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OVERVIEW

This guidance is intended to help project managers and engineering and environmental specialists develop high-quality reports that effectively document ODOT’s decision-making process for a given project. This guidance focuses on the Feasibility Study (FS) and the Alternative Evaluation Report (AER) during the Project Development Process (PDP). Additionally, ODOT provides accompanying training, Feasibility Studies and Alternative Evaluation Reports, offered thru the Local Technical Assistance Program’s (LTAP) eLearning website.

In general, high-quality FS and AER reports:

- Clearly explain the information used to narrow the range of alternatives and/or to identify the preferred alternative;
- Focus on relevant data and avoid unnecessary length;
- Include supporting technical information by reference; and
- Use “reader friendly” principles as appropriate.

Appendix E of this guidance, Example of Quality PDP Documents in Ohio, contains graphics, text and tables adapted from documents prepared under ODOT’s PDP. The examples illustrate the techniques discussed in this guidance. ODOT has also developed Preparing Reader Friendly Documents training which can be accessed thru the LTAP’s eLearning courses. This training discusses reader friendly concepts and provides examples of how to incorporate these concepts into ODOT documents.

PROCESS

The Ohio Department of Transportation (ODOT) Project Development Process (PDP) consists of five phases, shown in the graphic below. All capital projects go through these five phases, with varying degrees of detail in each phase. An overview of the process is available here:


The preferred alternative is determined during the Preliminary Engineering (PE) Phase. The FS and AER are critical components of this phase because they document the decisions relied upon in future approvals, such as the NEPA document.

What is a NEPA document?

A NEPA document demonstrates ODOT’s compliance with the National Environmental Policy Act (NEPA) and related regulations. Over 98% of ODOT’s program fits within the thresholds of a Categorical Exclusion (CE) – actions that do not individually or cumulatively have a significant environmental impact.
For every project, the project manager (PM) must establish the project’s description, method and footprint to choose the preferred alternative:

- **Description** - What will my project involve? Where will it be located?
- **Method** – What design standards will apply? How will we build it? How will traffic be maintained?
- **Footprint** - What are the limits that should be used for environmental clearance? Will there be temporary impacts?

There are three milestones where enough detail may be available to define the preferred alternative: at Project Initiation, in the Feasibility Study (FS), or in the Alternative Evaluation Report (AER). An AER is only prepared when the preferred alternative cannot be defined based upon the level of detail investigated for the FS. The project’s path under the PDP indicates whether a FS and an AER are necessary.

For Path 1 and many Path 2 projects, enough information is available to define the preferred alternative at Project Initiation. Some Path 2 projects and Path 3 projects require a FS to define the preferred alternative. Path 4 and Path 5 projects use the FS to narrow the range of alternatives and then use an AER to define the preferred alternative. There may be instances where a Path 3 project may require completion of an AER to fully identify the preferred alternative.

The discussion below explains how each key decision occurs based upon the project path.

**Path 1** - These projects include maintenance activities occurring within the existing roadway footprint. For these, the description, design details and footprint are known at project initiation. These decisions are made when the project is chosen for funding and included in ODOT’s program. The only alternatives include Build and No Build. There is no potential for significant social, economic or environmental impacts, and the environmental approval is typically a low-level Categorical Exclusion (CE). For these projects, the FS and AER are not prepared.
**Path 2** - These projects include simple transportation improvements with non-complex property acquisition and few environmental impacts. Common project types include culvert and in-kind bridge replacements, stand-alone bike and pedestrian projects, intersection improvements, including roundabouts and restricted crossing U-turns, and minor widening projects with no added lanes, i.e. no additional capacity. The environmental approval is typically a low-level CE. For most Path 2 projects, a FS is not required to identify the preferred alternative. An AER is never required.

Many Path 2 projects will require some level of investigation before moving into design, such as a structure type study, safety study, MOT considerations, etc. These studies assist in defining the parameters of the preferred alternative, but there are no "NEPA alternatives" other than Build and No Build. There are only design alternatives where the impacts do not substantially differ. Therefore, these reports serve as the Feasibility Study for these projects.

Where such studies have not occurred, the FS for most Path 2 projects may be presented in the form of meeting minutes or a note to file to document the decision-making process.

An example of a Path 2 project that may require a FS is an intersection improvement with left-turn lane additions on opposing approaches at an intersection. On one corner of the intersection there is a gas station with access on two approaches. On the other corner is a utility. In order to install the turn lanes, either the utility will need to be relocated or one of the gas station's accesses will need to be removed. A site visit and meeting could be held with all necessary District personnel and consultant if one is being used. A decision on the preferred alternative could be made after weighing the pros and cons. (Refer to Sample Outline #1 in Appendix A.)

Some path 2 projects will require a formal FS, as detailed in Outline 2 in Appendix A. Such projects may have public concerns or resource impacts that necessitate a more formal documentation of the decision-making process.

**Path 3** - These projects are less predictable, such as interchange reconstructions or modifications, widening projects to add capacity and minor roadway realignments.

For Path 3 projects, some environmental issues or design challenges exist and must be weighed against each other before choosing a preferred alternative. The project description may be known at project initiation or it may need to be refined. The design strategy and

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<table>
<thead>
<tr>
<th>Project Milestone</th>
<th>When is the Preferred Alternative Identified?</th>
</tr>
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<tbody>
<tr>
<td></td>
<td>Path 1</td>
</tr>
<tr>
<td>Project Initiation</td>
<td>X</td>
</tr>
<tr>
<td>Feasibility Study</td>
<td></td>
</tr>
<tr>
<td>Alternative Evaluation Report</td>
<td></td>
</tr>
</tbody>
</table>

*Note: X = For most projects; O = In some cases"
footprint may also be uncertain. In a project such as this, there may be separate and distinct alternatives, or there may be a series of analyses that build upon each other until the preferred alternative is established. The FS provides enough detail to choose a preferred alternative. (Refer to Sample Outline #2 in Appendix A.) The NEPA approval is typically a lower level Categorical Exclusion (CE).

Some Path 3 projects fit the definition of a Path 3 but during the development of the project initiation package multiple competing engineering considerations and/or a higher potential for impacts to sensitive resources are recognized. For these Path 3 projects, an AER may be necessary. In these cases, several competing issues must be balanced, and several alternatives must be evaluated against each other to identify the preferred alternative. The FS will narrow the range of alternatives before proceeding to additional studies in an AER. (Refer to Sample Outline #2 in Appendix A.) The PM makes the decision on the intent of the FS and AER based upon the best available information, including advice from relevant subject matter experts. Involving subject matter experts is valuable for all projects but is critical for these types of Path 3 projects where there is a greater likelihood of impacts and design challenges. The AER may be limited to only those elements or the portion of the project that requires more analysis or engineering to make a decision. In this case, the AER does not need to cover the entire project area. The environmental approval is likely a higher-level CE and the FS and AER are made available and shared with the public during public involvement activities. These Path 3 projects are the exception, not the rule.

**Path 4 and Path 5** - These projects involve potential for major changes in access, substantial right-of-way acquisition, impacts to high quality environmental features or a high level of public controversy. Path 4 projects occur in rural or suburban areas. They may involve major realignments or new alignments with the potential for evaluating multiple corridors. Path 5 projects occur in urban areas and may include substantial utility issues and complex right-of-way acquisition. Because of their setting, Path 4 (rural) projects typically include a heavier consideration of environmental studies during the development of alternatives to adequately identify environmental impacts. Path 5 (urban) projects typically necessitate a higher level of engineering investigation to identify impacts to right-of-way, utilities and cultural resources. Both project types may require resource and regulatory agency coordination at decision points. They typically involve an Environmental Assessment (EA), an Environmental Impact Statement (EIS) or a high-level CE document.

For Path 4 and 5 projects, the Preliminary Engineering phase uses two steps to identify the preferred alternative. The FS narrows the field of alternatives to two or three. The AER evaluates the remaining two or three alternatives in greater detail in order to identify the preferred alternative. (Refer to Sample Outline #2 in Appendix A.) The FS and AER are made available and shared with the public during public involvement activities.

On projects where the alternatives have the potential for a high level of environmental impacts, ODOT’s Office of Environmental Services (OES) will provide the report to regulatory agencies for review and comment. This coordination occurs in advance of the
formal coordination on the NEPA document, providing the agencies an early opportunity to review the alternatives and their associated impacts.

RELATED ODOT MANUALS AND GUIDANCE

ODOT manuals and guidance documents provide information related to the FS and AER. Links to key resources are included below:

PDP Website:
http://www.dot.state.oh.us/projects/pdp/Pages/default.aspx

PDP Manual:
http://www.dot.state.oh.us/projects/pdp/Pages/Manual.aspx

PDP task list and notes within the Scope and Fee system (SAFe):
http://pdp.dot.state.oh.us/General/TaskTemplateReader.aspx

PDP, FS/AER and Reader Friendly online trainings are available thru the LTAP's eLearning website.

PLANNING THE REPORT

Many individuals review FS and AER documents, including technical experts, government officials, stakeholder groups and the public. Effectively communicating with such a wide range of stakeholders requires high-quality, “reader-friendly” reports. Because of this, ODOT is expecting the FS and AER’s to be in a reader-friendly format. In general, a reader-friendly report is one that:

- Is readily understandable by all audiences, including those without technical expertise.
- Provides key information in an easy-to-navigate format.
- Focuses on pertinent information and avoids unnecessary bulk.
- Includes supporting technical information in appendices, or by reference, as appropriate.
- Meets all legal requirements.

REPORT EXPECTATIONS

During project start-up, the team determines the expectations for the report. While all reports incorporate reader-friendly concepts, the degree to which different techniques are used varies based on the individual project. Key considerations include:

Audience – Consider expectations of those reviewing the report. Will other offices and/or agencies see the report? Will the public read the report?

Review Team – Identify which offices are required to review the report and identify which individuals will be included on the review team. Do any members of the review team have specific expectations for the report? What content must be included in the report to meet these expectations? For example, interchange projects and safety analyses both require reviews by specific subject matter experts.

For projects recommending new alignments, non-traditional intersections, major capacity additions on the interstate or interstate look-
alike system, modifications to an existing interchange or proposing to add a new interchange, the Office of Roadway Engineering (ORE) will be a required reviewer for the FS and AER. Note that projects requiring an Access Point Request Document, specifically an Interchange Modification Study (IMS) or Interchange Justification Study (IJS), will require a multi-step review and approval process by ORE. Approval by ORE will occur for the FS, and the AER if one is required, and again for the Interchange Study. Refer to Section 550 of the Location and Design Manual, Volume 1 for further details.

All projects evaluating alternatives must include a safety analysis of alternatives using the AASHTO Highway Safety Manual to confirm safety implications regarding alternatives comparison and evaluation. The extent of analysis varies based upon need elements. Refer to the Safety Analysis Guidelines maintained by the Office of Program Management for more information. Due to the complexities of this analysis, the District Safety Review Team will be required to review the FS and AER.

**Writing Quality and Style** – Consider the strategy for drafting the document. Who will be the lead editor? What involvement will subject matter experts have in drafting the text? How will the team address writing quality?

The report tells the story of the project much in the way one would explain the project decision-making process to a spouse or a friend. Clear writing allows all readers to easily understand the project’s purpose and need, the impacts and benefits of each alternative and the reasons for each decision. Writing clearly requires careful planning and editing. Crafting the text to use short, basic sentences, active voice and consistent verb tenses and terminology makes a document more readable. Incorporating everyday language in place of jargon and highly technical terms promotes understanding. This is important for all reports – even those not likely to be read by the public. Different reviewers do not always have a clear understanding of the terminology used by other disciplines and benefit from using everyday language.

Refer to Appendix D: Writing Quality and Style for tips.

**Data** – Consider the key topics covered in the report. What information will appear in the report? What data will the appendices include? What stand-alone documents will be incorporated by reference? Will simple tables, charts and graphs help to summarize data?

Refer to Appendix C: Tips for Presenting Data for suggestions.

Items that were used as primary elements for decision-making may require more discussion in the body of the document. Detailed technical information that is required to supplement the discussion in the body of the report may be included in the appendices. Technical data that is not required for most reviewers may be referenced and may remain in the project file.

One example is traffic count data. The certified traffic plates or planning level traffic and operational analyses contain relevant information required to review the alternatives evaluation. Therefore, the report briefly summarizes the traffic items that influence the decision using graphs, charts and tables as appropriate. The report’s appendices contain the supporting traffic
plates and operational analyses. The traffic counts and other raw data are not necessary to review the report and are retained in the project file.

Refer to Appendix B: Guidance on Appendices and Technical Reports for direction on what to include.

**Graphics** – Consider the graphics needed to communicate key concepts. Which concepts are best represented visually? What staff will support this work?

A reader-friendly report provides key information using a range of techniques. Text boxes and graphics are excellent tools to help readers understand complex or technical information. Simple drawings and charts are more understandable to all readers than engineering plans and lengthy, detailed tables.

**NEPA Compliance** – The alternatives analysis will be based upon an evaluation of addressing all Primary Needs while considering which Secondary Needs may be addressed. Consideration of addressing Secondary Needs will require a careful evaluation of the impacts and costs associated with improving the elements of the project which are associated with the Secondary Needs. Consider what environmental issues may affect the preferred alternative decision. How will the report incorporate these items? What technical terms require explanation, so the reader understands the decision? Refer to Section 1000 of the Location and Design Manual, Volume 1 for more information regarding Performance Based Project Development (PBPD) and how the development of Primary and Secondary Needs drives the identification of alternatives.

**Regulatory Issues and Permitting Processes**

Consider which regulations affect the preferred alternative decision. Are there any requirements that play an important role in comparing the alternatives and require explanation?

Often, a report requires specific information to meet regulations or satisfy interagency agreements. This information often conflicts with the goals of a reader-friendly document. To address this, technical documents geared toward technical reviewers may be written and circulated separately, such as a safety study or an Ecological Survey Report. The document should incorporate these reports by reference.

Agency responses often include lengthy legal terminology for specific findings and references to agreements. Footnotes are an excellent tool to move these phrases out of the body of the report. The report also explains important terminology needed to understand agency coordination, findings and actions.

**DEVELOPING THE REPORT**

Once the report expectations and preparation strategy are determined, the project team begins to develop the report. Every report must cover the same general concepts. However, each report will vary in how it presents the general concepts, depending on the size and complexity of the project.

**GENERAL CONCEPTS**

For every project, the project team must establish the answers to key questions to evaluate alternatives and select the preferred alternative.
**Project Description** - How can the project be described? What will it involve? Where will it be located?

Define the major features of the project. (e.g. Will the project add lanes or just reconstruct the existing pavement?) If alternatives in several locations will be considered, how will the location be determined?

**Design Details and Construction Strategies** – What standards will be used? How will the project be built? Are there features that will impact the decision on the preferred alternative?

Consider what environmental, design, or construction issues will impact how the project will look. The preferred alternative may be influenced by design standards, maintenance of traffic, or constructability. (e.g. What structure type will be most cost effective? Will it be part-width, require temporary roadways or use a detour? Will there be any design exceptions?)

**Project Footprint** - What is information is needed to establish the area of impact for the alternatives? Will there be temporary impacts?

The project’s description, design standards, and construction strategy dictate the project’s footprint (i.e. temporary and permanent impact limits). The project team develops the footprint based upon a conservative estimate of the temporary and permanent impact limits, including consideration of access for construction activities. The team develops the footprint based upon the applicable design standards with consideration for minimizing utility involvement, right-of-way impacts or environmental issues. The footprint must be carefully established for future environmental studies.

**SPECIFIC CONTENT**

For most projects, the FS is the only documentation explaining how the preferred alternative was chosen. For complex projects, the FS narrows the alternatives to be refined in the AER. An AER is prepared only if a FS has already been prepared and identified the need for further alternatives evaluation.

Based upon the number of alternatives and complexity of the issues, consider the most appropriate report outline. The project team should review the outlines provided in this guidance, choose one, and adapt it to fit the needs of the project. A report does not need to cover every item in the sample outline. It focuses on the issues that matter most so the reader understands the decision-making process. Please refer to *Appendix A: Sample Outlines*.

Example outlines are provided in Appendix A. Not every FS or AER will include every item from the example outlines. The report only includes sections relevant to the decisions for that particular project. However, the following items are required for every project:

**Introduction** – The introduction explains what the report does and does not include. It explains what studies were conducted and why. The introduction specifies which studies have a bearing on the preferred alternative decision and which ones were done only to obtain an understanding of the impacts. The introduction explains the project’s context to reviewers. This is particularly important for specialized reviewers, allowing them to understand which issues will be weighed against their particular topic of interest. Subject matter experts are encouraged to
read the introduction in addition to their own area of expertise if they do not have time to review the entire report.

Please note that if a specific study would typically occur for a project of that type or setting, and the PM chooses not to do it, the report briefly explains why it was not included.

**Purpose and Need** – For projects requiring a formalized Purpose and Need Statement (P&N), the FS and AER include a summary of the previously reviewed and accepted draft P&N. The summary needs to include a discussion of the Primary and Secondary Needs. The summary allows reviewers to understand the need for the project, the origin of the alternatives and evaluate the alternatives against the identified needs. All reviewers are encouraged to read the P&N summary to understand the project's primary and secondary needs and how consideration of addressing those elements affects the alternatives analysis.

For Path 2 level projects requiring a FS but the environmental document level does not require a formal P&N, reviewers should ensure that this statement adequately presents the conditions that need to be addressed by the project and that the range of alternatives considered by the FS are adequate.

For higher level projects where a formalized P&N is required, the draft P&N shall be reviewed and accepted ahead of drafting the FS. This is because the identification of needs drives the range of alternatives, especially when incorporating PBPD concepts. Refer to [ODOT OES’s Guidance for Developing Purpose and Need](#) to assist with proper preparation of a purpose and need statement.

**Alternatives Considered and Dismissed** – The report provides a brief description of the alternatives studied, including the No Build Alternative and those that were dismissed from consideration, and how the alternatives carried forward addressed the Primary Needs of the project. Additionally, any Secondary Needs being addressed by an alternative will be identified. The purpose of this section is not to provide in-depth alternatives evaluation. Rather, it introduces the alternatives to provide context for the key issues and set the stage for the comparison of alternatives.

**Key Issues** – The report explains the issues important to the decision-making process and summarizes the findings for those issues. The order presented in the example outline is only a starting point; the report shall present topics in the order best suited to explain the process – in the order that the studies occurred or in order of relevance to the decision-making process. The report briefly mentions what other tasks are occurring or have been completed but does not provide extensive detail if they do not weigh on the selection of the preferred alternative.

The report summarizes the key findings from separate stand-alone studies that bear upon the decision-making process. These studies may include safety studies, structure type studies, maintenance of traffic alternatives analysis, environmental studies, etc. The report references the study by title and date. Text from technical studies is not included verbatim in the body of the report nor are the reports included in the report's appendices. Any individual study which is scoped for a specific purpose will have been distributed for review and approval as necessary. These studies are part of the project file and including them in the FS or AER appendices is
unnecessary. The project manager will need to be able to readily provide a copy of any stand-alone reports to anyone requesting to see it as part of the FS or AER review process.

Comparison of Alternatives – The report summarizes the findings of key topics by alternative and provides a comparison in an easy to understand format. If there are many competing issues, a matrix is very effective and is recommended. The matrix includes each factor evaluated to determine the preferred alternative, such as property impacts, environmental issues, design issues, maintenance of traffic, etc. The matrix must identify how each alternative addresses the Primary Needs. Additionally, any alternative addressing a Secondary Need(s) must identify the impacts and costs associated with those improvements. Subject matter experts will use this information to decide whether to address these Secondary Needs. Refer to Section 1001.2 of the Location and Design Manual, Volume 1 for more information regarding implementing PBPD during the Preliminary Engineering Phase of the PDP.

Note that ODOT does not endorse or accept using a numerical scoring system (weighting, etc.) to compare alternatives within the FS or AER. While engineering analyses may lend themselves to numerical comparisons between alternatives (capacity calculations, safety analyses, etc.) the overall comparison between alternatives cannot be arbitrarily assigned a numerical ranking.

For those projects that identify safety as a need in the project’s Purpose and Need Statement an analysis of alternatives using the AASHTO Highway Safety Manual (HSM) will be required to show a comparison of reduction in total crashes or crash severity between alternatives.

Additionally, any project where multiple alternatives are being considered but where safety has not been identified as a need element, a Highway Safety Analysis will also be required to confirm safety implications regarding alternatives comparison and evaluation. These required analyses will occur during development of the Feasibility Study (FS). ODOT will only accept quantitative analyses of safety considerations when comparing alternatives. Qualitative statements regarding one alternative being “more safe” than another will not be accepted. For more information refer to the Safety Analysis Guidelines maintained by the Office of Program Management.

Conclusion – The draft report ends with a conclusion. The Conclusion explains the determination of the preferred alternative or the reasons for carrying a narrowed range of alternatives forward. The purpose of the draft report is to document the process used to reach the conclusion and provide an opportunity for review before finalization and approval.

The selection of the range of alternatives or preferred alternative will be confirmed upon review of the report by subject matter experts, stakeholders and upon completion of the public involvement process, if applicable. Once all reviews are completed, including the public involvement comment period, the revised report will identify the preferred alternative or range of alternatives carried forward into the AER.

For projects where an AER is necessary, two approvals will be issued. The first approval will occur for the FS and will confirm the range of alternatives to be carried forward into the AER. The second approval will take place when the preferred alternative is
identified upon completion of the AER. Note that the preferred alternative will continue to be further refined and confirmed thru the NEPA process.

FORMALIZING THE CONCLUSION (REPORT APPROVAL)

The report is complete when the approval is issued. For projects where an AER is necessary, the FS needs to be approved before starting the AER to clearly establish the decision on the narrowed set of alternatives being carried forward. The approval will cite the title and date of the referenced report to make clear which version was approved.

Subject matter experts and District staff need to provide concurrent reviews to ensure that all engineering, right of way and other critical decision making has occurred appropriately prior to any approvals occurring.

The ODOT PM is to ensure that all comments by various offices and stakeholders are addressed before approving the report or submitting the report to other offices for approval.

The District PM or OES will be required to approve the FS and AER. Which entity approves the studies will be based upon the project’s environmental document level. Those projects where the environmental document is approved by the District (C1, C2 or D1), the District PM shall approve the FS and AER. Note than an AER should not be required for C1, C2 or D1 types of projects. ODOT OES will approve the FS and AER for projects requiring OES approval of the environmental document (D2, D3, EA or EIS). OES’s review will be based solely on the report’s ability to adequately provide a reasonable and defensible summary of the decision-making process on the identification of the preferred alternative. Engineering and other subject matter reviews will be required before requesting OES to approve the FS and AER.

For those projects requiring an Access Point Request Document, specifically an IMS or IJS, the Office of Roadway Engineering shall approve the FS and AER. Note that for these types of projects the study area considered during alternatives analysis in the FS and AER must encompass the required study limits for the future Interchange Study. Refer to Section 550 of the Location and Design Manual, Volume 1 for further details. The District PM or OES, as noted below, will also review and approve the FS and AER.

More than one review may be necessary based upon the extent of comments. To minimize the timeframe for reviews, the District PM should coordinate early with subject matter experts who possess approval authority over specific project elements.

For those projects requiring an EA or EIS, resource and regulatory agency coordination will occur during the FS and AER. OES will provide a copy of the FS and AER to the resource agencies for a 30-day review period. Note that for Path 4 and 5 projects the FS, although not recommending a singular alternative, does require resource agency reviews before being approved by OES. Upon completion of the agency coordination, including any public comment period, an approval of the document will be issued by OES. The Project Manager shall not announce the recommendation of the preferred alternative until the agencies are provided
the opportunity to comment on the document.

Once approved, the District PM is responsible for notifying all who reviewed the report that a decision was reached.

For all projects, once approved, outdated versions of the report (those that were not accepted) are deleted from the project file per ODOT's Records Retention Policy. Only the final version of the report is kept. The date of the report which is being approved will be identified in the approval of the FS and AER.

**IN CLOSING**

The FS and AER are extremely important to ODOT's PDP. These documents outline the issues ODOT considered in making decisions. This information is vital to the public and to the defensibility of ODOT's decisions.

The FS and AER can be as short or as long as needed to accurately capture ODOT's decision-making process for a given project. Ensuring that these documents are written in a reader friendly format, regardless of the document's size, will ensure that our customers can quickly understand ODOT's decision-making process.

The purpose of these reports is to summarize the issues such that a lay person (or a court of law) can understand how the preferred alternative, or narrowed range of alternatives, was developed. The reader does not have to agree with the decision, but he/she should be able to clearly understand the issues considered and how they were balanced to make the choice.

**Report Resources**

Links to key resources for preparing high-quality, reader-friendly documents are included below.

_AASHTO Practitioner's Handbook: Preparing High Quality NEPA Documents for Transportation Projects:_

[http://www.environment.transportation.org/center/products_programs/practitioners_handbooks.aspx#14](http://www.environment.transportation.org/center/products_programs/practitioners_handbooks.aspx#14)

_Examples of Effective Techniques for Improving the Quality of Environmental Documents:_

[http://environment.transportation.org/center/products_programs/reports/quality_enviro_docs.aspx](http://environment.transportation.org/center/products_programs/reports/quality_enviro_docs.aspx)
A “low level” CE is one that is of the lowest risk for environmental impacts (C1 and C2 actions). A “high level” CE is one that requires additional documentation per 23 CFR in order to confirm that it meets the requirements of a CE (D1, D2 or D3 Actions). For more information on classifications of NEPA documents, refer to ODOT NEPA Assignment CE Guidance: [http://www.dot.state.oh.us/Divisions/Planning/Environment/NEPA_policy_issues/EnvironmentalDocumentation/Documents/CE_Guidance_NEPA.pdf](http://www.dot.state.oh.us/Divisions/Planning/Environment/NEPA_policy_issues/EnvironmentalDocumentation/Documents/CE_Guidance_NEPA.pdf)

ODOT does not typically consider the following to be added capacity for the purposes of PDP classifications: widening by less than a full a lane (i.e. widening 10-foot lanes to meet standards for 12-foot lanes); adding a center two-way left turn lane; adding or lengthening turning lanes; adding or improving shoulders; or converting a traditional intersection to a roundabout.

A roadway realignment is a project where the centerline of the roadway is moved, such as to straighten out a curve or to move the roadway farther away from a stream.

APPENDIX A: SAMPLE OUTLINES

SAMPLE OUTLINE #1: PATH 2 MEETING MINUTES AS FEASIBILITY STUDY

Meeting minutes for ABC-##-##.## PID #######

Date

Attendees:
District P&E/Staff
District Traffic Engineer
District HMA/Construction Engineer/Staff
District Safety Engineer/Liaison
District Project Manager
Consultant

Purpose
The purpose of the meeting is to review the design alternatives for the project and confirm the preferred alternative.

Discussion
• Existing conditions
• Discussion of issues and constraints
• Considerations for defining the Preferred Alternative

Conclusion
SAMPLE OUTLINE #2: PATH 3, PATH 4 AND PATH 5 FEASIBILITY STUDY

Cover – Provides the project name (county-route-section), PID number, descriptive name for the project (e.g. “State Route 94/Granger Road Roundabout, Medina County”), title and date of the report, and the name/logo of the firm or office preparing the document. (The consulting firm’s logo should not appear within the body of the report. It may appear on drawings or plans.)

Table of Contents
   I. Introduction
   II. Purpose & Need Summary
   III. Alternatives Considered and Dismissed – always include a discussion of the No Build.
   IV. Key Issues – Briefly summarize and reference technical studies by name and date. Discuss those elements/reports that affected the decision on the preferred alternative or narrowed range of alternatives and how. Do not discuss analyses or reports that had no bearing on these decisions. Examples may include:
      a. Traffic Analysis - Includes discussion of capacity, safety, travel time, interchange considerations, access management, etc. – as applicable to the requirements of the project.
      b. Roadway Design Issues - Includes design speed, functional classification, typical section(s), bicycle/pedestrian facilities, property access (consider constructability as well as implementation of access management), horizontal geometry, potential design exceptions – as applicable to the requirements of the project.
      c. Structural Design Issues – Bridge and culvert locations, structure type studies, retaining wall justifications, constructability – as applicable to the requirements of the project.
      d. Maintenance of Traffic – Proposed MOT strategy, MOTAA, detours – as applicable to the requirements of the project.
      e. Right-of-Way Requirements - Preliminary right-of-way (permanent and temporary) by parcel, right-of-way costs, relocations (by type), known relocation challenges – best available data.
      f. Preliminary Geotechnical Assessment – Preliminary exploration results/mapping, summary of findings
      g. Utility/Railroad Issues – Impacts and coordination, if available.
      h. Environmental Analysis – Summarize only issues that are relevant to the decision on preferred alternative or narrowed range of alternatives. Include Discussion of resources, impacts, mitigation or avoidance. If no issues, provide a summary of what studies are in progress or are planned. Public Involvement – Provide a brief summary of what public involvement has occurred and what is planned. Must include a discussion of how PI activities affected the decision on the PA or narrowed range of alternatives.
      i. Aesthetics - Briefly discuss aesthetics and status of approval by Aesthetic Committee, if applicable. (Refer to ODOT’s Aesthetic Design Guidelines)
      j. Cost Estimates
V. **Comparison of Alternatives** – Includes comparison matrix and summary of key pros/cons of each alternative, including how Primary Needs were met and to what level and if any Secondary Needs were addressed.

VI. **Conclusion** - FS summarizes decision of which alternative has been identified as the PA or for those projects requiring more analyses, summarizes which alternatives will be carried forward and why.

VII. **Next Steps** – Include discussion of next steps, schedule, funding status. Include the phasing plan, if applicable.

**Exhibits**
- Study Area Map
- Alternatives Exhibits (including construction limits)
- Graphics for Key Issues – If there are specific challenges discussed in the FS, provide graphics to aid in understanding those issues.

Appendices – The appendices should contain any important reference materials that are relevant to the identification of the preferred alternative (or decision on alternatives carried forward to the AER) that are not captured in other stand-alone documents. For example, capacity analyses completed for the FS that are not captured in a stand-alone report are included. Stand-alone reports shall be made available in the project file and are not included in the appendices. Those studies which heavily influenced the decision on the PA shall be uploaded to EnviroNet as supporting documentation for NEPA.
- Capacity Analyses
- Safety Analysis of Proposed Alternatives
- Preliminary Alignment and Profile, Cross Sections
- Cost Estimates
SAMPLE OUTLINE #3: PATH 4/PATH 5 AER

Cover – Provides the project name (county-route-section), PID number, descriptive name for the project (e.g. “State Route 94/Granger Road Roundabout, Medina County”), title and date of the report, and the name/logo of the firm or office preparing the document. (The consulting firm’s logo should not appear within the body of the report. It may appear on drawings or plans.)

Table of Contents

Executive Summary – Includes a brief summary of the alternatives considered and conclusions.

I. Introduction – This section will summarize the findings of the FS. Include the approval date of the FS.

II. Purpose & Need Summary

III. Alternatives

   a. Alternatives Considered and Dismissed – Explanation of alternatives that were considered and eliminated during the development of the FS. These alternatives will not be discussed further in the report. Always include a discussion of the No Build.

   b. Feasible Alternatives – Description and key features of alternatives to be compared in the AER in higher detail.

IV. Key Issues – Only include level of detail relevant to the decision-making process. Briefly summarize and reference technical studies by name and date. For Path 4 and Path 5 projects, it is likely that a few key issues will be used in the FS to narrow the range of alternatives; most or all of these topics may be included in the AER. Discuss those elements that affected the decision on the preferred alternative. Examples may include:

   a. Traffic Analysis – Includes discussion of capacity, safety, travel time, interchange considerations, access management, etc. – as applicable to the requirements of the project.

   b. Roadway Design Issues – Includes design speed, functional classification, pavement selection, typical section(s), bicycle/pedestrian facilities, property access (consider constructability as well as implementation of access management), service roads, horizontal geometry, conceptual cross-sections, profiles showing constraints (clearances/cover), potential design exceptions, constructability – as applicable to the requirements of the project. Refer to sample provided in Appendix B.

   c. Structural Design Issues – Bridge and culvert locations, structure type studies, retaining wall justifications, constructability – as applicable to the requirements of the project.

   d. Maintenance of Traffic – Proposed MOT scheme, MOTAA, detours – as applicable to the requirements of the project.

   e. Preliminary Geotechnical Assessment – Preliminary exploration results/mapping, summary of findings

   f. Right-of-Way Requirements – Preliminary right-of-way (permanent and temporary) by parcel, right-of-way costs, relocations (by type), known relocation challenges – best available data.

   g. Utility/Railroad Issues – Impacts and coordination
**Environmental Analysis** – Summarize only issues that are relevant to the decision on preferred alternative. Include Discussion of resources, impacts, mitigation or avoidance. If no issues, provide a summary of what studies are in progress or are planned.

**Aesthetics** - Briefly discuss aesthetics and status of approval by Aesthetic Committee, if applicable. (Refer to ODOT's Aesthetic Design Guidelines)

**Public Involvement** – Provide a brief summary of what public involvement has occurred and what is planned. Must include a discussion of how PI activities affected the decision on the PA.

**Construction Cost Estimates**

**Comparison of Alternatives** – Includes comparison matrix and summary of key pros/cons of each alternative.

**Conclusion** - FS summarizes decision of which alternatives will be carried forward and why. AER summarizes decision of preferred alternative.

**Next Steps** – Include discussion of next steps, schedule, funding status. Include the phasing plan, if applicable.

**Exhibits**
- Study Area Map
- Land Use Map
- Typical Sections
- Level of Service graphics (No Build and Build Alternatives)
- Environmental Resources Mapping
- Alternatives Exhibits – Exhibits should be appropriate to the level of detail available, but may include aerial photography overlaid with environmental resources, alternative alignments with curve data, bridge and culvert locations, major utilities, existing property lines, ownership information, buildings, construction limits and preliminary right-of-way, relocations, retaining wall locations, noise wall locations and always include construction limits.
- Exhibit of preferred alternative
- Graphics for Key Issues – Provide graphics to aid in understanding of critical issues.

**Appendices** – The appendices should contain any important reference materials that are relevant to the identification of the preferred alternative that are not captured in other stand-alone documents. For example, capacity analyses completed for the AER that are not captured in a stand-alone report are included. Stand-alone reports shall be made available in the project file and are not included in the appendices. Those studies which heavily influenced the decision on the PA shall be uploaded to EnviroNet as supporting documentation for NEPA.
- Capacity Analyses
- Safety Analysis of Proposed Alternatives
- Preliminary Alignment and Profile, Cross Sections Cost Estimates
APPENDIX B: GUIDANCE ON APPENDICES AND TECHNICAL REPORTS

General:
- Provide a detailed list of appendices in the table of contents.
- Include a title sheet for each appendix. Voluminous appendices should include a separate table of contents on the cover sheet.
- Include page numbers for appendices. Consider using a prefix that is unique for each appendix (i.e. Page A-X for Appendix A).
- Include cross references to appendices in the main body of the document.
- Use the table below as a guide as to which data or studies to include in the FS or AER.

Where to include information in a Feasibility Study or Alternative Evaluation Report

<table>
<thead>
<tr>
<th>Supporting Data</th>
<th>FS/AER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Support in Text and Reference</td>
<td>Include in Appendix</td>
</tr>
<tr>
<td>Certified traffic</td>
<td>X</td>
</tr>
<tr>
<td>Traffic analyses HCS/Synchro/Vissim(^1)</td>
<td>X</td>
</tr>
<tr>
<td>Safety study</td>
<td>X</td>
</tr>
<tr>
<td>Safety analysis of alternatives (HSM)</td>
<td>X</td>
</tr>
<tr>
<td>Alternatives mapping</td>
<td>X</td>
</tr>
<tr>
<td>Evaluation matrix</td>
<td>X</td>
</tr>
<tr>
<td>Key issues mapping</td>
<td>X(^1)</td>
</tr>
<tr>
<td>Structure Type Study</td>
<td>X</td>
</tr>
<tr>
<td>Geotechnical reports</td>
<td>X</td>
</tr>
<tr>
<td>Utility information</td>
<td>X</td>
</tr>
<tr>
<td>Conceptual MOT or MOTAA(^3)</td>
<td>X</td>
</tr>
<tr>
<td>Cost estimates</td>
<td>X</td>
</tr>
<tr>
<td>Environmental resource reports(^4)</td>
<td>X</td>
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<tr>
<td>Preliminary plans</td>
<td>X</td>
</tr>
<tr>
<td>Photolog</td>
<td>X</td>
</tr>
<tr>
<td>Public involvement materials</td>
<td>X</td>
</tr>
</tbody>
</table>

Notes:
1. Other analysis software may be accepted. Consult with ODOT engineering staff. Typically vetted during project scoping.
2. May include simplified graphics in text. Full page exhibits could be included in appendices or in body.
3. Include in appendix if separate technical report not prepared.
4. Only discuss resources which influence the decision on the preferred alternative.
APPENDIX C: TIPS FOR PRESENTING DATA

Figures
- Simplify content to the minimum required to convey the message.
- Consider overlaying plan elements on aerial photographs.
- Make important elements stand out against the background.
- Label key aspects of alternatives and/or key issues described in the text.
- Include a descriptive title.
- Include a clear legend, north arrow and scale.
- Locate close to corresponding text and provide a clear cross reference.
- Include citations when appropriate.

Tables
- Limit the amount of information conveyed (avoid data dumps).
- Move complex tables to appendices.
- Incorporate colors and borders appropriately and consistently throughout the document.
- Include a descriptive title.
- Accompany with simple text that explains the key conclusions.
- Locate tables close to corresponding text and provide a clear cross reference.
- Provide citations when necessary.

Charts
- Consider using pie and bar charts in lieu of tables.
- Use charts to convey the relative magnitude of data (i.e. most common crash types or number of relocations for each alternative).
- Include a descriptive title.
- Include a clear legend and label data sets.
- Use color appropriately (data sets should be easy to distinguish).
- Assure the conclusions are evident with little text explanation required.
- Locate charts close to corresponding text and provide a clear cross reference.
- Provide citations when necessary.

Evaluation Matrices
- Include purpose and need elements, including Primary and Secondary Needs.
- Do not select an alternative based on a mathematical formula (i.e. don’t assign points).
- Consider using symbols or colors to illustrate differences between alternatives.
- Be quantitative where possible. (i.e. Alternative 1 impacts 16 utility poles. Alternative 2 impacts 2 utility poles.)
- The reasons for selecting the preferred alternative should be apparent when reviewing the data in the evaluation matrix.
## APPENDIX D: GUIDANCE FOR WRITING QUALITY AND STYLE

### Tips:
- Write clearly
- Draw conclusions, don’t hide behind analysis
- Be specific
- Define technical terms and acronyms
- Use active voice

#### Before:

It was recommended by the Steering Committee that Alternative 2 should be the preferred alternative.

#### After:

The Steering Committee recommended Alternative 2 as the preferred alternative.

#### Before:

Alternative A will not meet the project’s Primary Need. It corrects the sight distance problem. However, it could not improve level of service. So, Alternative A has been removed from further study.

#### After:

Alternative A failed to meet the project’s Primary Need. It corrected the sight distance problem. However, the intersections’ operations did not improve. So, the project team removed Alternative A from further study.

### Eliminate unnecessary words

#### Before:

In order to address the public’s concerns about the project, several elements were added to help pedestrians in the study area. The features that were added to the project included tree lawns, sidewalks, marked crosswalks, pedestrian lighting and benches.

#### After:

The project team added tree lawns, sidewalks, painted crosswalks, pedestrian lighting and benches to help pedestrians.

### Eliminate unnecessary sections

- The amount of text should reflect the amount of impact.
- Sample outlines are only guides. The project’s specific requirements ultimately determine content.
Use short, basic sentences

Before:

There will continue to be opportunities for public involvement and outreach while the project is under final design. ODOT will reach out to the Advisory Committee and ask if they are interested in sending a note to their members letting the individuals know the proposed meeting and outreach dates during final design. If the advisory committee agrees to help distribute information, ODOT will develop a letter that they can use.

After:

Public involvement will continue into the project's final design. ODOT will coordinate future outreach with the project Advisory Committee. As appropriate, the Advisory Committee will distribute meeting information to their constituencies.

Use bullets

Before:

The Preferred Alternative includes changes to local streets. Francis Avenue will be closed between E. 55th Street and E. 57th Street. Cul-de-sacs will be built on Berwick Road, Colfax Road, E. 73rd Street and Rawlings Avenue. Rawlings Avenue will also be closed between E. 75th Street and E. 79th Street. Lisbon Road will have a new cul-de-sac and a new connection with Grand Avenue near Evarts Road. Tennyson Road will be closed between Evarts Road and Buckeye Road.

After:

The preferred alternative also will 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; and
- **Tennyson Road** – closure between Evarts and Buckeye roads.

Incorporate white space onto the page

- In the margins
- Between sections
- Between paragraphs
- Between columns
- Around figures and tables

Make it visual

- Simplified illustrations such as simplified plans overlaid on aerial mapping
- Graphs
- Charts
- Tables
- Photographs with captions
As stated previously, refer to Appendix E of this Guidance and ODOT’s Preparing Reader Friendly Documents online training course for additional information and best practices for presenting data in a reader friendly format for all potential audiences.
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B. Basic layout with color accents  
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E. Complex full column layout

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SECTION 1 – DOCUMENT LAYOUT EXAMPLES

A. Basic, black and white layout
B. Basic layout with color accents
C. Full page color layout
D. Basic two-column layout
E. Complex full column layout
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 only: 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 Escort Drive. 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.
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 accomplish 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.
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.

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.
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 considerations.

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.

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.
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)
B. Key issue summary tables (levels of service, crash frequency)
C. Public involvement activity summary table
D. Formal comment and response summary table
E. Comment and response summary within document
F. Pie chart
G. Bar chart
H. Simplified alternative comparison figure
I. Simplified alternative layout figure
J. Alternative schematics
K. Key issue illustration
L. Typical section to illustrate key issue
M. Typical section rendering
N. Typical sections to compare alternatives
O. Before/after renderings
P. Study area mapping
Q. Alternative mapping – basic
R. Alternative mapping - complex
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

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Permanent Right of Way</th>
<th>Property Owned by City Land Bank</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>acres</td>
<td>acres</td>
</tr>
<tr>
<td>Alternative A</td>
<td>46.9</td>
<td>10.2</td>
</tr>
<tr>
<td>Alternative B</td>
<td>39.0</td>
<td>3.5</td>
</tr>
<tr>
<td>Alternative C</td>
<td>41.1</td>
<td>5.6</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Residential</th>
<th>Commercial</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Buildings</td>
<td>Units¹</td>
</tr>
<tr>
<td>Alternative A</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td>Alternative B</td>
<td>35</td>
<td>43</td>
</tr>
<tr>
<td>Alternative C</td>
<td>30</td>
<td>37</td>
</tr>
</tbody>
</table>

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.
4.1 TRAFFIC OPERATIONS

ODOT provided opening day (2016) and design year (2036) certified traffic plates for the 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

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Intersection</th>
<th>AM Peak LOS</th>
<th>PM Peak LOS</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-Build</td>
<td>US 42SB and SR-96 ramps (two-way stop)</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td></td>
<td>US 250 and US 42SB ramp/Bob Evans (two-way stop)</td>
<td>F</td>
<td>F</td>
</tr>
<tr>
<td></td>
<td>US 250 and US 42NB ramp (signalized)</td>
<td>C</td>
<td>F</td>
</tr>
<tr>
<td>Alternative 1</td>
<td>US 42 and US 250</td>
<td>C</td>
<td>C</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>US 42SB and SR-96 ramps (signalized)</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>US 250 and US 42SB ramp/Bob Evans (signalized)</td>
<td>B</td>
<td>C</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>US 42 and Quadrant Roadway</td>
<td>B</td>
<td>B</td>
</tr>
<tr>
<td></td>
<td>US 250 and Quadrant Roadway</td>
<td>B</td>
<td>C</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Crash Rate (Crashes Per Year)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No-Build†</td>
<td>18.7</td>
</tr>
<tr>
<td>Alternative 1</td>
<td>13.6</td>
</tr>
<tr>
<td>Alternative 2</td>
<td>12.2</td>
</tr>
<tr>
<td>Alternative 3</td>
<td>10.8</td>
</tr>
</tbody>
</table>

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

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

<table>
<thead>
<tr>
<th>DATE</th>
<th>LOCATION</th>
<th>TOPICS DISCUSSED</th>
</tr>
</thead>
<tbody>
<tr>
<td>May 19, 2005</td>
<td>NOACA Board Room 1299</td>
<td>• Project background and history</td>
</tr>
<tr>
<td></td>
<td>Superior Ave Cleveland, OH 44114</td>
<td>• Transportation problems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Project goals and alternatives</td>
</tr>
<tr>
<td>June 16, 2005</td>
<td>Quincy Place B1111 Quincy Ave., Ste. 100 Cleveland, OH 44104</td>
<td>• Existing conditions</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Planned developments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Alternatives evaluation process and criteria</td>
</tr>
<tr>
<td>Aug. 18, 2005</td>
<td>Quincy Place B1111 Quincy Ave., Ste. 100 Cleveland, OH 44104</td>
<td>• Results of alternatives evaluation</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Changes to alternatives</td>
</tr>
<tr>
<td>Sept. 22, 2005</td>
<td>Quincy Place B1111 Quincy Ave., Ste. 100 Cleveland, OH 44104</td>
<td>• Coordination of planned developments and alternatives, including bridge options at I-490/East 55th Street</td>
</tr>
<tr>
<td>Nov. 10, 2005</td>
<td>Quincy Place B1111 Quincy Ave., Ste. 100 Cleveland, OH 44104</td>
<td>• Alternatives evaluation results</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Draft recommendations for further study</td>
</tr>
<tr>
<td>May 15, 2009</td>
<td>Cleveland Plain Dealer 1801</td>
<td>• Reconvene steering committee</td>
</tr>
<tr>
<td></td>
<td>Superior Ave. East Cleveland, OH 44114</td>
<td>• Redefine committee role</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Overview of project status</td>
</tr>
<tr>
<td>Sept. 1, 2009</td>
<td>Greater Cleveland Partnership 100 Public Square Cleveland, OH 44113</td>
<td>• Overview of study process</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Project goals and objectives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Summary of data collected and alternatives</td>
</tr>
<tr>
<td>March 11, 2010</td>
<td>Karamu House 8111 Quincy Ave. Cleveland, OH 44104</td>
<td>• Alternatives</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Overview of public comments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Context sensitive solutions (CSS) workshop</td>
</tr>
<tr>
<td>Sept. 8, 2010</td>
<td>Cleveland Plain Dealer 1801</td>
<td>• Alternatives recommended for further study</td>
</tr>
<tr>
<td></td>
<td>Superior Ave. East Cleveland, OH 44114</td>
<td>• CSS workshop</td>
</tr>
<tr>
<td>July 7, 2011</td>
<td>Cleveland Plain Dealer 1801</td>
<td>• Recommended preferred alternative</td>
</tr>
<tr>
<td></td>
<td>Superior Ave. East Cleveland, OH 44114</td>
<td>• Introduction to city’s brownfield study</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Greater Cleveland Partnership’s (GCP) economic development efforts</td>
</tr>
<tr>
<td>Nov. 16, 2011</td>
<td>Greater Cleveland Partnership 1240 Huron Road East, #300 Cleveland, OH 44115</td>
<td>• Revisions to recommended preferred alternative</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Summary of October 2011 public meeting comments</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Update on the city’s brownfield study</td>
</tr>
<tr>
<td></td>
<td></td>
<td>• Results of GCP economic development study</td>
</tr>
<tr>
<td>Nov. 29, 2012</td>
<td>Greater Cleveland Partnership 1240 Huron Road East, #300 Cleveland, OH 44115</td>
<td>• Preferred alternative, including results of engineering and environmental studies</td>
</tr>
</tbody>
</table>
## Public Comment Summary and Responses

<table>
<thead>
<tr>
<th>ID</th>
<th>NAME</th>
<th>NO.</th>
<th>TOPIC</th>
<th>COMMENT</th>
<th>RESPONSE</th>
</tr>
</thead>
<tbody>
<tr>
<td>B-12</td>
<td>Beckwith II,</td>
<td>B-12-1</td>
<td>Quincy Avenue</td>
<td>What will be the alternative routes for traffic going across from Woodhill to 105th to Quincy?</td>
<td>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.)</td>
</tr>
<tr>
<td></td>
<td>Winston</td>
<td></td>
<td>Closure</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-13</td>
<td>Bonacci, Chuck</td>
<td>B-13-1</td>
<td>Existing</td>
<td>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.</td>
<td>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.)</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Roadways</td>
<td></td>
<td></td>
</tr>
<tr>
<td>B-13</td>
<td></td>
<td>B-13-2</td>
<td>Schedule</td>
<td>How long will this project take?</td>
<td>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.)</td>
</tr>
</tbody>
</table>

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**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
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 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
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](image)

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

<table>
<thead>
<tr>
<th>Neighborhood</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Buckeye-Shaker</td>
<td>43.1%</td>
</tr>
<tr>
<td>Central</td>
<td>26.5%</td>
</tr>
<tr>
<td>University Circle</td>
<td>39.3%</td>
</tr>
<tr>
<td>Fairfax</td>
<td>65.0%</td>
</tr>
<tr>
<td>Kinsman</td>
<td>42.9%</td>
</tr>
<tr>
<td>North Broadway</td>
<td>65.0%</td>
</tr>
</tbody>
</table>


- 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.
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 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 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 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 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
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
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.

3.2 Alternative 2

Alternative 2 changes the alignment of the Allen Avenue/Allenford Drive and Mill Street intersection 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.

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.

Figure 3.1: Alternative 1 Schematic

Figure 3.2: Alternative 2 Schematic
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

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...
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.

**Legend**
- Existing pavement
- Temporary pavement
- New pavement/sidewalk
- Pavement/sidewalk built in that phase

**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.

**Legend**
- Existing pavement
- Temporary pavement
- New pavement/sidewalk
- Pavement/sidewalk built in that phase
Figure 3-1: Alternative 1 Section Views

▼ East 55th Street Bridge (Looking East)

▼ Typical Boulevard at Side Street Intersection
### 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

**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.

### Alternative Comparison

<table>
<thead>
<tr>
<th>Alternative</th>
<th>Pros</th>
<th>Cons</th>
<th>Conclusion</th>
</tr>
</thead>
</table>
| 1 | “Balances” land impacts. | Relocates most utility poles.  
Requires three construction phases.  
Requires permanent property from owners on both sides.  
Requires the most amount of temporary pavement. | Not chosen due to utility impacts. |
| 2 | Avoids most utility poles.  
Provides sidewalk on both sides.  
Requires land from south side only. | Includes sidewalk right next to the road.  
Requires three construction phases.  
Requires moderate temporary pavement. | Not chosen due to construction phasing, temporary pavement and sidewalk placement. |
| 3 | 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. | Requires more land from the south side. | Selected due to shorter construction, minimal temporary pavement and tree lawns. |
4.8 Downtown Bridge Aesthetics

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.

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 comments 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.
Study Area Location Map

AREA OF DETAIL
Stark County, Ohio

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

NORTH

Mill Street Bridge
SFN 7631103

Bauhoff Park

Mill Street

Allen Avenue

Cleveland Avenue

Almashillia Creek

Esmont Park

Mill Street Bridge
SFN 7631103
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

Note: GIS data used to create this map are from the best sources available. Use of this map should be for planning purposes only.
Figure 4-15: Cleveland Opportunity Corridor Alternative 1 Plan / Map 6 of 10

Legend

Opportunity Corridor Alignment
- Preferred Alternative
- Pavement
- Bridge Deck
- Impacted Area
- Temporary Right-of-Way
- Permanent Right-of-Way
- Edge of Pavement

Study Area Structures
- Church
- Commercial
- Residential
- Impacted Structure
- Medical Facility/Hospital
- Traffic Signal
- Historic Structure
- Bridge Removal and Replacement with Pedestrian Bridge
- Section 4(f) Boundary
- Section 6(f) Boundary
- Potential Noise Barrier 50’ Long 13’ High
- Woodland Recreation Center / Bath House
- Nickle Plate Sidewalk
- Bridge Removal and Replacement with Pedestrian Bridge

Legend

Study Area Structures
- Church
- Commercial
- Residential
- Impacted Structure
- Medical Facility/Hospital
- Traffic Signal
- Historic Structure
- Bridge Removal and Replacement with Pedestrian Bridge

Kenneth L. Johnson (Woodland) Recreational Center
- Section 4(f)
- Section 6(f)

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
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

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
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</tr>
</thead>
<tbody>
<tr>
<td>No Build</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>$0</td>
</tr>
<tr>
<td>Alternative 1</td>
<td>*</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>$230</td>
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<tr>
<td>Add connection from SR 104 to I-70</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Alternative 2</td>
<td>*</td>
<td>*</td>
<td>○</td>
<td>○</td>
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<td>Add connection from SR 104 to I-70</td>
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<tr>
<td>Alternative 3</td>
<td>○</td>
<td>○</td>
<td>○</td>
<td>▲</td>
<td>○</td>
<td>○</td>
<td>▲</td>
<td>**</td>
</tr>
<tr>
<td>Reroute I-71 to I-670 &amp; SR 315</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>Alternative 4</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>*</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>$670</td>
</tr>
<tr>
<td>Add capacity &amp; improve performance I-70/I-71 overlap</td>
<td></td>
<td></td>
<td></td>
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<td></td>
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<td>Alternative 5</td>
<td>▲</td>
<td>○</td>
<td>○</td>
<td>*</td>
<td>▲</td>
<td>▲</td>
<td>▲</td>
<td>$1,565</td>
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<tr>
<td>Add ”Through Truck Only” lane</td>
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<td></td>
</tr>
<tr>
<td>Alternative 6</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>Improve traffic &amp; transit operations</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TDM, TSM and ITS Techniques</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
<tr>
<td>HOV</td>
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<td></td>
<td></td>
<td></td>
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<td>**</td>
</tr>
<tr>
<td>Transit</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>**</td>
</tr>
</tbody>
</table>

** Minor cost compared to other alternatives

---

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

- High positive impact
- High negative impact
- Similar impact
- Moderate positive impact
- Moderate negative impact
- Included in the preferred alternative
## Feasible Alternatives Comparison

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

### COST ESTIMATE*

|                | NA       | $222,000,000 | $289,000,000 | $231,000,000 |

*Includes Construction and Right-of-Way acquisition costs

Notes:
- Compares key features of each alternative
- Concise text descriptions

NB = Northbound  SB = Southbound  WB = Westbound
### Table 5.3: Alternative Comparison Matrix

<table>
<thead>
<tr>
<th></th>
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<th></th>
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<th></th>
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<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>No Build</td>
<td>○ ○ ○ ○</td>
<td>○ ○ ○ ○</td>
<td>○ ○</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>○ ○ ● ● ●</td>
<td>$0</td>
<td>○ ○ ○ ○</td>
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<tr>
<td></td>
<td>Leave the corridor entirely unchanged</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One-way Mound-Fulton Urban Corridors</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>$660</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td></td>
<td>One-way urban corridors along Mound &amp; Fulton and parallel to both sides of I-71 that collect traffic from existing downtown areas and distribute onto the highway.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One-Way Fulton-Livingston Urban Corridors</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>$675</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Way Urban Corridor – Boulevard</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>○ ○ ○ ○</td>
<td>$830</td>
<td>● ● ● ●</td>
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<tr>
<td></td>
<td>Add lanes to the freeway and create two-way urban corridor boulevard downtown along the Fulton &amp; Lester and decked over southbound and westbound freeway lanes.</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Two-Way Urban Corridor - Local Street System</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>○ ○ ○ ○</td>
<td>$720</td>
<td>● ● ● ●</td>
</tr>
<tr>
<td></td>
<td>Add lanes to the freeway and create two-way urban corridor downtown along Fulton and Lester.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Urbanized Freeway System</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
<td>● ● ● ●</td>
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<td>○ ○ ○ ○</td>
<td>$585</td>
<td>● ● ● ●</td>
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<tr>
<td></td>
<td>Improve both the interchanges (SR 315 &amp; 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.</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Legend
- ● Good
- ◐ Satisfactory
- ○ Poor
- ○○ Fair
- ○○○ Unsatisfactory
# Alternative Comparison Matrix

<table>
<thead>
<tr>
<th>Key Issue</th>
<th>No-Build</th>
<th>Alternative 1 At-Grade Signalized Intersection</th>
<th>Alternative 2 Quadrant Roadway</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Purpose and Need</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intersection LOS (2036 PM peak hour)</td>
<td>Unacceptable</td>
<td>Acceptable</td>
<td>Acceptable</td>
</tr>
<tr>
<td>US 250 / US 42S ramp</td>
<td>Unsignalized - LOS F</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>US 42 / US 250/SR 96 (SW) ramp</td>
<td>N/A</td>
<td></td>
<td>N/A</td>
</tr>
<tr>
<td>US 42 / US 250 (NE) ramp</td>
<td>N/A</td>
<td></td>
<td>Signalized - LOS B</td>
</tr>
<tr>
<td><strong>Delay to through movements (2036 PM peak hour)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
| 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 |
<table>
<thead>
<tr>
<th>Key Issue</th>
<th>No-Build</th>
<th>Alternative 1 At-Grade Signalized Intersection</th>
<th>Alternative 2 Quadrant Roadway</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Environmental Resources</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Noise impacts</td>
<td>N/A</td>
<td>Possible</td>
<td>Possible</td>
</tr>
<tr>
<td>Wetland impacts</td>
<td>N/A</td>
<td>~0.2 ac</td>
<td>~0.2 ac</td>
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<tr>
<td>Stream impacts</td>
<td>N/A</td>
<td>55 feet</td>
<td>No</td>
</tr>
<tr>
<td>Historic structure impacts</td>
<td>N/A</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Archeological impacts</td>
<td>N/A</td>
<td>Potential</td>
<td>Potential</td>
</tr>
<tr>
<td>Hazardous materials site impacts</td>
<td>N/A</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td><strong>Geometric Features</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Design exceptions required</td>
<td>N/A</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Davis Road impacts</td>
<td>N/A</td>
<td>Closed at SR 96/US 250</td>
<td>Full access maintained</td>
</tr>
<tr>
<td>Other design issues</td>
<td>None</td>
<td>Break in US 42 L/A R/W</td>
<td>None identified</td>
</tr>
<tr>
<td><strong>Major Right of Way Impacts</strong></td>
<td></td>
<td>Bob Evans parking</td>
<td>- Bob Evans parking</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>- Farmland</td>
</tr>
<tr>
<td><strong>Construction Issues</strong></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance of traffic on US 42</td>
<td>None</td>
<td>Close and detour US 42 and ramps</td>
<td>Close and detour US 42 and ramps</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Short term closures/detours</td>
<td>- Short term closures/detours</td>
</tr>
<tr>
<td></td>
<td></td>
<td>- Multi-phase, part-width construction</td>
<td>- Multi-phase, part-width</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>construction</td>
</tr>
<tr>
<td>Maintenance of traffic on SR 96/US 250</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Maintenance of traffic on SR 96/US 250</td>
<td>None</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Potential Major Utility Issues</strong></td>
<td>None</td>
<td>Transmission line impacts</td>
<td>Transmission line impacts</td>
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</tbody>
</table>
# Alternative Comparison Matrix

<table>
<thead>
<tr>
<th>Key Issue</th>
<th>No-Build</th>
<th>Alternative 1</th>
<th>Alternative 2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>At-Grade Signalized Intersection</td>
<td>Quadrant Roadway</td>
</tr>
<tr>
<td>Planning-Level Cost (^{2,3})</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
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<tr>
<td>Part 1 (Bridge Replacement)</td>
<td></td>
<td>N/A</td>
<td>N/A</td>
</tr>
<tr>
<td>Part 2 (Ramps and SR 96/US 250)</td>
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<td>N/A</td>
<td>$0</td>
</tr>
<tr>
<td>Total Project Cost</td>
<td></td>
<td>N/A</td>
<td>$8.7 M</td>
</tr>
<tr>
<td>Conclusion</td>
<td>Dismissed</td>
<td>Preferred</td>
<td>Dismissed</td>
</tr>
</tbody>
</table>

\(^1\)Notes:
2. Estimates are shown in 2015 dollars.
3. Estimates do not include right of way, utility relocation.

\(^2\)Quantitative summary of key issues.
\(^3\)Readable text size.
\(^4\)Most appropriate in an appendix.
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
   • Purpose and Need - Example 2
   • Purpose and Need - Example 3

C. Alternatives Considered
   • Alternatives Considered - Example 1
   • Alternatives Considered - Example 2
   • Alternatives Considered - Example 3

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
   • Comparison of Alternatives - Example 2
   • Comparison of Alternatives - Example 3
   • Comparison of Alternatives - Example 4

F. Conclusion
   • Conclusion - Example 1
   • Conclusion - Example 2
   • Conclusion - Example 3

G. Next Steps
   • Next Steps - Example 1
   • Next Steps - Example 2
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.
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.