated by the improvements to capacity and mobility allowing for efficient movement of goods, employees, and customers.

Preliminary evaluation of the alternatives was based on an assumed footprint for relative comparison between the alternatives. The build alternatives are described in Section 5.1 through Section 5.3.

5.1 Section 1: Reed Road to Rainsford Drive

Section 1 is approximately $\frac{1}{4}$ mile in length with a posted speed of 45 mph and design speed of 50 mph. The southern terminus is located within a 1,640 foot radius horizontal curve upon which Reed Road intersects IL 47 at an existing signalized intersection. Reed Road is a two lane, east-west roadway with left and right turn channelization on its approaches. The intersection currently operates at an overall LOS C in both the a.m. and p.m. peak hours. Under proposed 2040 conditions, the operations will improve to a LOS “B” in the a.m. peak hour and a LOS C in the p.m. peak hour.

Recent construction of Section 1, based on the preferred improvement identified from the IL 47 Phase I study from Kreuzer Road to Reed Road, was completed in the summer of 2011. It consists of two 12 foot lanes in each direction with curb and gutter separated by a 22 foot barrier median. As part of the proposed improvements to IL 47 between Reed Road and U.S. 14, Section 1 will remain unchanged with the exception of removing the shoulders, placing curb and gutter at the edge of pavement, and adding sidewalk to connect to the existing sidewalk at Reed Road.

The above improvements to Section 1 meet the Project Purpose and Need for this project.

5.2 Section 2: Rainsford Drive to Hercules Road

Section 2 of IL 47 is 6.6 miles in length with a posted speed of 55 mph and design speed of 60 mph. The existing roadway consists of a 12 foot lane in each direction with open drainage. The existing alignment is generally on tangent between Rainsford Drive and IL 176 (East Leg) and again on tangent between IL 176 (West Leg) and Hercules Road. Between the two signalized intersections with IL 176, the existing alignment contains two successive 1,577 foot radius curves separated by a 3,375 foot tangent section.

A total of five stream crossings are encountered within the limits of the Section 2 build alternatives, resulting in the need to replace an existing two span bridge structure (SN 056-0025) crossing the Kishwaukee River, located between Foster / Union Road and

Hawthorne Way. The other four stream crossings will result in replacement culverts which will be enlarged and lengthened.

IL 47 intersects a total of ten side roads within Section 2, as listed below. The IL 176 intersections are signalized, while all other side roads are currently unsignalized and do not meet warrants for new signal installations. Currently, full access is allowed at each of the intersections (listed from north to south):

- Talamore Boulevard
- Ackman Road
- Conley Road
- Foster/Union Road
- Hawthorne Way
- Ballard Road
- IL 176 (West Leg)
- Pleasant Valley Road
- IL 176 (East Leg)
- Lucas Road

Left turn lanes will be developed in advance of each of the intersections listed above. The existing spacing between the IL 176 (East Leg) and Pleasant Valley Road is 590 feet. The proposed improvement realigns Pleasant Valley Road $\frac{1}{4}$ mile to the north of IL 176 (East Leg). IL 47 alternatives are described in more detail in Section 5.2.5.

Under proposed conditions, residential and commercial driveways will be converted to right-in/right-out access by way of a non-traversable median. U-turn capability is being provided at the side road access points.

IL 47 intersects IL 176 in two locations, each consisting of a signalized T-intersection; the state highways share designation for approximately 0.9 miles. Both East and West legs of IL 176 consist of one 12 foot departing lane and two 12 foot approach lanes providing separate left and right turn lanes for vehicles turning from IL 176 to IL 47. Improvements along IL 176, at both intersections, will provide dual left turn lanes and free flow right turn lanes and acceleration lanes from IL 176 to IL 47 to accommodate the heavy turning movements. At both IL 176 intersections, the proposed improvement along IL 47 will provide dual-left lanes and a right-turn lane and an additional through lane in each direction.

The south intersection, which approaches and departs to the east, currently operates at an overall LOS C in the a.m. peak and a LOS D in the p.m. peak. The north intersection, which approaches and departs to the west currently, operates at an overall LOS of "D" in both the a.m. and p.m. peak hours. The proposed improvement will improve the operations to LOS B for the a.m. and p.m. peak hours at both intersections under

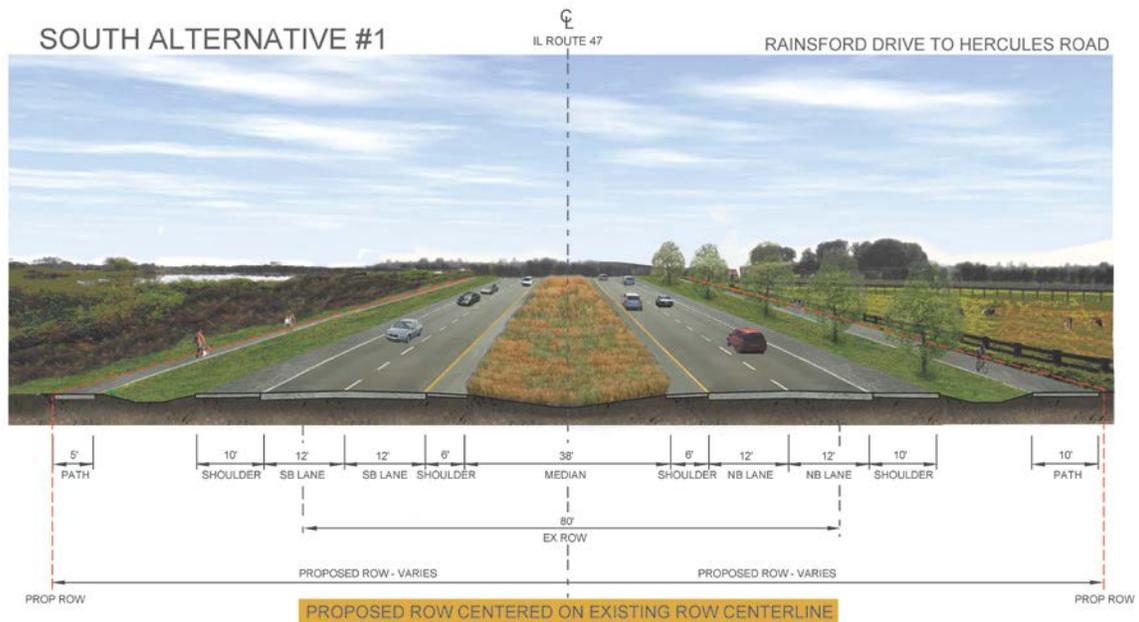
projected 2040 traffic volumes. In general, improving intersection LOS by adding additional through lanes and channelization should reduce the crashes at the IL 176 split intersections.

Consideration was given to eliminating the split intersection at IL 176. A total of eight concept level alternatives were developed for this intersection, six of which realigned the south and north IL 176 intersections at IL 47. The IL 176 intersection alternatives are described in more detail in Section 5.2.5.

5.2.1 Section 2 (South Alternative 1: 50 Foot Median - Retain Existing Centerline)

In South Alternative 1, the proposed centerline of IL 47 matches the existing and is centered upon an 80 foot existing right of way. The proposed right of way required is generally 200 feet wide centered upon the existing centerline. Consistent with the IL 47 Strategic Regional Arterial (SRA) Planning Study, two 12 foot lanes are proposed in each direction with 10 foot wide paved outside shoulders and a depressed median providing 50 feet of separation between the opposing edges of pavement. The median includes 6 foot wide paved inside median shoulders and a 4 foot wide flat bottom ditch. Pedestrian and bicyclists will be accommodated on a 10 foot wide shared-use path on one side of the roadway and a 5 foot wide sidewalk on the other side of the roadway. A swale is proposed between the edge of shoulder and the sidewalk/path. A four foot flat bottom ditch is proposed between the sidewalk/path and the right of way. See Figure 5–1 for the proposed typical section.

Figure 5–1 - South Alternative 1



Preliminary evaluation of South Alternative 1 identified 30.3 acres of transverse impacts to the 100 year floodplains associated with the stream crossings and infringes on 31 wetlands resulting in 18.3 acres of impact.

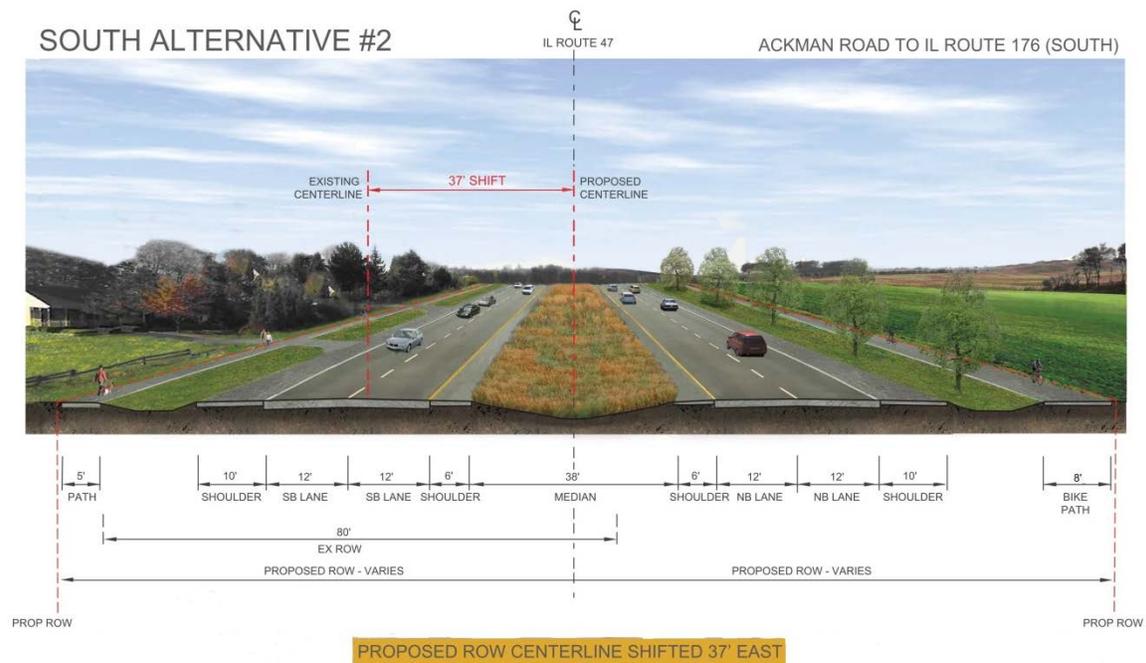
The necessary right of way acquisition includes eight residential displacements and no commercial displacements requiring an additional 89 acres of right of way.

South Alternative 1 meets the Project Purpose and Need to improve this route to address vehicular and pedestrian safety, enhance traffic mobility and capacity, and facilitate planned economic growth. It was not carried forward due to wetland impacts and eight residential displacements.

5.2.2 Section 2 (South Alternative 2: Shift Roadway Centerline 37 Feet East)

This build alternative retains the same typical section and operational characteristics as described in South Alternative 1; however, the roadway centerline is shifted 37 feet to the east by way of a two 38,200 foot radius curves. The roadway shift occurs between Ackman Road and IL 176 (East Leg) and minimizes the impact to the residential properties on the west side of IL 47 between Hawthorne Way and IL 176. Pedestrian and bicyclists will be accommodated on a narrower 8 foot wide shared-use path on one side of the roadway and a 5 foot wide sidewalk on the other side of the roadway. From Rainsford Drive to Ackman Road and from IL 176 (East Leg) to Hercules Road the roadway remains on the existing centerline. See Figure 5–2 for the proposed typical section.

Figure 5–2 - South Alternative 2



The wetland and floodplain impacts for both South Alternative 1 and South Alternative 2 are similar. Preliminary evaluation of South Alternative 2 identified 30.3 acres of transverse impacts to the 100 year floodplains associated with the stream crossings and infringes on 31 wetlands resulting in 18.3 acres of impact.

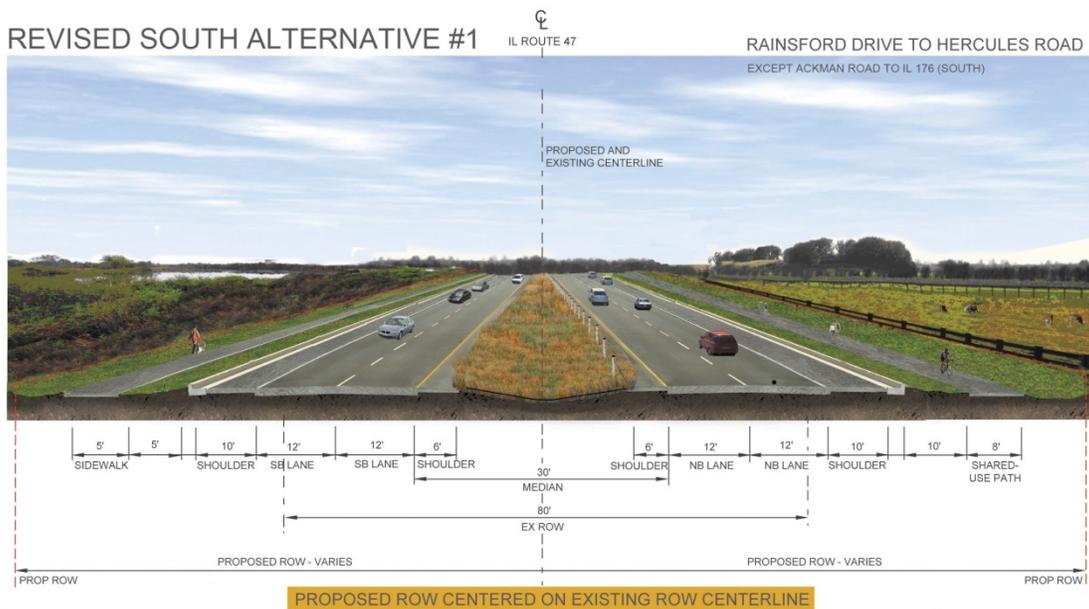
South Alternative 2; however, minimizes the necessary displacements to one residential displacement and no commercial displacements. Although no commercial displacements are anticipated, the proposed improvement may impact the parking lot and putting green of the Craig Woods Executive Golf Course (a private golf course).

South Alternative 2 meets the Project Purpose and Need to improve this route to address vehicular and pedestrian safety, enhance traffic mobility and capacity, and facilitate planned economic growth. It was not carried forward due to wetland impacts.

5.2.3 Section 2 (Revised South Alternative 1: 30 Foot Median - Retain Existing Centerline)

This build alternative has similar physical and operational traits as described for South Alternative 1. However, to minimize impacts the median has been reduced to 30 foot wide and curb and gutter would be placed at the outside edge of the outside shoulders. The proposed centerline of IL 47 matches the existing and is centered upon an 80 foot existing right of way. The proposed right of way required is generally 170 feet wide, centered upon the existing centerline. Pedestrians and bicyclists will be accommodated on an 8 foot wide shared-use path on one side of the roadway and a 5 foot wide sidewalk on the other side of the roadway. A four foot flat bottom ditch is proposed between the sidewalk/path and the right of way. See Figure 5–3 for the proposed typical section.

Figure 5–3 - Revised South Alternative 1



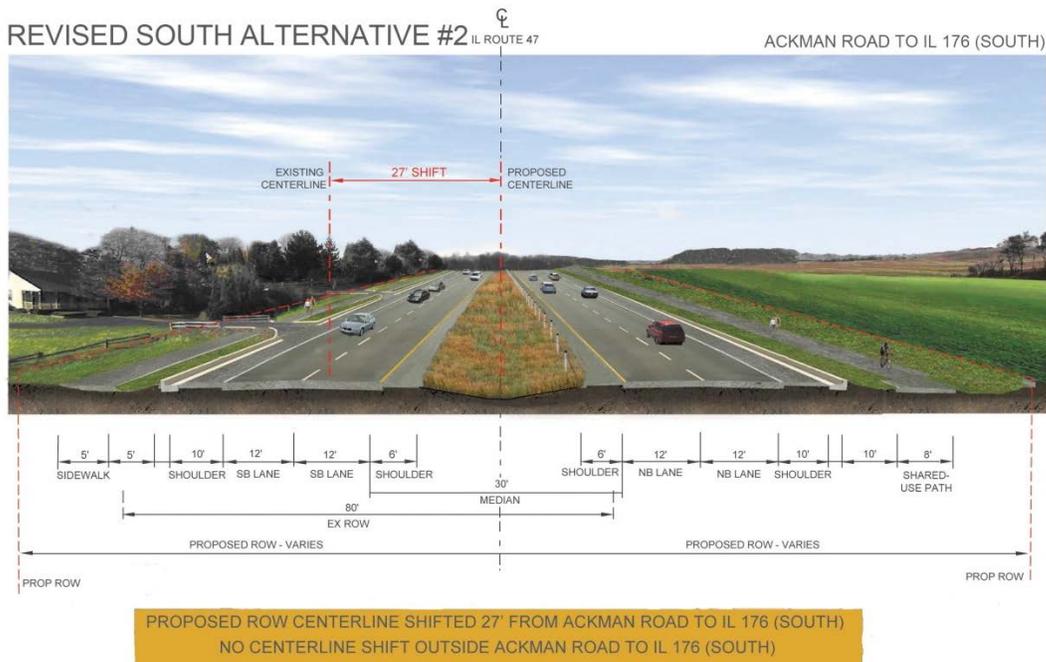
Preliminary evaluation of this reduced cross section indicated the amount of impacts would be minimized to 21.1 acres of transverse impacts to the 100 year floodplains associated with the stream crossings, and infringement on 31 wetlands resulting in 12.7 acres of wetland impact. Therefore the reduced cross section would result in minimizing impacts by 9.2 acres of transverse impacts to the 100 year floodplains, and 5.6 acres of wetland impact. The necessary right of way acquisition includes eight residential displacements and no commercial displacements.

Revised South Alternative 1 meets the Project Purpose and Need to improve this route to address vehicular and pedestrian safety, enhance traffic mobility and capacity, and facilitate planned economic growth. It was not carried forward due to the eight residential displacements.

5.2.4 Section 2 (Revised South Alternative 2: 30 Foot Median - Shift Roadway Centerline 27 Feet East)

This build alternative retains the same typical section and operational characteristics as described in Revised South Alternative 1; however, the roadway centerline is shifted 27 feet to the east by way of a 38,200 foot radius reverse curve. The roadway shift occurs between Ackman Road and IL 176 (East Leg) and minimizes the impact to the residential properties on the west side of IL 47 between Hawthorne Way and IL 176. From Rainsford Drive to Ackman Road and from IL 176 (East Leg) to Hercules Road, the roadway remains on the existing centerline. See Figure 5–4 for the proposed typical section.

Figure 5–4 - Revised South Alternative 2



The wetland and floodplain impacts for Revised South Alternative 1 and Revised South Alternative 2 are similar. Preliminary evaluation of this reduced cross section indicated the amount of impacts would be minimized to 21.1 acres of transverse impacts to the 100 year floodplains associated with the stream crossings, and infringement on 31 wetlands resulting in 12.7 acres of wetland impact.

Revised South Alternative 2, however, minimizes the necessary displacements to one residential displacement and no commercial displacements. Although no commercial displacements are anticipated, the proposed improvement may impact the parking lot and putting green of the Craig Woods Executive Golf Course (a private golf course).

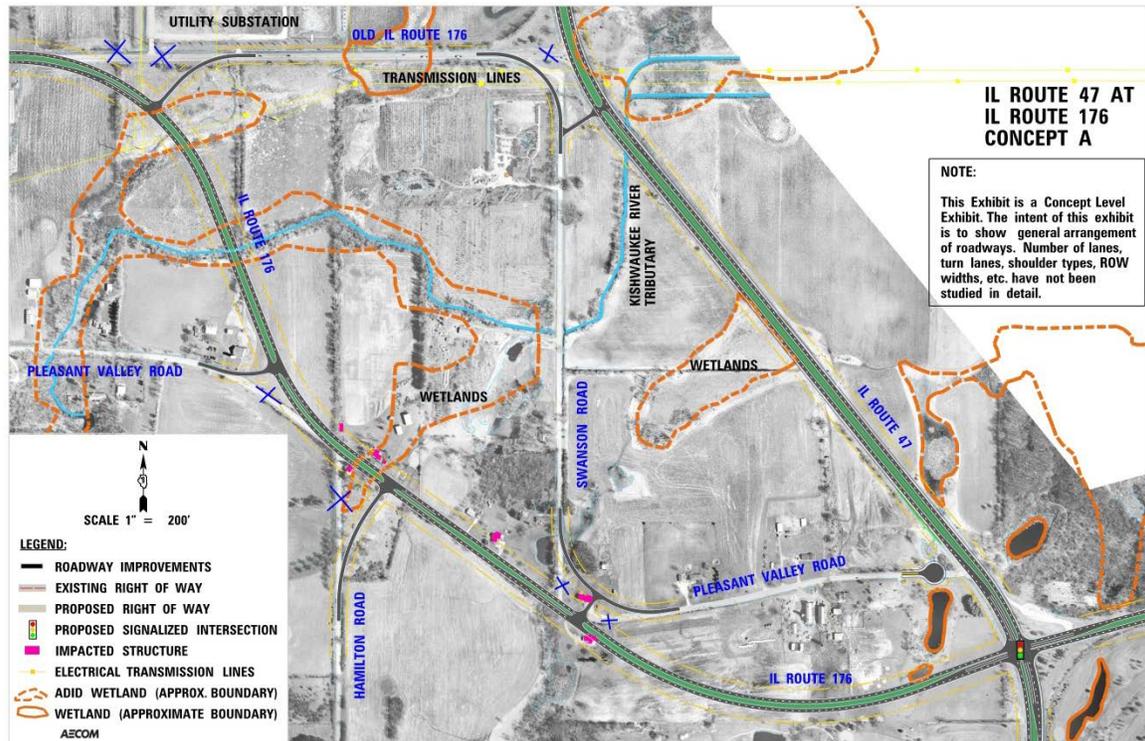
Revised South Alternative 2 meets the Project Purpose and Need to improve this route to address vehicular and pedestrian safety, enhance traffic mobility and capacity, and facilitate planned economic growth. It was carried forward since it had the lowest wetland impacts and the least number of displacements.

5.2.5 Section 2 (IL 47 at IL 176 Intersection Realignment Alternatives)

Consideration was given to improving the IL 47 at IL 176 split intersections. A total of eight concept level alternatives were developed for this intersection, six of which realigned the south and north IL 176 intersections at IL 47. The alternatives evaluated meet the project purpose and need. All alternatives would improve IL 176 to include two 12 foot lanes in each direction, a depressed median, paved inside shoulders, paved outside shoulders, and left and right turns between IL 176 and IL 47. All alternatives would require similar improvements to IL 47 as described in the previous Sections. Alternatives A, B, C, and D would realign the West Leg of IL 176 to connect to the existing East Leg of IL 176. Alternative E would realign the East Leg of IL 176 to connect with the existing West Leg of IL 176. Alternative F would realign both the East and West Legs of IL 176 to connect halfway between the existing East and West Legs of IL 176. Alternatives G and H would retain the existing split intersections.

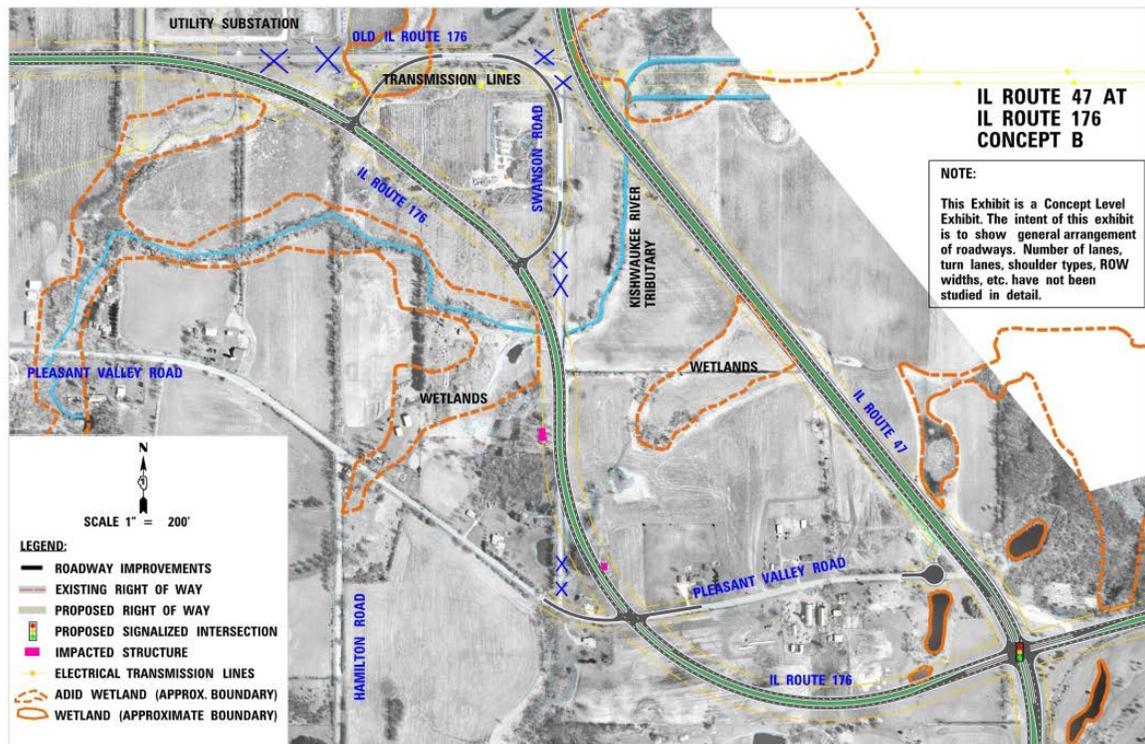
Alternative A, see Figure 5–5, would commence at the existing intersection of the East Leg of IL 176 at IL 47 and travel west and north to connect into the West Leg of IL 176 east of Dean Street. The majority of the roadway would be on new alignment. Based on preliminary evaluation the alternative would require 63.36 acres of new right of way and displace six residences. It would also impact 5.97 acres of wetland and 0.46 acres of ADID wetlands while crossing three streams. The alternative would add 1.8 miles of adverse travel for those traveling between northbound IL 47 and westbound IL 176. The intersection would operate at a LOS C. See Table 5–2 for a summary of preliminary impacts.

Figure 5–5 - IL 47 at IL 176 Intersection Alternative A



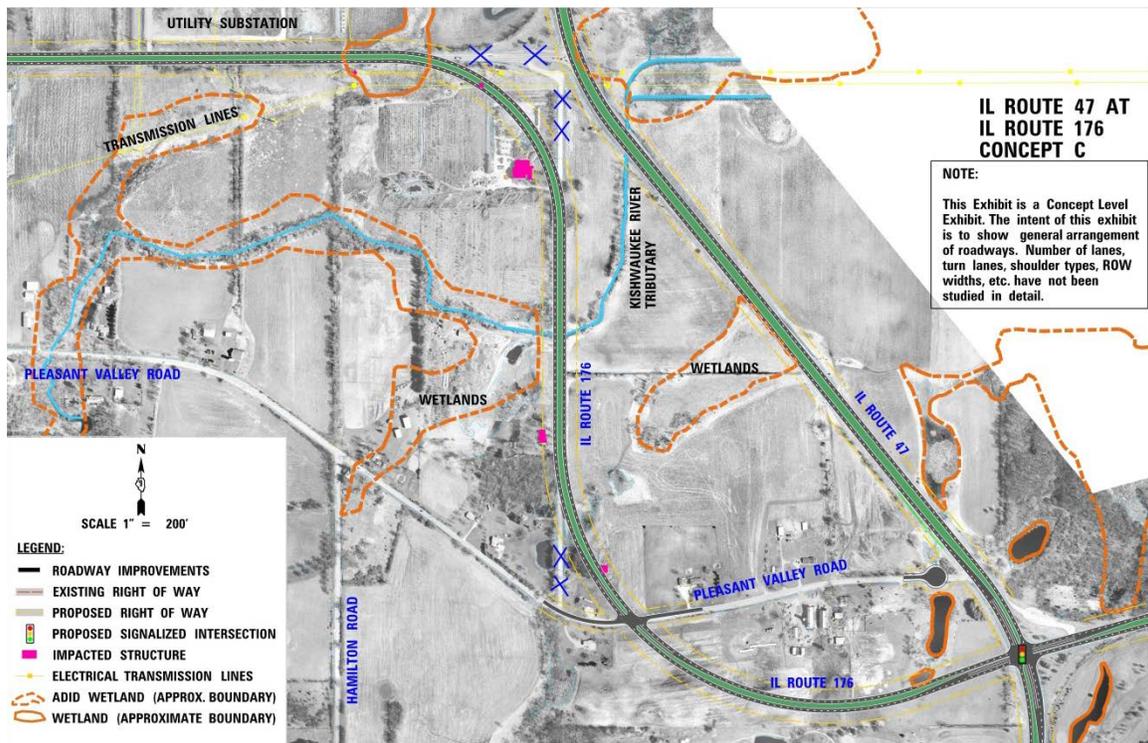
Alternative B, see Figure 5–6, would commence at the existing intersection of the East Leg of IL 176 at IL 47 and travel west and north to connect back into the West Leg of IL 176 east of Dean Street. The majority of the roadway would be on new alignment. Based on preliminary evaluation the alternative would require 60.97 acres of new right of way and displace three residences. It would also impact 4.13 acres of wetland and 0.46 acres of ADID wetlands while crossing two streams. The alternative would add 1.8 miles of adverse travel for those traveling between northbound IL 47 and westbound IL 176. The intersection would operate at a LOS C. See Table 5–2 for a summary of preliminary impacts.

Figure 5–6 - IL 47 at IL 176 Intersection Alternative B



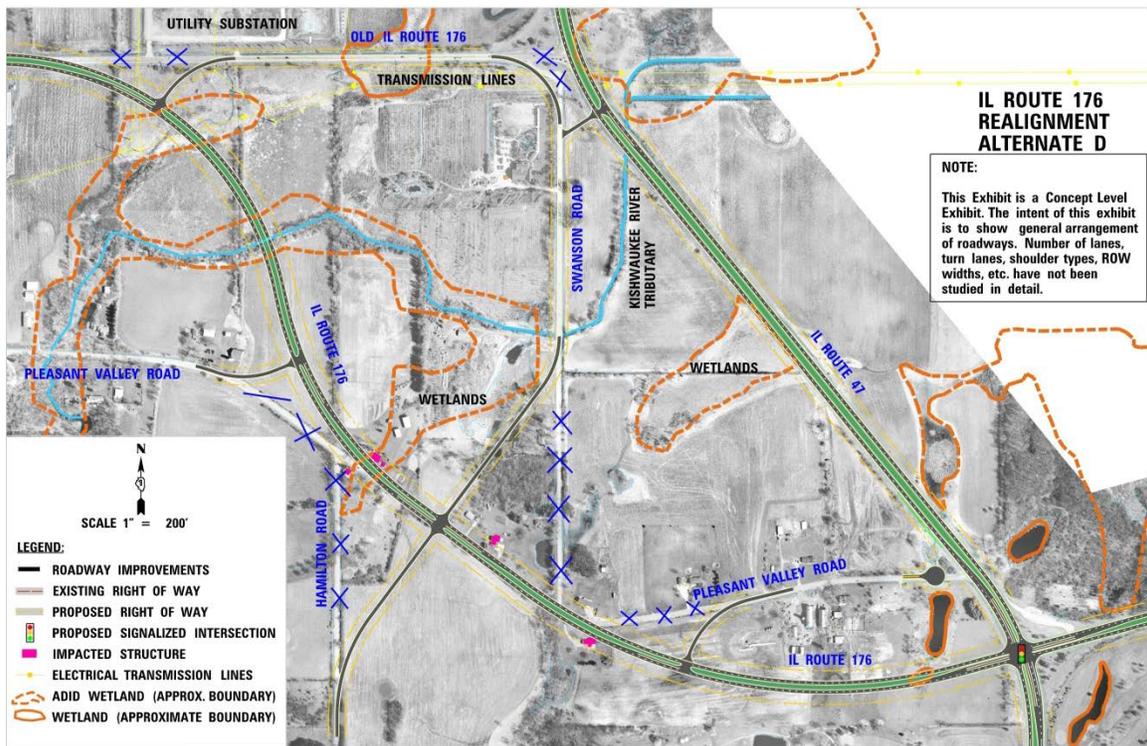
Alternative C, see Figure 5–7, would commence at the existing intersection of the East Leg of IL 176 at IL 47 and travel west and north to connect back into the West Leg of IL 176 west of Swanson Road. The majority of the roadway would follow Swanson Road with additional sections on new alignment. Based on preliminary evaluation the alternative would require 56.56 acres of new right of way and displace three residences and one business. It would also impact 1.38 acres of wetland and 1.38 acres of ADID wetlands while crossing two streams. The alternative would add 1.8 miles of adverse travel for those traveling between northbound IL 47 and westbound IL 176. The intersection would operate at a LOS C. See Table 5–2 for a summary of preliminary impacts.

Figure 5–7 - IL 47 at IL 176 Intersection Alternative C



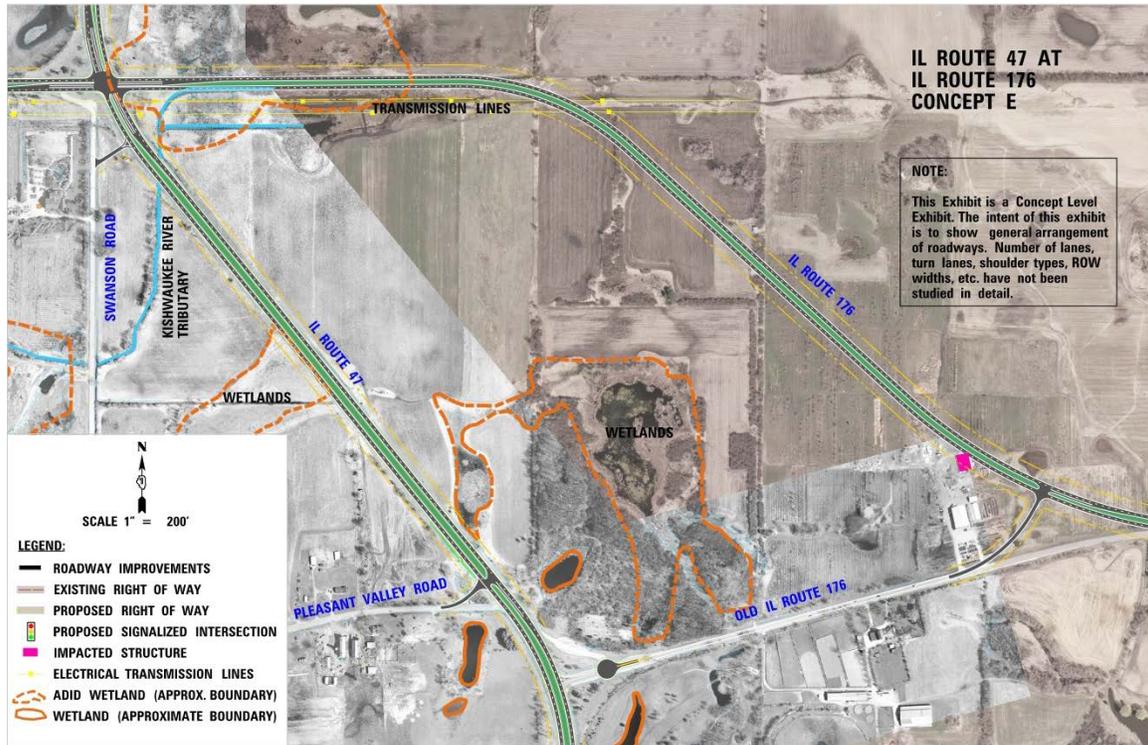
Alternative D, see Figure 5–8, would commence at the existing intersection of the East Leg of IL 176 at IL 47 and travel west and north to connect back into the West Leg of IL 176 east of Dean Street. The majority of the roadway would be on new alignment. Based on preliminary evaluation the alternative would require 64.28 acres of new right of way and displace five residences. It would also impact 7.35 acres of wetland and 0.46 acres of ADID wetlands while crossing four streams. The alternative would add 1.8 miles of adverse travel for those traveling between northbound IL 47 and westbound IL 176. The intersection would operate at a LOS C. See Table 5–2 for a summary of preliminary impacts.

Figure 5–8 - IL 47 at IL 176 Intersection Alternative D



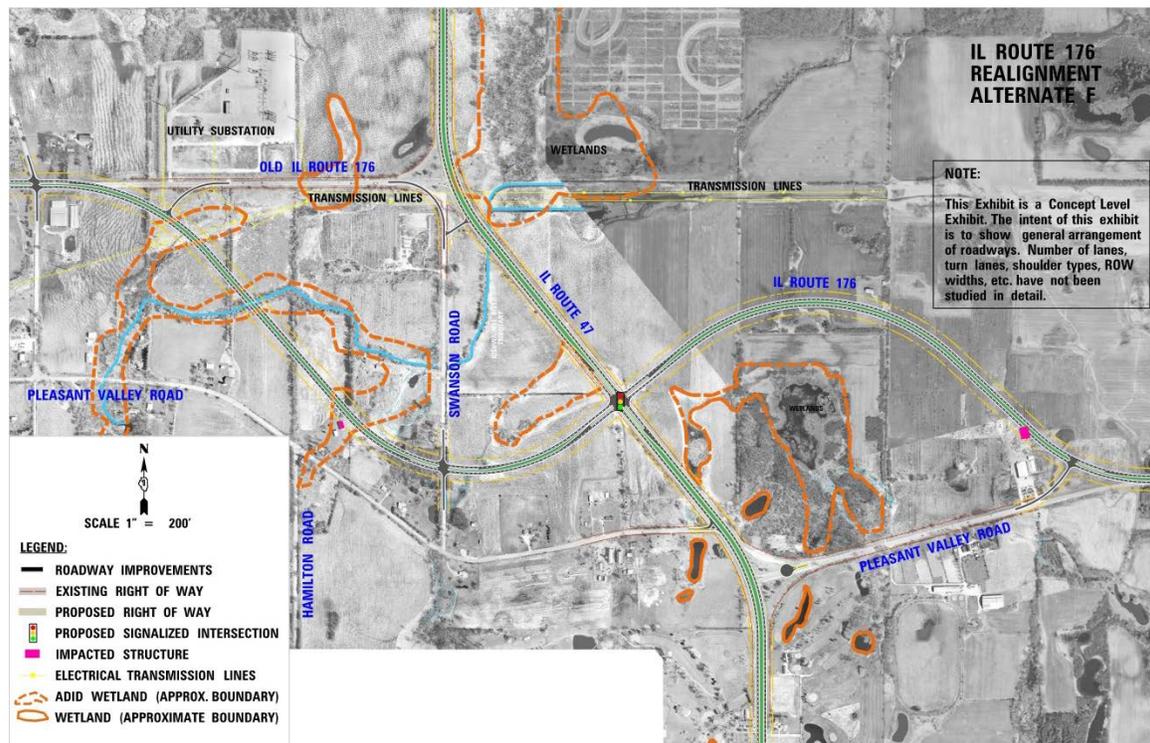
Alternative E, see Figure 5–9, would commence at the existing intersection of the West Leg of IL 176 at IL 47 and travel east and south to connect back into the East Leg of IL 176 approximately ½ mile east of IL 47. The majority of the roadway would be on new alignment. Based on preliminary evaluation the alternative would require 55.83 acres of new right of way and displace one business. It would also impact 11.48 acres of wetland while crossing two streams. The alternative would add 1.8 miles of adverse travel for those traveling between northbound IL 47 and eastbound IL 176. The intersection would operate at a LOS C. See Table 5–2 for a summary of preliminary impacts.

Figure 5–9 - IL 47 at IL 176 Intersection Alternative E



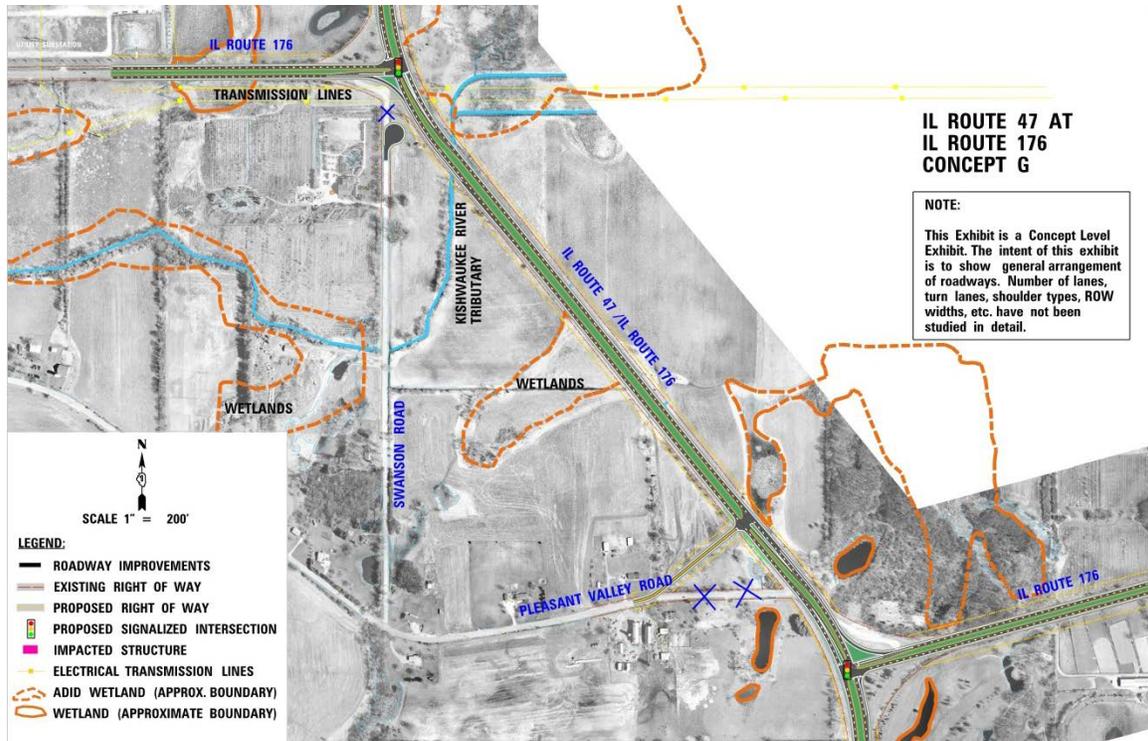
Alternative F, see Figure 5–10, would commence from ½ mile west of IL 47 on the West Leg of IL 176 and travel east and south to connect into the East Leg of IL 176 approximately ½ mile east of IL 47. It would cross IL 47 approximately halfway between the existing split IL 176 intersections. The majority of the roadway would be on new alignment. Based on preliminary evaluation the alternative would require 69.6 acres of new right of way and displace one residence and one business. It would also impact 6.43 acres of wetland and 0.46 acres of ADID wetlands while crossing three streams. The alternative would add 0.9 miles of adverse travel for those traveling between northbound IL 47 and eastbound IL 176. The intersection would operate at a LOS C. See Table 5–2 for a summary of preliminary impacts.

Figure 5–10 - IL 47 at IL 176 Intersection Alternative F



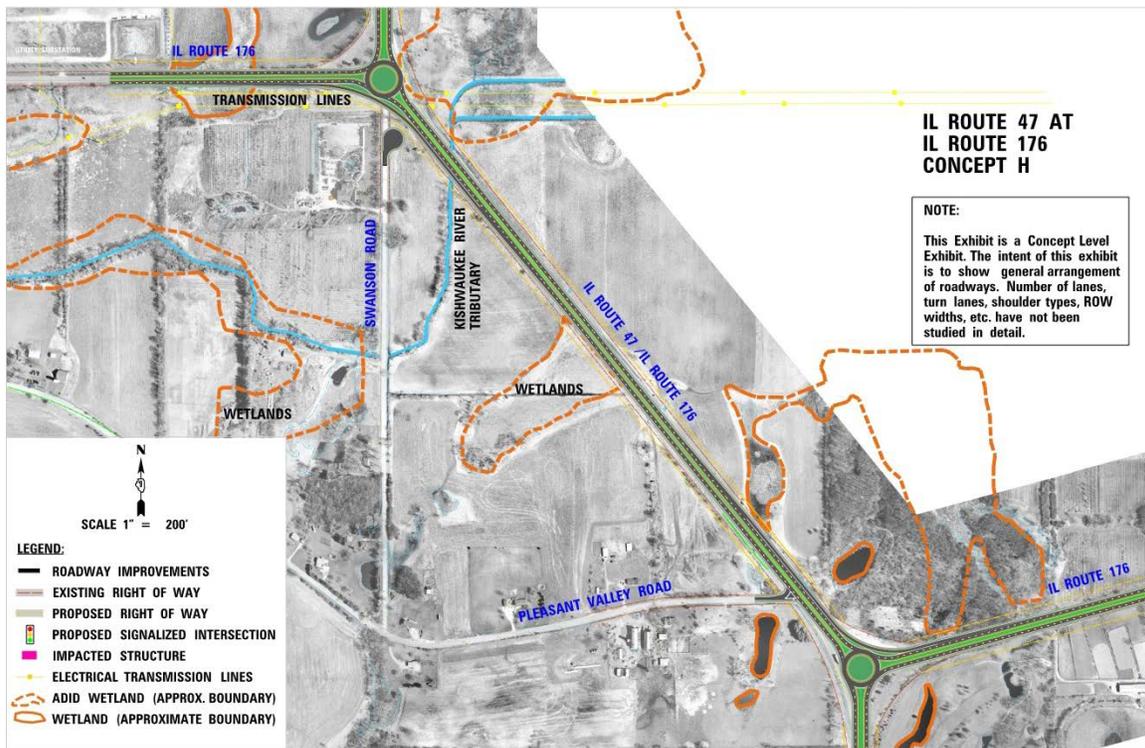
Alternative G, see Figure 5–11, would retain the existing split IL 176 intersections with IL 47. The alternative would utilize conventional intersection geometrics. Based on preliminary evaluation the alternative would require 19.10 acres of new right of way and would not displace any residence or business. It would impact 1.38 acres of wetland and 0.46 acres of ADID wetlands while crossing one stream. The alternative would not have any adverse travel for those traveling between IL 47 and IL 176. The intersection would operate at a LOS B. See Table 5–2 for a summary of preliminary impacts.

Figure 5–11 - IL 47 at IL 176 Intersection Alternative G



Alternative H, see Figure 5–12, is similar to Alternate G however it utilizes roundabouts in place of conventional intersections for the split intersections of IL 47 with IL 176. Based on preliminary evaluation the alternative would require 21.40 acres of new right of way and would not displace any residence or business. It would also impact 1.38 acres of wetland and 1.03 acres of ADID wetlands while crossing one stream. The alternative would not have any adverse travel for those traveling between IL 47 and IL 176. The intersection would operate at a LOS C. See Table 5–2 for a summary of preliminary impacts.

Figure 5–12 - IL 47 at IL 176 Intersection Alternative H



5.3 Section 3: Hercules Road to U.S. 14

North of Hercules Road, the posted speed is 40 mph with a design speed of 45 mph and the roadway transitions to an urban section with curb and gutter, containing many closely spaced access points. This section of IL 47 is 0.9 miles in length. The northern terminus is located at Davis Road south of U.S. 14.

The IL 47 and U.S. 14 intersection is signalized. U.S. 14 is a four lane east-west SRA with left and right turn lanes on both legs of the intersection. The intersection currently operates at an overall LOS D in both the a.m. and p.m. peak hours. Similar operations are expected under either alternative within this section.

The existing alignment is generally on tangent between Hercules Road and U.S. 14, intersecting with four side roads listed below. Each of the side roads is currently unsignalized and do not meet warrants for new signal installations. Currently, full access is allowed at each of the intersections.

- Hercules Road
- Novean Parkway (Private)
- Cobblestone Way/Dieckman Street
- Davis Road (U.S. 14 Frontage Road)

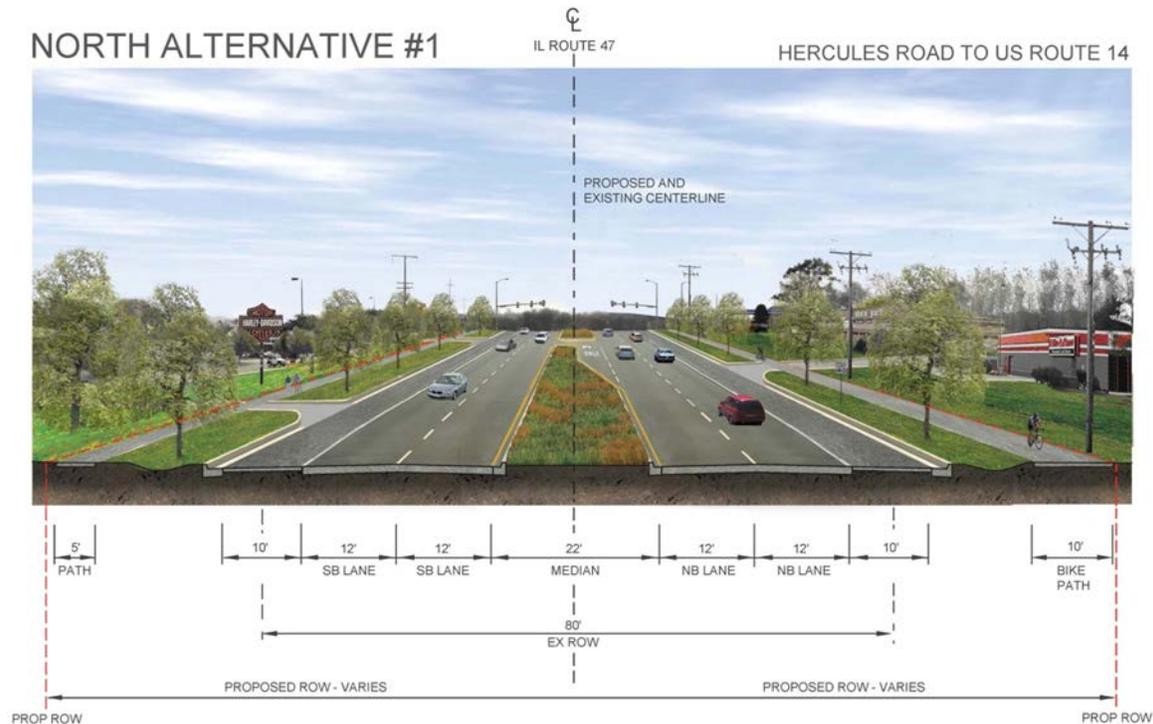
Left turn lanes will be developed in advance of each of the unsignalized intersections, with the exception of Dieckman Street. The existing spacing between the Cobblestone Way and Dieckman Street intersection is 270 feet. Consideration was given to realigning Cobblestone Way to align with Dieckman Street; however, the City of Woodstock would not approve the realignment. The proposed improvement will provide a left turn lane at Cobblestone Way but Dieckman Street will become right-in/right-out. Dieckman Street and Cobblestone Way are local streets with a 30 mph design speed.

Curb cut access to commercial properties will be maintained along the route. Under proposed conditions, driveways will be converted to right-in/right-out access by way of the non-traversable median. U-turn capability is being provided at the side road access points.

5.3.1 Section 3 (North Alternative 1: 22 Foot Median)

This alternative consists of two 12 foot lanes in each direction, separated by a 22 foot barrier median. A 10 foot paved shoulder is proposed adjacent to the travel lanes. Outside of the shoulder, curb and gutter are provided. Pedestrians and bicyclists will be accommodated on a 10 foot wide shared-use path on one side of the roadway and a 5 foot wide sidewalk on the other side of the roadway. The proposed centerline of IL 47 matches existing and is centered upon an 80 foot existing right of way. The existing right of way widens to 120 feet between Cobblestone Way and U.S. 14. The proposed right of way required is generally 140 feet wide centered upon the existing centerline, impacting several of the existing parking lots along IL 47. See Figure 5–13 for the proposed typical section.

Figure 5–13 - North Alternative 1



A total of one stream crossing is encountered within these limits, resulting in the need to realign the flow line of the Kishwaukee River, just south of Cobblestone Way. Preliminary evaluations of North Alternative 1 identified 3.2 acres of transverse impacts to the 100 year floodplains associated with the Kishwaukee River crossing and infringes on four wetlands resulting in 2.7 acres of impact.

Right of way acquisition is required and will impact the parking lots of the commercial properties north of Cobblestone Way. North Alternative 1 does not require any residential or commercial displacements.

North Alternative 1 meets the Project Purpose and Need. It was not carried forward due to high impacts to business parking lots.

5.3.2 Section 3 (North Alternative 2: 18 Foot Median)

This alternative proposes two 12 foot lanes in each direction with curb and gutter, similar to the North Alternative 1. The barrier median however is reduced from 22 feet to 18 feet and no shoulders are provided. Bicyclist accommodations are proposed by way of an 8 foot shared-use path along the east side of the roadway at the right of way line and a five foot sidewalk is proposed along the west right of way line. The roadway centerline will remain centered along the existing right of way. The proposed right of way for this alternative is reduced to 115 feet and generally does not impact the existing parking lots within this section of IL 47. See Figure 5–14 for the proposed typical section.

Figure 5–14 - North Alternative 2



Similar to North Alternative 1, North Alternative 2 crosses the Kishwaukee River. Preliminary evaluation of this alternative identified 2.4 acres of transverse impacts to the 100 year floodplains associated with the stream crossing and infringes on four wetlands resulting in 1.7 acres of impact.

Right of way acquisition is required, but will not impact the parking lots of the commercial properties north of Cobblestone Way. North Alternative 2 does not require any residential or commercial displacements.

North Alternative 2 meets the Project Purpose and Need. It was carried forward since it had the lowest impacts to businesses.

5.4 Evaluation of Build Alternatives

5.4.1 Section 1 – Reed Road to Rainsford Drive

Improvements to Section 1, Reed Road to Rainsford Drive, would remain mostly unchanged from the construction completed in the fall of 2011. The improvements consist of 24 feet of pavement in each direction (two 12 foot lanes), separated by a 22 foot barrier median. Curb and gutter is proposed adjacent to the outside travel lane.

The above improvements to Section 1 meet the Project Purpose and Need and would not be further modified.

5.4.2 Section 2 – Alternatives - Rainsford Drive to Hercules Road

Five alternatives, including the No-Action, were developed for Section 2, Rainsford Drive to Hercules Road. A preliminary impact evaluation was performed for each build alternative and the No-Action Alternative. The results are summarized in Table 5–1 below.

Table 5–1 - IL 47 South Alternative Preliminary Evaluation

Topic		South Alternatives ¹				
		No-Build	Alternative 1	Alternative 2	Revised Alternative 1	Revised Alternative 2 ²
Environmental	Displacements					
	Residential	0	8	1	8	1
	Commercial	0	0	0	0	0
	Emergency Services Impacted	None	None	None	None	None
	Wetlands					
	Acres	0	18.3	18.3	12.7	12.7
	Number	0	31	31	31	31
	Floodplains					
	Acres	0	30.3	30.3	21.1	21.1
	Number	0	4	4	4	4
	Cultural					
	Archaeological or Pre-Historic Historic Structures	None None	None None	None None	None None	None None
	T & E Species	None	None	None	None	None
Natural Areas						
Nature Preserves	None	None	None	None	None	
Section 4(f)	None	None	None	None	None	
Purpose & Need	Improve Safety	No	Yes	Yes	Yes	Yes
	Improve Mobility/Capacity	No	Yes	Yes	Yes	Yes
	Facilitate Growth	No	Yes	Yes	Yes	Yes

¹ Impacts Based On Assumed Row, Preliminary Estimates Only

² Preferred Alternative

Revised South Alternative 2 meets the Project Purpose and Need. It is recommended as the preferred alternative for Section 2, Rainsford Drive to Hercules Road, since it has the lowest wetland impacts and least number of displacements. Revised South Alternative 2 will be further refined to develop Best Management Practices (BMPs) to minimize impacts. BMPs which will be investigated include collecting and slowing runoff from the roadway, treatments at wetlands, and native plant usage to provide a filtering media for runoff.

IL 47 at IL 176 Intersection Alternative Evaluation

All alternatives evaluated for the IL 47 at IL 176 intersection meet the project purpose and need. A preliminary evaluation of each concept level alternative was performed to determine cost, impacts, and benefits. The preliminary results are summarized in the Table 5–2.

Table 5–2 - IL 47 at IL 176 Intersection Alternative Evaluation

Alternate	Adverse Travel (miles)	Construction Cost (Millions)	Wetlands (acres)	ADID Wetlands (acres)	Displacements		Additional ROW	Stream Crossings	Level of Service (LOS)
					Residence	Business			
A	1.8	\$57.09	5.97	0.46	6	0	63.36	3	C
B	1.8	\$54.75	4.13	0.46	3	0	60.97	2	C
C	1.8	\$50.77	1.38	1.38	3	1	56.56	2	C
D	1.8	\$58.06	7.35	0.46	5	0	64.28	4	C
E	1.8	\$51.51	11.48	0	0	1	55.83	2	C
F	0.9	\$60.37	6.43	0	1	1	69.6	3	C
G	0	\$23.83	1.38	0.46	0	0	19.1	1	B
H	0	\$24.23	1.38	1.03	0	0	21.4	1	C

As shown in Table 5–2, all six concept level alternatives which eliminated the split intersection (Alternative A, B, C, D, E, and F) and the concept level alternative which utilized roundabouts (Alternative H) would result in a lower LOS, higher wetland impacts, more stream crossings, increased adverse travel, higher construction costs, more required right of way, and more displacements as compared to the concept level alternative which retained the traditional split intersection (Alternative G). Therefore, concept level Alternative G, which retained the existing split IL 176 intersections was chosen to be carried forward, while the concept level Alternatives A, B, C, D, E, F, and H were not carried forward.

5.4.1 Section 3 – Hercules Road to U.S. 14

Three alternatives, including the No-Action, were developed for Section 3, Hercules Road to U.S. 14. A preliminary impact evaluation was performed for each alternative. The results are summarized in **Table 5–3** below.

Table 5–3 - IL 47 North Alternative Preliminary Evaluation

Topic ¹		North Alternatives		
		No Action	Alternative 1	Alternative 2 ²
Environmental	Displacements			
	Residential	0	8	0
	Commercial	0	0	0
	Emergency Services Impacted	None	None	None
	Wetlands			
	Acres	0	2.7	1.7
	Number	0	4	4
	Floodplains			
	Acres	0	3.2	2.4
	Number	0	1	1
	Cultural			
	Archaeological or Pre-Historic	None	None	None
	Historic Structures	None	None	None
	T & E Species	None	None	None
Natural Areas				
Nature Preserves	None	None	None	
Section 4(f)	None	None	None	
Purpose & Need	Improve Safety	No	Yes	Yes
	Improve Mobility/Capacity	No	Yes	Yes
	Facilitate Growth	No	Yes	Yes

¹ Impacts based on Assumed ROW, Preliminary Estimates Only

² Preferred Alternative

As shown in Table 5–3, both Build North Alternatives have similar impacts. The only difference is North Alternative 1 impacts 2.7 acres of wetland and 3.2 acres of floodplain, while North Alternative 2 only impacts 1.7 acres of wetlands and 2.4 acres of floodplain. North Alternative 2 also avoids impacts to the parking lots of existing businesses. Based on this preliminary evaluation North Alternative 2 was chosen as the preferred alternative to be studied in further detail for Section 3, Hercules Road to U.S. 14.

North Alternative 2 meets the Project Purpose and Need. It is recommended as the preferred alternative since it had the lowest impacts to businesses and the lowest impacts to wetlands. North Alternative 2 will be further refined to develop BMPs to minimize impacts. BMPs which will be investigated include collecting and slowing runoff from the roadway, treatments at the Kishwaukee Headwaters and other wetlands, and native plant usage to provide a filtering media for runoff.

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6. DESCRIPTION OF PREFERRED ALTERNATIVE

6.1 Introduction

Chapter 3 discussed the process by which the preferred alternative was chosen. Based on this process, Revised South Alternative 2 was chosen for the southern portion of the project, and North Alternative 2 was chosen for the northern portion of the project. These alternatives were chosen because they have the least overall environmental impacts.

Once the preferred alternative was selected, further design was conducted using more refined data. The more detailed design determined that the roadway geometry requires more width than the preliminary design assumed. As a result, some environmental impacts will exceed those originally predicted for the preferred alternative. These differences are shown in [Table 4-1](#). Due to the need for a wider project corridor, there would have been the same relative increase in all environmental impacts for the alternatives not chosen. Although there is an increase in environmental impacts over what was originally predicted for the preferred alternative, it minimizes the impacts compared to the other build alternatives that were evaluated.

Table 4-1: Comparison of Preferred Alternative Impacts

Topic ¹		Preferred Alternative	
		Preliminary Estimate of Impacts for Alternatives Analysis (See Chapter 3)	Impacts based on Refined Preferred Alternative
Environmental	Displacements		
	Residential	1	3
	Commercial	0	2
	Wetlands		
	Acres	14.4	25.77
	Number	35	50
	Floodplains		
Acres	23.5	18.83	
Number	5	7	

The Preferred Alternative meets the Project Purpose and Need as follows:

- *Improve vehicle and pedestrian safety* – Vehicle safety is improved by adding shoulders, center medians, turn lanes, and through lanes. Pedestrian and bicycle safety is improved by adding accommodations for sidewalks and shared use paths. Improvements to pedestrian and bicycle accommodations are contingent

upon local agencies agreeing to paying their share of construction costs and agreeing to maintain the improvements after construction.

- *Improve mobility/capacity* - Vehicle mobility/capacity is improved by adding turn lanes and through lanes. Pedestrian and bicycle mobility is improved by adding accommodations for sidewalks and shared use paths.
- *Facilitate planned economic growth* – Planned economic growth is facilitated by the improvements to capacity and mobility allowing for efficient movement of goods, employees, and customers.

This Section discusses the preferred alternative in more detail.

6.2 Design Criteria Utilized

The principal document used to establish the roadway design classification and design criteria for the corridor is titled Bureau of Design and Environment (BDE) Manual by IDOT, Division of Highways, dated 2010 (Revised June 2013).

Illinois Route 47 (IL 47) is classified as a rural SRA, thus Chapter 46 – Strategic Regional Arterials (New Construction/Reconstruction) section of the BDE was used for the roadway design criteria.

6.3 Geometric Improvements

6.3.1 Section 1: (Reed Road to Rainsford Drive)

Improvements to Section 1, Reed Road to Rainsford Drive, will remain unchanged from the construction completed in the summer of 2011 with the exception of adding sidewalk on the west side of IL 47. The improvements consisted of 24 feet of pavement in each direction (two 12 foot lanes), separated by a 22 foot barrier median. Curb and gutter is adjacent to the outside travel lane.

6.3.2 Section 2: (Rainsford Drive to Hercules Road)

Revised South Alternative 2 was recommended as the preferred alternative to be studied in further detail for Rainsford Drive to Hercules Road. The improvements consist of two 12 foot lanes in each direction, 10 foot wide paved outside shoulders with curb and gutter at the outside edge of shoulder, and a depressed median with cable guard rail, which provides 30 feet of separation between the opposing edges of travel way (edge of travel lane). The depressed median includes 6 foot wide paved inside shoulders and a 2 foot wide flat bottom ditch.

Pedestrian and bicyclists will be accommodated by an 8 foot wide shared-use path on the east side of the roadway and a 5 foot wide sidewalk on the west side of the roadway. The narrower shared-use path width of 8 feet was pursued to minimize impacts to adjacent property. Shared use paths and sidewalks would require local agency commitment before being included in the final design. A 4 foot flat bottom ditch is proposed between the sidewalk/path and the right of way. The roadway centerline is shifted 27 feet to the east between Ackman Road and Illinois Route 176 (IL 176) (East Leg) to minimize the impact to the residential properties on the west side of IL 47

between Hawthorne Way and IL 176. From Rainsford Drive to Ackman Road and from IL 176 (East Leg) to Hercules Road the roadway remains centered on the existing centerline.

The Preferred Alternative retains the split intersection and current horizontal alignment of both IL 47 and IL 176.

IL 47 at IL 176 (East Leg) Intersection

On the East Leg of IL 176, the existing lane configurations are expanded to include two eastbound lanes on IL 176, two westbound IL 176 to southbound IL 47 left turn lanes and one westbound IL 176 to northbound IL 47 right turn lane. The right turn lane is designed as a free flow lane with an acceleration lane for traffic to merge with IL 47 northbound traffic. A pedestrian signal would be included which could be activated by pedestrians to cross the free flow right turn lane.

On the South Leg of IL 47, the proposed design expands the existing roadway to include two northbound lanes on IL 47, one northbound IL 47 to eastbound IL 176 right turn lane, and two southbound lanes on IL 47.

On the North Leg of IL 47, the proposed design expands the existing roadway. In the southbound direction, there would be two through lanes on IL 47 and two left turn lanes (southbound IL 47 to eastbound IL 176). The northbound direction would accommodate two through lanes and an acceleration lane for the free flow right turn from westbound IL 176 to northbound IL 47.

A separate study is being performed by others to potentially realign Pleasant Valley Road with this intersection. The Phase II consultant should coordinate with the Village of Lakewood about the possible realignment of Pleasant Valley Road.

IL 47 at IL 176 (West Leg) Intersection

On the West Leg of IL 176, the existing lane configurations are expanded to include two westbound lanes on IL 176, two eastbound IL 176 to northbound IL 47 left turn lanes, and one eastbound IL 176 to southbound IL 47 right turn lane. The right run lane is designed as a free flow lane with an acceleration lane for traffic to merge with IL 47 southbound traffic. A signal would be included which could be activated by pedestrians via push button to cross the free flow right turn lane. There would also be a right-turn lane for eastbound IL 176 intersection to southbound Swanson Road.

On the North Leg of IL 47, the proposed design expands the existing roadway to include two southbound lanes on IL 47, one southbound IL 47 to westbound IL 176 right turn lane, and two northbound lanes on IL 47.

On the South Leg of IL 47, the proposed design expands the existing roadway to include two northbound lanes on IL 47, two northbound IL 47 to westbound IL 176 left turn lanes, two southbound lanes on IL 47, and an acceleration lane for the free flow right turn from eastbound IL 176 to southbound IL 47.

6.3.3 Section 3 (Hercules Road to U.S. Route 14)

Based on the preliminary alternatives evaluation North Alternative 2 was chosen as the preferred alternative to be studied in further detail. The improvements consist of two 12 foot lanes in each direction, separated by an 18 foot barrier median. Curb and gutter will be provided at both the median and outside edges of pavement. Pedestrians and bicyclists will be accommodated on 8 foot wide shared-use path on the east side of the roadway and a 5 foot wide sidewalk on the west side of the roadway.

6.4 Pavement Drainage

For the south segment of IL 47 (between Reed Road and Hercules Road) the inside lanes and shoulders will be drained via a grassed median. Inlet boxes will be provided to drain this median, and then outlet into the outside ditches via 18" to 24" diameter lateral pipes. The median will include native plants for water quality purposes under Best Management Practices (BMP's). The outside lanes and shoulders will be drained via catch basins located along the proposed curb and gutter and then outlet into the adjacent roadside ditches. At drainage outlet locations, generally 10' wide by 200' long bioswale segments will be provided within some of the roadside ditches in addition to other BMPs.

At certain locations, the BMPs would be widened and/or lengthened in order to meet the U.S. Army Corps of Engineer's (USACE) request to meet a first flush capture rate of 1.0-inch and 1.25-inch for areas draining to high quality aquatic resources (HQARs) as documented in their letter on April 21, 2014. In a meeting with USACE on October 14, 2014 as well as the IDOT response letter from March 2, 2015; IDOT was able to include additional BMPs and increases to the compensatory storage which raised the average first flush capture rate 0.94 inches for the project area. The letter from the USACE and IDOT's response are included in Volume 3, Appendix B-4, Agency Correspondence. Following this coordination, further refinement of the compensatory storage and BMPs, an average first flush capture of 1.20 inches was achieved for the project. The 1.25-inch first flush capture for High Quality Aquatic Resources (HQARs) was met at both Kishwaukee River crossings. There was only one watershed outlet (#7) where the 1.0-inch capture rate could not be achieved. This location includes many conflicts with existing wetlands and floodplains which made it prohibitive to provide additional infiltration storage to capture the first flush.

For the north segment of IL 47, between Hercules Road and U.S Route 14 (U.S. 14), the entire pavement area will be drained via oversized storm sewer pipes. These storm sewers were designed utilizing the Hydraflow drainage software, with discharges calculated via the Rational Formula.

Stormwater detention storage was provided to meet IDOT criteria where 100-year detention storage was provided, while maintaining the existing 10-year allowable release rate for the added impervious area. Detention storage will not be required for offsite runoff or unchanged impervious/pervious areas. For the most part, stormwater detention will be provided within roadside ditches (with ditch checks provided at the downstream end) to maintain the allowable release rates. In some cases, such as near Cobblestone

Way, a proposed detention facility was proposed to provide 100-year stormwater detention storage to meet McHenry County stormwater ordinance criteria.

Catch basins are to be installed within the urban section of the project with lateral pipes connecting into the proposed storm sewer system. An inlet-catch basin-manhole configuration is being used to assist in the reduction of sediments entering the storm sewer conveyance system. Erosion control measures will be taken at the downstream end of pipe outlets to assist in the reduction of high velocities exiting storm sewer pipes into adjacent properties / streams. At sensitive outlet locations where the construction of bioswale system or roadside ditch is not suitable for water quality purposes (especially within urban areas) a hydrodynamic separator will be provided instead.

The Location Drainage Study was approved in November 29, 2017. (See Supplement S-2).

Outfalls

For the most part, all existing outfalls will be maintained along the project improvement limits. There are a few outlets that will be combined under proposed conditions to avoid outletting into sensitive areas (e.g. the existing retention basin near Dieckman Street that has no visible outlet).

6.5 Design Exceptions and Maximum Extent Practicable Determinations for ADA

These design elements of the build alternative that deviate from the proposed design standards were presented at IDOT/FHWA Coordination Meetings and were granted on May 10, 2016, September 13, 2016, and December 13, 2016 (see Volume 2, Appendix A-2). A summary discussion of the design exceptions follows. Table 6–1 presents the design exceptions.

Table 6–1 Design Exception Table

Design Exception Table				
Level One Design Exceptions				
#	Proposed Design	BDE Standard	Location	Reason for Exception
1	Lane 1: -2.0%; Lane 2: +2.0%	Through Lane Cross Slopes: Lane 1: +2.0%; Lane 2: +2.0%; (BDE 34-2.01(b)); Travel Lane Cross Slope +2.0% (BDE Figure 46-3E)	IL RTE 47: Sta. 381+00 to 716+00	Sloping of inside lanes to the median improves the water quality in an environmentally sensitive area. The median has shoulders and is depressed. Inlets have been placed in the median to minimize the potential of pavement flooding.

CHAPTER 6. DESCRIPTION OF PREFERRED ALTERNATIVE

2	R=275-feet	Minimum Radius for Horizontal Curve on Local Street: Rmin=835-feet (50-mph Design Speed) (BLRSM Figure 29-2B)	Pleasant Valley Road: Proposed Curve Pleasant-1; Sta. 2133+27.91 to 2134+49.31	Pleasant Valley Road is a local road that will be reconstructed by the local agency at a future date. The proposed 275-foot curve is necessary in order to avoid the acquisition of a residential property. The proposed curve will be advisory posted for 30-mph. Potential mitigation to address the design exception includes advisory posting Pleasant Valley Road for 30-mph in conformance with Rmin=275-feet for 30-mph design speed.
3	R=120-feet	Minimum Radii for Horizontal Curves on Local Street (BLRSM Figure 29-2C and Figure 29-3C): Rmin=125-feet (20-mph Design Speed; e _{max} =4.0%)	Swanson Road: Proposed Curves: Prswanson-1 Sta. 503+91.66 to 505+27.88 to 104+00.75; Prswanson-2 Sta. 505+85.00 to 507+19.86	Swanson Road is a local street with low traffic volumes. The curves will be advisory posted at 20-mph consistent with the proposed radii of 120-feet. Both curves are proximate to a stop condition at its intersection with IL-176. Right-of-way is constrained by a commercial business and by ComEd transmission line towers. Per BRLSM Section 29-4.03(b), e(max) set at 4.0%. Through lanes are widened to 15-feet through the curves to accommodate turning vehicles. Potential mitigation to address the design exception includes advisory posting Swanson Road for 20-mph consistent with the proposed 120-foot radii for the curves.

CHAPTER 6. DESCRIPTION OF PREFERRED ALTERNATIVE

4	Distance between PT and PC of Reverse Curves = 57.12-feet	Minimum Tangent Distance Between PT and PC of Reverse Curves on Local Street: for Continuously Rotating Plane = 121.5-feet – (BLRSM Equation 29-3.4)	Swanson Road: Proposed Curves: Prswanson-1 Sta. 503+91.66 to 505+27.88 to 104+00.75; Prswanson-2 Sta. 505+85.00 to 507+19.86	Swanson Road is a local street with low traffic volumes. The curves will be advisory posted at 20-mph consistent with the proposed radii of 120-feet. Both curves are proximate to a stop condition at its intersection with IL-176. Right-of-way is constrained by a commercial business and by ComEd transmission line towers. Per BRLSM Section 29-4.03(b), e(max) set at 4.0%. Through lanes are widened to 15-feet through the curves to accommodate turning vehicles. Potential mitigation to address the design exception includes advisory posting Swanson Road for 20-mph consistent with the proposed 120-foot radii for the curves.
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Level 2 Design Exceptions

#	Proposed Design	BDE Standard	Location	Reason for Exception
5	K=206	Vertical Curve K-values > 167 on Curbed Roadways: Maximum K-value for Drainage on Curbed Roadways is 167; BDE 33-4.01(d); BDE 33-4.02(e)	IL RTE 47: VPI Sta. 732+85.00	Longitudinal profile grades of at least 0.3% are provided with 2.0% pavement cross slopes. The potential for travel lane ponding is nonexistent due to the presence of shoulders between the outside travel lanes and the proposed mountable curb and gutters.
6	K=205	Vertical Curve K-values > 167 on Curbed Roadways: Maximum K-value for Drainage on Curbed Roadways is 167; BDE 33-4.01(d); BDE 33-4.02(e)	IL RTE 47: VPI Sta. 738+00.00	Longitudinal profile grades of at least 0.3% are provided with 2.0% pavement cross slopes. The potential for travel lane ponding is nonexistent due to the presence of shoulders between the outside travel lanes and the proposed mountable curb and gutters.

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7	K=168	Vertical Curve K-values > 167 on Curbed Roadways: Maximum K-value for Drainage on Curbed Roadways is 167; BDE 33-4.01(d); BDE 33-4.02(e)	IL RTE 47: VPI Sta. 742+00.00	Longitudinal profile grades of at least 0.3% are provided with 2.0% pavement cross slopes. The potential for travel lane ponding is nonexistent due to the presence of shoulders between the outside travel lanes and the proposed mountable curb and gutters.
8	K=188	Vertical Curve K-values > 167 on Curbed Roadways: Maximum K-value for Drainage on Curbed Roadways is 167; BDE 33-4.01(d); BDE 33-4.02(e)	IL RTE 47: VPI Sta. 744+00.00	Longitudinal profile grades of at least 0.3% are provided with 2.0% pavement cross slopes. The potential for travel lane ponding is nonexistent due to the presence of shoulders between the outside travel lanes and the proposed mountable curb and gutters.
9	30-feet	Depressed Rural Median Width: Greater Than or Equal to 40-feet; (BDE Figure 34-3.A)	IL RTE 47: proposed rural typical section of mainline roadway: Sta. 381+00 to 617+89; Sta. 640+88 to 718+00	Policy value impacts other than cost include additional ROW acquisition that would result in greater socio-economic and substantial wetland impacts. Applying the design exception saves approximately 8-acres of wetland impacts. The design exception minimizes the levels of environmental impacts. The proposed 30-foot rural median matches the existing/proposed 18-foot urban median and the project termini when the two 6-foot shoulders are tapered to zero. The clear width between the innermost northbound and southbound travel lanes is 30-feet e-e. Potential mitigation to address the design exception includes the use of cable barrier protection.

CHAPTER 6. DESCRIPTION OF PREFERRED ALTERNATIVE

10	Back-to-back left turn storage bays of 137.4-feet	Left Turn Lane Storage Lengths: 185-foot minimum storage length (45-mph design speed); (BDE Figure 36-3.I)	IL RTE 47: between US 14 and Willow Brook Drive; Sta. 768+01 to 772+77	It is physically impossible to maintain access to existing roadways and maintain minimum distance between the storage bays due to the location of the existing roadways. Eliminating the southbound to eastbound left turn lane to Willow Brooke Drive, in favor of applying the full design requirements to the northbound to westbound left turn at US-14 would modify traffic patterns in the area, and create a public inconvenience for those users accustomed to full access at Willow Brooke Drive. Potential mitigation to address the design exception includes effective storage of the left turn bays are 204-feet which includes one-third of the 200-foot taper length (66.7-feet). The opening to the left turn storage bays are 8-feet in width at a distance of 66.7-feet from the end of the storage bays. The effective storage of 204-feet meets the minimum 185-foot requirement for the stop condition.
11	14 foot V-shaped drainage swales at 6:1 (16.7%) slopes between back of curb and proposed multi-use path or 5-foot sidewalk	Outside Roadway Ditch: 3 to 10-foot shelves at 5% cross slopes behind back of curb before sidewalk or drainage swale at variable depths; (BDE Figure 34-4.B)	IL-47: Sta. 718+00 to 745+92.31; and Sta. 752.84.98 to 773+19.98	Policy value impacts other than cost include additional ROW acquisition that would result in greater socio-economic and substantial wetland impacts. The 14 foot V-shaped drainage swales at 6:1 (16.7%) slopes between back of curb and proposed multi-use path or sidewalk are required to pick up localized drainage.

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12	4:1 median slopes	Rural Median Ditch Slopes: 5:1 median slopes; (BDE 34-3.04(c))	<p>IL RTE 47: Regions of the mainline roadway where left-turn channelization is present:</p> <p>Sta. 374+68 to 380+33 Sta. 393+70 to 406+40 Sta. 416+46 to 428+83 Sta. 447+35 to 460+85 Sta. 473+15 to 485+70 Sta. 511+99 to 524+79 Sta. 551+74 to 564+72 Sta. 569+49 to 581+99 Sta. 589+72 to 606+25 Sta. 627+80 to 633+40 Sta. 652+34 to 665+14 Sta. 685+10 to 697+76 Sta. 720+58 to 729+35 Sta. 734+23 to 742+81 Sta. 754+90 to 758+73 Sta. 763+02 to 772+77</p>	<p>Policy value impacts other than cost include additional ROW acquisition that would result in greater socio-economic and substantial wetland impacts. Approximately 8-acres of wetland impacts are eliminated. The design exception values minimize the levels of environmental impacts.</p>
13	Intersection Sight Distance: 845 ft (BDE Figure 36-6.E)	530 ft	Rainsford Dr. right-turn onto northbound IL Route 47	<p>Due to the horizontal curve south of this intersection, vehicles turning right from Rainsford Dr. onto northbound IL 47 may not be able to see the approaching vehicles for the entire length of the required ISD. Policy value impacts other than cost include additional ROW acquisition that would result in greater socio-economic impacts. Adjusting the alignment of IL 47 would require additional ROW from commercial properties adjacent to IL 47 south of Rainsford Dr as well as affecting the signalized intersection of IL 47 and Reed Rd to the south.</p>

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14	Intersection Sight Distance: 1350 ft (BDE Figure 36-6.E)	852 ft	Pleasant Valley Road left-turn onto northbound IL 47.	Due to the horizontal curve south of this intersection, vehicles turning right from Pleasant Valley Rd. onto northbound IL 47 may not be able to see the approaching vehicles for the entire length of the required ISD. Policy value impacts other than cost include additional ROW acquisition that would result in greater socio-economic and substantial wetland impacts in order to either re-align Pleasant Valley Rd further to the north or to adjust the IL 47 horizontal curve at the intersection of IL 176.
15	K=180	Maximum K-value for Drainage on Curbed Roadways is 167; BDE 33-4.A	IL RTE 47: VPI Sta. 581+60.00	The minimum vertical curve length is proposed at this location, which results in a K-value greater than the maximum. The proposed profile is constrained by ROW limitations, existing development and wetlands. The need to have a minimum grade-line of 0.3% grade for drainage purposes is met within this section.
16	K=190	Maximum K-value for Drainage on Curbed Roadways is 167; BDE 33-4.A	IL RTE 47: VPI Sta. 630+00.00	The minimum vertical curve length is proposed at this location, which results in a K-value greater than the maximum. The proposed profile is constrained by ROW limitations, existing development and wetlands. The need to have a minimum grade-line of 0.3% grade for drainage purposes is met within this section.
17	K=64	Minimum K-value is 151 for 60 mph design speed; BDE 33-4.B	IL RTE 176 (East Leg): Sta. 302+10.00	The design of the vertical curve results in a K-value less than the minimum. The proposed profile is constrained by ROW limitations, existing development and wetlands.
18	SSD = 375'	Minimum sight distance is 570 for 60 mph and level-grade; BDE Figure 33-4.B	IL RTE 176 (East Leg): Sta. 302+10.00	The design of the vertical curve results in a stopping sight distance that is less than the minimum. The proposed profile is constrained by ROW limitations, existing development and wetlands.

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19	K=187	Maximum K-value for Drainage on Curbed Roadways is 167; BDE 33-4.A	IL RTE 176 (West Leg): Sta. 416+80.00	The design of the vertical curve results in a K-value less than the minimum. The proposed profile is constrained by ROW limitations, existing development and wetlands.
20	K=69	Minimum K-value is 151 for 60 mph design speed; BDE 33-4.B	IL RTE 176 (West Leg): Sta. 426+75.00	The design of the vertical curve results in a stopping sight distance that is less than the minimum. The proposed profile is constrained by ROW limitations, existing development and wetlands.
21	2.7 feet	3.0 feet	Sta. 398+00	Can't raise roadway profile due to wetlands & wildlife impacts. Increasing the proposed structure size will not increase freeboard value due to natural high-water elevation. There are no reports of flooding at this location. 100-year edge of pavement protection will be provided. Sloping of inside lanes to the median improves the water quality in an environmentally sensitive area. The median has shoulders and is depressed. Inlets have been placed in the median to minimize the potential of pavement flooding.

In addition, at two locations within the project limits, Americans with Disabilities Act (ADA) standards could not be met; therefore, maximum extent practicable (MEP) determinations for ADA were requested and approved on July 13, 2017 for these two locations. The information is presented in Table 6–2.

Table 6–2 Maximum Extent Practicable Determinations Table

#	Proposed Design	BDE Standard	Location	Reason for Exception
1	5.8% crosswalk longitudinal slope	5% maximum longitudinal slope	IL RTE 47: Sta. 589+64; crosswalk across north leg of intersection with IL 176 (east leg)	In order to have a maximum cross slope of 5% at this location, the superelevation rate for the horizontal curve would need to be revised to 5%; however, the design speed and proposed curve radius require a 5.8% superelevation rate. Increasing the radius to have a rate of 5% would result in a significant deviation from the existing roadway alignment and additional right-of-way would need to be acquired. Currently, the horizontal curve is designed as close to the existing alignment horizontal curve as possible to help minimize impacts. The proposed alignment at this intersection is slightly east of the existing alignment to avoid impacts to the homes along the west side of IL 47 south of this intersection.
2	6.0% crosswalk longitudinal slope	5% maximum longitudinal slope	IL RTE 47: Sta. 633+53; crosswalk across south leg of intersection with IL 176 (west leg)	In order to have a maximum cross slope of 5% at this location, the superelevation through the horizontal curve would need to be revised to 5%; however, the design speed and proposed curve radius require a 5.8% superelevation rate. The proposed alignment follows the existing alignment to minimize impacts. Increasing the radius to have a rate of 5% would result in a significant deviation from the existing roadway alignment and additional right-of-way would need to be acquired.

6.6 Right-of-Way

Proposed right-of-way in the form of fee simple acquisitions (FSA) and temporary easements (TE) will be required for this project. In summary, a total of 157 parcels will be impacted, requiring 140.8 acres of FSA and 2.7 acres of TE. Two businesses and three residences would be displaced and would need to be acquired. Locations of right-of-way impacts are detailed in CDR Volume 2, A-8.

6.7 Structures

The project includes 2 bridges, 10 culverts, and 2 retaining walls. The structures are summarized in Table 6–3.

The existing bridge over the Kishwaukee River is in poor condition and is proposed to be replaced with two single span structures (SN 056-0315 and SN 056-0316). The roadway profile at this location is proposed to be 4 feet higher than the existing profile.

The ten culverts listed in Table 6–3 are functionally obsolete due to sizing, invert elevation and length needed to meet the proposed hydraulic requirements. One of the culverts (SN 056-0288) would be removed and not replaced. This culvert crossing is a cattle pass with small tributary offsite drainage areas that will be completely removed.

The proposed retaining walls (SN 056-0350 and SN 056-0351) are included in order to minimize impacts of the preferred alternative on the Kishwaukee River, which is an important environmental resource in the study area.

Table 6–3 - Structures within Project Limits

Structure Number	Description
SN 056-0315	This structure is a single span bridge which will carry southbound IL 47 over Kishwaukee River. It replaces SN 056-0025 as the southbound structure. It is located at approximately station 532+00.
SN 056-0316	This structure is a single span bridge which will carry northbound IL 47 over Kishwaukee River. It replaces SN 056-0025 as the northbound structure. It is located at approximately station 532+00 to the east of SN 056-0315.
SN 056-0305	Is an 11'x7' culvert which replaces existing SN 056-0250 a 6'x4' culvert at station 405+05. It carries IL 47 over a tributary to the Kishwaukee River.
SN 056-0288	Is a 6'x5' culvert which will be removed and not replaced at station 439+23. It carries IL 47 over a tributary to the Kishwaukee Creek.
SN 056-0307	Is a 12'x12' culvert which replaces SN 056-0249 a 6'x12' culvert at station 440+04. It carries IL 47 over a tributary to the Kishwaukee Creek.
SN 056-0308	Is an 8'x6' culvert which replaces SN 056-0248 a 6'x4' culvert at station 481+77. It carries IL 47 over a drainage ditch.
SN 056-0309	Is a 6'x5' culvert which replaces SN 056-0247 a 6'x5' culvert at station 598+48. It carries IL 47 over a drainage ditch.
SN 056-0310	Is an 6'x6' culvert which replaces SN 056-0246 a 6'x4' culvert at station 627+65. It carries IL 47 over a tributary to the Kishwaukee River.
SN 056-0311	Is a 4'x4' culvert which replaces SN 056-0245 a 6'x6' culvert at station 654+07. It carries IL 47 over a drainage ditch.
SN 056-0312	Is a 6'x5' culvert which replaces SN 056-0244 a 3'x2' culvert at station 672+58. It carries IL 47 over a drainage ditch.

Structure Number	Description
SN 056-0313	Is a culvert which replaces SN 056-0243 a 6'x6' culvert at station 726+96. It carries IL 47 over a drainage ditch.
SN 056-0314	Is a triple 10'x6' box culvert which replaces a 6'x5' culvert at station 753+17. It carries IL 47 over a drainage ditch.
SN 056-0350	Is a 693' long 7' high retaining wall on the west side of IL 47 located between Stations 745+90 and 752+85.
SN 056-0351	Is a 567' long 7' high retaining wall on the east side of IL 47 located between Stations 745+95 and 751+62.

6.7.1 Potential Wildlife Crossings

Wildlife crossings under IL 47 are recommended and will be further studied during the final engineering design. The crossings recommended at this time consist of openings 4.0 feet wide by 5.0 feet high placed below ground level so that soil and other natural ground components can be added to bring the bottom of the crossing up to grade level. These crossings would accommodate small animals, but it is unlikely that larger animals, such as deer will be able to utilize them due to their size. Enlarging the opening of the crossing, is not feasible as raising the profile to accommodate larger crossings would result in the need for additional right of way and increased wetland impacts. Further studies during final design may be able to identify locations where the crossings can be made large enough to accommodate deer. In any event, the length of the crossings would be determined by the width of the embankment, but in most cases would be slightly less than 100 feet.

In most instances, the crossings would be placed adjacent and parallel to box culverts or bridges at stream crossings. The wildlife crossings would be raised slightly above the low flow line so they would be relatively dry during low flow periods. There is one location for wildlife crossings that is not be associated with a nearby creek or river. This location, 100 feet south of Conley Road, should be designed for small animals. Table 6–4 indicates locations for recommended crossings and the types of animals that are expected to utilize them. The installation of wildlife crossings should serve to minimize the number of vehicle/wildlife crashes. The locations of the potential wildlife crossings are shown in Exhibit 4-1: Environmental Inventory Map in the Environmental Assessment (Supplement S-1.1). The FHWA's Wildlife Crossing Structure Handbook, Design and Evaluation in North America (FHWA-CFL/TD-11-003 March 2011) will be used when designing the crossings. Fencing or low profile barriers will be used whenever practical to help guide the animals towards the crossing locations. Design efforts to guide animals towards the crossing locations will be evaluated during Phase II. For example, channeling turtles to a crossing by using a turtle fence or high curb along the side of the road and then directed to the culvert opening will be considered in the final design process.

Table 6–4 - Potential Wildlife Crossings

Location	Description	Wildlife Crossing
850 feet north of Ackman Rd	Tributary to Kishwaukee Creek culvert should be designed to promote amphibian and small animal crossings	Wildlife crossing can be placed south of and adjacent to culvert for Kishwaukee Creek.
100 feet north of Conley Rd	IDOT animal crash data indicates a large animal crossing should be considered here	Wildlife crossing can be placed south of Conley Road.
650 feet north of Union/Foster Rd	Accommodations for amphibians, small animals, and large animals should be considered. A large animal crossing could be installed at Station 531, or a Kishwaukee River bridge could be designed to accommodate large animals. The Kishwaukee River bridge should promote amphibian and small animal crossings. The presence of the Iowa darter requires natural riverine conditions at the Kishwaukee River.	Wildlife crossing can be placed south of Kishwaukee River bridge.
100 feet south of relocated Pleasant Valley Rd	IDOT animal crash data indicates a large animal crossing should be considered here. May be installed in conjunction with proposed drainage culvert at this location.	Wildlife crossing can be placed south of and adjacent to culvert.
900 feet south of Lucas Rd	IDOT animal crash data indicates a large animal crossing should be considered here. May be installed in conjunction with proposed drainage culvert at this location.	Wildlife crossing can be placed north of and adjacent to culvert.
600 feet north of Hercules Rd	IDOT animal crash data indicates a large animal crossing should be considered here. Should be placed outside of existing wetland.	Wildlife crossing can be placed south of and adjacent to culvert.
450 feet south of Dieckman St	Accommodations for amphibians, small animals, and large animals should be considered. A Kishwaukee River bridge could be designed to accommodate large and small animals. The presence of the Iowa darter requires natural riverine conditions at the Kishwaukee River.	Wildlife crossing can be placed north of and adjacent to culvert for Kishwaukee River.
0.75 miles south of Lucas Rd	Culvert should be designed to promote amphibian and small mammal crossings.	Wildlife crossing can be placed adjacent to culvert.

6.8 Traffic Signal Modernization/Installation

Traffic signal warrants were performed at all 16 intersections along IL 47. Of the 16 intersections, the IL 47 and IL 176 (East Leg) and IL 47 and IL 176 (West Leg) were the only intersections to warrant traffic signals. The Preferred Alternative includes traffic signal modernization to replace the existing traffic signals at the intersections of IL 47 and IL 176 (East Leg) and IL 47 and IL 176 (West Leg). No other traffic signals are proposed to be improved as part of the proposed improvements.

6.9 Lighting

There is currently roadway lighting on IL 47 at the intersections with IL 176 (East Leg), IL 176 (West Leg), and U.S. 14. This lighting is only located near the intersections. There is not currently any roadway lighting on IL 176 within the study limits. This condition will remain after the proposed improvement is completed.

6.10 Parking

On-street parking is not permitted on IL 47 within the study limits.

6.11 Bicycle & Pedestrians

An eight foot wide shared-use path is provided along the east side of IL 47 and a five foot wide sidewalk is provided on the west side of IL 47. Accommodations for the proposed sidewalk and shared-use path will connect to existing pedestrian and bicycle facilities along the following cross streets within the study area: Reed Road, Rainsford Drive, Talamore Boulevard, Ackman Road, and Cobblestone Way. On December 22, 2011, IDOT concurred with the bicycle and pedestrian accommodations. Shared use paths and sidewalks would require local agency commitment before being included in the final design.

6.12 Mass Transportation

Mass transit service does not presently exist, nor is it anticipated in the near future within the project limits. See Sections 4.1.3 for information on existing transit services near the study area.

6.13 Utility Conflicts

Public utilities are primarily located near each end of the project in the municipalities of Huntley and Woodstock. The utilities include water main, storm sewer, and sanitary sewer systems. Private utility facilities were identified both above and below ground. Utility poles with ComEd (electric), AT&T (phone & fiber optic), and cable television exist throughout the project area. Underground conduits, ducts, cables, fiber optics, and pipelines also exist throughout the project area. ComEd, AT&T, Nicor (Gas), Natural Gas Pipeline Company of America (NGPL), SBC, and Comcast all have facilities underground throughout the project area. ComEd has several high voltage lines which cross IL 47 and has a 100 foot wide utility easement perpendicular to IL 47 across from IL 176 (west leg). AT&T possesses long distance fiber optic utilities south of IL 176 that are parallel to both legs (East and West). The long distance fiber optics continue path across IL 47. NGPL high pressure natural gas line, Illinois Lateral #2 is located underneath IL 47 approximately 500 feet south of the intersection of IL 47 and IL 176 West.

6.14 Encroachments

There are no encroachments by adjacent property owners along IL 47.

6.15 Mail Drop-Off

Mail delivery is limited from IL 47. Most of the developed properties along the corridor are accessed via side streets or consists of commercial development within strip malls. Plan sheets showing the location of mailboxes affected by the project were sent to the Post Master on August 23, 2013 (see Volume 3 - Appendix B-4, Agency Correspondence).

6.16 Landscape/Roadside Development

Landscaping by IDOT will be done at all areas disturbed by construction and would be restored to turf cover in accordance with “Guidelines for Use of Landscape Items” as appropriate for the project location. All tree and other plants removed for construction will be replaced on a per-inch diameter nursery stock basis at a minimum wherever feasible and appropriate under IDOT guidelines.

Recommendations (to save, relocate, prune, or replace) trees will be performed in Phase II (detailed design) of the project, and will be primarily based on the size and quality of the trees, as well as proposed geometrics, final grading, and utility locations. Efforts shall be made to keep replacements to a minimum in accordance with Departmental Policy D&E 18, “A Policy on Preservation and Replacement of Trees”.

Protection and care will be provided for all existing trees and shrubs to remain within the project limits as provided in Section 201 of the IDOT Standard Specifications for Road and Bridge Construction, adopted January 1, 2012. Existing trees and shrubs that are to remain will be delineated on the final design plans, as well as those that are to be removed.

6.17 Retaining Walls

The project includes two 7 foot high retaining walls (SN 056-0350 and SN 056-0351) at the Kishwaukee River Headwaters, just south of Cobblestone Way. The retaining walls were included to reduce impacts to wetlands and floodplain.

6.18 Environmental Resources

The *Illinois Route 47 Environmental Assessment* (Supplement S-1.1) provides detailed information on environmental resources and potential environmental and socioeconomic impacts which would result from implementation of the project. The following subsections provide a synopsis of this information.

6.18.1 Community Characteristics and Cohesion

The project is for improvements to existing IL 47. Because of this, no new community divisions would be introduced, neighborhoods would not experience any divisions, and none would be isolated. Community characterization would not be impacted. The proposed improvements would not alter adjacent property uses and would therefore have no impact on community characterization.

6.18.2 Title VI and Other Protected Groups

Based on the census data available, and the current land uses adjacent to IL 47, groups of ethnic, racial, religious minorities, elderly, or disabled people are not present within any areas the proposed improvement would affect. No groups of individuals have been or will be excluded from participation in public involvement activities, denied the benefit of the project, or subjected to discrimination in any way on the basis of race, color, age, national origin, disability, or religion.

6.18.3 Environmental Justice

It has been determined that this project is not located within or through identified minority and/or low income areas or adjacent to minority and/or low income neighborhood communities. There would be no disproportionately high and adverse effects on minorities or low-income residents or communities because populations of minority and/or low income groups are not concentrated along the project corridor.

6.18.4 Public Facilities and Services

The proposed improvements are expected to result in overall improvements to emergency services. Improved mobility and decreased congestion would result in the ability of emergency services such as ambulances, fire trucks, and police to respond more quickly. The presence of a median that allows for left turns every half mile is expected to have minimal impacts on emergency service access as all major subdivisions would include at least one entrance cut in the median. Future subdivisions are also expected to have breaks in the median to provide direct access. The improved mobility would offset the increased travel time caused by inclusion of non-traversable medians at those locations where access roads have not been provided. The proposed improvements may have temporary impacts to services during construction; however, emergency response may experience delays due to construction activities and increased traffic congestion. These impacts are expected to be minimal and temporary in nature.

Pedestrian and bicycle access to public facilities would be improved as a result of the proposed improvements. Accommodations for five foot sidewalks are proposed along the west side of IL 47, and 8 foot wide shared-use paths would be added to the east side of the roadway, through most of the project corridor. Shared use paths and sidewalks would require local agency commitment before being included in the final design.

6.18.5 Travel Patterns

IL 47 is an important north-south transportation linkage because it provides access to residential, retail, commercial, agricultural, and recreational lands throughout the region, including Wisconsin. The proposed improvements would have no negative impacts on regional travel patterns because they call for improvements to existing IL 47. Where there is current access to other roadways, left turn lanes would be developed in advance of each of these intersections. Therefore, there would be no change in access to intersecting roadways and no corresponding change to travel patterns.

Minor impacts to local travel patterns may occur for those traveling to commercial or residential properties. A barrier median is proposed to separate northbound from southbound traffic, with breaks in the median at intersections. Because of the barrier median, all access along IL 47 would be limited to right-in/right-out by the addition of non-traversable medians along IL 47. Residential and commercial driveways that currently enter/exit directly to/from IL 47 would be converted to right-in/right-out access only. U-turn capability would be provided at the side road access points; however, thereby minimizing these impacts.

The proposed improvements would not create any barrier effects; change access for police, fire and/or health services; nor would it create economic impacts on

transportation-sensitive commercial facilities. No new accesses would be created, and no current accesses to any areas would be eliminated.

6.18.6 Relocations (Residential and Business)

The proposed improvements would result in the displacement of three residential homes and two commercial enterprises. The displaced structures are summarized below.

- Residence immediately north of Rainsford Drive, west side of IL 47
- Residence 1,000 feet south of Pleasant Valley Road, east side of IL 47
- Residence 1,100 feet south of Lucas Road, east side of IL 47
- Vacant Business (barn) 1,050 feet south of Lucas Road, east side of IL 47
- Red Barn Farm Market, 1,000 feet south of Hercules Road, east side of IL 47

In addition to displacements, a portion of four businesses will be impacted. The impacted businesses are summarized below.

- Crystal Wood Golf Course, 1,050 feet south of Pleasant Valley Road, west side of IL 47, north of Ballard Road, a portion of parking lot will be impacted, resulting in the loss of 26 parking spaces
- Craig Woods Executive Golf Course, 750 feet south of Pleasant Valley Road, east side of IL 47, a portion of parking lot will be impacted, resulting in the loss of 38 parking spaces
- Craig Woods Executive Golf Course, 650 feet south of Pleasant Valley Road, east side of IL 47, Green #5 will be impacted
- Eddie's Landscape and Supplies, 2,000 feet north of IL 176 (West Leg), west side of IL 47, a portion of their materials storage will be lost
- Advantech Plastic LLC, 1,200 feet south of Cobblestone Way, west side of IL 47, will lose four visitor parking spaces

The proposed improvements were designed to minimize the number of displacements to the greatest extent possible. Multiple alternatives were studied and an impact evaluation was done on each of them. Based on the impact evaluations, the alternatives with the least number of displacements were chosen. In the northern half of the project corridor, the chosen alternative generally fits within the existing right-of-way, which results in minimal impacts to businesses. Once the alternatives were chosen, further design changes were incorporated in order to minimize displacements. For example, the median was reduced to 30 feet south of Hercules Road and shoulders were eliminated north of Hercules Road, both of which further reduce the width of the right-of-way and minimized impacts.

For impacts to parking spaces (Craig Woods, Advantech Plastic), material storage (Eddie's Landscaping), and golf course green #5 (Craig Woods), replacement parking spaces, storage, and green will be developed with the landowner during the Phase II Design. Replacement of lost parking will be consistent with local zoning requirements.

Additionally a private recreational air strip (Phyllis Air Field) on the east side of IL 47, approximately 2,000 feet north of Conley Road, will be reduced in length by approximately 70 feet on the western end of the runway. The 2,000 foot runway will be shortened to 1,930 feet, which will still be greater than the 1,600 foot minimum required by the Illinois Division of Aeronautics.

The acquisition of these properties would be accomplished in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act (Uniform Act). The Uniform Act provides for uniform, fair and equitable treatment of persons whose real property is acquired or who are displaced in connection with federally funded projects.

Under the Uniform Act, in addition to just compensation, displaced residents are entitled to benefits to minimize hardships of relocation such as acquisition and relocation assistance designed to help residents and businesses with reimbursement claims and the lease or purchase of new locations. Relocation advisory assistance would be provided to owners and renters of displaced properties. Relocation advisory benefits would include determining the needs and preferences of displaced persons, providing current and ongoing listings of comparable dwellings for residential displacements, providing transportation to search for replacement housing, as well as financial referrals and housing inspection. Displaced residents would also be entitled to counseling and other assistance to minimize hardship in adjusting to the relocation. The Uniform Act would allow for reimbursement for moving expenses and payment for the added cost of renting or purchasing comparable replacement housing.

Comparable business locations and residential housing are generally characterized as housing that would meet the needs of displacees in terms of price, size, location and market availability. Market data from multi-listing services (<http://www.realtor.com> and <http://www.illinoisproperty.com>) were reviewed to determine the availability of similar replacement properties. The market data shows that a sufficient number of comparable replacement homes at similar values and in the same general areas are available.

6.18.7 Economic Impacts

The proposed improvements would result in measurable impacts to five businesses, two businesses will be displaced and three will be impacted by having portions of their facility lost. These impacts are discussed above in Section 6.18.6 - Relocations (Residential and Business). In addition to these impacts, minor impacts to businesses would occur due to the fact that commercial driveways would be converted to right-in/right-out access by way of a non-traversable median. These impacts would be minimized with the U-turn capability that would be provided at the side road access points.

6.18.8 Land Use and Economic Development

The proposed improvements would not have any effect on land use. The communities adjacent to IL 47 have all anticipated improvements to this roadway that include widening. All of the communities have planned for residential, retail, or commercial development adjacent to the roadway. Various communities have planned for open space in more environmentally sensitive areas. The proposed improvements would not

result in the need for the involved communities or jurisdictions to alter any of the proposed land use or zoning.

The preferred alternative facilitates planned economic growth by improving capacity, accessibility, and mobility, thereby allowing for efficient movement of goods, employees, and customers.

6.18.9 Agriculture

Due to the fact that the land that is currently under agricultural production is committed to urban development, and the proposed improvements received an Illinois Land Evaluation and Site Assessment (LESA) site assessment score less than 175, which means that it has a low rating for protection and additional evaluation is not necessary, it has been determined that the farmland impacts are not substantial.

6.18.10 Surface Water Quality

The proposed improvements have the potential to impact water quality. Increased erosion and sedimentation during construction can result in an increase in runoff to receiving waters, resulting in elevated suspended solids concentrations. During operations, contaminants such as sediments, metals, oil and grease, and chlorides may occur on roadway surfaces and wash into adjacent streams with stormwater runoff.

The proposed improvements would result in a small, incremental change in the amount of impervious surface, creating additional runoff, but stormwater management improvements would also be included in the project. Stormwater management for the proposed improvements has been designed with the intention of minimizing impacts to water quality.

Drainage of stormwater from the inside lanes to the center median where vegetation will remove contaminants, the installation of vegetated ditches, and the installation of bioswales will all result in the treatment of stormwater before it exits the right-of-way. Bioswales would be planted with native plants and installed along the outside ditches where feasible and practical. They would be installed in locations immediately upstream of surface water resources, such as streams and wetlands, to improve water quality prior to discharge to these resources. Bioswale design will be developed during the final design, but proposed locations have been identified. In addition, stormwater detention ponds will provide for temporary storage of stormwater runoff and then release it at a controlled rate, thereby minimizing erosion in receiving streams.

The Kishwaukee River is a medium priority impaired waterway. The designated use impairments are fish consumption and aquatic life with the causes of the impairments listed as mercury/PCBs and dissolved oxygen/sedimentation/siltation respectively. The BMPs proposed as part of the project are intended to reduce these types of contaminants and further impairments are not expected as a result of project implementation.

As this project moves into the design phase and eventually permitting, efforts to minimize contaminated run-off will be identified during the 401/404 water quality

certification process. During construction, water quality impacts would be minimized through the use of a Storm Water Pollution Prevention Plan (SWPPP). The SWPPP will identify best management practices (BMPs) for erosion and sediment control to be used throughout construction. The SWPPP will be developed using guidance from IDOT's Bureau of Design and Environment Manual and Section 280 of IDOT's Standard Specification for Road and Bridge Construction (2012 or current edition). Through the use of BMPs during construction, it is anticipated that there will be only minimal impacts to water quality.

6.18.11 Groundwater Quality

Groundwater Protection Areas

No IDOT maintenance facilities exist or are planned for this project, hence there will be no impact to the 200 foot setback zone around groundwater wells as determined by the IEPA Division of Public Water Supplies.

Well Information

The closest public well in Huntley is approximately 2,135 feet west of the southern project limits. The closest public well in Woodstock is approximately one mile to the north-northwest of the northern project limits.

The project corridor crosses two non-Community Water Supply (CWS) Phase I Wellhead Protection Recharge Areas (WHPA). The first non-CSW WHPA is associated with the Crystal Woods Golf Course and is crossed by IL 47 approximately 435 to 2,315 feet south of IL 176 (East Leg). The second non-CSW WHPA is associated with the Red Barn Farm Market at 3500 S. IL 47 and is crossed by IL 47 from approximately 785 to 2,780 feet south of Hercules Road.

There are several private wells mapped within 200 feet of the project corridor. Most of these wells are located in the rural section of the project corridor and are likely associated with farmsteads or residences. Other wells not within the ISGS database may be present near the project corridor.

Aquifers

According to the USEPA list of Designated Sole-Source Aquifers in (Illinois) USEPA Region 5, there are no sole-source aquifers in Illinois as defined by Section 11424(e) of the Safe Drinking Water Act, hence the proposed project will not have any effect on any such aquifers in Illinois.

6.18.12 Floodplains

The proposed IL 47 project improvements will impact the existing floodplain at five separate waterway crossings of IL 47 (4 culverts and 1 bridge). Only one of these locations has a regulatory floodway associated with it (culvert crossing of Kishwaukee Creek – Outlet #7).

Compensatory storage was provided at a 1.5:1 ratio for fill in the floodplain where feasible, and at a 1:1 ratio where additional right-of-way was not available. Compensatory storage was provided between the normal and 10 year, and between the 10 and 100 year water surface elevations. Compensatory storage sites were proposed at each of the 5 waterway crossing locations. The fill in the floodplain volume at each waterway crossing were as follows:

- 1) Tributary to Kishwaukee Creek crossing of IL 47 at Station 405+05 (450 feet north of Talamore Boulevard) has 2.62 ac-ft of fill in the floodplain
 - a. The existing structure is a 6' wide x 4' high box culvert located at the Tributary to Kishwaukee Creek crossing of IL 47 at Station 405+05 (approximately 450 ft north of Talamore Boulevard). This structure will be replaced by a double 10' wide x 7' high box culvert. The 100-year natural high water elevation at this location is 866.80 ft. The tributary area to this culvert is 2.76 square miles.
- 2) Kishwaukee Creek crossing of IL 47 at Station 440+04 (1700 feet north of Ackman Road) has 1.95 ac-ft of fill in the floodplain
 - a. The existing structure is a 6' wide x 12' high box culvert located at the Kishwaukee Creek crossing of IL 47 at Station 440+04 (approximately 1,700 ft north of Ackman Road). This structure will be replaced by a double 12' wide x 10' high box culvert. The 100-year natural high water elevation at this location is 858.44 ft. The tributary area to this culvert is 6.80 square miles.
- 3) Kishwaukee River crossing of IL 47 at Station 532+15 (1100 feet south of Hawthorne Way) has 18.46 ac-ft of fill in the floodplain
 - a. The existing structure is a 2-span bridge located at the Kishwaukee River crossing of IL 47 at Station 532+15 (approximately 1,100 ft south of Hawthorne Way). This structure will be replaced by a 1-span bridge. The 100-year natural high water elevation at this location is 861.45 ft. The tributary area to this culvert is 14.80 square miles.
- 4) Kishwaukee River Tributary crossing of IL 47 at Station 627+84 (600 feet south of IL 176 West Leg) has 7.53 ac-ft of fill in the floodplain, and
 - a. The existing structure is a 6' wide x 6' high box culvert located at the Kishwaukee River Tributary crossing of IL 47 at Station 627+84 (approximately 600 ft south of IL 176 West Leg). This structure will be replaced by a double 9' wide x 7' high box culvert. The 100-year natural high water elevation at this location is 900.64 ft. The tributary area to this culvert is 1.90 square miles.
- 5) Kishwaukee River crossing of IL 47 at Station 752+42 150 feet south of Cobblestone Way) has 4.43 ac-ft of fill in the floodplain.
 - a. The existing structure is a 4' wide x 5' high box culvert located at the Kishwaukee River crossing of IL 47 at Station 752+42 (approximately

150 ft south of Cobblestone Way). This structure will be replaced by a double 10' wide x 6' high box culvert. The 100-year natural high water elevation at this location is 923.73 ft. The tributary area to this culvert is 0.94 square miles.

All these structures were constructed in 1936 and partially extended in the 1950s. Structures 1 to 4 flow from east to west, while structure 5 flows from west to east. All the existing structures require upsizing to achieve adequate freeboard and clearance for the 50 and 100-year storm events. Since these waterway crossings are not currently mapped by Federal Emergency Management Agency (FEMA), an independent hydrologic (TR-20) and hydraulic (HEC-RAS) analysis was performed to determine the natural and headwater elevations at the upstream face of the existing and proposed structures.

6.18.13 Wetlands

The proposed improvements will impact a total of 25.77 acres of wetland. A jurisdictional determination by the USACE will need to be conducted to verify the status of the wetlands impacted by the Preferred Alternative. The proposed improvements would impact 0.67 acres of farmed wetlands. (Farmed wetlands are those that are artificially drained or those which hydrology is such that agricultural production is possible during dryer years. If farmed wetlands were altered prior to 1985, they are considered Prior Converted wetlands and are not subject to regulation under the Clean Water Act.) For those wetland impacts that cannot be avoided, mitigation must be provided. Mitigation ratios are determined by both the USACE and the IDNR.

The Wetland Impact Evaluation (WIE) Forms were submitted in January of 2014 and clearance was received on June 2, 2014 (see Volume 3, D-1).

6.18.14 Natural Resources

IDNR determined that there was a potential for impacts to the Iowa darter and requested a survey for this species. The IDNR concluded that the proposed improvements did not have the potential to impact any of the other species identified in the EcoCAT report.

Illinois Natural History Survey (INHS) performed fish surveys on July 15, 2009 in the project corridor in order to determine the potential for the presence of the Iowa darter. Fish sampling determined that the Iowa darter is located at two locations, the first within the Kishwaukee River south of U.S. 14 and the second at the Kishwaukee River south of Ballard Road.

For the Iowa darter, IDOT made a commitment that no instream work shall be conducted during the darter's spawning season, from April 1 through June 15 at either of the locations it was found. Therefore, no adverse impacts would occur to the Iowa darter as a result of the project. Additionally, IDOT determined that project development could proceed with no additional Biological Resource Reviews.

6.18.15 Special Waste

The ISGS performed three PESAs for the project corridor. The third PESA, ISGS #1789V, dated October 30, 2013, covered the entire project corridor and incorporated

results of the earlier documents. Several Recognized Environmental Concerns (RECs) were identified through the assessment. Per PESA #1789V, 32 properties were identified with RECs. The PESA was validated by IDOT District One Environmental Studies Unit on March 10, 2016. It is the responsibility of Phase II to determine if any of the sites with RECs or right-of-way adjacent to the site with RECs will be impacted with the proposed work and/or if any right-of-way will be required at any of the REC locations. Any acquisitions shall be discussed with the Bureau of Land Acquisition prior to responding to the PESA to request further studies.

Further environmental studies will be conducted if the proposed improvements require excavation adjacent to a property identified with a REC or requires excavation, including subsurface utility relocation, on a property with an easement. In some cases, the portion of the project that involves the REC can be risk managed and not require additional assessment. If the affected property containing the REC is a full take, then the property is ineligible to be risk managed. If risk managing is not possible, further environmental study is required, specifically, a Preliminary Site Investigation (PSI), to determine the nature and extent of possible contamination.

6.18.16 Special Lands

The project corridor does not contain any properties that would require Section 4(f) evaluation. There are no publicly owned parks, recreational areas, wildlife and waterfowl refuges, or any land from a historic site of national, State, or local significance. There are no Section 6(f) lands that have involvement with LAWCON funds, State Designated Lands, or lands that were obtained from Development OSLAD funding. While the Village of Lakewood owns the property at the intersection of IL 47 and IL 176 (East Leg) they have confirmed it will be sold to a developer and not used for recreational purposes. The Village is coordinating with the District to provide access to the site and possibly align Pleasant Valley Road with IL 176 (East Leg).

6.19 Air Quality

Microscale Analysis

A Pre-Screen carbon monoxide (CO) analysis was completed for the proposed IL 47 project corridor. The Pre-Screen results conducted for the proposed improvements indicate that a microscale Carbon Monoxide Screening for Signalized Intersections (COSIM 4.0) air quality analysis is not required, as the highest design-year approach volume on the busiest leg of any intersection is less than 5,000 vehicles per hour and there is less than 62,500 average daily traffic.

Air Quality Conformity Statement

The National Ambient Air Quality Standard (NAAQS), established by the U.S. Environmental Protection Agency (USEPA), set maximum allowable concentration limits for six criteria air pollutants. Areas in which air pollution levels persistently exceed the NAAQS may be designated as “nonattainment.” States where a nonattainment area is located must develop and implement a State Implementation Plan (SIP) containing policies and regulations that will bring about attainment of the NAAQS. Areas that had been designated as nonattainment, but that have attained the NAAQS for the criteria pollutant(s) associated with the nonattainment designation, will be designated as maintenance areas.

All areas of Illinois currently are in attainment of the standards for four of the six criteria pollutants: CO, nitrogen dioxide, sulfur dioxide, and lead. For the eight-hour ozone and particulate matter with particles smaller than 2.5 micrometers (PM2.5) standards, Cook, DuPage, Kane, Lake, McHenry, and Will Counties have been designated as moderate nonattainment areas for the eight-hour ozone standard. The Lake Calumet area and Lyons Township in Cook County have been designated as a maintenance area for the particulate matter with particles smaller than 10 micrometers (PM10) standard.

This project is included in the FY 2014 - 2019 TIP endorsed by the Metropolitan Planning Organization Policy Committee of the CMAP for the region in which the project is located. Projects in the TIP are considered to be consistent with GO TO 2040, the 2040 regional transportation plan endorsed by CMAP. The project is within the fiscally constrained portion of the plan.

On October 25, 2010, the FHWA and the Federal Transit Administration determined that the 2040 regional transportation plan conforms to the SIP and the transportation-related requirements of the 1990 Clean Air Act Amendments. On October 22, 2012, the FHWA and the Federal Transit Administration determined that the TIP also conforms to the SIP and the Clean Air Act Amendments. These findings were in accordance with 40 CFR 93, "Determining Conformity of Federal Actions to State or Federal Implementation Plans." The project's design concept and scope are consistent with the project information used for the TIP conformity analysis. Therefore, this project conforms to the existing SIP and the transportation-related requirements of the 1990 Clean Air Act Amendments. The TIP number for this project is: 11-07-0014.

The proposed improvements for IL 47 are not an air quality concern under 40 CFR 93.123(b)(1) due to the fact that the project is an expanded add lanes highway project; it does not generate a significant increase in the number of diesel vehicles; it does not affect intersections that are at LOS “D”, “E”, or “F” with significant number of diesel vehicles; and it would not change intersections to Level of Service “D”, “E”, or “F” because of increased traffic volumes from a significant number of diesel vehicles related to the project. It has been determined that the project would not cause or contribute to any new localized PM2.5 or PM10 violations or increase the frequency or severity of any PM2.5 or PM10 violations. The USEPA has determined that such projects meet the Clean Air Act’s requirements without any further Hot-Spot analysis.

Construction – Related Particulate Matter

Demolition and construction activities can result in short-term increases in fugitive dust and equipment-related particulate emissions in and around the project corridor. (Equipment-related particulate emissions can be minimized if the equipment is well maintained.) The potential air quality impacts from this construction would be short-term, occurring only while demolition and construction work is in progress and local conditions are appropriate.

The potential for fugitive dust emissions typically is associated with building demolition, ground clearing, site preparation, grading, stockpiling of materials, on-site movement of equipment, and transportation of materials. The potential is greatest during dry periods, periods of intense construction activity, and during high wind conditions.

IDOT's Standard Specifications for Road and Bridge Construction includes provisions on dust control. Under these provisions, dust and airborne dirt generated by construction activities will be controlled through dust control procedures or a specific dust control plan, when warranted. The contractor and IDOT will meet to review the nature and extent of dust-generating activities and will cooperatively develop specific types of control techniques appropriate to specific situations. Techniques that may warrant consideration include measures such as minimizing track-out of soil onto nearby publicly-traveled roads, covering haul vehicles, and applying chemical dust suppressants or water to exposed surfaces, particularly those on which construction vehicles travel. With the application of appropriate measures to limit dust emissions during construction, the proposed improvements would not cause any significant, short-term particulate matter air quality impacts.

Construction air quality dust control (particulate matter) shall consist of developing and implementing a detailed Dust Control Plan (DCP) when circumstances warrant, and in the non-attainment areas and "Maintenance" areas as specified in the currently adopted IDOT "Standard Specifications for Road and Bridge Construction", Article 107.36, Dust Control, the wind prone open areas of this project are considered to warrant a DCP. All construction activities shall be governed by a DCP. The nature and extent of dust generating activities, and specific control techniques appropriate to specific situations, shall be discussed at the pre-construction meeting, with subsequent development of the DCP.

IDOT's construction-related requirements dealing with the use of cleaner diesel fuel is addressed and specified in the currently adopted "Supplemental Specifications and Recurring Special Provisions", Article 107.41(a) and (b), Construction Air quality for Idling Restrictions, and Diesel Vehicle Emissions Control, respectively.

In addition, IDOT Bureau of Design and Environment (BDE) "Special Provision" for Construction Air Quality - Diesel Retrofit, effective June 1, 2010, may also be applicable.

Mobile Source Air Toxics

For the proposed improvements to IL 47, the design year (2040) traffic level is predicted to be less than 140,000 vehicles annual average daily traffic.

A qualitative analysis provides a basis for identifying and comparing the potential differences among Mobile Source Air Toxic (MSAT) emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions among Transportation Project Alternatives, found at:

http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.cfm

The amount of MSAT emitted from the proposed improvements would be proportional to the vehicle miles traveled (VMT), assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the proposed improvements is slightly higher than that for the No-Action Alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMT would lead to higher MSAT emissions in the project corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to USEPA's MOVES2010b model, emissions of all of the priority MSAT decrease as speed increases. Because the estimated VMT under each of the studied build alternatives are nearly the same, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of USEPA's national control programs that are projected to reduce annual MSAT emissions by over 80 percent between 2010 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the IL 47 proposed improvements would have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, the proposed improvements may result in localized areas where ambient concentrations of MSAT could be higher under the proposed improvements than the No-Action Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built from Reed Road to U.S. 14 due to the proposed improvements. However, the magnitude and the duration of these potential increases compared to the No-Action Alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In summary, when a highway is widened, the localized level of MSAT emissions for the build alternative could be higher relative to the No-Action Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT would be lower in other locations when traffic shifts away from them. However, on a regional

basis, USEPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today.

6.20 Noise

6.20.1 Traffic Noise

A traffic noise study has been conducted to evaluate traffic noise for the proposed IL 47 proposed improvements and is documented in the IL 47 Noise Analysis Technical Report. The traffic noise study evaluated a total of 39 Common Noise Environments (CNEs) with their Representative Receptor identified. The existing traffic noise levels range from 49 A-weighted decibel dB(A) to 67 dB(A). The traffic noise levels resulting from the proposed improvements range from 51 dB(A) to 70 dB(A). The noise levels that result from the proposed improvements increase between 0 dB(A) and 5 dB(A) from the existing condition as a function of increased traffic and a shift of the widened alignment.

The noise study determined that there would be three CNEs that would approach, meet, or exceed the FHWA Noise Abatement Criteria as a result of the proposed improvements, and therefore warranted consideration of a traffic noise abatement analysis. Of these three, only one remained viable since the other two CNEs represent a single receptor each, and in both cases are to be acquired as a result of the proposed improvements. One traffic noise abatement wall was considered and evaluated for the remaining CNE. The evaluated wall met the Feasibility criterion but did not stand the test of reasonableness for the Noise Reduction Design Goal and Cost Effectiveness criterion.

6.20.2 Construction Noise

Trucks and machinery used for construction produce noise may affect some land uses and activities during the construction period. Residents along the alignment would at some time experience perceptible construction noise from implementation of the proposed improvements. To minimize or eliminate the effect of construction noise on these receptors, mitigation measures have been incorporated into the currently adopted IDOT's Standard Specifications for Road and Bridge Construction, Article 107.35, Construction Noise Restrictions.

The construction methods to be used for proposed improvements are considered and determined in the final engineering design with the preparation of contract plans and specifications. Depending on the construction methods and potential for construction noise impacts, there are several potential abatement options that might be considered if they are warranted.

Construction Staging

Options for minimizing noise impacts during construction could include the installation of temporary barriers, such as temporary walls, stock piles of materials; equipment enclosures for noisy equipment, such as shields or heavy curtains; routing construction

equipment away from identified sensitive receptors; or operating equipment as far from any identified sensitive receptors as is feasible and practical.

Sequence of Operations

Options for minimizing noise impacts could include scheduling and conducting louder construction operations during the day and not during the night, when people are much more sensitive to noise, or conducting multiple loud operations at one time. The total noise level from multiple activities would not substantially increase the overall noise level. Its effect is that it would reduce the total duration of that noise level in the defined area.

Alternative Construction Methods

Options for minimizing noise impacts include the evaluation of alternative pile driving methods, as this is a major noise contributor and can generate vibration complaints. The project could also consider quieter demolition methods or pavement removal methods, such as using special muffler systems, shields (such as structural barriers), or enclose equipment (such as portable curtains).

6.21 Erosion and Sediment Control

The need for erosion and sediment control measures (and any additional right-of-way necessary to accommodate their implementation) have been evaluated for this project.

I. Project Description

a) Proposed Construction Activity

The work consists of reconstructing the existing one lane, two-way IL 47 roadway to a grass median separated two-lane roadway and a curb and gutter roadway section without a grass median separation at the north and south ends of the project. The work will include removal of existing pavement and the construction of new pavement, an existing bridge removal and the construction of a new bridge over the Kishwaukee River, as well as existing water crossing culverts to be replaced with new culverts. The existing drainage system will be replaced with a new system including new storm sewers, roadway ditches, a detention basin, compensatory storage basins, and bioswales for improved water quality. Roadway improvements including pavement reconstruction, drainage structure replacement, and new ditch establishment will also take place along Illinois 176 East and West, Conley Road, Union and Foster Road, Ballard Road, Pleasant Valley Road, Lucas Road, Hercules Road, Novean Parkway, and Cobblestone Way. Additional work includes new retaining wall construction, utility relocation, erosion control and protection, grading, and pedestrian/bicycle paths adjacent to the roadway.

b) Soil Disturbance

≥ 1.0 acre NPDES SWPPP documentation necessary

< 1.0 acre

c) Sensitive Environmental Resources--The presence of sensitive environmental resources requiring special consideration for protection from sedimentation, or other resources which require special commitments for protection will require attention during the preparation of the erosion control plan whether or not a permit is required.

yes See Commitments section

No

II. Information for the Erosion Control Plan

This project will result in the disturbance of 1.0 acre or more of total land area and is subject to the statewide general NPDES Storm Water Permit for Construction Site Activities. The District is responsible for preparing and updating as necessary throughout subsequent stages of project implementation, a Storm Water Pollution Prevention Plan (SWPPP). The portions of the Plan describing the construction activity, describing the erosion and sediment control measures intended for use and the associated maintenance practices, and describing any requirements applicable under approved State or local erosion and sediment control plans shall be prepared prior to project implementation.

Temporary measures in accordance with applicable Department standards will be used to control erosion and sedimentation while the project is under construction, prior to establishment of permanent measures. Permanent measures as necessary will be part of the completed project and will be used to prevent erosion and sedimentation after completion of the construction project. The designer shall include appropriate pay items and details in the plans and specifications to implement the selected erosion and sediment control measures. This project may also involve sensitive environmental resources to be protected during all stages of project implementation (see EA and Section 4.18.10).

The following section includes information that will be required in the preparation of the suggested erosion control plan.

1. Additional information for the preparation of the erosion control plan

a) Area of Disturbance

222 acres

b) Environmental Resources or Critical Areas

Critical areas are ADID wetlands and wetlands adjacent to the proposed roadway improvements, throughout the project corridor. The Kishwaukee River headwaters at the north end of the project, just south of Woodstock, and all existing waterway crossings within the project limits are also critical areas to minimize impacts.

c) Sequence of Activity and Anticipated Erosion Control Items

The sequence of construction activity is anticipated to take place in two primary stages as described in Section 4.22.

Anticipated erosion control items include the minimization of exposed soil during construction activity by minimizing the existing vegetation impacts. Also, the appropriate erosion and sediment control measures including, but not limited to, perimeter erosion barrier, storm drain inlet protection, riprap, protection of existing vegetation, temporary mulching and seeding, permanent seeding, and erosion control blanket.

d) Site Map, Runoff Coefficient, Receiving Waters

A site map is included in Supplemental Document S-3 – Location Drainage Study as Exhibit 1-00a (General Location Drainage Map).

Pre-development Runoff Coefficient:

50.5 ac (0.9 IMPERVIOUS) + 171.5 ac (0.3 PERVIOUS) / 222 ac = 0.44

Post-development Runoff Coefficient:

108.5 ac (0.9 IMPERVIOUS) + 113.5 ac (0.3 PERVIOUS) / 222 ac = 0.59

Receiving waters are, from south to north, Tributary to Kishwaukee Creek, Kishwaukee Creek, the Kishwaukee River, Kishwaukee River Tributary, and the Kishwaukee River.

6.22 Traffic Management Plan

IL 47 is a SRA and is listed on the Department's Significant Route Locations Map dated 2007. Its status as a significant route coupled with its full reconstruction scope results in a "Significant Projects-Long Term" classification and requires the preparation of a Traffic Management Plan (TMP). See Volume 2, Appendix A-10 for the TMP.

IDOT utilizes various Temporary Traffic Control Plan (TCP) strategies including signal phasing adjustments within the project limits, lane shifts, channelizing devices, temporary pavement markings, flaggers/traffic control officers, temporary signals as needed, lighting devices as needed, temporary lane closures, temporary signage, incentive/disincentive clauses in the contract documents, coordination with local stakeholders and adjacent projects, restrictions for special events as requested by the local municipalities, improvement and/or signing of alternate routes, and pedestrian accommodations, among others.

IDOT utilizes various Transportation Operations Plan (TOP) strategies which can include traffic radio, portable changeable message signs, speed limit reduction initiatives, high occupancy vehicle (HOV) lanes, variable work hours, signal timing/coordination improvements, temporary traffic signals, alternate route improvements, parking and turn restrictions, reversible lanes, heavy vehicle restrictions, coordination with adjacent projects, incidence response coordination, Intelligent Transportation System (ITS) monitoring, surveillance through closed circuit TV (CCTV) and loop detectors, traffic screens, and local detour routes, among others.

IDOT utilizes various Public Information Plan (PIP) strategies depending on the level of public involvement within the project, population and traveling public density, and overall resource availability within the project area. The strategies utilized can include brochures/mailers, press releases and media advisories, paid advertisements, telephone hot lines, websites, Public Hearings and/or Meetings, press conferences, Community Task Forces, coordination with media outlets, municipalities, schools and emergency services, work zone education campaigns and signage among others.

The following safety and congestion mitigation strategies will be implemented for the IL 47 corridor improvement:

- All traffic control devices will conform to the Illinois Manual on Uniform Traffic Control Devices (ILMUTCD). Temporary traffic signals will include emergency pre-emption and communication devices. Temporary traffic signal controllers will be supplied by one of the District approved closed loop equipment manufacturers.
- Temporary traffic signals within any existing closed loop traffic signal system shall be interconnected to that system using similar brand control equipment. Traffic signal management systems shall be maintained in operation as indicated by the plans or as directed by the Resident Engineer. To best mitigate traffic queues, detection at temporary traffic signals shall be included for all approaches

of the existing signalized intersections unless stated otherwise in the temporary traffic signal plans.

- All signs, barricades, and temporary striping will conform to the ILMUTCD and applicable State standards. Vehicular access to local businesses and properties will be maintained at all times during construction, except when paving operations occur directly on or in front of entrances. In those cases, flag persons will be used to direct traffic. In the case of multi-entrance businesses, at least one entrance will remain open at all times. Property and business owners will be notified in advance of any temporary closures. All properties will have access at the end of every workday.

The IL 47 reconstruction will be performed in two primary stages with minor preparation of the roadway surface such as curb and gutter removal, temporary pavement installation, and temporary striping operations being performed under advanced, pre-stage work.

Stage I reconstruction will maintain existing traffic patterns of two-way traffic with one lane in each direction on the existing roadway. The existing roadway will be modified to maintain two-way traffic flow by the installation of temporary pavement in the existing median and shoulder areas. The IL 47 existing typical section accommodates one lane of travel in each direction. Stage I reconstruction will similarly maintain one lane of travel in each direction. Stage I operations will include curb and gutter removal, shoulder and pavement removal, earthwork, installation of the proposed drainage system, installation of temporary drainage pipes for maintaining drainage system connections along with the bulk heading of newly installed lateral pipes, the installation of roadway lighting and signal posts, and the reconstruction of the new pavement on the east half-section of the proposed IL 47 right-of-way. The northbound lanes will be constructed during Stage I. See Volume 2, Appendix A-10 for Stage I Typical Section.

Stage II reconstruction will establish two-way traffic with one lane in each direction on the newly reconstructed pavement established during Stage I operations. Stage II operations will include curb and gutter removal, shoulder and pavement removal, earthwork, installation of the proposed drainage system, the removal of temporary drainage pipes and lateral pipe bulkheads, the installation of roadway lighting and signal posts, and the installation of permanent landscaping and erosion control measures. The southbound lanes will be constructed during Stage II. Major operations will be completed at the end of Stage II reconstruction. See Volume 2, Appendix A-10 for Stage II Typical Section.

The proposed right-of-way along IL 47 and its crossroads is sufficient to implement the project under the two-stage reconstruction operations summarized in the paragraphs above.

Traffic will remain open on all crossroads at all times. Temporary access to all commercial and residential lands uses within the project area will be maintained at all times during construction.

Two (2) through lanes with minimum widths of 10-feet edge-to-edge (preferably 11-feet edge-to-edge) will be provided during all construction stages. The 10-foot minimum lane widths are sufficient for emergency vehicles and truck traffic. Eleven (11) foot lanes should be used where feasible.

Similarly, the reconstruction of the structure over the Kishwaukee River will be performed in two stages that dovetail with the IL 47 staging plans.

6.22.1 Permits

The proposed project will result in the disturbance of more than one acre of total land area. A National Pollutant Discharge Elimination System (NPDES) permit for storm water discharges from construction sites will be required.

It is anticipated that Clean Water Act permits will be required for stream crossings and work within wetlands. Both a Section 401 will be required from the Illinois Environmental Protection Agency (IEPA), as well as a Section 404 permit from the U.S. Army Corps of Engineers (USACE). Permits would be obtained prior to the initiation of any work in these streams, and all permit conditions will be complied with.

A permit will be required from the IDNR, Office of Water Resources for work in the floodplain/floodway.

6.23 Other Planned Improvements

A separate Phase I study is underway by IDOT to re-align Pleasant Valley Road to align with the east leg of the IL 47 and IL 176 (East Leg) intersection to create a four-legged intersection. If Pleasant Valley Road is re-aligned as part of a separate project prior to the construction of the IL 47 improvements between Reed Rd and U.S. 14, then the proposed alignment for Pleasant Valley Road included in the IL 47 improvements is not necessary.

7. PRELIMINARY COST ESTIMATE

The current estimate of cost in 2013 construction dollars is \$99,706,680. See Table 7-1 for construction cost estimate.

Table 7-1 – Illinois Route 47 (IL 47) Construction Cost Estimate

Date:	<u>10/20/2016</u>	Designer:	<u>AECOM</u>
Route:	<u>IL 47</u>	City/County:	<u>McHenry County</u>
Section:	<u>Reed Road to U.S. 14</u>	Base Year:	<u>2013</u>

Item #	Item Description	Estimated Costs
1	Pavement Removal, Clearing; Minor Removal Items	\$ 1,553,000
2	Earthwork	\$ 3,943,000
3	Construction Site Stormwater Pollution Control	\$ 231,000
4	Drainage	\$ 4,318,000
5	Subbase, Base, Surface, Shoulders	\$ 38,463,000
6	Guardrail, Roadside Safety	\$ 1,692,000
7	Traffic Signals (Modernization or New)	\$ 500,000
8	Detours, Temporary Traffic Control - Roadway	\$ 2,800,000
9	Landscaping	\$ 3,896,000
10	Field Office and Laboratory	\$ 192,000
11	Environmental Mitigation/Incidental Items	\$ 4,950,000
12	Roadway Subtotal (Categories 1-11)	\$ 62,538,000
13	Retaining Walls	\$ 1,391,000
14	Major Culverts	\$ 2,850,000
15	Bridges	\$ 1,587,000
16	Structures for Detours and Temporary Traffic Control (NONE)	\$ -
17	Structure Subtotal (Categories 13-16)	\$ 5,828,000
18	Roadway and Structure Subtotal (Lines 12 and 17)	\$ 68,366,000

CHAPTER 7. PRELIMINARY COST ESTIMATE

19	Contingencies (15 % of Line 18)	\$ 10,254,900
20	Total Construction Cost (Lines 18 and 19)	\$ 78,620,900
21	Lighting	\$ 588,650
22	Utility Adjustments	\$ 1,000,000
23	Land Acquisition and Relocation	\$ 18,500,000
24	*Design Engineering (10% of Line 20)	\$ 6,289,672
25	*Construction Engineering (13% of Line 20)	\$ 6,289,672
26	Total Project Cost (Lines 20-25)	\$ 111,288,894

8. PUBLIC INVOLVEMENT ACTIVITIES

An extensive public involvement process was utilized as part of the project. Through frequent and meaningful communication with interested stakeholders, the Build Alternatives were developed to result in the implementation of a project that will improve traffic safety and mobility for the traveling public.

Public involvement activities have included:

- stakeholder workshops
- local official meetings
- business/commercial organization meetings
- development of a project website
- mailings to announce meetings
- development of press releases
- development of project brochures
- public meetings
- public hearings

Public involvement documentation is included in Volume 3, Appendix C.

8.1 Initial Public Involvement Activities

8.1.1 Interested Group Outreach Efforts

The initial focus of the public outreach was to identify stakeholders by having individual meetings with municipal, county, and township officials. Meetings were held with the Village of Huntley, Village of Lake in the Hills, Village of Lakewood, City of Woodstock, McHenry County, Dorr Township, and Grafton Township. Meetings were also held with the Chamber of Commerce for each of the municipalities.

From these initial meetings a committee of community members was convened to assist with the community outreach efforts. The committee met at each of the five Stakeholder Workshops to provide input at key milestones in the development of the project.

8.1.2 Other Outreach Efforts

A project website was maintained (www.route47study.com) to report project progress with links to frequently asked questions (FAQ), descriptions of possible build alternatives, summary of public meetings and workshops, a description of the public involvement process, a project history summary, and a link to contact the design team with question or comments. In addition, a newsletter was developed and sent to stakeholders to inform them of the progress at major milestone events.

8.2 Public Outreach Meetings

Five Stakeholder Workshops, two Public Meetings, and one Public Hearing were held during the course of the project. The Stakeholder Workshops were an interactive meeting process where information was presented to the stakeholders and then an interactive activity followed to obtain the stakeholders input into the project development. This stakeholder input was then used to develop the alternatives. Two open house style Public Meetings and one Public Hearing were held at the Chesak Elementary School located just east of the study area. The Public Meetings/Hearing included a continuously run audio/video presentation with exhibits and display materials depicting the details of the proposed reconstruction. Engineering and environmental reports were also made available for review. Project staff members from IDOT and the engineering consultant firm were positioned amongst the exhibit materials to explain, answer questions, and discuss details of the project with those attending. The opportunity to provide written comments was available for submittal at the Public Meeting sessions, through the mail and on the project website. Links to all material presented at the meetings were made available on the project website. The following sections provide a summary of each of the public outreach meetings, which are also documented in Volume 3, Appendix C.

8.2.1 Open House Public Meeting #1 (September 30, 2008)

The first Public Informational Meeting was held on September 30, 2008 from 4:00 to 7:00 p.m. at the Chesak Elementary School (10910 Reed Road). The purpose of the presentation was to introduce the Context Sensitive Solutions process and present existing road conditions and data that had been collected. Advertisements for the meeting were published in the Daily Herald and the Northwest Herald on September 9th and 23rd and approximately 350 meeting invitations and brochures were mailed to residents who live in and around the study area. One of the primary issues discussed at the meeting was traffic mobility. Residents were concerned about the amount of traffic currently present along the route and the potential effects the increase in traffic would have on mobility in the future. Another primary issue was traffic safety.

Two comments resulting from the public meeting were received via email; another 16 were obtained via notes at the public meeting. A community questionnaire was developed in support of this meeting, 10 comments were received as a result of this questionnaire. Comments were somewhat general as this was the initial Public Meeting. They included concern for safety, bicycle accommodations, building the road as soon as possible, and how many lanes it would be. All comments were responded to either by U.S. Postal Service mail or email depending on how they were received. For more information please see Supplement-1.1 (Environmental Assessment).

8.2.2 Stakeholder Workshop #1 (February 13, 2009)

The first Stakeholder Workshop Meeting was held on February 13, 2009 from 10:00 a.m. to 12:00 p.m. The workshop was held at the Huntley Park District Recreation Center (12015 Mill Street, Huntley, IL). The purpose of the workshop was to introduce the Context Sensitive Solutions process and obtain public input for the project's purpose and need. A total of 28 stakeholders were identified and invited to the workshop, 19

attended. Invitation letters were mailed to home or business addresses and electronic invitation cards were sent by email.

The workshop obtained consensus on four project goals and objectives. The goals and objectives developed were:

- improve safety of Illinois Route 47 (IL 47)
- improve mobility on IL 47
- protect the environment along IL 47
- accommodate economic development along IL 47.

8.2.3 Stakeholder Workshop #2 (May 29, 2009)

The second Stakeholder Workshop Meeting was held on May 29, 2009 from 10:00 a.m. to 12:00 p.m. The workshop was held at the Huntley Park District Recreation Center (12015 Mill Street, Huntley, IL). Consensus was obtained on the Project Problem Statement and the stakeholders were encouraged to comment on the Project Purpose and Need. The meeting was attended by 17 stakeholders.

The workshop obtained consensus on the following four project elements:

- number of lanes - four lanes were preferred
- median type - barrier median or wide grass median was preferred
- edge treatment – paved shoulder with or without curb and gutter was preferred
- pedestrian/bicycle accommodations – a bicycle path was preferred

8.2.4 Stakeholder Workshop #3 (October 6, 2009)

The third Stakeholder Workshop Meeting was held on October 6, 2009 from 10:00 a.m. to 12:00 p.m. The workshop was held at the Huntley Park District Recreation Center (12015 Mill Street, Huntley, IL). Invitation letters were mailed to home or business addresses, electronic invitation cards were sent by email, and stakeholder volunteers were contacted by telephone to participate in the workshop. The meeting was attended by 19 stakeholders.

The stakeholder response to the alternatives was favorable and the preferred options identified. Five major categories of comments were received, including concerns related to accommodations for possible future bicycle overpasses, wetland impacts, reduced access, stormwater detention, or quality, and residential or business impacts.

8.2.5 Public Meeting #2 (November 19, 2009)

The second Public Informational Meeting was held on November 19, 2009 from 4:00 to 7:00 p.m. at the Martin Elementary School (10920 Reed Road, Lake in the Hills). Advertisements for the meeting were published in the Daily Herald and the Northwest Herald on October 29th and November 12th and meeting invitations and brochures were mailed to public official, agencies, business owners, and residents who live in and around the study area. The meeting was attended by approximately 23 people.

The primary concerns of the stakeholders via discussion or in written comments were accessibility, providing bike paths, runoff water quality, wetland impacts, tree removal, general geometric differences of the Public Meeting's two alternatives versus IDOT's Strategic Regional Arterial study, being a participant in further workshops, and right of way acquisition. Preferred alternatives were also identified.

Five comments resulting from the public meeting were received via email; another 16 were obtained via notes at the public meeting. Thirteen comments were received at the public meeting. Comments included the desire for separated pedestrian and bicycle accommodations, left turn access, and concern for a narrower right of way for less property take. All comments were responded to either by U.S. Postal Service mail or email depending on how they were received. For more information please see Volume 3, Appendix C.

8.2.6 Stakeholder Workshop #4 (August 23, 2011)

The fourth Stakeholder Workshop Meeting was held on August 23, 2011 from 10:00 a.m. to 12:00 p.m. The workshop was held at the Huntley Park District Recreation Center (12015 Mill Street, Huntley, IL). Electronic invitation cards were sent by email to stakeholder volunteers to participate in the workshop. The meeting was attended by 17 stakeholders.

The workshop consisted of a power point presentation and a group exercise. The power point presentation included an overview of the project progress and presentation of the concepts being utilized to reduce impacts. Exhibits were available for stakeholders to review, including a roll plot of the project showing the alternatives over an aerial background, renderings of the typical sections, and charts summarizing the impacts.

8.2.7 Stakeholder Workshop #5 (March 5, 2014)

The fifth Stakeholder Workshop was held on March 5, 2014 from 10:00 a.m. to 12:00 p.m. The workshop was held at the Huntley Park District Recreation Center (12015 Mill Street, Huntley, IL). Electronic invitation cards were sent by email to stakeholder volunteers to participate in the workshop. Invitation letters were mailed to home or business addresses for those stakeholder volunteers who had not previously provided an e-mail address. Twenty-two stakeholders attended the meeting.

The workshop included a power point presentation and exhibit boards. The power point presentation consisted of an update on the project progress and next steps, description of the Preferred Alternative and an overview of the proposed BMPs. The exhibits included a roll plot of the proposed improvements over an aerial background, renderings of the proposed cross sections, and exhibit boards showing the project purpose and need, crash data, and traffic volume data.

8.2.8 Public Hearing (March 12, 2015)

The public hearing for the IL Route 47 from Reed Road to U.S. Route 14 Preliminary Engineering and Environmental (Phase I) Study was held on Thursday, March 12, 2015 at the Huntley Recreation Center, 12015 Mill Street, Huntley, IL from 4 – 7 PM. The public hearing was conducted in an open house format with a public comment forum,

which started at 6:00 p.m. A court reporter was present to transcribe oral comments during the public hearing. Attendees could sign-up for the public comment forum to publicly speak their comments, which were documented by the court reporter.

A public hearing invitation was produced and mailed to 280 stakeholders approximately prior to the public hearing. In addition to the advertisements, press release, and newsletter mailing, the public hearing was announced to stakeholders via electronic invitations to those stakeholders who provided email addresses.

There were two rooms available for the public to view project materials, one room displayed a continuous audio-visual presentation that included information regarding the project overview, a review of the Purpose and Need, alternatives development and evaluation process, preferred alternative, Environmental Assessment (EA), request for feedback on the Environmental Assessment and public hearing materials, and the next steps of the project. The second room contained exhibit boards and roll plot maps, and attendees had the opportunity to speak with representatives from IDOT and the Project Study team. Representatives from the Pleasant Valley Road Re-alignment Study were also available to speak with attendees about that project. An exhibit showing the proposed improvements from that study was also displayed at the Public Hearing. The hearing was attended by 84 people. Within the comment period, which ended on March 26, 2015, 10 comment forms, 13 emails, 7 letters were received. In addition, three individuals spoke during the public comment forum and nine individuals spoke with the court reporter during the hearing. These comment methods resulted in 155 comments submitted during the public comment period.

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9. COMMITMENTS / DESIGN CONSIDERATIONS

9.1 Design and Construction Considerations

The project is not fully funded at this time. As funding becomes available it may be constructed in Stages. Consideration for stages may include:

- Replacement of the bridge over the Kishwaukee River. The existing bridge is in poor condition and in need of replacement. The suggested staging would be to build the east (northbound) bridge along with a combination of temporary and permanent pavement. Traffic would be move to the new construction while the west (southbound) bridge was constructed. This stage is funded for construction. See Volume 2, Appendix A-9.
- A separate IDOT Phase I study is evaluating a re-alignment of Pleasant Valley Road to align with the IL 47 and IL 176 (East Leg) intersection. The improvement is being coordinated with the Village of Lakewood. While construction is not funded at this time, design has been funded. If the Pleasant Valley Road re-alignment is completed prior to the IL 47 improvements between Reed Rd and US 14, then the proposed alignment of Pleasant Valley Road in the IL 47 improvements is not necessary. Final design of the IL 47 improvements between Reed Rd and US 14 should be coordinated with this separate study.
- Intersection improvements and extension of Talamore Boulevard east of IL 47 by Village of Huntley. The Village has long term plans to extend Talamore Boulevard to the east. If Talamore Boulevard is extended prior to IL 47 being improved, modifications to IL 47 will be needed to accommodate turn lanes. At this time there is not a schedule for the improvements.
- Intersection improvements and extension of Ackman Road east of IL 47 by Village of Lake in the Hills. The Village has long term plans to extend Ackman Road to the east. If Ackman Road is extended prior to IL 47 being improved modifications will be need to IL 47 to accommodate turn lanes. At this time there is not a schedule for the improvements.
- Accidental spills of hazardous materials and wastes during construction or operation of the transportation system require special response measures. Occurrences will be handled in accordance with local government response procedures. Refueling, storage of fuels, or maintenance of construction equipment will not be allowed within 100 feet of wetlands or water bodies to avoid accidental spills impacting these resources.
- Install silt fence at limit of construction in wetlands to minimize impacts.
- Erosion and sediment control will be included in the Phase II preparation of Contract Plans and Specifications. The erosion and sediment control plan will include site monitoring by the contractor and project engineer.

- Detailed sizing and design of bioswales will be performed in Phase II preparation of Contract Plans and Specifications.
- Aerial mapping flown in 2007 was utilized for the Phase I Studies. Much development and roadway improvements have occurred since it was flown. New survey should be utilized for Phase II Detailed Design.
- Phase II shall coordinate with IDOT's Environmental Studies Unit one year prior to project letting when a permit is required for in-stream work or wetland impacts. One year is needed in order to provide ample time for the review process as well as to conduct any necessary field surveys that will need to be performed.
- A Preliminary Environmental Site Assessment (PESA) has been completed for this project in October 2013. It is the responsibility of Phase II to determine if any of the sites or ROW adjacent to the site will be impacted with the proposed work and/or if any ROW will be required at any of the locations.
- Special waste issues that may arise in the construction phase will be managed in accordance with the "IDOT Standard Specifications for Road and Bridge Construction and Supplemental Specifications and Recurring Special Provisions." Further environmental studies will be conducted if the proposed improvements require excavation adjacent to a property identified with a recognized environmental concern (REC) or requires excavation, including subsurface utility relocation, on a property with an easement.
- Accidental spills of hazardous materials and wastes during construction or operation of the transportation system require special response measures. Occurrences will be handled in accordance with local government response procedures. Refueling, storage of fuels, or maintenance of construction equipment will not be allowed within 100 feet of wetlands or water bodies to avoid accidental spills impacting these resources.
- A detailed lighting assessment and analysis should be performed in Phase II.

9.2 Commitments

- Coordinate with the Village of Huntley about the future extension of Talamore Boulevard east of IL 47 (See 9.1 Design and Construction Considerations).
- Coordinate with the Village of Lake in the Hills about the future extension of Ackman Road east of IL 47 (See 9.1 Design and Construction Considerations).
- Coordinate with the Village of Lakewood about the future realignment of Pleasant Valley Road with IL 176 (East Leg).
- In order to avoid impacts to the state threatened Iowa darter (*Etheostoma exile*), no in stream work shall be conducted from April 1 through June 15 of any construction year at the following locations:
 - Site 1: Kishwaukee River at IL 47, approximately 200 feet to 600 feet south of Dieckman Road

- Site 2: Kishwaukee River at IL 47, approximately 650 feet north of Foster/Union Road
- Wildlife crossings under IL 47 are recommended and will be further studied during the final engineering design. Proposed crossing locations are listed in Table 6–4 - Potential Wildlife Crossings
- Bioswales will be installed along the outside ditches where feasible and practical. They will be installed in locations immediately upstream of surface water resources, such as streams and wetlands. Other BMPs will be installed in the vegetated medians where appropriate.

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