Plainfield I-70 from US 40 New Corridor Analysis Report

Date: 07/14/2021

TOWN OF PLAINFIELD, INDIANA

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PLAINFIELD

EXECUTIVE SUMMARY

Substantial growth over the past two decades has caused the Town of Plainfield's transportation network to show signs of strain under increasing traffic volumes. Town planning studies and reports (comprehensive plans, thoroughfare plans, etc.) over the past decade have recurringly indicated that a western US 40 to I-70 connector corridor and accompanying interchange on I-70 could have significant improvements on Town congestion levels. This corridor was again indicated in the 2019 Town of Plainfield Thoroughfare Plan as having a significant impact on the Town's transportation network.

This study of the US 40 to I-70 connector corridor was commissioned to conduct a more in-depth analysis of a future corridor alignment and interchange location west of the existing Plainfield town limits. The results of this study would provide information necessary to allow the Town of Plainfield to better plan for future implementation and funding. A blank-slate approach was used to find the optimal location for a north-south connector corridor.

Recent INDOT traffic counts from other studies and nearby/relevant count stations were used wherever possible. For those locations where traffic counts were not available, the Town of Plainfield travel demand model (TDM) developed for the Town's Thoroughfare Plan update was used to estimate AADTs. The TDM was also used to evaluate traffic pattern changes caused by shifting the location of the proposed connector corridor and interchange. A few major corridors (I-70, SR 39, US 40, and SR 267) were analyzed, along with major intersections along those routes and some additional local intersections that would likely see significant changes in travel patterns.

The project team initiated the study with no preconceived or initial alternatives in place. A public open house was used to gain an understanding of the area and obtain input from the public on where logical connection points and corridors may lie, as well as features to avoid. Using this public input as guidance, several potential corridors and connection points were developed. With numerous alignments, the project team worked with the Town to build a hierarchy of performance measures that would evaluate the analysis results to reduce the number of alternatives to a manageable number for in-depth analysis.

Multiple performance measures were developed and selected based on input and coordination with Town of Plainfield and Hendricks County staff. These measures cover criteria pertaining to traffic safety and operational performance, quality of place, environmental resources, and system compatibility and regional connectivity, to name a few. Weighting of these measures was then developed based on input from Plainfield and Hendricks County staff by utilizing a paired-pair comparison.

Using additional input from public, Town and County staff, and analysis of the diversion potential of some of the corridors, three alignments were selected for in-depth analysis. The three alignments represented bookends of the study area and a central alignment. These three alignments would be representative of the range of performance by all of

the potential corridors developed. Analyses were conducted on the alternatives to calculate results that would be fed into an evaluation matrix of the performance measures, and the results would be multiplied by the weights established through the paired-pair comparison of the performance measures. Some criteria did not lend themselves to numerical results, so a value was assigned based on the range of qualitative results. With all of the analyses completed, a total weighted score for each alternative was calculated.

After evaluating the No Build and three Build alternatives against multiple performance metrics, **a central alignment (Alternative DX) is recommended** as the optimal location for a future connector corridor between US 40 and I-70. Alternative DX had the highest weighted performance score of all alternatives, scoring well in traffic safety and operations, system compatibility and regional connectivity, and quality of place. The central location of Alternative DX would allow the corridor to have both an immediate and long-term impact on the Town's transportation network, providing resiliency for a wide range of potential growth futures for Plainfield. Alternative DX's general alignment is shown in the image below.

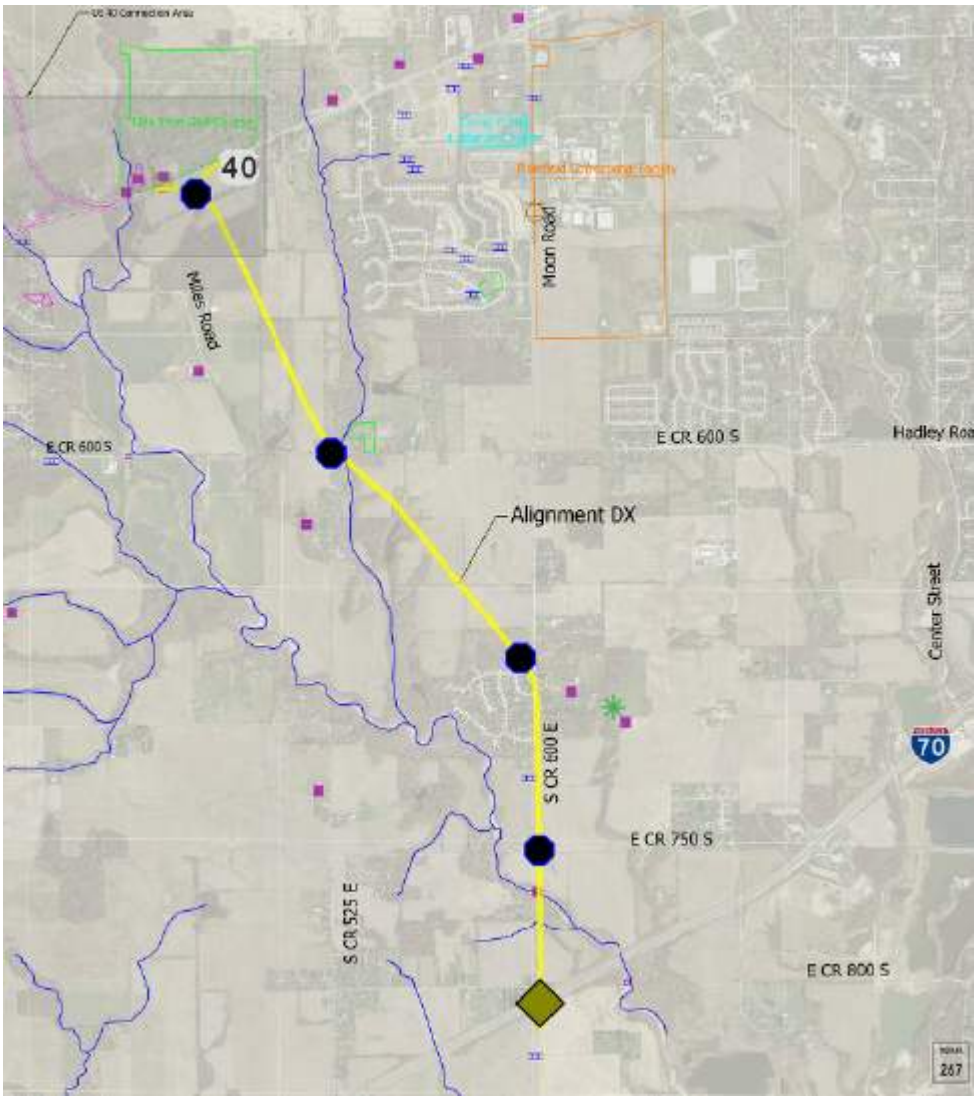

FIGURE – RECOMMENDED CORRIDOR ALIGNMENT DX

The results of this study allow the Town of Plainfield to better plan for a future corridor, implement the corridor into a future transportation improvement plan, and identify funding sources. The results of this study are conceptual only; locations of roadway improvements are generalized. Detailed traffic analysis and geometric analysis will be necessary to refine and finalize the corridor once funding is established. Any potential right of way impacts shown should not be construed as final.

Interchange type was not included as a part of this study. A standard diamond interchange was chosen to show proof of concept with an acceptable number of lanes; more detailed analysis and coordination with INDOT is needed to finalize any future interchange geometry.

The connection to US 40 is not well-defined at the time of this study, as multiple factors will weigh significantly into a decision of how the connection to US 40 is configured. The first is the condition of the US 40 bridges over the West Fork White Lick Creek once the Town of Plainfield seek to build the connector corridor. The second factor is the designated route of US 40, as it currently runs through downtown Plainfield. With Plainfield's promotion of the downtown area as a destination and as work progresses to activate the public spaces, there may be a desire to reroute through US 40 traffic from downtown. US 40 could be redesignated to follow the connector corridor to I-70 once built, but this will require coordination between the Town and INDOT that has not occurred to-date.

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1.0 INTRODUCTION

This study was commissioned by the Town of Plainfield to take a more in-depth look at a specific future corridor that had been identified in both the most recent and the previous Town Thoroughfare Plans. This future corridor would have a major impact on mobility and the Town's transportation infrastructure network. In coordination with Plainfield at the onset of the project, the following process steps were established to conduct the study.

- Review past planning documents and currently programmed/under construction improvements to adjacent interchanges.
- Seek public input on community concerns within the study area and thoughts on potential impacts.
- Consider all reasonable options and three selected development scenarios.
- Receive Town staff and local stakeholder feedback to help identify performance measures to aid in identifying and selecting a recommended corridor.
- Analyze analysis results using established performance measures.
- Review results with INDOT and FHWA prior to providing a recommendation to the Town of Plainfield.
- Announce the results of the study to the community at-large.

This process sought public input at regular intervals through the study's development to communicate progress and reassess community concerns as more details were developed.

2.0 PROJECT DESCRIPTION

2.1 REPORT PURPOSE & BACKGROUND

The substantial growth experienced by the Town of Plainfield has begun to strain the local transportation network. Since 2010, the US Census Bureau estimates the Town of Plainfield's population has increased 24%. With the Town's proximity to Indianapolis, Interstate 70 and Indianapolis International Airport, this trend is expected to continue for the foreseeable future. As the Town's population continues to grow and expand further west into Hendricks County, a transportation network able to accommodate the future growth is needed. Plainfield recently completed its 2019 Thoroughfare Plan, which indicated a new north-south connector corridor between US 40 and I-70 with a new access to I-70 would provide significant improvements to congestion levels. That Plan was structured on the assumption that a future interchange be placed at an approximate location where CR 525 E crosses over I-70. This study was structured to analyze the

effects of locating the proposed interchange at varying locations along I-70 while continuing to provide a route to US 40. The purpose of this report is to document the analysis conducted to determine where a recommended north-south connector corridor between US 40 and I-70 and new interstate access point should be located.

2.2 PROJECT LOCATION

The proposed study area is in located in Hendricks County, Indiana. The area is roughly bounded to the south by I-70 (RP 59+0.43 to RP 66+0.41), to the north by US 40 (RP 58+0.77 to RP 65+0.25), to the west by SR 39 (RP 31+0.27 to RP 35+0.95), and to the east by SR 267 (RP 5+0.15 to RP 10+0.08). Consideration will be given for a connection point south of I-70. See ***Appendix A – Project Graphics*** for study area map.

FIGURE 1 – COUNTY LOCATION MAP

2.3 PROJECT NEED AND PURPOSE

The substantial growth experienced by the Town of Plainfield has begun to strain the local transportation network. To accommodate current and expected future traffic demands at and within the vicinity of I-70 and SR 267, Plainfield (in coordination with Hendricks County) is seeking to identify a recommended corridor for a connector road between US 40 and I-70 bounded between SR 39 and SR 267 to lessen the congestion on Town and State Roads. The intention of the road is to connect to I-70 via a future interchange. The new corridor will be designed to meet the needs of the Town of Plainfield, Hendricks County, INDOT, and the traveling public. A formal NEPA study will be used to determine the official need and purpose for the project if federal funds are

used for future project phases. However, preliminary components of the need and purpose were developed during this study to assist in the overall framework.

2.4 ENVIRONMENTAL PROCESS

The results and recommendations in this report are based on traffic and safety analyses. Any recommendations from the corridor evaluation would still need to be evaluated for environmental impacts. A Red Flag Investigation will be conducted with the traffic study of the area to identify environmentally sensitive areas that should be considered in future phases of the project.

2.5 PREVIOUSLY COMPLETED OR IN-PROGRESS STUDIES & REPORTS

The framework for this study was established by referencing multiple studies and reports that were either completed previously or are currently being drafted. The two primary guiding documents are the Town of Plainfield's 2016 Comprehensive Plan and the subsequent 2019 Town Thoroughfare Plan update. Hendricks County completed a thoroughfare plan update in late 2020, and the draft version of that report has been used as a reference for county visions and planning. Additionally, the Town of Plainfield South of I-70 Subarea Plan and Town of Plainfield Master Plan reports, along with State and Regional Transportation Improvement Plans (TIPs) are being used to guide the project team. These documents set the vision for the study area to guide the project team during the analysis.

3.0 EXISTING CONDITIONS

Prior to beginning the analysis, the existing state of the study area was documented. The study area's existing conditions were documented from multiple perspectives: transportation infrastructure geometry, current traffic volumes and posted speed limits, environmental features, and identified utility services. The Environmental features are identified in ***Appendix F – Environmental Resources*** and were factored into the alternative alignments developed. The other items are detailed in this section.

3.1 ROADWAYS

Several state and local roads will be directly impacted by the proposed project. Existing roadway conditions have been summarized in Table 1 within the study area and includes a description of each road. The existing roadways identified in Table 1 are highlighted in Figure 1 for a frame of reference. Historic traffic volumes for S County Road 400 East were not available.

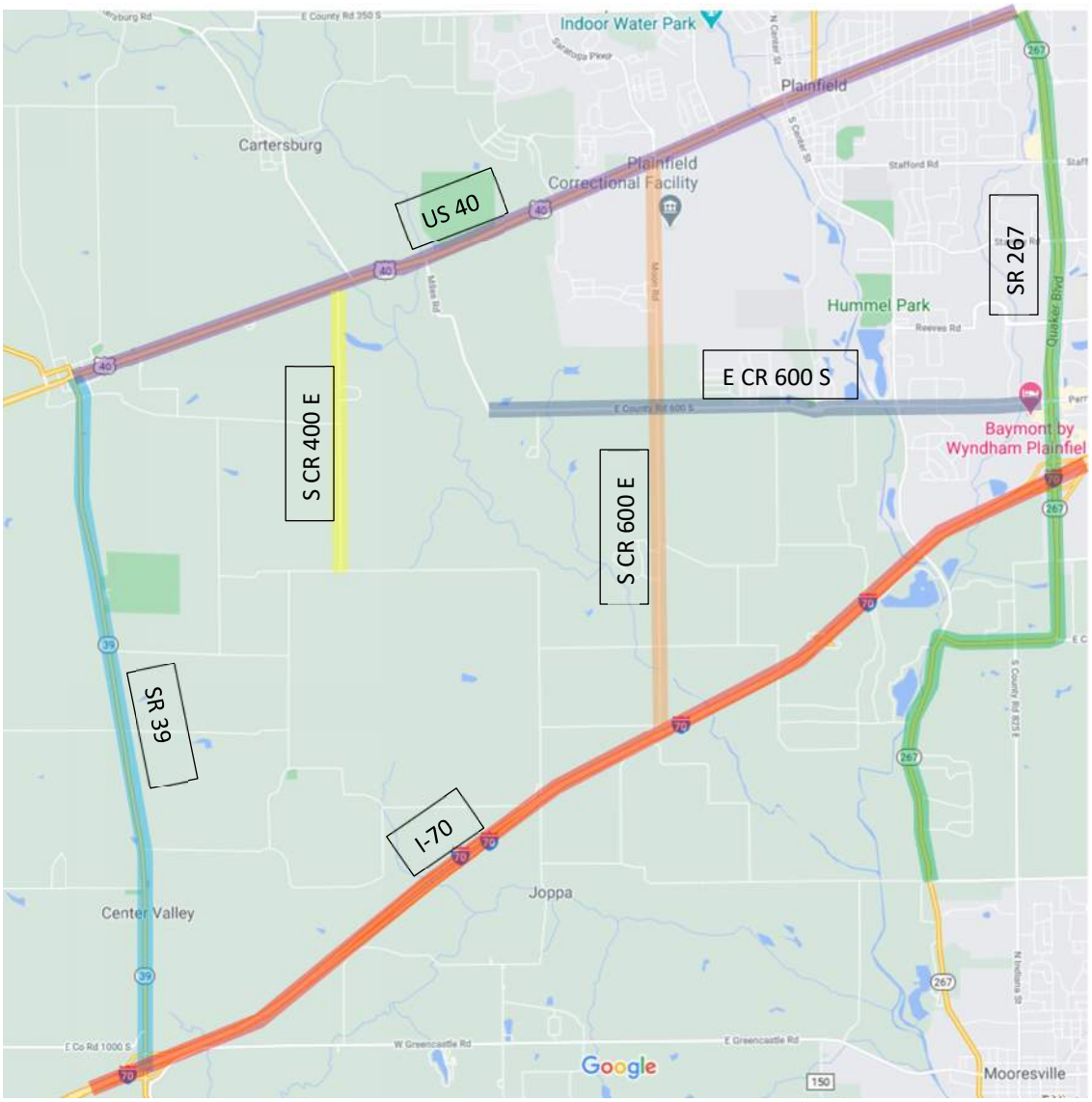


FIGURE 2 - LOCATION OF EXISTING FACILITIES

TABLE 1 - EXISTING FACILITY INFORMATION

Facility	Functional Classification	No. of Primary Lanes	Level of Access Control	2019 ADT (veh/day)	Speed Limit (mph)
Interstate 70	Interstate	4	Full	65,000	65-70
US 40	Principal Arterial	4	None	27,700	45-55
SR 39	Major Collector	2	None	16,000	45
SR 267	Principal Arterial	4	Partial	20,000	55
East County Road 600 South	Major Collector	2	None	13,000	35
South County Road 400 East	Major Collector	2	None	1,350	50
South County Road 600 East	Major Collector	2	None	7,200	35

INTERSTATE 70

Interstate 70 is a major east-west Eisenhower Interstate System Highway on the National Highway System that runs from Cove Fort, Utah to Baltimore Maryland. The freeway enters Indiana west of Terre Haute and passes miles of rolling terrain to reach Indianapolis. This commuting route to Indianapolis receives traffic from over five counties. The speed limit is 65 mph for vehicles with a gross weight of 13 tons or greater while other vehicles have a speed limit of 70 mph. At the project location, the existing roadway section has two 24-foot lanes in each direction with 10-foot right and 6-foot left (median) shoulders. The median width varies between 35 feet and 250 feet. Interstate 70 has two lanes in each direction. Local road overpasses exist at South County Road 525 East and County Road 675 East. The AADT is approximately 50,000 vehicles per day west of the SR 267 interchange and 65,000 vehicles per day east of the SR 267 interchange.

US 40

Present day US 40 has 2 lanes with a 2-foot right shoulder and a 1-foot left shoulder. It is classified as a principal arterial roadway by Hendricks County. It is a MAP-21 Principal Arterial on the National Highway System. US 40 is classified as a rural arterial west of Miles Road and an urban arterial to the east of Miles Road. The speed limit is 55 mph 0.25 mile west of Saratoga Parkway and 45 mph until reaching the bridge at White Lick Creek. The speed limit is reduced to 30 mph east of White Lick Creek. East of the creek, US 40 passes the Plainfield Town Hall, the Chamber of Commerce, and Central Elementary. The AADT is approximately 17,000 vehicles per day west of Moon Road and 27,700 vehicles per day east of Moon Road.

STATE ROAD 39

State Road 39 is a north-south major collector that runs between US 40 and has a conventional diamond interchange with I-70. Construction is currently underway to convert the interchange with I-70 from a conventional diamond to a diverging diamond configuration. The existing pavement is a two-lane paved road with 11-foot lanes and 2-foot paved shoulders. The roadway serves as property access to three warehouses, a golf course, and several dozen homes. The AADT is approximately 16,000 vehicles per day near I-70 decreasing to approximately 6,500 vehicles per day near US 40.

STATE ROAD 267/QUAKER BOULEVARD

State Road 267 (or Quaker Boulevard as it is called north of I-70) is classified as a principal arterial by Hendricks County. The existing pavement is two 12-foot lanes in each direction with a 12-foot outside shoulder and a 2-foot inside shoulder. There is a raised median between I-70 and Hadley Road. The roadway stretches south from US 40 to Mooresville. The AADT is 20,000 vehicles per day north of I-70 and 9,000 vehicles per day south of I-70.

EAST COUNTY ROAD 600 SOUTH

East County Road 600 South is a county road located south of Plainfield that runs east and west. The road becomes Hadley Road within the Town of Plainfield's corporate limits. The road is a two-lane paved local rural road and is designated as a major collector by Hendricks County. There is one 10-foot travel lane in each direction with no paved shoulder. The road serves as property access for a few dozen homes as well as at least two neighborhoods. The AADT varies from approximately 13,000 vehicles per day near SR 267 to approximately 10,000 vehicles per day near Moon Road.

SOUTH COUNTY ROAD 400 EAST

South County Road 400 East is a county road located west of Plainfield that runs south of US 40 to connect with East County Road 700 S. The road has been classified as a major collector by Hendricks County. The road serves a few dozen homes and three small neighborhoods.

MOON ROAD (SOUTH COUNTY ROAD 600 EAST)

Moon Road intersects US 40 at Saratoga Parkway and runs north-south through the study area. Located south of US 40, it becomes S. County Road 600 E outside the Town of Plainfield corporate limits. Major developments along the road include the Living Christ Lutheran Church and the Plainfield Correctional Facility. The AADT is approximately 7,200 vehicles per day.

MILES ROAD

Miles Road is a small stretch of road that connects US 40 to East County Road 600 S. Three properties depend on Miles Road for roadway access. The existing roadway section has two 10-foot lanes and a gravel shoulder. The AADT is approximately 2,000 vehicles per day.

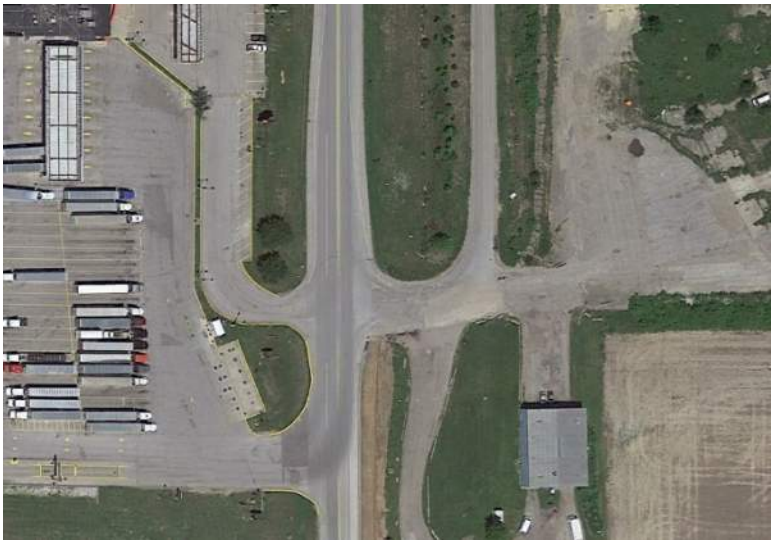
3.2 MAJOR INTERSECTIONS

SR 39 AND KOGER STREET/COUNTY ROAD 1000 SOUTH - This existing intersection is four-legged with signal control on all approaches. The northbound and southbound approaches have 3 lanes, one dedicated right-turn lane, and one dedicated left-turn lane. The westbound approach has two lanes, one being a shared through-right lane and the other lane was a dedicated left-turn lane. The eastbound approach consists of a single lane. This intersection is currently under construction with the I-70 interchange to the south, which will add a second through lane for both northbound and southbound traffic.

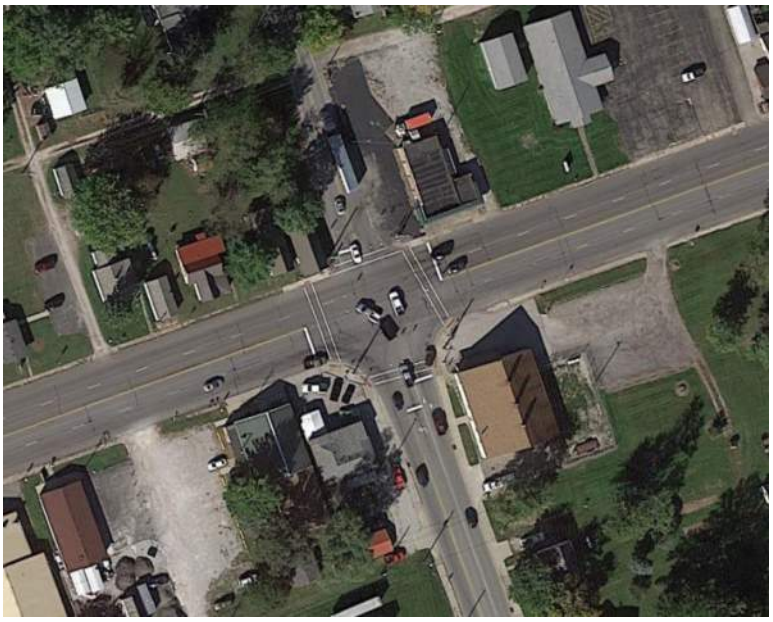
SR 39 AND I-70 EASTBOUND RAMPS – This existing intersection is four-legged with signal control on the north, south and eastbound approaches. The northbound and southbound approaches have a through lane. The northbound leg has a dedicated right turn lane. The eastbound off-ramp has one right-turn lane and one left-turn lane. The eastbound on-ramp is a single-lane ramp. This interchange is currently under construction to modify it to a diverging diamond configuration. A through lane will be added for both northbound and southbound State Road 39.

SR 39 AND I-70 WESTBOUND RAMPS – This existing intersection is four-legged with signal control on the north, south and westbound approaches. The northbound and southbound approaches have a through lane. The southbound leg has a dedicated right-turn lane. The westbound off-ramp has one right-turn lane and one left-turn lane. The westbound on-ramp is a single-lane ramp. This interchange is currently under construction to modify it to a diverging diamond configuration. A through lane will be added for both northbound and southbound State Road 39.

SR 39 AND GREENCASTLE ROAD/COUNTY ROAD 1000 SOUTH - This existing intersection is four-legged with stop control on the east and west approaches. The northbound approach has one lane, and the southbound approach has 2 lanes, one dedicated right-turn lane and one through/left-turn lane. The eastbound and westbound approaches consist of a single lane. This intersection is currently under construction with the I-70 interchange to the north, which will add a second through lane and a dedicated left turn lane for both northbound and southbound traffic.



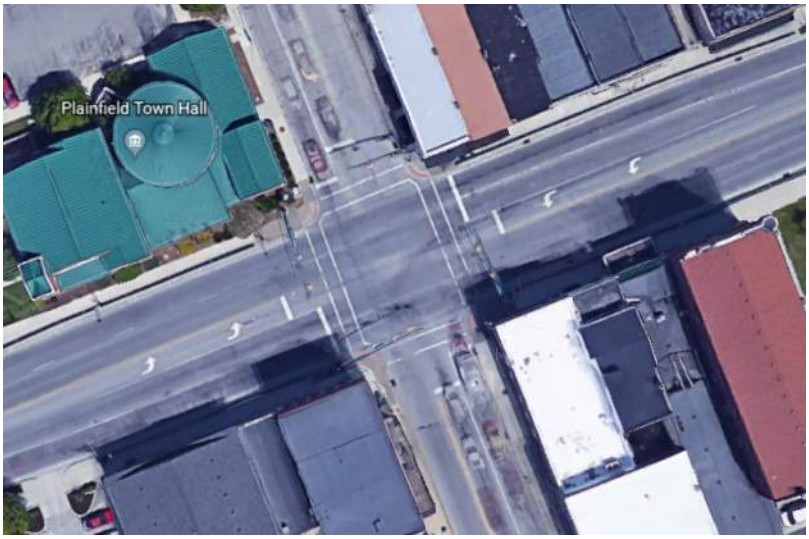
US 40 AND SR 39 – This existing intersection is four-legged with signal control on all approaches. The eastbound and westbound approaches consist of two lanes, a shared through-left and a shared through-right. The northbound approach has two lanes, one being a shared through-right lane while the southbound approach consists of a single lane. The intersection is approximately 4.5 miles north of the SR 39 – I-70 interchange.



US 40 AND MILES ROAD – This existing intersection is three-legged with a stop sign on the Miles Road approach with a gravel drive to the north. The eastbound and westbound approaches on US 40 are two lanes separated by a 29' depressed median and the northbound approach is single lane. The intersection is approximately 2.4 miles east of SR 39.

US 40 AND MOON ROAD/SOUTH COUNTY ROAD 600 EAST – This existing intersection is four-legged with signal control on all approaches. The eastbound and westbound approach have 2 through lanes and dedicated right and left-turn lanes. The depressed median is 20 feet wide. The northbound and southbound approaches have dedicated right and left-turn lanes as well as a shared left-through lane. Commercial development surrounds this intersection. The intersection is 2.5 miles southwest of the US 40 – SR 267 intersection.

US 40 AND SOUTH CENTER STREET – This existing intersection is four-legged with signal control on all approaches. All approaches have dedicated left-turn lanes. The eastbound and westbound approaches have two through lanes and the northbound and southbound approaches have one shared through-right lane. The intersection is 1.6 miles from the US 40 – SR 267 Intersection.



US 40 AND STATE ROAD 267 – This existing intersection is four-legged with a private drive to the north and signal control on all approaches. All approaches have dedicated left and right-turn lanes. The eastbound and westbound approaches have two through lanes each. The northbound approach has a shared left-through lane and the southbound approach has an exclusive through lane. The intersection is 3 miles north of the I-70 – SR 267 interchange.

STATE ROAD 267 AND HADLEY – This existing intersection is four-legged with signal control on all approaches. All approaches have dedicated left-turn lanes. The northbound and southbound approaches have two through lanes and a dedicated right turn lane. The eastbound approach has a single through lane and a dedicated right turn lane. The westbound approach has two dedicated left-turn lanes and a shared through-right turn lane. The intersection is located 0.5 miles north of the I-70 – SR 267 interchange.

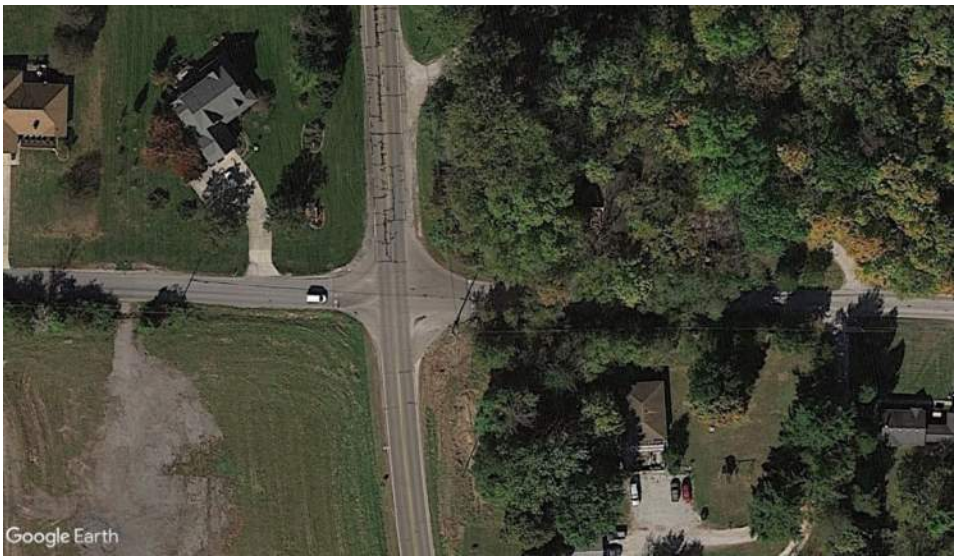
I-70 AND STATE ROAD 267 WESTBOUND RAMPS – This existing intersection is four-legged with signals on the northbound, westbound, and southbound legs. The northbound and southbound legs consist of two through lanes. The northbound leg has a dedicated left-turn lane, and the southbound leg has a dedicated right-turn lane. The existing westbound off-ramp has a shared left-through lane and a dedicated right turn lane that becomes an added lane for northbound SR 267. Construction has begun that includes modifying the westbound off-ramp right turn lanes. Both lanes, once built, will be controlled by a traffic signal.

I-70 AND STATE ROAD 267 EASTBOUND RAMPS – This existing intersection is four-legged with signal control on the northbound, eastbound, and southbound legs. The northbound leg consists of two through lanes. The northbound right turn splits off on an auxiliary ramp approximately 0.33 miles upstream of the signal. The southbound leg consists of a dedicated left-turn lane, a shared left-through lane, and an exclusive through lane. The eastbound off-ramp consists of a single lane from which all movements are made.

OLD STATE ROAD 267 AND CAMBY ROAD – This existing intersection is four-legged with stop signs on the eastbound and westbound legs. The northbound and southbound legs consist of one through lane and a dedicated left turn lane while the eastbound and westbound legs are both single lane approaches. The intersection is approximately 0.5 miles south of the I-70 and State Road 267 Eastbound Ramps intersection. Intersection improvements are currently under design for this intersection that will add a traffic signal, a dedicated southbound right turn lane, two dedicated eastbound left turn lanes and one dedicated eastbound right turn lane.

OLD STATE ROAD 267 AND COUNTY ROAD 750 EAST/CENTER STREET – This existing intersection is three-legged with stop control on the westbound leg. The northbound leg has a thru-lane and a dedicated right-turn lane. Both the westbound and southbound legs are single lane. This intersection is approximately 0.9 miles southwest from the State Road 267 and Camby Road intersection.

OLD STATE ROAD 267/CENTER STREET AND EAST HENDRICKS COUNTY ROAD – This existing intersection is four-legged with stop signs on the eastbound and westbound legs. All legs are single lane approaches, and the intersection is located approximately 1.5 miles south of the State Road 267 and County Road 750 East intersection.



SOUTH COUNTY ROAD 600 EAST/MOON ROAD AND EAST COUNTY ROAD 600 SOUTH/HADLEY ROAD – This existing intersection is four-legged with stop control on all approaches. The approaches are all single-lane, and the intersection is located 2.5 miles west of the State Road 267 and Hadley Road intersection. This intersection is scheduled to be converted to a roundabout in 2021.

SOUTH COUNTY ROAD 600 EAST/HADLEY ROAD AND SOUTH CENTER STREET – This existing intersection is a four-legged multi-lane roundabout. The eastbound and westbound legs are two-lane while the northbound and southbound are single lane. The intersection is located 1 mile west of the State Road 267 and Hadley Road intersection.

3.3 DRAINAGE STRUCTURES

The West Fork of White Lick Creek and its tributaries run throughout the project area. Drainage and hydraulic needs will not be fully known until an alignment for the corridor is determined. Regardless of the corridor recommendation, a connection to US 40 near Miles Road to accommodate a northern connection through Hendricks County will require a bridge over the West Fork of White Lick Creek. Some corridor alignments would require additional crossings of the West Fork of White Lick Creek and/or its tributaries, necessitating large culverts or bridges.

3.4 EXISTING UTILITIES

Coordination has begun with utilities having facilities in the project limits. There are a variety of utility facilities surrounding the intersection and located within the study limits. The purpose of the utility coordination efforts for this study is to discover any potential significant impacts to utility facilities which would result in unusual or extraordinary costs to the utility company or to the project. These types of impacts also need to be factored when determining construction schedules. A summary of the initial coordination follows:

- **AT&T-Distribution** has facilities throughout the area of the corridor study. These facilities consist of copper and fiber optic cables buried in conduit and directly buried into the ground at a depth of 24 to 36 inches in depth. They also have aerial facilities consisting of copper and fiber optic cables.

- **Brighthouse (Spectrum)** has fiber facilities on Moon Road (County Road 600 East) from Palomino Boulevard continuing north of US 40.
- **Citizens Energy (Water)** has determined through review of the GIS data there are no Citizen-owned water facilities within the project limits. Citizens Energy has no existing water mains and associated hydrants and valves within the project limits.
- **Clay County Telephone (Endeavor)** has not yet responded to the request for information.
- **Comcast** has coaxial and fiber optic facilities to commercial and residential properties along Moon Road from Bitternut Lane to US 40.
- **Communications TDS Telecom** has facilities bounded by E County Road 700 S to the north, S County Road 525 E to the east, I-70 to the south and S County Road 375 E to the west.
- **Duke Energy** has distribution facilities consisting of 12-kV overhead and underground facilities within the project limit. They have facilities that consist of both transmission and distribution facilities, only the distribution side has responded to this request.
- **Hendrick County Power Cooperative (Electrical)** has overhead and underground facilities within the project limits. Electronic drawings of the utility grid have been provided.
- **Hendrick County Power Cooperative (Fiber)** these facilities are located on the same facilities as the electrical facilities.
- **Indianapolis Power & Light** has a 345-kV transmission facility in the southern area of the study limits. The IPL transmission line crosses S. County Road 600 E north of E. County Road 750 S, crosses E County Road 750 S west of S County Road 600 E. The transmission line crosses Interstate 70 east of S. County Road 525 E. IPL distribution is outside of the study area and will not be involved.
- **New Wave Communications** has no facilities within the study area.
- **(Town of) Plainfield Utilities** has sanitary, storm and water facilities within the project limits. An electronic drawing layout of these facilities has been provided. Water facilities include water main, fire hydrants, water meters and service lines. The Town's utilities west of Moon Road are primarily only in the subdivisions.
- **Tallgrass Energy – Rockies Express Pipeline** has a pipeline facility that enters the traffic corridor study area north of E County Road 850 S then travelling in southeasterly direction where it crosses E County Road 850 S approximately 1000 feet east of S County Road 425 E continuing southeasterly where it crosses Interstate 70 approximately 4000 feet west of S County Road 525 E continuing past the town of Joppa.
- **Vectren** has a high-pressure transmission pipeline running along Moon Road the entire length of the study area from south of I – 70 to north of US 40. Vectren will need to approve any construction over the high pressure or transmission pipelines. There are multiple switching and pumping stations along Moon Road.

Vectren has multiple distribution facilities within the study are servicing both residential and commercial properties.

- **Windstream** has an underground facility along SR 39 from US 40 to South of County Road 800 S, then east along County Road 750 S (alignment and roadway) to Moon Road, then north along Moon Road to the alignment of Ruby Street extended turning east to Interstate 70.

All correspondence with utility companies is included in ***Appendix G – Early Utility Coordination***.

4.0 PUBLIC ENGAGEMENT AND INVOLVEMENT

Once existing features were identified based on available databases, public engagement began to get local knowledge of additional features and concerns not uncovered during a review of available databases. The Town of Plainfield recently conducted a series of public engagement activities during the development of the Town's Thoroughfare Plan update, but the intent of the Thoroughfare Plan was to show the impacts of an interchange and corridor connection to US 40 on the overall transportation system rather than identifying a specific corridor and location for an interchange. Because the interchange and connector corridor would impact many property owners in Hendricks County and the Town of Plainfield, more extensive public engagement sessions were conducted to gain local insight, provide opportunities for the public to voice concerns, and provide a conduit to keep property owners and Town residents updated on the progress of the study. The public was engaged through three separate types of meetings: public open houses, community advisory committee meetings and stakeholder workshops. Additionally, a project website and project email were established to provide opportunities for those unable to attend to view project documents, providing them an avenue to submit feedback and still engage in the study.

4.1 PUBLIC OPEN HOUSES

Three public open houses were planned for this study to provide the entire community an opportunity to provide input and to stay updated on the status of the study. The first open house was held in December 2019. The intent at this first open house was to gain an understanding of the area, identify areas of concern to bear in mind, and gather suggestions for locations for a proposed interchange and a connector corridor. Over two hundred members of the community attended the first open house. There was strong concern and opposition voiced by the community regarding land use, disturbing the natural terrain, and the location of what many believed had already been set as the corridor and interchange location.

A second open house was held in September 2020 with both in-person and online formats to engage the community. Between both formats, approximately 120 individuals participated. An overview of scenario planning, three primary alignments, and other project updates were presented. Corridor right of way and land use surrounding a

proposed corridor continued to be recurring topics of conversation and query. The input from the public was also used to validate and finalize the performance measures for the analysis.

A final public open house was held in April 2021 again with both in-person and online formats to engage the community. The results of the analysis and the recommended corridor alignment were presented to those attending, along with a quick review of the process followed. Between both formats, approximately 140 individuals participated. Construction schedule, land use surrounding the corridor, and a desire to maintain a rural context to the area were prevalent topics of comment and query. A summary of the comments for all three open houses may be found in ***Appendix B – Public Comment Summary***.

4.2 COMMUNITY ADVISORY COMMITTEE (CAC)

A community advisory committee (CAC) was established to assist the project team in reviewing comments provided through the public engagement opportunities. Representatives from the Town of Plainfield, Hendricks County, Morgan County, emergency services, area school districts, local business owners, and residents made up the CAC.

The Committee met in August 2020 to review feedback received from the first public open house and provide additional insight on what they have heard regarding the study in their respective community circles. A second Committee meeting was held in September 2020 following the second public open house. The Committee reviewed and discussed comments received during the open house. Scenarios for potential futures of Plainfield were reviewed to make sure they captured the spectrum of possible futures for Plainfield (more discussion on this in Section 8.0).

A final CAC meeting was held in March 2021 prior to the release of the draft corridor study report. The Committee reviewed the final recommendations and provided comments on what questions and concerns to expect from the public based on the final recommendations.

4.3 STAKEHOLDER WORKSHOPS

Separate from the CAC, stakeholder workshops were held with specific community focus groups in the community to garner perspective from similarly interested parties regarding the study. Separate meetings were held for business owners, community leaders, and residents. While multiple stakeholders voiced concerns with aspects of alternatives specific to their interests, there was consensus amongst all stakeholders that Plainfield would continue to grow and push west, necessitating some sort of corridor to be built at a point in the future.

5.0 CORRIDOR ALTERNATIVES

As noted previously in this report, the intent of this study was to consider all corridor alternatives. To that end, the project team began the public engagement by showing study area maps with no potential alternatives shown, only some identified environmental resources. From there, the development of alternative alignments began.

5.1 INITIAL DEVELOPMENT

At the first public open house, attendees were asked to identify local features or areas of concerns. As those locations were noted on maps, the project team asked individuals to draw on aerial exhibits where they thought a corridor would make the most sense. The open house attendees drew multiple alignments across the study area. Multiple points of connection to both US 40 and I-70 were indicated by the sketches. Along with some corridor sketches from members of the project team conducting a similar exercise as the public, a starting point for identifying potential corridors was established.

The hand sketches from the first public open house were coalesced into 15 unique alignments. The initial 15 corridor alignments may be seen in **Figure 3** and in ***Appendix A – Project Graphics***.

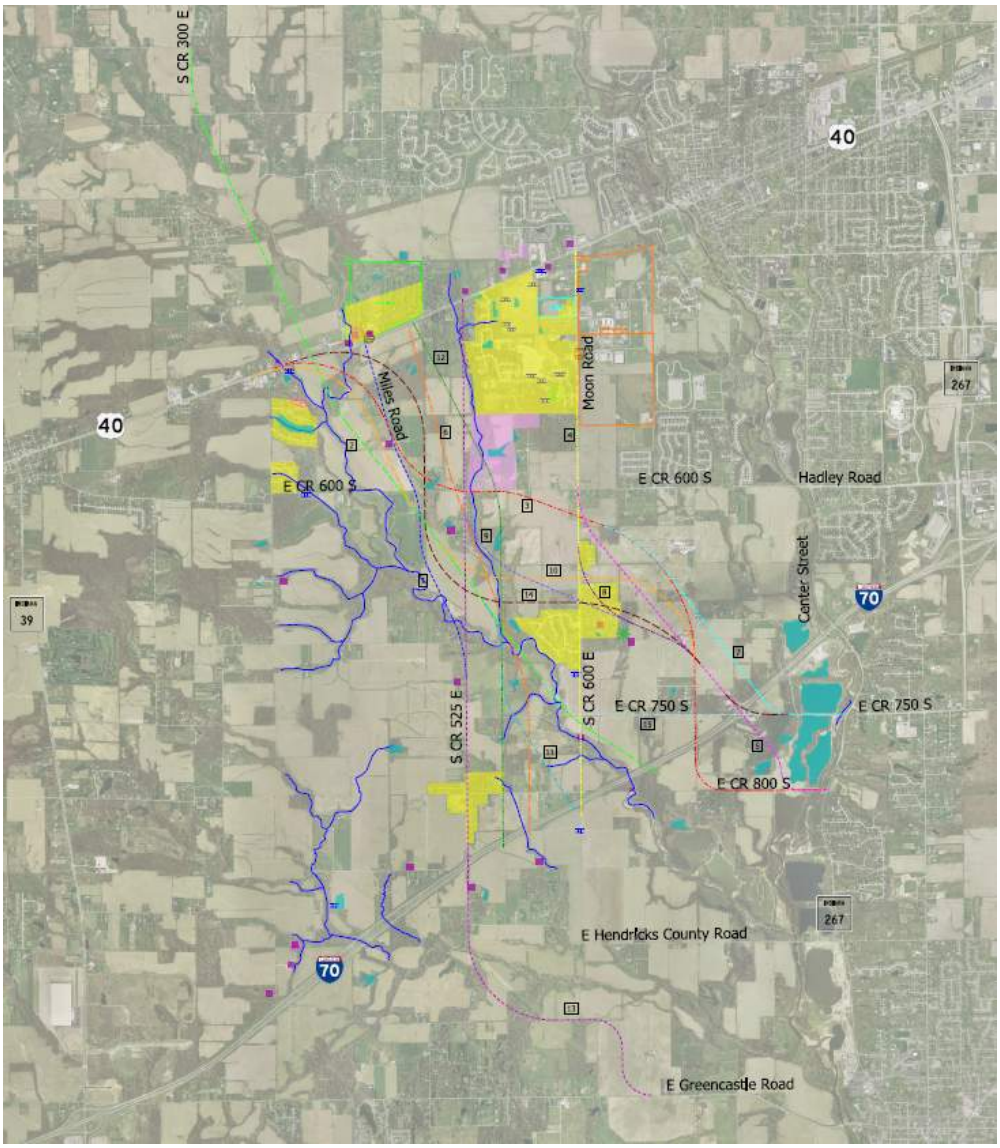


FIGURE 3 - INITIAL PUBLIC OPEN HOUSE CORRIDOR SKETCHES

5.2 REFINING AND DEFINING

High level environmental and engineering scans were used to better define the corridors identified during the first open house. Road design principles, environmental impacts, right of way impacts and waterway crossing/impacts, among others, were applied to refine corridors in an effort to define alignments that were more practical from an engineering perspective. These criteria were mostly high-level representations of the performance measures used in the final analysis and recommendation. **Figure 4** shows the refined corridors. The exhibit may also be found in ***Appendix A – Project Graphics***.

Initially, a corridor extending the length of CR 600 E/Moon Road from I-70 to US 40 was presented. The density of existing development, proximity of multiple utility facilities, and

lack of regional connectivity opportunities led the project team (with concurrence from the Town of Plainfield and Hendricks County) to eliminate any corridors along CR 600 E/Moon Road north of Hadley Road.

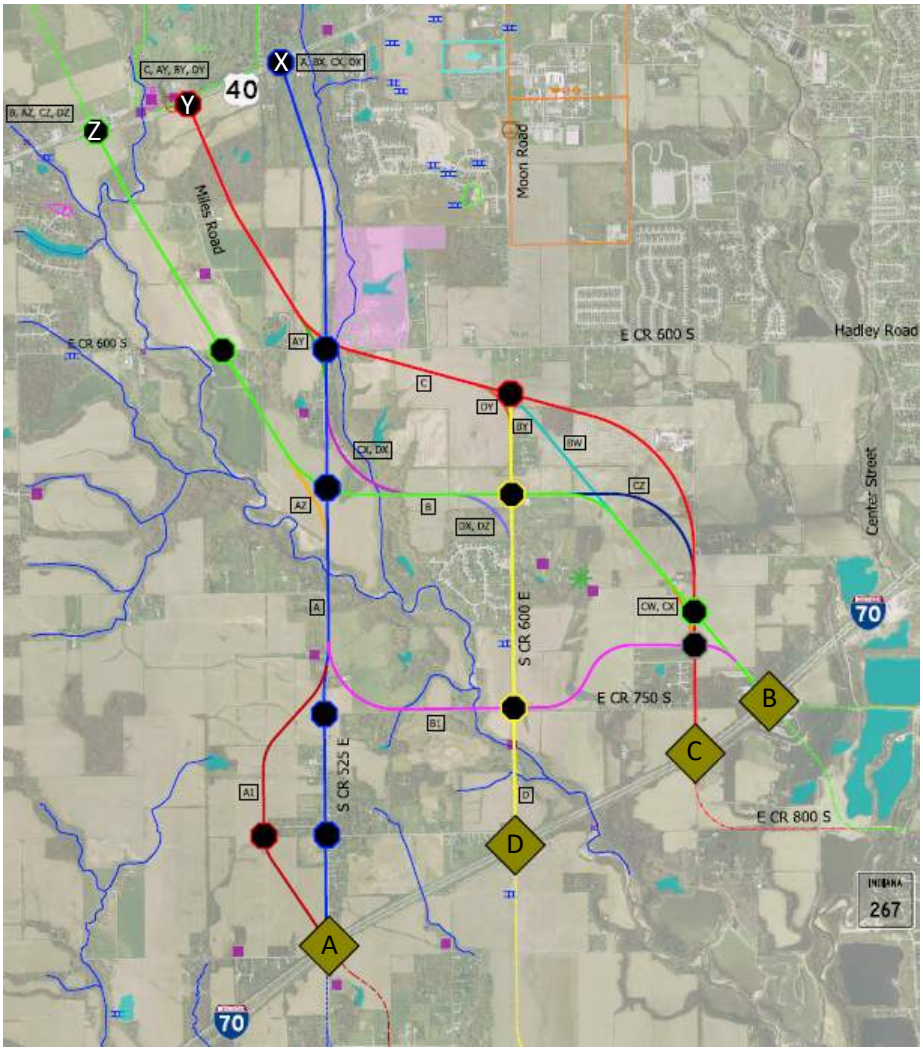


FIGURE 4 – REFINED CORRIDOR SKETCHES

After refining the alignments, further evaluation was needed to reduce the number of alignments for detailed analysis to a more representative sample. Three alignments were moved forward for detailed analysis that would capture the whole range of results encountered by analyzing all the refined alternatives. The retained alignments included Alignments AZ, B and DX. Exhibits of the three alignments may be found in ***Appendix A – Project Graphics***. These three alignments represent the "bookends" and a central option that are representative of the range of results possible. Variations of these alignments are being presented for context, but those variations provide operational results that fall within the range of the three alignments retained for more in-depth analysis.

6.0 TRAFFIC DATA AND CAPACITY ANALYSIS

While the alignment development was happening, traffic data collection was also occurring. Available existing traffic data was located and needed traffic data identified. An analysis framework document was developed that identified the sources of data to be used, how the analysis would be conducted, and some of the performance measures to be analyzed. Concurrence was attained on the framework document prior to commencing the analysis portion of the study to ensure the study was conducted in a manner acceptable to INDOT and FHWA.

6.1 TRAFFIC DATA

Traffic data used for the study was compiled in a variety of methods. Due to the large study area, multiple forms of traffic data collection were utilized. Data collection for the turning movements of the study intersections were calculated in the following methods:

- INDOT Traffic Counts & Forecasting Documents: I-70 Ramps at SR 267, SR 267 at Camby Road, SR 267 at Hadley Road, SR 267 at US 40, SR 39 at US 40, and US 40 at Center Street. The count year for the intersections varied (2011 to 2018) and were projected using a calculated growth percentage to the existing year 2019. INDOT growth factors and seasonal factors were applied to all volumes.

- WSP Report “Final Interstate Access Request at I-70 and SR 39”: I-70 Ramps at SR 39, SR 39 at TA Travel Center/CR 1000S, SR 39 at CR 1000S/Koger Street, and SR 39 at Innovation Blvd. The turning movement volumes were taken from the Synchro reports and are from the year 2018 and were projected using a calculated growth percentage to the existing year 2019.

- 2017 TransCAD AADTs: US 40 at Miles Road, US 40 at Moon Road, Moon Road at Hadley Road, Center Street at Hadley Road, SR 267 at Black Rock Road, SR 267 at E. Hendricks Road. AADTs by movement were taken from the Town of Plainfield’s travel demand model (TDM). Peak hour movements were derived by using the forecasting documents of adjacent intersections to calculate the percentage of traffic during the peak hours. The 2017 volumes were projected using a calculated growth percentage to the existing year 2019.

- TCDS website counts: I-70. The count volumes are from 2019.

If this study were being conducted for preliminary engineering/design processes, actual traffic counts would have been conducted at key locations and intersections. Because this study is more planning in nature, it is meant to prove an appropriate and acceptable concept, and there were a few recent INDOT traffic counts done within the study area, INDOT concurred with using recent counts and the Town’s travel demand model to develop turning movements and growth rates. Once a project is intended to progress into design, new traffic counts will be needed to develop appropriate roadway geometry.

The annual growth rate percentages for the study network were calculated by comparing the 2017 existing travel demand model AADTs from TransCAD and the 2045 No Build TransCAD AADTs. An annual growth rate of 0.75% was calculated for the I-70 corridor; 2.0% for SR 39, US 40, and SR 276; and 4.0% for the local roads. Most of these growth rates are higher than usually seen for an extended time. INDOT typically sees growth rates between 0.5% - 1.5%. Once detailed design is commenced, it is recommended that annual growth rates be reassessed to be more in line with typical growth rates seen by INDOT. For the purposes of this study, though, the growth rates that will be used are as follows: 0.75% for the I-70 corridor; 1.0% for SR 39, US 40, and SR 276; and 1.5% for the local roads. This brings growth rates more in line with what would be expected.

6.2 CAPACITY ANALYSIS (EXISTING CONDITIONS)

A detailed operational analysis was conducted to assess the capacity of the existing roadway network. The I-70 corridor was analyzed using VISSIM 2020-00.02. The surrounding local roadways were analyzed using Synchro 10 and the roundabout at Hadley Road and Center Street was analyzed using SIDRA Intersection 8.0. Highway Capacity Manual (HCM) 6 default values were used for modeling traffic behavior. Existing turning movement volumes were input into the software to analyze the existing 2019 conditions. Level of service, average delays, queue lengths, and travel time were compiled into output files to summarize the results.

The VISSIM microscopic simulation network was set up to include I-70, interchanges, and the first major intersection in either direction along crossing roads at interchanges. The major intersections were either the first signalized intersection, an intersection near the interchange, or the closest intersection to the interchange. This was done to capture any effects on arrival patterns at the interchange ramp termini those intersections may create.

The capacity analysis does reflect the current improvements being built at the I-70 and SR 39 interchange to convert the interchange to a diverging diamond (DDI) configuration. Improvements not reflected in the analysis include: future intersection improvements at Hadley Road and Moon Road (roundabout), SR 267 and Camby Road intersection improvements (traffic signal, added lanes) and I-70 auxiliary lane improvements between Ronald Reagan Parkway and SR 267 (inclusive of ramp alternations for the westbound off-ramp to SR 267).

Intersection performance was analyzed as a mobility measure of effectiveness. The performance criteria set forth in the HCM 6th Edition for signalized, unsignalized and roundabout intersections were used to analyze intersection delay and provide a level-of-service (LOS) for the results of the VISSIM, Synchro, and SIDRA analyses. **Table 2** below shows the intersection results for the VISSIM analysis and **Table 3** below shows the intersection results of the Synchro and SIDRA analysis. Per the Indiana Design Manual Section 40-2.04, the minimum LOS in an urban area is LOS D and in rural areas is LOS C.

TABLE 2 - VISSIM EXISTING 2019 INTERSECTION RESULTS

Intersection	AM		PM	
	LOS	Delay (s)	LOS	Delay (s)
I-70 and SR 39 EB Ramp	A	6.9	A	7.3
I-70 and SR 39 WB Ramp	B	10.7	B	11.0
SR 39 and Koger St / CR 1000 S	A	7.4	B	12.8
I-70 and SR 267 EB Ramp	C	27.3	B	19.8
I-70 and SR 267 WB Ramp	A	3.9	B	13.5
SR 267 and Hadley Rd	C	31.3	F	89.7
SR 39 and CR 1000 S / Greencastle Road	C	17.5	B	13.6

TABLE 3 - SYNCHRO/SIDRA EXISTING 2019 INTERSECTION RESULTS

Intersection	AM		PM	
	LOS	Delay (s)	LOS	Delay (s)
US 40 & SR 39	B	13.3	B	15.7
US 40 & Miles Rd	NB: C	NB: 16.9	NB: D	NB: 25.4
US 40 & Moon Rd	C	31.4	C	29.7
US 40 & Center St	C	28.9	D	43.5
US 40 & SR 267	D	41.2	D	41.2
Old SR 267 & Camby Rd	EB: F WB: D	EB: 139.0 WB: 29.3	EB: F WB: C	EB: 270.5 WB: 21.2
Center Street & Old SR 267	WB: C	WB: 18.3	WB: C	WB: 22.1
Center Street & Hendricks County Rd	EB: C WB: C	EB: 24.4 WB: 18.0	EB: D WB: C	EB: 34.2 WB: 17.1
Hadley Rd & Moon Rd	A	9.8	B	14.0
Hadley Rd & Center St	A	6.7	A	8.4

The results in the table confirm congestion is present at various intersections surrounding I-70 roadway network. In the existing condition, intersections such as SR 267 at Hadley Road and Old SR 267 at Camby Road are already resulting in failed levels of service and significant delays, especially in the PM Peak Hour. These are intersections that have been noted by locals as having existing congestion. The delays at these intersections, which are near I-70, may have a negative impact on the operations of the SR 267 interchange at I-70 as traffic volumes continue to grow. Additionally, a few other intersections are experiencing LOS D during one or both peak hours, which is acceptable in urban areas per the Indiana Design Manual but does indicate minor disruptions in the traffic stream have the ability to cause substantial delays.

The average and maximum queue lengths at the intersections in VISSIM were also output as a method of measurement during analysis. Below are the results of the 2019 existing queue lengths. The length and spacing of an average vehicle is approximately 25 feet.

TABLE 4 - VISSIM EXISTING 2019 QUEUE RESULTS

Location	2019 Existing			
	Average Queue Lengths (ft)		Maximum Queue Lengths (ft)	
	AM	PM	AM	PM
I-70_SR39_EB Ramps EBL	1	2	68	96
I-70_SR39_EB Ramps EBR	0	1	48	73
I-70_SR39_EB Ramps NBT	16	16	106	114
I-70_SR39_EB Ramps SBT	1	8	46	131
I-70_SR39_WB Ramps WBL	1	10	61	158
I-70_SR39_WB Ramps WBR	2	14	76	148
I-70_SR39_EB Ramps NBT	1	3	70	92
I-70_SR39_EB Ramps SBT	22	26	160	175
SR39_KogerSt EB	12	21	138	134
SR39_KogerSt WBL	42	53	169	263
SR39_KogerSt WBTR	38	53	162	263
SR39_KogerSt NBL	2	21	126	292
SR39_KogerSt SBL	6	21	109	166
I70_SR267_EB Ramps EBT	55	54	316	293
I70_SR267_EB Ramps EBR	39	34	315	282
I70_SR267_EB Ramps NBT	69	51	275	227
I70_SR267_EB Ramps SBL	58	43	292	396
I70_SR267_EB Ramps SBT	57	43	292	396
I70_SR267_WB Ramps WB	12	69	80	267
I70_SR267_WB Ramps NBL	2	5	93	147
SR267_Hadley Rd EBL	105	51	465	200
I70_SR267_WB Ramps NBT	3	7	94	147
I70_SR267_WB Ramps SB	13	72	269	496
SR267_Hadley Rd EBT	106	51	466	201
SR267_Hadley Rd EBR	116	32	510	239
SR267_Hadley Rd WBL	44	816	148	852
SR267_Hadley Rd WBT	44	817	150	853
SR267_Hadley Rd WBR	4	857	149	894
SR267_Hadley Rd NBL	143	619	462	1297

TABLE 4 – VISSIM EXISTING 2019 QUEUE RESULTS (CONT.)

Location	Average Queue Lengths (ft)		Maximum Queue Lengths (ft)	
	AM	PM	AM	PM
SR267_Hadley Rd NBT	144	620	463	1298
SR267_Hadley Rd NBR	111	529	491	1336
SR267_Hadley Rd SBL	52	189	231	477
SR267_Hadley Rd SBT	49	188	230	476
SR267_Hadley Rd SBR	13	132	203	471
SR 39 at CR 1000 S EB	1	0	56	42
SR 39 at CR 1000 S WBTL	8	1	120	55
SR 39 at CR 1000 S WBR	8	1	121	56
SR 39 at CR 1000 S NBL	0	0	22	30
SR 39 at CR 1000 S SBL	1	0	75	32

The average queue lengths indicate that congestion is present at the SR 267 and Hadley Road intersection sees congestion, with queues lasting more consistently through the PM peak hour. Two out of the four approaches have queues that do not fully clear in one cycle. Some longer maximum queues develop at the SR 267 and I-70 interchange ramp termini but on average over the peak hours, queues are manageable.

With the improvements currently being built at the I-70 and SR 39 interchange, queue lengths are very manageable and are reflected by the adequate levels-of-service at that interchange. Maximum queues experienced are under 200' in length (or less than approximately 10 vehicles).

6.3 UNINTERRUPTED FLOW EXPRESSWAY ANALYSIS (EXISTING CONDITIONS)

Interstate 70 capacity performance was evaluated using two measures of effectiveness: travel time and density/LOS. Density is a more appropriate measure for uninterrupted flow facilities such as the interstate system and is used to develop a LOS for the facility.

VISSIM was used to analyze the average travel time eastbound on I-70 from west of the SR 39 interchange to east of the SR 267 interchange. Average travel times for I-70 eastbound and westbound were measured in minutes per vehicle. The travel time results are shown in **Table 5**.

TABLE 5 - VISSIM EXISTING 2019 TRAVEL TIME RESULTS

I-70 Travel Time Results	AM	PM
Eastbound Avg. Travel Time (min/veh)	8.1	8.1
Westbound Avg. Travel Time (min/veh)	8.1	8.4
Eastbound Avg. Travel Speed (mph)	70.7	71.1
Westbound Avg. Travel Speed (mph)	70.8	68.8

The travel time results show travel speeds in line with posted speed limits within the study area. Average speed data was not available from INDOT to confirm travel speeds because this study was not commissioned/funded by the State of Indiana. Westbound I-70 has a slight reduction in travel speed, indicative of increasing traffic volumes and congestion on westbound I-70 noted by residents. As volumes continue to increase by the design year, the travel time will continue to increase, and the average travel speeds will decrease.

This section details the operation of I-70 at the various existing interchange ramps and expressway sections in between ramps. I-70 was divided into basic, on-ramp, and off-ramp sections. The division of the expressway was performed in accordance with the Highway Capacity Manual 6th Edition (HCM) segment definitions. The Highway Capacity Software (HCS7) was used to analyze the operation of I-70 and the merge/diverge areas at the ramps for both the AM and PM peak hour volume. **Table 6** below provides a description of the segments analyzed.

TABLE 6 - HCS SEGMENT DESCRIPTIONS

Eastbound			Westbound		
Segment	**Segment Type**	**Description**	**Segment**	**Segment Type**	**Description**
1	Off-Ramp	I-70 EB at SR 39	**14**	Off-Ramp	I-70 WB at SR 267
2	Basic	I-70 EB btwn SR 39 Ramps	**15**	Basic	I-70 WB btwn SR 267 Ramps (3 Lanes)
3	On-Ramp	I-70 EB at SR 39	**16**	Basic	I-70 WB btwn SR 267 Ramps (3 Lanes)
4	Basic	I-70 EB btwn SR 39 & Rest Stop	**17**	On-Ramp	I-70 WB at SR 267
5	Off-Ramp	I-70 EB at Rest Stop	**18**	Basic	I-70 WB btwn SR 267 & Rest Stop
6	Basic	I-70 EB btwn Rest Stop Ramps	**19**	Off-Ramp	I-70 WB at Rest Stop
7	On-Ramp	I-70 EB at Rest Stop	**20**	Basic	I-70 WB btwn Rest Stop Ramps
8	Basic	I-70 EB btwn Rest Stop & SR 267	**21**	On-Ramp	I-70 WB at Rest Stop
9	Off-Ramp	I-70 at SR 267	**22**	Basic	I-70 WB btwn Rest Stop & SR 39
10	Basic	I-70 EB btwn SR 267 Ramps (2 Lanes)	**23**	Off-Ramp	I-70 WB at SR 39
11	Basic	I-70 EB btwn SR 267 Ramps (2 Lanes)	**24**	Basic	I-70 WB btwn SR 39 Ramps
12	On-Ramp	I-70 EB at SR 267 CD	**25**	On-Ramp	I-70 WB at SR 39
13	On-Ramp	I-70 EB at SR 267			

The primary performance measure used by the HCM to provide a Level of Service (LOS) for expressway segments is average traffic density. Although speed is a major indicator of the quality-of-service to drivers, freedom to maneuver within the traffic stream and

proximity to other vehicles are equally important indicators. Both are related to the density of the traffic stream. The ranges of density used to define the LOS are described by the HCM. **Table 6** summarizes uninterrupted flow operations for I-70 existing conditions during the morning and evening peak hours.

TABLE 7 - HCS EXISTING 2019 OPERATIONS ANALYSIS

Eastbound				Westbound			
Segment	Segment Type	AM Avg Density (pc/mi/ln) & LOS	PM Avg Density (pc/mi/ln) & LOS	Segment	Segment Type	AM Avg Density (pc/mi/ln) & LOS	PM Avg Density (pc/mi/ln) & LOS
1	Off-Ramp	11.4 - B	15.0 - B	**14**	Off-Ramp	12.8 - B	26.4 - D
2	Basic	9.1 - A	10.1 - A	**15**	Basic	7.9 - A	15.4 - B
3	On-Ramp	14.7 - B	16.7 - B	**16**	Basic	11.9 - B	23.3 - C
4	Basic	16.9 - B	15.6 - B	**17**	On-Ramp	13.9 - B	27.9 - C
5	Off-Ramp	17.9 - B	17.1 - B	**18**	Basic	12.8 - B	25.6 - C
6	Basic	16.1 - B	14.6 - B	**19**	Off-Ramp	14.2 - B	27.5 - D
7	On-Ramp	19.7- B	17.0 - B	**20**	Basic	12.8 - B	25.5 - C
8	Basic	16.8 - B	15.5 - B	**21**	On-Ramp	13.8 - B	27.7 - C
9	Off-Ramp	17.9 - B	17.2 - B	**22**	Basic	15.1 - B	22.3 - C
10	Basic	15.6 - B	12.6 - B	**23**	Off-Ramp	16.7 - B	25.3 - C
11	Basic	10.4 - A	8.4 - A	**24**	Basic	12.1 - B	14.1 - B
12	On-Ramp	12.3 - A	7.4 - A	**25**	On-Ramp	14.6 - B	17.0 - B
13	On-Ramp	18.9 - B	13.3 - B				

Like the travel time results, congestion and traffic stream instability is forming on westbound I-70 during the PM Peak Hour. The SR 267 westbound off ramp and the westbound rest stop ramp are operating at LOS D, which is still considered acceptable since they are in an urban area. Also, in the PM peak hour, multiple other segments are operating at densities close to or approaching the threshold of LOS D, indicating during peak times that traffic operations are degraded, and minor incidents can cause significant queuing.

6.4 CAPACITY ANALYSIS (2045 DESIGN YEAR CONDITIONS)

The traffic volumes were projected to the design year of 2045 using the previously noted growth rates, and a detailed operational analysis was conducted to assess the capacity of the current roadway configuration with the expected growth in the project area. The capacity results for the 2045 design year can be found below.

TABLE 8 - VISSIM 2045 INTERSECTION ANALYSIS RESULTS

Intersection	2045 No Build				2045 Build Alignment AZ				2045 Build Alignment DX				2045 Build Alignment B			
	AM		PM		AM		PM		AM		PM		AM		PM	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
I-70 and SR 39 EB Ramp	A	8.3	A	8.1	B	12.0	A	7.8	B	11.6	A	9.4	B	10.2	A	7.8
I-70 and SR 39 WB Ramp	B	11.0	B	12.3	B	12.6	B	11.3	B	11.3	B	11.7	B	11.3	B	11.9
SR 39 and Koger St / CR 1000 S	A	9.6	B	16.9	A	9.1	A	9.4	A	9.4	B	11.7	A	9.7	A	9.3
I-70 and SR 267 EB Ramp	C	30.5	C	25.0	C	31.0	C	25.5	C	31.1	D	46.9	C	32.4	C	24.5
I-70 and SR 267 WB Ramp	A	5.6	C	29.8	A	5.6	C	21.0	A	8.7	C	33.1	B	10.3	C	23.7
SR 267 and Hadley Rd	D	49.9	F	153.5	E	73.9	F	143.3	F	83.9	F	152.8	F	84.1	F	156.0
SR 39 and CR 1000 S / Greencastle Road	D	32.5	C	18.1	E	43.3	C	19.8	F	51.9	C	20.8	E	45.4	C	22.0
I-70 and New Interchange EB Ramp					B	18.4	B	17.5	B	15.4	B	15.0	C	22.2	B	14.5
I-70 and New Interchange WB Ramp					B	12.3	B	12.8	B	14.1	B	16.1	B	14.4	C	29.0

Per Indiana Department of Transportation (INDOT) standards, LOS D and above is acceptable in urban areas while LOS C and above is acceptable in rural areas. Using those thresholds, the SR 267 corridor from I-70 to Hadley Road operates below acceptable levels regardless of the alternative including the No Build alternative. None of the connector corridors creates enough traffic diversion to alleviate the congestion experienced along the SR 267 corridor. Similarly, the intersection of SR 39 and CR 1000 S south of the interchange at I-70 also does not meet INDOT level-of-service standards. This intersection is being improved with the current construction but is remaining stop controlled. As the area continues to develop, a traffic signal warrant will likely be met, improving the intersection's operations to an acceptable level.

In all build alternatives, the new interchange ramp termini operate at a LOS in an acceptable range. A standard diamond configuration was used with signal-controlled ramp termini and dual westbound right turn lanes. The connector corridor was modeled with two lanes in each direction of travel to mimic the expected full build-out of the corridor. The intent was to show proof of concept, not to finalize the interchange geometry. Different geometric configurations may improve traffic operations at the ramp termini. Depending on the availability of funding and traffic volumes at the time of construction, the connector corridor could potentially be phased in, paving only two lanes until the additional travel lanes are needed.

The average queue lengths reiterate the need for capacity improvements at SR 267 and Hadley Road. When queues average such length (over 1000' > 40 cars), significant delay is occurring in the network. These queues extend past the length of the turn bays for turning traffic, which impacts the flow of through traffic on northbound SR 267. The congestion on northbound SR 267 causes traffic to back up on the I-70 westbound off-ramp out onto the I-70 travel lanes. The weave of traffic from the off-ramp to the northbound left turn lane on SR 267 at Hadley Road compounds the issue as will be shown in the build alternative travel time results.

In addition to the I-70 corridor, other intersections within the town limits were evaluated where traffic pattens may change. The operational analysis results for those intersections may be found in Table 9.

TABLE 9 - SYNCHRO/SIDRA 2045 NO BUILD INTERSECTION RESULTS

Intersection	2045 No Build				2045 Build Alignment AZ				2045 Build Alignment DX				2045 Build Alignment B			
	AM		PM		AM		PM		AM		PM		AM		PM	
	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)
US 40 & SR 39	B	12.3	C	28.6	B	16.5	F	332.2	C	29.1	F	382.5	C	20.6	D	53.2
US 40 & Miles Rd	NB: F	NB: 163.7	NB: F	NB: 894.1	B	12.5	C	20.3	C	33.8	E	76.1	B	17.7	F	140.4
US 40 & Moon Rd	D	50.4	E	65.3	F	106.0	F	143.6	F	122.0	F	178.2	F	124.9	F	152.2
US 40 & Center St	F	184.4	F	343.0	F	432.5	F	1013.5	F	469.5	F	537.8	F	493.2	F	534.8
US 40 & SR 267	E	87.6	F	408.3	F	215.4	F	629.6	F	241.0	F	491.2	F	260.5	F	474.6
Old SR 267 & Camby Rd	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error
Center Street & Old SR 267	WB: F	WB: Error	WB: F	WB: Error	WB: F	WB: Error	WB: F	WB: Error	WB: F	WB: Error	WB: F	WB: 733	F	106.3	WB: F	WB: 917
Center Street & Hendricks County Rd	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error	EB: F WB: F	EB: Error WB: Error
Hadley Rd & Moon Rd	F	152.6	F	297.6	B	10.0	B	12.2	B	10.8	C	16.1	B	13.6	D	34.3

*Errors indicate operations were so severely hampered by high traffic volumes that an error instead of delay was provided in the results.

The intersection performance results show that if no alignment, capacity, access control, or intersection control changes are implemented, congestion issues will worsen as traffic volumes increase. The No Build scenario shows degrading operations and unstable flow as traffic volumes increase, and many of the project intersections begin to operate at unacceptable levels of service. This is also seen in all three Build scenarios. The errors in Table 9 from Synchro indicate that the existing intersection became overwhelmed with the traffic growth out to the design year and operations were so severely hampered the software reported an error instead of providing delay results. This is not surprising given the significant growth expected to continue to occur in and around Plainfield over the next 25 years.

Intersection traffic control and geometric configurations were not altered between No Build and Build scenarios except for the US 40 and Miles Road intersection. This was done to determine if changes in traffic patterns improved operations at other intersections. US 40 and Miles Road was improved in the build scenarios to account for the new connector corridor with two through lanes each direction, a dedicated left turn lane and signal control. Additional geometric considerations to further improve performance were not conducted as it was not the intent of the study.

The average queue lengths at the intersections along the I-70 corridor modeled in VISSIM for the 2045 design year are shown below in **Table 10**. The queues along SR 267 reinforce the growing congestion along the SR 267 corridor. Maximum queues may be seen in **Appendix C – Traffic Capacity Analysis**.

TABLE 10 - VISSIM 2045 QUEUE RESULTS

Location	2045 No Build		2045 Build Align AZ		2045 Build Align DX		2045 Build Align B	
	Average Queue Lengths (ft)		Avg Queue Lengths (ft)		Avg Queue Lengths (ft)		Avg Queue Lengths (ft)	
	AM	PM	AM	PM	AM	PM	AM	PM
I-70_SR39_EB Ramps EBL	1	3	0	2	1	2	1	2
I-70_SR39_EB Ramps EBR	0	1	0	0	0	0	0	0
I-70_SR39_EB Ramps NBT	19	21	14	20	19	25	18	22
I-70_SR39_EB Ramps SBT	3	11	2	12	3	9	2	10
I-70_SR39_WB Ramps WBL	1	10	1	12	1	6	1	8
I-70_SR39_WB Ramps WBR	4	16	2	16	4	16	3	10
I-70_SR39_EB Ramps NBT	2	5	1	3	3	5	2	4
I-70_SR39_EB Ramps SBT	30	40	33	30	30	37	29	39
SR39_KogerSt EB	16	27	17	9	17	17	17	9
SR39_KogerSt WBL	51	66	51	54	51	52	51	55
SR39_KogerSt WBTR	46	65	47	49	47	47	46	50
SR39_KogerSt NBL	6	44	2	16	6	28	5	12
SR39_KogerSt SBL	12	36	12	11	11	16	11	14
I70_SR267_EB Ramps EBT	69	65	73	69	75	67	88	76
I70_SR267_EB Ramps EBR	49	42	54	51	57	51	65	54
I70_SR267_EB Ramps NBT	94	68	93	52	91	63	91	62
I70_SR267_EB Ramps SBL	85	74	86	83	83	304	86	54
I70_SR267_EB Ramps SBT	84	73	85	83	83	304	85	54
I70_SR267_WB Ramps WB	15	66	14	73	14	16	13	70
I70_SR267_WB Ramps NBL	7	9	6	6	6	2	6	7
I70_SR267_WB Ramps NBT	7	11	7	8	6	3	7	9
I70_SR267_WB Ramps SB	30	71	28	72	20	173	23	52
SR267_Hadley Rd EBL	1210	96	1187	75	1185	1068	1006	61
SR267_Hadley Rd EBT	1210	96	1188	74	1186	1069	1007	61
SR267_Hadley Rd EBR	1255	78	1232	56	1230	1113	1051	43
SR267_Hadley Rd WBL	62	824	61	1169	60	1029	63	709
SR267_Hadley Rd WBT	62	826	61	1170	60	1030	63	710
SR267_Hadley Rd WBR	9	854	10	1210	0	803	9	750
SR267_Hadley Rd NBL	415	1417	349	1282	676	1565	866	1426
SR267_Hadley Rd NBT	417	1418	351	1283	678	1565	868	1426
SR267_Hadley Rd NBR	429	1435	350	1301	700	1579	889	1429
SR267_Hadley Rd SBL	81	999	79	1020	72	233	76	957
SR267_Hadley Rd SBT	79	999	76	1019	69	232	73	956
SR267_Hadley Rd SBR	32	992	30	1014	24	193	24	950

TABLE 10 - VISSIM 2045 QUEUE RESULTS (CONT.)

Location	2045 No Build		2045 Build Align AZ		2045 Build Align DX		2045 Build Align B	
	Average Queue Lengths (ft)		Avg Queue Lengths (ft)		Avg Queue Lengths (ft)		Avg Queue Lengths (ft)	
	AM	PM	AM	PM	AM	PM	AM	PM
SR 39 at CR 1000 S EB	6	1	13	1	21	5	16	2
SR 39 at CR 1000 S WBTL	28	3	40	3	47	13	40	5
SR 39 at CR 1000 S WBR	29	3	40	4	48	14	40	5
SR 39 at CR 1000 S NBL	0	0	0	0	0	0	0	0
SR 39 at CR 1000 S SBL	4	0	5	0	5	3	5	0

6.5 UNINTERRUPTED FLOW EXPRESSWAY ANALYSIS (2045 NO BUILD CONDITIONS)

Given the congestion indicated by the intersection LOS, including the SR 267 ramp termini, it would not be surprising to see impacts spilling back onto mainline I-70. The travel time analysis for the 2045 No Build scenario is displayed in **Table 12** below.

TABLE 11 - VISSIM 2045 NO BUILD TRAVEL TIME RESULTS

I-70 Travel Time Results	AM	PM
Eastbound Avg. Travel Time (min/veh)	8.3	8.2
Westbound Avg. Travel Time (min/veh)	8.1	10.4
Eastbound Avg. Travel Speed (mph)	69.6	70.3
Westbound Avg. Travel Speed (mph)	70.6	55.2

Compared to the existing conditions, there are small increases in travel time and decreases in average travel speed for both eastbound and westbound I-70. The one exception is I-70 westbound in the PM peak hour. The average travel time increases by approximately 2.1 minutes and the average travel speed reduces by 13.6 MPH, indicating a severe degradation in operations.

Two factors are compounding to cause the significant reduction in travel speed for westbound I-70 in the PM peak hour. One is the long queues forming on northbound SR 267 at Hadley Road. The second is the significant weave of traffic from the westbound off-ramp traffic headed north to turn left onto Hadley Road. The heavy traffic volumes cause traffic on SR 267 northbound to jam, creating a spillback effect that queues traffic down the westbound I-70 off-ramp at SR 267 onto the I-70 mainline lanes. I-70 traffic is slowed navigating around the slowed traffic in the outside lane, causing the reduction in travel time.

The HCS results for the No Build scenario are indicative of the bottleneck forming on westbound I-70 at SR 267. The off-ramp to SR 267 from WB I-70 operates at LOS F in the PM peak hour, which confirms the congested conditions experienced in the VISSIM model. The full results are displayed below in **Table 12**.

TABLE 12 - HCS 2045 NO BUILD OPERATIONS ANALYSIS

Eastbound				Westbound			
Segment	Segment Type	AM Avg Density (pc/mi/ln) & LOS	PM Avg Density (pc/mi/ln) & LOS	Segment	Segment Type	AM Avg Density (pc/mi/ln) & LOS	PM Avg Density (pc/mi/ln) & LOS
1	Off-Ramp	14.7 - B	19.7 - B	14	Off-Ramp	16.6 - B	45.0 - F
2	Basic	11.9 - B	13.0 - B	15	Basic	10.3 - A	20.0 - C
3	On-Ramp	22.5 - B	21.8 - B	16	Basic	15.4 - B	32.9 - D
4	Basic	22.0 - C	19.8 - C	17	On-Ramp	18.1 - B	39.2 - D
5	Off-Ramp	24.1 - C	22.2 - C	18	Basic	16.6 - B	38.5 - E
6	Basic	20.9 - C	19.0 - C	19	Off-Ramp	18.4 - C	35.6 - E
7	On-Ramp	24.3 - C	22.3 - C	20	Basic	20.8 - C	37.1 - E
8	Basic	21.9 - C	20.1 - C	21	On-Ramp	18.0 - B	38.8 - D
9	Off-Ramp	24.2 - C	22.3 - C	22	Basic	19.5 - C	31.1 - D
10	Basic	20.3 - C	16.3 - B	23	Off-Ramp	21.8 - C	33.2 - D
11	Basic	13.5 - B	10.8 - A	24	Basic	15.7 - B	18.3 - C
12	On-Ramp	16.0 - B	9.7 - A	25	On-Ramp	19.0 - B	22.3 - B
13	On-Ramp	25.1 - C	17.4 - B				

The results confirm that the average density of the freeway is increasing with the increased traffic volumes. During the PM Peak hour, almost all segments of I-70 westbound are reaching levels of service that are unacceptable. The westbound off-ramp to SR 267 is expected to operate at LOS F in the design year. Some other segments around the rest areas are expected to operate at LOS E without any improvements to I-70. Eastbound I-70 is expected to continue to operate at acceptable levels for the foreseeable future without modifications.

6.6 UNINTERRUPTED FLOW EXPRESSWAY ANALYSIS (2045 BUILD CONDITIONS)

Freeway operations were analyzed for the three build alternatives to assess impacts to mainline I-70 traffic. The results are summarized in **Table 13**.

TABLE 13 - 2045 I-70 TRAVEL TIME ANALYSIS

I-70 Travel Time Results	No Build		Alignment AZ		Alignment DX		Alignment B	
	AM	PM	AM	PM	AM	PM	AM	PM
Eastbound Avg. Travel Time (min/veh)	8.3	8.2	8.4	8.2	8.4	8.2	8.4	8.2
Westbound Avg. Travel Time (min/veh)	8.1	10.4	8.2	11.1	8.5	13.9	8.4	13.8
Eastbound Avg. Travel Speed (mph)	69.6	70.3	68.3	70.4	68.2	69.8	68.3	70.1
Westbound Avg. Travel Speed (mph)	70.6	55.2	70.3	51.7	68.1	41.3	68.9	41.8

Like the travel time results of the No Build alternative, all three build alternatives show decreasing travel speeds on I-70 westbound in the PM peak hour. For I-70 westbound in the AM peak hour and eastbound I-70 in both peak hours, impacts to average travel speed and travel time are minor. Travel time increases are mostly 20 seconds or less. The same as the No Build alternative, the Build alternatives experience long queues and weaving congestion on SR 267 northbound in the PM peak hour that backs queues onto mainline I-70, causing the much more substantial impacts to travel time and speed.

If intersection improvements were made at SR 267 and Hadley Road to reduce queue lengths and/or reduce or eliminate the significant weave for northbound traffic, it is expected that westbound I-70 in the PM peak hour would see minor impacts to travel time and speed for all Build alternatives, like eastbound I-70 in both peak hours and westbound I-70 in the AM peak hour. The proposed interchange will operate acceptably for any of the Build alternatives, providing additional capacity for future growth.

7.0 CRASH DATA AND ANALYSIS

In concert with an operational analysis, a safety analysis of the study area was conducted. Recent crash history was reviewed for the major intersections and corridors being analyzed in this study. INDOT's RoadHAT software was used to analyze the crash history to identify hot spots within the project are located. Highway Safety Manual (HSM) methodologies were then used to develop crash predictions.

It should be noted that only certain corridors and intersections were analyzed in this study. With the significant changes to many other corridors and intersections, it would have been too cumbersome to try to quantify them all.

7.1 EXISTING CRASH DATA AND SAFETY ANALYSIS

Historic crash data were reviewed at intersections throughout the Plainfield study intersection. Key areas of interest include the intersections between State Road 39 and State Road 267 along the US 40 corridor. The crash data was provided by the Town of Plainfield from the ARIES database for January 2016 to October 2019. The intersections with the most accidents include the intersections of US 40 at State Road 267, State Road 267 and Hadley Road, and I-70 and State Road 267. The greatest percentage of the accidents were rear end collisions, which are a common crash type in congested areas and/or on signalized corridors. An example table of the breakdown of the crashes by type and location is provided in **Table 14**.

TABLE 14 - HISTORICAL CRASH SEVERITY DATA (2016-2019)

Location		I-70 and SR 39 Intersection	I-70 and SR 267 Intersection	US 40 and SR 39 Intersection	US 40 and Cartersburg Road Intersect.	US 40 at Miles Road Intersection	US 40 at Moon Road Intersection	US 40 at Center Street Intersection	US 40 at SR 267 Intersection	SR 267 at Hadley Road Intersection	SR 267 at Camby Road Intersection	SR 267 at CR 750 Intersection	SR 39 at CR 1000 S Intersection	SR 39 at Koger Street/CR 1000 S	I-70 MP 39 to MP 68	Moon Road	Miles Road	S CR 525 E	TOTAL	Percentage
Off-Road	PDO	1	1	1	4	5	1	1	3	2	0	4	8	0	131	14	4	3	183	18%
	NIC	0	1	0	0	1	0	0	0	0	0	1	0	0	6	1	0	1	11	
	IC	0	0	2	0	1	0	0	0	0	0	2	1	0	20	1	0	3	30	
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	1	1	0	0	2	
Rear End	PDO	17	40	9	12	3	4	10	71	52	1	12	20	10	131	4	0	1	397	37%
	NIC	1	2	0	2	0	0	2	5	2	0	1	1	2	10	1	0	0	29	
	IC	0	0	2	1	0	0	1	1	0	0	0	0	0	19	1	0	0	25	
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	3	0	0	0	3	
Side Swipe	PDO	4	13	3	2	0	0	3	24	13	0	6	7	4	119	4	0	0	202	17%
	NIC	0	0	0	0	0	0	0	0	0	0	0	0	0	2	1	0	1	4	
	IC	0	0	0	0	0	0	0	0	0	0	0	1	0	6	1	0	1	9	
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Head On	PDO	3	0	0	0	0	0	0	0	0	0	1	2	0	2	0	0	0	8	1%
	NIC	0	0	1	0	0	0	0	0	0	0	0	1	0	0	0	0	0	2	
	IC	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	1	
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
Right Angle/Turn	PDO	16	13	12	7	5	0	9	45	5	0	8	7	3	17	6	0	0	153	15%
	NIC	0	0	2	1	1	0	2	4	0	0	0	0	0	2	0	0	0	12	
	IC	3	0	5	2	5	0	0	1	1	0	3	1	0	0	0	0	0	21	
	F	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	
Other / Unknown	PDO	1	1	0	5	0	1	1	11	3	0	4	6	3	75	22	0	1	134	12%
	NIC	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	
	IC	0	0	0	0	1	0	0	0	0	0	0	0	0	4	0	0	0	5	
	F	0	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	2	
Total		46	71	37	36	23	6	29	165	78	1	42	56	22	552	57	4	11	1236	100%

PDO = Property Damage

NIC = Non-Incapacitating Injury

IC = Incapacitating Injury

F = Fatal

From January 2016 to October 2019, there were 1,236 crashes on the studied road segments and at the studied intersections. As would be expected, the facilities with the highest traffic volumes (I-70, US 40, SR 267) have the highest numbers of crashes in recent history. US 40 at SR 267 had the highest total number of crashes out of the study area intersections. Rear end crashes were the predominant crash type (37%) throughout the study area, which is a common crash type in urban areas. Ran off the road (18%), sideswipe (17%), and right angle/turning crashes (15%) were all similarly represented in the crash history. Sideswipe crashes are common on multi-lane facilities, which is the facility type for US 40, SR 267, and I-70. Right angle and turning crashes are common at intersections, which are more prevalent in urban areas. Run off the road crashes occur more often on facilities without curbs and higher speeds, which is representative of many of the facilities included in this study.

Because crash patterns vary from year to year, **Table 15** breaks out the intersection crashes by year to see if there are any discernable trends in the crash history. **Table 15** also better summarizes injury and fatal crashes at the intersections. No easily discernable crash patterns were observed year to year at any of the study intersections other than US 40 at Moon Road, US 40 at Center Street and SR 267 at CR 750 being steady/stable in the number of crashes from year to year.

TABLE 15 – INTERSECTION CRASH HISTORY BY YEAR

E-W Street	N-S Street	2016	2017	2018	2019	Total	Fatalities & Injuries		
							F+IC	NIC	% of Crashes
I-70	SR 39	9	15	13	9	46	3	1	9%
I-70	SR 267	30	19	10	15	74	0	3	4%
US 40	SR 39	13	13	5	6	37	9	3	32%
US 40	Cartersburg Road	10	12	7	7	36	3	3	17%
US 40	Miles Road	9	5	4	5	23	8	2	43%
US 40	Moon Road	3	1	1	1	6	0	0	0%
US 40	Center Street	6	7	8	9	30	1	4	17%
US 40	SR 267	36	42	58	30	166	2	9	7%
Hadley Road	SR 267	23	17	21	17	78	1	2	4%
Camby Road	SR 267	0	0	1	0	1	0	0	0%
CR 750	SR 267	15	5	12	10	42	5	2	17%
CR 1000 S	SR 39	14	17	10	15	56	4	2	11%
SR 39	Koger Street	5	4	6	7	22	0	2	9%
Total		173	157	156	131	617	36	33	11%

NIC = Non-Incapacitating Injury
IC = Incapacitating Injury
F = Fatal

Within the crash history period, there were 8 fatal crashes. A brief description of the fatal crashes is below. No crash narratives were available, so summaries are presented based on factors and information that were available. Most of the fatal crashes occurred on I-70 where speeds through the study area are highest.

- September 26, 2016: A fatal crash occurred on I-70 westbound near milepost 60. A vehicle ran off the road resulting in a fatal crash. The primary cause was driver asleep or fatigued. It was daylight and the pavement conditions were dry.
- October 21, 2016: A fatal crash occurred on I-70 westbound near milepost 59. A rear end crash involving 4 vehicles and 1 trailer occurred resulting in multiple injuries and a fatality. The primary cause was unsafe speed.
- January 5, 2017: A fatal crash occurred on Moon Road: A vehicle ran off the road. The primary cause was driver illness. The weather conditions were snowy, and the crash occurred during daylight.

- July 23, 2017: A fatal crash occurred on I-70 eastbound near milepost 66.4. A rear end crash involving 2 vehicles and 1 trailer occurred resulting in a fatality. The primary cause was following too closely. It was daytime and the weather conditions were clear.

- October 20, 2017: A fatal crash occurred on I-70 eastbound near milepost 59.8. A vehicle collided with an object (pedestrian) in the road and resulted in a fatality. The primary cause was pedestrian action. It was dark and there was no roadway lighting.

- February 14, 2018- A fatal crash occurred at the intersection of US 40 and Miles Road. A right-angle crash involving two vehicles resulted in a fatality. The primary cause was failing to yield at the T-intersection. The pavement conditions were wet, and the crash occurred during dawn/dusk.

- February 1, 2019: A fatal crash occurred on I-70 eastbound near milepost 59. A rear end crash involving 2 vehicles resulted in a fatality. The primary cause was traveling too fast for the weather conditions, which were blowing snow/slush. It was also dark, although roadway lighting was present.

- February 13, 2019: A fatal crash occurred on I-70 eastbound near milepost 59.8. A vehicle with a trailer collided with an object (pedestrian) in the road and resulted in a fatality. The primary cause was pedestrian action. It was dark, but there was roadway lighting present.

The crash history for the study intersection was input into INDOT's RoadHAT 3.0 project to compare intersections to similar locations statewide. Indices of crash frequency (ICF) and crash cost (ICC) are calculated to determine how many standard deviations away from average an intersection's crash history and severity are compared to other similar intersections across Indiana. The RoadHAT results for the current year (2019) traffic volumes and crash history from 2016-2019 are shown below in **Tables 16 & 17**.

TABLE 16 - ROADHAT INTERSECTION RESULTS

Intersection	Icf	Icc
I-70 and SR 39	0.23	1.02
I-70 and SR 267	0.02	-1.13
US 40 and SR 39	1.31	2.51
US 40 and Cartersburg Rd	5.91	2.19
US 40 and Miles Rd	4.79	3.00
US 40 and Moon Rd	-1.18	-1.42
US 40 and Center St	-0.04	0.14
US 40 and SR 267	2.87	1.63
SR 267 and Hadley Rd	2.17	0.90
SR 267 and Camby Rd	0.45	-0.54
SR 267 and CR 750 (Black Rock Rd)	3.67	2.11
SR 267 and CR 1000 S (E Hendricks County Rd)	5.99	2.12
SR 39 and CR 1000 S/Greencastle Rd	5.68	2.09
SR 39 and CR 1000 S/Koger St	-0.05	-0.62

*This interchange currently being modified to a DDI.

TABLE 17 - ROADHAT SEGMENT ANALYSIS

Segment	Icf	Icc
I-70	4.97	7.00
Moon Road	-0.13	0.51
Miles Road	-0.28	-0.37
S CR 525 E	-0.32	0.02

An Icc and an Icf of over 1.00 flag an intersection or segment as a safety concern. As displayed in the table above, there are multiple project intersections and segments that are experiencing higher frequencies of crashes and cost of crashes than similar intersection and segments in the state. Intersections such as US 40 at Cartersburg Road, SR 39 and CR 1000 S/Greencastle Road, and SR 267 and E Hendricks County Road are experiencing a frequency of crashes more than 5 standard deviations when compared to similar intersections in the state. US 40 at Miles Road and US 40 at Cartersburg Road also have high index values and could potentially be near or a part of the recommended connector corridor.

Additionally, the Enhanced Interchange Safety Analysis Tool (ISATe) from AASHTO, which is based on HSM methodology, was used to analyze I-70 from SR 39 through the SR 267 interchange. Geometric and site characteristics needed for the analysis were derived from aerial images. The 2019 traffic volumes were input to calculate the crash expectancy for the existing conditions. Then the project 2045 volumes were input to

predict how the added volume would affect crash expectancy for the 2045 No Build Scenario. **Table 18** shows the results from the ISATe analysis.

TABLE 18 - ISATE EXISTING CRASH EXPECTANCY

Year	Total	K	A	B	C	PDO
2019	61.80	0.60	1.90	7.90	15.60	35.80
2045	91.50	0.80	2.80	11.50	24.80	51.60

The ISATe analysis predicts that with the projected growth I-70 and the interchange ramps and terminals are expected to experience approximately 30 more annual crashes by the design year compared to 2019. The growth in crash expectancy goes along with the continued growth Plainfield is experiencing. The non-freeway safety analysis using safety performance functions is displayed in **Table 19**.

TABLE 19 - EXISTING HSM CRASH EXPECTANCY

Analysis Methodology	HSM Rural Multi-Lane		HSM Urban Arterials		Total
	F/I	PDO	F/I	PDO	
2019 Existing	9.8	13.1	38.5	76.6	**138**

PDO = Property Damage Only

F/I = Fatal/Injury

The HSM analysis was calibrated using the historical crash data. Intersections were split between signalized and unsignalized for calibration. The calibration factors and calculations are provided in ***Appendix D – Safety Analysis***. Comparing the No Build alternative to existing, the non-freeway facilities are expected to see an 87% annual increase in crashes by 2045 due to traffic volumes increasing with the continued growth of Plainfield.

7.2 PREDICTIVE SAFETY ANALYSIS

Highway Safety Manual (HSM) methodologies were used to analyze corridors and intersections in the study area that would be affected by the changes in traffic resulting from a new corridor and interchange. As was done for the existing conditions, ISATe was used to evaluate the safety performance of I-70 and the access interchanges within the study area. Safety performance functions for multi-lane arterials (SR 39) and urban and suburban arterials (remainder of non-freeway analysis locations) were used to evaluate non-freeway facilities that might be expected to see changes in traffic patterns and volumes to a level that would change crash predictions. The results of the predictive HSM analysis may be seen in **Table 20**.

TABLE 20 - PREDICTIVE HSM ANALYSIS

Analysis Methodology	ISATe		HSM Rural Multi-Lane		HSM Urban Arterials		Total	% Difference from Build No INT
	F/I	PDO	F/I	PDO	F/I	PDO		
2045 No Build	56.5	107.9	18.1	26.2	117.4	218.6	**544.7**	**--**
2045 Build Alternative AZ	71	132.3	16.1	23.3	126.6	248.8	**618.1**	**13.5%**
2045 Build Alternative DX	72	133.4	17	24.5	119.6	230.1	**596.6**	**9.5%**
2045 Build Alternative B	72.7	137.6	16.4	23.6	139.1	286	**675.4**	**24.0%**

PDO = Property Damage Only

F/I = Fatal/Injury

The Build alternatives were compared to the No Build Alternative. Out of the three build alternatives, Alternative DX is predicted to have the least increase in crashes at 9.5%. Alternative B is predicted to have the highest number of annual crashes, which is 24% higher than the No Build Alternative.

The analysis results show an increase in annual crashes for all three build alternatives. One must bear in mind that the analysis did not incorporate every segment and intersection that would see changes in volumes and/or travel patterns. Higher volume intersections were the target of the analysis. The travel demand model analysis projects substantial growth within and around Plainfield, which projected traffic volumes above the ranges specified for the safety performance functions in some locations. This may be causing some increased crash expectancy in the build alternatives more so than the no build alternative.

As Plainfield continues to grow, traffic volumes will continue to grow. Congestion levels will increase until transportation infrastructure is added or improved. When new facilities are added, there is more length of roadway exposure and more conflict points are created. New facilities lessen congestion, but they create additional opportunities for crashes even when designed to the highest standards. Including additional infrastructure upgrades that would occur in conjunction with or prior to a new corridor would likely show much less of an increase or even a reduction in traffic, but those improvements were outside the scope of this study and, therefore, not included in the analysis.

8.0 TRAVEL DEMAND MODELING AND TRAFFIC DIVERSION

Part of the intent on keeping a higher-level planning perspective for this study was understanding the impacts on the existing road network, particularly those locations already experiencing congestion. Shifts in traffic patterns could positively or negatively

affect the operations of the existing road network. This section reviews some of the results of those shifts in traffic patterns.

8.1 BACKGROUND

In 2019, Plainfield completed a Town Thoroughfare Plan update, which included the development of a travel demand model (TDM) specific to the Town. It was developed from the Indianapolis MPO regional model to look more closely at traffic impacts and capacity needs within and adjacent to Plainfield as the Town continues to grow. This model was used to assess shifts in traffic patterns and traffic volumes based on varying alignments of a connector corridor and new interchange access to I-70.

8.2 TRAFFIC DIVERSION FROM MAJOR CORRIDORS

At the onset of the study, it was anticipated that varying the location of a new corridor and full access interchange to I-70 might provide some congestion relief to Hadley Road and SR 267/Quaker Boulevard. The Thoroughfare Plan design year (2045) model was evaluated with the existing road network and proposed connector corridors to estimate traffic diversion from Hadley Road/SR 267 to the new connector corridor. The design year condition would provide the most similar conditions between No Build and Build alternatives. The model does factor in some background growth with the added capacity of the road network in the Build alternatives, but it is much less than the difference between no build and build in the design year 2045 compared to using the thoroughfare plan road network.

To assess the amount of diversion from US 40 and Hadley Road, the 2045 No Build alternative with the existing road network was used as a baseline. With any changes to the road network, TransCAD redistributes traffic based on an iterative process to set travel routes from origins (beginning points of trips) to destinations (end points of trips). **Table 21** below shows the estimated diversion for the other two corridors.

TABLE 21 - ESTIMATED NEW CORRIDOR TRAFFIC DIVERSION

	US 40 west of Moon Road		SR 267 @ Hadley Rd NB Lt AADT		Hadley Rd East of Moon Road	
	ADT	% Differ from No Build	ADT	% Differ from No Build	ADT	% Differ from No Build
2045 No Build Alternative	33154	--	7927	--	20073	--
2045 Build Alternative AZ	29361	-11.4%	6777	-14.5%	17549	-12.6%
2045 Build Alternative DX	27290	-17.7%	6637	-16.3%	17518	-12.7%
2045 Build Alternative B	26657	-19.6%	5800	-26.8%	13397	-33.3%

The results show all three build alternatives will divert some traffic from US 40 and Hadley Road. The diversion from US 40 will reduce traffic volumes through downtown Plainfield, allowing the Town to pursue opportunities to reallocate uses of the public right of way. Alternative B, whose alignment connects to I-70 furthest east in the study area, shows the greatest diversion from Hadley Road, which would be expected. It also correspondingly has the highest diversion of traffic from the northbound left turn at SR 267/Quaker Blvd. and Hadley Road. Alternative AZ, which is furthest west from SR 267, shows the least reduction in traffic volumes on existing roadways. Regardless of alternative, the estimated diversion is not enough to relieve congestion at SR 267 and Hadley Road. Expected traffic growth will negate the traffic diversion, necessitating future improvements to the SR 267 and Hadley Road intersection.

9.0 ALTERNATIVES ANALYSIS

9.1 INTRODUCTION

While a straight-lined alignment for a potential corridor was shown in Plainfield's 2019 Thoroughfare Plan, the intent of this study was to further investigate the location of a new access interchange and corridor. As noted in Section 4.0, public input was used to develop numerous corridor alternatives. High-level engineering analysis was then used to refine alignments to conceptually constructible alignments. Once refined, three build alternatives were selected for more detailed analysis that were mostly representative of all refined corridor alignments. The analyzed alternatives are described in more detail below.

In the initial development of alternative alignments, multiple connection points to US 40 were considered. As those connections were analyzed in more detail, it was decided that

one connection point made the most sense for all three build alternatives. This point is immediately east of the existing bridges on US 40 over the West Fork White Lick Creek. One main reason from two factors drove this decision: significant impacts to the West Fork White Lick Creek floodplain from both the corridor alignment and a substantial change in elevation that would necessitate significantly more fill to keep the roadway elevation above high water elevations. A north-south corridor extension and connection can still be made as shown in the alternative figures below.

9.2 NO BUILD

The No Build alternative maintains the existing road network while growth continues to push Plainfield's corporate limits westward. There is no cost, right-of-way acquisition or environmental impacts with this alternative. Congestion would continue to increase as development occurred, adding stress to a network that is already strained in certain areas.

All of the alternatives in the travel demand model used the existing road network as a base. This methodology lessened the substantial growth predicted in the TDM while still portraying changes in travel patterns and estimating traffic volumes at a new interchange on I-70.

9.3 ALTERNATIVE 1 – ALIGNMENT AZ

This alternative's alignment closely mimics the corridor shown in Plainfield's Thoroughfare Plan update in 2019. This alignment has been called the western alignment as it captures the western boundary of the study area and where a new corridor could be built. The new corridor would intersect with I-70 at or adjacent to the existing CR 525 E overpass. The corridor alignment moving north from I-70 would follow existing CR 525 E to E CR 700 S at which point the new corridor would continue north across the West Fork White Lick Creek paralleling CR 521 E to E CR 600 S. At E CR 600 S the corridor turns northwest and connects to US 40 east of the existing US 40 bridges over West Fork White Lick Creek. The full alignment is shown in **Figure 5** and in ***Appendix A – Project Graphics***.

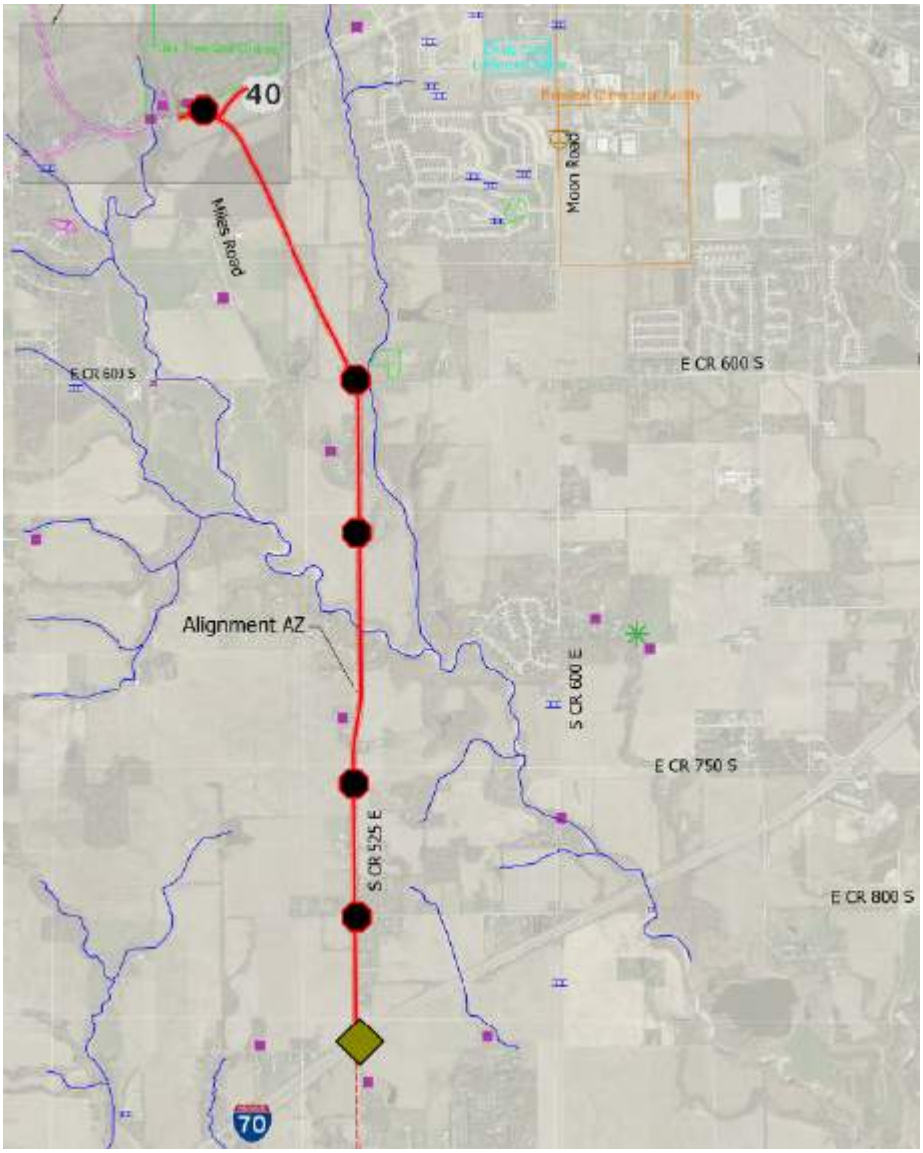


FIGURE 5 - WESTERN ALIGNMENT (ALIGNMENT AZ)

9.4 ALTERNATIVE 2 – ALIGNMENT DX

Alignment DX is the central alignment of the build alternatives, roughly traversing the middle of the study area to connect to Interstate 70. The corridor would begin at the intersection of S CR 600 E extended and I-70, following S CR 600 E north until past the Hickory Woods subdivision. North of Hickory Woods, the corridor turns west, paralleling E CR 600 S south of the new Plainfield elementary school property until S CR 521 E, where the alignment turns north again. The corridor heads north until the southern end of the Sugar Grove Farms subdivision extended, at which point the corridor angles northwest until meeting US 40 near the intersection of S CR 500 E and US 40. The full alignment is shown in **Figure 6** and in ***Appendix A – Project Graphics***.

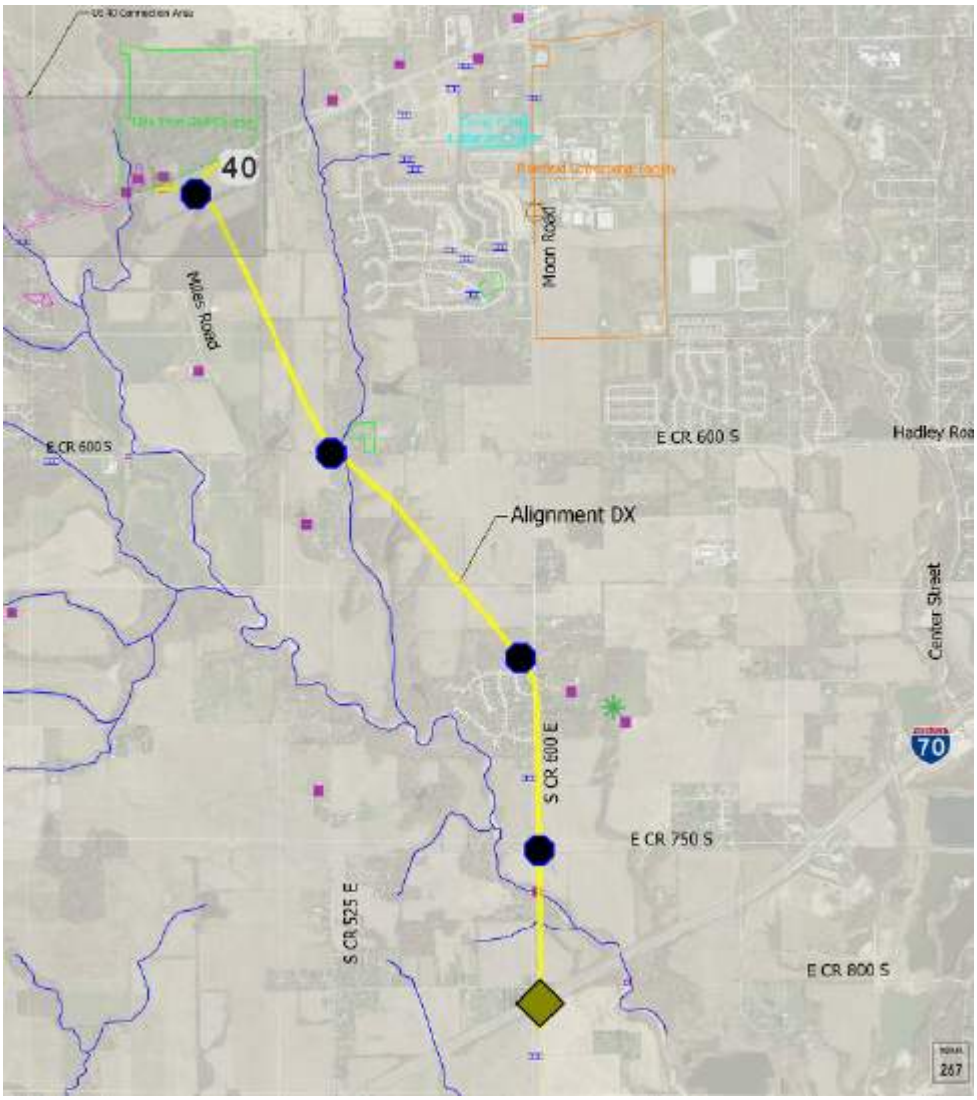


FIGURE 6 - CENTRAL ALIGNMENT (ALIGNMENT DX)

9.5 ALTERNATIVE 3 – ALIGNMENT B

The alignment referred to as the eastern alignment is Alignment B. Alignment B connects to I-70 the furthest east of any alignments, connecting roughly at the location of the existing rest areas on I-70. The corridor angles northwest from I-70 until north of the Hickory Woods subdivision and south of the new Plainfield elementary school, at which point the corridor turns to head due west. West of the new elementary school, the corridor snakes its way northwest to near the intersection of E CR 600 S and S CR 521 E. At E CR 600 S the corridor heads northwest and connects to US 40 east of the existing US 40 bridges over West Fork White Lick Creek. The full alignment is shown in **Figure 7** and in ***Appendix A – Project Graphics***. Additional coordination with INDOT and FHWA regarding the existing rest areas would be necessary to pursue this corridor.

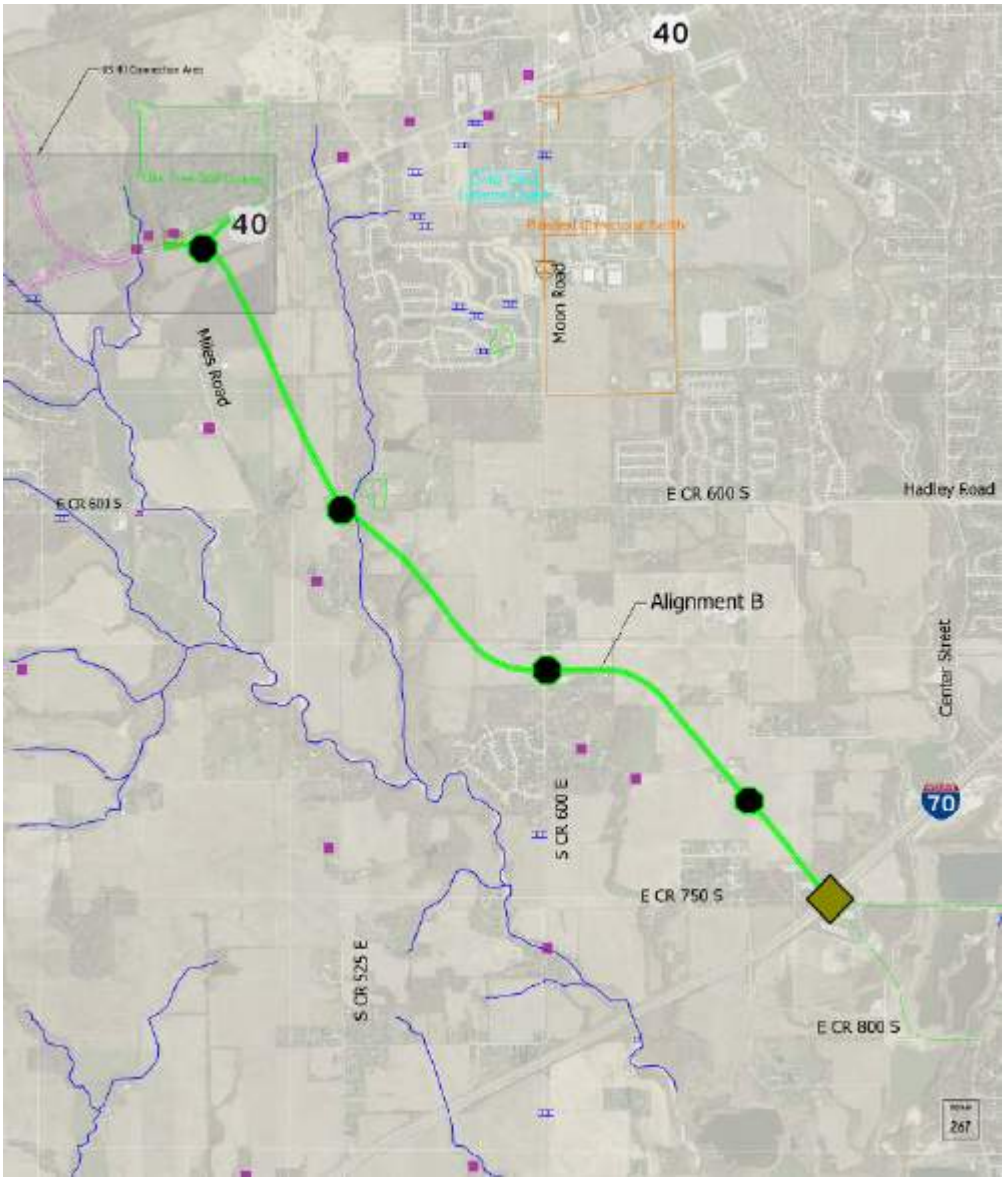


FIGURE 7 - EASTERN ALIGNMENT (ALIGNMENT B)

There are positives and negatives to all of the alternatives. To compare the alternatives more easily, a table was assembled to display them side-by-side. The pros and cons may be seen in **Table 22**.

TABLE 22 - ALTERNATIVE PROS AND CONS

	No Build	Alignment AZ	Alignment DX	Alignment B
Pros	No environmental impacts. No right of way acquisition necessary.	Meets FHWA interchange spacing requirements. Good opportunities for regional corridor connections.	Fewest number of predicted crashes of the Build alternatives. Very good opportunities for regional corridor connections. Provides some initial support to the Plainfield transportation network as well as future support. Meets FHWA interchange spacing requirements.	Provides immediate support to the transportation network as Plainfield continues to grow. Requires the fewest number of relocations. Lowest overall cost of the build alternatives.
Cons	Does not align with Town of Plainfield long range planning. Traffic demand increases with continued growth, straining the transportation network. Does not support the Town of Plainfield transportation network as the Town grows further west.	Potentially impacts several historic structures in the Joppa area. Highest overall cost. Provides the least traffic diversion and relief to SR 267 and Hadley Road. Provides little to no initial support as Plainfield continues to grow.	Potential impacts the Hickory Hills subdivision. Impacts the longest length of floodplain. Passes near the new elementary school on Moon Road.	Impacts the existing rest areas on I-70. Limited potential for a regional corridor connection to the south. Has the highest predicted number of annual crashes. Passes near the new elementary school on Moon Road.

9.6 US 40 CONNECTION POINT

The connection to US 40 is not well-defined at the time of this study, as multiple factors will weigh significantly into a decision of how the connection to US 40 is configured. The first is the condition of the US 40 bridges over the West Fork White Lick Creek once the Town of Plainfield seek to build the connector corridor. The second factor is the designated route of US 40, as it currently runs through downtown Plainfield. With Plainfield's promotion of the downtown area as a destination and as work progresses to activate the public spaces, there may be a desire to reroute through US 40 traffic from downtown. US 40 could be redesignated to follow the connector corridor to I-70 once

built, but this will require coordination between the Town and INDOT that has not occurred to-date.

For all three build alternatives, a connection is preliminarily shown occurring east of the US 40 bridges over the West Fork White Lick Creek. This alignment reduced expected costs by reusing the US 40 bridges, reduced impacts to the West Fork White Lick Creek floodplain and avoided a substantial change in elevation adjacent to the creek. More detailed future analysis will be needed to determine the best connection configuration to US 40.

9.7 ALTERNATIVE EVALUATION MATRIX

To evaluate the alternatives, numerous potential performance measures were considered. To narrow down the performance measures and develop a weighting factor for them based on the importance to the Town of Plainfield and Hendricks County, transportation staff for Plainfield and Hendricks County tiered all the performance measures. Two rounds of ranking were done to reduce the number of performance measures.

The performance measures that ranked the highest were then put in a paired-pair comparison matrix that was sent to and completed by multiple staff of Plainfield and Hendricks County. The paired-pair comparison asked participants to systematically prioritize two performance measures to indicate which one was more important than the other, or if they were equal in importance. Once the paired-pair comparison results were aggregated, the higher-ranking performance measures were retained. Two rounds of paired-pair comparisons were completed to refine the performance measures list to those of the highest importance. Examples of the initial performance criteria scoring and the paired-pair comparison tables may be found in ***Appendix J – Performance Measures***. Based on the selection of one performance measure's importance over another, a weighting factor was calculated. An evaluation matrix was developed from the remaining performance measures in the paired-pair comparison, which is shown in **Table 23**.

The weighted scores for each alternative were calculated by summing the weighted score of each performance measure. The high and low values for each measure were given a score of 5 and 1, respectively. Linear interpolation was used to calculate a score between the high and low values. The scores were multiplied by the weight factor for that performance measure to calculate the measure's weighted score.

TABLE 23 - EVALUATION MATRIX

Weighted Percentage	Category	Criteria	No Build	Alternative AZ	Alternative DX	Alternative B
26.6%	Traffic Operations	Highway User Safety (crashes/yr)	544.7	618.1	596.6	675.4
14.9%		Local Traffic Travel Time (Hrs)	25,253	23,571	21,439	22,659
16.9%		Travel Time Reliability - Corridor TT Deviation (Min)	N/A	0.25	0.27	0.28
10.3%		Total Network Delay (Hrs.)	79,613	78,176	78,500	81,594
16.9%	System Compatibility / Regional Connectivity	Northern Corridor Extension Potentional	N/A	Likely Feasible	Likely Feasible	Likely Feasible
		Southern Corridor Extension Potentional	N/A	Moderately Feasible	Likely Feasible	Low Feasibility
		Travel Distance - US 40/SR 39 to I-70/SR 267 (Miles)	11.4	10	9.6	8
		Impacts Existing Interstate Ramps	No	No	No	Yes
1.3%	Environmental Impacts	Stream Crossings	0	1	2	1
		Historic Structure Potential Impacts	0	4	2	1
		Floodplain Impacts (Lft)	0	1600	2400	600
13.0%	Quality of Place	Town Trail Network Connectivity Feasibility - Proximity to Proposed Future Trails (Miles)	0	0.75	0.5	0.5
		Opportunity for Linear Park Expansion - Distance to Connect (Miles)	0	2.05	1.5	1.05
		Opportunity of Development Overlay District - Corridor Length (Miles)	0	3.9	4.3	3.7

Alternative performance varied across the criteria. Alternative B had the least environmental impacts but had the highest predicted crash rate and lowest southern regional connectivity potential of the build alternatives. The lowest crash rate was Alternative DX, but it has 1,800 linear feet more of floodplain impacts. Alternative AZ requires the longest travel distance from the intersection of US 40 and SR 39 to I-70 at SR 267 out of the Build alternatives and potentially impacts the most identified historic structures.

After applying the weighting factors to the results, Alternative DX scored highest. As seen in **Table 24**, out of a possible 8.96 points, Alternative DX's score of 6.54 was the highest of the No Build and Build alternatives. Alternative AZ came in second at 5.38.

TABLE 24 – WEIGHTED ANALYSIS RESULTS

	No Build	Alternative AZ	Alternative DX	Alternative B
Weighted Score	4.46	5.38	6.54	5.08

The weighted score from the evaluation matrix shows that Alignment DX will provide the most functional alignment to meet the performance metrics desired by the Town of Plainfield. Alternative DX was next given a quick check to confirm that the corridor aligned with Plainfield's potential future.

10.0 SCENARIO PLANNING & CORRIDOR RESILIENCY

While Alternative DX scored highest based on the identified performance measures, what the future will hold is uncertain. In addition to the performance measures to select a recommended corridor, the alternatives were also scrutinized to make sure that whichever alignment was recommended would be resilient and functional for most potential futures for the Town of Plainfield.

10.1 INTRODUCTION

Scenario Planning is a strategic planning method used to make more flexible long-term plans. Specifically, scenario planning explores the interaction of pre-determined elements, driving forces, and critical uncertainties to develop a set of scenarios that represent possible futures that might be faced. Through interviews with the Town of Plainfield and Hendricks County along with feedback from the CAC, the study leaders combined several government initiatives, development opportunities, and community partnerships with the vision and objectives outlined in the Town's comprehensive plan to create multiple future scenarios for the area.

10.2 PLAINFIELD GROWTH SCENARIOS

Three different potential growth scenarios were drafted. These three scenarios attempt to capture (as best as possible) the bookends of potential growth scenarios along with a middle of the road growth scenario. The developed scenarios may be found in ***Appendix H – Scenario Planning***, but are summarized below:

- Explosive Growth - The Town of Plainfield, and by extension, southern Hendricks County continues to see tremendous interest from the commercial, residential, and industrial sectors.
- Adaptive Re-Use - The advancement of robotics and the conversion to more automated logistics and fulfillment centers creates renewed interest in Downtown Plainfield and the Ronald Regan corridor.

- Regional Partnerships – With the national economy under duress, freight and logistics continue to be a stabilizing force, leading to the development of unique partnerships in the region.

These scenarios were also presented to the CAC and the stakeholder groups to help brainstorm concepts for the area and vet the highlighted alternatives. The goal of the activity was to not only understand how best to assess the alternatives, but to also appreciate which alternative was most resilient, regardless of the future of the area.

An alternative that would be most resilient, regardless of Plainfield's future, would be one that offers both immediate and future transportation benefits. Immediate benefits would be providing some reduction in traffic congestion on the existing road network, such as US 40 through downtown and Hadley Road.

Under the "Explosive Growth" scenario, as the Town of Plainfield continues to see high volume commercial, residential, and industrial growth, development will expand to the west to SR 39. This development will continue to apply pressure to the existing, rural grid network. Drivers will look for connectivity to I-70, in lieu of travel to an already congested SR 267 corridor. Additionally, northwest to southeast connectivity will improve travel time reliability by shortening the distance created by the existing roadway grid. As development continues into the future the expansion potential of the corridor will be needed to grow from 2 lanes to a 4-lane divided facility.

In the "Adaptive Re-use" scenario, existing industrial and commercial facilities will be redeveloped as square footage requirements continue to lessen. However, with this conversion, more workers will be required to support a 24-hour work cycle. This employment demand coupled with the Town's attractive amenities and affordable cost of living will encourage additional residential development to the west. An increasing workforce and corresponding commuter demand will also put pressure on the existing rural roadway grid. Northwest to southeast connectivity will improve travel time reliability as commuter traffic can be directed directly to I-70 while local traffic can use the existing grid to drive toward downtown Plainfield and the Ronald Reagan corridor.

While considering the "Regional Partnership" scenario, the idea of logistics and freight being the connective tissue of the region rose to the forefront. The combination of an available workforce in Indianapolis, the industrial needs along the Ronald Reagan and Ameriplex Parkway, combined with the fulfillment capabilities in the region placed a network premium on the existing transportation network. In order to relieve pressure on the SR 267 corridor and provide travel time reliability to the interstate, another connection to I-70 was identified. This connection needs to support the existing residential areas to the west of SR 267 without increasing the overall travel distance significantly.

Alternative DX, the highest scoring alternative in the evaluation matrix, would provide both immediate and future transportation benefits. As noted in both the explosive growth and adaptive re-use scenarios, a need for travel time reliability is required west of SR

267. Irrespective of the development scale, having a northwest to southeast corridor is demonstrated. Additionally, the importance of another access to I-70 is highlighted in all scenarios. Because the distance from SR 267 to the next adjacent access is the most critical consideration of the various scenarios, Alternative DX will be the most resilient relative to the futures identified for the Town of Plainfield.

11.0 CORRIDOR CHARACTER

The blend of natural and agricultural character along the corridor should be considered in the next phases of design. We recommend being mindful to preserve and even celebrate existing features and the "personality" of the landscape whenever feasible. Design decisions should echo the spirit of place while adhering to budgetary constraints, timelines, and physical limitations. The strategies below include considerations for further design evaluation, such as rural and natural context sensitive strategies, pedestrian connectivity, and the overall character of place.

Corridor Pedestrian Connectivity Strategies

- Right-of-way to minimally allow for a pedestrian facility, and whenever possible, include bicycle facilities.
- Consider connections to larger pedestrian and bicycle systems to eliminate "trail to no-where" infrastructure and safety conflicts at the start/stop of facilities.
- Provide for safe and visible crossings at intersections.
- Celebrate natural, historical, and agricultural character of the corridor with wayfinding and interpretive signage.
- Utilize lighting and tree plantings to provide additional safety elements and create pleasant pedestrian experiences.

Agricultural and Rural Character Strategies

- Study design corridor improvements to minimize negative impacts on natural features, habitat, buildings, properties, and agricultural character.
- Take advantage of wide Right-of-way areas to buffer surrounding properties whenever possible.
- Access natural areas and design the corridor to avoid mature or significant trees, natural systems, and high-quality habitat whenever possible.
- Add to or replace trees and vegetation following corridor improvements to ensure adjacent parcels are buffered from vehicular facilities whenever practical. Mimic surrounding plant communities blend into existing vegetation along the corridor.
- Propose planting species that prioritize native trees, shrubs, grasses, and wildflowers. Whenever possible, incorporate engineered drainage systems (i.e. vegetated swales, planted drainage basins, etc.) to mimic and blend into the natural systems along the corridor where appropriate.

- When identity elements are proposed, utilize materials and forms that are inspired by, consistent with, and pay tribute to the agricultural and rural heritage of the community.

12.0 CONCEPTUAL COST ESTIMATE

Conceptual cost estimates were developed for each build alternative based on the corridor alignments. Cost estimates included construction, right-of-way acquisition, potential utility relocations, and environmental mitigation. More detailed cost estimates may be found in ***Appendix E – Engineer's Opinion of Probable Costs***. A condensed version of the cost analysis is shown below in **Figure 8** and **Table 25**.

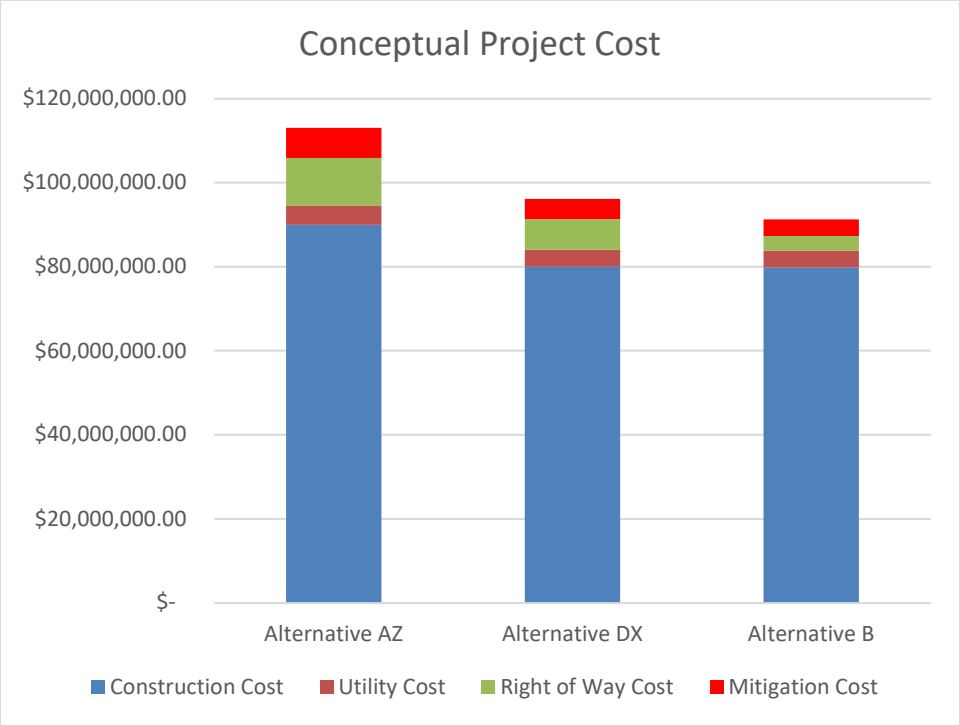


FIGURE 8 - CONCEPTUAL PROJECT COST

TABLE 25 - CONCEPTUAL PROJECT COST

	Alternative AZ	Alternative DX	Alternative B
Construction Cost	$ 89,940,000.00	$ 80,000,000.00	$ 79,830,000.00
Utility Cost	$ 4,500,000.00	$ 4,000,000.00	$ 3,992,000.00
Right of Way Cost	$ 11,420,000.00	$ 7,300,000.00	$ 3,480,000.00
Mitigation Cost	$ 7,200,000.00	$ 4,800,000.00	$ 3,990,000.00
Total Cost	$ 113,060,000.00	$ 96,100,000.00	$ 91,300,000.00

Alternatives B and DX are within the margin of error for preliminary engineering cost estimates. Alternative B is estimated to be the lowest cost alternative at $91.3 million while Alternative AZ is estimated to be the most expensive at $113 million. Alternative B is 0.1-0.2 miles shorter than the other alternative alignments. Because the alignment does not extend through established residential areas, the right of way cost for Alternative B is lowest, approximately $3.8 million less than Alternative DX. Alternative B would have a more expensive interchange to I-70 due to it impacting the existing rest areas. Alternative AZ has the longest length of bridges over bodies of water, which increases the potential for higher mitigation costs; it is also the longest alignment length and cuts through areas with existing residential. While Alternative DX is more expensive than Alternative B, they are within a margin of error for preliminary engineering cost estimates, and the configuration of the interchange with the rest areas could prove to be more costly than estimated dependent on FHWA and INDOT plans for the rest area facilities.

13.0 RECOMMENDATIONS

Several performance criteria were used to analyze the No Build and Build alternatives. After using an evaluation matrix to weight analysis results, the recommended connector corridor alignment should follow **Alternative DX**, the central alignment. This alternative provides the lowest predicted crash rate of the build alternatives, and safety was the highest weighted performance metric. Alternative DX was also the highest scoring alternative for system compatibility and regional connectivity as well as providing for quality of place opportunities as Plainfield continues to grow.

The corridor was assumed to have a cross section as shown for a major suburban arterial on page 114 of the *2019 Town of Plainfield Thoroughfare Plan*. This cross section would ultimately have two travel lanes in each direction, a center median/turn lane, buffer space and non-motorized travel facilities. Actual right of way limits and cross-sectional elements will need to be finalized in a future design process. The corridor design speed was assumed to be 55 MPH based on the Plainfield TDM.

14.0 DISCLAIMER

This report is a planning study for the Town of Plainfield and Hendricks County. The study excludes any potential future changes/alterations to the rest areas and the interchange at I-70 and SR 267. Improvements to the I-70 and SR 267 interchange may impact the recommendations presented in this study.

15.0 FUTURE WORK

The recommendations from this study are for planning purposes and were developed using high-level traffic analysis data. Once funding is available, a more detailed analysis will be needed to develop and design an interchange and corridor.

16.0 CONCURRENCE

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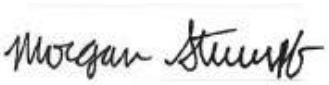

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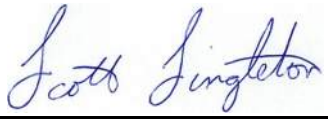
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