



## EXECUTIVE SUMMARY

This Conceptual Alternative Study (CAS) Report was prepared for the HAM-75-2.30 Project (I-75 Mill Creek Expressway study) as part of Step 5 of the Ohio Department of Transportation's (ODOT's), Project Development Process (PDP) for Major Projects.

The CAS includes a summary of the previous documents submitted and approved by ODOT. They include the Draft Purpose and Need, Existing and Future Conditions Report, Red Flag Summary and Planning Study Report Summary, whose contents were utilized in the determination of the conceptual alternatives. An update of the Public Involvement Plan is also included, listing relevant project meetings, mobile display locations and public comments received to date.

The subsequent section, Development of Conceptual Alternatives, summarizes the methodology utilized to develop the Conceptual Alternatives in Step 5 and provides a detailed description of each.

The conceptual alternatives were evaluated based on design issues and preliminary environmental evaluations. The results of these analyses are summarized *by impact/issue* in the Evaluation of Conceptual Alternatives.

These analyses are summarized *by alternative* in the Comparison Matrices and Conclusions section. Based upon the provided evaluations, alternatives will be recommended for advancement. The Feasible Alternatives that are chosen for further work will be analyzed in greater detail in Step 6 of the PDP, with additional environmental investigations and coordination.

Important conclusions from the Step 5 are summarized below.

The mainline alternatives to be carried forward to Step 6 include:

- I75-A: 4-Lane Continuity Alternative, which provides an additional through lane north of the I-74 interchange northbound and southbound, and
- I75-D: 5/4-Lane Alternative, which provides one additional through lane throughout the project limits, for four lanes in each direction north of I-74 and five lanes in each direction south of I-74.

Neither of these alternatives will achieve Level of Service D throughout the project limits. However, the consideration of additional lanes was eliminated based upon public input from the North South Transportation Initiative (NSTI), impacts and costs. More information on this topic is provided in a technical memorandum in Appendix 4.



Interchange alternatives carried forward from the Planning Study Report were evaluated in greater detail. The majority are recommended for continued consideration in Step 6 of the PDP, with the following noted exceptions, which were eliminated due to concerns with operational or geometric feasibility.

- The HOP-B: Offset Roundabout Diamond Interchange was replaced with the HOP-B1 Offset Diamond Interchange which utilizes a signalized intersection in lieu of a roundabout.
- The I74-A: Fully Directional Interchange with Local Access Maintained will require additional analysis during Step 6 due to vertical infeasibility of the southbound I-75 to Colerain ramp.



*NOR-A: Modified Interchange with Additional Ramp Lanes*.....38  
*TOW-NB: No Build Plus Minor Improvements* ..... 38  
*TOW-A: Close Ramps* ..... 38  
*PAD-NB: No Build Plus Minor Improvements* ..... 38  
*PAD-A: Low Impact / Spot Improvements* ..... 38  
*PAD-B: Double Roundabout Diamond Interchange (DRDI)*..... 38

EVALUATION OF CONCEPTUAL ALTERNATIVES ..... 39  
 Design Issues ..... 39  
   *Mainline Alternatives* ..... 39  
   *Interchange Alternatives* ..... 50  
 Traffic Analysis ..... 62  
 Social and Community Impacts..... 68  
 Environmental Justice..... 73  
 Parks and Recreation (Section 4(f))..... 75  
 Property Impacts and Relocations ..... 76  
 Cultural Resources..... 78  
 Ecological Resources..... 79  
 Hazardous Materials ..... 81  
 Noise Quality ..... 83  
 Air Quality ..... 83  
 Geotechnical Issues ..... 84  
 Rail Issues ..... 85  
 Transit Issues ..... 87  
 Utility Issues ..... 88  
 Cost..... 90  
 Public Input..... 91

COMPARISON MATRICES AND CONCLUSIONS ..... 95

EXHIBIT A: ODOT’S PDP 14-STEP ROADMAP  
 EXHIBITS A-0 TO A-21: EXHIBITS OF ALTERNATIVES  
 EXHIBITS B-1 AND B-2: USGS TOPOGRAPHIC MAPS  
 EXHIBITS C-1 TO C-5: ECOLOGICAL RESOURCES  
 EXHIBITS D-1 TO D-5: SOIL MAPS  
 EXHIBITS E-1 AND E-2: HAZARDOUS WASTE SITES  
 EXHIBIT F: POTENTIAL LOCATION FOR NOISE ABATEMENT

APPENDIX 1: NEWSLETTERS  
 APPENDIX 2: PUBLIC COMMENTS  
 APPENDIX 3: TRAFFIC PLATES  
 APPENDIX 4: TECHNICAL MEMORANDA

ON CD:  
 APPENDIX 5: HIGHWAY CAPACITY SOFTWARE (HCS) OUTPUT  
 APPENDIX 6: COST ESTIMATING OUTPUT  
 APPENDIX 7: PREVIOUS REPORTS



# TABLE OF CONTENTS

EXECUTIVE SUMMARY.....i

TABLE OF CONTENTS..... iii

INTRODUCTION..... 1

    Project History..... 1

    I-75 Projects and Adjacent Studies..... 3

    Study Area and Logical Termini ..... 4

    OKI’s 2030 Transportation Plan..... 11

SUMMARY OF PREVIOUS REPORTS ..... 12

    Public Involvement Plan..... 12

    Draft Purpose and Need..... 15

    Existing and Future Conditions Report ..... 17

    Red Flag Summary ..... 17

    Planning Study Report Summary ..... 18

DEVELOPMENT OF CONCEPTUAL ALTERNATIVES..... 22

    Methodology..... 22

*Conceptual Design Designations* ..... 24

*Design Criteria*..... 25

*Consideration of Design Exceptions* ..... 27

*Post Construction Stormwater Best Management Practices Threshold Determination* ..... 28

    Description of Mainline Alternatives ..... 29

*I75-NB: No-Build Plus Minor Improvements*..... 29

*I75-A: 4-Lane Continuity with Auxiliary Lanes* ..... 29

*I75-B: 5-Lane Continuity* ..... 32

*I75-C: 4-Lane Continuity with Elevated Express Lanes* ..... 34

*I75-D: 5/4-Lane*..... 34

    Description of Interchange Alternatives ..... 35

*HOP-NB: No-Build Plus Minor Improvements*..... 35

*HOP-A: Tight Urban Diamond Interchange (TUDI)*..... 35

*HOP-B: Offset Roundabout Diamond Interchange*..... 35

*HOP-B1: Offset Diamond Interchange* ..... 36

*I74-NB: No Build plus Minor Improvements* ..... 36

*I74-A: Fully Directional Interchange with Local Access Maintained* ..... 36

*I74-B: Fully Directional Interchange with No Local Access* ..... 36

*COL-NB: No Build plus Minor Improvements* ..... 36

*COL-A: Low Impact Improvement with Full Movements* ..... 36

*COL-A1: Low Impact Improvement with Full Movements* ..... 37

*COL-B: Double Roundabout Diamond Interchange (DRDI)*..... 37

*COL-B1: Double Roundabout Diamond Interchange (DRDI)*..... 37

*MIT-NB: No Build plus Minor Improvements* ..... 37

*MIT-A: Tight Urban Diamond Interchange (TUDI)* ..... 37

*NOR-NB: No Build Plus Minor Improvements* ..... 38



## INTRODUCTION

The purpose of the Conceptual Alternatives Study (CAS) is to develop and evaluate alternatives that avoid or minimize impacts to design and environmental red flag areas within the study area during Step 5 of the Ohio Department of Transportation's (ODOT's) 14-Step Project Development Process (PDP) for Major Projects. (For reference, a graphic of this process has been included in Exhibit A.) The CAS is the combined design and environmental document that refines and analyzes the transportation improvements selected for further study in Step 4. This report is based on the information provided in the Planning Study Report and includes the information developed throughout Step 5.

By Step 5, the design team has developed and evaluated horizontal alignments for the I-75 mainline and several interchange concepts. At this point in the Project Development Process, the design of concepts and evaluation of their potential impacts are based upon: topographic mapping from aerial photography by ODOT, property information from CAGIS, previous geotechnical evaluations, information provided by major utilities, and information on social, economic and environmental resources available from secondary sources. At this stage, field studies are limited to traffic analysis, ecological survey, Environmental Site Assessment screening, Phase I History/Architecture evaluation, and field reviews as needed by planners and engineers to understand existing conditions.

This report does not reflect final design details nor complete environmental studies, coordination or mitigation. It is the first major submission for early consideration of these issues, which will be expanded upon in future steps of the process.

## Project History

In 2000, the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) and the Miami Valley Regional Planning Commission (MVRPC) cooperated on a regional multi-modal transportation plan and Major Investment Study named the North South Transportation Initiative (NSTI). The primary focus of the NSTI was to determine how to improve the safety, efficiency and reliability of transportation networks within Southwest Ohio, Northern Kentucky and Southeast Indiana. Analysis of the existing and future travel corridors was combined with input obtained from stakeholders and the public. As a result, several projects were established to address the original focus of the NSTI. One of the most important corridors established by the public and stakeholders was Interstate 75. The I-75 Mill Creek Expressway study is intended to build upon this major investment study and refine the recommendations within this portion of the I-75 corridor.

The NSTI's original preferred program of projects was divided into three classifications: Corridor



Capacity Alternatives, Systems Modification Alternatives and Access Modification Alternatives. Listed below are the NSTI projects that are directly related to the I-75 Mill Creek Expressway study.

**Corridor Capacity – 4-lane Continuity with Auxiliary Lanes.** The NSTI used information from previous travel demand model runs, including Average Daily Travel (ADT), per-lane capacity and number of lanes, to create a planning-level study to determine the approximate number of through lanes needed on the interstate mainline. At minimum, this alternative would provide 4-lane continuity along the I-75 mainline with possible additional lanes should they be warranted. Within the I-75 Mill Creek Expressway study area, this applies north of the I-74 interchange to the northern extents of the study area (mile marker 10.10, north of the Paddock Road Interchange).

The NSTI study determined that the I-75 mainline from I-74 to SR 126 Ronald Reagan Cross County Highway (located within the HAM-75-10.10 Thru the Valley Project) would need at least 6 lanes to receive a level of service (LOS) D. However, the feasibility of additional lanes (beyond 4-lanes) includes numerous factors beyond achieving acceptable level of service.

**System Modification - I-74/75 Interchange, Hopple Street Interchange, Mitchell Interchange and Local improvements.** This alternative recommended improvements to the I-74 and I-75 interchange along with the nearest southern interchange, Hopple Street, and the nearest northern interchange, Mitchell Avenue. The project was adopted as the number one priority system modification in the entire region and appears in OKI's 2030 Transportation Plan (# 636).

**Access Modifications.** The final element of the NSTI was the evaluation of access points along the interstate mainlines. Based upon identified need and possible funding sources, the modifications were classified into three categories.

- Category I Project: A high priority project to be completed in 0 to 15 years.
- Category II Project: A medium priority project to be completed in 15 to 25 years.
- Category III Project: A low priority project to be completed beyond a 25-year threshold.

The following access modification projects, along with their categorization, are within the I-75 Mill Creek Expressway study area:

Location	Category	Identification Location	Dollars (millions)
Norwood Lateral Interchange	Category I	OKI's 2030 Transportation Plan (#635)	\$18.1
Towne Street Interchange	Category I	OKI's 2030 Transportation Plan (#633)	\$12.6
Paddock Road Interchange	Category I	Not specifically identified, but included with OKI's 2030 Transportation Plan (#639)	Not Listed
Western Hills Viaduct	Category II	OKI's 2030 Transportation Plan (#698)	\$13.3

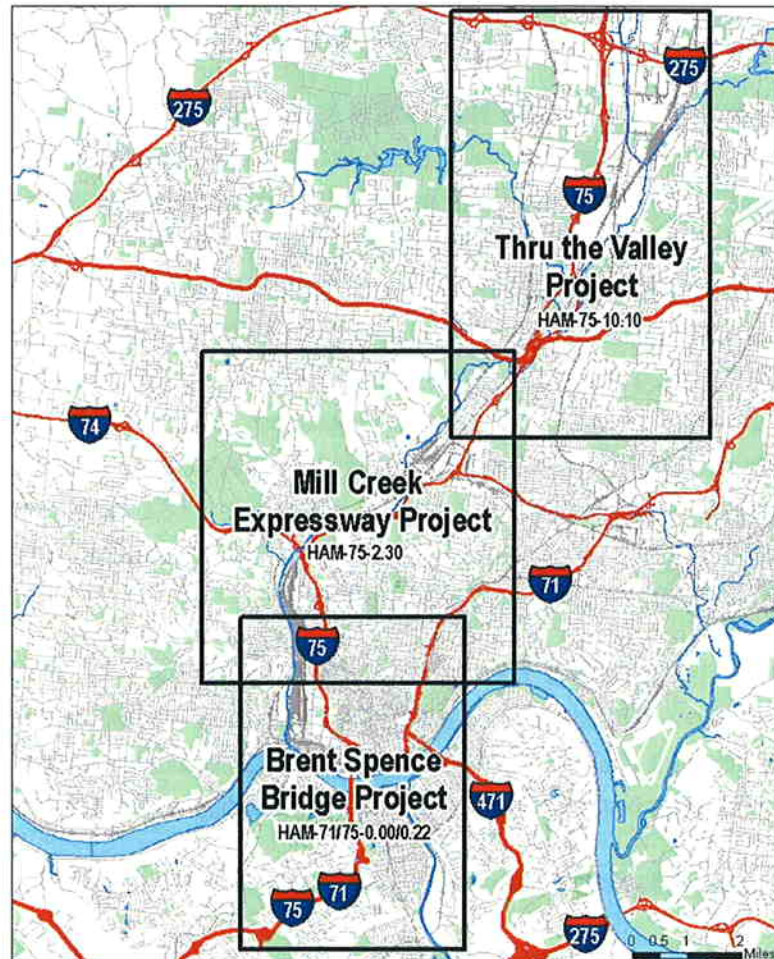
Source: North South Transportation Initiative (NSTI), 2000.



## I-75 Projects and Adjacent Studies

This project serves as the link between two additional I-75 studies within Hamilton County, shown on the graphic below. To the north, the **Thru the Valley** project involves the evaluation of I-75 from Paddock Road (on the south) to I-275 (on the north). To the south, the **Brent Spence Bridge Corridor** project involves a study of the replacement or rehabilitation of the functionally obsolete bridge that carries both I-75 and I-71 over the Ohio River connecting Ohio and Kentucky. The study area for the Brent Spence Corridor begins at the Western Hills Viaduct and continues to the Kyle's Lane Interchange in Northern Kentucky.

Sharing the eastern boundary of the I-75 Mill Creek Expressway project is the **Uptown Transportation Study** which is examining the transportation infrastructure within the Cincinnati neighborhoods of Avondale, Clifton, Clifton Heights, Corryville, East Walnut Hills, Evanston, Fairview/University Heights, Mt. Auburn, North Avondale, and Walnut Hills. The Uptown area is home to institutions such as the University of Cincinnati, Cincinnati Zoo and Botanical Garden, U.S. Environmental Protection Agency, Children's Hospital, VA Hospital and the Tri-Health and Health Alliance hospitals. A major component of the Uptown Transportation Study is the access to interstate highways bordering the Uptown area, including I-75.





## Study Area and Logical Termini

As part of the North South Transportation Initiative (NSTI), capacity improvements were recommended for the I-75 corridor through Hamilton County from the Brent Spence Bridge on the south, where I-75 crosses into Kentucky, to I-275 on the north. The NSTI was a planning study conducted by the Ohio-Kentucky-Indiana Regional Council of Governments (OKI) that evaluated overall transportation needs at a broad level and considered substantial public input.

ODOT also has recognized the need for capacity, access, and safety improvements on the I-75 corridor. ODOT's Highway Safety Program and the Congestion and Safety Initiative both identified major portions of the I-75 corridor for study to address capacity issues and high accident rates.

Improvements to the I-75 corridor and its interchanges would be extremely expensive and unlikely to be pursued in entirety within the typical planning horizon of twenty years. According to the OKI Travel Demand Model, of the roughly 160,000 vehicles per day utilizing I-75 in Hamilton County, only about 25,000 (16%) are truly through-trips, with both the origin and destination north of I-275 or south of the Brent Spence Bridge. Therefore, ODOT believes that benefits may be provided to the majority of motorists even if only portions of the corridor are improved at any given time. In other terms, well-defined projects on I-75 within Hamilton County would have independent utility even if the entire corridor were not improved. The NSTI planning study considered the corridor only at a broad level, which did not allow for any detailed examination of needs or the impacts or benefits of any proposed solutions. Therefore, ODOT desires to consider the I-75 corridor in several specific, more detailed studies in order to develop a proposed program of projects for implementation over a span of many years.

ODOT has identified three specific projects along the I-75 corridor that will be manageable for evaluation of needs and detailed consideration of alternative solutions, yet have logical termini, independent utility and are lengthy enough to consider environmental effects on a broad scale. These are shown on the graphic of adjacent studies on the previous page.

In order to illustrate these issues, the following summary for each project will demonstrate:

- The end points are at meaningful locations in the roadway network; and
- The project limits will be several miles in length through areas that have common environmental and social concerns, allowing for a meaningful examination of impacts.





Since the I-75 Mill Creek Expressway project is in the middle, this discussion of logical termini provides information on all three projects. Please note that the three projects described below are anticipated to be used for planning and environmental approvals. The improvements recommended by each of the three studies most likely will be further subdivided for design and construction according to availability of funding and maintenance of traffic needs.

***Brent Spence Bridge Corridor (HAM-71/75-0.00/0.22, PID 75119)***

The KYTC and ODOT are jointly planning for the replacement or widening of the Brent Spence Bridge, which conveys I-75 over the Ohio River between Kentucky and Ohio. The southern terminus for the Brent Spence Bridge Corridor project (BSB) was identified in coordination with the KYTC based upon the needed lanes over the bridge as well as plans for improvements to I-75 in Kentucky. The southern terminus is expected to be the 12<sup>th</sup> Street Exit in Covington. Therefore, the study area extends to the next interchange at Kyle's Lane.

The northern terminus of this project is the I-75 interchange with Western Hills Viaduct. Western Hills Viaduct is the first interchange north of the downtown area where connectivity is provided to a primary east-west arterial. South of this interchange, all of the connections are provided to local streets or to arterials that connect into the downtown area.

This project is approximately 2.5 miles in length through Hamilton County, Ohio. This portion of I-75 traverses the urban core of Cincinnati, ultimately joining with I-71 before crossing the Ohio River via the Brent Spence Bridge. This area is typical of a downtown freeway, with numerous closely spaced ramps. Connections are made to US 50, 5<sup>th</sup> Street, 6<sup>th</sup> Street, 7<sup>th</sup> and 8<sup>th</sup> Streets, 9<sup>th</sup> Street, Freeman Avenue, Ezzard Charles Drive, and Findlay Street, all within less than two miles.

This area is central city in character, with buildings located in close proximity to the right-of-way among a maze of ramp connections. According to 2000 census data, this area possesses a much higher population density than areas to the north, has more persons below poverty level, and more households with no vehicle available. These are factors that will be important in development of alternatives and consideration of impacts that are unique compared to adjacent sections.