I-65/I-70 North Split Project
Indianapolis, Indiana

Des. Nos. 1592385 and 1600808

ALTERNATIVES SCREENING REPORT

September 21, 2018

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1 INTRODUCTION

The Indiana Department of Transportation (INDOT) is developing a project involving the I-65/I-70 North Junction interchange (North Split) in Indianapolis, Indiana, in partnership with the Federal Highway Administration (FHWA). I-65 and I-70 are nationally significant corridors, serving the Midwest and United States in four directions. The North Split is the second-most heavily-traveled interchange in Indiana, accommodating about 214,000 vehicles per day. The objective of this project is to meet the transportation needs at the North Split with a safe, well-functioning facility.

Based on the condition of existing infrastructure, INDOT determined that the North Split requires repair, and the construction effort needed for these repairs creates an opportunity to improve the safety and operations of the interchange. The need for repairs in and near the North Split interchange is based on the deteriorated condition of bridges and existing pavement. Bridges located in or near the interchange require rehabilitation or replacement due to their structural condition (see **Figure 1-1**). The existing pavement also requires rehabilitation or replacement.

The purpose of the North Split Alternatives Screening Report is to identify a preliminary preferred alternative to be evaluated in the Environmental Assessment (EA) for the project. The EA is being developed to meet the requirements of the National Environmental Policy Act of 1969 (NEPA). The NEPA process for this project began by identifying project needs and scoping potential alternatives to be evaluated in the environmental study.

NEPA requires Federal agencies to prepare an environmental analysis for projects that may significantly affect the environment. FHWA has determined an EA is the appropriate level of analysis for this project. The purpose of an EA is to determine if a project will have significant impacts on the environment. If not, a Finding of No Significant Impact (FONSI) will be issued by FHWA, which will mark the end of the NEPA process and document the decision. If significant impacts are identified during the EA process, additional studies or an Environmental Impact Statement (EIS) may be required.

Figure 1-1: Washington Street Bridge

▲ *Many bridges in the project area show age-related wear such as rust and damage from leaking water.*

An EA describes why the transportation project is needed, the alternatives that were studied, and their potential impacts. It also provides opportunities for public and agency comments. Environmental impacts play an important role – alongside other considerations such as performance and cost – in decisions made about a project. The EA is made available for the public to review, and a public hearing is held to present its conclusions. The project sponsor (INDOT) must consider all the comments received during this process before making a final decision about the project.

INDOT is involving local stakeholders during the NEPA process for this project. Stakeholders include residents and other interested parties who help INDOT understand the needs and concerns about a project. A Community Advisory Committee (CAC) has been formed to discuss the project's progress and decisions. The CAC is made up of individuals and organizations with a vested interest in the project area. They assist INDOT in gaining stakeholder feedback, identifying and resolving local concerns, and involving the community during the decision-

making process. Input given by stakeholders, residents, and business owners at large-scale public meetings and smaller working group meetings also play a key role in the development of the North Split project.

The location of the North Split interchange with respect to the downtown interstate system is shown in **Figure 1-2**. The North Split project study area boundary identified in NEPA early coordination extended south along I-65/I-70 to Washington Street, west along I-65 to Meridian Street, and east along I-70 to the bridge over Valley Avenue (see **Figure 1-3**). Current traffic flow patterns through the interchange are shown in **Figure 1-4**. The project area is surrounded primarily by residential and commercial developments with some recreational land uses.

In addition to its poor physical condition, the interchange configuration is inefficient and poorly suited for the volumes of traffic it is serving. Reconstructing the infrastructure to correct physical deficiencies will provide the opportunity to improve safety and reduce congestion by realigning ramps and merges in the interchange area and correcting existing weaving problems.

1.1 North Split Interchange History

I-65 and I-70 are unofficially known as the "inner loop" where they pass through downtown Indianapolis (see **Figure 1-2**). The inner loop is approximately 4-1/2 miles long and provides 25 entrance and exit ramps serving all sections of downtown. The downtown interstates were constructed in the late 1960s and early 1970s, with the last section opening to traffic in October 1976. As in many urbanized areas during the early era of interstate highways, construction of the interstates in Indianapolis had substantial community impacts, displacing residents and separating existing neighborhoods in and near downtown.

The North Split interchange was constructed in stages. The I-65 legs to the west and south were completed in 1968, and the east leg to I-70 was completed in 1976. The interchange was designed for an additional interstate highway to the north, called I-165 or the "Northeast Freeway." The Northeast Freeway was proposed to link the North Split interchange with I-69 near Castleton. Congress recognized the first three miles north of I-65 as a "spur" (designated I-165) in the official interstate system. The remaining six miles to Castleton were not recognized in the system. Binford Boulevard was to be upgraded to interstate standards with state and local funds. The I-165 project was abandoned in 1980 and the spur was removed from the interstate system.

Minor safety improvements were made to the North Split soon after it opened and various maintenance projects have been accomplished over the years. In 2003, INDOT reconstructed the mainline pavement between the North Split and the South Split[1] – a project known as HyperFix. Other projects have been completed near the North Split where specific ramps or bridges required immediate repair. However, as currently conceived, the North Split project will be the first to address the operational and maintenance needs of the ramps, connections, bridges, and pavement through the North Split since the interchange was originally constructed.

Spurred by worsening bridge and pavement conditions and longstanding operational problems, INDOT prepared a Project Intent Report in 2016 to outline a conceptual approach to improve traffic operations on I-65 from Vermont Street to Fall Creek Parkway and on I-70 from the North Split to the I-465 east leg. The Project Intent Report covered approximately nine miles along I-65 and I-70. The purpose of the report was to support the programming process for individual projects and to provide a starting point for later, more detailed project-level studies. The North Split interchange was one of the projects identified in the 2016 Project Intent Report.

Although the Project Intent Report defined the North Split as a project and included preliminary assumptions for programming, it did not identify a preferred alternative. A final preferred alternative is not defined until a detailed alternatives analysis is conducted as part of the EA, with public and agency input. This Alternatives Screening Report identifies a preliminary preferred alternative for public input and more detailed analysis.

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[1] *The South Split is the I-65/I-70 South Junction interchange of I-65 and I-70. It is located about 1-1/2 miles south of the North Split.*

Figure 1-2: Indianapolis Downtown Interstate System

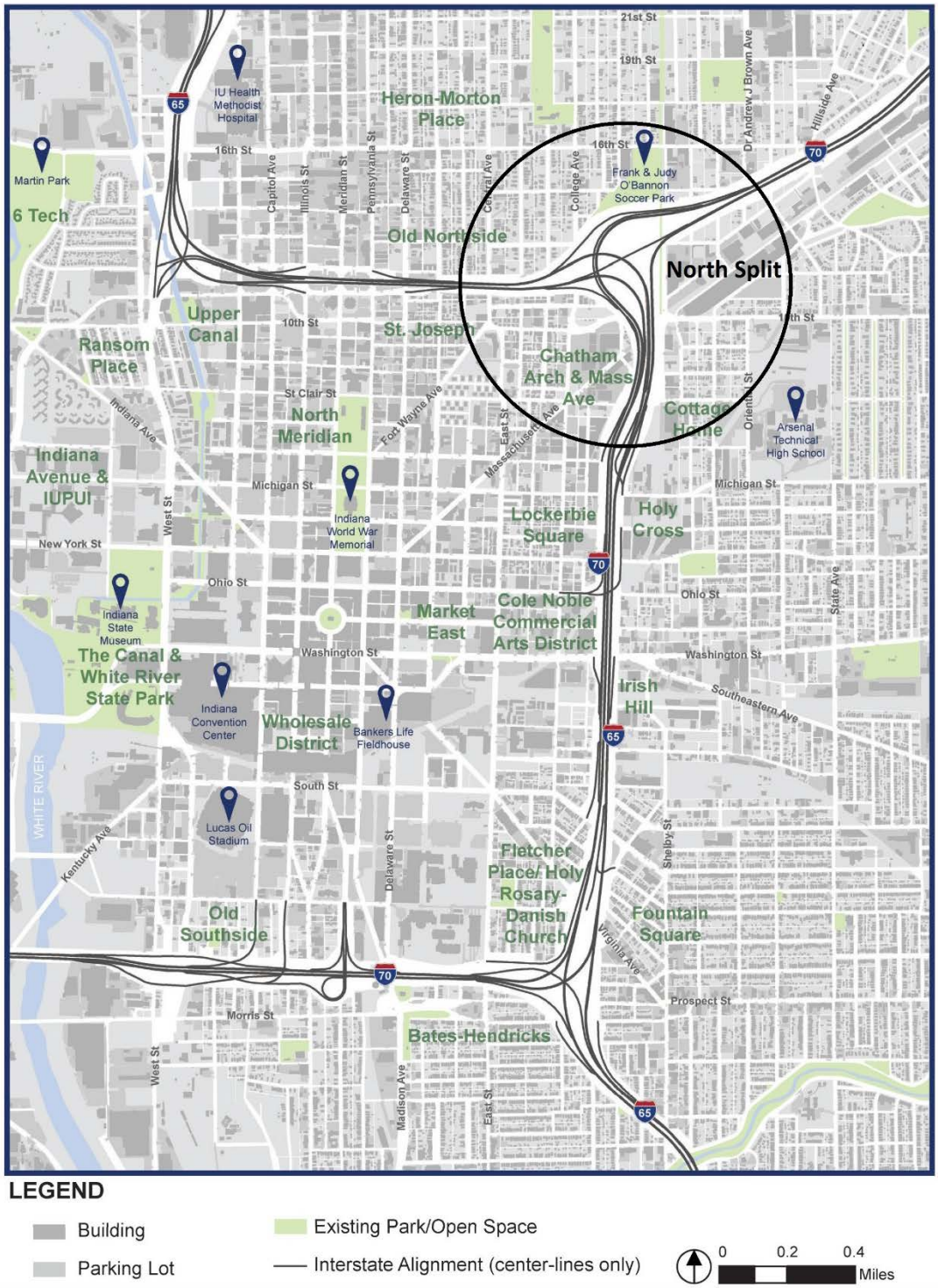


Figure 1-3: I-65/I-70 North Split Project Study Area

Figure 1-4: Existing North Split Traffic Flow

1.2 System-Level Analysis

As the North Split project was initiated, activities and information focused on upgrades of the existing North Split interchange and connecting roadways, with most construction to occur within existing right-of-way. The preliminary project needs and scope were shared with agencies and the public in initial project kick-off meetings in September 2017. Following these meetings, several community groups submitted comments suggesting that INDOT consider a broader scope of all downtown interstates as the North Split project-level scope was being prepared. These comments suggested alternative proposals at a system level that included diverting traffic off the interstates to other routes and converting downtown interstates to boulevards, and/or depressing or tunneling the interstates to operate below ground level.

INDOT agreed to conduct a high-level planning study of potential changes to the downtown interstate system, including concepts proposed by community groups. The study was called the System-Level Analysis. Concepts

were reviewed to identify their potential effectiveness in meeting mobility needs, probable cost, and traffic impacts downtown and in nearby neighborhoods.

The System-Level Analysis was conducted to support public dialogue and to determine whether the North Split project scope should be adjusted to address system-level issues. It was recognized that additional future studies would be needed to fully define a future system. The System-Level Analysis provided a baseline for future studies by evaluating performance, impacts, and costs of a range of potential options. The options were not ranked and no specific system-level recommendation was made in the study.

The System-Level Analysis study area was the full downtown interstate system shown in **Figure 1-2**. Alternative concepts proposed by various groups were intended to enhance connectivity, sustainability, and economic vitality of downtown Indianapolis and surrounding neighborhoods. These concepts are listed below.

1. No-Build (maintain existing configurations)
2. Transportation System Management (TSM), including diversion of through traffic to I-465 and/or transit*
3. Upgrade existing interstates for entire inner loop
4. Depress downtown interstates*
5. Replace interstates with at-grade boulevards*
6. Construct at-grade boulevards + interstates in tunnels*
7. Construct new interstate link – new I-65 west leg

*Suggested by various community groups

The results of the System-Level Analysis were published in a report released on May 3, 2018, and were presented to the CAC and several local groups during May and early June. A public open house was held to present the results of the System-Level Analysis on May 23, 2018.

At the conclusion of the System-Level Analysis, it was determined that the North Split interchange should tie in with the existing interstate system, and the North Split environmental study should move forward, with the scope of the project to be defined in the NEPA process. Project-level alternatives for the EA would be developed that best meet the project purpose and needs while minimizing impacts on the surrounding environment. Comments on the System-Level Analysis would be considered in developing these project-level alternatives, and efforts would be made to minimize the width and footprint, and to make other adjustments to respond to community concerns.

It was recognized that concepts for the inner loop interstate system are larger in size and scope than the North Split project and would take many years to plan, study, design, and implement. The current condition of the North Split interchange requires that it be reconstructed in the near term (next two to four years), and that it must connect and work effectively with the interstate system that currently exists.

The System-Level Analysis recognized plans for the inner loop could evolve in the future, and portions of the North Split interchange might need to be modified or replaced to fit with larger system changes. It was concluded that these considerations would not preclude the need for a North Split project to move forward to link with the existing interstate system and meet near term needs.

Public comments were accepted for the System-Level Analysis through June 14, 2018. Public comments are posted to the project website at www.northsplit.com and are available to guide future system-level studies by local or regional governmental or community groups.

1.3 Report Organization

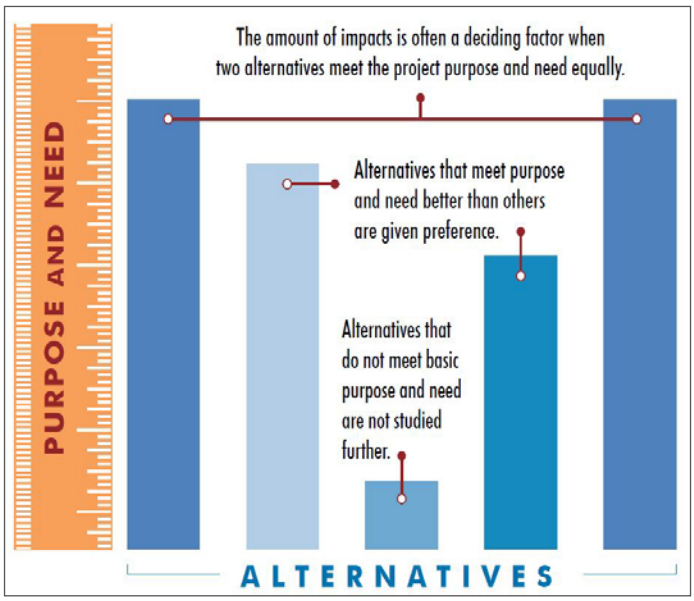
This Alternatives Screening Report focuses on the development of project-level alternatives for the North Split interchange. The process begins with a review of project purpose and need in **Chapter 2**. Criteria for alternatives development are described in **Chapter 3**. The alternatives are described in **Chapter 4**, and the results of the screening process are provided in **Chapter 5**.

2 PROJECT PURPOSE AND NEED

The project area is centered on the I-65/I-70 North Split interchange in downtown Indianapolis (see **Figure 1-3**). The layout and condition of connecting roadways are considered in defining the logical termini of the project. To the east, the logical terminus is where I-70 crosses over Valley Avenue, where bridge reconstruction was performed in 2007. To the west, the logical terminus of the project area is I-65 near Alabama Street for the mainline, and Meridian Street for the ramps on each side of I-65 to provide local access both north and south. South of the interchange, the logical terminus is the Washington Street interchange, to include improvements for a series of deteriorated bridges.

The project purpose and need identifies the transportation problems a project must solve. Purpose and need acts as a "measuring stick" for project alternatives (**Figure 2-1**), helping determine to what extent each alternative achieves project objectives. Build alternatives that do not meet the purpose and need of a project are not studied further. Assuming all other factors are equal, the alternative that best meets the project purpose and need is favored as the project progresses.

Figure 2-1: Meeting Project Purpose and Need



2.1 Purpose and Needs of the I-65/I-70 North Split Project

PURPOSE: The purpose of the I-65/I-70 North Split project is to rehabilitate and improve the existing interstate facilities within the North Split project area.

NEEDS: The I-65/I-70 North Split project must meet the following transportation needs:

- Correct deteriorated bridge conditions;
- Correct deteriorated pavement conditions;
- Improve safety by reducing or eliminating conditions that result in crashes; and
- Improve interchange operations and reduce congestion by eliminating bottlenecks.

Each of these needs is described in further detail below.

2.1.1 Correct Deteriorated Bridge Conditions

INDOT inspects each of its bridges every two years and documents the results in Routine Bridge Inspection Reports. Bridges are considered structurally deficient in Bridge Inspection Reports if their physical condition is deteriorated to an unacceptable degree.

All bridges in the project area are showing wear due to: (1) continuous use by large traffic volumes; and (2) weather-related deterioration over a long period of time. On many concrete bridges in the project area, the concrete is cracked, split, broken off, damaged from salt and leaking water, and patched to correct previous problems. Steel used to reinforce the concrete is often exposed and rusted. Steel bridge components – such as beams, bearing plates, and hinges – are also rusted, some so severely their function is compromised (See **Figure 2-2**).

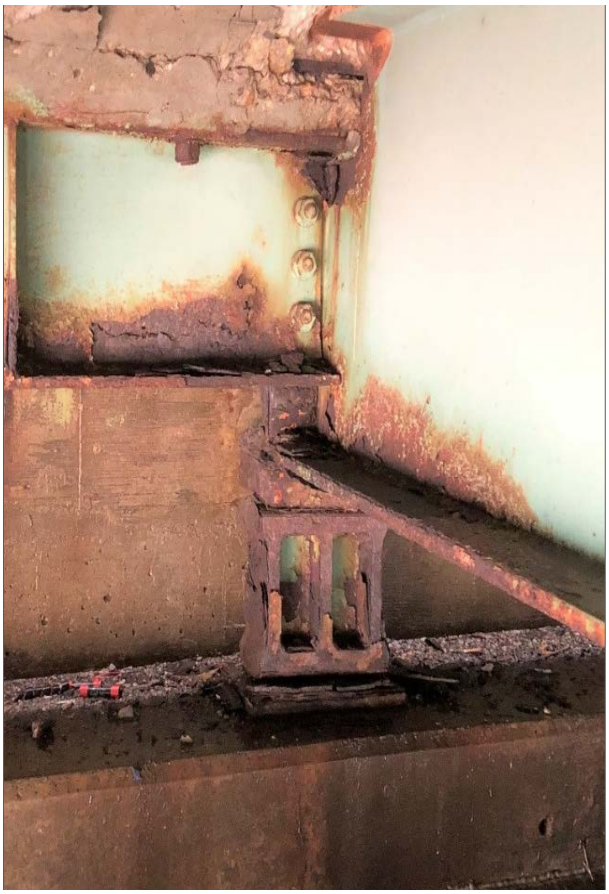
The estimated remaining service life of bridges represents the period before replacement or rehabilitation is required to address severe conditions. This estimate is based on the condition and age of existing bridge components, the use of each bridge, and the expected life of the components. The measure of current condition is based on the controlling condition rating from the Routine Bridge Inspection Report or a modified condition rating based on recent inspections by the project team.

The estimated remaining life of bridges in the North Split project area is summarized in **Table 2-1** and is shown by location in **Figure 2-3.** Of the 31 bridges, 27 are estimated to have less than 10 years of remaining service life before major repairs or reconstruction are needed. Eleven of the bridges only have less than five years of remaining service life.

All bridges replaced or rehabilitated as part of the North Split project would be designed to meet current standards unless design exceptions are approved by INDOT and/or FHWA to meet special conditions. Current standards would be met for bridge design load capacity at all locations.

In 2017, INDOT identified seven bridges (Numbers 1, 4, 6, 8, 11, 14, and 27) that require immediate repair. Bridge preventative maintenance treatments in fall 2018 will extend the remaining service life of these bridges for up to five years. INDOT is considering whether additional bridges in the North Split project area might require preventative maintenance in 2019 (prior to the full North Split project).

Figure 2-2: Physical Bridge Deficiencies



▲ *Many bridges in the project area show age-related wear such as rust and damage from leaking water.*

Table 2-1: Estimated Remaining Bridge Life

ESTIMATED REMAINING LIFE	BRIDGE NUMBERS (See Figure 2-3)
Less than 5 years	1, 3, 4, 5, 6, 8, 14, 15, 16, 17, 18
5 - 10 years	2, 7, 9, 10, 11, 12, 13, 19, 20, 21, 22, 23, 24, 25, 26, 27
More than 10 years	28, 29, 30, 31

Figure 2-3: Estimated Remaining Bridge Life

2.1.2 Correct Deteriorated Pavement Conditions

When the North Split interchange was constructed in 1968, the design life of the concrete pavement was 30 years. This original pavement is still in place and is showing age-related wear. The pavement's surface has become "polished" over time, a condition which reduces friction for vehicles traveling along the roadway. Pavement friction tests indicate that project area pavement has low friction values, which can increase the likelihood of skidding during wet conditions. INDOT also uses an international roughness index (IRI) to evaluate how the pavement affects the vehicle ride quality and to estimate design life. The IRI measures pavement surface deviations (irregularities or "bumpiness"). As the IRI increases, ride quality decreases.

The IRI values for mainline pavement in the project area range from 166 to 201. These values exceed the threshold value of 160, which indicates the pavement is at or beyond the end of its useful life.

The concrete and asphalt pavement is deteriorating through the project area. See **Figure 2-4**. Frequent patching is required to repair cracks and holes in the mainline concrete pavement, especially along I-65/I-70 south of the North Split. These types of maintenance operations in the North Split project area often require lane closures and result in traffic delays.

The asphalt shoulders are in poor condition and starting to oxidize, which is a process where pavement becomes brittle and cracks. Water in the cracks causes further damage as water freezes and expands during winter conditions. Aggregate particles in the shoulders are beginning to come loose, a condition referred to as raveling. This leads to loose debris on the roadway and can cause the shoulders to have poor traction when wet. INDOT testing shows the shoulder pavement has failed in some areas and requires full replacement.

Figure 2-4: Deteriorated Pavement Conditions

▲ *The pavement in the project area requires frequent patching to repair cracks and holes. Photo source: Earth Explorations*

2.1.3 Improve Safety

The project team analyzed crashes in the project area between 2012 and 2016.[2] The analysis included crashes on mainline I-65 and I-70, the westbound I-70 to southbound I-65 collector-distributor (C-D) road, and the directional ramps in the North Split interchange. Crashes on ramps between the interstates and local roadways were not included to allow comparisons between the North Split and urban interstates statewide, as shown in **Table 2-2**.

The crash rates per 100 million vehicle miles traveled (100 MVMT) in **Table 2-2** were determined for fatality, injury, and property damage crashes. The North Split crash rate was higher in all categories than crash rates experienced on other urban interstates in Indiana. Property damage crashes were about 2.3 times higher, and injury crashes were 2.8 higher in the North Split. High crash rates per vehicle miles traveled indicate conditions other than high traffic volumes are contributing to the large number of crashes.

[2] *Crash data retrieved from the Automated Reporting Information Exchange System (ARIES).*

Table 2-2: North Split to Statewide Crash Rate Comparison (2012 – 2016)

Crash Severity	INDOT 5-year Statewide Urban Interstate Crash Rate per 100 MVMT[1]	North Split 5-year Crash Rate per 100 MVMT	North Split Crash Rate vs INDOT Statewide Urban Interstate Crash Rate
Fatality	0.39	0.72	1.8 Times Higher
Injury	16.22	45.27	2.8 Times Higher
Property Damage	69.60	163.23	2.3 Times Higher

1. Source: INDOT Office of Traffic Safety

Figure 2-5 shows the breakdown of crashes in the study area by type. From 2012-2016, there were 1,656 crashes in the North Split project area. Of these, five were fatal crashes (0.3%) resulting in six fatalities, 288 were injury crashes (17%) resulting in 378 persons injured, and 1,363 (82%) were property damage only crashes. The primary type of crash was "rear-end" with 775 crash events, representing 47% percent of all crashes. "Sideswipe" was the second-most predominant crash type with 465 crash events, representing 28% of all crashes. **Figure 2-6** shows the location of crashes in the North Split project area

The high percentage of rear-end crashes is attributable to congestion, as motorists collide with stopped vehicles. The sideswipes are attributable to congestion, lane changes, and weaving movements. Weaving collisions occur when motorists cross a lane or multiple lanes of traffic to make a movement to or from the interstate. An example of weaving would be northbound I-65 motorists attempting to exit at the Meridian/Pennsylvania Street northbound exit ramp, and having to cross or "weave" with the westbound motorists traveling from I-70 to I-65.

Figure 2-5: Five-Year Crash Summary (2012-2016)

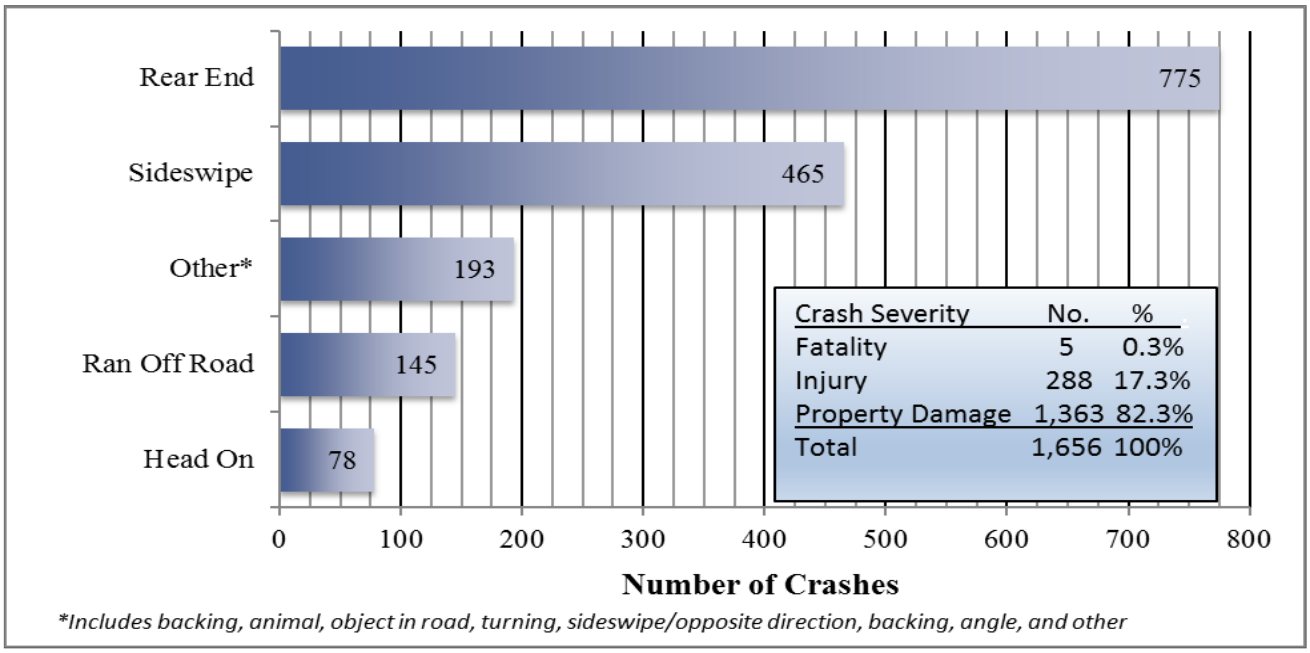


Figure 2-6: North Split Crash Locations (2012-2016)

The proposed project is intended to improve safety by reducing or eliminating conditions that result in crashes for traffic using I-65 and I-70. Based on roughly tenth mile location data provided by crash reports, the top four crash sites in the North Split project area between 2012 and 2016 are listed below:

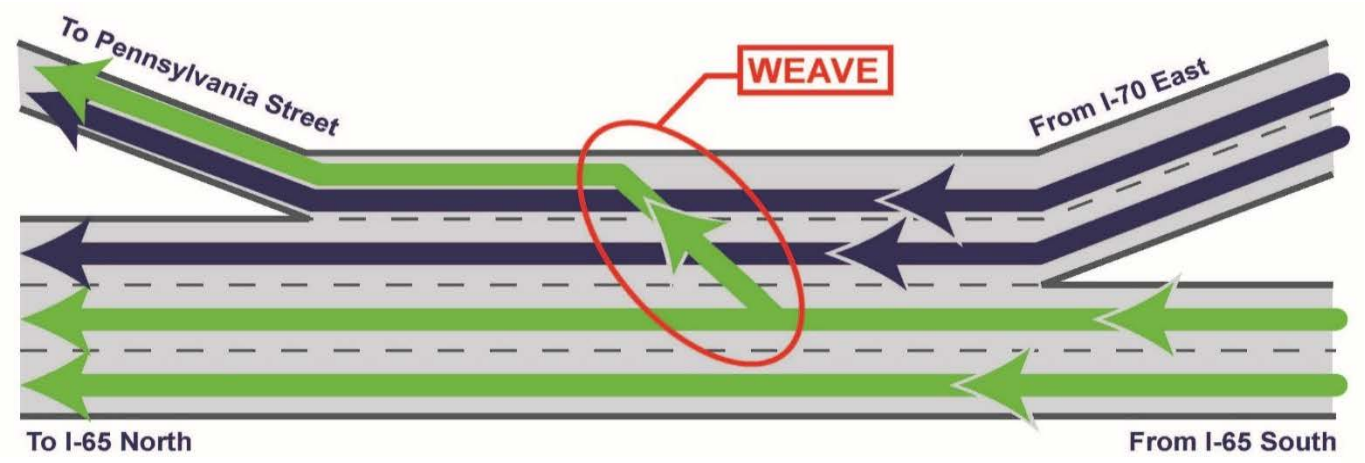
1. I-65 northbound at Meridian/Pennsylvania Street exit ramp, west leg of North Split
2. I-65 southbound at Meridian/Delaware Street entrance ramp, west leg of North Split
3. I-65 southbound and I-70 westbound merge point on south leg of North Split
4. I-70 eastbound, abrupt curve from south leg to east leg of North Split

These four sites account for approximately 20 percent of the total crashes in the project study area. Their location is shown in **Figure 2-8**.

The two locations with the highest number of crashes in the North Split project area are on the west leg of the interchange, in the weaving areas of the Meridian/Pennsylvania Street exit ramp[3] and the Meridian/Delaware Street entrance ramp.[4] The most frequent crash type at the Meridian/Pennsylvania Street exit ramp is rear-end, followed by sideswipe. The most frequent crash type at the Meridian/Delaware Street entrance ramp is sideswipe, followed by rear-end.

As shown in **Figure 2-7**, I-65 northbound traffic and I-70 westbound traffic to I-65 northbound experience a major conflict zone in the space of 1,575 feet between the branch connection and the Meridian/Pennsylvania Street exit ramp. The I-65 northbound traffic exiting at the Meridian/Pennsylvania Street ramp must shift two lanes across I-70 traffic to reach the exit. As the I-70 traffic crosses the I-65 exiting traffic, it loses a lane at the right side due to a lane drop at the Meridian/Pennsylvania Street exit ramp. These conflicts are further compounded by the large volume of I-70 traffic that quickly moves left to access the exit at West Street a short distance downstream.

Figure 2-7: Meridian/Pennsylvania Street Weave

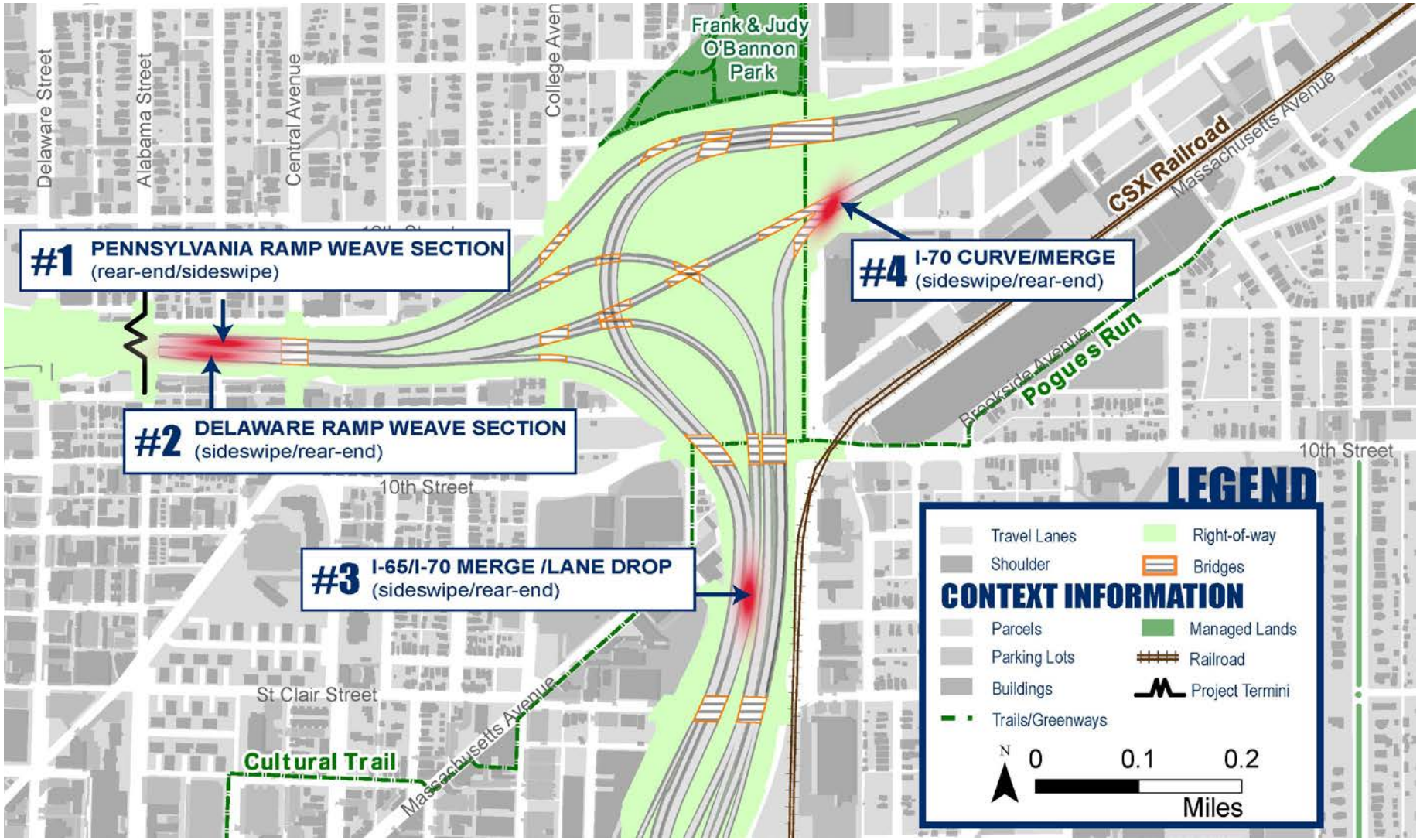


I-65 traffic from the south must cross one lane and merge with a second lane to exit at Meridian/Pennsylvania Street.

[3] *This exit is signed "Meridian St, Pennsylvania St" but the first street intersected by the ramp is Pennsylvania Street. This ramp is referred to as the "Meridian/Pennsylvania Street exit ramp" throughout the remainder of this report.*

[4] *This ramp is referred to as the "Meridian/Delaware Street entrance ramp" throughout the remainder of this report.*

Figure 2-8: High Crash Locations

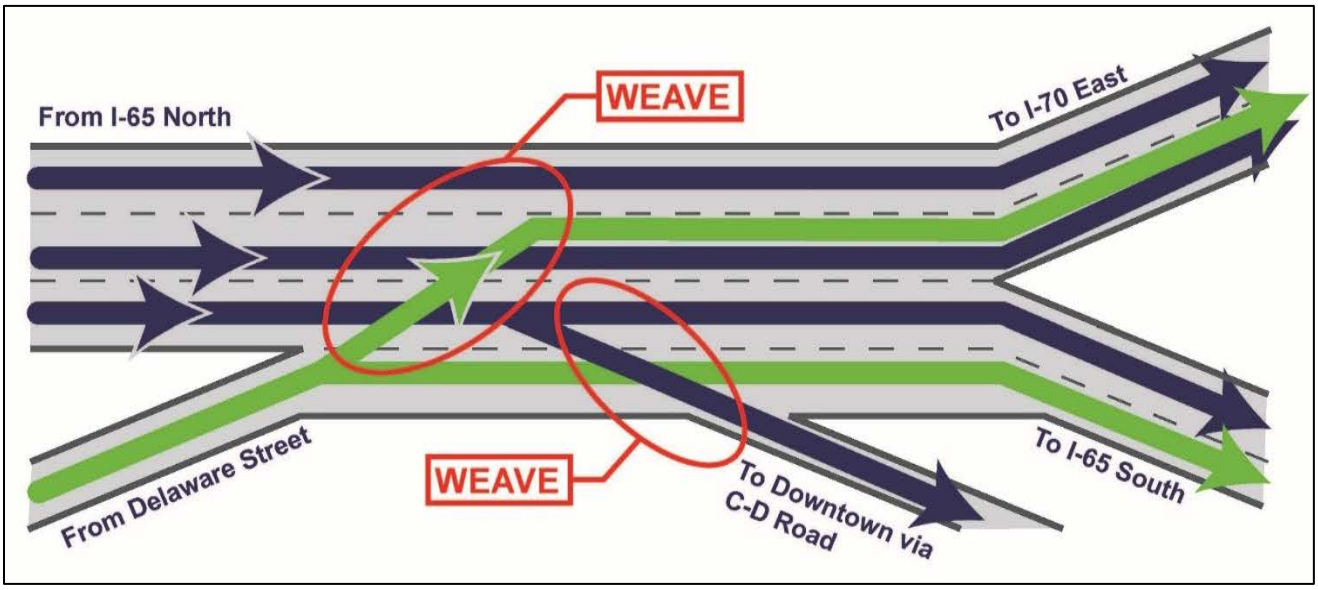


There are two weaving movements at the Meridian/Delaware Street entrance ramp. As shown in **Figure 2-9**, traffic entering from Meridian and Delaware Street must cross one lane and merge into a second lane in 1,875 feet to continue onto I-70 eastbound. To exit at the C-D road that serves Ohio and New York Streets, I-65 southbound vehicles must move right into the lane where vehicles are entering from the Meridian/Delaware Street ramp. These conflicts are compounded by traffic entering I-65 southbound on the left at West Street that must cross two lanes to access the C-D road or to continue on I-65 southbound at the North Split.

The third highest crash location in the interchange is the merge point where I-65 southbound and I-70 westbound join on the south leg of the interchange. See **Figure 2-8**. I-70 is reduced from two lanes to one lane at the location of the merge. Two lanes on I-65 join with two lanes on I-70 to form three lanes as the lane is dropped on I-70. The most frequent crash type at this location is sideswipe, followed by rear-end.

The fourth highest crash location in the North Split is the abrupt turn where I-70 turns east through the interchange as it leaves the south leg and enters the east leg. See **Figure 2-8**. The most frequent crash type at this location is sideswipe, followed by rear-end. I-70 is three-lanes wide at this location and the approach to this curve is on an uphill grade.

Figure 2-9: Meridian/Delaware Street Weave



Traffic from Meridian and Delaware Streets to I-70 must cross one lane of I-65 and merge with a second lane to proceed on I-70. Traffic from Meridian and Delaware Streets to I-65 must cross traffic exiting from I-65 to the Collector-Distributer (C-D) road to downtown exits.

2.1.4 Improve Interchange Operations and Reduce Congestion

"Operations" is a term used to describe the intended function of an interchange to distribute traffic through the area on an appropriate path to reach an intended destination. Interchange operations are negatively affected by high traffic volumes, substandard design features (such as sharp curves), merge areas where lanes join together, and weaving areas where traffic movements cross each other. Three legs of the interstate highway system

converge at the North Split, which require a series of weaves, merges, and diverging movements to make some connections.

In the morning peak period, northbound and westbound traffic experiences a breakdown in operations at the North Split. Traffic often backs up for nearly two miles from Pennsylvania Street to Keystone Avenue. In the afternoon peak period, southbound and eastbound traffic is congested and on-ramp traffic backups occur. This traffic congestion increases the potential for vehicle crashes, particularly rear-end crashes, that occur during stop-and-go conditions.

Critical locations where traffic congestion occurs are referred to as "bottlenecks." FHWA has identified nine conditions that create bottlenecks in interchange areas.[5] One of these, "freeway to freeway interchanges," defines the North Split interchange itself. Others refer to specific conditions within the interchange. Four bottleneck conditions identified by FHWA exist in the North Split interchange. These four bottleneck conditions are shown in the headings of **Table 2-3**, and their locations in the interchange are listed in **Table 2-3** and shown in **Figure 2-10**.

Table 2-3: Existing North Split Bottlenecks

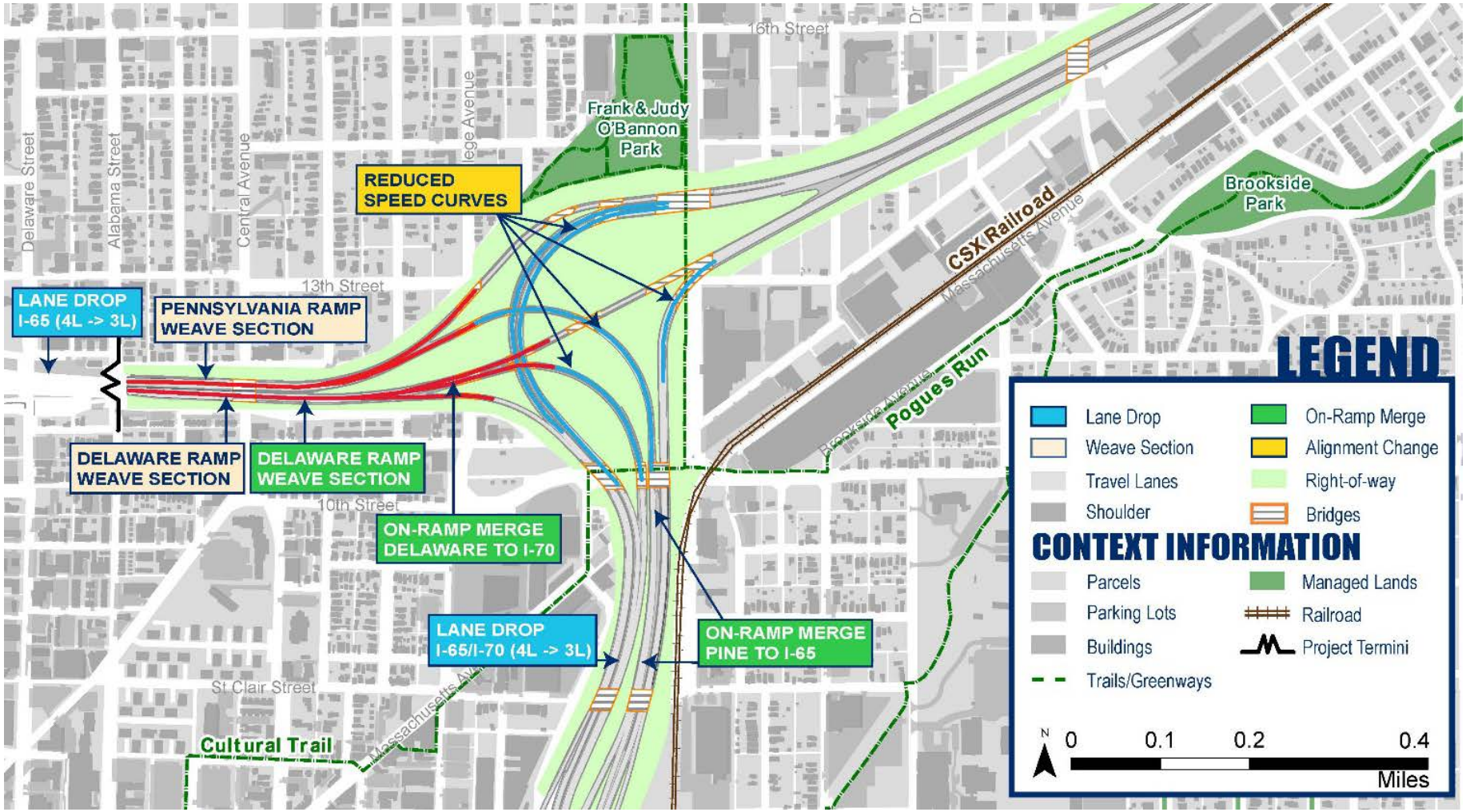
Roadway Section	Lane Drop[1]	Weave lanes[2]	On-Ramp Merge[3]	Alignment[4]
I-65 SB		1 (C-D), 1 (Delaware)	1 (Delaware)	2-lane curve
I-65 NB	1 (Pennsylvania)	2 (Pennsylvania)	2 (Pine)	2-lane curve
I-70 WB	1 (I-65)	1 (Pennsylvania)		2-lane curve
I-70 EB			1 (Delaware)	3-lane curve
C-D SB				2-lane curve
Delaware		2 (I-70 EB), 1 (I-65 SB)		
TOTAL	2 lanes	8 lanes	4 lanes	5 curves

1 At a "lane drop," one or more traffic lanes are lost. Ideally, lane drops should be located at exit ramps where there is a sufficient volume of exiting traffic, like at the Meridian/Pennsylvania Street exit ramp.
2 In a "weaving area," traffic must merge across one or more lanes to access entry or exit ramps or to enter the freeway main lanes. Bottleneck conditions are exacerbated by complex or insufficient weaving design and distance.
3 "Freeway on-ramps" are merging areas where traffic from local streets can join a freeway.
4. "Changes in highway alignment" occur at sharp curves and hills and cause drivers to slow down.

The most severe bottlenecks in the North Split are the weaving sections at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp. The crossing movement required for traffic passing from the South Split to the North Split on I-65 or I-70, is referred to as the "big weave" by INDOT staff. I-65 northbound traffic leaves the South Split on the right side and enters the North Split on the left side. I-70 eastbound traffic enters this section on the left side and leaves on the right side, which requires motorists to cross paths. This weave is longer (1.4 miles) than the weaves at Meridian/Pennsylvania Street and Meridian/Delaware Street ramps, but the number of weaving vehicles is higher. The "big weave" is also considered a hazard by INDOT engineers, although it is difficult to associate it with specific crashes due to the large roadway section affected.

[5] *FHWA, "Traffic Bottlenecks: A Primer – Focus on Low-Cost Solutions" (4th Edition, November 2017)* https://ops.fhwa.dot.gov/publications/fhwahop18013/fhwahop18013.pdf

Figure 2-10: I-65/I-70 North Split Interchange Bottleneck Locations



Level of Service (LOS) is a common way of describing the degree of traffic congestion on roadways, using “grades” on a letter scale from LOS A (best) to LOS F (worst). LOS A represents near ideal traffic flow, while LOS F represents a breakdown of the traffic flow. LOS relates to operations, not the physical condition of the roadway. **Figure 2-11** provides a description of the various levels of service on interstate highways.

INDOT conducted traffic counts in the project area in 2014. These traffic volume counts provided the basis for estimating the amount of traffic that will travel on I-65 and I-70 in 2017 and 2041. Traffic operations were then analyzed for two “peak hours”. The morning peak hour is 7:15 AM to 8:15 AM. The afternoon peak hour is 4:15 PM to 5:15 PM. These traffic estimates will be updated for the No-Build and preliminary preferred alternative during the NEPA process.

Today, many of the freeway sections in the project area operate below LOS D during one or both peak hours, as shown in **Figure 2-12** for 2017. With no changes to the configuration of the interchange, future operations are forecasted to be worse, as shown for year 2041 in **Figure 2-13**. Some sections currently operate at LOS E or LOS F. In the morning, northbound and westbound traffic experiences a breakdown in operations. In the evening, the southbound and eastbound traffic experiences congestion and on-ramp traffic backups occur.

INDOT’s minimum standard for peak hour operations on interstate highways is typically LOS D, with desired LOS C when practical. Deviations from this standard occur in some cases, however, when achievement is not feasible and practical due to the restrictive environment of urban areas. While improving the operations of the North Split interchange will be a priority in this project, the LOS to be achieved will be determined based on a study of opportunities for improvement balanced with cost and impact.

Figure 2-11: Level of Service (LOS) A - F

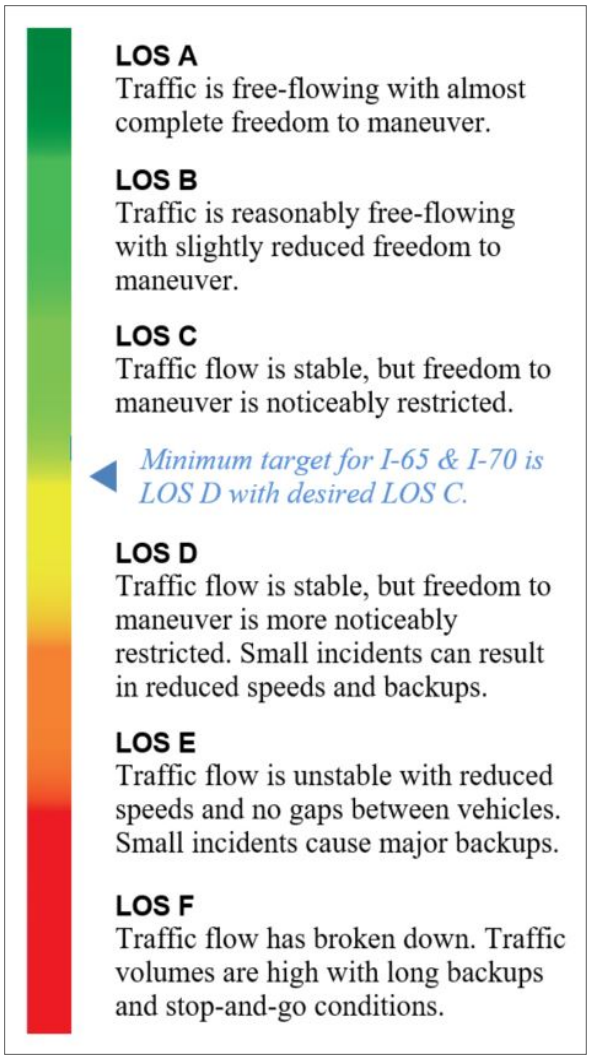
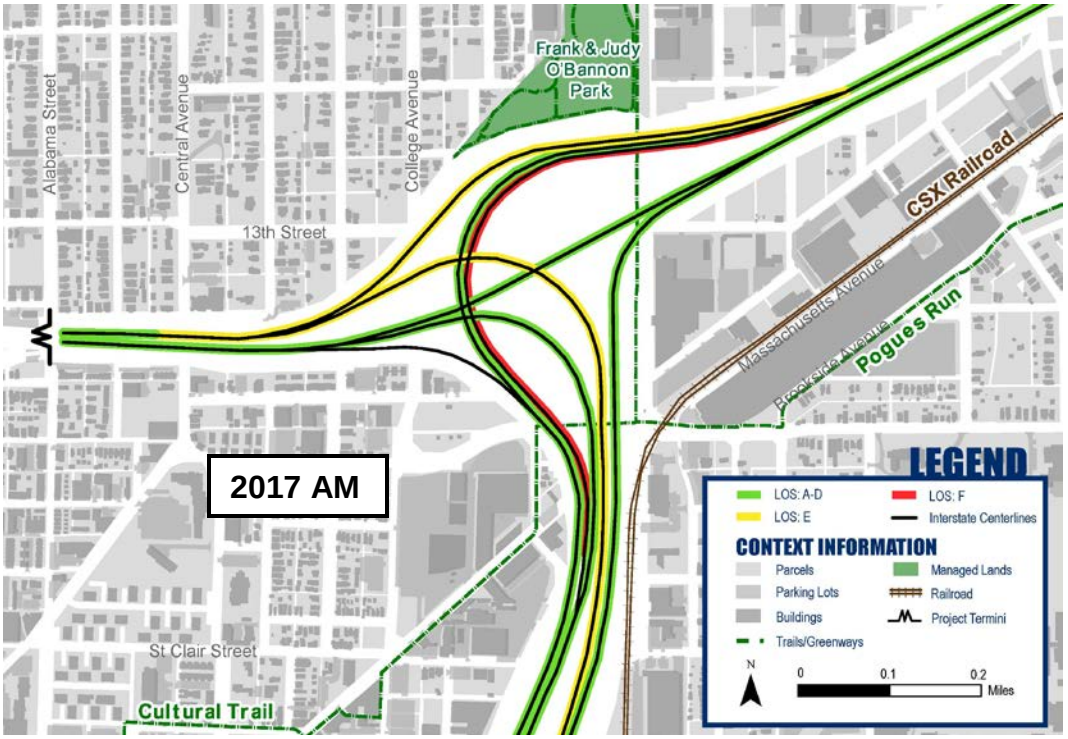


Figure 2-12: 2017 Levels of Service



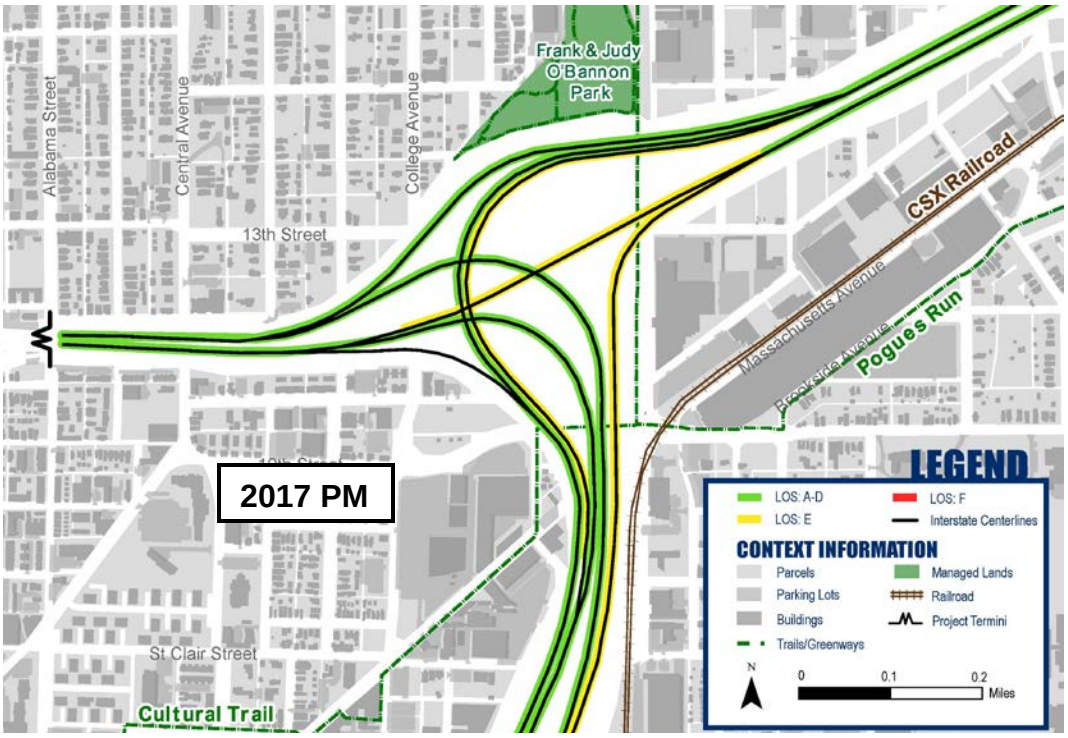
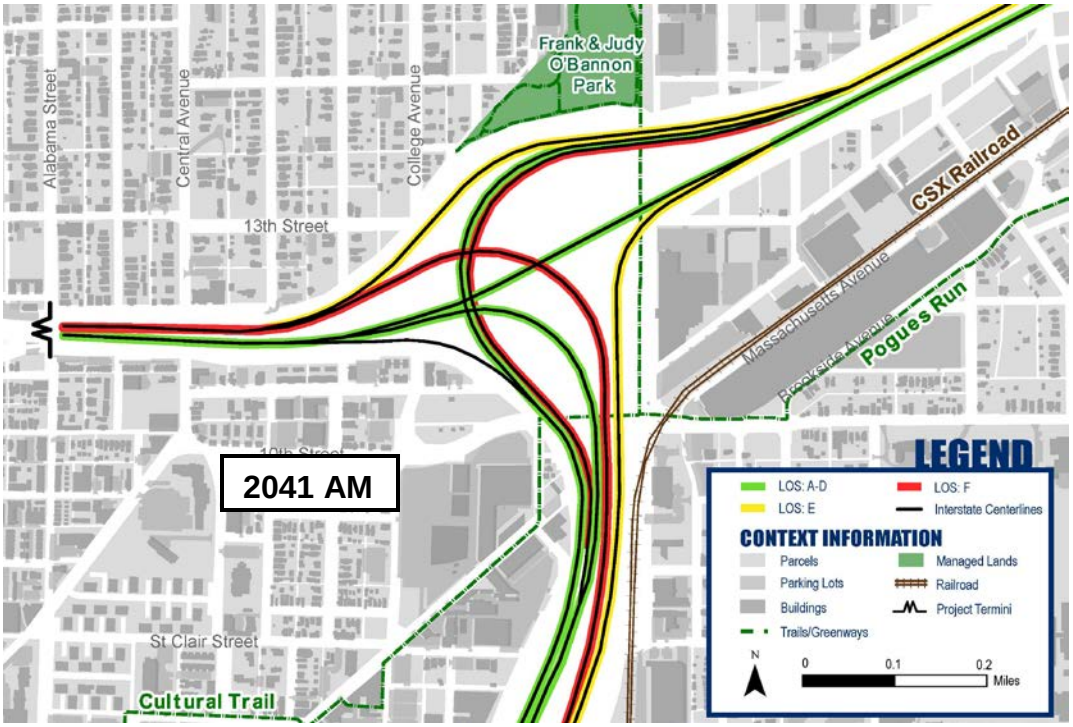
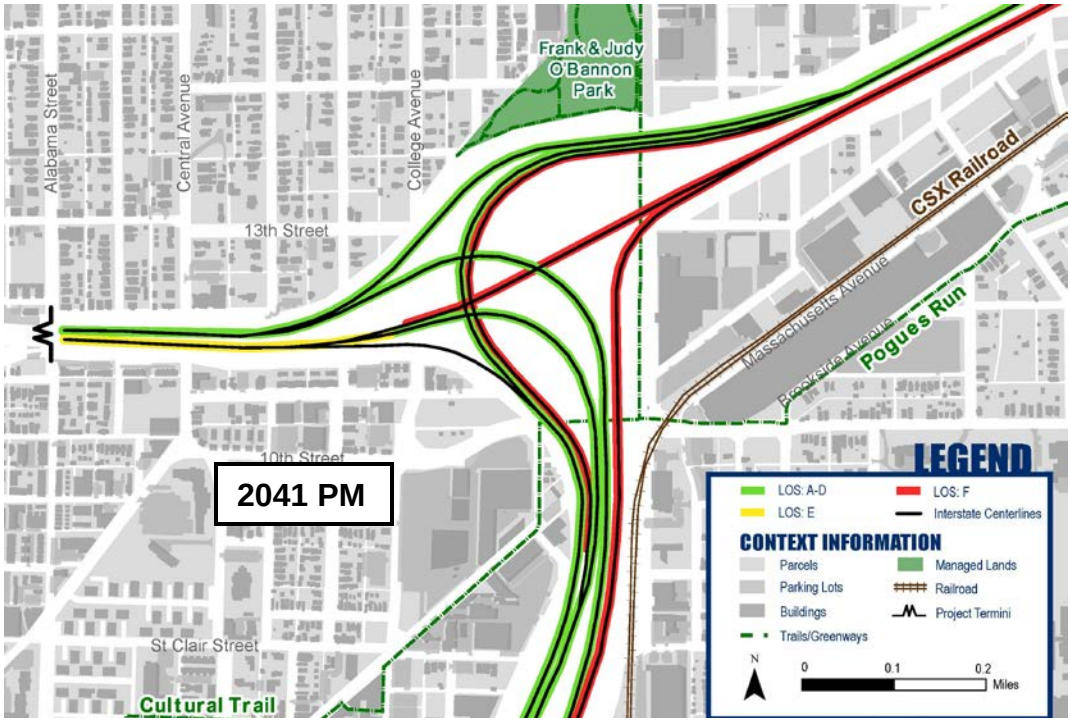


Figure 2-13: 2041 Levels of Service





2.2 Performance Measures

Performance measures are used to measure the effectiveness of alternatives in meeting project needs. **Table 2-4** presents the performance measures for each of the North Split project needs described in **Section 2.1**. These performance measures are intended for use in evaluating alternatives in this Alternatives Screening Report.

Table 2-4: Proposed Performance Measures

Project Need	Performance Measures
Correct Deteriorated Bridge Conditions	- Address deficient structural condition: Y/N
Correct Deteriorated Pavement Conditions	- Address deficient pavement condition: Y/N
Improve Safety	Alternative must address weaves on the west leg of the North Split: 1. Eliminate Meridian/Pennsylvania Street exit ramp weave: Y/N 2. Eliminate Meridian/Delaware Street entrance ramp weave: Y/N Alternative should include improvements at the following two crash locations: 3. Improve conditions at I-65 southbound/I-70 westbound merge point: Y/N 4. Improve curvature on I-70 northbound to I-70 eastbound: Y/N
Improve Interchange Operations and Reduce Congestion	- Improve Interstate level of service over No Build condition: Y/N - Eliminate “big weave” on I-65/I-70 south of North Split: Y/N

2.3 Summary of Purpose and Need

The North Split project purpose and needs are summarized below.

PURPOSE: The purpose of the I-65/I-70 North Split project is to rehabilitate and improve the existing interstate facilities leading to and through the I-65/I-70 North Split interchange in downtown Indianapolis.

NEEDS: The I-65/I-70 North Split project must meet the following transportation needs:

- **Correct deteriorated bridge conditions.** The proposed project is intended to correct deteriorated I-65/I-70 North Split bridge conditions within the I-65/I-70 North Split project area.
- **Correct deteriorated pavement conditions.** The proposed project is intended to correct the deteriorated pavement conditions on the interstates within the I-65/I-70 North Split project area.
- **Improve safety.** The proposed project is intended to improve safety by reducing or eliminating conditions that contribute to crashes along I-65 and I-70.
- **Improve interchange operations and reduce congestion.** The proposed project is intended to improve operations in the I-65/I-70 North Split project area by removing weaving sections and improving level of service now and in 2041.

3 CRITERIA FOR ALTERNATIVES DEVELOPMENT

Alternatives development for the North Split project is influenced by several factors. Transportation objectives relate to the physical, safety, and operational deficiencies to be corrected. System-level conditions, impacts on the surrounding neighborhood, and public and agency input are factors that relate to the community being served. These factors are briefly reviewed in this section.

3.1 Transportation Objectives

The overall transportation objectives of the North Split project relate to the deficiencies described in **Section 2.1** and the project purpose and need presented in **Section 2.3**. The first two needs are associated with deteriorated infrastructure, which requires the rehabilitation or replacement of bridges and pavement at most locations in the project area. The third need is safety, with the weaves at the Meridian/Pennsylvania Street exit ramp and Meridian/Delaware Street entrance ramp identified as the most hazardous conditions. Improved traffic operations and reduced congestion is the fourth need. These traffic operations would also be improved with elimination of the ramp weaving sections.

The first test for all potential alternatives is the satisfaction of the project purpose and need, as described in **Section 2**. Alternatives that do not meet the project purpose and need will be eliminated and not be carried forward for evaluation in the EA.

3.2 System-Level Context

The System-Level Analysis conducted for the Indianapolis downtown interstate system completed in May 2018 provided an initial review of large-scale changes to the existing system. (See **Section 1.2**.) It concluded that more detailed study with extensive public involvement over an extended period would be needed before committing to any of these major changes.

The System-Level Analysis showed extensive diversion to the local street network and large increases in delay if downtown interstates were replaced with at-grade facilities such as boulevards. Extensive land-use changes or local street improvements would be needed for advancing any boulevard concept. Depressing downtown interstates or constructing tunnel sections would involve major infrastructure changes, with high costs and extensive engineering challenges.

A conservative estimate of time to initiate, plan, prepare environmental impact studies, finance, program, and construct projects of the magnitude of the system-level options would be 10 years. Assuming staged construction, implementation would extend this time considerably. As shown in **Table 2-1**, most of the bridges in the North Split project area would be well past their useful life by the time the first stage was complete. Existing pavement in the North Split project area also require replacement much sooner.

In addition to addressing deteriorated bridges and pavement, reconstruction would provide the opportunity to reconfigure the interchange to improve safety and reduce congestion. The existing configurations of I-65 and I-70 as they approach the interchange will define the connection points. If there are major changes to the downtown interstate system in the future, the design of the new components would need to consider the reconfigured North Split. Meanwhile, the safety and operations benefits of the current project would accrue, and the reconstructed interchange would provide a high-quality junction for these heavily traveled corridors in the future.

3.3 Community Impacts

Potential impacts to the community have been considered throughout the alternatives development process. The surrounding area is densely developed with residential and commercial properties abutting the right-of-way. There are six historic districts listed in or eligible for the National Register of Historic Places (National Register) immediately adjacent to the existing right-of-way. The Frank & Judy O'Bannon Park is immediately north of the interchange. The Monon Greenway and the Cultural Trail cross under the interstates within the project area. Environmental resources near the project area are shown in **Figure 3-1**.

As a result of the types of land use that surround the project area, an objective with all build alternatives is to minimize or avoid right-of-way acquisition. Visual impact, bicycle and pedestrian connectivity between neighborhoods, and traffic impacts on local streets are other considerations in developing alternatives.

3.4 Public and Agency Input

The North Split project has generated a high degree of interest in the community. The System-Level Analysis was conducted by INDOT in response to suggestions that alternatives be reviewed for the downtown interstate system that could affect North Split design. INDOT has received input from the CAC, and Environmental Justice Working Group, Section 106 consulting parties, and the public. These groups will continue to be consulted as the NEPA process continues.

On June 7, 2018, Indianapolis Mayor Joe Hogsett made the following requests in a letter to the North Split project team:

> "I urge INDOT to minimize harm to downtown neighborhoods while striving, 'to maintain the existing interchange in a safe, functioning condition.' As the design process unfolds over the next several months, I will ask INDOT to keep the interstate within the existing road bed; make necessary bridge repairs to address valid safety concerns; make short-term repairs to allow further exploration of the long-term system-wide concepts; and build a project that does not preclude future construction of those concepts.
>
> Above all, I will stress that the state must continue to seek public input for a project that must strike an appropriate balance between the needs of downtown residents and suburban commuters."

On July 23, 2018, the Indianapolis Chamber of Commerce proposed the following draft set of principles to guide their approach to the North Split and future work on inner-loop highway network:

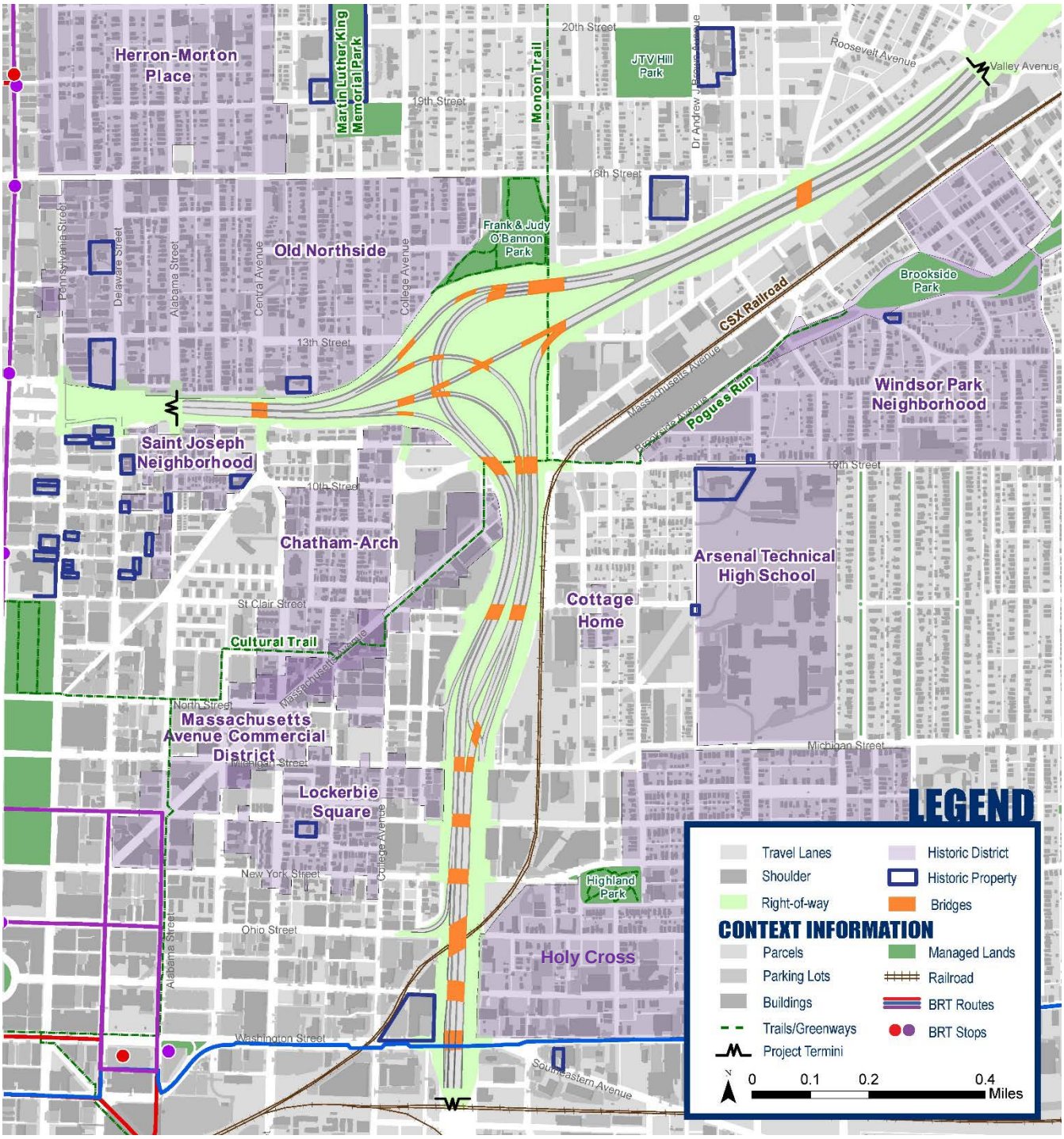
1. No above-grade walls outside the North Split interchange along the North, East, and South legs of I-65, I-65/70, and I-70*;
2. No expansion of the number of above-grade through lanes along the North, East, and South Legs of I-65, I-65/70, and I-70;
3. Increased connectivity of neighborhoods and areas of commerce divided by the interstates; and reduced visual barriers;
4. Increased opportunity for inclusive economic development along the path of interstates.

   *These proscriptions apply to the areas outside of the North Split interchange (bounded roughly by College, 10th, and Commerce) and the South Split interchange (bounded roughly by East St., Orange St., and Calvary St.

The four principles listed above have also been put forth by community advocacy groups on their website and communicated to the project team in stakeholder meetings.

The requests to avoid large above-grade walls to accommodate additional through lanes has been a consistent theme in comments received from stakeholder groups and the public. The development and evaluation of North Split alternatives has been responsive to these requests while balancing the need to address safety concerns in the interchange. Increased connectivity, visual enhancements, and other community objectives will be addressed in all remaining project phases as a part of context sensitive design.

Figure 3-1: Environmental Resources



4 DESCRIPTION OF ALTERNATIVES

Potential alternatives for the North Split project range from only completing frequent, critical maintenance projects to keep the interstate safely open to traffic (also known as the “No-Build” Alternative) to completely reconstructing the interchange and interstates within the project area to improve safety, remove bottlenecks, and provide added capacity. Potential alternatives within this range are described and reviewed in this section.

Alternatives are defined at a sufficient level of detail to support decision-making at a screening level. The preliminary preferred alternative will be carried forward and analyzed in greater detail in the EA. The following potential alternatives are defined and reviewed in this section:

- Alternative 1 - No-Build Alternative
- Alternative 2 - Transportation System Management (TSM) Alternative
- Alternative 3 - Replacement of Bridges and Pavement In-Kind
- Alternative 4 - Efficient Interchange Reconstruction
- Alternative 5 - Full Interchange Reconstruction

4.1 Alternative 1 - No-Build Alternative

With the No-Build Alternative, the existing interchange would stay as it is, without replacement of pavement and bridges. No safety or operational (capacity and/or congestion or weaving) improvements would be made. The number of lanes and their locations in the system would remain the same as existing. The existing ramp connections to local streets would not change.

Due to the age and deterioration of the existing system, the No-Build Alternative would require frequent maintenance and rehabilitation projects to maintain the safety and integrity of the interstate facility and local street connections. The types of projects to be scheduled would likely include the following:

- Pavement patching, overlay, and replacement of failed sections,
- Bridge reinforcement, replacement of components, and rehabilitation, and
- Drainage, signing, and lighting maintenance.

The No-Build Alternative assumes other programmed projects in the region would be implemented. The regional program of projects is listed in the Indianapolis Regional Transportation Improvement Program (IRTIP) maintained by the Indianapolis Metropolitan Planning Organization (IMPO) (http://www.indympo.org/).

4.2 Alternative 2 - Transportation System Management (TSM) Alternative

Transportation System Management (TSM) alternatives include activities which maximize the efficiency of the present transportation system by changing its operation. These projects focus on improving traffic flow and reducing traveler delay. TSM alternatives are often evaluated along with Transportation Demand Management (TDM) options, which focus on changing travel behavior (trip rates, trip length, travel mode, time-of-day, etc.). Park and ride facilities, shifting/separating freight movements, and bicycle/pedestrian facilities are examples of TSM/TDM alternatives.

FHWA has developed a series of documents and guidelines related to enhanced freeway management and operations (M&O). Transportation systems M&O is defined by the legislation "Moving Ahead for Progress in the 21st Century" (MAP-21) as the use of "integrated strategies to optimize the performance of existing infrastructure through the implementation of multimodal and intermodal, cross-jurisdictional systems, services, and projects designed to preserve capacity and improve the security, safety, and reliability of the transportation system." (3 MAP-21, SEC. 1103, Definitions. http://www.fhwa.dot.gov/map21/legislation.cfm.)

FHWA's Freeway Management and Operations Handbook states: "Freeway traffic management and operations is the implementation of policies, strategies and technologies to improve freeway performance. The overriding objectives of freeway management programs are to minimize congestion (and its side effects), improve safety, enhance overall mobility, and provide support to other agencies during emergencies."[6]

The FHWA publication, "Designing for Transportation Management and Operations,"[7] provides a listing of potential M&O strategies. Additional strategies are identified in FHWA's "Recurring Traffic Bottlenecks, Focus on Low-Cost Operational Improvements."[8] **Table 4-1** lists these potential strategies and identifies considerations regarding their potential as TSM strategies for the North Split project. As shown in the table, most strategies already exist or would not be applicable for the North Split project. Three strategies are identified as potentially feasible. Each of these potential strategies is reviewed below.

4.2.1 Transportation Demand Management (TDM)

As indicated previously, TDM strategies focus on changing travel behavior to reduce demand, which might reduce or eliminate the need for costly system improvements. Potential TDM strategies were evaluated for the North Split in the "System-Level Analysis for Downtown Interstates" completed in May 2018.[9] The potential actions listed below were reviewed to identify the potential to divert traffic from downtown interstates:

- Diversion of through interstate trips to I-465,
- Diversion of downtown interstate trips with tolling, and
- Diversion of downtown interstate trips to transit.

Diversion to I-465

Traffic that could potentially be diverted from downtown interstates to the I-465 beltway was assumed in the System-Level Analysis to be trips that originate on an interstate at I-465, pass through the downtown on an interstate highway, and leave the area on an interstate at I-465. These trips were estimated by three methods: tracing the path of trips in the nine-county travel demand model, tracing travel paths using location-based services of smart phones, and testing diversion with unlimited capacity on I-465 using the nine-county travel demand model. All three methods indicated approximately 10 percent of the trips on downtown interstates during peak periods are through trips.

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[6] *FHWA, Freeway Management and Operations Handbook, June 2006, page 1-2. http://ops.fhwa.dot.gov/freewaymgmt/publications/frwy_mgmt_handbook/chapter1_01.htm#1-1*

[7] *FHWA, "Designing for Transportation Management and Operations," February 2013, page 4. https://ops.fhwa.dot.gov/publications/fhwahop13013/index.htm*

[8] *FHWA, "Recurring Traffic Bottlenecks, Focus on Low-Cost Operational Improvements," November 2017, Appendix B. https://ops.fhwa.dot.gov/publications/fhwahop18013/fhwahop18013.pdf*

[9] *INDOT, "System-Level Analysis for Downtown Interstates," May 2018.*

Table 4-1: Potential North Split TSM Strategies

	Already Exists	Not Applicable (corridor-based)	Not Applicable (system-based)	Not Applicable (physical constraints)	Not Applicable (non-freeway)	Potential TSM Strategy (see detail)
Strategies from "Designing for Transportation Management and Operations"						
Traffic incident management	X					
Traffic detection and surveillance	X					
Corridor, freeway, and arterial management		X				
Transportation demand management						X
Work zone management	X					
Road weather management			X			
Emergency management			X			
Traveler information services	X					
Congestion pricing		X	X			
Parking management					X	
Traffic control					X	
Commercial vehicle operations		X	X			
Freight management			X			
Strategies from "Recurring Traffic Bottlenecks, Focus on Low-Cost Operational Improvements"						
Use shoulder lane		X		X		
Restripe weave area				X		
Improve merge area				X		
Install individual metered or signalize ramp						X
Widen, extend, remove, or consolidate ramps						X
Improve signalization or intersection design					X	
Install frontage road				X		
Effect "speed harmonization" as in Europe		X				
Encourage "zippering"		X				
Use access management techniques					X	
Provide traveler information	X					

Through traffic could be encouraged to use I-465 by providing and communicating a travel time benefit, or it could be mandated by regulation to use I-465. Travel time is already comparable for many through trips, and the test described above with unlimited capacity on I-465 indicates that a major shift in travel patterns would not occur with improvements to I-465. Through traffic carrying hazardous materials on I-65 and I-70 is currently required by regulation to use I-465.[10] There are no other restrictions in place, and no plans by INDOT, the IMPO, or the City of Indianapolis to regulate through traffic.

Even if through traffic was encouraged or forced to bypass the downtown area, the 10 percent diversion would not satisfy the project purpose and need. It would not improve the physical condition of North Split pavement and bridges, and it would not change the conditions that contribute to crashes. Any reduction in traffic levels would have some degree of positive effect on traffic flow, but the bottlenecks that cause most of the current North Split congestion, as described in **Section 2.1.4**, would not be improved. Since it would not meet the project purpose and need, this TDM strategy is not assumed in a North Split TSM alternative.

Diversion with Tolling

INDOT is currently studying interstate tolling. No decision or timelines on tolling implementation have been made. Selective tolling strategies on interstates inside I-465 could conceivably be used to encourage the diversion of through traffic to I-465 and reduce the volume of traffic on downtown interstates. As noted above, this diversion might improve North Split traffic flow to some degree, but it would not improve bridge and pavement conditions, reduce or eliminate conditions contributing to crashes, or remove existing bottlenecks in the interchange. Since it would not meet the project purpose and need, a tolling strategy is not assumed in a North Split TSM alternative.

Diversion to Transit

The transit system in the Indianapolis Region is undergoing a major transformation as a result of planning studies over the past 10 years and investments funded by new local taxes dedicated to transit. Work began in summer 2018 on the first of three bus rapid transit (BRT) lines. IndyGo also initiated service improvements on local routes. These service improvements are included in the IMPO nine-county travel demand model. The models used in the System-Level Analysis were derived from the IMPO model, so the increased ridership from the service changes was already accounted for. An analysis of potential users of the new BRT lines indicated most traffic diversion from BRT will be on local streets rather than interstates. Overall, the System-Level Analysis concluded that transit would not reduce the demand on downtown interstates sufficiently to eliminate the need for improvement.

As in the System-Level Analysis, the IMPO model is used in this study to evaluate traffic operations for the North Split project. The findings of this screening study are based on forecasted travel demand, and the model of future conditions assumes full implementation of the regional transit plan, including local IndyGo service changes and all three new BRT lines. In other words, these transit improvements are assumed to be fully implemented for all alternatives in this screening report, including any TSM Alternative.

4.2.2 Metered or Signalized Ramps

Ramp management is described in FHWA's "Ramp Management and Control Handbook." That publication defines ramp management as the "application of control devices, such as traffic signals, signing, and gates to regulate the number of vehicles entering or leaving the freeway, in order to achieve operational objectives."[11]

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[10] https://www.federalregister.gov/documents/2000/12/04/00-30815/transportation-of-hazardous-materials-designated-preferred-and-restricted-routes

[11] *FHWA, "Ramp Management and Control Handbook," January 2006, page 1-2.* https://ops.fhwa.dot.gov/publications/ramp_mgmt_handbook/manual/manual/pdf/rm_handbook.pdf

"Ramp management strategies may be used to control access to selected ramps, thus limiting the periods when vehicles may access the ramp or possibly restricting access to the ramp permanently. Ramp management may also control the manner in which vehicles enter a freeway. For instance, vehicles that enter the freeway in platoons introduce turbulence, which causes vehicles on both the mainline and ramp to slow down to safely merge. This causes congestion around and upstream of ramp/freeway merge points. Ramp management strategies may be used to control the flow of vehicles entering a freeway, thus smoothing the rate at which vehicles are allowed to enter the freeway."[12]

The most common form of ramp management is ramp metering, which only allows vehicles to enter the freeway one or two at a time to improve safety and maintain smooth traffic flow on the main line. Ramp metering is most effective when implemented on a system-wide or corridor basis. System-wide control is more flexible than local control in handling reductions in capacity that occur as a result of delay, collisions, and road blockages.

"Local control is a process of selecting metering rates based on conditions present at an individual ramp, rather than conditions along a segment of freeway, freeway corridor, or regional freeway network. Local control is appropriate for individual, non-adjacent ramps where problems are isolated. The primary concern is improving conditions and reducing congestion near the local ramp. In some cases, when local ramp metering is used, congestion problems at the local ramp may appear to be fixed, when in reality problems are transferred to or uncovered at downstream locations. In these situations, local ramp metering is not recommended."[13]

As an isolated location, the opportunities to implement ramp metering in the North Split interchange area are limited since there are only two entrance ramps from local streets. These ramps are located at Meridian/Delaware Street and at Michigan Street across from Pine Street, where traffic enters I-70 eastbound or I-65 northbound on the south leg of the North Split. Operations are poor at the Meridian/Delaware Street entrance ramp due to weaving problems where the ramp joins the main line. Traffic queuing occurs daily on Delaware Street during the afternoon peak due to congestion on the Meridian/Delaware Street entrance ramp. Metering this ramp would cause these queues to extend further into the downtown area, creating a potential for gridlock on the local roadway system. Traffic entering the project area on Pine Street is not a significant problem since a lane is added on the main line at the point of entry, making merging movements unnecessary at the end of the ramp.

Ramp metering at the Meridian/Delaware Street entrance ramp is not assumed in a TSM Alternative due to the limited effectiveness at this isolated location and because of the lack of storage for waiting vehicles on the downtown roadway system. Ramp metering is not assumed in a TSM Alternative at Pine Street due to the limited effectiveness at this isolated location and because of the lack of potential benefit where the ramp traffic enters the interstate.

4.2.3 Widen, Extend, Remove, or Consolidate Ramps

One way to eliminate the weaves at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp would be to remove these ramps from service. This would eliminate conflicts caused by weaving and improve safety at this location, but it would not improve safety and operations in other parts of the interchange. Rather than considering these ramp closures as a single TSM action, they are considered in combination with other adjustments to the interchange as one of the Alternative 4 options (Option 4a). See **Section 4.4**.

[12] *Ibid, pages 1-2 and 1-3.*

[13] *Ibid, page 5-16.*

4.3 Alternative 3 - Replace Bridges and Pavement In-Kind

With Alternative 3, the existing bridges and pavement would be rehabilitated or replaced at their current locations. The project limits would be the same as other build alternatives, as shown in **Figure 1-3**. The south and west project limits would include the Central Avenue and Washington Street bridges, respectively, due to their poor condition. The project limit on the east would be at Valley Avenue, where a bridge and pavement reconstruction project ended in 2007.

Although no safety, operational, or capacity improvements would be implemented with Alternative 3, a substantial investment would be required to address the deteriorated condition of roads and bridges in the project area. It is assumed that the facilities would be upgraded to current interstate design standards where feasible, but numerous design exceptions requiring approval from FHWA would still be needed to maintain the existing alignment and grade of roadways within the interchange. Design exceptions are required in special cases when features do not meet the requirements of the Indiana Design Manual adopted by INDOT.

Replacing pavement and bridges at existing alignment can sometimes have advantages for maintenance of traffic. With no major changes in alignment or elevation of a new roadway, motorists can often be shifted to adjacent lanes as new lanes are built, then use the new lanes while the work is completed. In the case of the North Split, those potential advantages are limited since many of the connections through the interchange are one-lane or two-lane ramps, which would require complete closure. The best opportunities to maintain traffic would be on the interstate legs, where multiple lanes operate in parallel, but this would be the case for any of the alternatives.

4.4 Alternative 4 - Efficient Interchange Reconstruction

With Alternative 4, bridges and pavement would be replaced within the project area, and ramps and connecting roadways would be realigned to provide more direct connections and smoother curves, which would improve safety and operations through the project area. Because the interchange would serve three legs instead of the four legs it was originally designed for, Alternative 4 would be more compact than the existing interchange. No additional through lanes would be constructed with Alternative 4.

A key criterion in defining Alternative 4 is the elimination of the existing weaves at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp. These weaves are illustrated in **Figure 2-7** and **Figure 2-9**, respectively, and are described in **Section 2.1.3**. Currently, the Meridian/Pennsylvania Street exit ramp allows traffic from I-70 westbound and I-65 northbound to leave the interstate system. The Meridian/Delaware Street entrance ramp allows traffic to access I-70 eastbound, I-65 southbound, and the C-D road to downtown exits on the east side of downtown.

There are more crashes in the weaving areas of the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp than anywhere else in the project area. As described in **Section 2.1.4**, these weaves are also the primary bottleneck in the interchange, reducing the level of service and causing congested conditions daily. As shown in **Table 2-4**, eliminating these weaves is defined in the first two performance measures for improving safety. It will be an important part of meeting the purpose and need of the North Split project.

Operations through weaving sections are a function of the volume of crossing traffic and distance available to accomplish the movement. In this case, the lengths of the weaving sections are very short. There are no reasonable options for increasing this distance and traffic volumes are likely to increase over time. Given the constraints, the practical solution is to eliminate the weaves entirely by not forcing traffic to cross paths to make necessary movements. There are three potential ways to eliminate these weaves, as shown in the options below:

Option 4a: Close the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp. Since these movements would no longer be available, there would be no need for traffic to cross paths. Thus, the existing weaves would be eliminated.

Option 4b: Reconfigure the interchange and the west leg to separate the movements that currently cross paths in the weave areas. This would eliminate the weaves and accommodate all movements. A two-lane exit ramp would be provided on the north, and a one-lane entrance ramp would be provided on the south side of the I-65 mainline.

Option 4c: Reconfigure the interchange and the west leg to accommodate some movements and prohibit other movements. Concrete barrier walls would be installed to prohibit movements that would require vehicles to cross paths. Ramps would be realigned in the interchange area to serve single lane ramps on each side of the I-65 mainline.

Each of these options would eliminate the weaving movements on this segment, but the options vary with respect to the degree of mobility provided and the width of new pavement. All options can be constructed within existing right-of-way, but the need for retaining walls and their height would vary for each option.

Each of the Alternative 4 options are described below in greater detail. Regardless of which option(s) are carried forward in the EA, additional design and refinement will be necessary to fully define Alternative 4 and evaluate its impacts.

4.4.1 Option 4a: No Access at Meridian/Pennsylvania and Meridian/Delaware Ramps

Traffic flow through the North Split with Option 4a is shown in **Figure 4-1**. Details of the interchange layout are shown in **Figure 4-2** through **Figure 4-4**. With this option, the existing Meridian/Pennsylvania Street exit ramp and the existing Meridian/Delaware Street entrance ramp would be closed. Either the ramp infrastructure would be removed and replaced with landscaping, or ramp access would be blocked using concrete barriers. A cross-section view of the west leg of the interchange near Central Avenue is provided in **Figure 4-5**. Except for the ramp closures, conditions on this segment would be relatively unchanged. All construction would be within existing right-of-way and there would be no outside retaining walls along the legs of the interchange. The existing pavement would be widened slightly to accommodate new guardrail along each side.

With Option 4a, interstate users would no longer be able to exit onto Meridian and Pennsylvania Streets, and downtown motorists would no longer be able to access to the interstates from Meridian and Delaware Streets. FHWA would need to approve this change in interstate access. To support the decision, FHWA would require the preparation of an Interstate Access Document (IAD) describing operational impacts to the interstate system and the local roadway system. FHWA has a policy of avoiding partial interchanges, meaning a motorist exiting at an interchange should be able to reenter at the same interchange. In this case, that could mean FHWA would require closure of Illinois/Meridian Street entrance ramp and the Meridian/Pennsylvania Street exit ramp since they are part of the same interchange.

The ramp from I-65 southbound on the west leg to I-65/I-70 on the south leg would be realigned slightly in Alternative 4a to provide a longer more sweeping curve, which would improve safety and operations of this movement, identified as one of the bottlenecks in **Table 2-3**. Ramps from I-65 southbound to I-70 eastbound and the C-D road[14] would follow the same general alignment that exists today.

Alternative 4a outside the west leg of the North Split would be reconfigured to address the safety problems described in **Section 2.1.3** and many of the operations problems described in **Section 2.1.4**. The through ramp

[14] *"C-D road" is the collector-distributor roadway parallel and west of I-65/I-70 with exits to downtown Indianapolis at Ohio Street, New York Street, and Michigan Street.*

from I-70 westbound and the ramp from I-70 westbound to the C-D road to downtown exits would remain on the same sweeping alignment. These segments have a 50 mile-per-hour design speed and a relatively low number of crashes, as shown in **Figure 2-6**. The ramp from I-70 westbound to I-65 northbound would be more direct than existing, passing through the central area of the interchange. The realignment of this ramp would reduce the overall footprint of the interchange to the northwest.

All lanes on I-70 on the east leg would merge to match the existing lane configuration of I-70 before reaching Commerce Avenue. The remaining changes to I-70 on the east leg would be limited to pavement replacement and bridge rehabilitation. There would be no widening of pavement or construction of retaining walls along I-70 on the east leg of the interchange.

On the south leg, I-70 eastbound currently enters the interchange on the right (east) and I-65 northbound enters on the left (west). Since I-70 eastbound and I-65 northbound leave the South Split on opposite sides, through traffic on these routes must cross paths between the South Split and North Split interchanges. As described in **Section 2.1.3** and **Section 2.1.4**, this movement is referred to as the "big weave." In Alternative 4a, these entry points would be reversed at the North Split, so that I-65 northbound would enter on the right and I-70 eastbound would enter on the left. Correcting the "big weave" would improve safety and reduce congestion on I-65/I-70 south of the North Split.

I-65 southbound and I-70 westbound would each have two lanes where they join to form a four-lane segment near the center of the interchange. This four-lane segment of I-65/I-70 would extend for about 1,000 feet before merging to three lanes. This configuration would improve the safety and operations at this location, identified as the third highest crash location in the project area (see **Figure 2-8)**.

The realignment of the ramp from I-65/I-70 on the south to I-70 eastbound would provide a smoother movement than the abrupt turn that exists today. This would improve safety at the fourth highest crash location in the project area (see **Figure 2-8)** and would improve operations for this movement (see list of bottlenecks in **Table 2-3**). In addition to improving safety and operations through the interchange, this ramp realignment would reduce the overall interchange footprint to the east.

South of the North Split interchange, Alternative 4a would include adjustments to the entrance ramps at Pine Street to accommodate the changes to I-65 and I-70 as they enter the North Split. The Pine Street entrance ramp would join I-65 northbound with one added lane entering on the right. Currently, traffic from Pine Street enters with two lanes on the left. These lanes merge into one lane, which then merges with the two lanes of I-65 as it enters a curve. Replacing these movements with a single added lane from the right would improve safety. It would also improve operations and reduce congestion as it eliminates one of the bottlenecks shown in **Table 2-3**.

The Pine Street ramp to I-70 eastbound would have two lanes merging from the left with two lanes of I-70 to form three lanes on the ramp through the interchange. Currently, this movement is accomplished by adding a lane from the ramp to the two I-70 lanes from the south. The safety and operations provided by the revised configuration would be similar to existing. There would be no widening of pavement or construction of retaining walls along I-65 and I-70 south of the interchange.

Figure 4-1: Alternative 4a - Traffic Flow

Figure 4-2: Alternative 4a - West Leg

Figure 4-3: Alternative 4a - Central Interchange Area and East Leg

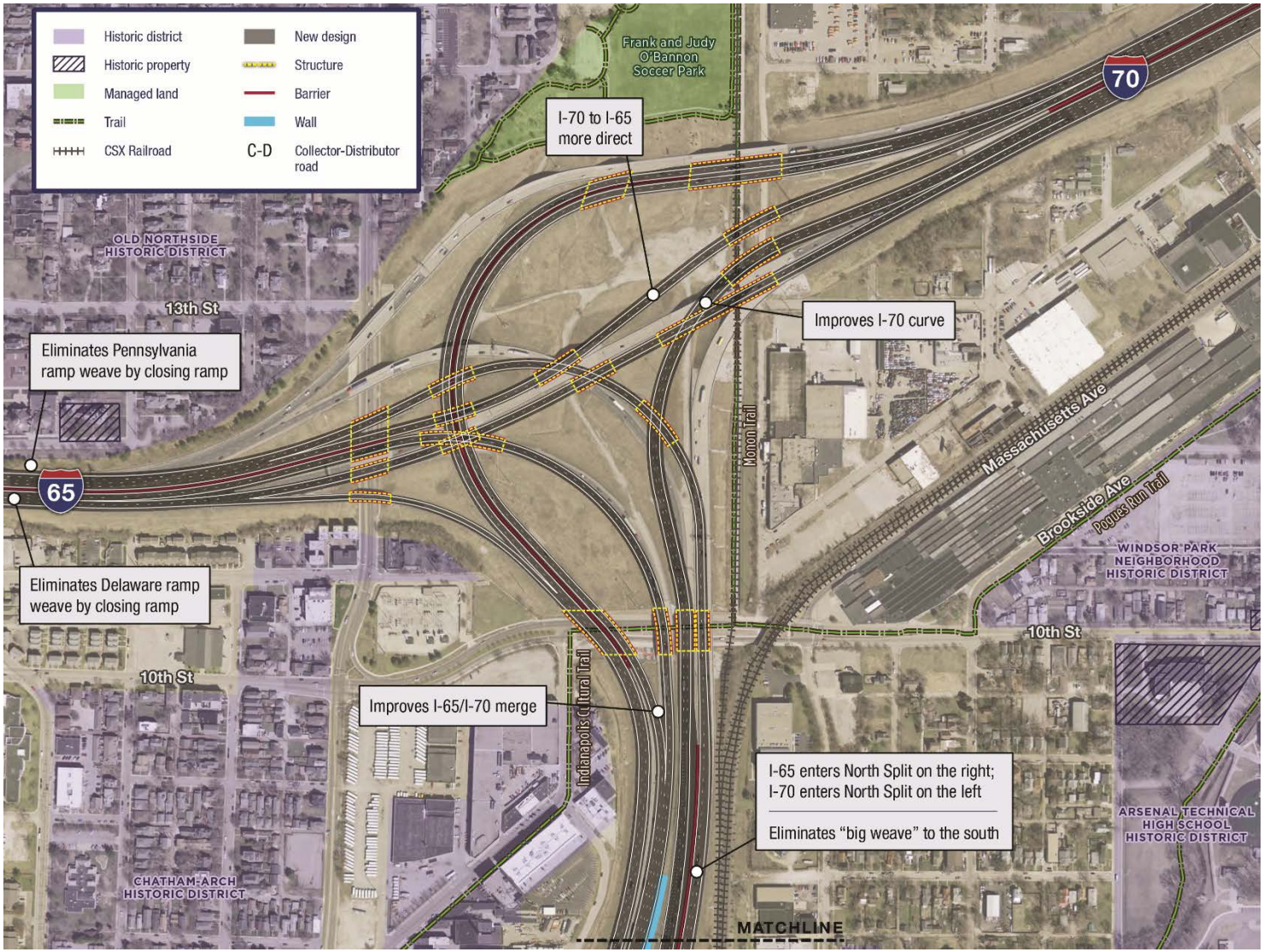
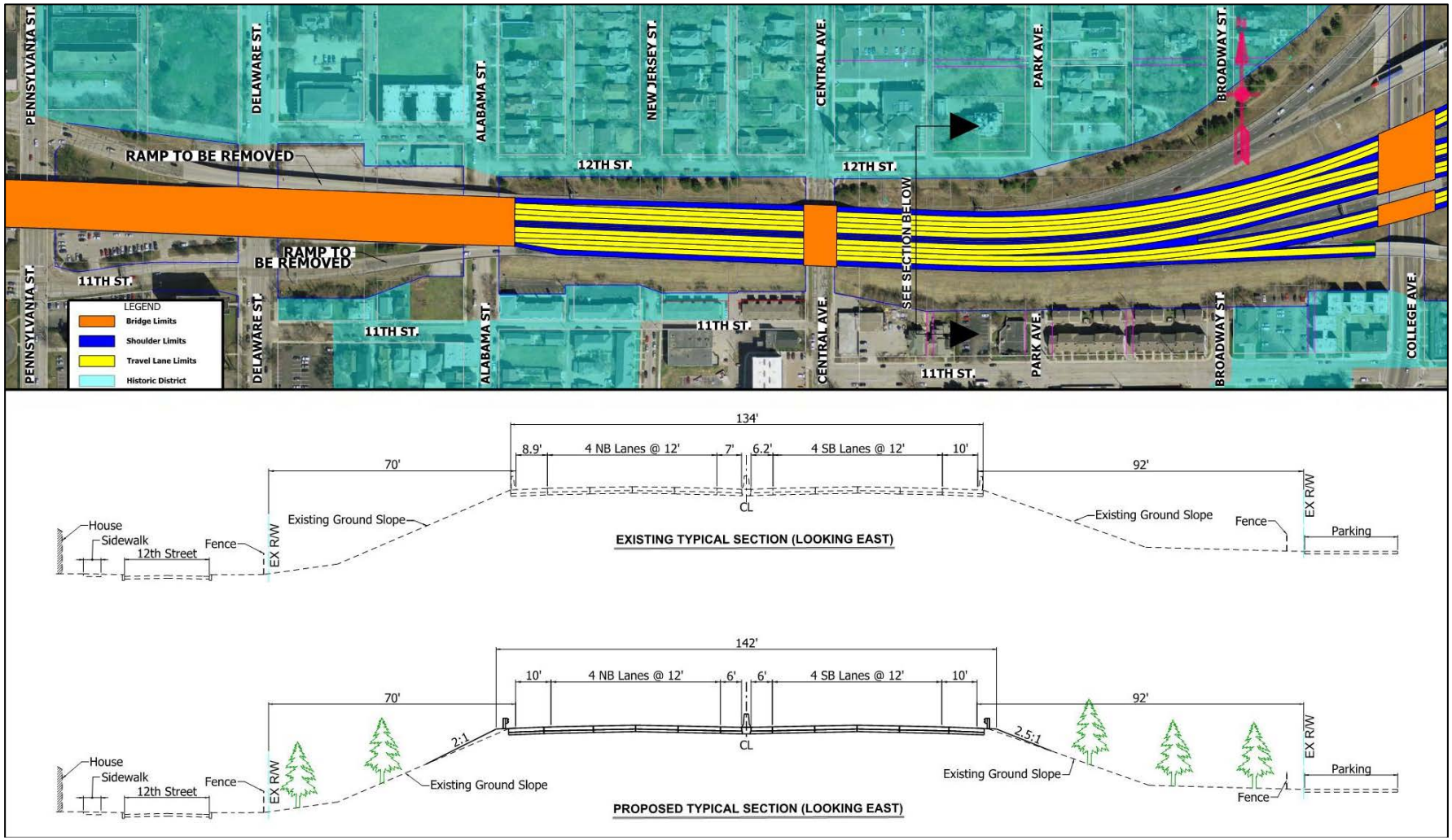


Figure 4-4: Alternative 4a - South Leg

Figure 4-5: Alternative 4a - Cross Section at Central Avenue



4.4.2 Option 4b: Full Access at Meridian/Pennsylvania and Meridian/Delaware Ramps

All existing movements at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp would be accommodated with Option 4b. Traffic flow through the North Split with Option 4b is shown in **Figure 4-6**. Details of the interchange layout are shown in **Figure 4-7** through **Figure 4-9**. Interstate users would have the same access to Meridian and Pennsylvania Streets and from Meridian and Delaware Streets as they do today. The weaving movement at the Meridian/Pennsylvania Street exit ramp would be eliminated by separating I-65 northbound and I-70 eastbound exiting traffic from all conflicting movements before joining the Meridian/Pennsylvania Street ramp. A two-lane exit ramp separated from other traffic with a barrier wall would be required to safely accommodate these movements.

The weaving movement at the Meridian/Delaware Street entrance ramp would be eliminated by extending the ramp and separating it from the mainline by a barrier wall until I-65 splits off to turn southbound. The ramp would then join I-70 eastbound, with an option to turn south to join the C-D road to downtown exits. Traffic from the Meridian/Delaware Street entrance ramp wishing to go south on I-65 could travel the length of the C-D road until it merges back into I-65/I-70 at its south end.

Option 4b would require greater pavement width through the west leg to accommodate the additional exit lane on the north side and the extension of the entrance lane on the south side. Retaining walls would be used to allow the additional lanes to be constructed within existing right-of-way. The height of the retaining walls would vary by location, ranging from approximately 8 feet to 33 feet maximum height. The additional width of pavement would range from about 8 feet to about 55 feet. A cross-section view of the west leg of the interchange near Central Avenue is shown in **Figure 4-10**.

Movements through the remainder of the interchange would be the same as those described for Alternative 4a in **Section 4.4.1**, except where provisions are made for the additional ramp connections on the west leg. These connections are shown in **Figure 4-6**. The most notable difference would be on the C-D road just south of 10th Street, where a realignment of the ramp from I-70 westbound would shift the pavement edge west and require a retaining wall to stay within existing right-of-way.

Alternative 4b would accommodate all movements, and would do so in a way that eliminates the weaves at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp. Option 4b would be more complex than Option 4a and its footprint would be larger due to the additional ramp connections provided. All mobility would be retained with this option and safety would be improved at the most hazardous locations in the interchange. The worst bottlenecks of the existing interchange would be eliminated, which would improve traffic flow and reduce congestion.

Figure 4-6: Alternative 4b - Traffic Flow

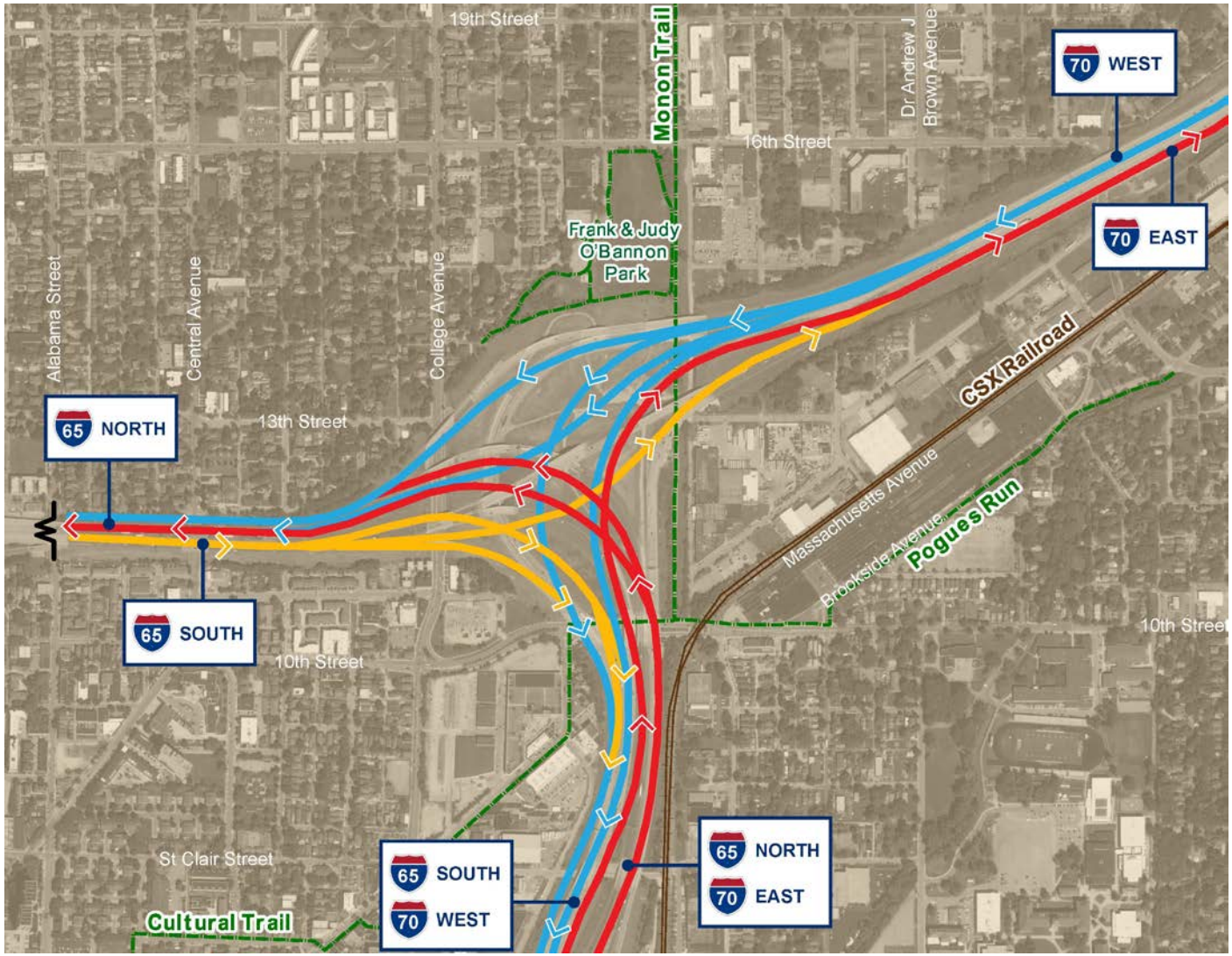


Figure 4-7: Alternative 4b - West Leg

Figure 4-8: Alternative 4b - Central Interchange Area and East Leg

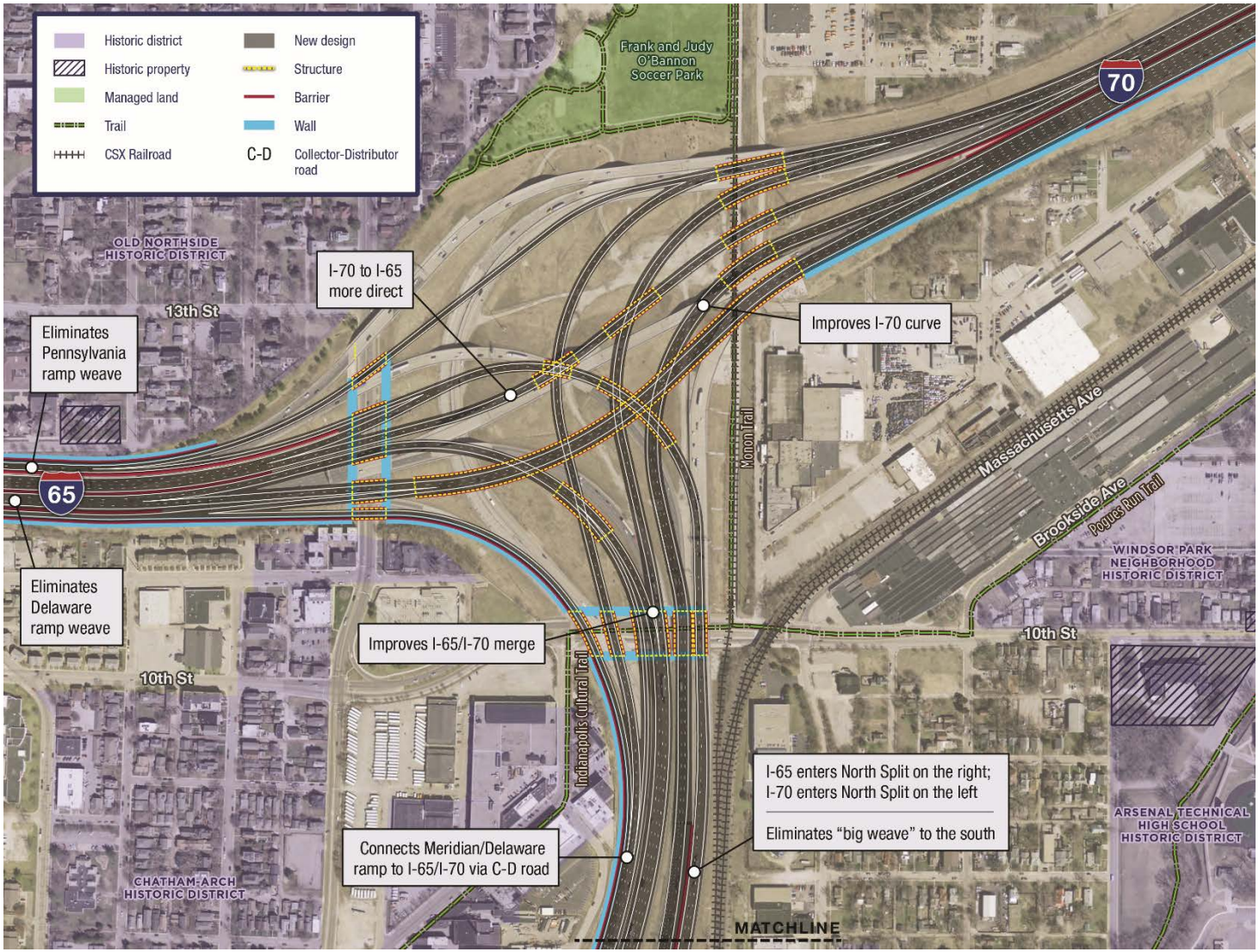


Figure 4-9: Alternative 4b - South Leg

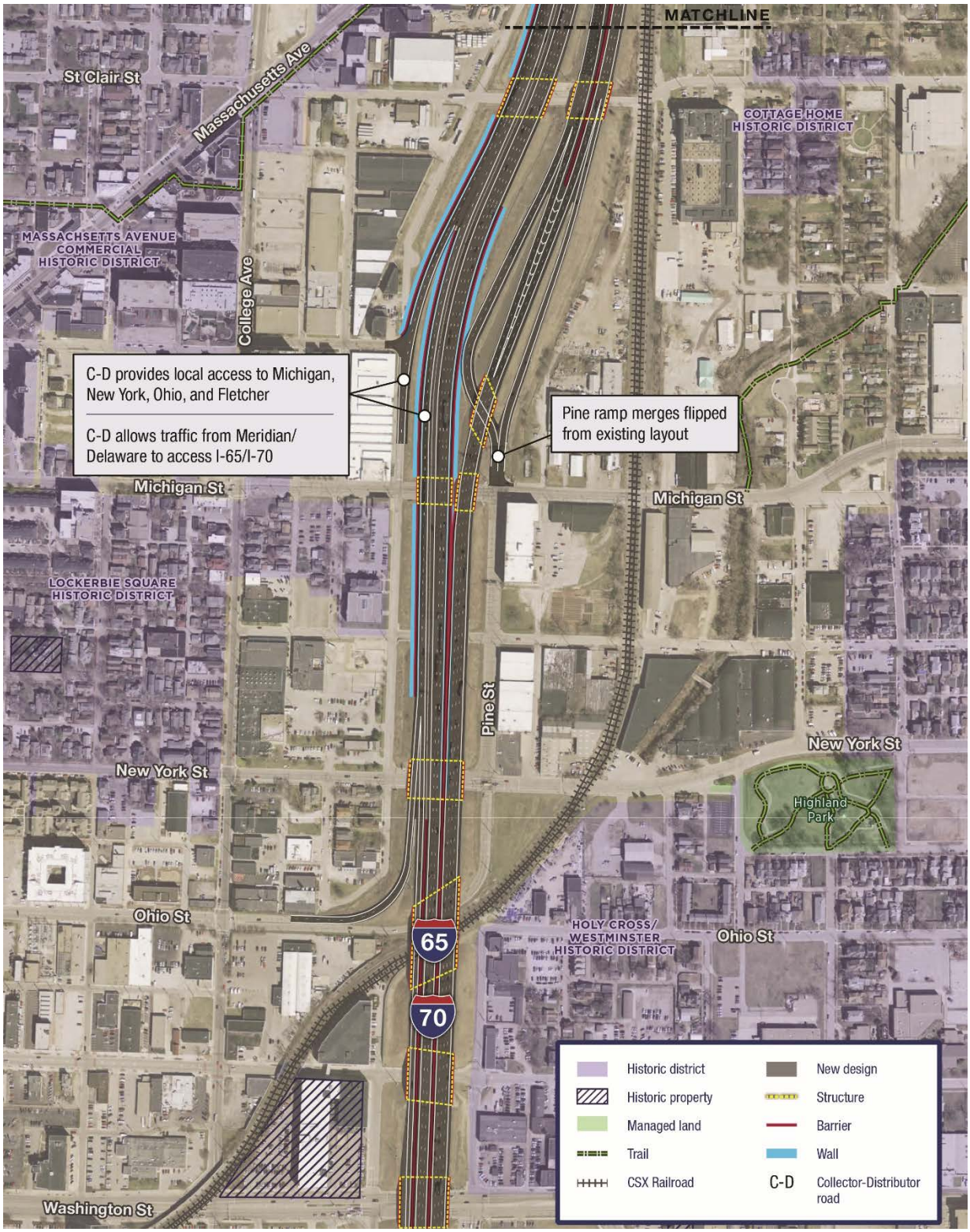
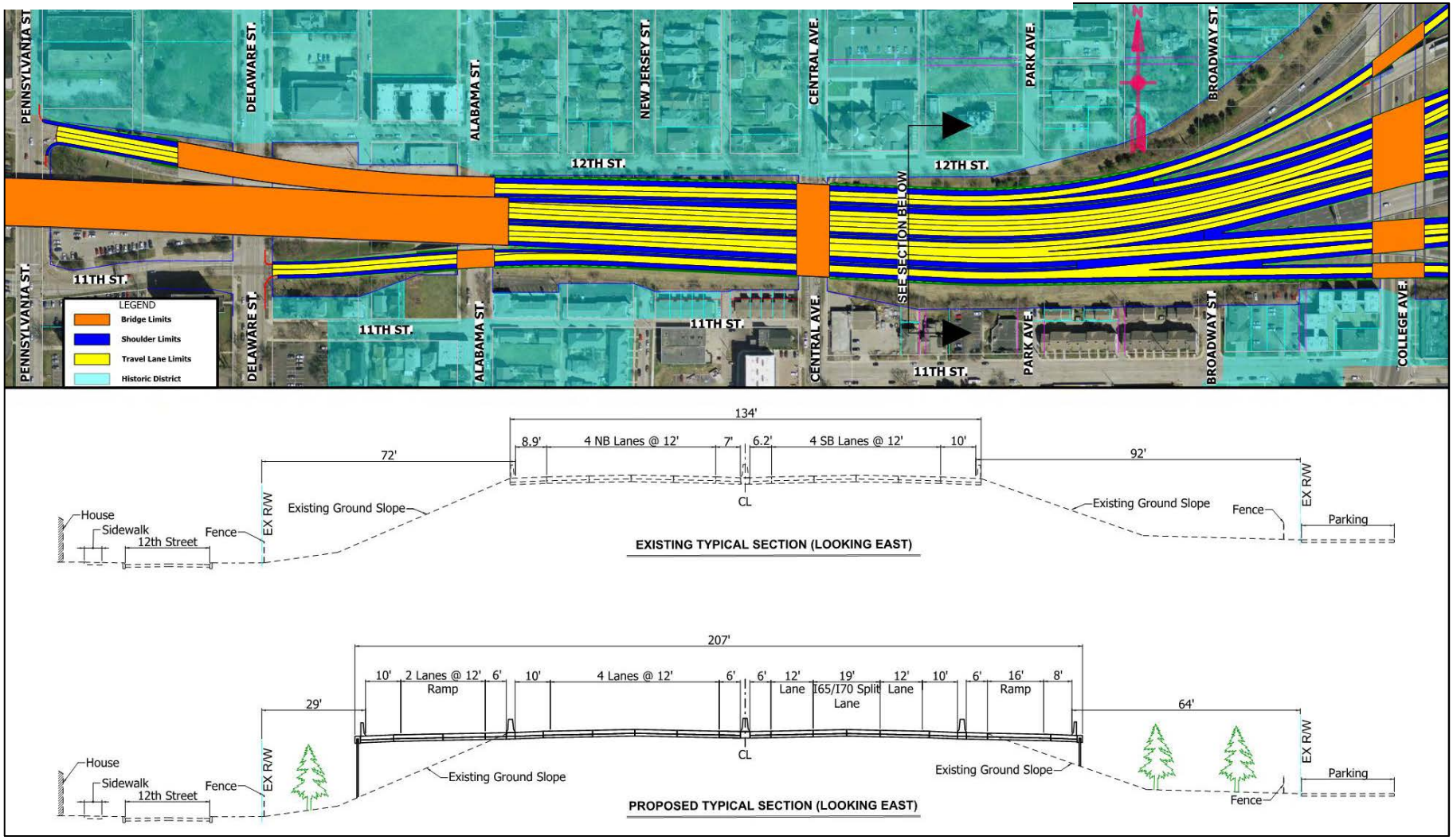


Figure 4-10: Alternative 4b - Cross Section at Central Avenue



4.4.3 Option 4c: Partial Access at Meridian/Pennsylvania and Meridian/Delaware Ramps

With Option 4c, some existing movements would be accommodated at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp, and other existing movements would be eliminated. The weaving movements would be eliminated by allowing entry or exit only at the adjacent interstate lane. Mobility would be increased compared to Option 4a and impacts would be reduced compared to Option 4b.

Various layouts have been investigated to accomplish the objectives of Option 4c. The layouts vary based on whether I-65 or I-70 is adjacent to the ramp. The traffic flow through the North Split as currently proposed for Alternative 4c is shown in **Figure 4-11**. Details of the interchange layout are shown in **Figure 4-12** through **Figure 4-14**. Alternative 4c would provide access to the Meridian/Pennsylvania Street exit ramp from I-65 northbound, but not from I-70. Likewise, traffic from I-65 southbound would be able to access I-70 eastbound, but not the C-D road to downtown exits. There would be potential for further refinements and potential adjustments as the EA is developed.

The footprint of Option 4c would be minimized by configuring ramps in the interchange area to maintain four lanes each way on the west leg section. Barrier walls would be strategically placed to prohibit weaving movements from parallel interstate lanes. The addition of barrier walls would result in a widened section, but it would not be as wide as Option 4b. As shown in the cross-section view of the west leg of the interchange near Central Avenue in **Figure 4-15**, the addition of barrier walls between lanes and adjacent shoulders would widen the footprint by about 24 feet on the north side of I-65 and 21 feet on the south side.

The additional width would require retaining walls approximately 7 feet to 11 feet maximum height at some locations to retain construction within the existing right-of-way. The need for these walls and their dimensions would be confirmed based on more detailed design during the EA. The community would have an opportunity for input regarding a low wall at the bottom of the slope or low wall at the top of the slope, and the potential for landscaping.

Movements through the remainder of the interchange would be the same as Option 4a, as described in **Section 4.4.1**. As with Option 4a, the overall footprint of the interchange would be reduced, particularly to the northwest and east of the existing interchange area.

As described for Option 4a in **Section 4.4.1**, FHWA would need to approve the change of interstate access associated with elimination of traffic movements currently available at this location. Traffic impacts would need to be described in detail in the IAD.

With this option, safety would be improved at the most hazardous locations in the project area and two major bottlenecks would be removed on the west leg. Some mobility would be lost, but the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp would continue to provide interstate access. Traffic flow through the interchange would be improved and congestion would be reduced. The impacts of the relatively small retaining walls could potentially be mitigated by context sensitive design in cooperation with neighborhood stakeholders.

Figure 4-11: Alternative 4c - Traffic Flow

Figure 4-12: Alternative 4c - West Leg

Figure 4-13: Alternative 4c - Central Interchange Area and East Leg

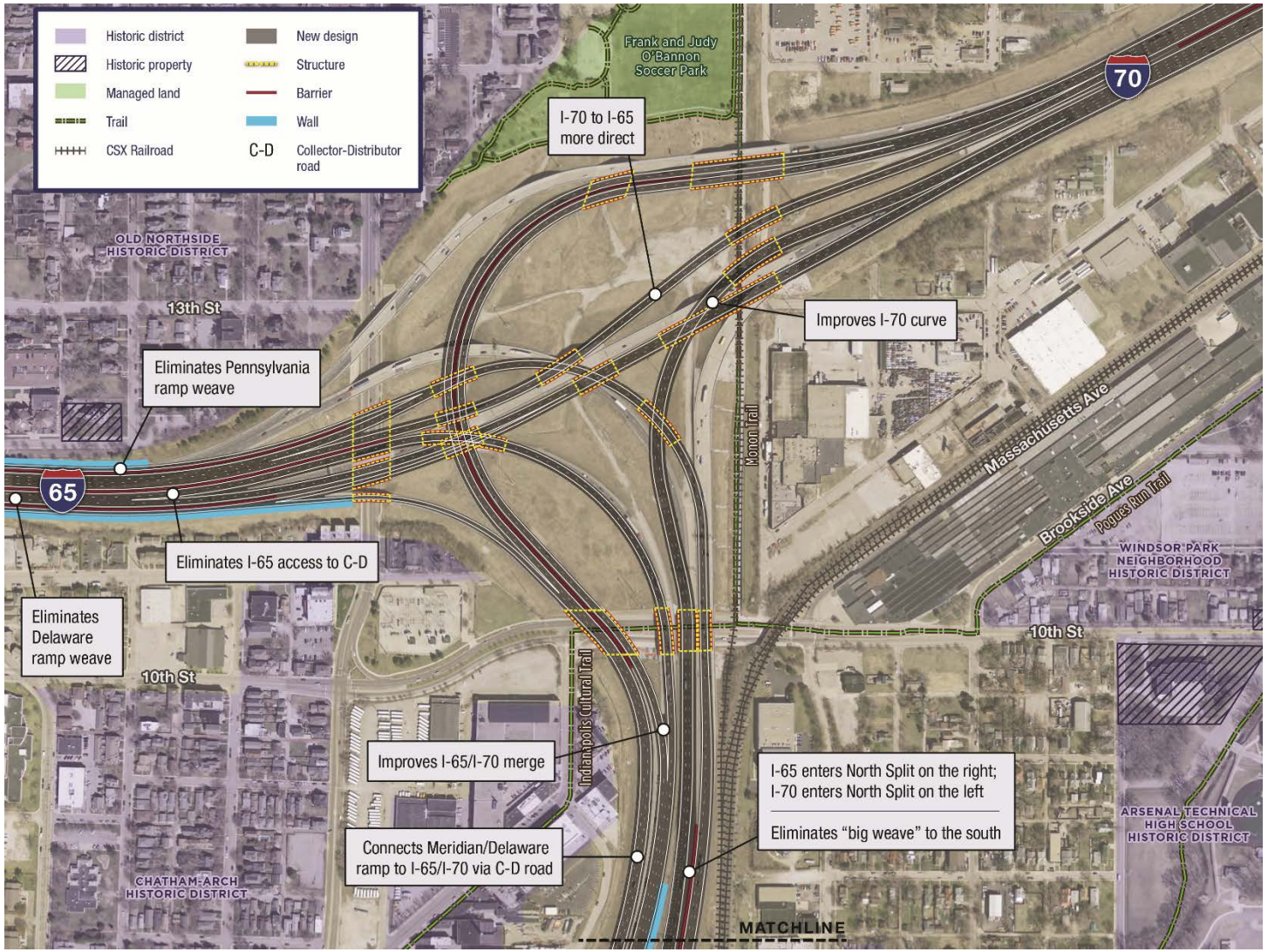


Figure 4-14: Alternative 4c - South Leg

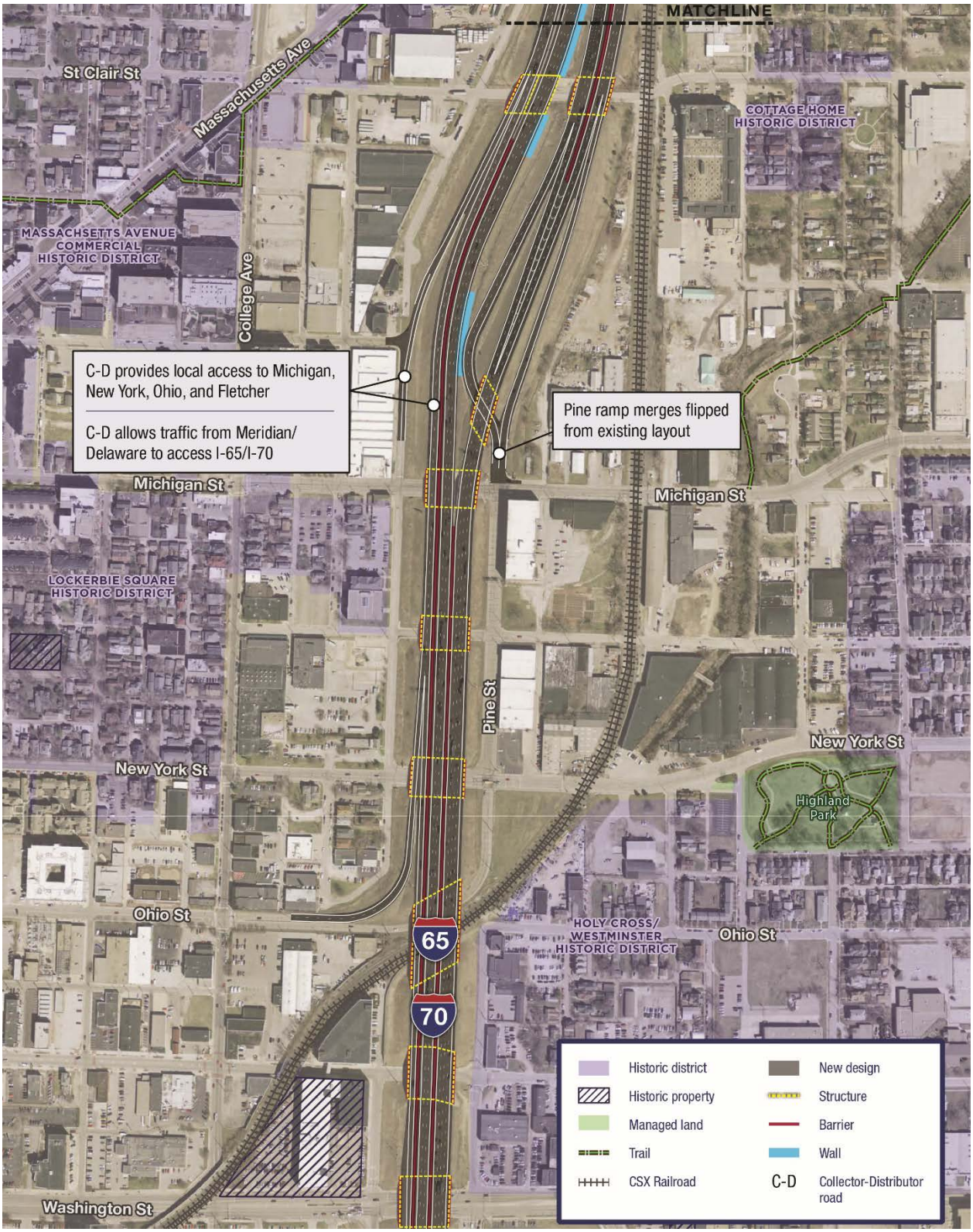
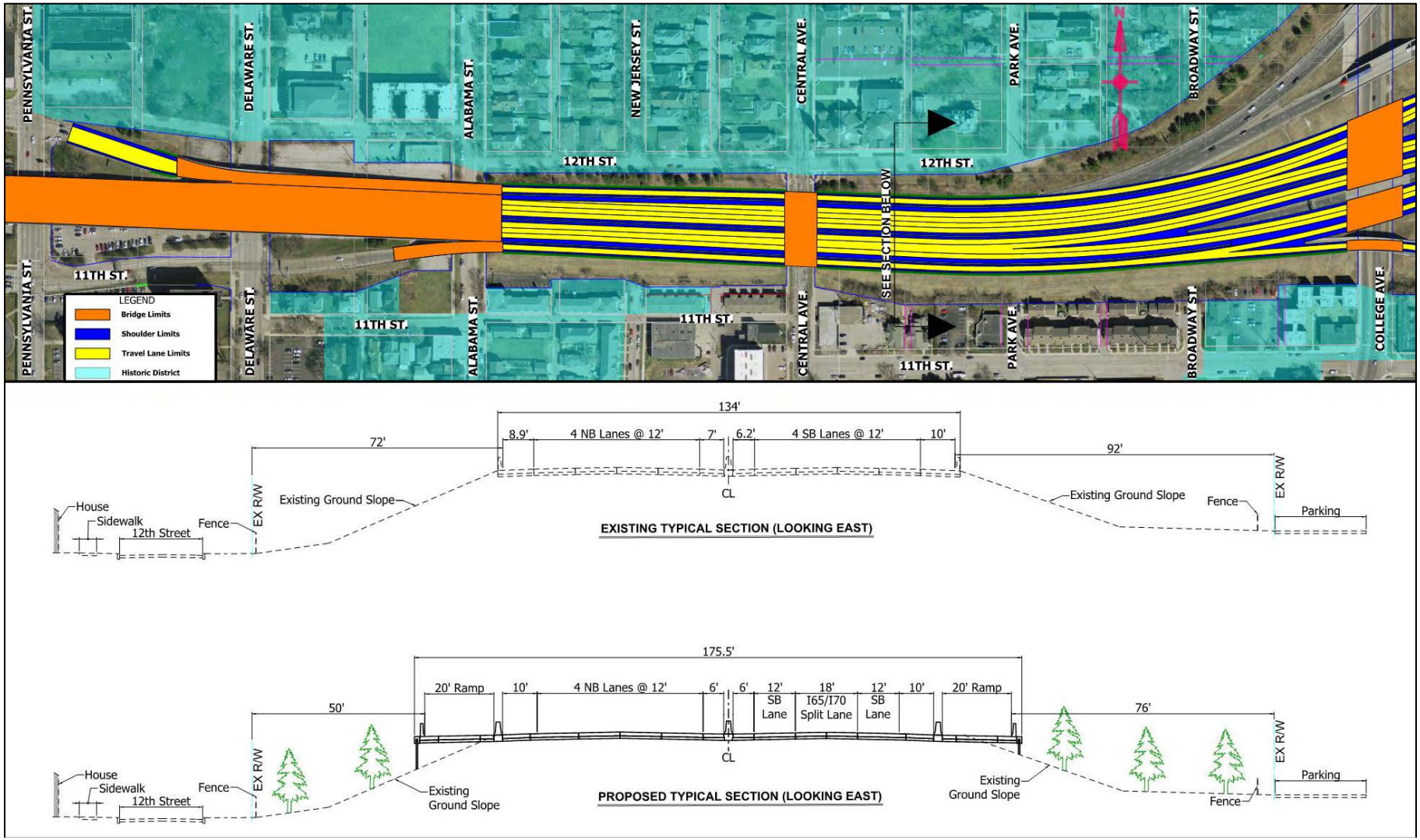


Figure 4-15: Alternative 4c - Cross Section at Central Avenue



4.5 Alternative 5 - Full Interchange Reconstruction

Alternative 5 would realign ramps and connecting roadways to improve safety and operations, with flexibility for accommodating predicted 2041 traffic growth with an acceptable level of service at nearly all locations in the interchange.[15] All existing bridges and pavement would be replaced with Alternative 5, and most components including shoulders would be designed in accordance with the Indiana Design Manual. Traffic flow through the North Split with Alternative 5 is shown in **Figure 4-16**. Details of the interchange layout are shown in **Figure 4-17** through **Figure 4-19**.

The configuration of ramps and connecting roadways with Alternative 5 would be similar to Alternative 4b. The existing weaving movements at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp, illustrated in **Figure 2-7** and **Figure 2-9**, respectively, would be eliminated and all movements to and from the ramps would be accommodated. As with all Alternative 4 options, I-65 northbound and I-70 eastbound alignments would be reversed on the south leg of the interchange to eliminate the "big weave" between the North Split and South Split, described in **Section 2.1.3** and **Section 2.1.4**.

Alternative 5 would differ from Alternative 4b in the number of lanes provided. On the west leg, an additional through lane would be added each way, and two lanes would be provided on the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp. The east leg would include an added westbound through lane, and one to two through lanes would be added on various segments of the south leg. Added lanes would be provided for several of the connecting ramps through the interchange. All shoulders along the mainlines would be assumed to be 12 feet wide, with an additional two-foot buffer along concrete barrier walls.

As with the other alternatives, additional design would be necessary to fully define Alternative 5 and evaluate its impacts if it is carried forward in the EA. At this stage of development, it is clear that Alternative 5 would provide a high degree of mobility with a more compact interchange than the one that exists today.

Alternative 5 would include wider pavement sections through all sections approaching the interchange, with retaining walls to keep the new construction within existing right-of-way in most places. As shown in the cross-section view of the west leg of the interchange near Central Avenue in **Figure 4-20**, the retaining walls would be near the existing right-of-way lines at many locations, and would range from 12 feet to 45 feet maximum height. Additional pavement ranging from 29 feet to 85 feet would be required with this alternative.

All mobility would be retained with this option and safety would be improved at the most hazardous locations in the interchange. The worst bottlenecks of the existing interchange would be eliminated, and the added lanes would reduce congestion throughout the interchange. The capacity of the interchange would be sufficient to meet near-term as well as forecasted long-term needs. The trade-off in achieving these benefits would be increased pavement width throughout the interchange, with retaining walls near the edge of right-of-way along each leg.

[15] *The only location with LOS worse than D is on the westbound section of the west leg in the 2041 AM peak, where I-65 westbound is forecasted to operate at LOS E.*

Figure 4-16: Alternative 5 - Traffic Flow

Figure 4-17: Alternative 5 - West Leg

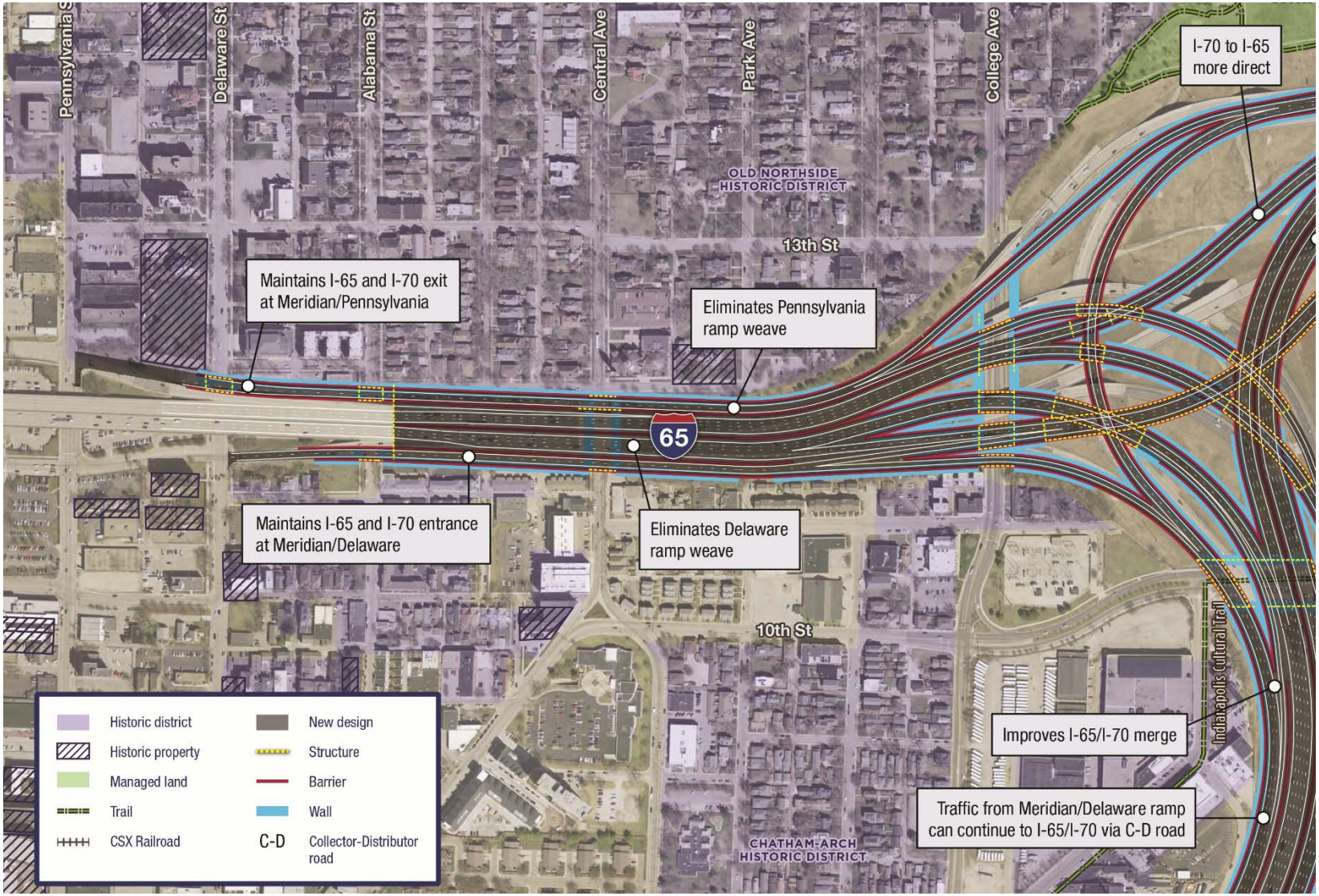


Figure 4-18: Alternative 5 - Central Interchange Area and East Leg

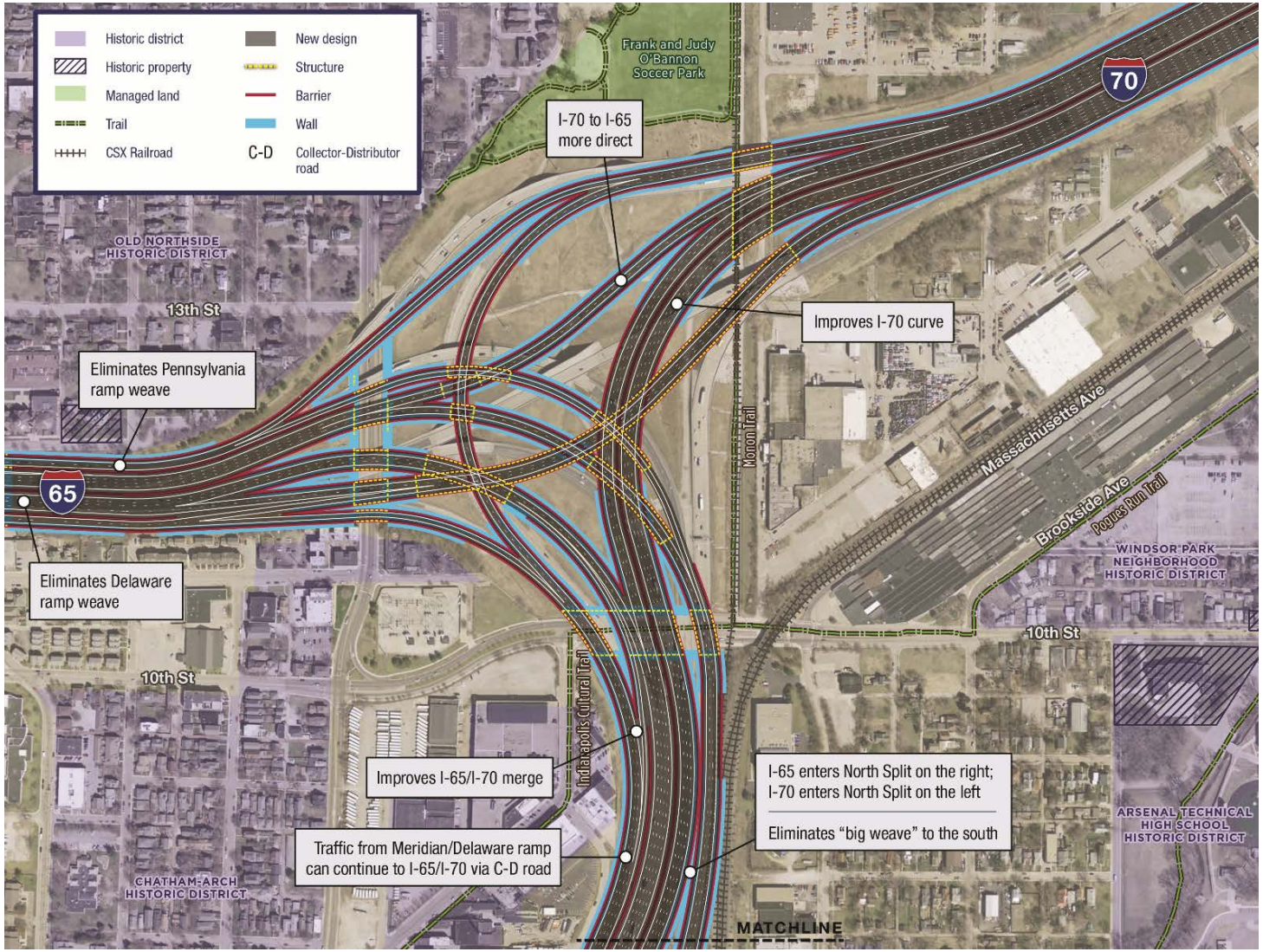


Figure 4-19: Alternative 5 - South Leg

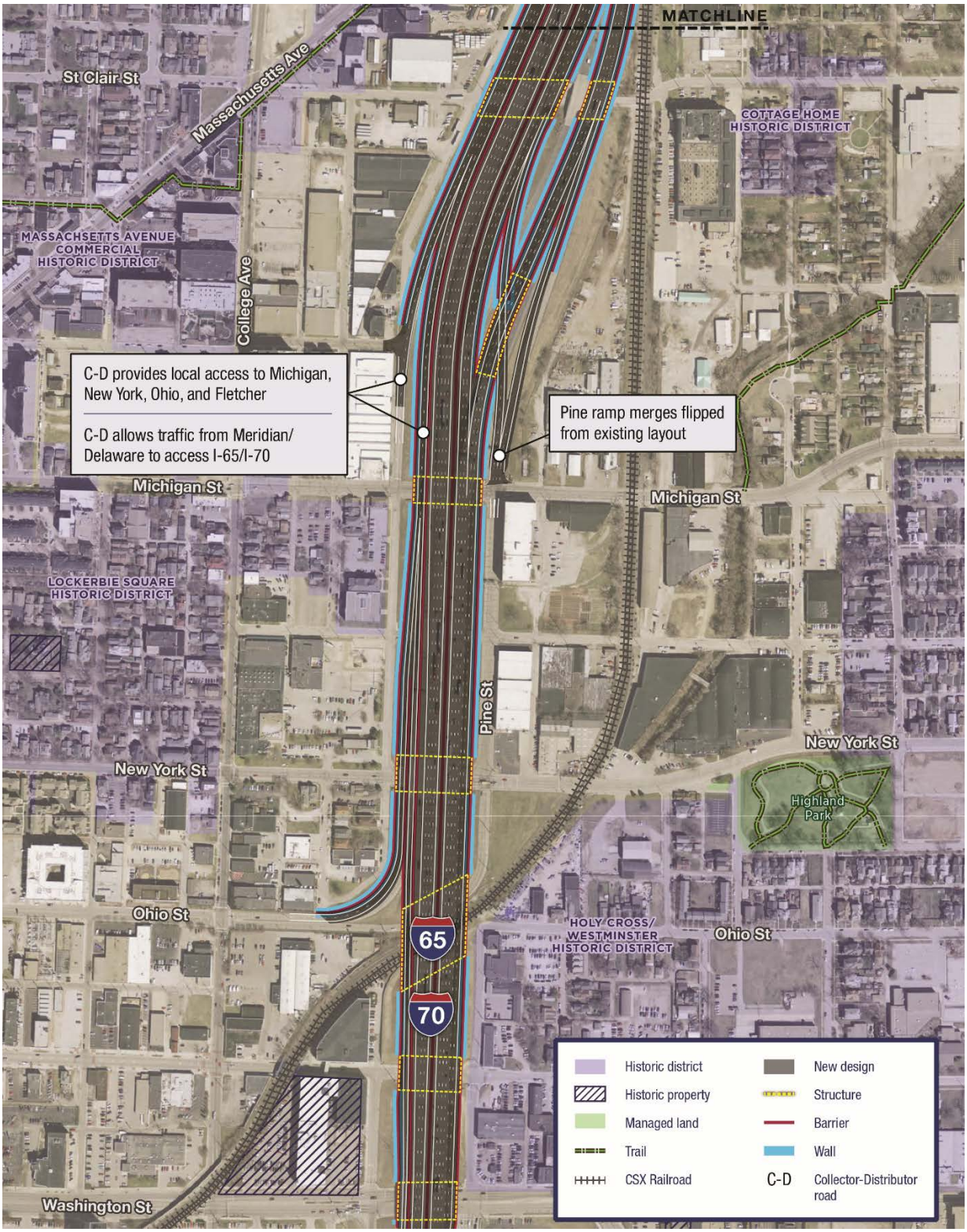
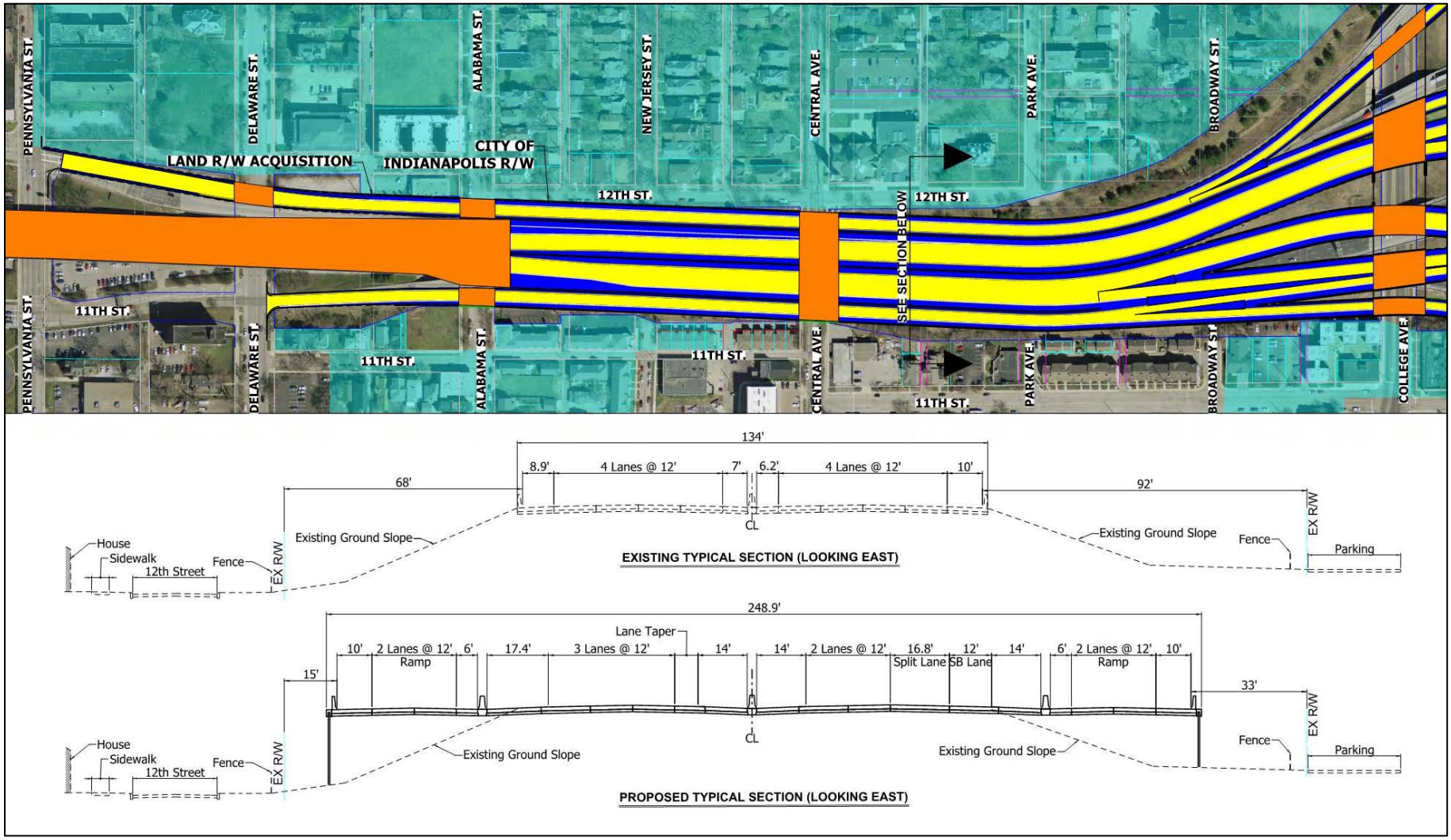


Figure 4-20: Alternative 5 - Cross Section at Central Avenue



5 ALTERNATIVES SCREENING

This section describes the process and results of alternatives screening. The alternatives described in **Section** 4 are first screened to see if they meet the project purpose and need, defined in **Section 2**. Alternatives that meet the purpose and need are then evaluated for environmental and community factors. Alternatives with greater impacts to the environment or community can be eliminated in the screening process, as illustrated in **Figure 2-1**.

5.1 Performance Measures and Estimated Cost

As described in **Section** 2, alternatives must satisfy the project purpose and need to be considered in the EA for the project. Each project need has an associated performance measure, as shown in **Table 2-4**, for use in determining whether a potential alternative meets the purpose and need. Many performance measures are "pass/fail," meaning an alternative either meets the requirement or not. Others require some degree of quantification. The information required to evaluate or quantify the performance measures is summarized below:

- Correct Deteriorated Bridge Conditions – Yes/No
- Correct Deteriorated Pavement Conditions – Yes/No
- Improve Safety - Yes/No, based on improvements at the top four crash locations
- Improve Interchange Operations and Reduce Congestion – Yes/No, based on calculations of level of service, plus Yes/No, based on physical parameter at "big weave" on I-65/I-70

Requirements for the first three needs, associated with bridge, roadway, and safety conditions, relate to the improvements of physical conditions in the project area. A determination of whether these performance measures have been met based on the alternatives descriptions presented in **Section** 4 is summarized in **Section 5.2** below. The performance measures for improving operations and reducing congestion, however, are based on traffic analysis. To support this screening process, a preliminary analysis of potential alternatives was conducted with the traffic model developed for this screening study.

The results of the preliminary traffic analysis regarding the performance and impacts of alternatives are presented in **Appendix A** and are summarized in the next section. This is followed by a section showing the preliminary estimates of construction cost for the alternatives.

5.1.1 Operations and Congestion Performance Measures

Traffic performance in this report is evaluated based on the level of service (LOS) on the interstate system within the North Split project study area. An LOS analysis was conducted for Alternative 1 (No-Build) to define the base condition, and Alternatives 4 and 5. With no operational improvements, the LOS for Alternative 3 would be the same as the No-Build Alternative. Options a, b, and c were analyzed for Alternative 4 since they would provide different LOS conditions. LOS concepts are described in **Section 2.1.4** and a description of LOS measures (LOS A through F) is provided in **Figure 2-11**. Preliminary estimates of LOS were developed for individual segments of the North Split interchange during AM and PM periods with 2017 and 2041 traffic levels. The morning peak period is 7:15 AM to 8:15 AM. The afternoon peak period is 4:15 PM to 5:15 PM.

A summary of interstate LOS with Alternatives 1, 3, 4a, 4b, 4c, and 5 is provided in **Table 5-1**. In all cases, Alternatives 4a, 4b, 4c, and 5 would improve the LOS on the interstates compared to the No-Build Alternative. LOS A through LOS D is considered acceptable for urban interstates (See **Section 2.1.4**). A description of the microsimulation model used for the analysis and figures showing estimated LOS values for individual ramp segments are provided in **Appendix A**.

Table 5-1: Traffic Performance Measures by Alternative

TIME PERIOD	PERCENT INTERSTATE SEGMENTS WITH LOS A - D					
	Alt 1 No-Build	Alt 3 Replace In-Kind	Alt 4a No Ramp Access	Alt 4b Full Ramp Access	Alt 4c Partial Ramp Access	Alt 5 Full Access Added Lanes
2017 AM	64%	64%	76%	88%	67%	97%
2017 PM	77%	77%	86%	100%	90%	100%
2041 AM	41%	41%	71%	81%	62%	90%
2041 PM	55%	55%	71%	88%	76%	97%

Another important aspect of traffic service with the alternatives would be operations on the local roadway network, particularly where route diversion may occur due to changes in access to the interstate system. To support screening, a preliminary review of local traffic pattern changes was conducted using the microsimulation model developed for this study. Operations on local streets are addressed as an impact of alternatives in **Section 5.3**.

5.1.2 Preliminary Estimated Construction Cost

Preliminary cost estimates were developed to provide an order of magnitude for alternative screening and are preliminary in nature. The methodology in establishing the estimates was consistent among all concepts. Primary quantities and unit costs were used for items such as roadway surface area, bridges, concrete barriers, and retaining walls. Secondary quantities and costs were developed based on historical data of similar projects of this magnitude. An overhead cost and a contingency factor was applied to generate the final estimates. Preliminary estimates of construction cost are shown in **Table 5-2**.

Table 5-2: Preliminary Estimated Construction Cost

Alternative	Preliminary Construction Cost Estimate
Alt 3: Replace In-Kind	$180 M – $220 M
Alt 4a: No West Leg Ramp Access	$215 M – $265 M
Alt 4b: Full West Leg Ramp Access	$270 M – $330 M
Alt 4c: Partial West Leg Ramp Access	$225 M – $275 M
Alt 5: Full West Leg Access/Added Lanes	$305 M – $370 M

These preliminary cost estimates are considered to be conceptual in nature. Multiple key components have not yet been developed which would have a potential impact on final design and could impact the final cost estimates. Due to the number of uncertainties at this stage of project development, the preliminary cost estimates are presented as ranges. These estimates do not include investments to city streets outside the project study area.

5.2 Purpose and Need Screening

As summarized in **Section 2.3**, the purpose of the I-65/I-70 North Split project is to rehabilitate and improve the existing interstate facilities leading to and through the I-65/I-70 North Split interchange in downtown Indianapolis. In order to serve this purpose, alternatives must meet a series of needs identified in the same section. **Table 2-4** lists the needs of the project and identifies associated performance measures for evaluating alternatives in this Alternatives Screening Report. Each alternative has been reviewed with respect to the performance measures listed in **Table 2-4** to determine whether it would meet the project purpose and need. The results are shown in **Table 5-3**. A review of each alternative and a determination related to purpose and need is presented below.

Table 5-3: Alternatives Review for Purpose and Need

PROJECT NEED	Alt 1 No-Build	Alt 2 TSM	Alt 3 In-Kind Interchange	Alt 4 Efficient Interchange	Alt 5 Full Interchange
Correct Deteriorated Bridge Conditions					
Address structural deficiencies			X	X	X
Correct Deteriorated Pavement Conditions					
Address poor pavement condition			X	X	X
Improve Safety					
Eliminate Meridian/Pennsylvania Street weave				X	X
Eliminate Meridian/Delaware Street weave				X	X
Improve I-65 SB/I-70 WB merge				X	X
Improve curvature onto I-70 EB at east leg				X	X
Improve Operations & Reduce Congestion					
Improve Interstate LOS over No-Build condition				X	X
Eliminate “big weave” on I-65/I-70 south				X	X
Does Alternative Meet Purpose & Need?	**No**	**No**	**No**	**Yes**	**Yes**

Alternative 1 - No-Build Alternative

The No-Build Alternative would not meet the project purpose and need. Pavement and bridges would continue to be in poor condition and safety would not be improved. Existing bottlenecks would remain in place and existing congestion would continue and likely worsen over time. Nevertheless, the No-Build Alternative will be carried forward in the EA since this is a requirement of NEPA and to provide a baseline for evaluation of other alternatives.

Alternative 2 - Transportation System Management (TSM) Alternative

As described in **Section 4.2**, an array of potential TSM actions were reviewed for potential application in the North Split. Most of these actions would not be applicable to North Split conditions, and none of the actions would meet the project purpose and need with respect to pavement and bridge conditions, safety needs, or operational deficiencies.

Alternative 3 - Replace Bridges and Pavement In-Kind

Alternative 3 would meet the first two project needs, to correct existing bridge deficiencies and pavement deficiencies, but it would not address needs related to safety and operations. No operational or capacity improvements would be completed. As shown in **Table 5-2**, the cost to replace the bridges and pavement would be substantial, even though safety and operational improvements would not be made. Alternative 3 would not meet the project purpose and need.

Alternative 4 - Efficient Interchange Reconstruction

Alternative 4 would have some variation in safety and operations effectiveness depending on which option is selected. All options would correct existing bridge and pavement deficiencies. All options would improve safety by reducing or eliminating unsafe movements for the four the highest crash locations, and providing other safety improvements in the interchange area. All options would improve operations by eliminating the weaving sections at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp.

Alternative 4 would provide several safety and traffic flow benefits in addition to eliminating the weaves on the west leg. Northbound traffic flow and safety would be improved on I-65 and I-70 by eliminating the “big weave” between the South Split and North Split described in **Section 2.1.3**. This would be accomplished by reversing the paths of I-65 and I-70 where they enter the North Split, so that I-65 is on the right and I-70 is on the left.

With Alternative 4, the curvature of I-70 would be realigned to be less abrupt, improving safety at that location (See **Figure 2-8**), and the merge of I-65 southbound and I-70 westbound would be improved. Alternative 4 would retain the direct alignment of I-65 to I-70 from west to east through the interchange, and would realign the westbound ramp from I-70 to I-65 to provide a similar direct movement. All Alternative 4 options would meet the purpose and need of the project.

Alternative 5 - Major Interchange Reconstruction

Alternative 5 would provide the best service of the alternatives under consideration. Bridge and pavement deficiencies would be corrected with the installation of new infrastructure. Safety would be improved by reducing or eliminating unsafe movements at the highest crash locations and by providing other safety improvements throughout the project area. Traffic operations would be improved and congestion reduced by eliminating most existing bottlenecks and providing added lanes to meet current and anticipated travel demand.

Alternative 5 would be the most effective alternative in reducing congestion at the time construction is completed and over the long term. It would provide an acceptable level of service in nearly all parts of the interchange during the morning and afternoon peak periods, now and in the future. In large part, these benefits would result from the fact that it is the only alternative to provide additional through lanes. Alternative 5 would meet the purpose and need of the project.

5.3 Environmental/Community Impacts Screening

Alternative 1, Alternative 2, and Alternative 3 do not meet the project purpose and need, as shown in **Table 5-3**. Since alternatives evaluated in the EA must meet project purpose and need, these alternatives are not evaluated further in this screening report, and they will not be carried forward as a part of the EA. Alternatives 4a, 4b, 4c, and 5 meet the purpose and need of the project and are evaluated below for environmental and community impacts.

A major concern expressed by the community is the presence and size of retaining walls along the three legs of the North Split interchange. Preliminary wall locations and dimensions are described below for each alternative. For ease of reference in this section, the review of each alternative includes a table of maximum wall heights and

dimensions. All information is preliminary and subject to refinement as the design is further developed and the EA is completed.

Alternative 4a - No Meridian/Pennsylvania or Meridian/Delaware Ramp Access

With Alternative 4a, the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp would be closed. No retaining walls would be necessary along the outside of any of the interstate legs. The interstate legs would look similar to their current condition. Closing these existing ramps would mean a loss of service for those using these ramps today, and would cause changes elsewhere in the transportation network. Traffic impacts would occur on the interstates and on local streets as traffic diverts to other routes.

Preliminary traffic studies indicate the most severe traffic impacts on local roads with the closure of the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp would be at West Street, which is the closest interchange to the ramps being closed. Traffic models indicate the inbound traffic in the morning peak from I-70 westbound to destinations south of the North Split would divert mainly to the I-70 westbound C-D road or to West Street, then would disperse among east-west downtown streets. Those with destinations north of the North Split would mainly divert to the 21st Street exit.

During the afternoon peak, traffic that currently uses the Delaware Street entrance ramp to I-70 eastbound would divert to the West Street entrance ramp and the Pine Street entrance ramp. The diverted traffic at West Street would require the addition of a fourth lane on northbound West Street between 10th and 11th Streets, and an added lane on the on-ramp to I-65 southbound (which would drop to one lane before merging with I-65 southbound). These adjustments are assumed to be feasible for purposes of screening. Even with these changes, however, the operation of the signalized intersections of West Street with 10th and 11th Streets would operate at LOS F during all periods, compared to the current LOS C. This indicates a high level of impact on the local system now and in the future, which would require additional analysis if Alternative 4a is carried forward in the EA.

The closure of the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp and the resulting impacts on other parts of the transportation network would be subject to review and approval by FHWA. In addition to issues related to traffic diversion, FHWA would be concerned with continuity of the interchange formed by these ramps in conjunction with the nearby Meridian Street exit ramp from I-65 southbound and the Illinois Street entrance ramp to I-65 northbound. Together, these four ramps make up a single, complete interchange serving the north side of downtown Indianapolis.

Changes in access to the interstate system require approval pursuant to 23 U.S.C. 111. General informational guidance is provided in the "Interstate System Access Informational Guide."[16] The current FHWA policy is provided in "Policy on Access to the Interstate System."[17] Each entrance or exit point, including access to C-D roads or ramps, is considered to be an access point. Closure of ramps is considered a change in access to the interstate system. Based on modifications to existing ramps or restrictions to current movements, Alternatives 4 and 5 would require approval by FHWA for change of access.

INDOT is required to submit a written request called an Interstate Access Document (IAD) that addresses the policy requirements related to safety, performance, impact on the surrounding network, and planning support for the proposed changes. Of particular interest for the North Split is policy point 2 of the FHWA policy, which states:

> "The proposed access connects to a public road only and will provide for all traffic movements. Less than 'full interchanges' may be considered on a case-by-case basis for applications requiring special access for managed lanes…."[18]

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[16] *FHWA, "Interstate System Access Informational Guide," August 2010, https://www.fhwa.dot.gov/design/interstate/pubs/access/access.pdf*

[17] *FHWA, "Policy on Access to the Interstate System," May 22, 2017, https://www.fhwa.dot.gov/design/interstate/170522.cfm*

[18] *Ibid.*

Based on the stipulation in Policy Point 2, it is unknown at this time if INDOT could obtain FHWA approval for Alternative 4a since it eliminates the northbound I-65 Meridian/Pennsylvania Street exit ramp and the Meridian Street/Delaware Street entrance ramp to southbound I-65, resulting in a partial interchange.

As recommended in the Interstate System Access Informational Guide, INDOT has coordinated with the Indiana Division Office of FHWA as alternatives for this project have been developed. A determination of whether this partial interchange would be approved can only be made based on the IAD, which will be submitted around the time a draft EA is completed. FHWA staff have pointed out the guidance described here, however, and have cautioned INDOT regarding the risk of advancing alternatives incorporating partial interchanges.

Alternative 4a would meet the project purpose and need, but it would do so at the expense of those who currently use the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp. Traffic diverted from these ramps to adjacent interchanges would result in traffic concentrations that would cause the operations of nearby intersections to fail. FHWA approval is uncertain since the closure of these ramps would result in a partial interchange. Based on these factors, and the availability of another option that meets the project purpose and need with fewer traffic impacts, Alternative 4a will not be carried forward as an option in the EA.

Alternative 4b - Full Meridian/Pennsylvania and Meridian/Delaware Ramp Access

Alternative 4b would continue to provide access to the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp from both I-65 and I-70. It would require wider pavement and retaining walls to keep the construction within existing right-of-way, as shown in **Figure 4-7**Figure 4-2 through **Figure 4-9**. The approximate length and maximum height of the retaining walls is shown in **Table 5-4**. Along the north side of the west leg, approximately 1,500 feet of variable height retaining wall with a maximum height of 18 feet would border the Old Northside Historic District. Along the south side of the west leg, approximately 2,375 feet of variable height retaining wall with a maximum height of 33 feet would border the St. Joseph Neighborhood and Chatham Arch Historic Districts.

Along the west side of the south leg, approximately 3,474 feet of variable height retaining wall with a maximum height of 15 feet would be constructed. A portion would border the Lockerbie Square Historic District. A retaining wall would not be required on the east side of the south leg next to the Holy Cross Westminster Historic District. No retaining walls would be required along the north side of the east leg with Alternative 4b. Along the south side of the east leg, approximately 1,486 feet of variable height retaining wall with a maximum height of 8 feet would be required.

Widening of the interstates and construction of retaining walls in the dimensions described in **Table 5-4** would likely result in visual impacts to the adjacent historic districts. These potential visual impacts would be evaluated as part of the Section 106 consultation process during the environmental study and preparation of the EA.

Table 5-4: Alternative 4b Retaining Walls

Wall Location	Length	Maximum Height	Maximum Added Pavement Width
East Leg (North Side)	None	None	8 ft
East Leg (South Side)	1,486 ft	8 ft	23 ft
West Leg (North Side)	1,500 ft	18 ft	48 ft
West Leg (South Side)	2,375 ft	33 ft	55 ft
South Leg (West Side)	3,474 ft	15 ft	50 ft
South Leg (East Side)	None	None	None

Alternative 4b would meet the project purpose and need. It would provide all traffic movements that currently exist at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp. It would require the construction of retaining walls 18 feet to 33 feet maximum height on the west leg of the interchange. Based on the need to construct relatively tall retaining walls adjacent to historic residential areas, and the availability of

another option that meets the project purpose and need with fewer impacts, Alternative 4b will not be carried forward as an option in the EA.

Alternative 4c - Partial Meridian/Pennsylvania and Meridian/Delaware Ramp Access

With Alternative 4c, the Meridian/Pennsylvania Street exit ramp would no longer be available to I-70 westbound traffic and I-65 southbound traffic would no longer have access to the C-D road exits on the eastside of downtown. Restricting the use of these existing ramps would mean a loss of service for those using these ramps today, and would cause changes elsewhere in the transportation network as traffic diverts to other routes. The changes to the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp and the resulting impacts on other parts of the transportation network would be subject to review and approval by FHWA.

According to traffic models developed for this study, traffic that currently uses the Meridian/Pennsylvania exit ramp from I-70 westbound would divert in approximately equal numbers to the I-70 westbound C-D road, the West Street exit ramp, and the 21st Street exit ramp. I-65 southbound traffic that currently uses the C-D road to access the downtown area would use the West Street exit and the Meridian Street exit.

As with Alternative 4a, the locations most affected by traffic diversions would be West Street intersections at 10th Street and 11th Street. During the morning peak, delay would increase at the West Street/10th Street intersection, but the LOS (LOS C in 2017 and LOS D in 2041) would not change with Alternative 4c. The West Street/11th Street intersection would operate at LOS D with Alternative 4c compared to LOS C today, and at LOS E with Alternative 4c in 2041 compared to LOS D with the existing configuration in 2041.

During the afternoon peak, traffic on the Delaware Street entrance ramp would increase over existing due to the easier access to I-70 eastbound. This traffic would flow more smoothly with fewer back-ups due to the elimination of the weave and smoother merging with I-70 traffic. The lost movement from the Delaware Street entrance ramp to I-65 southbound would not result in a notable change in operations since the current movement is relatively small. Traffic that currently makes this movement would likely divert to the southbound entrance ramp at Washington Street. The intersections of West Street with 10th and 11th Streets would operate at LOS C during the both peak periods with the existing configuration or with Alternative 4c.

The locations of retaining walls with Alternative 4c are shown in **Figure 4-12** through **Figure 4-14**. **Table 5-5** summarizes the approximate length and maximum height of retaining walls along the interstate legs.

Table 5-5: Alternative 4c Retaining Walls

Wall Location	Length	Maximum Height	Maximum Added Pavement Width
East Leg (North Side)	None	None	None
East Leg (South Side)	None	None	8 ft
West Leg (North Side)	1,170 ft	11 ft	24 ft
West Leg (South Side)	1,882 ft	7 ft	21 ft
South Leg (West Side)	None	None	None
South Leg (East Side)	None	None	None

No retaining walls would be required along the outside of the east leg or south leg of the interstates. Approximately 1,170 feet of variable height retaining wall up to about 11 feet maximum height would border the Old Northside Historic District on the north side of the west leg.

On the south side of the west leg, approximately 1,882 feet of variable height retaining wall up to about 7 feet maximum height would border the St. Joseph Neighborhood and Chatham Arch Historic Districts.

It may be possible to further refine Alternative 4c to reduce the height of retaining walls or to eliminate them entirely at some locations, based on adjustments to the steepness or extent of the earth slopes. The potential for these adjustments would be investigated for this alternative as the design details are better defined during development of the EA.

It is uncertain whether widening of the interstates and construction of retaining walls in the dimensions described in **Table 5-5** would result in adverse visual impacts to the adjacent historic districts. This would be evaluated as part of the Section 106 consultation process.

Alternative 4c would meet the project purpose and need, and it would provide most traffic movements that currently exist. Retaining walls would not be necessary along the outside of the east and south legs, and retaining walls would be minimized or possibly eliminated along the outside of the west leg. Alternative 4c would provide substantial safety and operational benefits not provided by Alternative 3 or the No-Build Alternative. Based on these factors, Alternative 4c is identified in this screening report as the preliminary preferred alternative, subject to public input and additional analysis in the EA.

Alternative 5 - Major Interchange Reconstruction

Alternative 5 would require the most additional pavement and the most retaining walls of any alternative being considered. **Table 5-6** summarizes the approximate length and maximum height of retaining walls along the interstate legs. The retaining wall locations are shown in **Figure 4-17** through **Figure 4-19**. Alternative 5 would likely require right-of-way acquisition along the north side of I-65 in the Old Northside Historic District and could require the relocation of a commercial building at 277 East 12th Street within the historic district. Acquisition of right-of-way and the commercial building in the historic district might be a Section 4(f) use.

Table 5-6: Alternative 5 Retaining Walls

Wall Location	Length	Maximum Height	Maximum Added Pavement Width
East Leg (North Side)	4,055 ft	12 ft	29 ft
East Leg (South Side)	3,893 ft	15 ft	37 ft
West Leg (North Side)	2,316 ft	30 ft	56 ft
West Leg (South Side)	2,762 ft	37 ft	72 ft
South Leg (West Side)	4,887 ft	25 ft	85 ft
South Leg (East Side)	4,459 ft	45 ft	36 ft

Along the north side of the west leg, approximately 2,316 feet of retaining wall with a maximum height of 30 feet would border the Old Northside Historic District. Along the south side of the west leg, approximately 2,762 feet of retaining wall with a maximum height of 37 feet would border the St. Joseph Neighborhood and Chatham Arch Historic Districts.

Along the west side of the south leg, approximately 4,887 feet of retaining wall with a maximum height of 25 feet would be constructed along the border the Lockerbie Square Historic District. Along the east side of the south leg, approximately 4,459 feet of retaining wall with a maximum height of 45 feet would border the Holy Cross Westminster Historic District. Along the north side of the east leg, approximately 4,055 feet of retaining wall with a maximum height of 12 feet would be constructed. Along the south side of the east leg, approximately 3,893 feet of retaining wall with a maximum height of 15 feet would be constructed.

Widening of the interstates and construction of retaining walls in the dimensions described in **Table 5-6** would likely result in visual impacts to the adjacent historic districts. These potential impacts would be evaluated as part of the Section 106 consultation process.

Tall retaining walls near the existing right-of-way line along the legs of the North Split interchange, as required for Alternative 5, have been the subject of intense public resistance, as described in **Section 3**. In addition, Alternative 5 is the only alternative in this screening process that includes additional through lanes. Community groups and agencies have voiced opposition to construction of additional through lanes.

Alternative 5 would have the greatest impacts of the alternatives with respect to right-of-way, relocations, and visual impacts. It would potentially result in a Section 4(f) use. It includes elements that are deemed unacceptable to the community, as described in **Section 3.4**. Since other options are available that meet the project purpose and need with fewer impacts, Alternative 5 will not be carried forward as an option in the EA.

5.4 Screening Summary

Build alternatives must satisfy the project purpose and need to be carried forward in the EA. Alternative 1 (No-Build) would not meet purpose and need, but will be carried forward in the EA as a baseline for comparative evaluation against the build alternatives. Alternative 2 will not be carried forward since no TSM actions were identified that would meet the project purpose and need. Alternative 3 would satisfy needs related to the condition of pavement and bridges, but it will not be carried into the EA since it would cost nearly as much as Alternatives 4 and 5, and would not meet the project purpose and needs related to safety and operations.

The only alternatives that meet the project purpose and need are Alternatives 4 and 5. Alternative 4 has three options that differ in access to the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp on the west leg of the interchange. Alternative 5 differs from Alternative 4 by providing added through lanes in the interchange. **Table 5-7** summarizes the characteristics and trade-offs associated with these alternatives.

Table 5-7: Summary Comparison -- Alternative 4 Options and Alternative 5

Alternative	Pennsylvania Street Exit (access from)	Delaware Street Entrance (access to)	Ohio/Michigan via C-D Road (access from)	Approximate Maximum Wall Height / Added Pavement Width		Added Through Lanes	Estimated Cost
				North of West Leg	South of West Leg		
Alternative 4a: Efficient Interchange	Closed	Closed	I-65, I-70	None	None	No	$215 M to $265 M
Alternative 4b: Efficient Interchange	I-65, I-70	I-65 (via C-D) I-70	I-65, I-70	18 feet/ 48 feet	33 feet/ 55 feet	No	$270 M to $330 M
Alternative 4c: Efficient Interchange	I-65 only	I-65 (via C-D) I-70	I-70 only	11 feet/ 24 feet	7 feet/ 21 feet	No	$225 M to $275 M
Alternative 5: Full Interchange	I-65, I-70	I-65 (via C-D) I-70	I-65, I-70	30 feet/ 56 feet	37 feet/ 72 feet	Yes	$305 M to $370 M

Note: Shaded area denotes preliminary preferred alternative.

Since Alternative 5 would have the highest impacts of the alternatives considered and there are other alternatives that meet purpose and need, Alternative 5 will not be carried forward in the EA. Alternative 4 would provide most of the benefits of Alternative 5, with the exception of additional capacity to accommodate potential future traffic increases near the end of the planning period.

Based on the factors presented in this report and the characteristics summarized in **Table 5-7**, INDOT has determined that among the alternatives that meet the project purpose and need, Alternative 4c would provide the best balance of meeting safety and mobility needs while minimizing or potentially eliminating the use of retaining walls along the legs of the interchange. Subject to input from agencies, advisory committees, and the public during the comment period of this screening report, INDOT has determined that Alternative 4c will be the preliminary preferred alternative to be analyzed in detail in the EA.

5.5 Next Steps

As a final step in the screening process, this report will be provided for public review and placed on the project website. The results of the screening process and preliminary preferred alternative will be presented to the public, Community Advisory Committee, Section 106 consulting parties, and other stakeholders associated with the project. A public open house will be held and a comment period will be provided. The alternatives considered and the recommendations of this report will be subject to adjustment based on the review of comments.

Once the results of the screening process are refined or confirmed, the preliminary preferred alternative will be defined in greater detail in the EA. The No-Build Alternative will be included in the EA to provide a basis of comparison against the build alternative(s). Refinements in alternative definition will continue in order to best meet project needs and address community concerns.

The refinements to the project will include the definition of project components that integrate the project most effectively with the surrounding community. Neighborhood organizations and stakeholders will be directly engaged as context sensitive solutions are developed to enhance the appearance of the project and to provide effective connectivity across the corridors.

Information regarding project designs and potential impacts will be provided to the public as it is developed and opportunities for feedback will be provided. Based on public feedback and the more detailed analysis, a final preferred alternative will be identified in the EA. The EA is anticipated to be published and presented to the public and agencies for additional comment in a public hearing in early 2020. The Finding of No Significant Impact (FONSI) is anticipated to be issued in early 2020 following the public hearing.

I-65/I-70 North Split Project
Indianapolis, Indiana

Des. Nos. 1592385 and 1600808

ALTERNATIVES SCREENING REPORT

Appendix A - Traffic Analysis

September 21, 2018

CONTENTS

FIGURES

TABLES

1 TRAFFIC ANALYSIS METHODOLOGY

Traffic analysis is used in the alternatives screening study for the North Split project to evaluate the performance of preliminary alternatives in meeting the project purpose and need, and to review potential traffic impacts of alternatives on the interstate and local roadway network. This appendix is provided to describe the travel demand model used for the analysis and to provide level of service (LOS) data that supports the summary information presented in the Alternatives Screening Report.

2 TRAVEL DEMAND MODEL

Travel demand models allow transportation planners to ask and test critical "what if" questions about potential alternatives. The type of model used varies based on the type of project and geographic influence area of the alternatives. For the North Split project, a subarea microsimulation model is used since it provides an appropriate level of detail regarding traffic operations within the proximity of downtown Indianapolis.

The microsimulation model used in the North Split project uses a program called TransModeler, which is derived from the most current version of the Indianapolis Metropolitan Planning Organization (IMPO) nine-county travel demand model using TransCAD software. TransCAD is industry standard travel modeling software used by many MPOs across the country for multi-county regional transportation planning. The IMPO model has evolved over the years, with updates and additions as the technology has improved and the network has grown, but the fundamental components of the model have been applied by the IMPO for over 50 years.

The IMPO model, and by extension the microsimulation model, uses geographic information system (GIS) data files to represent the transportation environment. These data files provide assumptions on population, employment, income, roadways, and transit networks. The IMPO model's components are calibrated to replicate traffic patterns (e.g., origin-destination patterns and route choice) of current travelers. The IMPO model is similar to models used by many other major metropolitan transportation planning agencies nationwide. It includes the following four steps:

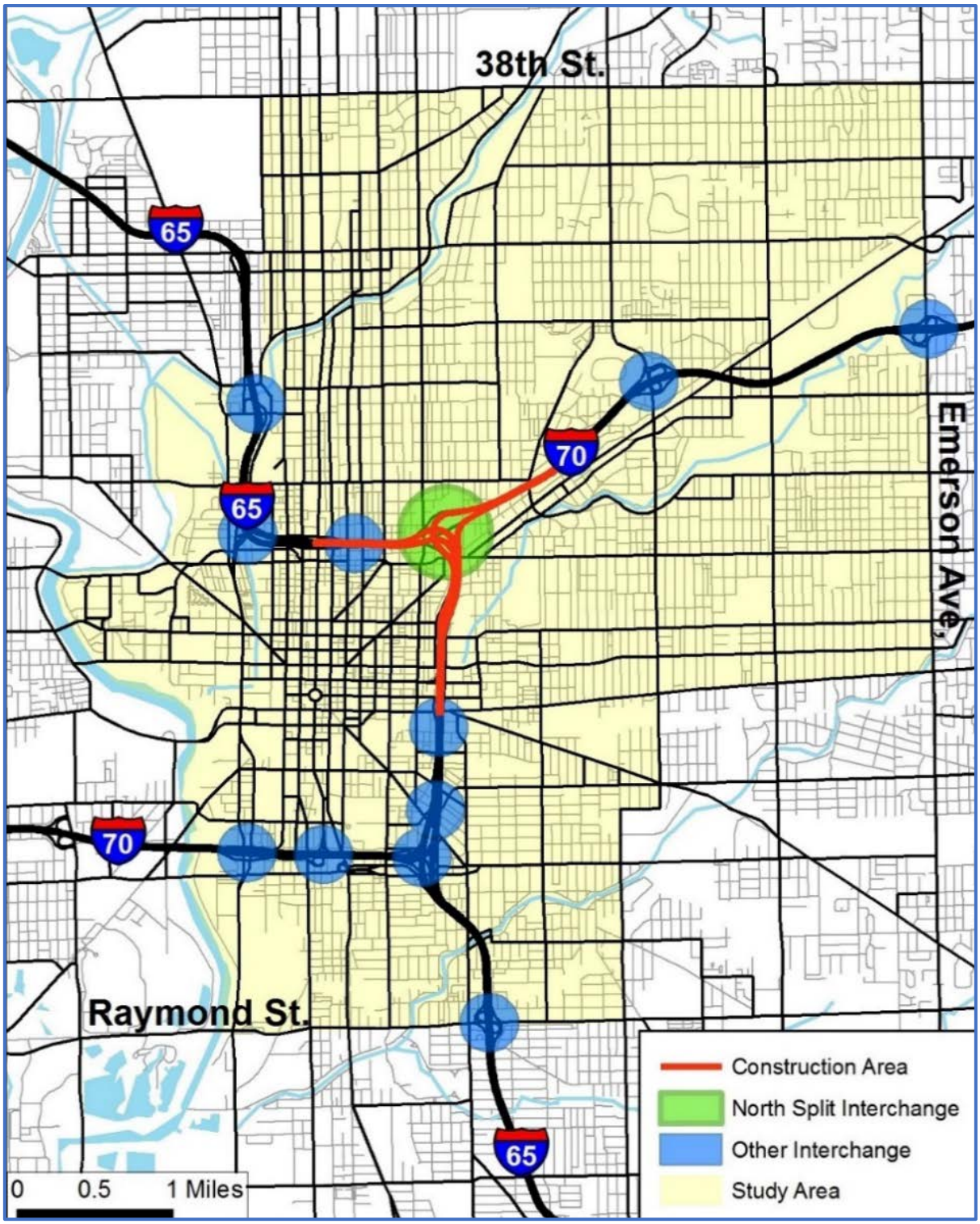
- Trip Generation – How many trips are produced from regional land use and employment?
- Destination Choice – Where do persons travel to work, school, or shopping?
- Mode Choice – How many persons drive; how many take transit?
- Trip Assignment – What are the vehicle flows on the roadway and transit network links?

Generally, the IMPO model identifies trips by origin and destination, determines whether the trips are by roadway or transit, and assigns the trips to the roadway or transit network. For trip assignments, the model identifies the quickest path for each individual trip in the network based on speed. It then adjusts the speed on each link based on congestion, and finds the quickest path again. The process is repeated multiple times to produce final estimates.

In both the IMPO model and the microsimulation model, the trips being served are tied directly to estimates of current or future population, employment, and other demographic measurements rather than to assumed traffic growth rates. This analysis is conducted for 2017 to represent current conditions and 2041 to represent future conditions. The year 2041 correlates with an approximate 20-year planning period, assuming the North Split project will be completed sometime around 2021.

The subarea for this analysis, referred to as the "traffic study area," is shown in **Figure 1**. It is roughly bordered by 38th Street to the north, Emerson Avenue to the east, Raymond Street to the south, and the White River to the west. This model was calibrated to existing traffic counts on the interstate and local roadway network and to existing time of day speed data for the interstate system within the traffic study area.

Figure 1: North Split Traffic Study Area



While TransCAD models, such as the IMPO model, are primarily based on estimated travel times associated with individual roadway links in the model, TransModeler microsimulation models consider other factors such as operational effects of lane utilization; freeway merging, diverging, and weaving; and traffic signal operations, particularly during peak hours. TransModeler uses more detailed definition of traffic controls in a smaller yet refined network to simulate the behavior of individual vehicles. Microsimulation models are used to predict the changes in localized traffic flow due to roadway or traffic control changes.

Travel demand modeling for this screening report is based on current traffic conditions with the existing roadway network as a base, and forecasted 2041 conditions with the North Split improvements in place that vary with the alternative. The transit system is assumed to be the existing IndyGo system, including enhancements in routes and frequency for the current system, and three new bus rapid transit lines (Red Line, Purple Line, and Blue Line) for the 2041 system. The same modeling assumptions will be used in the Environmental Assessment (EA).

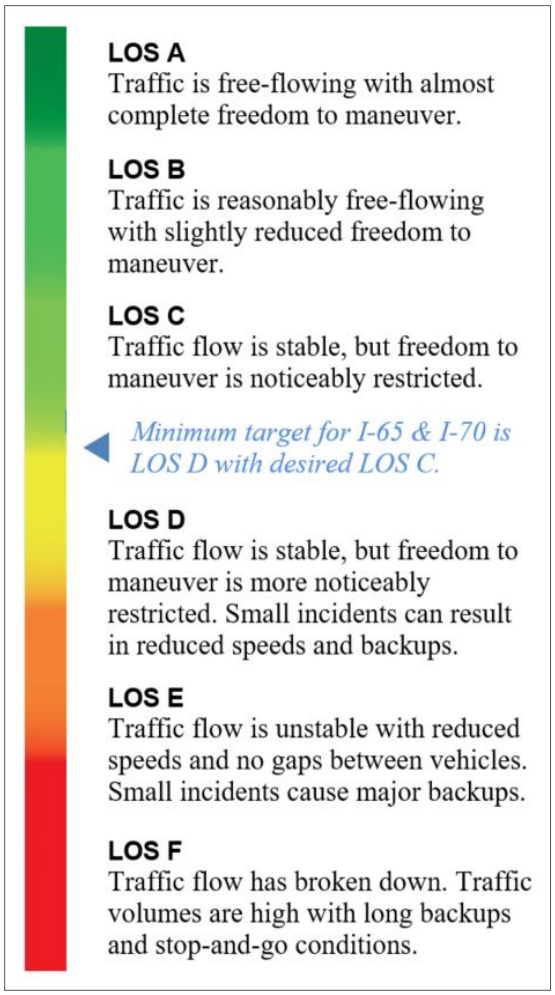
3 INTERCHANGE LEVEL OF SERVICE

Level of service (LOS) concepts are described in **Section 2.1.4** of the Alternatives Screening Report. Descriptions of LOS measures A through F are provided in **Figure 2** (shown as **Figure 2-11** in the Alternatives Screening Report). LOS varies throughout each interchange as traffic volumes and lane configurations change from segment to segment. Based on information from the microsimulation model, preliminary estimates of LOS were developed for individual segments of the North Split interchange for each alternative during AM and PM periods with 2017 and 2041 traffic levels. The morning peak period is 7:15 AM to 8:15 AM. The afternoon peak period is 4:15 PM to 5:15 PM.

Operations with LOS A through LOS D are considered to be acceptable on urban interstates, while operations with LOS E and F are considered poor. **Table 5-1** in the Alternatives Screening Report summarizes the percentage of segments operating at LOS A through LOS D within each alternative during each study period. The LOS percentages for each alternative by period are provided in **Table 1** through **Table 4** below. **Figure 3** through **Figure 22** show the LOS of segments within each alternative during each period of study.

Section 5 of this Alternatives Screening Report summarizes the performance of each alternative using the LOS data presented here. As shown in **Table 5-1**, the interstate operations would improve with any of the build alternatives compared to the no-build condition. In addition, all the build alternatives would provide major safety benefits at the most hazardous locations in the interchange, as described in **Section 5.2**. As discussed in **Section 5.3**, however, each alternative would involve trade-offs of benefits with impacts. The alternatives vary with respect to localized impacts, mobility options for users, and impacts on local traffic patterns. The LOS benefits must be considered in the context of these and other factors in reviewing North Split alternatives.

Figure 2: Level of Service (LOS) A - F



4 LEVEL OF SERVICE AT WEST STREET INTERSECTIONS

The review of environmental and community impacts in **Section 5.3** of the Alternatives Screening Report identifies West Street intersections with 10th and 11th Streets as the locations of greatest local traffic impact from the alternatives. The most notable impacts are with Alternative 4a and Alternative 4c, where existing movements at the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp are removed or restricted compared to existing. The estimated level of service during the morning and afternoon peak periods of 2017 and 2041 are shown in **Table 5** for the West and 10th Street intersection and **Table 6** for the West and 11th Street intersection.

Table 1: 2017 AM Alternative Levels of Service

Alternative	Total Segments	LOS E	LOS F	Acceptable LOS* (segments)	Acceptable LOS* (percent)
Alt 1 (No-Build)	22	5	3	14	64%
Alt 4a (no ramp access)	21	5		16	76%
Alt 4b (full ramp access)	26	3		23	88%
Alt 4C (partial ramp access)	21	7		14	67%
Alt 5 (full access/added lanes)	29	1		28	97%

* Acceptable LOS = LOS A - D (value is for interstates only)

Table 2: 2017 PM Alternative Levels of Service

Alternative	Total Segments	LOS E	LOS F	Acceptable LOS* (segments)	Acceptable LOS* (percent)
Alt 1 (No-Build)	22	5		17	77%
Alt 4a (no ramp access)	21	3		18	86%
Alt 4b (full ramp access)	26			26	100%
Alt 4C (partial ramp access)	21	2		19	90%
Alt 5 (full access/added lanes)	29			29	100%

* Acceptable LOS = LOS A - D (value is for interstates only)

Table 3: 2041 AM Alternative Levels of Service

Alternative	Total Segments	LOS E	LOS F	Acceptable LOS* (segments)	Acceptable LOS* (percent)
Alt 1 (No-Build)	22	9	4	9	41%
Alt 4a (no ramp access)	21	3	3	15	71%
Alt 4b (full ramp access)	26	4	1	21	81%
Alt 4C (partial ramp access)	21	5	3	13	62%
Alt 5 (full access/added lanes)	29	3		26	90%

* Acceptable LOS = LOS A - D (value is for interstates only)

Table 4: 2041 PM Alternative Levels of Service

Alternative	Total Segments	LOS E	LOS F	Acceptable LOS* (segments)	Acceptable LOS* (percent)
Alt 1 (No-Build)	22	5	5	12	55%
Alt 4a (no ramp access)	21	4	2	15	71%
Alt 4b (full ramp access)	26	3		23	88%
Alt 4C (partial ramp access)	21	3	2	16	76%
Alt 5 (full access/added lanes)	29	1		28	97%

* Acceptable LOS = LOS A - D (value is for interstates only)

Table 5: Level of Service at West Street and 10th Street

	2017		2041	
Alternative	AM	PM	AM	PM
Alt 1 (No-Build)	C	C	D	C
Alt 4a (no ramp access)	D	C	E	D
Alt 4b (full ramp access)	C	C	C	C
Alt 4C (partial ramp access)	C	C	D	C
Alt 5 (full access/added lanes)	C	C	C	C

Table 6: Level of Service at West Street and 11th Street

	2017		2041	
Alternative	**AM**	**PM**	**AM**	**PM**
Alt 1 (No-Build)	C	C	E	C
Alt 4a (no ramp access)	F	F	F	F
Alt 4b (full ramp access)	C	C	D	C
Alt 4C (partial ramp access)	D	C	E	C
Alt 5 (full access/added lanes)	C	C	D	C

Figure 3: Alternative 1 (No-Build) - 2017 AM Level of Service

Figure 4: Alternative 1 (No-Build) - 2041 AM Level of Service

Figure 5: Alternative 1 (No-Build) - 2017 PM Level of Service

Figure 6: Alternative 1 (No-Build) - 2041 PM Level of Service

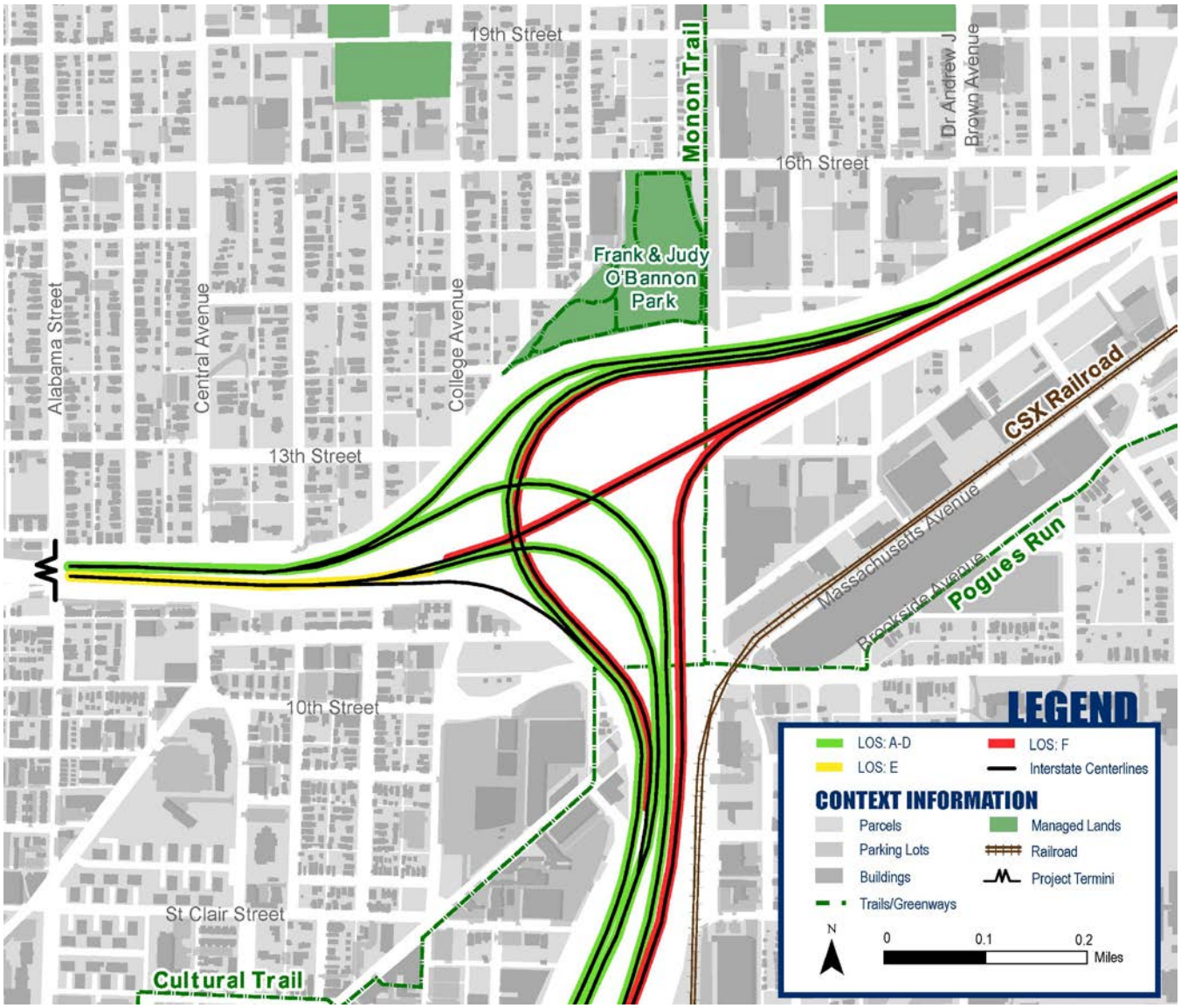


Figure 7: Alternative 4a - 2017 AM Level of Service

Figure 8: Alternative 4a - 2041 AM Level of Service

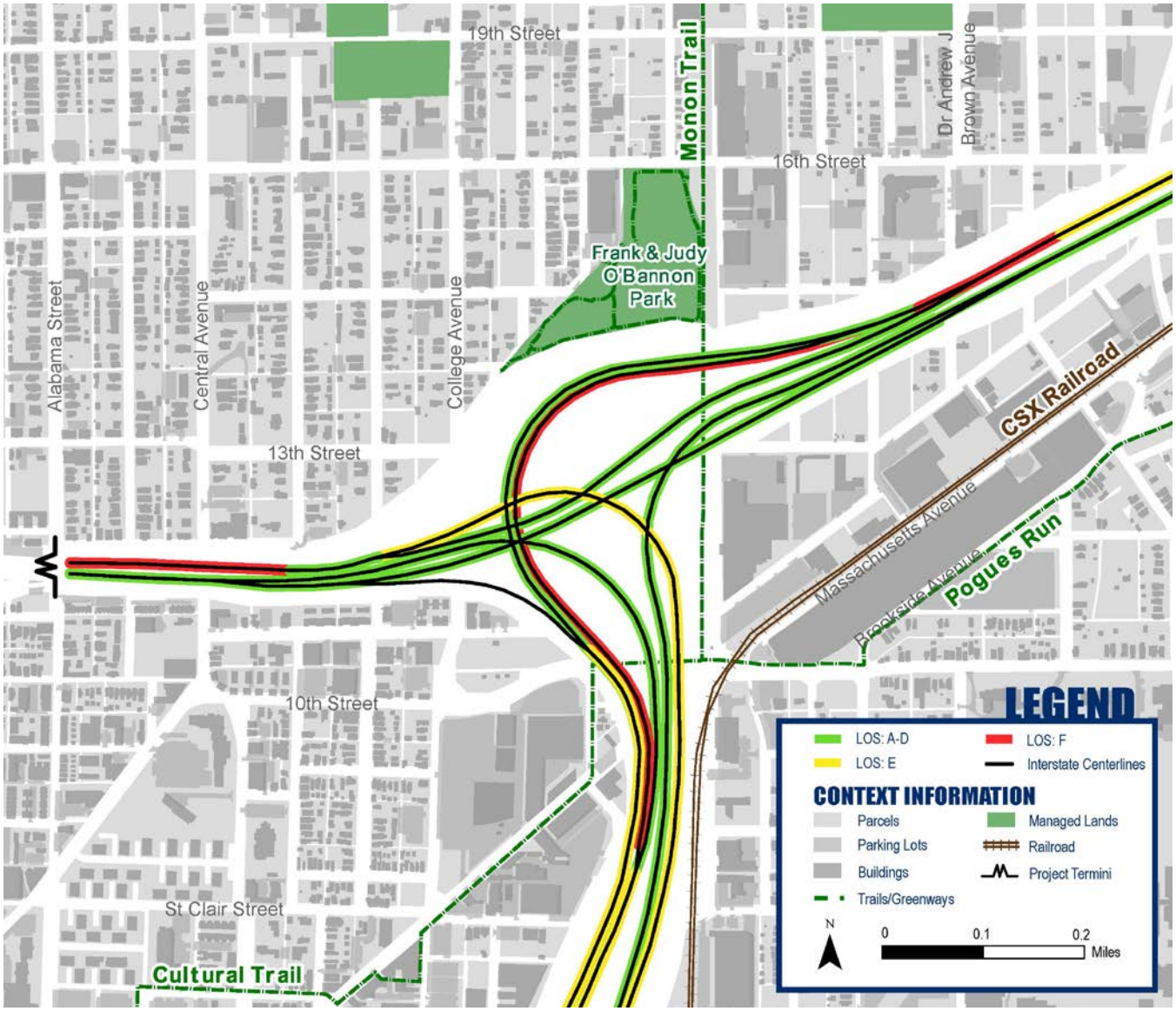


Figure 9: Alternative 4a - 2017 PM Level of Service

Figure 10: Alternative 4a - 2041 PM Level of Service

Figure 11: Alternative 4b - 2017 AM Level of Service

Figure 12: Alternative 4b - 2041 AM Level of Service

Figure 13: Alternative 4b - 2017 PM Level of Service

Figure 14: Alternative 4b - 2041 PM Level of Service

Figure 15: Alternative 4c - 2017 AM Level of Service

Figure 16: Alternative 4c - 2041 AM Level of Service

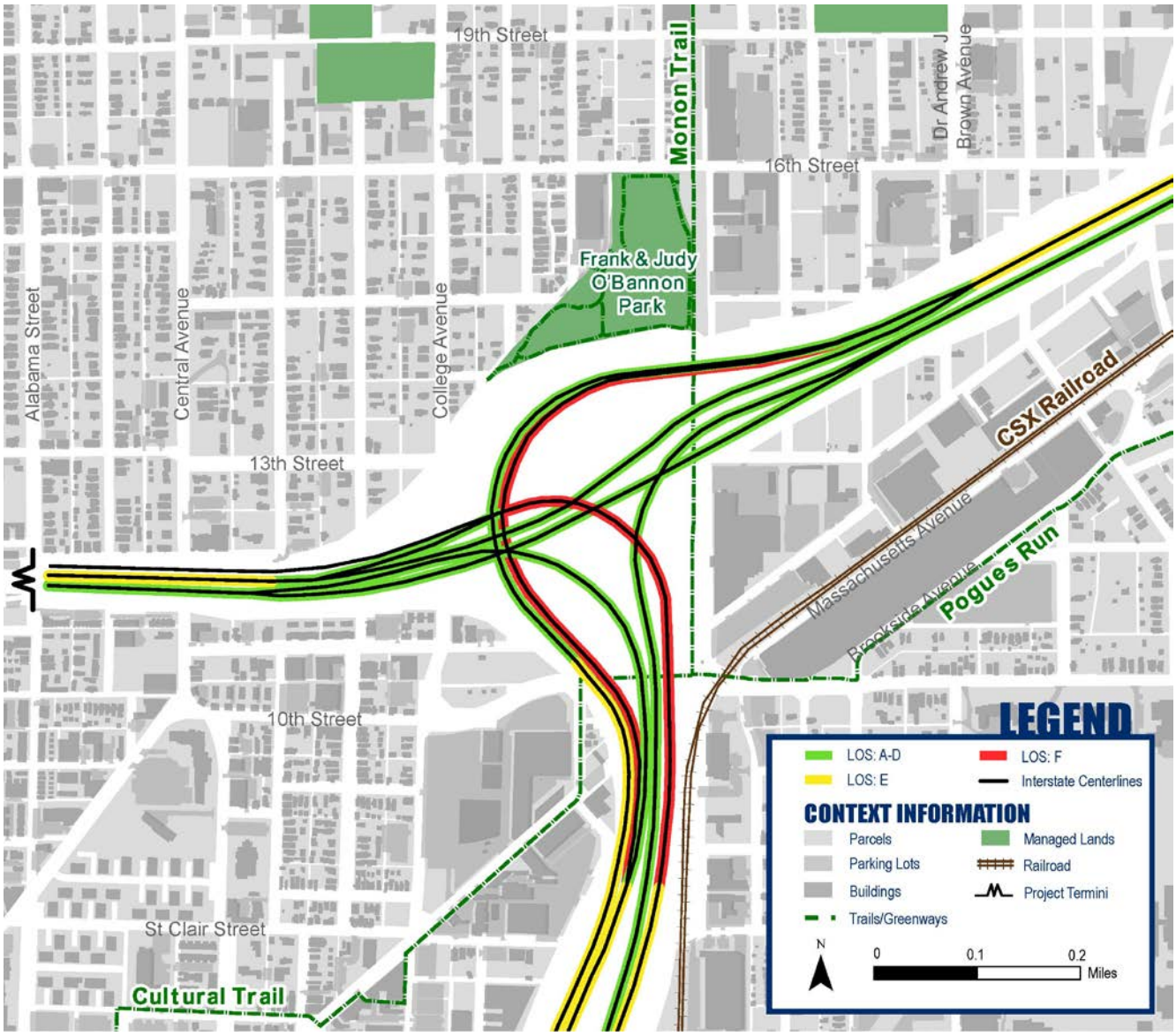


Figure 17: Alternative 4c - 2017 PM Level of Service

Figure 18: Alternative 4c - 2041 PM Level of Service

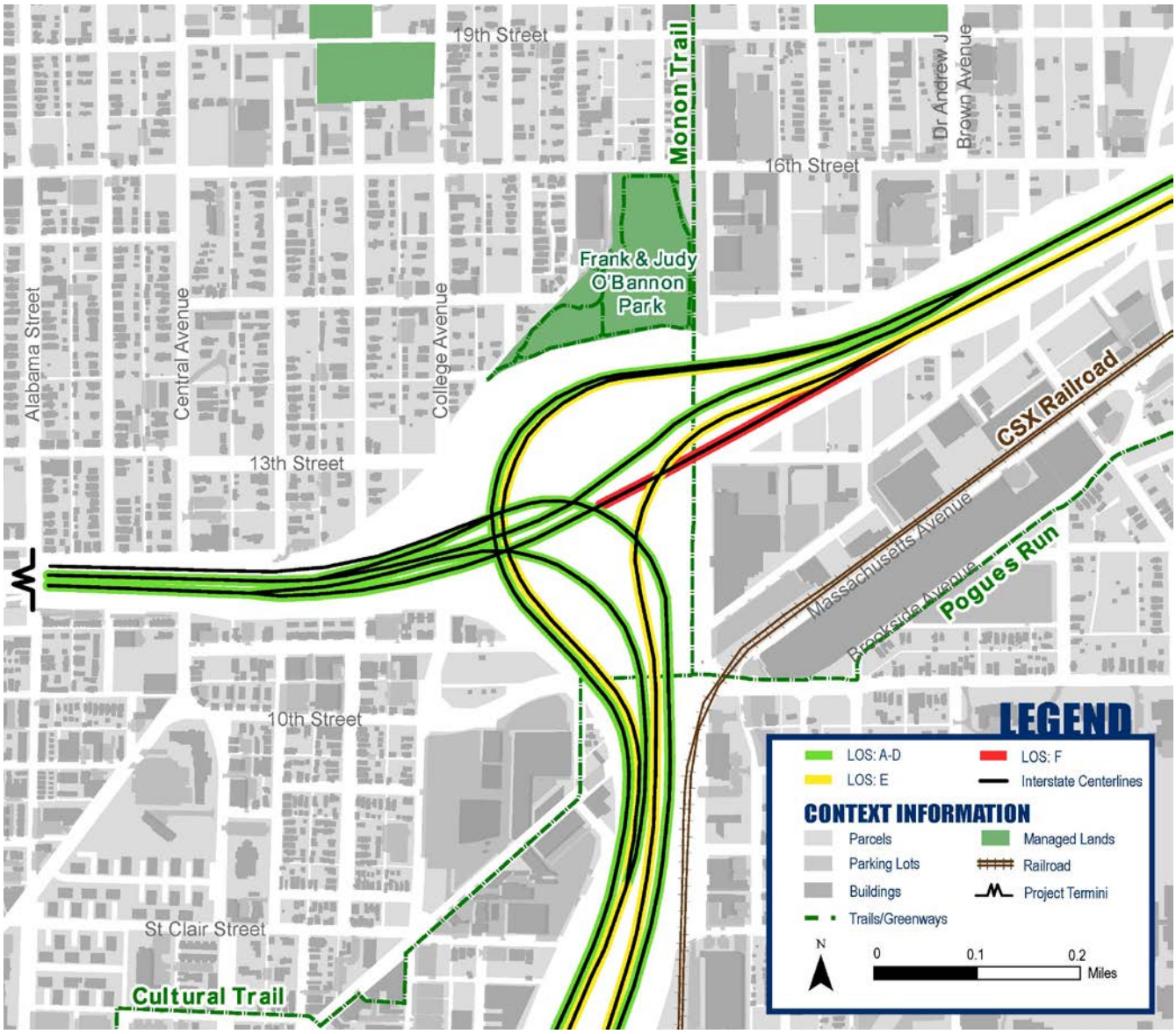


Figure 19: Alternative 5 - 2017 AM Level of Service

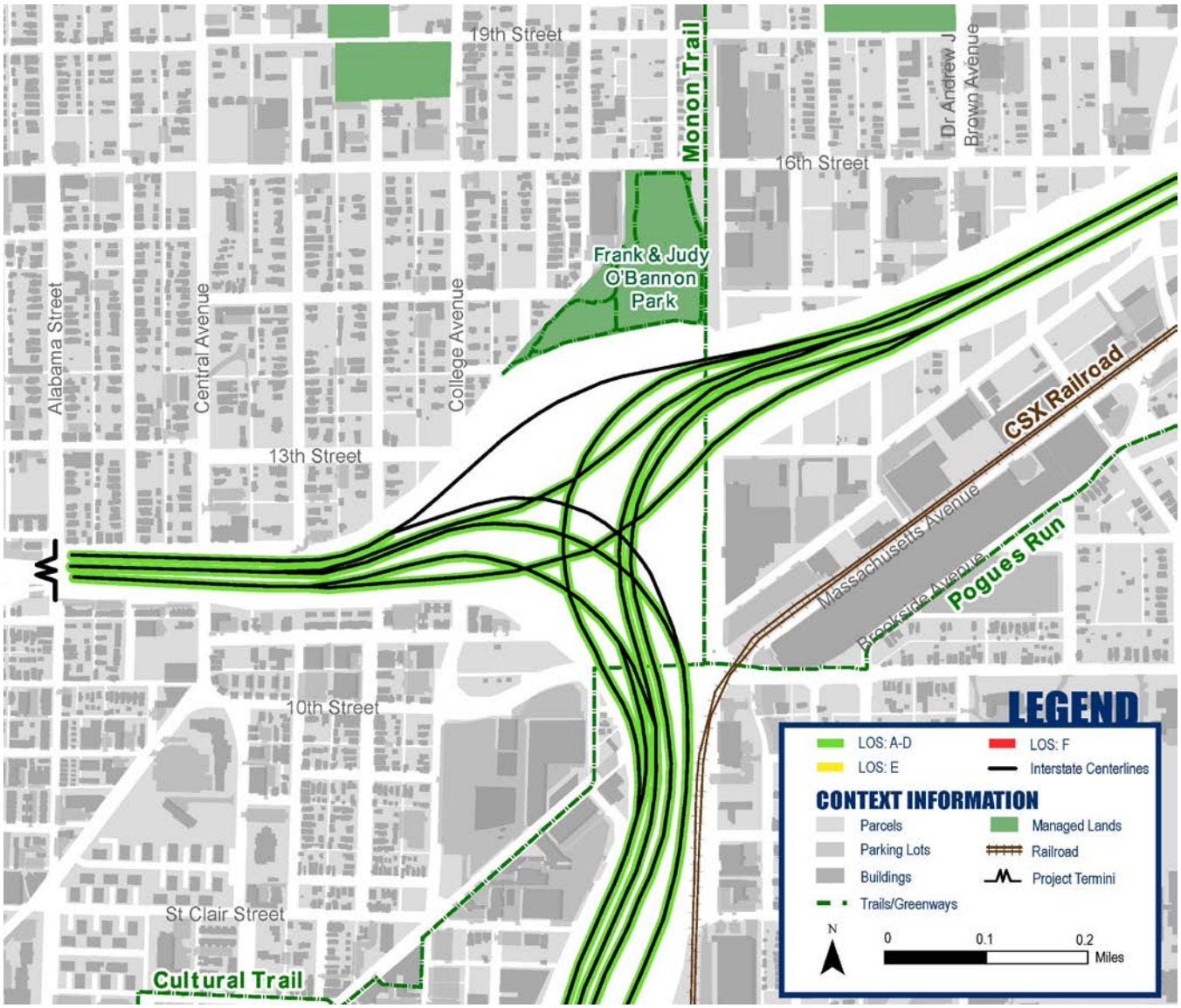


Figure 20: Alternative 5 - 2041 AM Level of Service

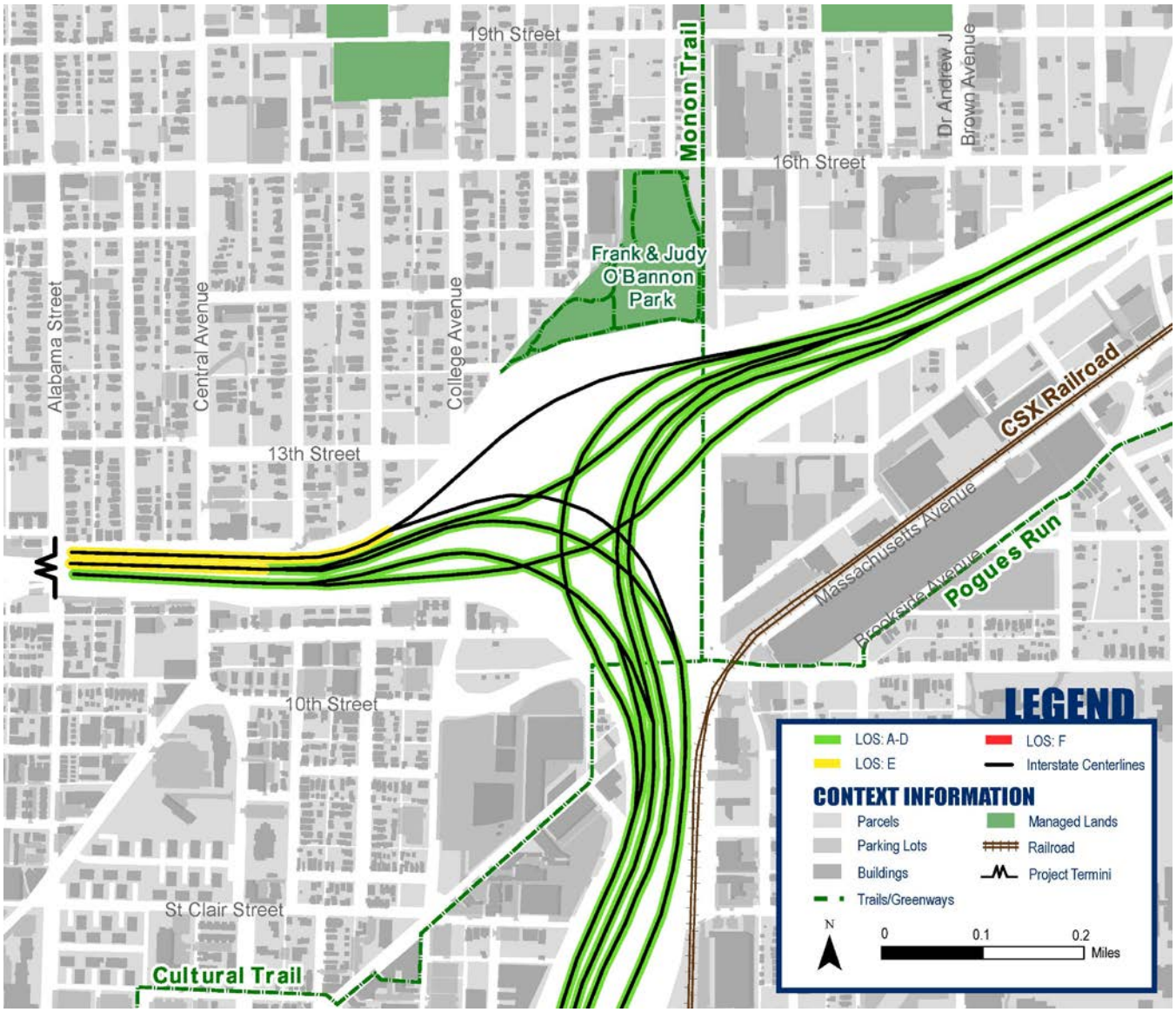
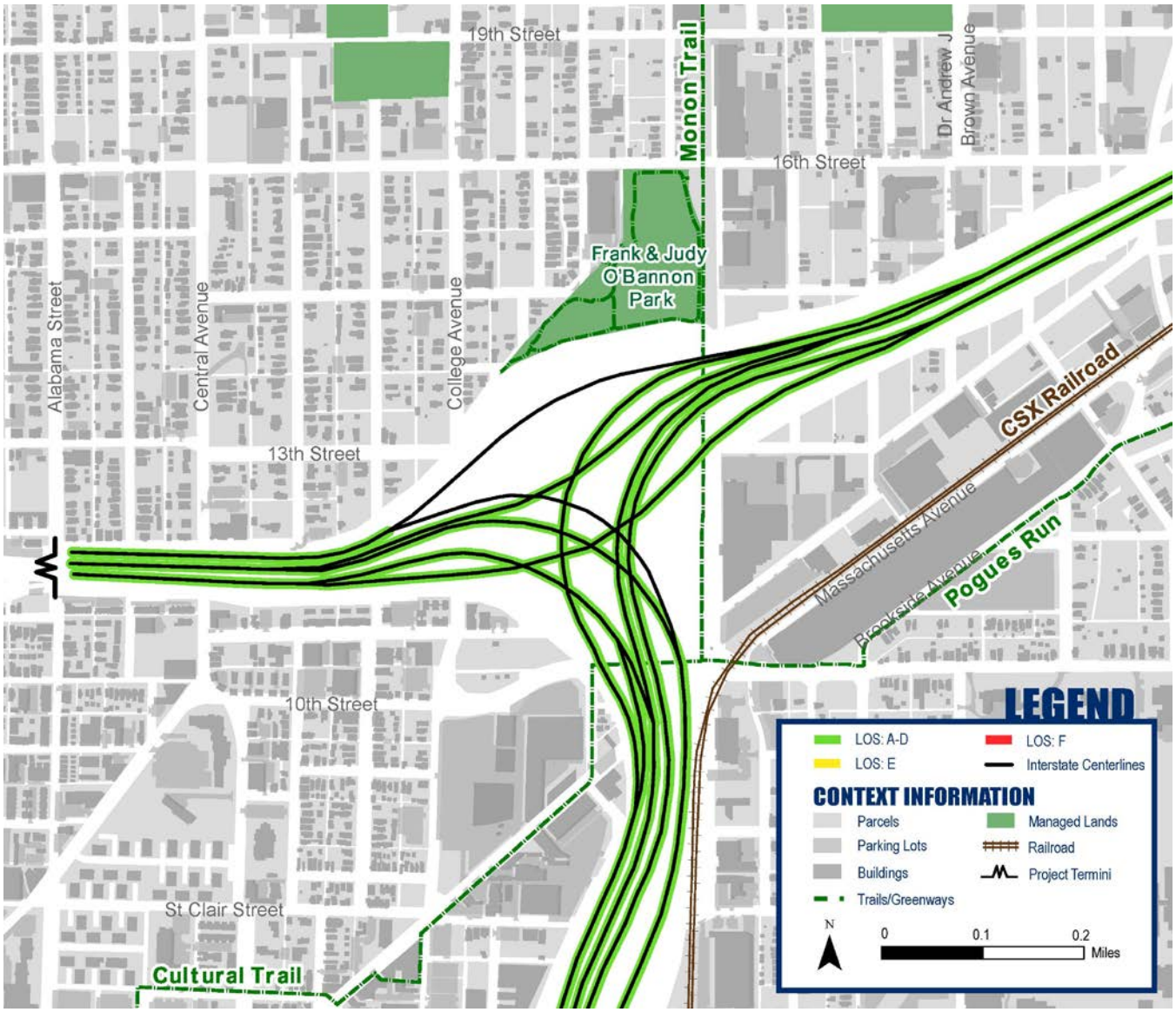


Figure 21: Alternative 5 - 2017 PM Level of Service

Figure 22: Alternative 5 - 2041 PM Level of Service



ALTERNATIVES SCREENING

https://northsplit.com/project-documents/alternatives-screening-report

Alternatives screening is the process used to narrow potential alternatives for evaluation in the environmental study. The goal of the Alternatives Screening Report is to present the project's range of alternatives considered, discuss the results of the screening analysis, and identify the preliminary preferred alternative to be carried forward for further development and evaluation in the Environmental Assessment (EA). Alternatives must first meet the project's purpose and need, and they are then evaluated for environmental impacts.

Download the Alternatives Screening Report (September 2018)

See the Refined Preliminary Preferred Alternative (April 2019)

INDOT has determined that Alternative 4c would provide the best balance of meeting safety and mobility needs while minimizing or potentially eliminating the use of retaining walls along the legs of the interchange. **Click here to learn more about Alternative 4c**

FACTORS CONSIDERED IN THE SCREENING PROCESS

FIVE ALTERNATIVES EVALUATED IN THE SCREENING REPORT

- No-Build – Although a No-Build Alternative does not meet the purpose and need for the project, it must be included as a project alternative in accordance with the National Environmental Policy Act (NEPA).
- Transportation System Management (TSM) – This alternative considers transportation improvements through policies, strategies and technologies to improve freeway performance. It also includes strategies to divert traffic away from the project area.
- Replace Bridges and Pavement In-Kind – Existing bridges and pavement would be rehabilitated or replaced at their current locations, bringing them to current design standards where feasible without changing the alignment and grade of roadways within the interchange.
- Efficient Interchange Reconstruction – This alternative includes three options to address the most severe safety problems in the project area. Highways and ramps would be realigned to provide more efficient and direct connections and smoother curves. Existing bridges and pavement are replaced. There are no additional through lanes, and some existing movements may be removed.
- Full Interchange Reconstruction – Highways and ramps would be realigned to improve safety and operations. Existing bridges and pavement would be replaced and additional through lanes would be added. All existing movements would be maintained.

SCREENING SUMMARY

Project Need	Alt 1 - No-Build	Alt 2 - TSM	Alt 3 - In-Kind Interchange	Alt 4 - Efficient Interchange	Alt 5 - Full Interchange
Correct Deterioriated Bridge Conditions					
Address structural deficiencies			x	x	x
Correct Deteriorated Pavement Conditions					
Address poor pavement condition			x	x	x
Improve Safety					
Eliminate Meridian/Pennsylvania St. weave				x	x
Eliminate Meridian/Delaware St. weave				x	x
Improve I-65 SB/I-70 WB merge				x	x
Improve curvature onto I-70 EB at east leg				x	x
Improve Operations and Reduce Congestion					
Improve interstate LOS over No-Build condition				x	x
Eliminate "big weave" on I-65/I-70 south				x	x
Does alternative meet the Purpose & Need?	**No**	**No**	**No**	**Yes**	**Yes**

Build alternatives must satisfy the project purpose and need to be carried forward in the EA.

- Alternative 1 (No-Build) would not meet purpose and need, but will be carried forward in the EA as a baseline for comparative evaluation against the build alternatives.
- Alternative 2 will not be carried forward since no TSM actions were identified that would meet the project purpose and need.
- Alternative 3 would satisfy needs related to the condition of pavement and bridges, but it will not be carried into the EA since it would cost nearly as much as Alternatives 4 and 5, and would not meet the project purpose and needs related to safety and operations.
- The only alternatives that meet the project purpose and need are Alternatives 4 and 5.
- Alternative 4 has three options that differ in access to the Meridian/Pennsylvania Street exit ramp and the Meridian/Delaware Street entrance ramp on the west leg of the interchange.
- Alternative 5 differs from Alternative 4 by providing added through lanes.

ALTERNATIVES SCREENING REPORT FAQS

What is the purpose of Alternatives Screening Report?

The purpose of the Alternatives Screening Report is to evaluate preliminary alternatives for the North Split project and to identify the preliminary preferred alternative to be analyzed in greater detail in the EA, subject to public and agency input received during the comment period for the Alternatives Screening Report.

How were preliminary alternatives developed for the Alternatives Screening Report?

An inventory of existing conditions was conducted, safety and operational problems were defined, and constraints were identified based on environmental resources and public input. Potential solutions were developed to address the safety and operational problems while minimizing the impacts to adjacent properties. Options were developed to represent trade-offs between traffic service and impact to adjacent properties. Addressing safety problems was a priority in all preliminary alternatives.

Were final designs developed for the preliminary alternatives?

Final designs were not developed for the Alternatives Screening Report. Layouts were conceptual and subject to adjustment based on more detailed engineering. In most cases, preliminary alignments, pavement edges, side slopes and retaining walls, and bridge sizes were defined to meet current standards in the Indiana Design Manual used by INDOT. Some minor variations requiring "design exceptions" from FHWA were identified. Graphic layouts were prepared for each preliminary alternative.

What alternatives were studied in the Alternatives Screening Report?

Five alternatives were evaluated in the Alternatives Screening Report:

1. No-Build – The existing interchange would stay as it is, without replacement of pavement and bridges, and with no safety or operational improvements. A No-Build Alternative must be included as a project alternative in accordance with NEPA.
2. Transportation System Management (TSM) – Policies, strategies, and technologies would be used to improve freeway performance or to divert traffic away from the project area.

3. Bridge and Pavement Replacement In-Kind – Bridges and pavement would be rehabilitated or replaced at their current locations, bringing them to current design standards where feasible, without changing the alignment and grade of roadways within the interchange.
4. Efficient Interchange Reconstruction – This alternative includes three options that realign highway sections and ramps to provide safer and more direct connections through the interchange. Bridges and pavement would be replaced, but there would be no added through lanes. Existing movements would be removed in some options to minimize impacts.
5. Full Interchange Reconstruction – Highways and ramps would be realigned to improve safety and operations. Bridges and pavement would be replaced, and all existing movements would be accommodated. Added through lanes would provide a good level of service in the future.

How were the preliminary alternatives evaluated?

Once the preliminary alternatives were identified, a three-step screening process was used for evaluation, as described below:

- Purpose and Need. Each preliminary alternative was evaluated to determine whether it would meet the purpose and need of the project. Alternatives not meeting the purpose and need were not carried forward in the screening process.
- Access Options and Community Impacts. Alternatives meeting the project purpose and need were defined in sufficient detail to identify potential impacts. Options were identified to reduce these impacts by modifying entrance and exit ramps, with a primary focus on increasing safety in the interchange, to provide a range of access options and community impact levels to represent potential trade-offs.
- Review of Trade-offs. Trade-offs between access options and community impacts are identified and reviewed in the Alternatives Screening Report. Based on this information, INDOT proposes a preliminary preferred alternative that appears to optimize this balance, while correcting physical deficiencies and addressing the greatest safety needs in the interchange.

What are the greatest safety needs in the interchange?

Crash data was reviewed at tenth-mile intervals through the interchange for the period 2012 to 2016 to identify the most hazardous locations in the interchange. Four locations were identified as having particularly high crash rates, as described below:

- Meridian/Pennsylvania Street Exit Ramp. This is the highest crash location in the interchange area. Northbound traffic on I-65 must cross I-70 traffic from the east to access this ramp. Locations where traffic must cross to make certain movements are called weaving areas.
- Meridian/Delaware Street Entrance Ramp. This is the second highest crash location in the interchange. Traffic entering at this ramp and wishing to access eastbound I-70 must cross all southbound I-65 traffic, creating another weaving area.
- I-65/I-70 Merge Point. I-65 and I-70 both have two lanes as they pass through the north split approaching the south leg of the interchange. The two I-70 lanes must merge to one lane just before joining with I-65 to create a three-lane combined roadway of I-65/I-70. This merge area is the third highest crash location in the interchange.
- Eastbound I-70 Curve. The location where I-70 turns eastward to leave the North Split on the east leg is the fourth highest crash location in the interchange. Three lanes of traffic approach this abrupt curve on an uphill grade.

Alternatives must improve conditions at the first two high crash locations and should improve conditions at the second two locations to meet the project purpose and need

Which alternatives were eliminated based on purpose and need?

Alternative 1 (No-Build) and Alternative 2 (TSM) were eliminated because they would not meet the need to correct deteriorated bridge and pavement conditions in the project area. The No-Build Alternative would be carried forward as a baseline for evaluating other alternatives. Alternative 3 (Bridge and Pavement Replacement In-Kind) was eliminated because it would not meet the project needs to improve safety and operations in the interchange.

Alternatives 4 and 5 would meet the purpose and need by replacing deteriorated infrastructure, improving traffic safety, and providing an acceptable level of service. They differ in their physical footprint, need for retaining walls, and the mobility they provide for motorists.

What are the trade-offs of mobility and impact with Alternatives 4 and 5?

Trade-offs between the three options of Alternative 4 and Alternative 5 occur on the west leg of the interchange. The west leg has the most severe safety problems due to the weaving conditions created by the ramps in each direction. Weaving is a term for traffic forced to cross paths to reach a destination, such as traffic entering from Delaware Street that must cross I-65 traffic to reach eastbound I-70. The weaves must be eliminated in order to meet the project purpose and need with respect to safety.

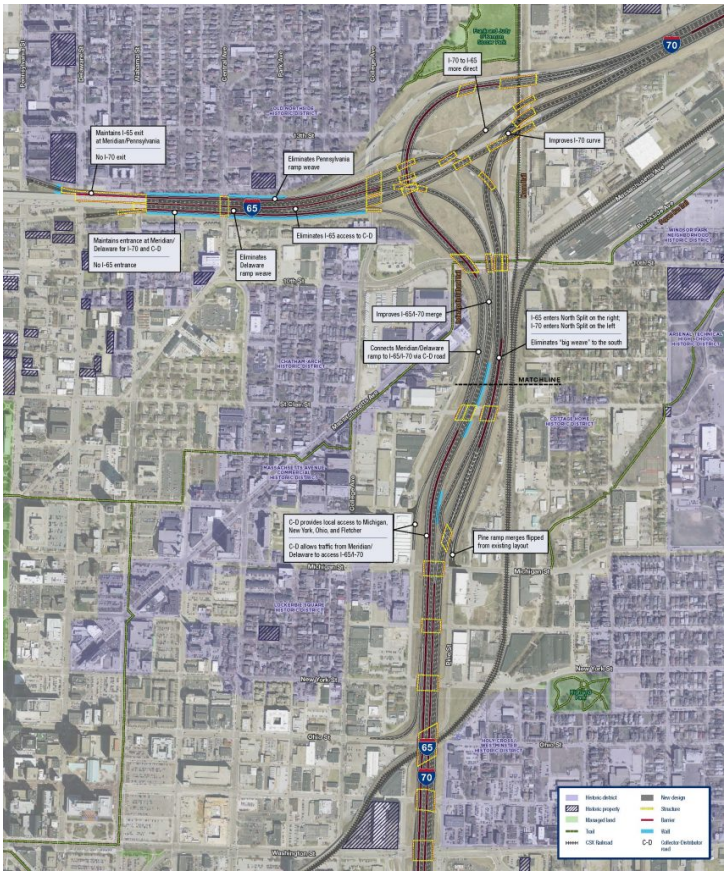
The weaves are eliminated in different ways in each alternative, as described below:

- Alternative 4a – Close the existing Pennsylvania Street exit ramp and Delaware Street entrance ramp. This alternative would have the smallest footprint, with minimal pavement widening and no outside retaining walls, but current access and egress would be lost on the west leg.
- Alternative 4b – Reconfigure the interchange to separate the movements that currently cross paths in the weave areas. New bridges would be added in the interchange area and a two-lane ramp would be added on the north and a one-lane ramp on the south. The additional pavement width would require retaining walls up to about 18 feet high on the north side of I-65 and about 33 feet high on the south side of I-65, but all existing movements would be accommodated.
- Alternative 4c – Reconfigure the interchange and the west leg to separate the movements that currently cross paths and eliminate some movements that currently exist. Single lane ramps would be added on each side of the I-65 mainline, with retaining walls up to about 11 feet high on the north side of I-65 and up to about 7 feet high on the south side of I-65. Westbound I-70 traffic would lose access to the Pennsylvania Street exit, and southbound I-65 traffic would lose access to the Ohio Street and Michigan Street exits. Traffic entering from the Delaware Street ramp would lose immediate access to southbound I-65, but could use the collector-distributor roadway that currently accesses Ohio and Michigan Streets to access I-65 further south. All other existing movements would be accommodated.
- Alternative 5 – Reconfigure the interchange and the west leg to separate the movements that currently cross paths in the weave areas, and provide two-lane ramps on both sides of the I-65 mainline. Provide added through lanes to improve traffic service. Alternative 5 would require retaining walls up to about 30 feet high on the north side of I-65 and up to about 37 feet high on the south side of I-65.

A coalition of interests has commissioned an independent economic study of downtown interstates. Why didn't INDOT wait for the results of this economic study before releasing the Alternatives Screening Report?

The studies are independent of each other. Based on information provided to INDOT, the economic study is considering the full downtown interstate system. The Alternatives Screening Report evaluated alternatives at the North Split interchange. Ultimately, each study may inform the other with respect to long range planning, but this will not depend on which study is released first. Studies of the North Split reached an important milestone and the public benefited from having this information without delay.

https://northsplit.com/project-documents/screening-report/alternative-4c/



Alternative 4c would meet the project purpose and need effectively by replacing deteriorated pavement and bridge infrastructure, improving safety at the highest crash locations and reducing traffic congestion by removing existing bottlenecks. Improvements would be made throughout the interchange, but a key area of improvement would be the west leg, where existing weaving areas – where traffic is forced to cross paths – create the greatest hazards and bottlenecks in the interchange.

Based on a review of the trade-offs between benefits and impacts of the alternatives, INDOT has determined that Alternative 4c would provide the best balance of meeting safety and mobility needs while minimizing impacts on adjacent neighborhoods. Subject to input from agencies, advisory committees and the public during the comment period of the screening report, Alternative 4c will be the preliminary preferred alternative to be analyzed in detail in the EA.

OVERVIEW

- Replaces bridges and pavement
- Improves safety at the most hazardous locations in the project area
- Removes two major bottlenecks on the west leg
- Configures ramps to serve single-lane ramps on each side of the I-65 mainline
- Minimizes footprint by configuring ramps in the interchange to maintain four lanes each way on the west leg
- Adds no through lanes
- Estimated cost is $225-$275 million

See additional maps of Alternative 4c

CHANGES TO THE INTERCHANGE AND WEST LEG

- Maintains access from the Meridian/Delaware Street entrance ramp to eastbound I-70 and southbound I-65 via collector-distributor (C-D) road that also serves Ohio and Michigan streets
- Eliminates weaving movements by allowing entry or exit only at the adjacent interstate lane
- Provides access to the Meridian/Pennsylvania Street exit ramp from northbound I-65, but not from I-70
- Allows access for southbound I-65 traffic to eastbound I-70, but not the C-D road that serves Ohio and Michigan streets

CHANGES TO AESTHETICS

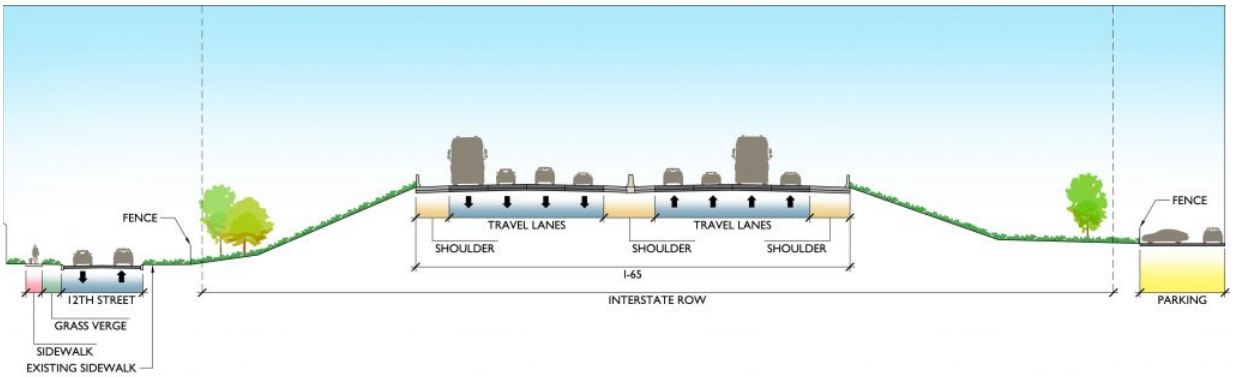
- Concrete barrier walls would be installed between certain lanes to prohibit movements that would require vehicles to cross paths
- The additional width would require retaining walls approximately 7 feet to 11 feet maximum height at some locations to retain construction within the right of way. Retaining walls would be minimized or possibly eliminated along the outside of the west leg as engineering design is refined
- The footprint would be widened by about 21 feet on the south side and 24 feet on the north side
- Retaining walls would not be necessary along the outside of the east and south legs

The need for walls at all locations would be confirmed based on more detailed design during the EA.

If the need for exterior retaining walls is confirmed, INDOT will seek community input regarding a low wall at the bottom of the slope or low wall at the top of the slope, and the potential for landscaping.

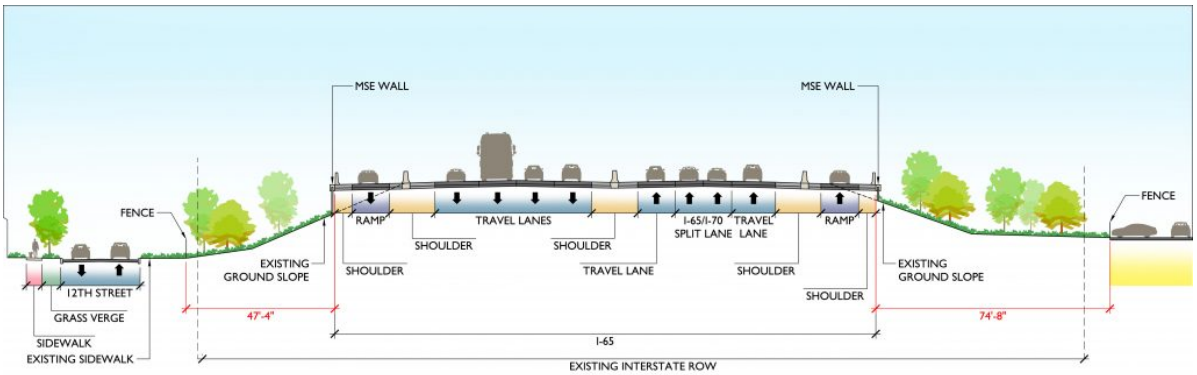
TYPICAL SECTION COMPARISONS

Existing Typical Section



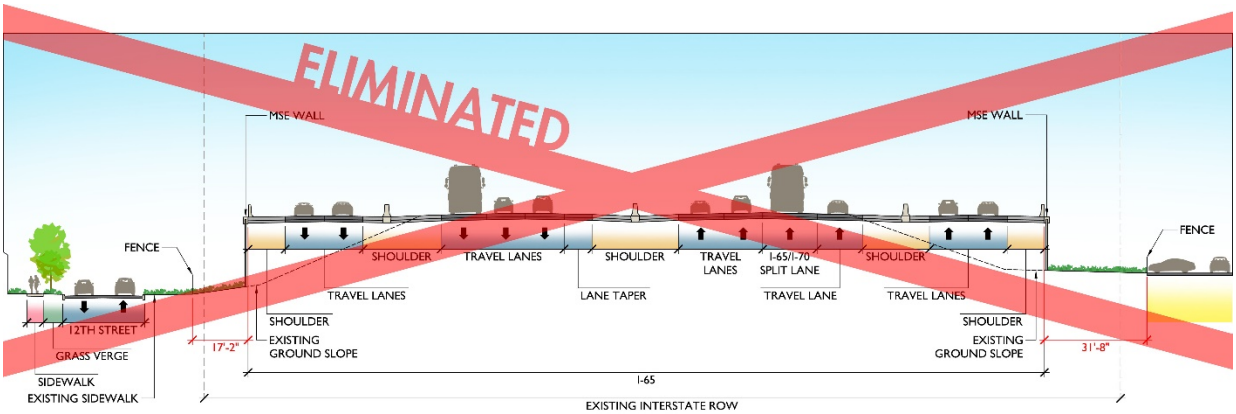
EXISTING CENTRAL AVENUE TYPICAL SECTION (LOOKING EAST)

Alternative 4c Typical Section



ALTERNATIVE 4C
PROPOSED CENTRAL AVENUE TYPICAL SECTION WITH WALLS (LOOKING EAST)

Alternative 5 (Eliminated) Typical Section

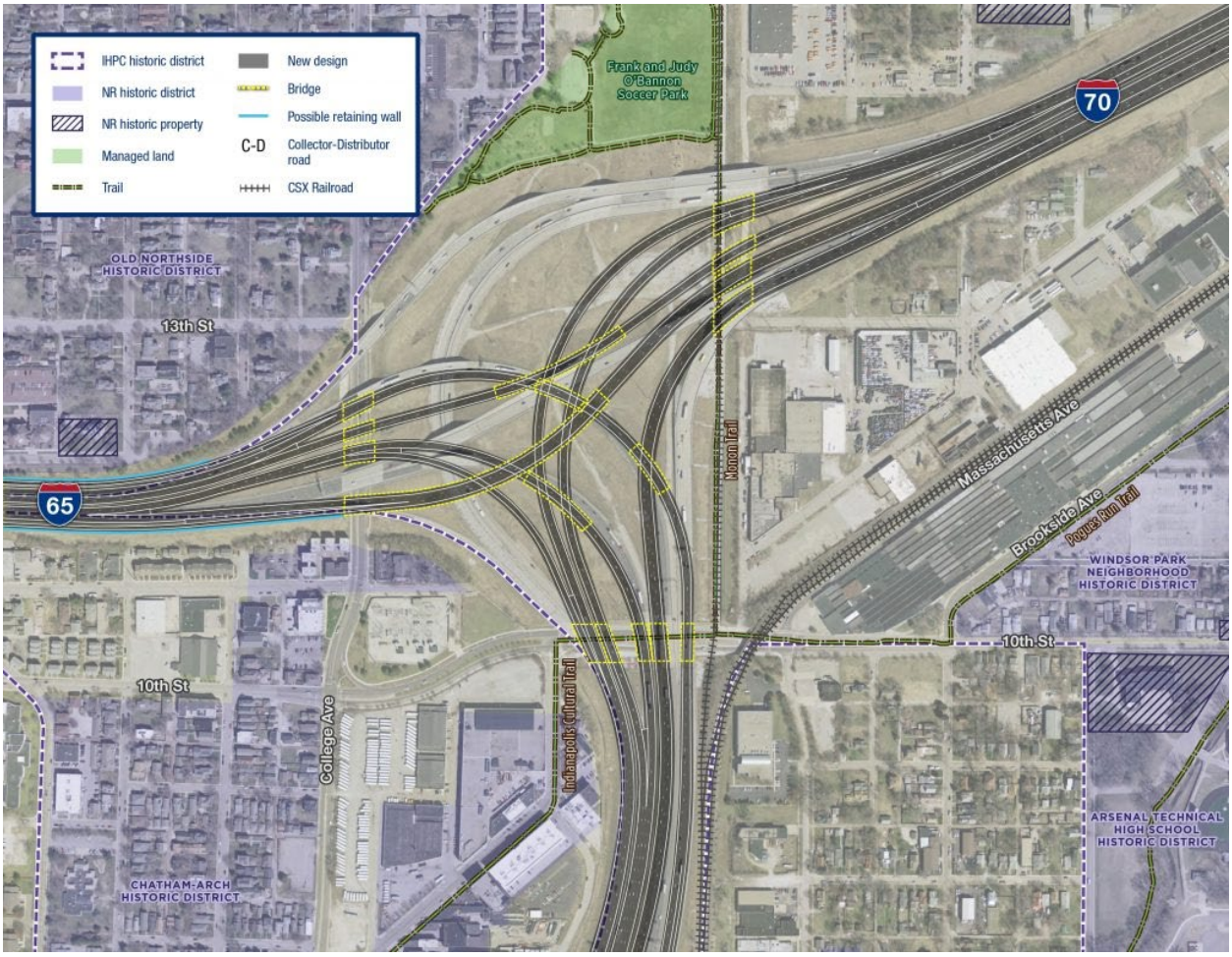


ALTERNATIVE 5
PROPOSED CENTRAL AVENUE TYPICAL SECTION (LOOKING EAST)

Click here to view FAQs about Alternative 4c

https://northsplit.com/maps/alternative-4c-maps/

PRELIMINARY PREFERRED ALTERNATIVE – INTERCHANGE



WEST LEG

SOUTH LEG

https://northsplit.com/project-documents/faqs/alternative-4c-faqs/

Alternative 4c is an option of Alternative 4. What is Alternative 4?

Alternative 4 – Efficient Interchange Reconstruction – is one of five evaluated in the Alternatives Screening Report for the North Split. Alternatives 1, 2 and 3 were eliminated because they would not meet the project purpose and need. Alternative 4 would meet the project purpose and need without providing added through lanes. Alternative 5 – Full Interchange Reconstruction – would also meet the project purpose and need, but it would also add through lanes to provide reserve capacity to meet future needs.

What are Alternatives 4a, 4b and 4c?

Three variations of Alternative 4 (a, b and c) are evaluated in the Alternatives Screening Report. Through most of the North Split interchange, Alternatives 4a, 4b and 4c are the same. They all provide a smaller overall footprint, improve safety at the worst crash locations and remove most of the bottlenecks that currently cause congestion. Alternatives 4a, 4b and 4c differ in how they connect with the Pennsylvania Street exit ramp and the Delaware Street entrance ramp on the west leg of the interchange.

Why focus on the Pennsylvania Street exit ramp and the Delaware Street entrance ramp?

The highest crash rate in the project area is at the Pennsylvania Street exit on the west leg of the interchange. I-65 traffic must cross the path of traffic coming from I-70 to reach the exit. This crossing movement is referred to as "weaving." The second highest crash rate in the project area is at the Delaware Street entrance ramp, where entering traffic must cross all I-65 traffic to access I-70 eastbound, creating a second weaving area. Eliminating these weaving areas is essential to improve safety in the interchange. It would also remove two of the main bottlenecks that cause congestion.

How do Alternatives 4a, 4b and 4c vary on the west leg of the interchange?

Alternatives 4a, 4b and 4c eliminate the weaving areas on the west leg in three different ways. The configuration of these local ramp connections determines what connections can be made at these ramp locations (if any), as well as how much the interstate needs to be widened and how high retaining walls need to be to keep the project within existing right of way. In effect, Alternatives 4a, 4b and 4c provide a series of trade-offs between the number of available movements and the physical impact on the adjacent area. These trade-offs are summarized in the table below. Alternative 5 is included in the table to illustrate the effect of adding through lanes while serving all movements at the ramps.

West Leg Access and Impacts – Alternatives 4a, 4b, 4c and 5

Alternative	Pennsylvania St. Ramp		Delaware St. Ramp		Ohio/Michigan Ramps (via C-D Road*)		Approximate Maximum Wall Height (Distance from R/W line)		Added Through Lanes	Estimated Cost
	I-65	I-70	I-65	I-70	I-65	I-70	North of West Leg	South of West Leg		
Alternative 4a: All Ramps Closed	✗	✗	✗	✗	✓	✓	None	None	No	$215M to $265M
Alternative 4b: All Ramps Open	✓	✓	✓	✓	✓	✓	18 feet (27 feet)	33 feet (64 feet)	No	$270 M to $330 M
Alternative 4c: Selected Ramps Closed	✓	✗	✓	✓	✗	✓	11 feet (47 feet)	7 feet (75 feet)	No	$225M to $275M
Alternative 5: All Ramps Open + Added Through Lanes	✓	✓	✓	✓	✓	✓	30 feet (17 feet)	37 feet (32 feet)	Yes	$305M to $370M

*C-D connects with Ohio Street and Michigan Street ramps, then merges with southbound I-65.

What trade-offs are associated with the alternatives?

Based on the information provided in the table above, the trade-offs with the alternatives can be summarized in terms of ramp connections and the maximum height of retaining walls along the west leg of the interchange, as follows:

- Alternative 4a: Pennsylvania Street exit closed, Delaware Street entrance closed. No retaining walls
- Alternative 4b: Pennsylvania Street exit open to I-65 and I-70, Delaware Street entrance open to I-65 and I-70. 18-foot retaining wall north of I-65; 33-foot retaining wall south of I-65
- Alternative 4c: Pennsylvania Street exit open to I-65 only, Delaware Street entrance open to I-70 only, I-65 access to Ohio and Michigan streets eliminated. 11-f00t retaining wall north of I-65, 7-foot retaining wall south of I-65
- Alternative 5: Pennsylvania Street exit open to I-65 and I-70, Delaware Street entrance open to I-65 and I-70. 30-foot retaining wall north of I-65, 37-foot retaining wall south of I-65

Why was Alternative 4c chosen as the Preliminary Preferred Alternative?

Alternative 4c would meet the project purpose and need effectively by replacing deteriorated pavement and bridge infrastructure, improving safety at the highest crash locations and reducing traffic congestion by removing existing bottlenecks. Improvements would be made throughout the interchange, but a key area of improvement would be the west leg, where existing weaving areas create the greatest hazards and bottlenecks in the interchange.

Based on a review of the trade-offs between benefits and impacts of the alternatives, INDOT has determined that Alternative 4c would provide the best balance of meeting

safety and mobility needs while minimizing impacts on adjacent neighborhoods. Subject to input from agencies, advisory committees and the public during the comment period of the Alternatives Screening Report, Alternative 4c will be the preliminary preferred alternative to be analyzed in detail in the EA.

If Alternative 4c is advanced as the preferred alternative in the EA, will additional measures be investigated to minimize impacts to surrounding neighborhoods?

As the NEPA process moves forward, the preliminary preferred alternative will be defined in greater detail and opportunities will be investigated to further reduce impacts, including the following:

- Options to adjust the steepness of the slopes or the location of the bottom of the slopes will be investigated to determine whether the retaining wall heights can be reduced or if the retaining walls can be eliminated entirely at some or all locations
- Aesthetic treatments will be investigated throughout the corridor in consultation with neighborhood representatives and consulting parties to improve neighborhood integration
- Local traffic impacts and connectivity across the corridor will be investigated and plans will be developed to minimize impacts and enhance opportunities or all modes of travel, including pedestrians and bicycles, as well as motor vehicles using the local roadway system

  The project team will continue to work with the Community Advisory Committee (CAC) and others to enhance the North Split project and minimize community impacts as the project moves from the NEPA process to implementation.

NORTH SPLIT UPGRADES DRIVING PROGRESS

Alternatives Screening Report

October 2018

The Indiana Department of Transportation (INDOT) is preparing to reconstruct the I-65/I-70 North Split Interchange in downtown Indianapolis. The project will repair deteriorating bridges, upgrade pavement conditions in the area, lessen congestion and improve safety.

PURPOSE:

Rehabilitate and improve the existing interstate facilities leading to and through the I-65/I-70 North Split interchange in downtown Indianapolis

NEEDS:

- Correct deteriorated I-65/I-70 bridge conditions
- Correct the deteriorated pavement conditions on the interstates
- Improve safety by reducing or eliminating conditions that contribute to crashes along I-65 and I-70
- Improve interchange operations and reduce congestion by removing weaving sections and improving level of service now and in 2041

ALTERNATIVES SCREENING REPORT

Alternatives screening is the process used to narrow potential alternatives for evaluation in the environmental study. The goal of the Alternatives Screening Report is to present the project's range of alternatives considered, discuss the results of the screening analysis, and identify the preliminary preferred alternative to be carried forward for further development and evaluation in the Environmental Assessment (EA). There are many factors considered in the Alternatives Screening Report, including:

- Road and bridge conditions
- Traffic demands
- Safety
- Property impacts
- Construction costs
- Environmental impacts

FIVE ALTERNATIVES EVALUATED

1. **No Build** – No replacement of pavement and bridges, and no safety or operational improvements
2. **Transportation System Management (TSM)** – Policy, strategy and technology improvements, including traffic demand reduction or diversion
3. **Replace Bridges and Pavement In-Kind** – Rehabilitate or replace existing bridges and pavement at their current locations
4. **Efficient Interchange Reconstruction (3 Options)** – Reconfigure interchange; three options for access to the Meridian/Pennsylvania exit ramp and the Meridian/Delaware entrance ramp on the west leg
5. **Full Interchange Reconstruction** – Reconfigure interchange, including added through lanes

Details for each alternative are available on the project website.

WHY ALTERNATIVE 4C?

Alternative 4c would meet the project purpose and need, and it would balance efficient design with impacts to nearby neighborhoods. It includes replacing deteriorated pavement and bridge infrastructure, improving safety at the highest crash locations and reducing traffic congestion by removing existing bottlenecks. Improvements would be made throughout the interchange, but a key area of improvement would be the west leg weaving areas – where traffic is forced to cross paths, which creates the greatest hazards and bottlenecks in the interchange.

- Replaces bridges and pavement
- Improves safety at the most hazardous locations in the project area
- Removes two major bottlenecks on the west leg
- Maintains existing entry and exit points for most movements
- Minimizes footprint
- Adds no through lanes
- Minimizes impacts on adjacent neighborhoods
- Estimated cost is $225-$275 million

CHANGES TO THE INTERCHANGE AND WEST LEG

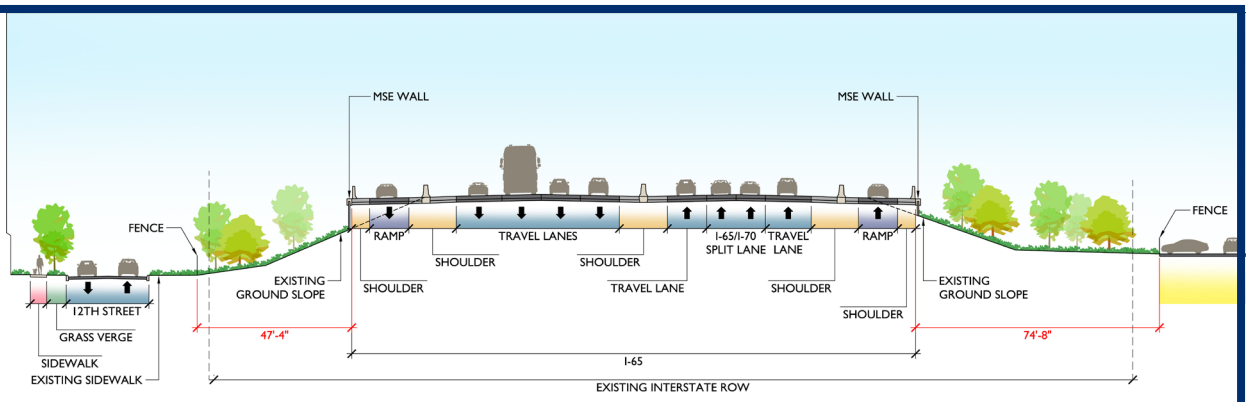
Alternative 4c maintains access from the Meridian/ Delaware Street entrance ramp to eastbound I-70 and southbound I-65 via the collector-distributor (C-D) road that also serves Ohio and Michigan streets. However, I-65 southbound access to the C-D road is eliminated. It eliminates weaving movements by allowing entry or exit only at adjacent interstate lanes.

This alternative maintains access to the Meridian/ Pennsylvania Street exit ramp from northbound I-65, but removes access from I-70.

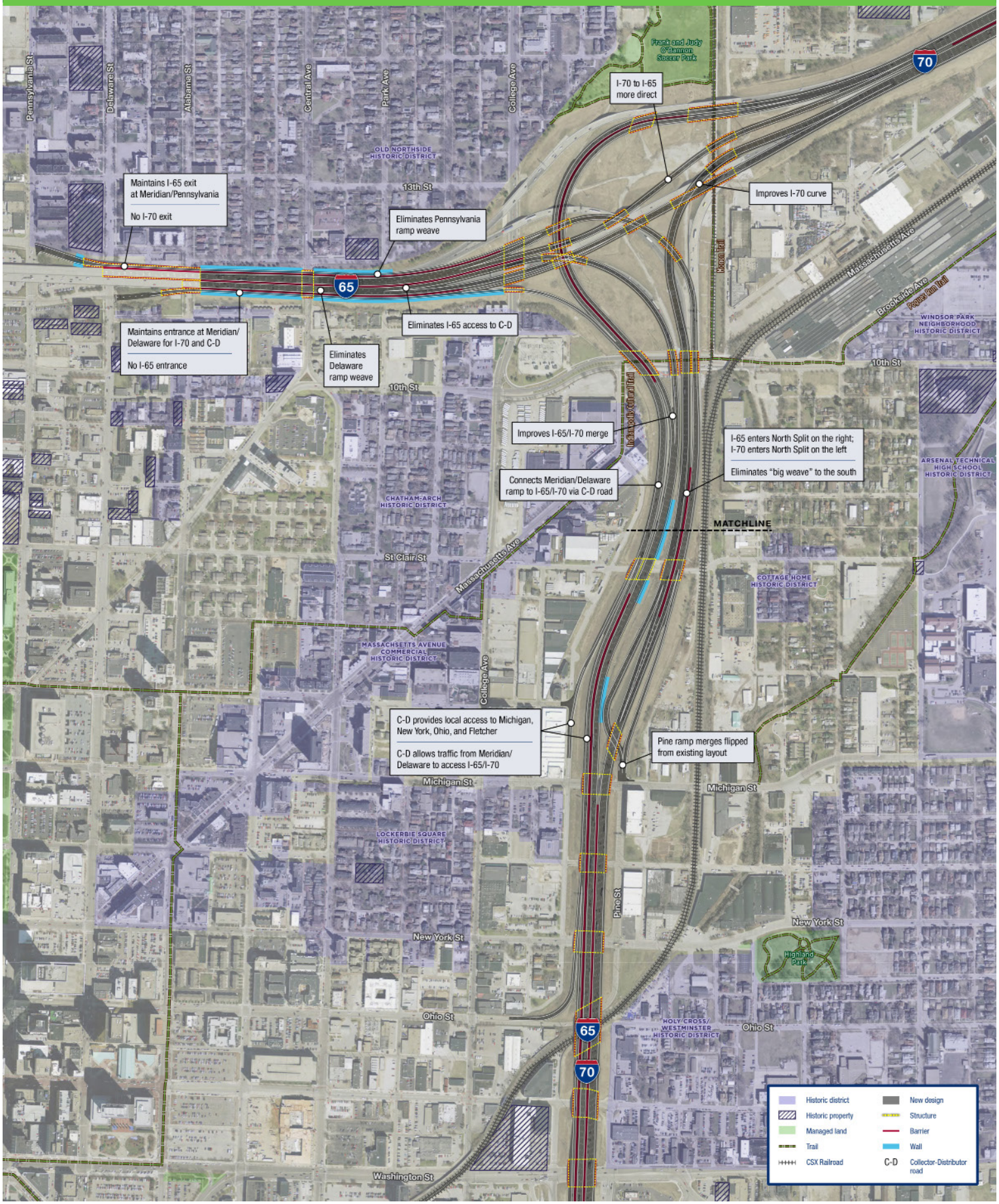
CHANGES TO AESTHETICS

- The footprint would be widened by a maximum of about 21 feet on the south side and 24 feet on the north side of I-65 on the west leg. There would be no widening along the east and south legs.
- The additional width would require retaining walls up to about 7 feet to 11 feet maximum height along I-65 on the west leg to keep construction within the right of way. Retaining walls would be minimized or possibly eliminated along the outside of the west leg as design is refined.
- Exterior retaining walls would not be necessary along the outside of the east and south legs, closely matching the existing conditions.
- The need for and height of walls at all locations would be confirmed based on more detailed design.
- If the need for exterior retaining walls is confirmed, INDOT will seek community input regarding a low wall at the bottom of the slope or low wall at the top of the slope, and the potential for landscaping.

ALTERNATIVE 4C
PROPOSED CENTRAL AVE. TYPICAL SECTION WITH WALLS (LOOKING EAST)



ALTERNATIVE 4C:
North Split Preliminary Preferred Alternative



SCREENING RESULTS FOR ALTERNATIVES

The only alternatives that meet the project purpose and need are Alternatives 4 and 5. Other than added through lanes (Alternative 5), the primary differences between the three options of Alternative 4 and Alternative 5 are on the west leg of the interchange, as shown in the following summary table.

Alternative	Pennsylvania St. Ramp		Delaware St. Ramp		Ohio/Michigan Ramps (via C-D Road*)		Approximate Maximum Wall Height (Distance from R/W line)		Added Through Lanes	Estimated Cost
	I-65	I-70	I-65	I-70	I-65	I-70	North of West Leg	South of West Leg		
Alternative 4a: All Ramps Closed	✗	✗	✗	✗	✓	✓	None	None	No	$215M to $265M
Alternative 4b: All Ramps Open	✓	✓	✓	✓	✓	✓	18 feet (27 feet)	33 feet (64 feet)	No	$270 M to $330 M
Alternative 4c: Selected Ramps Closed	✓	✗	✓	✓	✗	✓	11 feet (47 feet)	7 feet (75 feet)	No	$225M to $275M
Alternative 5: All Ramps Open + Added Through Lanes	✓	✓	✓	✓	✓	✓	30 feet (17 feet)	37 feet (32 feet)	Yes	$305M to $370M

*C-D connects with Ohio Street and Michigan Street ramps, then merges with southbound I-65.

WHAT'S NEXT?

Subject to input from agencies, advisory committees and the public during the comment period of the Alternatives Screening Report, Alternative 4c will be the preliminary preferred alternative to be analyzed in detail in the EA.

The No-Build Alternative will be included in the EA to provide a basis of comparison against the build alternative(s). Refinements in alternative definition will continue in order to best meet project needs and address community concerns.

INDOT will work with the community to refine the project, focusing on aesthetics, lighting, landscaping, connectivity, and ways to integrate the project better with the community.

Share your Feedback by October 29, 2018

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