

Chapter Contents

| | | |
|------------|---|----------|
| 7.0 | EVALUATION OF ALTERNATIVES..... | 1 |
| 7.1 | EVALUATION METHODOLOGY | 1 |
| 7.1.1 | Project Goals and Objectives | 4 |
| 7.1.2 | Evaluation Measures | 5 |
| 7.2 | EVALUATION AGAINST THE GOALS AND OBJECTIVES OF THE PROJECT | 8 |
| 7.2.1 | Goal 1 – Improve Corridor mobility by providing a balanced transportation system to efficiently and effectively move people and goods..... | 9 |
| 7.2.2 | Goal 2 - Provide better access to downtown Cincinnati, Covington, and the central riverfronts..... | 11 |
| 7.2.3 | Goal 3 - Provide a higher level of mobility to people who rely on public transportation..... | 14 |
| 7.2.4 | Goal 4 - Develop a system that meets changing urban-suburban development patterns and travel behavior..... | 16 |
| 7.2.5 | Goal 5 - Provide better access from the central city to the emerging suburban employment centers..... | 17 |
| 7.2.6 | Goal 6 - Support economic development investments and opportunities with transportation infrastructure..... | 19 |
| 7.2.7 | Goal 7 - Develop a transportation system that enhances the physical and social environment of the Greater Cincinnati/ Northern Kentucky region..... | 21 |
| 7.2.8 | Goal 8 - Improve air quality..... | 25 |
| 7.3 | EQUITY CONSIDERATION..... | 25 |
| 7.3.1 | Environmental Justice Conclusions..... | 25 |
| 7.4 | SECTION 5309 NEW STARTS CRITERIA | 27 |
| 7.4.1 | Purpose | 27 |
| 7.4.2 | Methodology..... | 28 |
| 7.4.3 | Project Justification | 28 |
| 7.4.3 | New Starts Criteria Submittal for the I-71 Corridor LRT Project | 29 |
| 7.5 | FINANCIAL ANALYSIS..... | 30 |
| 7.5.1 | Overview of Financial Planning Process and Structure | 30 |
| 7.5.2 | Analysis Structure | 30 |
| 7.5.3 | Sources and Uses of Funds Analysis | 32 |
| 7.5.4 | Risks and Uncertainties | 33 |

List of Tables

| | | |
|--------------|---|----|
| Table 7.1.1: | Comparison of Alternatives Against the Project Goals and Objectives..... | 2 |
| Table 7.2.1: | Station Area Development Potential | 20 |
| Table 7.2.2: | Comparison of Alternatives Against Quality of Life and Livability Issues..... | 22 |
| Table 7.2.3: | Comparison of Alternatives Against Physical, Social and Environmental Issues | 24 |
| Table 7.4.1: | 2001 New Starts Quantitative Measures Summary | 29 |
| Table 7.5.1: | Summary of Total Capital Costs (Estimated in millions of 2001 dollars) | 32 |
| Table 7.5.2: | Summary of Annual Gross Operating and Maintenance Costs* (Estimated in millions of 2001 dollars)..... | 32 |

7.0 EVALUATION OF ALTERNATIVES

This chapter presents the results of the evaluation conducted for each of the alternatives and design options in the Interstate-71 (I-71) Corridor Light Rail Transit (LRT) Project. The purpose of the evaluation process is to bring together the salient facts, both qualitative and quantitative, for each alternative so that their benefits, costs and environmental consequences can be evaluated against the stated goals for the project as set forth in Chapter 1.0, Purpose and Need. The intent of this comparative analysis is to facilitate the decision-making process for the I-71 Corridor for the Oversight Committee, in consultation with the Ohio-Kentucky-Indiana Regional Council of Governments, Southwest Ohio Regional Transit Authority (SORTA) and the Transit Authority Northern Kentucky (TANK), the City of Cincinnati, public officials, interested residents, institutions, businesses and other organizations.

This chapter also summarizes the project performance against the Federal Transit Administration (FTA) Section 5309 New Starts Criteria, the Environmental Justice implications of the project alternatives and the proposed financial plan for the project.

7.1 EVALUATION METHODOLOGY

This section identifies the goals, objectives and evaluation measures that were used to evaluate the project alternatives and design options. The evaluation measures address each of the goals and objectives that were established during the August 1998 major investment study, *I-71 Corridor Transportation Study*. These measures were also identified and reviewed by OKI and the I-71 Corridor Oversight Committee. They were further refined during the public participation process.

An overall qualitative assessment was performed to determine the degree to which the alternatives under consideration support each of the goals and objectives of the I-71 Corridor LRT Project. Three degrees of support – “strongly supports”, “supports” and “somewhat supports” - were used to summarize the performance of the alternatives relative to these goals and objectives. The fourth assessment criterion – “does not support” – was used to indicate that the alternative is neutral or has a negative performance. The results are summarized in Table 7.1.1: Comparison of Alternatives Against the Project Goals and Objectives. Table 7.1.1 also provides an overall performance summary for each alternative considered, which is simply an unweighted average of the qualitative ratings for each goal.

The following symbols were applied to each evaluation measure:

Symbol Definition

-  The Alternative strongly supports the objective
-  The Alternative supports the objective
-  The Alternative somewhat supports the objective
- X** The Alternative does not support the objective

Table 7.1.1: Comparison of Alternatives -- Project Goals and Objectives

| Alternatives | | | | | | |
|--|----------------------|-----------------|---------------------|---------------------|---------------------|---------------------|
| Goals and Objectives | No-Build Alternative | TSM Alternative | Build Alternative 1 | Build Alternative 2 | Build Alternative 3 | Build Alternative 4 |
| Goal 1 – Improve Corridor mobility by providing a balanced transportation system to efficiently and effectively move people and goods | | | | | | |
| Objective A – Maximize efficiency and cost-effectiveness | ◐ | ◐ | ● | ● | ● | ● |
| Objective B – Minimize dependence on single-occupant vehicles | X | ○ | ● | ● | ● | ● |
| Goal 2 - Provide better access to downtown Cincinnati, Covington, and the central riverfronts | | | | | | |
| Objective A – Maximize access to major activity centers | X | ○ | ◐ | ◐ | ● | ● |
| Objective B – Support existing community investments with transportation alternatives | X | ○ | ◐ | ◐ | ◐ | ● |
| Goal 3 - Provide a higher level of mobility to people who rely on public transportation | | | | | | |
| Objective A – Enhance public transportation system connections to growing suburban communities | X | ○ | ● | ● | ● | ● |
| Objective B – Provide transit centers to enhance regional mobility and attract new riders | X | ○ | ● | ● | ● | ● |
| Goal 4 - Develop a system that meets changing urban-suburban development patterns and travel behavior | | | | | | |
| Objective A – Maximize “reverse commute” capabilities to new suburban employment centers | X | ○ | ◐ | ◐ | ◐ | ◐ |
| Objective B – Expand transit service to new development markets | X | ○ | ● | ● | ● | ● |
| Goal 5 - Provide better access from the central city to the emerging suburban employment centers | | | | | | |
| Objective A – Maximize transit service to transit-dependent, low-income and minority populations | X | ○ | ● | ● | ● | ● |
| Objective B – Minimize travel time between urban and | X | ○ | ● | ● | ● | ● |

Table 7.1.1: Comparison of Alternatives -- Project Goals and Objectives

| Alternatives | | | | | | |
|---|----------------------|-----------------|---------------------|---------------------|---------------------|---------------------|
| Goals and Objectives | No-Build Alternative | TSM Alternative | Build Alternative 1 | Build Alternative 2 | Build Alternative 3 | Build Alternative 4 |
| suburban destinations | | | | | | |
| Goal 6 - Support economic development investments and opportunities with transportation infrastructure | | | | | | |
| Objective A –Support local and regional economic development objectives and planned investments | X | ○ | ● | ● | ● | ● |
| Objective B – Foster access to riverfront attractions | X | ○ | ● | ● | ● | ● |
| Goal 7 - Develop a transportation system that enhances the physical and social environment of the Greater Cincinnati/ Northern Kentucky region | | | | | | |
| Objective A – Enhance the quality of life and livability within the region (Table 7.2.2) | X | ◐ | ● | ● | ● | ● |
| Objective B – Minimize adverse physical, social and environmental impacts (Table 7.2.3) | ◐ | ◐ | ◐ | ◐ | ◐ | ◐ |
| Goal 8 - Improve air quality | X | ○ | ● | ● | ● | ● |
| Overall Performance Rating | X | ○ | ● | ● | ● | ● |

7.1.1 PROJECT GOALS AND OBJECTIVES

In response to the transportation needs identified for the I-71 Corridor and the region, the following eight project goals for multi-modal transportation improvements were identified and adopted by the stakeholders as part of the *I-71 Corridor Transportation Study* and refined through the Environmental Impact Statement (EIS) scoping process. The eight goals are subdivided into the general criteria of: transportation and mobility; economic opportunity and investment; and communities and environment. Specific objectives were identified for each of the goals, as described below.

Transportation and Mobility

- Goal 1 - Improve Corridor mobility by providing a balanced transportation system to efficiently and effectively move people and goods.
 - Objective A – Maximize efficiency and cost-effectiveness.
 - Objective B – Minimize dependence on single-occupant vehicles.
- Goal 2 - Provide better access to downtown Cincinnati, Covington, and the central riverfronts.
 - Objective A – Maximize access to major activity centers.
 - Objective B – Support existing community investments with transportation alternatives.
- Goal 3 - Provide a higher level of mobility to people who rely on public transportation.
 - Objective A – Enhance public transportation system connections to growing suburban communities.
 - Objective B – Provide transit centers to enhance regional mobility and attract new riders.

Economic Opportunity and Investment

- Goal 4 - Develop a system that meets changing urban-suburban development patterns and travel behavior.
 - Objective A – Maximize “reverse commute” capabilities to new suburban employment centers.
 - Objective B – Expand transit service to new development markets.
- Goal 5 - Provide better access from the central city to the emerging suburban employment centers.
 - Objective A – Maximize transit service to transit-dependent, low-income and minority populations.
 - Objective B – Minimize travel time between urban and suburban destinations.
- Goal 6 - Support economic development investments and opportunities with transportation infrastructure.
 - Objective A – Support local and regional economic development objectives and planned investments.
 - Objective B – Foster access to revitalized riverfront attractions.

Communities and Environment

- Goal 7 - Develop a transportation system that enhances the physical and social environment of the Greater Cincinnati/ Northern Kentucky region.
 - Objective A – Enhance the quality of life and livability within the region.
 - Objective B – Minimize adverse physical, social and environmental impacts.
- Goal 8 - Improve air quality.

7.1.2 EVALUATION MEASURES

Specific evaluation measures were developed to assess the effectiveness of the alternatives in satisfying the project goals and objectives. All of the measures were used to compare the No-Build, TSM and four build alternatives, as applicable.

These are the specific evaluation measures that apply to each of the project goals and objectives.

Transportation and Mobility

- Goal 1 - Improve Corridor mobility by providing a balanced transportation system to efficiently and effectively move people and goods.
 - Objective A – Maximize efficiency and cost-effectiveness.
Evaluation Measures:
 - Total capital cost
 - Annual operating cost
 - Operating cost per transit rider
 - Objective B – Minimize dependence on single-occupant vehicles.
Evaluation Measures:
 - Reduction in daily auto trips
 - Reduction in daily vehicle miles of travel
- Goal 2 - Provide better access to downtown Cincinnati, Covington, and the central riverfronts.
 - Objective A – Maximize access to major activity centers
Evaluation Measures:
 - Employment centers served
 - Activity centers served
 - Objective B – Support existing community investments with transportation alternatives
Evaluation Measures:
 - Community facilities served
 - Major attractions served

- Goal 3 - Provide a higher level of mobility to people who rely on public transportation.
 - Objective A – Enhance public transportation system connections to growing suburban communities.
Evaluation Measures:
 - Services from CBD to suburban employment centers and suburb-to-suburb services
 - Consistency with local comprehensive plans
 - Objective B – Provide transit centers to enhance regional mobility and attract new riders
Evaluation Measures:
 - Number of new transit centers and park-and-ride facilities
 - Number of new transit riders from automobiles

Economic Opportunity and Investment

- Goal 4 - Develop a system that meets changing urban-suburban development patterns and travel behavior.
 - Objective A – Maximize “reverse commute” capabilities to new suburban employment centers.
Evaluation Measures:
 - Services from CBD to suburban employment centers
 - Intermodal connections
 - Objective B – Expand transit service to new development markets
Evaluation Measures:
 - Transit services added to new suburban communities
 - Transit ridership from previously unserved markets

- Goal 5 - Provide better access from the central city to the emerging suburban employment centers.
 - Objective A – Maximize transit service to transit-dependent, low-income and minority populations.
Evaluation Measure:
 - Number of transit-dependent, low-income and minority population served
 - Objective B – Minimize travel time between urban and suburban destinations.
Evaluation Measures:
 - Travel time saving
 - Traffic operations at key intersections
 - Parking impacts

- Goal 6 - Support economic development investments and opportunities with transportation infrastructure.
 - Objective A – Support local and regional economic development objectives and planned investments.

Evaluation Measures:

- Economic development potential
- Consistency with the Long Range Transportation Plan
- Objective B – Foster access to revitalized riverfront attractions.
Evaluation Measure:
 - Enhanced regional connectivity to new riverfront attractions

Communities and Environment

- Goal 7 - Develop a transportation system that enhances the physical and social environment of the Greater Cincinnati/ Northern Kentucky region.
 - Objective A - Enhance the quality of life and livability within the region.
Evaluation Measures:
 - Neighborhoods served
 - Business community served
 - Regional energy consumption
 - Environmental justice effects
 - Community facilities served
 - Visual and aesthetic effects
 - Economic benefits
 - Objective B – Minimize adverse physical, social and environmental impacts.
Evaluation Measures:
 - Neighborhood impacts
 - Noise and vibration receivers
 - Historic building impacts
 - Archaeological site impacts
 - Historic district impacts
 - Parkland impacts
 - Property acquisitions/ relocations
 - Contaminated site rankings
 - Wetland impacts
 - Significant upland impacts
 - Floodplain impacts
 - Listed species impacts
- Goal 8 - Improve air quality.
 - Objective A - Improve air quality
Evaluation Measures:
 - Consistency with National Ambient Air Quality Standards
 - Reductions in Regional Emissions

7.2 EVALUATION OF THE GOALS AND OBJECTIVES OF THE PROJECT

This section discusses the results of the evaluation based on the measures used to establish the effectiveness of the alternatives in satisfying the project goals and objectives of the I-71 Corridor LRT Project.

The alternatives that were evaluated are listed below. Descriptions are provided for the No-Build Alternative and the TSM Alternative, and detailed descriptions of the four build alternatives are provided in Chapter 2 of this document, with alignments and station locations shown on Figure 2.2-3a and 2.2-3b.

- No-Build Alternative
- TSM Alternative
- Build (LRT) Alternatives
 - Alternative 1 - From Covington (at grade), no Zoo connection, to Blue Ash;
 - Alternative 2 - From Covington (above grade), no Zoo connection, to Blue Ash;
 - Alternative 3 - From Covington (at grade), including the Zoo connection, to Blue Ash;
 - Alternative 4 - From Covington (above grade), including the Zoo connection, to Blue Ash.

The No-Build Alternative utilizes the existing transportation system and provides for a minimum level of transportation system expansion. It includes all projects programmed and funded in the state Transportation Improvement Program (TIP) for fiscal years 1998 - 2001. Components of the No-Build Alternative include the following roadway projects in the I-71 Corridor:

- Adding 2 lanes on I-71 from Pfeiffer Road to State Route 48 (completed 2000).
- Reconstruction/realignment of Fort Washington Way (completed 2001).
- Reconstruction of on I-71/75 3000-feet south of Dixie Highway to Kyles Lane (completed 2000).
- Adding one eastbound lane on U.S. 22 (Montgomery Road) between Kenwood Road and I-71.
- Adding one travel lane on U.S. 22 (Montgomery Road) in each direction from I-71 to Hosbrook Road.

The TSM Alternative consists of a variety of low-cost improvements to the existing transportation system designed to improve transportation conditions in the I-71 Corridor. It would include major expansion of the current bus system, Travel Demand Management (TDM) programs such as carpooling and telecommuting, ITS, and traffic engineering improvements.

The TSM Alternative would expand bus service in areas that are currently unserved or underserved (Figure 2.2-1). Bus service would include both local and express service. An important element would be the implementation of timed-transfer transit centers. These are locations where several bus routes converge, with synchronized schedules to permit convenient transferring among routes, similar to the hub-and-spoke systems of major airlines. A transit center can include a small building for waiting, ticket

sales, etc., and may also include a park-and-ride lot. Transit centers may serve as neighborhood centers and/or be the focus of economic redevelopment in the area. New service could include a wide variety of bus types including small buses for neighborhood or circulator services and large articulated buses for mainline trunk services.

Under the TSM Alternative, the following transit centers would be constructed in the vicinity of the following street intersection or shopping centers:

- Walnut Hills/Peebles Corner (Gilbert Avenue and McMillan Street)
- Anderson (possible locations include Beechmont Mall or the Anderson Township Building)
- Kenwood (Kenwood Road and I-71)
- Fields Ertel (Fields Ertel Road and I-71)
- Reading (U.S. 42 and Galbraith)
- Springdale/Tri-County Mall
- Northside/Knowlton's Corner (Hamilton Avenue and Spring Grove Avenue)
- Northgate Mall
- Western Hills Plaza
- Florence Mall
- Latonia Center
- Northern Kentucky University

7.2.1 GOAL 1 – IMPROVE CORRIDOR MOBILITY BY PROVIDING A BALANCED TRANSPORTATION SYSTEM TO EFFICIENTLY AND EFFECTIVELY MOVE PEOPLE AND GOODS.

7.2.1.1 Objective A – Maximize efficiency and cost-effectiveness.

The evaluation measures used to evaluate how well the alternatives would maximize efficiency and cost-effectiveness included total capital cost, annual operating cost and operating cost per transit rider.

No-Build Alternative

The total capital cost and annual operating costs for the No-Build Alternative have not been developed in this document.

Relative to the other alternatives considered, the No-Build Alternative supports the objective.

TSM Alternative

The total capital cost and annual operating costs for the TSM Alternative have not been developed in this document.

Relative to the other alternatives considered, the TSM Alternative supports the objective.

Alternative 1

In 2001 dollars the estimated capital cost for Alternative 1 is \$816 million and the annual operating cost is \$18.4 million. Transit ridership for all four alternatives is estimated at 24,000 daily boardings, and differences between the build alternatives in operating cost per transit rider and travel time savings are expected to be negligible.

Relative to the other alternatives considered, Alternative 1 strongly supports the objective.

Alternative 2

In 2001 dollars the estimated capital cost for Alternative 2 is \$808 million and the annual operating cost is \$19.1 million.

Given a slight advantage over the other three build alternatives due to the lower capital cost, Alternative 2 strongly supports the objective.

Alternative 3

In 2001 dollars the estimated capital cost for Alternative 3 is \$845 million and the annual operating cost is \$18.4 million.

Relative to the other alternatives considered, Alternative 3 strongly supports the objective.

Alternative 4

In 2001 dollars the estimated capital cost for Alternative 4 is \$852 million and the annual operating cost is \$19.1 million.

Relative to the other alternatives considered, Alternative 4 strongly supports the objective.

7.2.1.2 Objective B – Minimize dependence on single-occupant vehicles.

The objective of minimizing dependence on single occupant vehicles is measured in terms of reduction in daily auto trips and reduction in daily vehicle miles of travel.

No-Build Alternative

Since the No-Build Alternative does not include a transit component, the alternative would provide no reduction in the number of daily auto trips or reduction in daily vehicle miles of travel. The No-Build Alternative was used as the base case for determining reduction in daily vehicle miles of travel for the other alternatives considered.

The No-Build Alternative does not support the objective.

TSM Alternative

The TSM Alternative does include proposed transit centers and improved local and express bus service, however the specific plans and locations of the transit centers have not yet been finalized. For this objective, it may be assumed that the TSM Alternative will provide some transit centers, and attract some ridership from single occupant vehicles, but the extent is not clear at this time. Further, the OKI Regional Council of Governments Travel Demand Model for Year 2020 indicates a 1,717,025-mile increase in annual vehicle miles traveled.

It may be assumed that the additional transit centers will attract some ridership from single occupant vehicles, and the TSM Alternative will somewhat support the objective.

Build (LRT) Alternatives

The OKI Regional Council of Governments Travel Demand Model for Year 2020 indicates a 12,620,322-mile decrease in annual vehicle miles traveled. The impact of the build alternatives on dependence on single-occupant vehicles has not been determined.

The four build alternatives strongly support the objective to reduce annual vehicle miles of travel.

7.2.2 GOAL 2 - PROVIDE BETTER ACCESS TO DOWNTOWN CINCINNATI, COVINGTON, AND THE CENTRAL RIVERFRONTS.

7.2.2.1 Objective A – Maximize access to major activity centers.

The objective is measured in terms of service to employment centers and major activity centers.

The I-71 Corridor, from Covington to Blue Ash, is highly-developed with a variety of activity centers, including: offices and industry; major institutions including universities and medical centers; moderate to high density residential areas; cultural institutions, sports arenas; and parks. The I-71 Corridor serves the following geographic areas.

- *Downtown Cincinnati* – Cincinnati’s central business district (CBD) is the largest traffic generator in the metropolitan area, as it is host to approximately 90,000 jobs and an increasingly popular residential market. Downtown is also the area’s focus of culture, entertainment, and sports.
- *Uptown Cincinnati* – Located a few miles north of the CBD, this area is the focus of higher education and medical services in the region. It is a densely developed area with over 50,000 employees. Its three anchor activity centers are the over 30,000-student University of Cincinnati campus, the multi-institution medical center campus, and the Cincinnati Zoo.
- *Blue Ash* – This is one of the region’s largest suburban employment centers with a daytime employment population of over 50,000. Blue Ash is currently in the midst of a development boom and higher density office buildings are replacing warehouse and light industrial facilities.

No-Build Alternative

Negative effects of the No-Build Alternative are defined in terms of the benefits forgone. Positive effects of the build alternatives would not be available to the communities located within the project corridor.

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

Although the TSM Alternative offers some increased access due to bus system improvements, the majority of positive effects of the build alternatives are not realized. The increase in benefits for the TSM Alternative as compared to the build alternatives does not outweigh the benefits lost.

Relative to the other alternatives considered, the TSM Alternative somewhat supports the objective.

Build (LRT) Alternatives

All four build alternatives will equally maximize service to activity centers in downtown Cincinnati, Covington, and the central riverfronts, including service to I-71 Corridor employment centers. The build alternatives are differentiated only with respect to service to the Cincinnati Zoo. Alternative 1 and Alternative 2 do not provide additional transit service to the Zoo (Option B). Alternative 3 and Alternative 4 include an extension to the alignment that includes the Zoo (Option A).

Alternative 3 and Alternative 4 strongly support the objective to maximize service to activity centers in downtown Cincinnati, Covington, and the central riverfronts, while Alternative 1 and Alternative 2 support the objective.

7.2.2.2. Objective B – Support existing community investments with transportation alternatives.

The objective is measured in terms of service to existing community facilities and major attractions.

Section 3 identifies and locates the major community facilities and major attractions relative to the proposed I-71 Corridor. These include major employment centers and health care facilities, government offices, schools, colleges and universities, and numerous attractions, from sports stadiums to the Cincinnati Zoo. The analysis considered that community facilities and major attractions were “served” if their location was within a ½ -mile radius of the proposed station locations.

No-Build Alternative

The No-Build Alternative would not provide enhanced services to neighborhoods, business communities, community facilities or major attractions.

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

The projects included in TSM Alternative would provide limited enhanced transportation service to neighborhoods, business communities, community facilities or major attractions.

Relative to the other alternatives considered, the TSM Alternative somewhat supports the objective.

Build (LRT) Alternatives

In general, the build alternatives would provide enhanced access to community facilities and major attractions within a ½ -mile radius of the station areas. Each alignment provides a different degree of access to the same cluster of community facilities. Table 3.3.1 lists the major facilities that would potentially benefit from this improved access to community facilities. In general, the build alternatives serve the objective equally, with slight differentiation within the following segments.

Covington Segment

Alternative 1 and Alternative 3 traverse the Covington segment at-grade (Option B) and Alternative 2 and Alternative 4 are above-grade (Option A).

With Alternative 2 and Alternative 4, the proposed above-grade facility (Option A) would create an additional visual barrier in an area already affected by elevated rail right-of-way and Ohio River Bridge approach that may tend to reduce accessibility to existing facilities. The removal of one commercial business facility would have little lasting impact as the area redevelops following construction.

With Alternative 1 and Alternative 3, the proposed at-grade facility (Option B) would create a somewhat reduced visual barrier and reduced accessibility in the area of the elevated rail right-of-way and Ohio River Bridge approach. The removal of four small commercial buildings would have a greater initial impact, but little lasting impact as the area redevelops.

Uptown Segment

Alternative 1 and Alternative 2 serve the University of Cincinnati Medical Campus segment without a connection to the Cincinnati Zoo (Option B) and Alternative 3 and Alternative 4 include a Zoo connection (Option A).

Proposed Alternative 1 and Alternative 2 (Option B), would serve the Medical Campus facilities, including University Hospital, Medical Arts Building, Vontz Center, and residential Corryville neighborhood south of MLK Drive, schools, parks and places of worship. On the east side of the campus, improved access would be provided to Health Alliance Business Center, State Hospital, a commercial node at Reading Road and MLK Drive, Hauck Botanic Gardens, Merry Middle School. Negative community facility impacts would include view-sheds along MLK Drive and a loss of the open space at the Medical Center Station site.

Alternative 3 and Alternative 4 (Option A) would serve the Cincinnati Zoo, VA Hospital, EPA offices and other facilities in northwest part of medical campus. Improved service would be provided to medical campus facilities, including Children's Hospital, University Hospital, and the Shriners Hospital. On the east side of the Medical Campus, service would be provided to the Health Alliance Business Center; Temple Bible College and the residential and commercial area along Reading Road. Negative community facility impacts would include loss of open space (plaza), and medical building parking facilities and removal of at least six residential units and a negative impact to a small residential enclave along Hickman Avenue. The removal of nine residential units in five buildings would lessen the cohesion of the

small residential enclave along Vine and Erkenbrecher; however, these are already impacted by proximity of large institutions.

In terms of the objective to maximize service to community facilities and major attractions, Alternative 4 is determined to have greater positive impact and lesser negative impact and is considered to strongly support the objective. Likewise, Alternatives 1, 2, and 3 support the objectives.

7.2.3 GOAL 3 - PROVIDE A HIGHER LEVEL OF MOBILITY TO PEOPLE WHO RELY ON PUBLIC TRANSPORTATION.

7.2.3.1 Objective A – Enhance public transportation system connections to growing suburban communities.

The objective of enhancing public transportation to suburban communities is measured in terms of service from the CBD to suburban employment centers, and suburb-to-suburb services, and the consistency within local comprehensive plans.

No-Build Alternative

The No-Build Alternative would not provide enhanced public transportation system connections to growing suburban communities.

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

The TSM Alternative would provide limited enhanced public transportation system connections to growing suburban communities.

Relative to the other alternatives considered, the TSM Alternative somewhat supports the objective.

Build (LRT) Alternatives

All four build alternatives are considered to be equal in terms of service from the CBD to suburban employment centers and suburb-to-suburb services within the I-71 Corridor. Thirty-one percent of the total households in the corridor are within ½-mile of the LRT stations.

Consideration of the consistency of each alternative relative to the local comprehensive plans is provided in Chapter 3.0. In general, current and proposed zoning, land available for redevelopment, support for infill development and opportunity for transit-supportive station area development are consistently good and essentially identical for each of the build alternatives.

The four build alternatives are differentiated for the options considered within the Covington segment and within the Uptown segment. The two proposed Covington segments, although configured at-grade and above grade, are essentially identical. The station locations in the segments are identical except for the Riverfront Station, located only a block apart. Given the similarities under the criterion for this objective, neither is differentiated in terms of compatibility with local comprehensive plans.

The Uptown segment is differentiated with the introduction of the Zoo option. Alternatives 1 and 2 (Option B), along MLK Drive provide slightly less direct access to major medical institutions such as University Hospital, Children's Hospital and Holmes Hospital, and provides no direct access to the Cincinnati Zoo.

Alternatives 1, 2, 3 and 4 strongly support the objective to enhance public transportation system connections to growing suburban communities.

7.2.3.2 Objective B – Provide transit centers to enhance regional mobility and attract new riders.

The objective of enhancing public transportation to suburban communities is measured in terms of the number of new transit centers and park-and-ride facilities, and the number of new transit riders from automobiles.

No-Build Alternative

The No-Build Alternative provides no new transit centers or park-and-ride facilities, and will provide no new transit riders from automobiles.

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

The TSM Alternative does include proposed transit centers and improved local and express bus service, however the specific plans and locations of the transit centers have not yet been finalized. For this objective, it may be assumed that the TSM Alternative will provide some transit centers and attract some ridership from automobiles, but the extent is not clear at this time.

Relative to the other alternatives considered and the given uncertainties, the TSM Alternative somewhat supports the objective.

Build (LRT) Alternatives

All four build alternatives are considered to be equal in terms of the evaluation measures included in this objective. Alternatives 3 and 4 include a total of 21 proposed station locations and Alternatives 1 and 2 include a total of 20 proposed station locations, however this difference is considered to have negligible effect in terms of this objective. All four build alternatives include seven park-and-ride facilities, providing a total of 3,933 parking spaces. OKI travel demand models have forecasted Year 2020 daily transit ridership at approximately 24,000 riders, with a negligible difference between alternatives of less than 100 boardings.

Relative to the other alternatives considered, the build alternatives strongly support the objective.

7.2.4 GOAL 4 - DEVELOP A SYSTEM THAT MEETS CHANGING URBAN-SUBURBAN DEVELOPMENT PATTERNS AND TRAVEL BEHAVIOR.

7.2.4.1 Objective A – Maximize “reverse commute” capabilities to new suburban employment centers.

The objective of maximizing “reverse commute” capabilities to new suburban employment centers is measured in terms of enhanced services from the CBD to suburban employment centers and enhanced intermodal connections.

No-Build Alternative

The No-Build Alternative includes the construction of five proposed roadway projects. The No-Build Alternative would provide no enhancement in services from the CBD to suburban employment centers and no enhancements to intermodal connections.

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

The TSM Alternative includes bus improvements, traffic engineering improvements, Travel Demand Management programs and bus transit centers that would have some positive benefits in terms of the objective. It may be assumed that the majority of positive effects of the build alternatives will not be realized with the TSM Alternative.

Relative to the other alternatives considered, the TSM Alternative somewhat supports the objective.

Build (LRT) Alternatives

Each of the four build alternatives would provide enhanced services from the CBD to the suburban employment centers located in the I-71 Corridor. Each includes all of the projects identified for the No-Build and TSM Alternatives, including the intermodal connections.

Relative to the other alternatives considered, the build alternatives support the objective.

7.2.4.2 Objective B – Expand transit service to new development markets.

The objective of expanded transit service to new development markets is measured in terms of transit services added to new suburban communities and transit ridership from previously unserved markets.

No-Build Alternative

The No-Build Alternative provides no additional transit services to new suburban communities and ridership from previously unserved markets.

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

Although the TSM Alternative offers some increased access to new development markets due to bus system improvements, the majority of positive effects of the build alternatives are not realized. The increase in benefits for the TSM Alternative as compared to the build alternatives does not outweigh the benefits lost.

Relative to the other alternatives considered, the TSM Alternative somewhat supports the objective.

Build (LRT) Alternatives

All four build alternatives offer enhanced transit services to new suburban communities and enhanced transit ridership from previously unserved markets. The build alternatives are differentiated only with respect to service to the Cincinnati Zoo connection. Alternative 1 and Alternative 2 do not provide additional transit service to the Zoo (Option B). Alternative 3 and Alternative 4 include an extension to the alignment that includes the Zoo (Option A).

In terms of the objective, the differences between the build alternatives are considered to be negligible and all are considered to strongly support the objective.

7.2.5 GOAL 5 - PROVIDE BETTER ACCESS FROM THE CENTRAL CITY TO THE EMERGING SUBURBAN EMPLOYMENT CENTERS.

7.2.5.1 Objective A – Maximize transit service to transit-dependent, low-income and minority populations.

The objective of maximized transit service to transit-dependent, low-income and minority populations is measured in terms of the number of transit-dependent, low-income and minority population served.

In general, minority populations are concentrated in the southern third of the corridor and between the proposed stations of Ridge and Silverton. Low Income populations and no vehicle populations are concentrated in the southern half of the corridor. Elderly populations and populations with mobility limitations are evenly distributed throughout the corridor. Transit stations in minority, low income, elderly, mobility limitation and no vehicle population areas with high or moderate development potential would be considered to have a direct positive effect on the existing minority, low income, elderly, mobility limitation and no vehicle population areas.

No-Build Alternative

Under the No-Build Alternative, there would be no additional transit service provided to transit-dependent, low-income and minority populations. The positive impacts offered by the build alternatives, such as improved mobility, improved access to local businesses and educational facilities and affordable transportation, would not be provided with the No-Build Alternative.

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

The locations of the proposed transit centers have not been identified under the TSM Alternative; therefore, no additional transit service provided to transit-dependent, low-income and minority populations can be specifically measured.

Relative to the other alternatives considered, it may be assumed that the TSM Alternative is somewhat supportive of the objective.

Build (LRT) Alternatives

The OKI November 2001 New Starts submittal indicates that 10,400 low-income households would benefit from enhanced mobility due to the build alternatives. All four build alternatives would provide benefits to transit-dependent, low-income and minority populations, with a slight advantage given to Alternatives 3 and 4 which provide service to the University of Cincinnati (Option A) segment that includes the Zoo.

Relative to the other alternatives considered, all of the build alternatives strongly support the objective.

7.2.5.2 Objective B – Minimize travel time between urban and suburban destinations.

The objective of minimized travel time between urban and suburban destinations is measured in terms of travel time saving, traffic operations at key intersections and parking impacts.

No-Build Alternative

Under the No-Build Alternative, there would be no additional transit services between urban and suburban destinations. Therefore, the No Build Alternative does not support the objective.

TSM Alternative

The TSM Alternative would result in a savings of 2.2 million hours of annual travel time over the No Build Alternative.

Traffic operations at key intersections - Table 6.1.11 identifies 13 key intersections for the TSM Alternative that will operate at Level of Service (LOS) E and F for the Year 2020 AM peak hour, and Table 6.1.12 identifies 18 key intersections with LOS E and F for the PM peak hour.

Parking impacts – The locations of the proposed transit centers have not been identified under the TSM Alternative; therefore the potential impact to parking spaces cannot be measured.

Relative to the other alternatives considered, the TSM Alternative somewhat supports the objective.

Build (LRT) Alternatives

Travel time saving – The build (LRT) alternative will save 4.8 million hours and 2.5 million hours of annual travel time, respectively over the No-Build and TSM Alternatives.

Traffic operations at key intersections - Table 6.1.13 identifies 14 key intersections for the build alternatives that will operate at Level of Service (LOS) E and F for the Year 2020 AM peak hour, and Table 6.1.14 identifies 19 key intersections with LOS E and F for the PM peak hour.

Parking impacts – As indicated in Section 6.5.2, on-street parking spaces will be displaced by the proposed build alternatives in the following locations.

| Segment/ Station | Parking Spaces Displaced |
|-------------------------|---------------------------------|
| Downtown Cincinnati | 185 |
| Over-the-Rhine | 214 |
| Uptown | 72 |
| Norwood - Blue Ash | 400 |
| Galbraith Station | 40 |
| Blue Ash | 6 |

Each of the four proposed build alternatives will include additional parking spaces at the following park-and-ride stations.

| Station | Segment | Proposed Park-and-Ride Spaces |
|-----------------------|---------------------|--------------------------------------|
| 12th Street Station | Covington | 247 |
| Xavier Station | Avondale to Norwood | 456 |
| Ridge Avenue Station | Norwood to Blue Ash | 667 |
| Silverton Station | Norwood to Blue Ash | 291 |
| Galbraith Station | Norwood to Blue Ash | 413 |
| Pfeiffer Road Station | Blue Ash | 932 |
| Cornell Park Station | Blue Ash | 838 |
| Total | | 3,844 |

Relative to the other alternatives considered, the build alternatives strongly support the objective.

7.2.6 GOAL 6 - SUPPORT ECONOMIC DEVELOPMENT INVESTMENTS AND OPPORTUNITIES WITH TRANSPORTATION INFRASTRUCTURE.

7.2.6.1 Objective A –Support local and regional economic development objectives and planned investments.

The objective of supporting local and regional economic development objectives and planned investments is measured in terms of economic development potential, and consistency with the Long Range Transportation Plan.

No-Build Alternative

Land development and redevelopment will likely occur along with changes in population and employment consistent with previous forecasts from regional, county, and local units of government.

Because this alternative will not create concentrations of users (e.g. commuters) in specific locations, such as occurs around transit centers or stations, it is assumed that existing development patterns and local market trends will not be directly influenced by the No-Build Alternative.

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

The TSM Alternative includes enhancements to local bus service on city streets. Generally, these will have minimal effect on land use, development, or property values because ridership is not concentrated at stations, and because the lack of a fixed guideway and stations fosters a perception among property developers and investors that bus service could change at any time. Development of transit centers could, however, result in a concentration of riders much like occurs around LRT stations. Some of the proposed transit centers may be located in conjunction with LRT stations; however, specific locations have not been identified. As a result of concentrated ridership, some new development may occur in the immediate vicinity of a transit center.

Relative to the other alternatives considered, the TSM Alternative somewhat supports the objective.

Build (LRT) Alternatives

Section 5.3.4 provides a detailed analysis for the station area development potential, and the results are summarized on Table 7.2.1: Station Area Development Potential.

Table 7.2.1: Station Area Development Potential

| Alternative | Rank of Development Potential (# stations) | | | | |
|--------------|--|-----------|--------|----------|-----|
| | High | High/Med. | Medium | Med./Low | Low |
| LRT-1 | 3 | 6 | 7 | 3 | 1 |
| LRT-2 | 3 | 6 | 7 | 3 | 1 |
| LRT-3 | 3 | 5 | 8 | 4 | 1 |
| LRT-4 | 3 | 5 | 8 | 4 | 1 |

Source: Station Area Analysis for the I-71 Corridor LRT Transit Oriented Development Opportunities, February 23, 2001, Basile Baumann Prost & Associates, Inc.

All four build alternatives offer much stronger opportunity for economic development than the No-Build and TSM Alternatives due to the potential for development in the areas surrounding the LRT stations. These stations would serve as the hub for additional regional economic development to occur at destinations located away from the LRT Corridor. As indicated in Table 7.2.1, station area development potential is considered to be slightly higher for Alternative 1 and Alternative 2.

Relative to the other alternatives considered, the build alternatives strongly support the objective.

7.2.6.2 Objective B – Foster access to revitalized riverfront attractions.

The objective of fostering access to revitalized riverfront attractions is measured in terms of enhanced regional connectivity to new riverfront attractions. The objective is similar to Goal 2, Objective A, but considers specific access to revised riverfront attractions.

No-Build Alternative

The No-Build Alternative would provide no additional access to revitalized riverfront attractions.

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

Although the TSM Alternative offers some increased access due to bus system improvements, the majority of positive effects of the build alternatives are not realized. The increase in benefits for the TSM Alternative as compared to the build alternatives does not outweigh the benefits lost.

Relative to the other alternatives considered, the TSM Alternative somewhat supports the objective.

Build (LRT) Alternatives

In general, the build alternatives all provide enhanced regional connectivity to new riverfront attractions within a ½ -mile radius of the station areas. Although the alignments are somewhat different in Covington and in the Uptown area, the alignments and station locations relative to service to the riverfront attractions are the same. The differences are considered to be minor in terms of service to the riverfront attractions and the four build alternatives serve the objective equally.

Relative to the other alternatives considered, the build alternatives strongly support the objective.

7.2.7 GOAL 7 - DEVELOP A TRANSPORTATION SYSTEM THAT ENHANCES THE PHYSICAL AND SOCIAL ENVIRONMENT OF THE GREATER CINCINNATI/ NORTHERN KENTUCKY REGION.

7.2.7.1 Objective A – Enhance the quality of life and livability within the region.

As shown in Table 7.2.2, the objective of enhancing the quality of life and livability within the region is measured in terms of:

- Neighborhoods Served
- Business Community Served
- Regional Energy Consumption
- Environmental Justice Effects
- Community Facilities Served
- Visual and Aesthetic Effects
- Economic Benefits

Table 7.2.2: Comparison of Alternatives -- Quality of Life and Livability Issues

| | Alternatives | | | | | |
|--|-----------------------------|---------------------------|----------------------------|----------------------------|----------------------------|----------------------------|
| | No-Build Alternative | TSM Alternative | Build Alternative 1 | Build Alternative 2 | Build Alternative 3 | Build Alternative 4 |
| Neighborhoods Served | None | Limited improvement | Improved service | Improved service | Improved service | Improved service |
| Business Community Served | None | Limited improvement | Improved service | Improved service | Improved service | Improved service |
| Regional Energy Consumption increase over No-Build | Base | 80,322 MBTU/Year increase | 61,120 MBTU/Year increase | 61,120 MBTU/Year increase | 61,120 MBTU/Year increase | 61,120 MBTU/Year increase |
| Environmental Justice Effects | X | Limited improvement | ● | ● | ● | ● |
| Community Facilities Served | None | Limited improvement | Improved service | Improved service | Improved service | Improved service |
| Visual and Aesthetic Effects | None | Limited improvement | Moderate | Moderate | Moderate | Moderate |
| Economic Benefits | Unknown | Limited improvement | Return rate 8.1% | Return rate 8.1% | Return rate 8.1% | Return rate 8.1% |
| Overall Performance | X | Limited improvement | ● | ● | ● | ● |

Symbol Definition

- The Alternative strongly supports the objective
- ◐ The Alternative supports the objective
- The Alternative somewhat supports the objective
- X The Alternative does not support the objective

7.2.7.2 Objective B – Minimize adverse physical, social and environmental impacts

The objective of minimizing adverse physical, social and environmental impacts is measured in terms of:

- Neighborhood Impacts
- Noise and Vibration Receivers
- Historic Building Impacts
- Archaeological Site Impacts
- Historic District Impacts
- Parkland Impacts
- Property Acquisitions/ Relocations
- Contaminated Site Rankings
- Wetland Impacts
- Significant Upland Impacts
- Floodplain Impacts
- Listed Species Impacts

Table 7.2.3: Comparison of Alternatives Against Physical, Social and Environmental Issues

| | Alternatives | | | | | |
|------------------------------------|---|--|---|---|---|---|
| | No-Build Alternative | TSM Alternative | Build Alternative 1 | Build Alternative 2 | Build Alternative 3 | Build Alternative 4 |
| Neighborhood Impacts | None identified | None identified | Positive impacts | Positive impacts | Positive impacts | Positive impacts |
| Noise and Vibration Receivers | None identified | None identified | 138 Noise 125 Vibration | 138 Noise 125 Vibration | 138 Noise 125 Vibration | 138 Noise 125 Vibration |
| Historic Building Impacts | None identified | None identified | 14 NRHP properties | 14 NRHP properties | 14 NRHP properties | 14 NRHP properties |
| Archaeological Site Impacts | None identified | None identified | 57 areas | 57 areas | 57 areas | 57 areas |
| Historic District Impacts | None identified | None identified | One | One | One | One |
| Parkland Impacts | None identified | None identified | 2 direct 8 indirect | 2 direct 8 indirect | 3 direct 9 indirect | 3 direct 9 indirect |
| Property Acquisitions/ Relocations | None identified | None identified | 136 units | 133 units | 161 units | 158 units |
| Contaminated Site Rankings | None identified | None identified | 4 high 2 medium | 4 high 2 medium | 5 high 2 medium | 5 high 2 medium |
| Wetland Impacts | None identified | None identified | One | One | One | One |
| Significant Upland Impacts | None identified | None identified | None | None | None | None |
| Floodplain Impacts | None identified | None identified | None | None | None | None |
| Listed Species Impacts | None identified | None identified | None | None | None | None |
| Overall Performance |  |  |  |  |  |  |

Symbol Definition

-  The Alternative strongly supports the objective
-  The Alternative supports the objective
-  The Alternative somewhat supports the objective
- X** The Alternative does not support the objective

7.2.8 GOAL 8 - IMPROVE AIR QUALITY.

7.2.8.1 Objective A - Improve air quality

The objective of improving air quality is measured in terms of consistency with National Ambient Air Quality Standards and reductions in regional emissions.

No-Build Alternative

The No-Build Alternative would not reduce vehicular travel and would not result in lower emissions of CO and the ozone precursors (VOC and NO_x).

Relative to the other alternatives considered, the No-Build Alternative does not support the objective.

TSM Alternative

The TSM Alternative is expected to increase regional travel by 1,717,025 vehicle miles relative to the No-Build Alternative. Based upon this analysis, the TSM Alternative would result in an adverse effect, relative to the No-Build Alternative, including emission increases of 4 tons/ year CO, 1 ton/ year NO_x and 1 ton/ year VOC.

Relative to the other alternatives considered, the TSM Alternative does not support the objective to reduce regional emissions consistent with National Ambient Air Quality Standards.

Build (LRT) Alternatives

The implementation of one of the build alternatives would reduce regional travel by 12,620,322 vehicle miles relative to the No-Build Alternative. Based upon this analysis, the build alternatives would result in a positive effect, relative to the TSM Alternative, including emission reductions of 31 tons/ year CO, 7 tons/ year NO_x, 6 tons/ year VOC, 1 ton per year PM₁₀ and 1,969 tons per year CO₂.

Relative to the other alternatives considered, the build alternatives strongly support the objective to reduce regional emissions consistent with National Ambient Air Quality Standards.

7.3 EQUITY CONSIDERATION

7.3.1 ENVIRONMENTAL JUSTICE CONCLUSIONS

The evaluation of alternatives takes into consideration impacts to minority, low income, elderly, mobility limitation and no vehicle populations. In this evaluation, impacts both positive and negative are identified. Benefits offered by the build alternatives include increased mobility, access to transit, improved access to local businesses and educational facilities, visual enhancements provided in station areas and transit-related redevelopment opportunities. These benefits are frequently accompanied with possible adverse impacts such as potential traffic impacts; displacements of residential, commercial and community facilities; and noise and vibrations effects. These effects are evaluated to determine whether or not negative effects can be minimized and benefits can be maximized, with special regard to minority, low income, elderly, mobility limitation and no vehicle populations.

7.3.1.1 No-Build Alternative

Negative effects of the No-Build Alternative are defined in terms of the benefits foregone. Positive effects of the Build Alternative, such as those mentioned above, would not be available to the communities located within the project corridor. While minority, low income, elderly, mobility limitation and no vehicle populations, are free from direct physical impacts, opportunities for enhancements to the quality of life, supportive land use development patterns and mobility choices are lost with the No-Build Alternative. Minority, low income, elderly, mobility limitation and no vehicle populations are not served to the greatest extent through this alternative.

7.3.1.2 TSM Alternative

Although the TSM Alternative offers some increased mobility due to bus system improvements, the majority of positive effects of the Build Alternative are not realized. While minority, low income, elderly, mobility limitation and no vehicle populations, are free from direct physical impacts, opportunities for enhancements to the quality of life, supportive land use development patterns and mobility choices are lost with the TSM Alternative. The increase in benefits for this alternative compared to the No-Build Alternative do not outweigh the benefits lost.

7.3.1.3 Build (LRT) Alternatives

The build alternatives offer the opportunity to enhance the quality of life in affected communities through a major infrastructure investment and related policy changes designed to support transit. The build alternatives offer increased access to transit, opportunities for transit-related redevelopment, potential for increased pedestrian and bicycle connections and potential for enhanced visual quality through station area improvements. For all build alternatives, benefits and adverse impacts to protected populations and the general population are representative of the areas within and adjacent to the project corridor. Opportunities for design option choices that minimize adverse effects to minority, low income, elderly, mobility limitation and no vehicle populations are low due to the significant number of those populations within the project corridor.

Alternative 1

Alternative 1 serves high concentrations of minority, low income and no vehicle populations primarily in the southern portion of the alignment. For the entire length of the alignment, impacts to neighborhoods, community facilities, community cohesion and parklands would be low. Transit service and other benefits mentioned above would be high. Displacement of residential and non-residential buildings would be a negative impact. The number of dwelling units displaced with this alternative would be high. Potential traffic impacts would impact both protected populations and the general populations and would not be disproportionately borne to protected populations.

Alternative 2

Alternative 2 includes all benefits and impacts described above in Alternative 1.

Alternative 3

Alternative 3 includes all benefits and impacts described in Alternative 1, however, the number of dwelling units displaced would be moderate as compared to high for Alternative 1 and 2.

Alternative 4

Alternative 4 includes all benefits and impacts described in Alternative 1, however, the number of dwelling units displaced would be moderate as compared to high for Alternatives 1 and 2.

Mitigation Measures for Environmental Justice Analysis

All impacts identified in this document would be mitigated, if possible, to avoid adverse impacts, with special concern and emphasis with regard to minority, low income, elderly, mobility limitation and no vehicle populations. Active public involvement in the corridor would continue to be a goal through design and implementation. Public engagement activities for all communities in the corridor would continue through the length of this project and is explained in detail in Chapter 8.

7.4 SECTION 5309 NEW STARTS CRITERIA

This section describes the New Starts Criteria and resulting ratings for the I-71 Corridor Light Rail Transit Project, which are used by the Federal Transit Administration (FTA) to evaluate rail transit projects that may seek federal funding for implementation. The I-71 Corridor Light Rail Transit Project New Starts submittal was completed in September 2002. The New Starts criteria include the following:

- Project Justification
 - Mobility Improvements;
 - Environmental Benefits;
 - Operating Efficiencies;
 - Cost-Effectiveness; and
 - Transit-Supportive Land Use and Future Patterns.

- Local Financial Commitment
 - Stability and Reliability of Capital Financing Plan; and
 - Stability and Reliability of Operating Finance Plan.

7.4.1 PURPOSE

Each year the Secretary of Transportation is required to submit the Annual Report on New Starts to Congress as a collateral document to the budget submitted by the President. The report documents the Department's recommendations for allocating the funds for transit fixed-guideway projects under Section 5309 of Title 49 of the United States Code, referred to as the New Starts Program. The Transportation Efficiency Act for the 21st Century (TEA-21) requires that the annual report include the Secretary's evaluation and ratings of the capital projects seeking grants or loans for new or extended fixed guideway transit projects. The FTA reviews the criteria results for each candidate project and assigns a rating for each of the criteria. Based on the criteria ratings, a candidate project receives an overall rating of either highly recommended, recommended, or not recommended.

7.4.2 METHODOLOGY

In July 1999, FTA published Technical Guidance on Section 5309 New Starts Criteria includes recommended methodologies for estimating project performance relative to each of criteria. Potential grantees are asked to provide the results of specific project measures that respond to each of the criteria. These measures are described as follows.

7.4.3 PROJECT JUSTIFICATION

Mobility Improvements

The estimated annual travel time savings for the candidate project compared to both the No-Build and TSM Alternatives is used as measure for this criterion. The number of low-income household within one-half mile of station sites is also considered for this criterion.

Environmental Benefits

There are two measures that are considered for this criterion. The impact of the project on criteria pollutants and the impact on annual energy savings measured in BTU's. The criteria pollutants include:

- Carbon Monoxide (CO)
- Nitrogen Oxide (NO_x)
- Volatile Organic Compound (VOC)
- Hydrocarbon (HC)
- Particulate Matter (PM₁₀)
- Carbon Dioxide (CO₂)

Operating Efficiencies

The estimated system operating cost per passenger mile is used as the measure for this criterion.

Cost-Effectiveness

The estimated incremental cost per incremental passenger is used as a measure for this criterion.

Transit-Supportive Land Use and Future Patterns

This criterion is measured using a qualitative assessment of the candidate project's ability to address the following land-use related issues:

- Existing Land Use
- Containment of Sprawl
- Transit Supportive Corridor Policies

- Supportive Zoning Regulations near Stations
- Tools to Implement Land Use Policies
- Performance of Land Use Policies

Local Financial Commitment

- Stability and Reliability of the Capital Financing Plan – The project financial plan is reviewed with particular emphasis on local financial commitment to fund the capital needs of the project.
- Stability and Reliability of the Operating Finance Plan - The project financial plan is reviewed with particular emphasis on local financial commitment to meet the operating and maintenance needs of the project.

7.4.3 NEW STARTS CRITERIA SUBMITTAL FOR THE I-71 CORRIDOR LRT PROJECT

Table 7.4.1 summarizes the quantitative measures as submitted in September 2002.

Table 7.4.1: 2002 New Starts Quantitative Measures Summary

| Criteria | Measure | Results for I-71 Corridor LRT Project 2002 New Starts Criteria Submittal |
|------------------------|--|--|
| Mobility Improvements | Hours of Transportation System User Benefits | 5,584,800 hours of transportation system user benefits per year compared to Baseline |
| | Low-Income Households Served | 7,513 low-income households within ½ mile of stations |
| | Employment Near Stations | 173,526 jobs within ½ mile of stations |
| Environmental Benefits | Reduction in Carbon Monoxide (CO) Emitted | 107 tons per year compared to Baseline |
| | Reduction in Nitrogen Oxide (NO _x) emitted | 38 tons per year compared to Baseline |
| | Reduction in Volatile Organic Compound (VOC) Emitted | 21 tons per year compared to Baseline |
| | Reduction in Particulate Matter (PM10) Emitted | 4 tons per year compared to Baseline |
| | Reduction in Carbon Dioxide (CO ₂) Emitted | 21,827 tons per year compared to Baseline |
| | Energy Savings (in millions of BTU's) | 276,795 million BTU's per year compared to Baseline |
| Operating Efficiencies | Operating Cost per Passenger Mile | \$0.63 for Baseline \$0.53 for New Start Project |
| Cost Effectiveness | Incremental Cost per Hour of Transportation System User Benefits | \$15.40 New Start Project compared to Baseline |

Source: URS, OKI New Starts Submittal 2002

7.5 FINANCIAL ANALYSIS

This section describes the results of the financial analysis for the I-71 Corridor Light Rail Transit Project alternatives. The analysis focuses on the resource requirements and funding and financing strategies available to construct, operate and maintain the project. The section includes an overview of the financial planning process used in the analysis; the assumptions and results of the sources and uses of funds analysis are presented. The section concludes with an overview of the risk factors that may affect the financial plan and possible strategies for addressing these risks.

7.5.1 OVERVIEW OF FINANCIAL PLANNING PROCESS AND STRUCTURE

Capital outlay, operations and maintenance costs, and funding are projected for the Baseline and LRT Build Alternatives over a 20-year horizon. The Baseline Alternative consists of two components: (1) the “No Build” and (2) MetroMoves bus expansion program. Five-year projects from the project sponsors, SORTA and TANK, form the foundation for the consultant team’s 20-year cash flow projections. Cash flow projections and sources and uses of funds analysis are provided for each of the two components of the Baseline Alternatives individually and then for the two combined.

Capital outlay, operations and maintenance costs, and funding for the LRT Build Alternative are estimated separately from the Baseline Alternative. Cash low projections and sources and uses of funds analysis are provided first for the LRT Build Alternative, followed by the combined Baseline and build Alternatives.

7.5.2 ANALYSIS STRUCTURE

- Cost and Revenue Variables (Baseline System. See Section 7.5.3 for Project Capital and O&M Revenue Sources)

Operations and Maintenance

SORTA has employed a very conservative one percent growth in farebox receipts, including inflation, while costs are projected to grow at the three percent rate of inflation. The agency forecasts minimal fare increases and no passenger or service growth – all service expansion is projected to come as a result of the Metro Moves Bus and LRT expansion projects. If additional revenues were needed due to increased costs or a shortfall in other revenues, SORTA has the option of raising fares to provide revenues in addition to those shown in the projection. SORTA’s major funding sources for operations funding are: (1) City of Cincinnati Income Tax Transit Fund (a projection for the tax is provided); (2) Federal Section 5307 preventative maintenance assistance; and (3) State of Ohio fuel tax reimbursement, elderly/handicapped grants, and maintenance assistance.

TANK projects growth in service and passengers carried of approximately 3 percent per year from 2001 to 2005, resulting in an annual increase in revenues and expenditures of about six percent including inflation. The three percent growth rate in service and passengers is reduced to one-half percent (0.5%) after 2005.

TANK's major funding sources for operations and maintenance include: (1) Local payroll tax and general fund revenues from the three counties it serves; (2) FTA Section 5307 preventative maintenance assistance; and (3) Commonwealth of Kentucky fuel tax reimbursement.

Capital Outlay

The replacement pattern for the bus fleet of each sponsor was analyzed over the base period. This ten-year pattern was then supplemented in 2006 and 2007 to ensure that the bus fleet was replaced within a 12-year period. For 2008 and beyond, the resulting 12-year pattern was repeated. Any planned buses for expansion were then added. Expansion vehicles for TANK are assumed to be minimal after 2006. The projections also assume no fleet expansion for SORTA in the No Build Alternative, as SORTA's bus expansion plans are embodied in the Metro Moves program.

Capital outlay required for fixed facilities was projected using trend analysis over the base period. The sum of capital outlay for bus vehicles and fixed facilities was then distributed among the various funding sources. The funding share for federal, state and local capital grants was estimated using a combination of trend analysis of the expenditures themselves and an examination of the behavior of the federal share over the base period. SORTA's local share is constrained by the available amount from the City of Cincinnati Income Tax Transit Fund.

- Variables Affecting the Cost and Revenue Streams

The base inflation assumption applied to all cost and revenue items for the years 2001-2021 is 3.0 percent per annum. The 3.0 percent assumption is based on an analysis of historical CPI data for the last 40 years. In addition, long-term forecasts of inflation by some government and academic organizations were reviewed to verify the reasonableness of the 3.0 percent assumption.

A detailed analysis of the inflationary behavior of major cost components (labor, equipment, power, etc.) revealed little long-term deviation from the base inflation rate – components experiencing higher inflation over a 3-4 year period would lag behind in later years. Given the very limited demonstrated value to be obtained from a greatly increased level of analytical complexity, no differential inflation rates are applied in the analysis.

- Factors Considered in the Sources and Uses of Funds Analysis

Underlying assumptions are provided in the text in other sections of this document. The key factor considered in the analysis is the adequacy of capital and operations & maintenance funding sources for the Metro Moves bus and rail expansion programs.

- Description of the Financial Analysis

See overview.

7.5.3 SOURCES AND USES OF FUNDS ANALYSIS

- Projected Capital Costs

Table 7.5.1: Summary of Total Capital Costs (Estimated in millions of 2001 dollars)

| Alternative | Bus Improvements | LRT Capital Costs | Total Costs |
|----------------------|------------------|-------------------|-------------|
| No-Build Alternative | \$222 | \$0 | \$222 |
| TSM Alternative | \$239 | \$0 | \$239 |
| Alternative 1 | \$236 | \$816 | \$1,052 |
| Alternative 2 | \$236 | \$808 | \$1,044 |
| Alternative 3 | \$236 | \$845 | \$1,081 |
| Alternative 4 | \$236 | \$852 | \$1,088 |

Source: URS, 2001

- Projected Operations and Maintenance Costs

Table 7.5.2: Summary of Annual Gross Operating and Maintenance Costs* (Estimated in millions of 2001 dollars)

| Alternative | Bus Component (in 2001\$) | LRT Component (in 2001\$) | Total Annual O&M Costs |
|----------------------|---------------------------|---------------------------|------------------------|
| No-Build Alternative | \$81.3 | \$0 | \$81.3 |
| TSM Alternative | 114.0 | \$0 | 114.0 |
| Build Alternative 1 | 110.6 | \$18.4 | 129.0 |
| Build Alternative 2 | 110.6 | \$18.2 | 128.8 |
| Build Alternative 3 | 110.6 | \$19.1 | 129.7 |
| Build Alternative 4 | 110.6 | \$19.1 | 129.7 |

Source: Manuel Padron and Associates, 2001.

*These numbers are gross operating and maintenance costs and do not include any reductions in costs based on projected fare revenues.

- Capital Revenue Sources

The project sponsors assume that 50 percent of LRT capital funding will be provided through FTA Section 5309 New Starts Program. The funding scenario for the remaining has been for 25 percent state department of transportation funding and 25 percent county based funding. In Hamilton County, a ½ cent sales tax was proposed. For Kenton County, state legislative approval is required before a countywide sales tax can be enacted.

- Operating and Maintenance Revenue Sources

Farebox revenues are assumed to cover 30 percent of operating expenses for the LRT project. Funding for the remaining LRT operations and maintenance expenses will be local responsibility and can be generated through the aforementioned local sales tax revenue.

7.5.4 RISKS AND UNCERTAINTIES

7.5.4.1 Operating Risk

- **Fares, fare policy and cost recovery:** Changes in fare level and structure affect ridership, fare revenue and cost recovery. Changes in ridership would impact how much transit service the potential SORTA/ Tank operating entity can cost-effectively operate. This, in turn, affects capital and operating costs.
- **Service levels:** The frequency of service and hours of operation affect ridership and fare revenue and capital and operating costs.
- **Operating costs:** Differences in bus and rail operating costs (including labor, fringes, insurance and liabilities) may occur because of differences among the requirements of the technologies, or variations in labor productivity and unit cost.

7.5.4.2 Construction Cost Risk

- **Construction costs:** Differences in construction costs may occur due to the following factors:
 - Differences among the technologies;
 - Unforeseen conditions such as soil conditions or utility relocation;
 - Variations in construction unit costs, bid quantities and other contingencies;
 - Changes in design elements such as additional noise mitigation or architectural design modifications; and
 - Delays that extend or shorten the period of construction.
- **Real inflation:** The rate of real inflation (i.e., the difference between the rate of inflation for a specific commodity or service and the baseline rate of inflation) may vary. These variations in the real rate of inflation are particularly important for certain commodities or services that constitute a significant element of the capital and operations and maintenance cost structure of the transit system (e.g., labor, electricity, fuel, parts and construction).
- **Financing risk:** This is based on the range and combination of values for variables that influence capital project financing and, consequently, the project construction schedule. These variables include fare revenues (discussed above), revenue growth, capital funding availability and interest rates.

7.5.4.3 Operating Revenue Risk

- **Fare Revenue Shortfalls:** Estimates of ridership for rail and bus services may not match actual ridership levels. Failure to meet fare revenue estimates can result from variability in population growth, changes in relative prices between transportation modes and any changes or delays in the transportation system.

- **Government Revenue Shortfalls:** Transfers from local, state and federal government can vary from projections due to such factors as budget cutbacks or reprogramming of budget resources.
- **Capital Funding Availability:** The availability of capital funds from various sources affects the timing and overall cost of the project. Insufficient annual allocations require an extension of the construction schedule so that costs do not exceed available resources. Also, additional bond revenue may be required to cover the shortfall in capital funds. As a result, the overall cost of the project increases because of higher material and financing costs associated with inflation and debt service. In contrast, sufficient capital resources help to ensure that a project remains on schedule and minimizes the potential for higher capital costs resulting from greater than expected material costs and debt service.
- **Interest Rates:** Variations in interest rates impact the size of long-term debt service and influence the level of working capital and the ability to both operate existing service and undertake new initiatives. To attract investors, the debt used to finance a transit project must pay a rate of interest that is competitive with similar types of municipal bonds.

As planning for the I-71 Corridor Light Rail Transit Project progresses, management can address these risks through several strategies:

- Staging the construction of the project;
- Controlling the growth of bus and rail service;
- Raising fares;
- Redefining the scope of the project;
- Utilizing short-term financing strategies, such as grant anticipation notes and revenue anticipation notes, which can be used to close short-term gaps between needed and available revenues; and
- Issuing greater levels of long-term debt within the constraints of projected available revenue sources.