FEASIBILITY STUDIES AND ALTERNATIVE EVALUATION REPORTS

EXAMPLES OF QUALITY PROJECT DEVELOPMENT PROCESS (PDP) DOCUMENTS IN OHIO

OHIO DEPARTMENT OF TRANSPORTATION
OFFICE OF ENVIRONMENTAL SERVICES
AUGUST 2016

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by ODOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 11, 2015, and executed by FHWA and ODOT.

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B. Basic layout with color accents
C. Full page color layout
D. Basic two-column layout
E. Complex full column layout

Basic black and white layout
Notes:
- Clear headings
- Ample white space in paragraph spacing and margins
- Use of bullets to summarize key points

3.0 Alternatives Considered

Two alternatives were developed to address the project needs while minimizing impacts to the surrounding properties. The alternatives are briefly described below. Schematic representations of the alternatives are shown in **Appendix D**.

3.1 Alternative 1 – North Side Widening with Shift

Key features of Alternative 1 include:

- Widen Fields Ertel Road only on the north side. Provide 11-foot lanes, except where adjacent to the curb. In these areas, provide 12 foot lanes to create an 11 foot effective lane width after the curb offset. These lane widths minimize impacts and are acceptable per Figure 301-4E of ODOT's *Location and Design Manual, Volume 1*.
- Plane, resurface and re-stripe the existing roadway throughout the project limits.
- Widen Gregory Lane to the east for an additional thru/right lane. Preserve the existing roadway while removing the east curb and gutter for the widening. Remove and restore the existing pavement markings.
- Eliminate one driveway at Speedway (12184 Mason-Montgomery Road), reconfigure two driveways as a right-in/right out at Speedway and Olive Garden (4900 Fields Ertel Road), and reconfigure three driveways to right out onlyt: McDonald's (8969 Fields Ertel Road), White Castle (9001 Fields Ertel Road), and First National Bank (9015 Fields Ertel Road).
- Add a third through turn lane to westbound Fields Ertel Road at Mason-Montgomery Road.
- Remove the driveway from Fields Ertel Road to VME Properties, LLC at 9956 EscortDrive. Maintain access via Escort Drive.
- Improve sight distance by shifting the westbound travel lanes on Fields Ertel Road 3.25 feet south to take advantage of the existing, unused pavement currently within the striped-out islands. Compensate for the 3.25 foot southward shift and realign the travel lanes through the Gregory Road/I-71 NB Ramp and Fields Ertel Road Intersection using small deflections in the westbound travel lanes along.
- The estimated cost for Alternative 1 is $1.2 million in 2017 dollars.

3.2 Alternative 2 – North and South Side Widening

Key features of Alternative 2 include:

- Widen Fields Ertel Road on both the north and south sides. Use the same lane widths described in Alternative 1.
- Plane, resurface and re-stripe the existing roadway throughout the project limits.
- Widen on Gregory Road as described in Alternative 1.

Basic layout with color accents

Notes:

- Clear headings
- Ample white space in paragraph spacing and margins
- Succinct summaries

1. INTRODUCTION

The purpose of this report is to present alternative improvements for the US 42/US 250/SR 96 interchange area in Ashland County, Ohio and identify a preferred alternative for detailed engineering design. The existing interchange consists of an overpass on US 42 and two-way ramps in the northeast and southwest quadrants. The interchange is the intersection of three key routes for residential, commuter and freight traffic. It provides access to the City of Ashland and industrial complexes to the west and I-71 to the east. It also serves as a main thoroughfare for truck traffic traveling between the US 250 bypass and I-71. A residential area of Ashland lies west of the interchange, while the areas to the east are rural with some commercial and industrial developments. The land use surrounding the interchange itself is largely commercial. A map of the study area is shown in **Appendix A**.

1.1 PROJECT HISTORY

In 2011, ODOT District 3 began a *Safety Study: SR 96 (East Main Street) from East Liberty Street to east of the US 42 interchange* (DLZ, 2011). One goal of the study was to identify crash patterns and determine their causes. The study identified a crash history at the US 42/US 250/SR 96 interchange and looked at several conceptual, long-term solutions to the identified problems. This project expands on the information presented in the *Safety Study* and provides further in-depth analysis of the alternatives for the US 42/US 250/SR 96 interchange.

2. PURPOSE AND NEED

The purpose and need for the project was documented in a *Purpose and Need Statement* (HNTB, February 2012). It was approved by ODOT's Office of Environmental Services on February 13, 2012 (see **Appendix F**). The purpose of this project is to improve traffic operations and safety and to correct structural deficiencies to provide a more efficient transportation facility. To accommplish this, the following needs must be met:

- Improve traffic flow and level of service
- Improve safety
- Correct structural deficiencies

One desired outcome of the project includes improving intersection levels of service to a minimum LOS C, specifically at the US 250/US 42 NB ramp and the US 250/US 42 SB ramp intersections. Another desired outcome is reducing crash rates to levels that are more comparable to local and statewide averages. The final desired outcome involves bringing the US 42 overpass up to current design standards.

Full page color layout
Notes:
- Graphics incorporated with clear reference in text
- Graphics make use of wide right margin
- Large heading fonts and spacing

4 KEY ISSUES

4.1 MAINTENANCE OF TRAFFIC

During construction, traffic will be maintained on SR 96 and US 250. Traffic on US 42 north of SR 96/US 250 will be maintained using a temporary crossover to Davis Road. Davis Road will be widened and resurfaced to handle the increased traffic during construction. US 42 will be closed south of SR 96/US 250. This traffic will be detoured along SR 511/SR 60. Access to driveways for businesses and residences will remain open throughout construction.

During the demolition of the US 42 bridge, SR 96 and US 250 will be closed. This closure is anticipated to last for only one weekend. During that time, the existing interchange ramps will be used to route traffic around the interchange area (see **Figure 4-1**).

The construction is anticipated to be completed in one season. Detailed MOT sequencing and drawings are included in **Appendix D**.

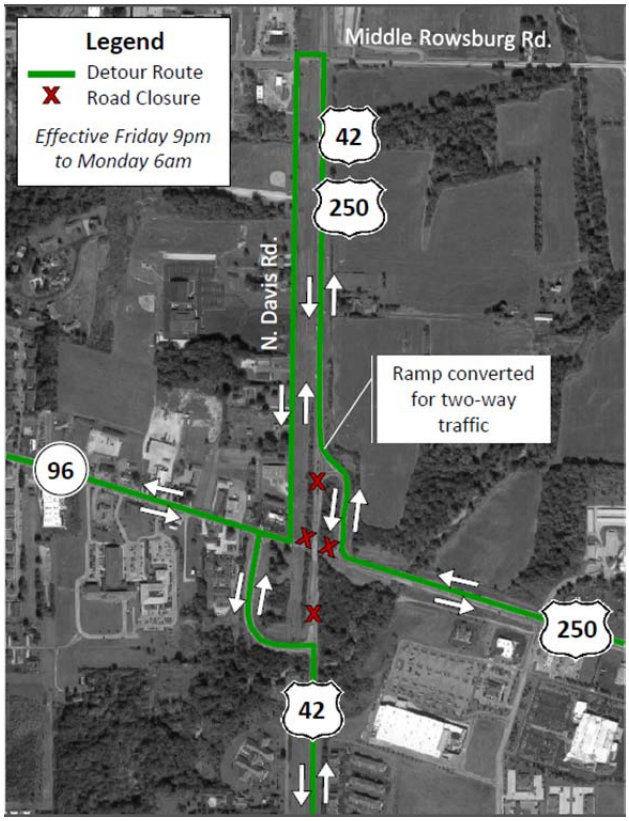


Figure 4-1: Weekend Detour

4.2 STRUCTURAL ASSESSMENT

The following sections summarize the structural assessment for the US 250 and US 42 bridges over Jamison Creek. The detailed assessment is included in **Appendix E.**

4.2.1 US 250 BRIDGE OVER JAMISON CREEK

The US 250 Bridge over the Jamison Creek (Bridge Number ASD-250-1648) currently carries four lanes. It consists of a three (3) span continuous reinforced concrete slab bridge on capped H-pile abutments and piers. For Alternative 1, US 250 would have a total of six lanes and two shoulders. The width of the road from the face of guardrail to face of guardrail would be 92.0 feet. The existing profile and cross slope would remain the same.

The overall structure is rated in satisfactory condition with no restrictions. Widen the existing deck by 11.83 feet on each side with a similar continuous reinforced concrete deck. Dowel the new transverse reinforcing steel into the existing deck to provide continuity between the two decks. Upgrade the railing to a 42-inch tall single slope deflector parapet due to the increase in roadway width. This upgrade increases the crash rating of the railing and eliminates the over the side drainage, which is deteriorating the deck edge. Drainage will flow along the shoulders to the ends of the bridge and into either a sodded flume or a catch basin.

Basic two-column layout
Notes:
- Graphics incorporated with clear reference in text
- Ample white space between paragraphs and columns
- Use of bullets to summarize issues

4.0 Key Issues

The key issues used to evaluate the alternatives included right-of-way and utility impacts, multi-modal provisions and construction phasing. These factors are summarized below:

- **Right-of-way impacts:** Alternatives that minimized the number of properties impacted were given preference in the evaluation process.
- **Utility impacts:** Alternatives that did not impact the transmission lines on the north side of SR-82 were given preference due to the extensive cost and lead-time to relocate the facilities.
- **Tree lawns:** Alternatives with tree lawns were given preference due to safety concerns associated with adjacent sidewalk. Furthermore, tree lawns would allow for the placement of mailboxes, signs and snow from plowing operations.
- **Bike lanes:** Currently, there are not any bike lanes or multi-modal paths on SR-82 immediately east or west of the project limits, nor are there plans to build any. As a result, bike lanes and multi-modal paths were not considered a high priority in the evaluation process.
- **Construction phasing:** Alternatives that required fewer construction phases and minimized temporary pavement were given preference due to cost and schedule consisideraitons.

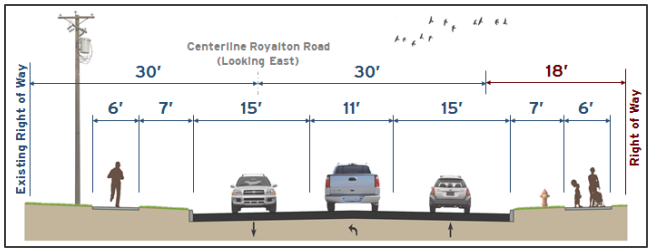
5.0 Comparison of Alternatives

All of the alternatives, with the exception of the No-Build, meet the project needs. The addition of a TWLTL will improve mobility and reduce crashes associated with turning vehicles slowing or stopped in traffic. In addition, the reconstructed SR-82 roadway meets current design standards. Specifically, turn lanes and driveways meet the requirements of ODOT's L&D Manual, and necessary sight distances are provided. This will also reduce the number of crashes along the corridor.

Appendix B includes drawings of the alternatives and a summary of the key issues for each. An alternatives evaluation matrix is included in **Appendix C**. Alternatives 1, 2, 3, 4, 5 and 8 were eliminated due to utility impacts, construction phasing and/or bike lane costs.

Alternatives 6 and 7 require the same project footprint and permanent property acquisition on the south side of SR-82 only. In addition, both avoid most of the utility poles on the north side of SR-82. Alternatives 6 and 7 both include tree lawns, although the tree lawns for Alternative 7 are one-foot narrower to provide additional pavement for shared bicycle use. Both alternatives may also be constructed in two phases with minimal temporary pavement.

Figure 5-1: Alternative 7



6.0 Conclusion

Alternative 7 (see **Figure 5-1**) is the preferred alternative, because it would require permanent property acquisition on the south side of SR-82 only and would avoid most of the utility poles to the north. Alternative 7 provides sidewalks and tree lawns and additional pavement for shared bicycle use, which may make the project eligible for additional funding sources. Alternative 7 may also be constructed in two phases with minimal temporary pavement. Finally, it provides the most conservative impervious area to design storm water mitigation measures. The estimated cost of Alternative 7 is $12.3 million in 2016 dollars.

Project Logo

Complex two-column layout
Notes:
- Question and answer format
- Text boxes highlight key points
- Ample white space between paragraphs and columns
- Use of bullets to key project elements

The No-Build Alternative would have no effect on bicycle and pedestrian connections, access and safety.

HOW WOULD EXISTING ROADS AND ACCESS POINTS BE CHANGED?

The Cleveland Opportunity Corridor project would require changes to the local street network, one of the biggest being the I-490-East 55th Street intersection. In this area, I-490 would be lowered, and a new bridge would be built on East 55th Street. Access to and from East 55th Street would be provided by the new "quadrant roadway." The quadrant roadway is a short new roadway that would be built near East 59th Street to route traffic between East 55th Street and the proposed boulevard (Figure 3-2, page 3-3).

The urban boulevard would also include new traffic lights at Kinsman Road, East 75th Street, East 79th Street, Buckeye Road, Woodland Avenue, East 93rd Street, Quincy Avenue. Traffic lights on East 105th Street north of Quincy Avenue would remain, including those at Cedar, Carnegie, Euclid and Chester avenues.

Most of the remaining changes to the existing streets would occur on low-volume neighborhood streets. These changes (see Figures 4-10 through 4-19, pages 4-8 through 4-17) include:

- Francis Avenue – closure between East 55th Street and East 57th Street;
- Berwick Road – cul-de-sac;
- Colfax Road – cul-de-sac;
- East 73rd Street – cul-de-sac;
- Rawlings Avenue – cul-de-sac and closure between East 75th Street and East 79th Street;
- Lisbon Road – cul-de-sac and connection with Grand Avenue near Evarts Road;
- Tennyson Road – closure between Evarts and Buckeye roads;
- East 87th Street – closure between Buckeye Road and Woodland Avenue;
- East 89th Street – closure between Woodland and Nevada avenues; and
- Quincy Avenue – closure between East 105th Street and Woodhill Road.

In each of the areas, the project would provide access to homes and businesses. Additionally, as requested by the City of Cleveland, access for bicycles, pedestrians and emergency service providers would remain on Quincy Avenue. These features would minimize impacts as much as possible; as a result, overall impacts would be minor.

The No-Build Alternative would keep existing roadway connections between I-77 and the University Circle area, but it would not improve these connections. It would also not improve the mobility or levels of service for traffic traveling to, from and within the area between I-77 and University Circle.

THE GOALS OF THE PROJECT INCLUDE IMPROVING PUBLIC TRANSPORTATION CONNECTIONS AND IMPROVING FACILITIES FOR PEDESTRIANS AND CYCLISTS.

HOW WOULD THE EXISTING ROADWAY NETWORK BE AFFECTED?

The Cleveland Opportunity Corridor project would improve regional travel by providing a direct connection between I-77/I-490 and University Circle. Local travel would also be improved through new connections (intersections) among the roads, neighborhoods, and businesses in the study area.

For instance, the Cleveland Opportunity Corridor would provide a way for traffic to travel across human-made and natural

SECTION 2 – TABLE, CHART, FIGURE AND MAP EXAMPLES

A. Key issue summary tables (right of way)
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Key issue summary tables (right of way)
Notes:
- Tables match document styles/colors
- Ample white space in and around tables
- Clear table titles with references in the text
- Readable text size

4.5 Right of Way

All of the alternatives require additional land – caller permanent right of way (ROW) – to build the improvements. Some of the land is privately owned by local residents and businesses. However, some of the land is owned by the City through its Land Bank Program. **Table 4-5** summarizes how much land would be needed to build each alternative, including land owned by the city's Land Bank Program.

The preliminary plan sheets in **Appendix C** show the location of each alternative and the additional land required to build it.

Table 4-5: Land Needed to Build Each Alternative

Alternative	Permanent Right of Way	Property Owned by City Land Bank	
	acres	acres	percentage
Alternative A	46.9	10.2	21.75%
Alternative B	39.0	3.5	8.97%
Alternative C	41.1	5.6	13.63%

Each alternative also requires residential and business buildings to be relocated to make room for the improvements. Furthermore, an impacted building may contain more than one residential unit or business occupant. **Table 4-6** summarizes the estimated relocations for each alternative.

A Relocation Assistance Program (RAP) survey showed feasible residential and business relocation sites within and near the study area.

The RAP survey of the local market was conducted within a five-mile radius of the study area; therefore, residents and businesses that must move because of the project could choose to relocate close to their original locations. One possible exception is the salvage yard impacted by Alternatives A and C. Local regulations require that businesses such as salvage yards be located in areas that avoid incompatible land uses.

Table 4-6: Estimated Relocations by Alternative

Alternative	Residential		Commercial	
	Buildings	Units[1]	Buildings	Occupants[1]
Alternative A	24	24	12[2]	7
Alternative B	35	43	3	2
Alternative C	30	37	10[2]	9

Notes:

1. *An impacted building may contain more than one residential unit or business occupant.*
2. *Commercial impacts include a salvage yard, which may not be able to be relocated within a five-mile radius of the study area.*

Project Logo

Key issue summary tables (levels of service, crash frequency)

Notes:
- Tables match document styles/colors
- Color used to group related data
- Clear table titles with references in the text
- Readable text size
- Simplified, pertinent results included
- Detailed data in appendices

4.1 TRAFFIC OPERATIONS

ODOT provided opening day (2016) and design year (2036) certified traff
US 42/US 250/SR 96 interchange. Copies of the certified traffic plates are included in Appendix A. The traffic included in the certified traffic plates was manually redistributed to determine turning movements associated with the alternatives. Copies of the turning movements for the alternatives are also included in Appendix A.

Traffic analyses were conducted to determine the design year (2036) levels of service for each alternative, including the No-Build. Table 4-1 summarizes the results. Detailed LOS summaries for each alternative are included in Appendix B.

Table 4-1: Design Year (2036) Levels of Service

Alternative	Intersection	Level of Service[1]	
		AM Peak LOS	PM Peak LOS
No-Build	US 42SB and SR-96 ramps (two-way stop)	B	C
	US 250 and US 42SB ramp/Bob Evans (two-way stop)	***F***	***F***
	US 250 and US 42NB ramp (signalized)	C	***F***
Alternative 1	US 42 and US 250	C	C
Alternative 2	US 42SB and SR-96 ramps (signalized)	B	B
	US 250 and US 42SB ramp/Bob Evans (signalized)	B	C
Alternative 3	US 42 and Quadrant Roadway	B	B
	US 250 and Quadrant Roadway	B	C

1. *The target level of service is LOS C or better. Intersections below target LOS are shown in **bold** print.*

4.2 CRASH ANALYSIS

Utilizing FHWA's Crash Frequency Prediction Model, which estimates crashes at intersections based on equations from FHWA Report No. FHWA-RD-99-128, ODOT projected crash rates for each of the alternatives. Table 4-2 compares the predicted No-Build crash rate to the predicted crash rate for each alternative. All of the alternatives are expected to have crash rates lower than the No-Build condition. The results of the crash prediction model are included in Appendix C.

Table 4-2: Crash Frequency Predictions

Alternative	Crash Rate (Crashes Per Year)
No-Build[1]	18.7
Alternative 1	13.6
Alternative 2	12.2
Alternative 3	10.8

1. *The predicted crash rates are based on design year (2036) traffic volumes.*

Public involvement activity summary table
Notes:
- Summarizes several years of meetings
- Provides brief descriptions of pertinent activities
- Detailed meeting minutes retained in project file

Table 4-12: Cleveland Opportunity Corridor Steering Committee Meeting Summary

DATE	LOCATION	TOPICS DISCUSSED
May 19, 2005	NOACA Board Room 1299 Superior Ave Cleveland, OH 44114	• Project background and history • Transportation problems • Project goals and alternatives
June 16, 2005	Quincy Place 8111 Quincy Ave., Ste. 100 Cleveland, OH 44104	• Existing conditions • Planned developments • Alternatives evaluation process and criteria
Aug. 18, 2005	Quincy Place 8111 Quincy Ave., Ste. 100 Cleveland, OH 44104	• Results of alternatives evaluation • Changes to alternatives
Sept. 22, 2005	Quincy Place 8111 Quincy Ave., Ste. 100 Cleveland, OH 44104	• Coordination of planned developments and alternatives, including bridge options at I-490/East 55th Street
Nov. 10, 2005	Quincy Place 8111 Quincy Ave., Ste. 100 Cleveland, OH 44104	• Alternatives evaluation results • Draft recommendations for further study
May 15, 2009	Cleveland Plain Dealer 1801 Superior Ave. East Cleveland, OH 44114	• Reconvene steering committee • Redefine committee role • Overview of project status
Sept. 1, 2009	Greater Cleveland Partnership 100 Public Square Cleveland, OH 44113	• Overview of study process • Project goals and objectives • Summary of data collected and alternatives
March 11, 2010	Karamu House 8111 Quincy Ave. Cleveland, OH 44104	• Alternatives • Overview of public comments • Context sensitive solutions (CSS) workshop
Sept. 8, 2010	Cleveland Plain Dealer 1801 Superior Ave. East Cleveland, OH 44114	• Alternatives recommended for further study • CSS workshop
July 7, 2011	Cleveland Plain Dealer 1801 Superior Ave. East Cleveland, OH 44114	• Recommended preferred alternative • Introduction to city's brownfield study • Greater Cleveland Partnership's (GCP) economic development efforts
Nov. 16, 2011	Greater Cleveland Partnership 1240 Huron Road East, #300 Cleveland, OH 44115	• Revisions to recommended preferred alternative • Summary of October 2011 public meeting comments • Update on the city's brownfield study • Results of GCP economic development study
Nov. 29, 2012	Greater Cleveland Partnership 1240 Huron Road East, #300 Cleveland, OH 44115	• Preferred alternative, including results of engineering and environmental studies

then gave a formal presentation followed by a question and answer session. The meeting ended with more time for people to review the display boards and ask questions of the study team. Business owners and their representatives could give spoken comments to a court reporter, write their comments down on a comment sheet or email comments to the study team.

One-on-one meetings were also held with area businesses including AMCLO, Final Cut, Orlando Baking Company, Miceli's Dairy Products, Brost Foundry, Quality Stamping, ACME Krivanek Iron Works, and Forge Products. The study team also had informal talks with other businesses including Mz. De' Ledari' Unisex Salon, Danzy Discount,

Public Comment Summary and Responses

ID	NAME	NO.	TOPIC	COMMENT	RESPONSE
B-12	Beckwith II, Winston	B-12-1	Quincy Avenue Closure	What will be the alternative routes for traffic going across from Woodhill to 105th to Quincy?	The project would close Quincy Avenue between E. 105th Street and Woodhill Road. Although Quincy Avenue would be closed to vehicular traffic, access for bicycles, pedestrians and emergency services would be maintained. The alternative route for traffic traveling from Woodhill Road to E. 105th Street via Quincy Avenue would be to use Woodland Avenue and E. 93rd Street to access the new boulevard and continue to E. 105th Street. The travel distance for the existing and new routes would be nearly equivalent. (See AER "How would existing roads and access points be changed?" on page 4-22.)
		B-12-2	Mitigation Measures	Will ODOT be accountable for its actions regarding mitigation measures?	ODOT, on behalf of FHWA, will implement or will coordinate with other agencies as needed to confirm that the environmental commitments and mitigation measures are implemented. Failure to comply with the project's commitments would result in the loss of federal funding for the project. A complete list of mitigation measures for the project is included in Table A of the Alternative Evaluation Report (AER).
B-13	Bonacci, Chuck	B-13-1	Existing Roadways	I don't understand the need for any of the project that is currently underway or the Opportunity Corridor as the roads that are currently there seem under traveled for the most part. I think an easier solution could be better sequencing of stoplights and using roundabouts.	Sequencing traffic signals and using roundabouts alone would not support the project purpose and need. Specifically, these measures would not improve system linkage by providing the missing east-west arterial street between I-77 and University Circle or provide the transportation infrastructure to support planned economic development in and around the Forgotten Triangle. (See AER Chapter 2 and the *Opportunity Corridor Purpose and Need Statement* (May 2011) which is on the CD included with the AER and incorporated by reference into both the FS and the AER.)
		B-13-2	Schedule	How long will this project take?	The Cleveland Opportunity Corridor project likely will be built in phases. ODOT has developed a preliminary phasing plan of two sections, but that could be changed during final design or as funding becomes available. Section 1 will be the East 105th Street Corridor. Section 2 will be from I-490-East 55th Street to Quincy Avenue. Right now, construction on Section 1 is expected to begin in 2014 and finish in 2016. Construction on Section 2 is expected to begin in 2015 and finish in 2018. (See AER "When would the project be built?" on pages 3-9 and 3-10.)

Formal comment and response summary

Notes:

- Comments organized by person and topic
- Specific responses provided for each comment
- Original comment sheets with matching ID's included in appendix

Comment and response summary within document
Notes:
- Clear differentiation between comments and responses
- Appropriate when small number of comments received
- Responses may be specific or grouped for similar issues

4.8 Public Involvement

A public meeting for the project was held on November 8, 2012 from 4:00 p.m. to 7:00 p.m. at the Holy Church at 999 Royalton Rd, North Royalton, Ohio 44444. Information from the public meeting is included in **Appendix F**. Several written public comments expressed concerns about the alternatives. These are summarized, with responses, below.

- Both tenants businesses will have their sales impacted during construction. Motorists avoid orange barrel areas due to traffic slowness. The least time needed for construction the better. Because our business[999 Royalton Road] uses the front lawn to display the lawn mowers they sell, I am happy to see our land will only be affected for one season. It is important that our side lawn is maintained because lawn mower demonstrations are necessary for our sales,

  Response: The preferred alternative was selected, in part, because it minimizes the amount of time needed for construction. Access to businesses will be maintained throughout construction. No new permanent right-of-way will be required from this property, which is on the north side of SR-82.

- We think this idea is short sighted. We need two lanes each way.

  Response: Traffic analyses using 2036 traffic projections certified by ODOT, have shown that three lanes provide acceptable traffic operations. The City of North Royalton and the County are currently investigating access management measures that could improve operations for vehicles turning out of the many driveways along the roadway.

- Phasing is a major concern. We as property owners can not afford to have construction in front of our four properties [Live Well Apartments] for a two year duration. Phasing should be completed in sections to reduce construction time at each property.

  Response: The preferred alternative was selected, in part, because it minimizes the amount of time needed for construction. Project designers will develop special details for the western portion of the project (in the vicinity of the apartments mentioned above) to assure construction will last only one season to minimize impacts to residents.

- My driveways [are a concern]. Our address is 999 and the locations of the two drives are currently functional. Any change would cause major issues with entry/exit.

  Response: Driveways on the south side of SR-82 will be rebuilt when the road is widened. All existing driveways will be replaced.

- What would happen with our detention basins [at 999 Royalton Road]?

  Response: The preferred alternative impacts privately-owned detention basins next to SR-82. These basins will either be rebuilt as part of the project, or the property owners will be provided money to address impacts themselves. This will be worked out during the process of buying property for the project.

- [We have] many issues turning left out of our parking lot to head west on SR-82. How will this be addressed?

  Response: The City of North Royalton and the County are currently investigating access management measures that could improve operations for vehicles turning out of the many driveways along the roadway.

- I would prefer minimal impact on south side of 82 near apartments to keep more greenway and nicer looking entry way entering North Royalton.

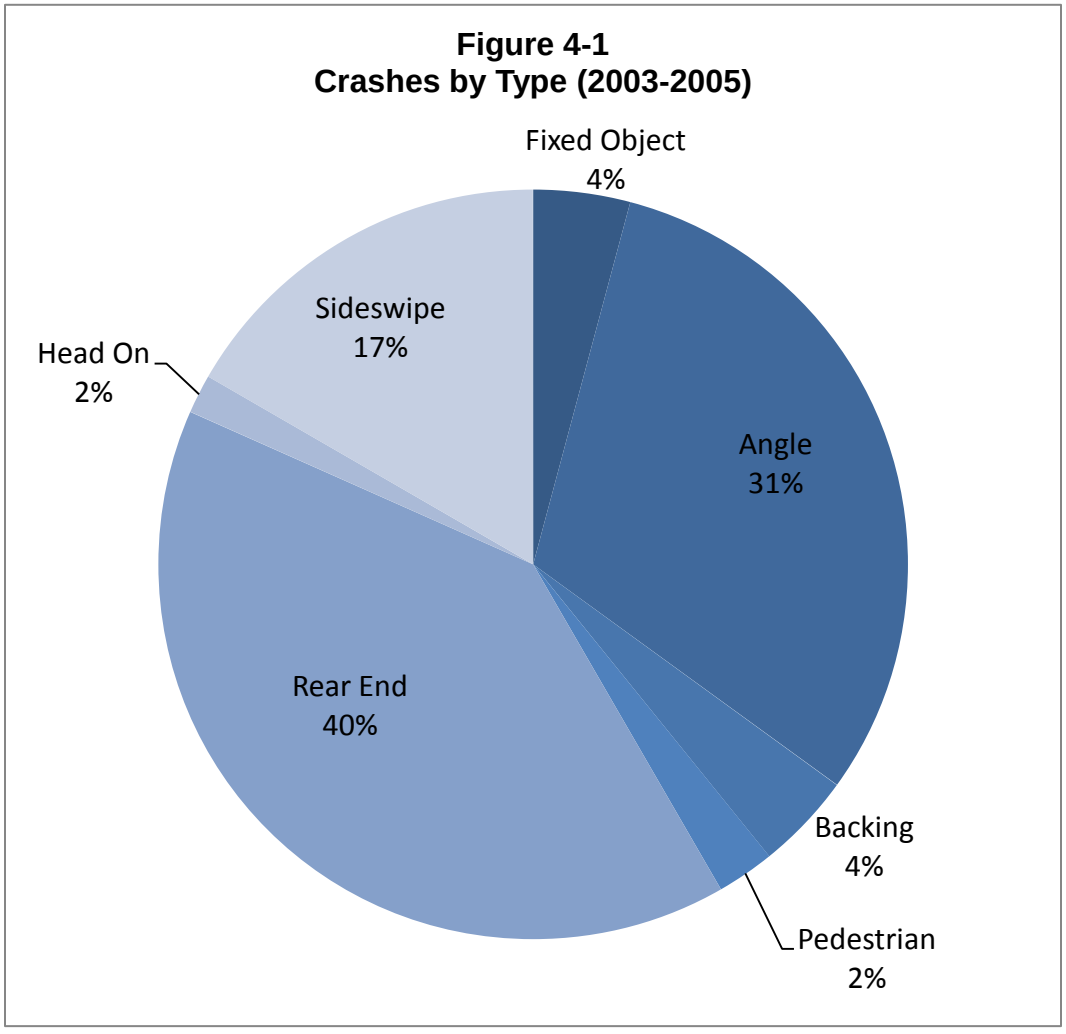
  Response: The preferred alternative widens SR-82 to the south to avoid large utility transmission poles on the north side of the road. Impacting the utility poles would substantially increase the project's cost and the amount of

Pie chart
Notes:
- Visually compares types of crashes
- Chart matches document styles/colors
- Ample white space around chart
- Clear figure title with reference in the text
- Readable text size

4.1 SAFETY

Crashes over a three-year (2003-2005) period were analyzed for the area that includes the MLK, E. 105th, Mount Sinai, East Boulevard, and Jeptha Drive. Because the intersections are closely spaced and almost intertwined, it is nearly impossible to pinpoint the cause of an accident to a single location. So, the entire network was considered as one location. Between 2003 and 2005, there were a total of 120 crashes in the project area. The crash breakdown is shown in **Figure 4-1**.

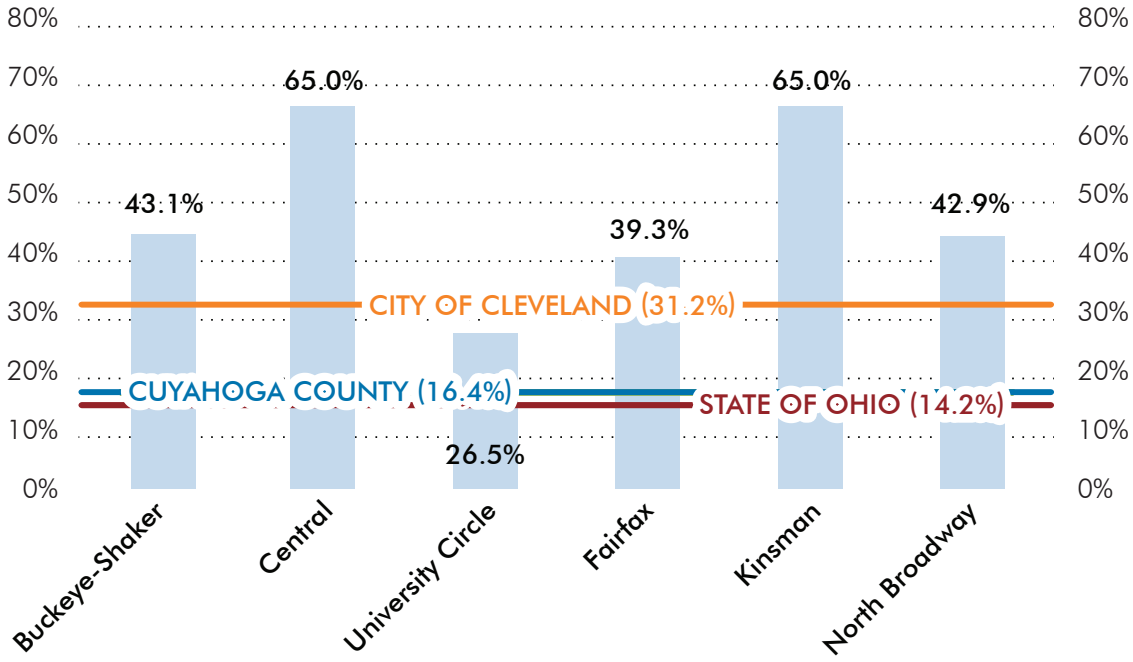
Figure 4-1
Crashes by Type (2003-2005)



Rear-end crashes contributed to 40 percent of the total (48 crashes). Heavy, stop and go traffic is a major contributing factor to these collisions. Another cause is the need to yield as vehicles enter the traffic circle. Driver confusion may also be a factor because of the close spacing between the signalized intersection and the Circle and the lack of clear guidance for drivers as they travel through the Circle.

Bar chart
Notes:
- Visually compares geographic areas to each other
- Visually compares to pertinent averages
- Chart matches document styles/colors

Figure 4-26: 2010 Percent Persons Below Federal Poverty Level by Study Area Neighborhood



Source: State, county, and city data based U.S. Census Bureau (Factfinder Quickfacts accessed on Aug. 13, 2012) Neighborhood data based on 2006-2010 American Community Survey (Block Group data downloaded Aug. 10, 2012).

- Potential for enhanced community cohesion through complementary infill development and redevelopment;

- Improved visual environment by including mast-arm traffic signal supports; combined street and pedestrian lighting; grass tree lawns, or parkways; street trees; a landscaped roadway median with stormwater treatment measures; retaining walls and bridge abutments with form-liner surfaces and colored surface sealer; and design locations for streetscape elements such as benches, trash receptacles and bike racks;

- Improved safety resulting from upgrades to the existing local streets at proposed intersections; the construction of dedicated bicycle and pedestrian facilities; improved levels of service at congested intersections; as well as an increased traffic- and pedestrian-generated human presence.

Despite the benefits expected to result from the project, low-income and minority populations will be affected more than other populations. Because of this, the project was found to have a disproportionately high and adverse effect to low-income and minority populations.[4]

As a result of this finding, several measures will be implemented as part of the project to mitigate impacts and provide added benefits to the local community. These measures include the following:

- ODOT will build two pedestrian/bike bridges: one at East 59th Street and one at East 89th Street.

[4] *Because the impacts will affect low-income and minority populations more than others, they are considered disproportionately high and adverse according to Executive Order 12898, which governs federal agencies in how to treat environmental justice issues.*

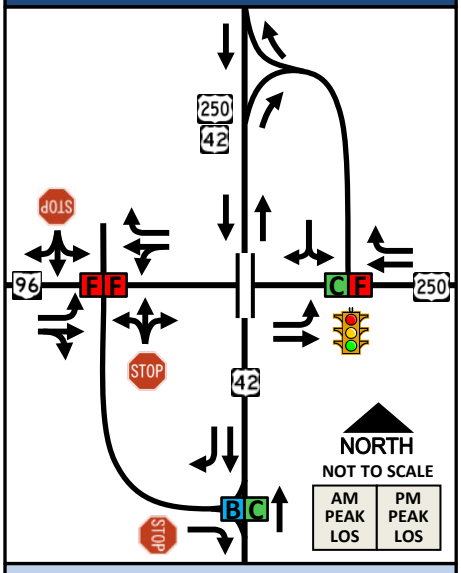
Simplified alternative comparison figure

Notes:

- Schematic views show general configurations
- Symbols indicate key features (lane use, signals)
- Technical concepts explained
- Bullets compare key issues for each alternative

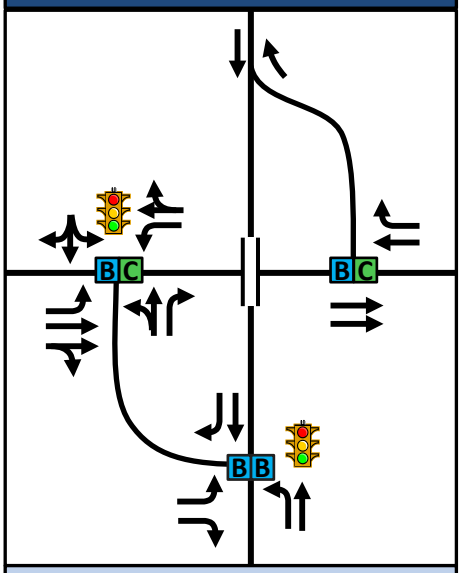
Figure 5-3: Alternative Comparison

No Build Configuration



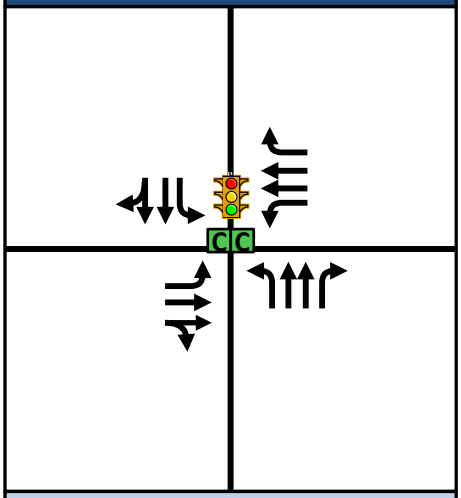
- US 42 bridge needs to be replaced.
- LOS F for 2036 PM peak hour.
- 41 crashes from 2008 – 2010 with 33 (83%) rear-end crashes.
- Crash Rate = 18.7 crashes/yr

Alternative 2 Reconfigure Ramps



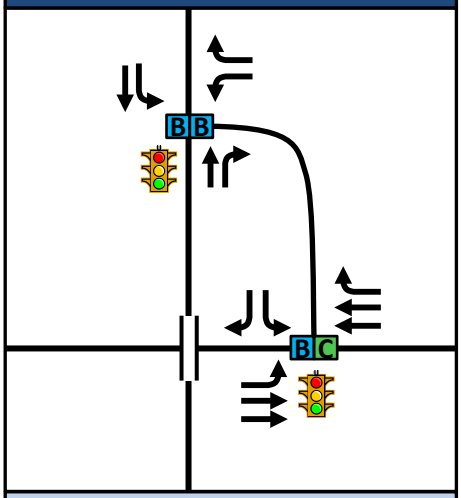
- Reconfigure ramp movements.
- Move the signal on US 250.
- Add a signal on US 42.
- Widen US 250.
- Limit Davis Rd to right-in/right-out.
- Crash Rate = 12.2 crashes/yr
- Total Cost = $9.3M

Alternative 1 At-Grade Intersection



- Remove US 42 bridge.
- Create at-grade intersection.
- Widen US 250.
- Close Davis Road.
- Crash Rate = 13.6 crashes/yr
- Total Cost = $8.7M

Alternative 3 Quadrant Roadway



- Remove SW and NE ramps.
- Build two-way road (NE quadrant).
- Add signals on US 42 and US 250.
- Widen US 250.
- Keep full access at Davis Road.
- Crash Rate = 10.8 crashes/yr
- Total Cost = $9.0M

What is Level of Service?

Level of Service (LOS) describes how traffic flows. It is divided into six categories: A-F (see below). The target for this project is LOS C. Levels of service shown are for the year 2036.

A

- Free-flow Speed
- Excellent Maneuverability
- Very Few Vehicles Stopping

B

- Free-flow Speed
- Slightly Reduced Maneuverability
- Few Vehicles Stopping

C

- Reduced Speed
- Slightly Reduced Maneuverability
- Few Vehicles Stopping

D

- Reduced Speed
- Restricted Maneuverability
- Many Vehicles Stopping

E

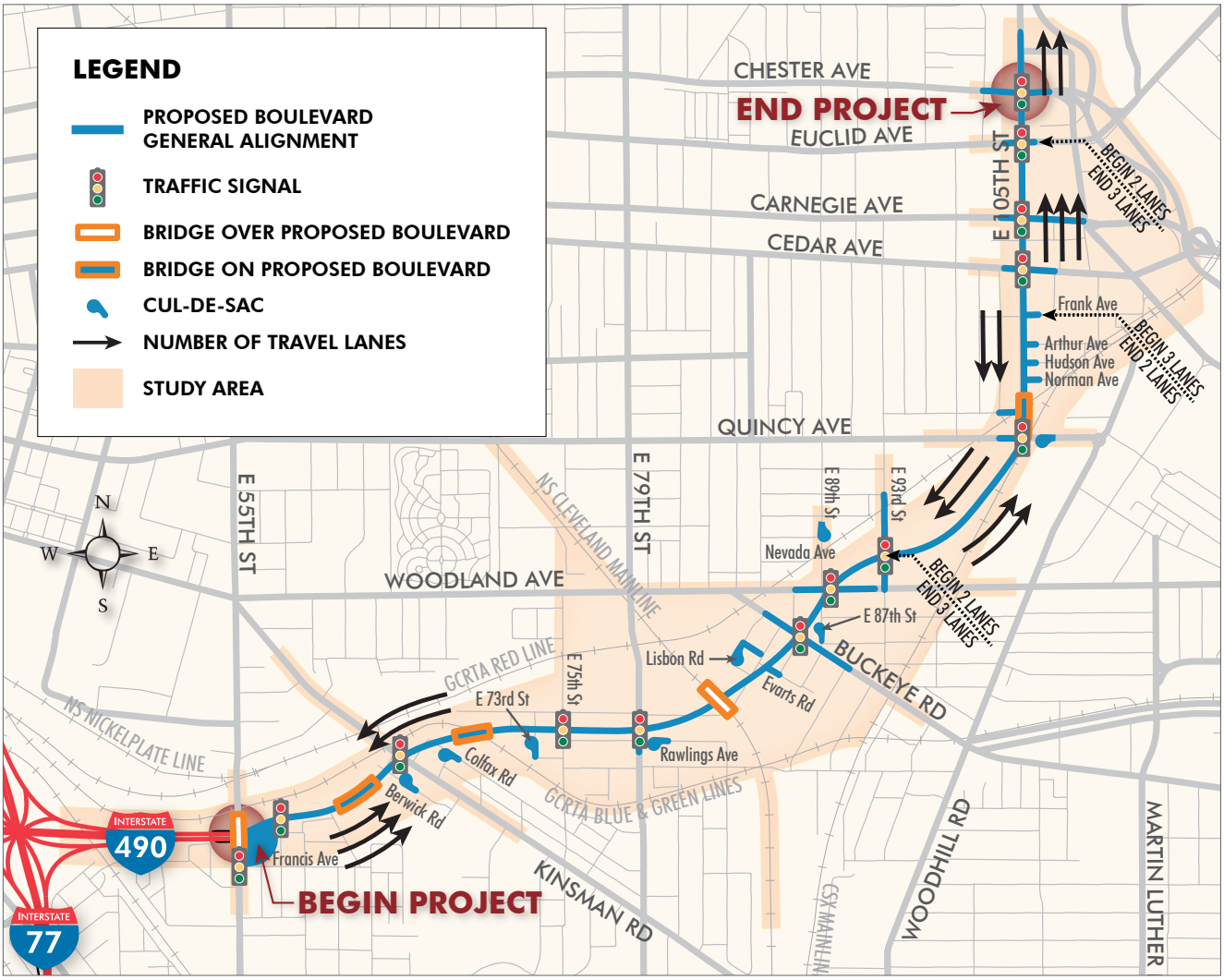
- Very Variable Speed
- Severely Restricted Maneuverability
- Nearly All Vehicles Stopping

F

- Stop and Go Traffic
- Severely Restricted Maneuverability

Simplified alternative layout figure
Notes:
- Simple line drawing shows general layout
- Clear legend shows key features
- Important streets and project features labeled
- Simple, light and uncluttered background

Figure 3-1: Feasible Alternative 1



will be built south of the new boulevard and near East 59th Street. As shown in Figure 3-2 on page 3-3, it will have traffic lights at both East 55th Street and the boulevard, and it will allow cars to access both roadways.

Feasible Alternative 1 will also change some local streets:

- **Francis Avenue** – closure between East 55th Street and East 57th Street;
- **Berwick Road, Colfax Road** and **East 73rd Street** – cul-de-sacs;
- **Rawlings Avenue** – cul-de-sac; closure between East 75th Street and East 79th Street;
- **Lisbon Road** – cul-de-sac; connection with Grand Avenue near Evarts Road;
- **Tennyson Road** – closure between Evarts and Buckeye roads;
- **East 87th Street** – closure between Buckeye Road and Woodland Avenue;
- **East 89th Street** – closure between Woodland and Nevada avenues; and
- **Quincy Avenue** – closure between East 105th Street and Woodhill Road; design will

Alternative schematics

Notes:

- Simple drawings show differences between alternatives
- Symbols show key features
- Figures supplement brief text description
- Clear figure labels with references in the text

3.0 Alternatives Considered

Two alternatives were developed to address the project's needs. A description of each alternative is described below. Preliminary plan sheets are included in **Appendix B**.

3.1 Alternative 1

Alternative 1 provides the same traffic operation as the existing configuration with a slight change in roadway alignments. Allen Avenue/Allenford Drive runs north south and operates as a free-flow movement. Mill Street runs east-west and is stop controlled. The alignment of Allen Avenue/Allenford Drive shifts slightly east, increasing spacing between the bridge and the intersection. All three roadways remain two-lanes with one lane in each direction. A crosswalk is located on Mill Street. **Figure 3.1** illustrates Alternative 1.

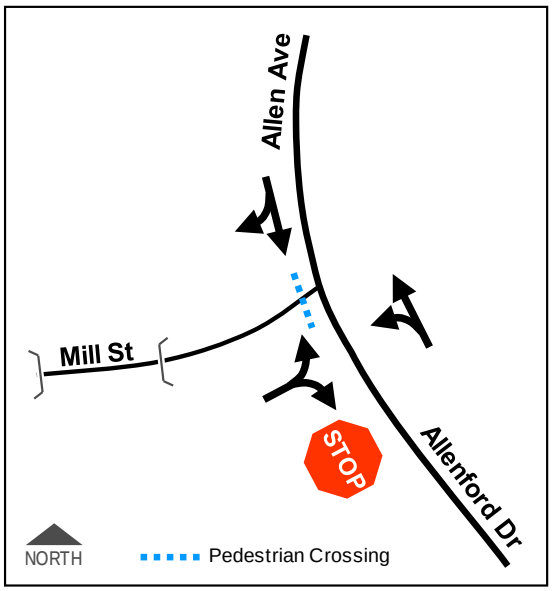


Figure 3.1: Alternative 1 Schematic

3.2 Alternative 2

Alternative 2 changes the alignment of the Allen Avenue/Allenford Drive and Mill Street intersectin so that the eastbound Mill Street and Allen Avenue become the free-flow thru streets. Allenford Drive forms a "T" intersection with a stop sign. Allen Avenue, Allenford Drive and Mill Street remain two lane roadways with one lane in each direction. Crosswalks are located on Allen Avenue and Allenford Drive. **Figure 3.2** illustrates Alternative 2.

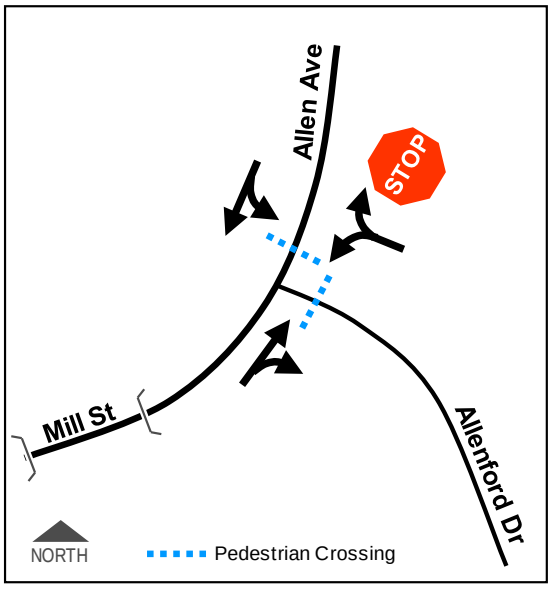


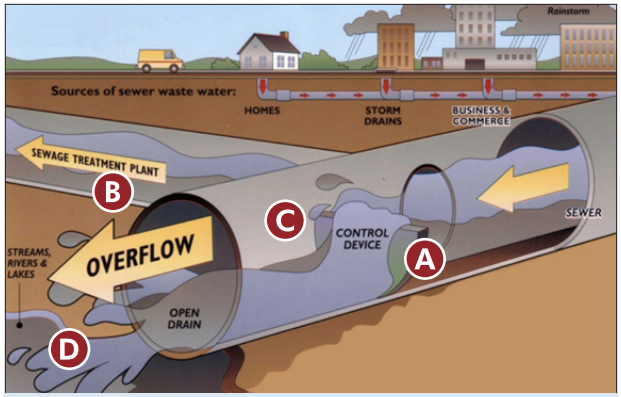
Figure 3.2: Alternative 2 Schematic

4.0 Key Issues

Each alternative was analyzed in terms of traffic operations and geometric feasibility. The alternatives analysis did not include detailed horizontal/vertical alignments, detailed right of way impacts, detailed costs or timelines.

Key issue illustration
Notes:
- Visual graphic explains complex technical issue
- Supplements text for pertinent design issue

Figure 4-31: How a Combined Sewer System Works



OVERFLOW POLLUTION

A) Normal flows from combined sewers are diverted by control devices …

B) … into an interceptor drain and on to the sewage treatment plant.

C) Stormwater runoff can create excessive water flows that overwhelm the control device …

D) … allowing untreated waste water into streams and rivers.

Source: www.maysville-online.com/lifestyles/article_e23ec5b6-c034-11df-b87c-001cc4c002e0.html

and Quincy Avenue that would store extra rain and snow and allow them to slowly seep into the ground. This helps reduce the volume of stormwater flowing to the combined sewer system by slowing it down and helping it drain over a longer period of time. The soil and grass in the depressed areas would also help filter some of the "pollution" in the water;

- Building a separate "storm-only" system to collect water runoff from the roadway, reducing the volume of combined sewer overflows; and

- Building a detention basin in the low-lying Kingsbury Run ravine between East 64th Street and Berwick Road (Figure 4-12, page 4-10). The basin would store stormwater and slowly release it into the existing Kingsbury Run culvert system, reducing the number of combined sewer overflows.

The storm sewer system that would be built as part of Feasible Alternative 2 would be designed to meet ODOT water quality standards and NEORSD flow volume requirements. The sewer design would continue to be coordinated with ongoing NEORSD planning efforts within the project area. Construction of the depressed grassy median; the separate "storm-only" system to collect runoff; and the detention basin will reduce the total amount of stormwater runoff directed into the combined sewer system. By directing stormwater runoff away from the combined sewer system, the project would decrease the chances of combined sewer overflows, which would improve water quality.

For additional details about the potential improvements to water quality, please refer to the *Opportunity Corridor Stormwater Summary* (December 2012). This report is on the CD included with this AER.

The No-Build Alternative would not have any effect on water quality.

HOW WOULD LAND FROM INDUSTRIAL PROPERTIES BE ADDRESSED?

The Cleveland Opportunity Corridor study area includes a large number of active and inactive industrial properties (Figure 4-32, page 4-37). Several of the properties are vacant or are no longer in industrial use; however, due to their previous uses, many of the properties in the study area could contain polluted soil or groundwater. These types of pollution are studied through Environmental Site Assessments (ESAs).

First, an ESA screening is done to determine what properties could be polluted. If needed, Phase I ESAs are done to provide more detailed research into the land, including the types of activities that took place and the materials used at the site, and the history of spills and other incidents. If the Phase I ESA shows there

Typical section to illustrate key issue

Notes:

- Common graphics (utility pole, orange barrel, hydrant) used in lieu of plan-style labeling
- Clear legend and labeling explain key features
- Bullets summarize important information

4.5 MAINTENANCE OF TRAFFIC

Figures 4-5 and 4-6 show the general construction phasing for Alternative 1. Alternative 1 could be constructed in two phases with minimal temporary pavement (see Figures 4-5 and 4-6). Additional phasing may be required when reconstructing the culverts under Royalton Road and when working under the Ohio Turnpike bridge.

FIGURE 4-5: ALTERNATIVE 1 CONSTRUCTION PHASE 1

- Build south side pavement, sidewalk and grading.
- Maintain traffic on north side.
- Maintain access to driveways on Royalton Road at all times.

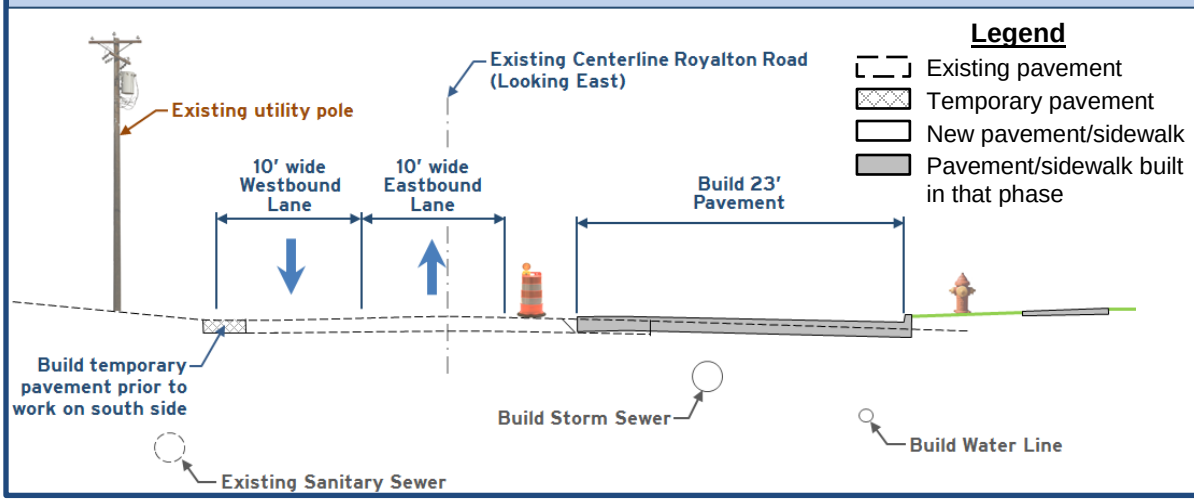
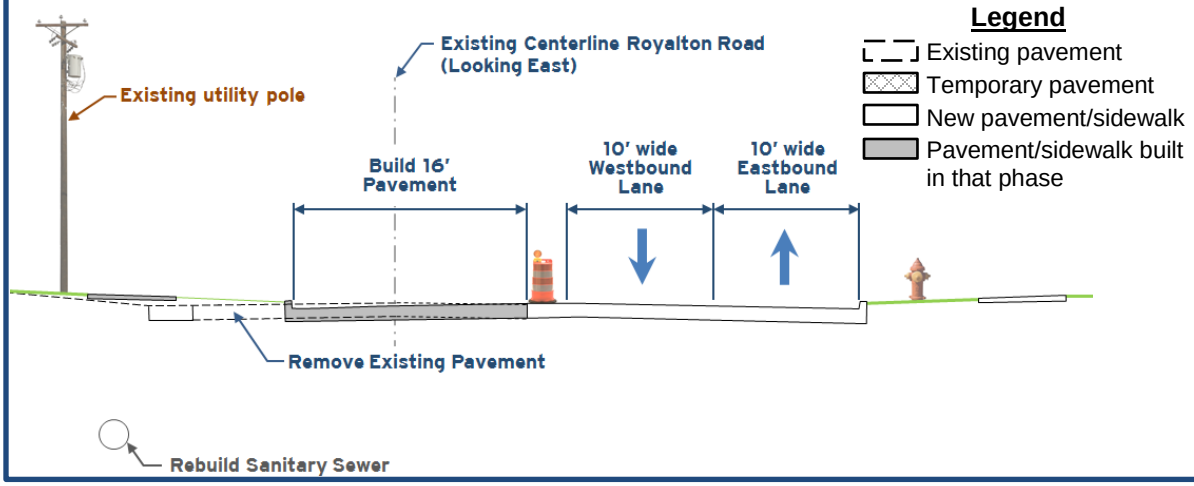


FIGURE 4-6: ALTERNATIVE 1 CONSTRUCTION PHASE 2

- Build north side pavement, sidewalk and grading.
- Maintain traffic on pavement built in Phase 1.
- Maintain access to driveways on Royalton Road at all times.



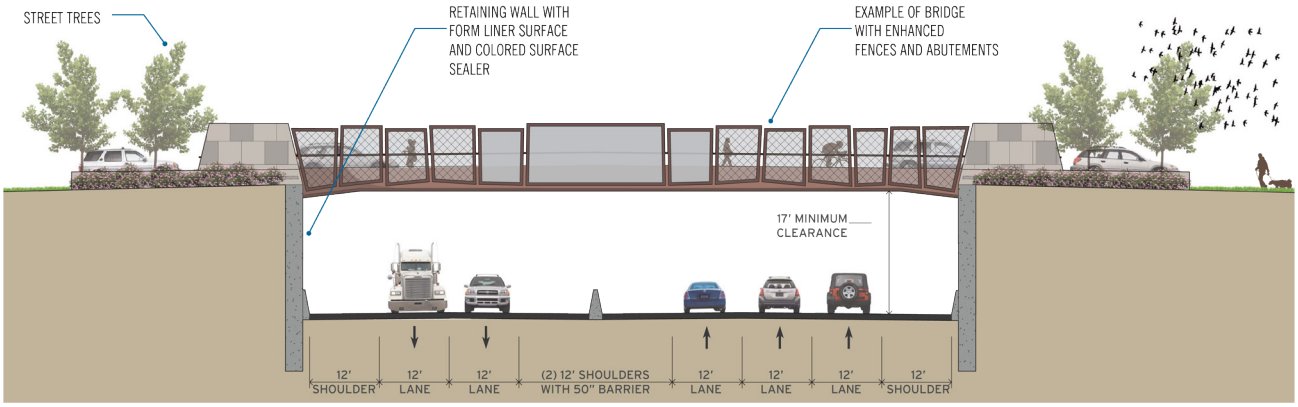
Typical section rendering

Notes:

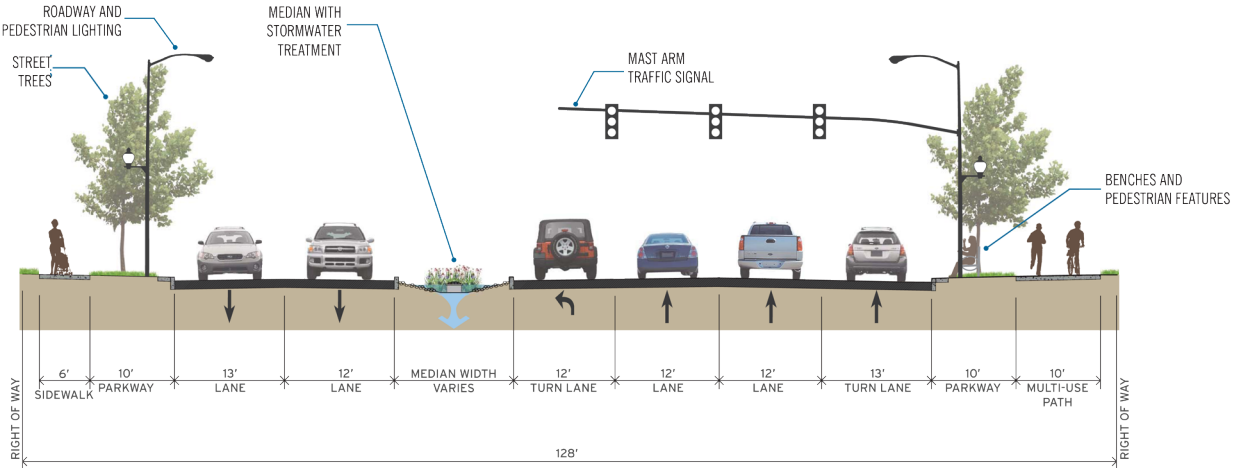
- Visually illustrates alternative cross section
- Symbols and graphics paint a picture of the alternative
- Key features are labeled

Figure 3-1: Alternative 1 Section Views

▼ East 55th Street Bridge (Looking East)



▼ Typical Boulevard at Side Street Intersection

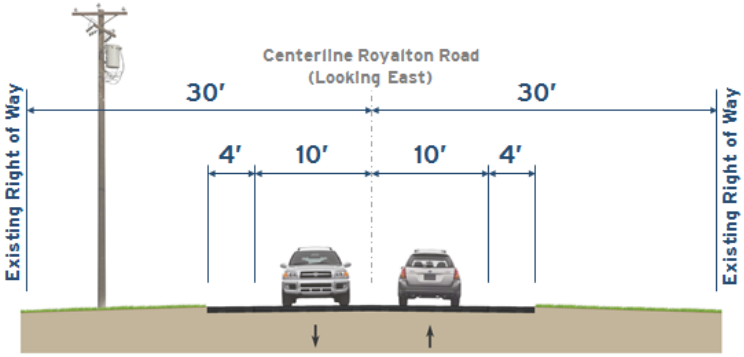


Typical sections to compare alternatives

Notes:

- Visually appealing typical sections show differences between alternatives
- Bullets summarize key issues for each alternative

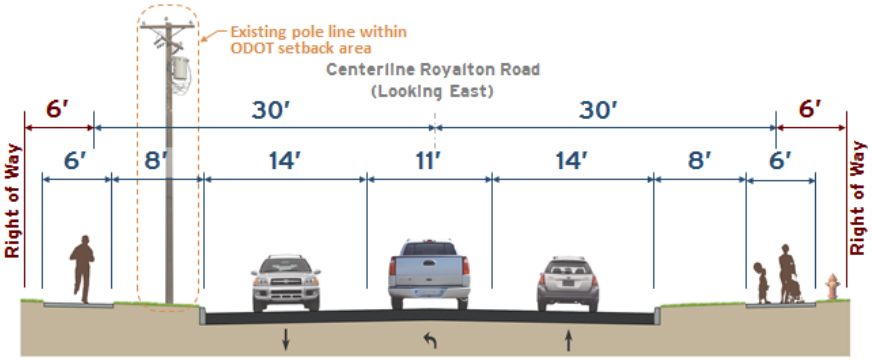
Figure 5-1
Alternative Comparison



Existing Royalton Road (No Build)

- Safety
  - Crash rates above local/state averages
- Traffic Movements
  - Left turns create backups
- Substandard Roadway Features
  - Driveways
  - Stopping sight distance
  - Intersection sight distance

1



Pros

- "Balances" land impacts.

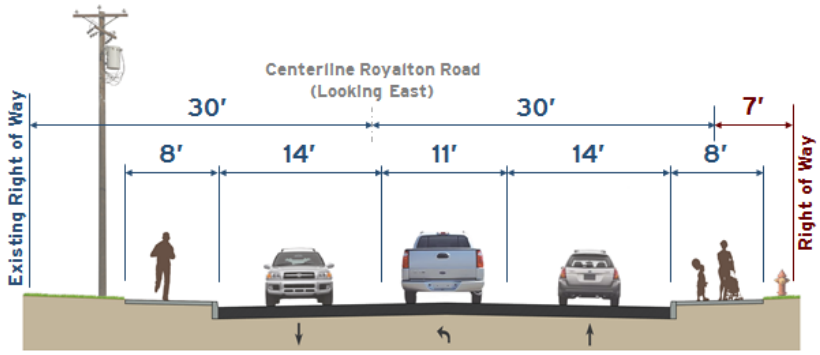
Cons

- Relocates most utility poles.
- Requires three construction phases.
- Requires permanent property from owners on both sides.
- Requires the most amount of temporary pavement.

Conclusion

Not chosen due to utility impacts.

2



Pros

- Avoids most utility poles.
- Provides sidewalk on both sides.
- Requires land from south side only.

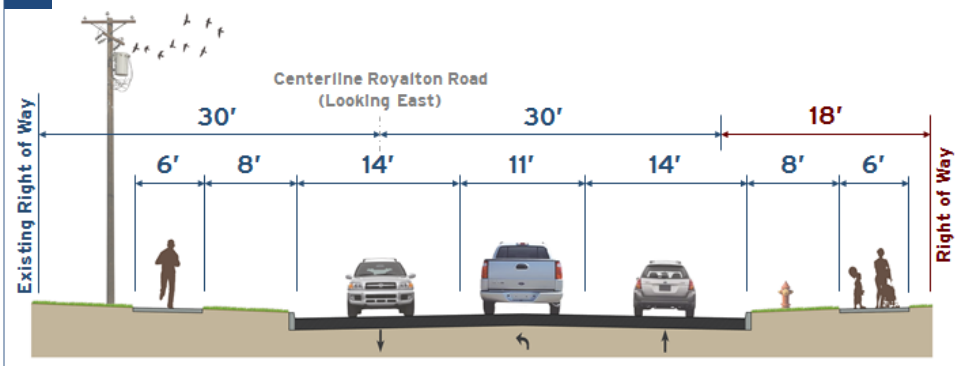
Cons

- Includes sidewalk right next to the road.
- Requires three construction phases.
- Requires moderate temporary pavement.

Conclusion

Not chosen due to construction phasing, temporary pavement and sidewalk placement.

3



Pros

- Avoids most utility poles.
- Includes sidewalk/tree lawns on both sides.
- Requires two construction phases.
- Requires minimal temporary pavement.
- Requires land from south side only.

Cons

- Requires more land from the south side.

Conclusion

Selected due to shorter construction, minimal temporary pavement and tree lawns.

4.8 Downtown Bridge Aesthetics

Before/after renderings
Notes:
- Photographs show existing conditions
- Renderings show proposed conditions
- Clear labeling explains each picture

Starting in 2006 and through 2007, ODOT held nine public meetings, met with more than 50 stakeholder organizations and hundreds of individuals to brainstorm ideas for the new interstate bridges. These early discussions focused on aesthetic bridge designs and locations for caps and gateways.

Bridges - Summary of Public Meeting and Online Comments

Residents uniformly agreed that the bridge aesthetics were very important and that low maintenance on the bridge greenery was essential.

While there was an initial preference for caps to be built on all bridges now, residents understood the budget constraints and understood that retaining walls near bridges would be designed capable of supporting caps, which could be developed in later years.

Assorted comments included safety concerns about the width of Main and Broad Street bridges, the use of more brick on bridges, and the addition of a signature design element to mark the bridges as gateways.

Community comme
continued input will help to shape this project during final design. Figure 4-8 shows the preliminary bridge aesthetics.

Making the retaining walls capable of holding a cap was a priority as well as building wider sidewalks, adding decorative architectural features, along with trees, railing and lighting. To meet these needs and move the bridge design beyond the industry standard, ODOT, the City of Columbus and MORPC added an additional $26 million to the project to pay for enhancements.

The additional dollars were allocated to the bridge projects based on the following:

1. City and regional planning for current and future use of each city street
2. Economic development and revitalization potential
3. Opportunities for city gateways
4. Ability to maintain the landscape enhancements, and
5. Community priorities set through stakeholder voting.

ODOT will continue to refine the bridge concepts during final design.

Figure 4-8: Preliminary Bridge Aesthetics

Town Street Bridge Proposed View

18th Street Bridge Proposed View

Grant Avenue Bridge Proposed View

Parsons Avenue Bridge Proposed View

Main Street Bridge Proposed View

Study Area Location Map

Study area mapping

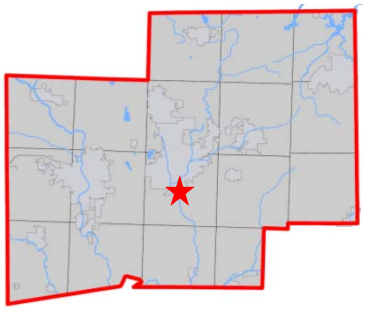
Notes:

- Shows project location
- Study area boundary clearly marked
- Key streets and study area features labeled

NORTH

AREA OF DETAIL

Stark County, Ohio



Legend

- Stream
- Ditch
- Phase I ESA Site
- Existing Right-of-way
- Construction Limits

Alternative mapping (basic)

Notes:

- Shows project location
- Legend shows key project features and resources
- Key features of the alternative are labeled
- Streets and other identifying landmarks labeled
- Figure includes north arrow and scale

Cracker Barrel
Olive Garden
Mike's Car Wash
Retaining Wall
71
Mason-Montgomery Road
Ramp to I-71 north
Fields Ertel Road
Speedway
Mason Road
Gregory Road
McDonald's
White Castle
Royal Point Drive
Ramp from I-71 north
Governors Way

Source: Esri, DigitalGlobe, GeoEye, i-cubed, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

C-R-S
Project Name (PID #####)
City, OH

Date: 01/15/2014

0 75 150 300 Feet

N

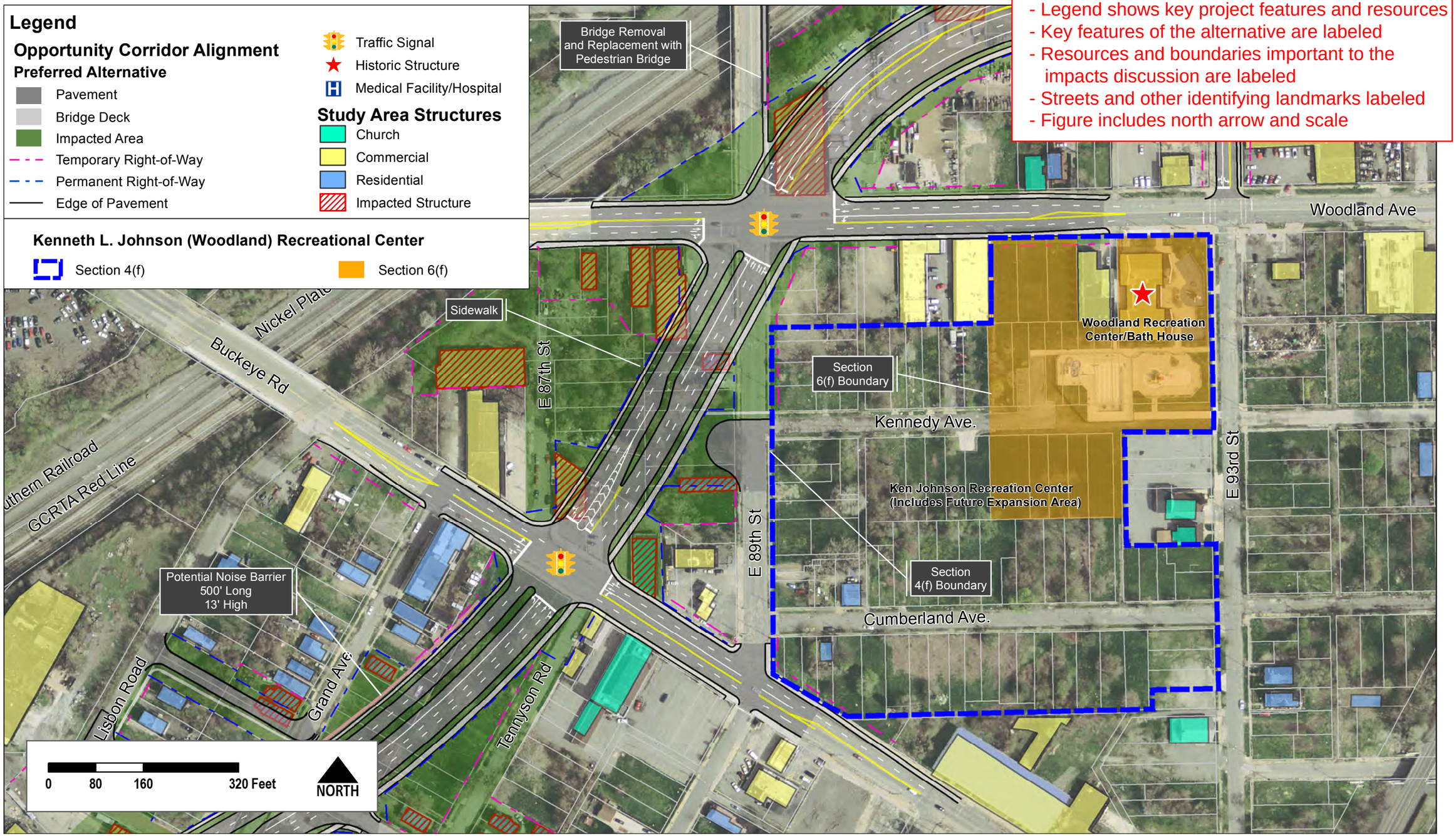
Study Area
Alternative 1

Note:
GIS data used to create this map are from the best sources available. Use of this map should be for planning purposes only.

Alternative mapping (complex)

Notes:
- Legend shows key project features and resources
- Key features of the alternative are labeled
- Resources and boundaries important to the impacts discussion are labeled
- Streets and other identifying landmarks labeled
- Figure includes north arrow and scale

Figure 4-15: Cleveland Opportunity Corridor Alternative 1 Plan / Map 6 of 10



SECTION 3 – EVALUATION MATRIX EXAMPLES

A. Evaluation matrix using color symbols
B. Descriptive evaluation matrix
C. Evaluation matrix using black and white symbols
D. Detailed evaluation matrix

Table 5.2: Alternative Comparison Matrix

	Goal I Operational Efficiency	**Goal II** Mobility	**Goal III** Accessibility	**Goal IV** Safety	**Goal V** Environmental & Community Issues	**Goal VI** Constructability	**Goal VII** Cost Effectiveness	**Summary**	**Planning Level Cost** (in million dollars)
No Build	○	○	○	○	○	○	○	○	$0
Alternative 1 Add connection from SR 104 to I-70	✳	○	○	○	▲	▲	▲	▲	$230
Alternative 2 Add connection from SR 104 to I-70	✳	✳	○	○	▲	▲	▲	▲	$340
Alternative 3 Reroute I-71 to I-670 & SR 315	○	○	○	○	▲	○	○	▲	**
Alternative 4 Add capacity & improve performance I-70/I-71 overlap	✳	✳	✳	✳	▲	▲	▲	✳	$670
Alternative 5 Add "Through Truck Only" lane	▲	○	○	✳	▲	▲	▲	▲	$1,565
Alternative 6 Improve traffic & transit operations									
TDM, TSM and ITS Techniques	○	○	○	○	○	○	○	○	**
HOV	○	○	○	✳	▲	▲	▲	▲	$1,565
Transit	○	○	○	○	○	○	○	○	**

*** Minor cost compared to other alternatives*

Legend *(Impacts Compared to the No Build Alternative)*

✳ High positive impact
✳ Moderate positive impact
▲ High negative impact
▲ Moderate negative impact
○ Similar impact
Included in the preferred alternative

Descriptive evaluation matrix

Notes:

- Compares key features of each alternative
- Concise text descriptions

Alternatives Comparison

I-75 FEATURE	NO-BUILD	ALTERNATIVE A	ALTERNATIVE B	ALTERNATIVE C
I-75 Mainline Lanes	3 Lanes NB and SB	4 Lanes NB and SB	4 Lanes NB and SB	4 Lanes NB and SB
Auxiliary Lanes	No	Yes	Yes	Yes
Sharon Road Interchange	Same as existing	Same as existing	Same as existing	Same as existing
Glendale-Milford Road Interchange	Same as existing	Same as existing	Same as existing	Same as existing
Neumann Way / C-D Roads	Same as existing	Closed	Closed	Closed
G-E Loop Ramps	Same as existing	Closed	Closed	Closed
Mangham Drive Ramps	Same as existing	Closed	Closed	Closed
Shepherd Lane Interchange	Same as existing	Same as existing	Full Movement Interchange	Full Movement Interchange
Local roads from Shepherd Lane to Glendale-Milford Road	Same as existing	No Local Roads	New Local Roads • (1) east of I-75 • (1) west of I-75	New Local Road • (1) from Shepherd Lane to Steffen Avenue
Cooper Avenue Ramps	Same as existing	Closed	SB entrance and exit relocated to Davis Street (extended)	SB entrance and exit relocated to Anthony Wayne Avenue
Davis Street Ramp	Same as existing	Same as existing	Add NB entrance	Same as existing
Davis Street Extension	No	No	Yes	No
Galbraith Road Ramps	Same as existing	• Close Galbraith Road left exit from I-75 NB • All others open	• I-75 SB to Galbraith Road will be open • All others closed	Full Movement Interchange
SR 126 Interchange	Same as existing	Same as existing	• Add I-75 SB to SR 126 WB • Add SR 126 WB to I-75 NB ramps	Same as existing
COST ESTIMATE*	**NA**	**$222,000,000**	**$289,000,000**	**$231,000,000**

*Includes Construction and Right-of-Way acquisition costs

NB = Northbound SB = Southbound WB = Westbound

Table 5.3: Alternative Comparison Matrix

	Goal I Operational Efficiency	**Goal II** Mobility	**Goal III** Accessibility	**Goal IV** Safety	**Goal V** Environmental & Community Issues	**Goal VI** Constructability	**Goal VII** Cost Effectiveness	**Planning Level Cost** (in million dollars)	**Overall**
No Build Leave the corridor entirely unchanged	○	○	○	○	◔	●	◔	$0	○
One-way Mound-Fulton Urban Corridors One-way urban corridors along Mound & Fulton and parallel to both sides of I-71 that collect traffic from existing downtown areas and distribute onto the highway.	●	●	◔	●	◔	◔	◔	$660	●
One-Way Fulton-Livingston Urban Corridors One-way urban corridors parallel to both sides I-70 and I-71 that collect traffic from existing downtown areas and distribute onto the highway.	●	●	●	●	◒	◔	◔	$675	●
Two-Way Urban Corridor – Boulevard Add lanes to the freeway and create two-way urban corridor boulevard downtown along the Fulton & Lester and decked over southbound and westbound freeway lanes.	●	●	●	◔	◔	○	○	$830	◔
Two-Way Urban Corridor - Local Street System Add lanes to the freeway and create two-way urban corridor downtown along Fulton and Lester.	●	●	●	◔	◔	◔	◔	$720	◔
Urbanized Freeway System Improve both the interchanges (SR 315 & I-71), untangle and add lanes to the I-70/I-71 overlap, improve existing ramps, but leave the highway and ramp system unchanged. The most unsafe ramps could be consolidated or closed.	◒	◒	◔	◔	◒	◔	◔	$585	◒

Legend

● Good ◒ Satisfactory ○ Poor

◔ Fair ◔ Unsatisfactory

Detailed evaluation matrix
Notes:
- Quantitative summary of key issues
- Readable text size
- Most appropriate in an appendix

Alternative Comparison Matrix

Key Issue	No-Build	Alternative 1 At-Grade Signalized Intersection	Alternative 2 Quadrant Roadway
Purpose and Need			
Intersection LOS (2036 PM peak hour)	Unacceptable	Acceptable	Acceptable
US 250 / US 42S ramp	Unsignalized - LOS F	Signalized - LOS C (US 42 & SR 96/US 250)	N/A
US 250 / US 42N ramp	Signalized - LOS F		Signalized - LOS C
US 42 / US 250/SR 96 (SW) ramp	N/A		N/A
US 42 / US 250 (NE) ramp	N/A		Signalized - LOS B
Delay to through movements (2036 PM peak hour)			
SR 96/US 250 corridor	EB: 116 seconds WB: 158 seconds	EB: 42 seconds WB: 23 seconds	EB: 24 seconds WB: 41 seconds
US 42 corridor	Free flow	NB: 47 seconds SB: 43 seconds	NB: 25 seconds SB: 7 seconds
Safety			
FHWA crash predictive model results[1]	13.7 crashes/year	13.6 crashes/year	10.8 crashes/year
Conflict points (high speed conflict points)	45 (8 high speed)	32 (22 high speed)	18 (10 high speed)
Structural deficiencies (US 42 over SR 96/US 250)	Deficient Sufficiency rating of 62.0 Functionally Obsolete	None - no structure required	None - new structure

Detailed evaluation matrix

Notes:

- Quantitative summary of key issues
- Readable text size
- Most appropriate in an appendix

Alternative Comparison Matrix

Key Issue	No-Build	Alternative 1 At-Grade Signalized Intersection	Alternative 2 Quadrant Roadway
Environmental Resources			
Noise impacts	N/A	Possible	Possible
Wetland impacts	N/A	~0.2 ac	~0.2 ac
Stream impacts	N/A	55 feet	No
Historic structure impacts	N/A	0	0
Archeological impacts	N/A	Potential	Potential
Hazardous materials site impacts	N/A	2	2
Geometric Features			
Design exceptions required	N/A	No	No
Davis Road impacts	N/A	Closed at SR 96/US 250	Full access maintained
Other design issues	None	Break in US 42 L/A R/W	None identified
Major Right of Way Impacts	N/A	Bob Evans parking	- Bob evans parking - Farmland
Construction Issues			
Maintenance of traffic on US 42	None	Close and detour US 42 and ramps	Close and detour US 42 and ramps
Maintenance of traffic on SR 96/US 250	None	- Short term closures/detours - Mulit-phase, part-width construction	- Short term closures/detours - Mulit-phase, part-width construction
Potential Major Utility Issues	None	Transmission line impacts	Transmission line impacts

Detailed evaluation matrix

Notes:

- Quantitative summary of key issues
- Readable text size
- Most appropriate in an appendix

Alternative Comparison Matrix

Key Issue	No-Build	Alternative 1 At-Grade Signalized Intersection	Alternative 2 Quadrant Roadway
Planning-Level Cost [2,3]			
Part 1 (Bridge Replacement)	N/A	N/A	$3.9 M
Part 2 (Ramps and SR 96/US 250)	N/A	$0	$5.1 M
Total Project Cost	N/A	$8.7 M	$9.0 M
Conclusion	**Dismissed**	**Preferred**	**Dismissed**

[1]Notes:

1. Source: from FHWA report no. FHWA-RD-99-128, dated October 1999.
2. Estimates are shown in 2015 dollars.
3. Estimates do not include right of way, utility relocation

SECTION 4 –FS/AER TEXT EXAMPLES

A. Introduction
   - Introduction - Example 1
   - Introduction - Example 2
   - Introduction - Example 3

B. Purpose and Need
   - Purpose and Need - Example 1
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C. Alternatives Considered
   - Alternatives Considered - Example 1
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D. Key Issues
   - Key Issues - Example 1 (General)
   - Key Issues - Example 2 (Safety)
   - Key Issues - Example 3 (Geometry)
   - Key Issues - Example 4 (Maintenance of Traffic)

E. Comparison of Alternatives
   - Comparison of Alternatives - Example 1
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   - Conclusion - Example 1
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G. Next Steps
   - Next Steps - Example 1
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INTRODUCTION

INTRODUCTION – EXAMPLE 1

This report evaluates alternative improvements for the roadway network surrounding the US 42/US 250/SR 96 interchange in Ashland County, Ohio and identifies a preferred alternative. The existing interchange consists of an overpass on US 42 and two-way ramps in the northeast and southwest quadrants. Three key routes for residential, commuter and freight traffic converge at this interchange. It provides access to the City of Ashland and industrial complexes to the west and I-71 to the east. It also serves as a main thoroughfare for truck traffic traveling between the US 250 bypass and I-71. A residential area of Ashland lies to the west of the interchange, while the areas to the east are rural with some commercial and industrial developments. The land use surrounding the interchange itself is largely commercial. A map of the study area appears in Appendix A.

Safety concerns prompted ODOT to investigate the US 250/SR 96 corridor, including the US 42 interchange. As a result, ODOT District 3 commissioned a *Feasibility Study: SR 96 (East Main Street) from East Liberty Street to east of the US 42 interchange* (Consultant, 2011). One of the study's goals included identifying crash patterns and determining their causes. The study documented a crash history at the US 42/US 250/SR 96 interchange and investigated several conceptual, long-term solutions to the identified problems. This project expands on the information presented in the *Feasibility Study* and provides further in-depth analysis of the alternatives for the US 42/US 250/SR 96 interchange.

INTRODUCTION – EXAMPLE 2

The Martin Luther King Jr. Drive (MLK)/East 105th Street (E. 105th) roadway network includes the intersections of MLK, E. 105th, Mount Sinai Drive (Mount Sinai), East Boulevard and Jeptha Drive within the City of Cleveland, Ohio. MLK is the main roadway that routes traffic from I-90 through Rockefeller Park to University Circle. E. 105th is also County Route 400 and serves as a main north-south artery through University Circle. An adjacent traffic circle complicates operations where these two roads intersect. The current configuration contributes to driver confusion, especially for the millions of visitors to University Circle each year. In addition, the pedestrian and bicycle network is compromised because of the non-traditional roadway network and limited crossings.

In 2005, University Circle Incorporated (UCI) commissioned an urban design study for the entire MLK corridor within University Circle. This study examined existing and future conditions and recommended for improvements to the roadway network, land use, landscaping and architecture. From this study, three focus areas were identified, including the intersections at: MLK/E. 105th, MLK/Euclid Avenue/Stearns Road and MLK/Cedar Avenue/Chester Avenue. This report evaluates the alternatives considered and identifies a preferred alternative for the MLK/E. 105th area.

INTRODUCTION – EXAMPLE 3

The Mill Street Rehabilitation project involves replacing the existing geometrically and structurally deficient bridge that carries Mill Street over the Nimishillen Creek in the City of Canton, Stark County. The replacement utilizes a new alignment and involves realigning Allen Avenue and Allenford Drive. The Stark County Engineer's Office commissioned a Feasibility Study for the Mill Street Bridge Replacement project as part of ODOT's Project Development Process (PDP). This report evaluates two structure types and identifies a preferred alternative for the bridge replacement.

PURPOSE AND NEED

PURPOSE AND NEED – EXAMPLE 1

The purpose of this project is to provide a more efficient transportation facility by:

- Improving safety - reduce the number of congestion-related crashes on Fields Ertel Road in the vicinity of the I-71 ramps.
- Improving traffic flow and levels of service - provide LOS C or better at the intersections in the project area.

PURPOSE AND NEED – EXAMPLE 2

Greater University Circle is projected to grow at a record pace. The job growth associated with the VA Hospital expansion and CWRU's proposed West Quad development directly impacts the MLK/E. 105th study area. In addition, substantial job growth anticipated at the Cleveland Clinic and University Hospitals will add to existing traffic volumes. Under the current roadway configuration, heavy traffic congestion is expected. The existing high crash frequency is also projected to grow as the traffic volumes increase. Finally, pedestrian and bicycle network is compromised in this area due to limited crossing locations.

To alleviate these issues, the following needs must be met:

- Improve safety and minimize driver confusion
- Improve traffic flow and levels of service
- Improve pedestrian and bicycle access

PURPOSE AND NEED – EXAMPLE 3

The purpose and need for the project was documented in a Purpose and Need Statement (Consultant, February 2012). It was approved by ODOT's Office of Environmental Services on February 13, 2012 (see Appendix F). The purpose of this project is to improve traffic operations and safety and to correct structural deficiencies to provide a more efficient transportation facility. To accomplish this, the following needs must be met:

- Improve traffic flow and level of service
- Improve safety
- Correct structural deficiencies

One desired project outcome includes improving levels of service to a minimum LOS C, specifically at the US 250/US 42 NB ramp and the US 250/US 42 SB ramp intersections. Another desired outcome is reducing crash rates to levels that are more comparable to local and statewide averages. The final desired outcome involves bringing the functionally obsolete US 42 overpass up to current design standards by eliminating deficiencies.

ALTERNATIVES CONSIDERED

ALTERNATIVES CONSIDERED – EXAMPLE 1

Three alternatives were developed for the intersection between I-490, E. 55th Street and the proposed boulevard:

- Alternative A – Conventional four-legged, signalized intersection at I-490/E. 55th Street/Proposed Boulevard
- Alternative B – Depress I-490 under E. 55th Street and braid a series of ramps west of E. 55th Street to provide access between the freeways and E. 55th Street
- Alternative – Depress I-490 under E. 55th Street and construct a quadrant roadway in the vicinity of E. 59th Street to provide full access between E. 55th Street, the freeways and the proposed boulevard

ALTERNATIVES CONSIDERED – EXAMPLE 2

Prior to establishing specific alignments, three preliminary roadway configurations were developed. All three configurations remove the Van Aken Boulevard leg from the existing six-legged intersection and relocate the Northfield Road leg. This provides a conventional, four-legged intersection. The three configurations are described below:

- Configuration 1 - Relocate Northfield Road to Warrensville Center Road
- Configuration 2 - Relocate Northfield Road to Chagrin Boulevard
- Configuration 3 - Relocate Northfield Road with two, one-way roadways: one connecting to Chagrin Boulevard providing only northbound movements and one connecting to Warrensville Center Road providing only eastbound movements

A schematic of each of these configurations is shown in Appendix C.

The Core Project Team dismissed Configurations 2 and 3 due to poor traffic operations and impacts to Tower East, an office building located south of Chagrin Boulevard which is listed on the National Register of Historic Places (NRHP). Configuration 1 was advanced for further development.

Using Configuration 1, alternatives were developed for the Chagrin/Warrensville/ Northfield/Van Aken intersection. The alternatives are described below and shown in Appendix C.

- No Build Alternative
- Curve Alternative: Relocate Northfield Road to Warrensville Center Road utilizing a curved roadway.
- Roundabout Alternative: Relocate Northfield Road to Warrensville Center Road and connect to existing Northfield Road with a roundabout.
- Signalized Intersection Alternative: Relocate Northfield Road to Warrensville Center Road and connect to existing Northfield Road with a signalized intersection.

ALTERNATIVES CONSIDERED – EXAMPLE 3

Four alternatives were developed for the SR-82 improvement project. Each utilized the same general alignment as the existing roadway with one lane in each direction and a two way left turn lane (TWLTL). The No-Build alternative was also considered. Appendix B includes a representative typical section for each alternative.

No-Build Alternative – The No-Build alternative does not include any new construction or land acquisition. However, it includes on-going maintenance activities.

Alternative 1: Balanced Land Impacts – Alternative 1 balances the widening and land acquisition on the north and south sides of SR-82. Six feet of new right-of-way would be required on each side for 14-foot curbed lanes, a TWLTL, 8-foot tree lawns and 6-foot sidewalks.

Alternative 2: Minimal Land Impacts – Alternative 2 provides 14-foot curbed lanes, a TWLTL and an adjacent 8-foot sidewalk on the south side only.

Alternative 3: Roadway Shifted South – Alternative 3 provides the same facilities as Alternative 1, but shifts the SR-82 centerline south by about 12 feet. To prevent impacting the existing utility poles to the north, all land impacts occur on the south side of the roadway.

KEY ISSUES

KEY ISSUES – EXAMPLE 1 (GENERAL)

The key issues used to evaluate the alternatives included right-of-way and utility impacts, multi-modal provisions and construction phasing. These factors are summarized below.

Right-of-Way – Alternatives that minimized the number of impacted properties were given preference in the evaluation process.

Utilities – Alternatives that did not impact the transmission lines on the north side of SR-82 were given preference due to the extensive cost and lead-time to relocate the facilities.

Tree Lawns – Alternatives with tree lawns were given preference due to safety concerns associated with adjacent sidewalk. Furthermore, tree lawns provide additional space for mailboxes, signs and snow from plowing operations.

Bike Lanes – Currently, there are not any bike lanes or multi-modal paths on SR-82 immediately east or west of the project limits, nor are there plans to build any. As a result, bike lanes and multi-modal paths were not considered a high priority.

Construction Phasing – Alternatives that required fewer construction phases and minimized temporary pavement were given preference due to cost and schedule considerations.

KEY ISSUES – EXAMPLE 2 (SAFETY)

For Alternative A, traffic operates at acceptable levels of service with reduced vehicle queues. As a result, rear-end crashes are expected to decrease. In addition, Alternative A replaces the non-standard hybrid traffic circle/adjacent signal with traditional signalized intersections. This configuration eliminates the unexpected merging, yielding, and stopping within the existing traffic circle. Alternative A includes clear signing for destinations and street names. Furthermore, lane lines, turn lanes and protected phasing (where warranted) channelize vehicle movements. These factors are expected to reduce driver confusion and the resulting rear-end, angle and sideswipe crashes. Finally, Alternative A provides standard lane widths, which is anticipated to provide greater maneuverability and reduce sideswipe and angle crashes.

The safety considerations for Alternative B are similar to those for Alternative A. More conventional and traditional roadway signage allow first time visitors to navigate through the site with less confusion. However, the increased traffic queues on northbound 105th and westbound MLK will likely continue to pose safety concerns. Alternative B does not provide access to MLK southbound from East Boulevard. The closest alternate access is at Chester Avenue, approximately 0.4 miles away.

KEY ISSUES – EXAMPLE 3 (GEOMETRY)

For Alternative 1, the relocated roadway ties in before the recently constructed Sherrick Run Bridge and requires undesirable superelevations. The superelevations pose an overturning concern for truck traffic traveling from Mill Street to northbound Allen Avenue and vice versa. Also, Alternative 1 may require non-regular approach slabs due to the proximity of the Allenford Drive intersection.

For Alternative 2, the curvature of each leg does not require superelevation. A normal shaped approach slab is provided, because the intersection with Allenford Drive is located further away from the bridge. The intersection geometry consists of near right angles, reducing the need for larger curb return radii. The bridge abutments are located further from the creek, lessening potential erosion impacts.

KEY ISSUES – EXAMPLE 4 (MAINTENANCE OF TRAFFIC)

All three alternatives maintain traffic on SR 96 and US 250 and are expected to be completed in one construction season. Detailed MOT sequencing and drawings for the alternatives are included in Appendix D.

The maintenance of traffic requirements are the same for Alternatives 1 and 2. Traffic on US 42 north of SR 96/US 250 is maintained using a temporary crossover to Davis Road. Davis Road is widened and resurfaced to accommodate the increased traffic during construction. Alternative 1 closes US 42 south of SR 96/US 250 and detours traffic along SR 511/SR 60. Access to driveways for businesses and residences is maintained throughout the construction period. The US 42 bridge demolition requires SR 96 and US 250 to be closed. This closure is anticipated to last for only one weekend. During that time, the existing interchange ramps will route traffic around the interchange area (see Figure 4-5).

Alternative 3 constructs the quadrant roadway first and utilizes the new roadway coupled with the SW ramp to maintain traffic on US 42 in both the north and south directions (see Figure 4-6). As with Alternatives 1 and 2, the bridge demolition requires SR 96 and US 250 to be closed for one weekend.

COMPARISON OF ALTERNATIVES

COMPARISON OF ALTERNATIVES – EXAMPLE 1

Both alternatives meet the project purpose and need and have similar impacts to the natural environment. Alternative 2 requires more complex maintenance of traffic, storm sewer construction and utility coordination. It also impacts the area designated for a potential future sidewalk. The estimated construction cost for Alternative 2 is $400,000 greater than Alternative 1.

COMPARISON OF ALTERNATIVES – EXAMPLE 2

All of the alternatives, with the exception of the No-Build, meet the project needs. The addition of a TWLTL improves mobility and reduces crashes associated with turning vehicles slowing or stopped in traffic. In addition, the reconstructed SR-82 roadway meets current design standards. Specifically, it provides turn lanes, driveways and sight distances per ODOT's L&D Manual. This also helps reduce the number of crashes along the corridor.

Appendix D includes drawings of the alternatives, and an alternative evaluation matrix is shown in Table 5-9. Alternatives 1 and 2 impact the transmission poles on the north side of the roadway. They require three construction phases and substantial temporary pavement. Alternative 2 includes additional costs for a bike lane. Alternative 3 requires permanent property acquisition on the south side of SR-82 only. In addition, it avoids most of the utility poles on the north side of SR-82. Alternative 3 requires only two construction phases with minimal temporary pavement.

COMPARISON OF ALTERNATIVES – EXAMPLE 3

The at-grade intersection proposed with Alternative A is not geometrically feasible without incurring extreme costs to re-design and reconstruct the I-77/I-490 interchange. Alternative A also leaves the existing weave section between the I-77 ramps and E. 55th Street. Requiring traffic to cross three lanes within a relatively short distance further compromises safety. In addition, the large intersection area and high traffic volumes negatively affect pedestrian safety and mobility, including access to the GCRTA station. Residents also expressed concerns regarding the safe transition from the higher speed interstate to lower speeds on the proposed urban boulevard.

Alternative B, on the other hand, addresses the inside merge condition without the need for re-design or reconstruction of the interchange.

COMPARISON OF ALTERNATIVES – EXAMPLE 4

All of the build alternatives meet the project purpose. An evaluation matrix included in Appendix C compares the alternative benefits, impacts and costs. Notable differences between the alternatives are summarized below:

Davis Road – Alternative 1 requires Davis Road to be closed at SR 96. Alternative 2 requires restricting Davis Road to right-in/right-out access. Alternative 3 allows full access at Davis Road.

Traffic Signals – Alternative 1 utilizes only one traffic signal. Alternatives 2 and 3 include two traffic signals.

Traffic Movements – Alternative 1 provides a traditional 4-legged intersection with direct movements. The design is similar to the adjacent intersections on US 42. Alternative 2 accommodates movements between US 250/SR 96 and US 42 using a two-way ramp in the southwest quadrant and a one-way ramp in the northeast quadrant. Alternative 3 accommodates movements through the use of a quadrant roadway in the northeast.

US 42 Bridge – Alternative 1 removes the US 42 bridge over US 250/SR 96 and therefore eliminates future maintenance costs. Alternatives 2 and 3 reconstruct the bridge and raise the profile to provide the required clearance. Alternative 2 widens the bridge to provide a southbound turn lane at the southwest ramp.

Right of Way – Alternative 3 requires a substantial amount of right-of-way from the farmland in the northeast quadrant

Public Preference – Alternative 1 is preferred by a majority of the individuals who provided comments at the public meeting. In addition, it is preferred by the City.

COMPARISON OF ALTERNATIVES

CONCLUSION – EXAMPLE 1

Alternatives B and D are eliminated due to concerns related to traffic queues, safety and driver expectancy. Alternative A provides acceptable LOS, reduces traffic queues, alleviates driver confusion, improves safety and improves pedestrian and bicycle access. Therefore, Alternative A is the preferred alternative for the project.

CONCLUSION – EXAMPLE 2

Alternative 1 is the preferred alternative for the US 42/US 250/SR 96 interchange improvement project. Alternative 1 meets the project purpose and need. Furthermore, it is supported by the City of Ashland as well as many members of the general public. Other benefits of Alternative 1 include:

- It provides easy to understand, traditional movements.
- It utilizes only one traffic signal, which would provide direct access to all movements.
- It provides a design for the US 42/US 250/SR 96 intersection that is similar to adjacent intersections on US 42 and US 250.
- It eliminates future bridge maintenance and inspection requirements; and
- It has the lowest cost of the alternatives at $8.6 million in 2015.

CONCLUSION – EXAMPLE 3

Alternative 3 is the preferred alternative because it requires permanent property acquisition on the south side of SR-82 only and avoids most of the utility poles to the north. It also requires only two construction phases with minimal temporary pavement. Finally, it provides the most conservative impervious area for storm water design. Alternative 3 is anticipated to cost $12.3 million in 2016 dollars.

NEXT STEPS

NEXT STEPS – EXAMPLE 1

The project was allocated ODOT Safety Program funding in the amount of $1.2M for construction and $0.9M for right of way and utilities. In addition, the project received $4.5M in bridge preservation funds, $2.4 million in Small City funds and $600,000 in Local funds. All project stages are fully funded at the time of this report. Environmental clearance is expected in 2013. Detailed design is scheduled for completion in 2014. Right-of-way acquisition is anticipated in 2014. Construction is slated to begin in 2015.

NEXT STEPS – EXAMPLE 2

The evaluation of key issues eliminated several Alternatives, including Alternative W-B, Alternative C- C, Alternative E- A and Alternative E-B due to constructability, safety, traffic operational and geometric concerns.

The four-legged intersection at I-490/E. 55th Street included in Alternative W-A provides more conventional access to E. 55th Street in comparison to Alternatives W-B and W-C. Because it is the lowest cost option and provides the most conventional access, Alternative W-A is carried for further study in the AER. The AER will include additional capacity analyses to determine if acceptable design year traffic operations can be attained once NOACA refines the future traffic volumes.

Although results in the highest residential impact of the three West Alternatives, Alternative W-C provides the best traffic operations while maintaining full access to E. 55th Street. Therefore, Alternative W-C will be carried for further study in the AER. Additional analysis will focus on the number of occupied units and the potential for finding available replacement housing within the St. Hyacinth neighborhood.

For the Central Section, Alternatives C-A and C-C will be studied further in the AER. Additional analysis will better define impacts to Section 4(f) resources (historic and recreational), as well as potential impacts to homes and businesses.

With the exception of structure impacts, all the East Section Alternatives have similar impacts. Based on the lower impacts to structures, only Alternative E-C is the preferred alternative for the East Section.