7.0 Evaluation

7.1 Overview

This chapter describes the evaluation process and documents the evaluation results of the Southwest Transitway Alternatives Analysis (AA). Detailed information on the Southwest Transitway AA evaluation results are included in *Technical Memorandum No. 4, Evaluation Process and Results*.

The purpose of the evaluation was to identify key benefits, costs and impacts of each alternative in order to identify those alternatives most likely to successfully address the Southwest Transitway goals of improving mobility, providing a cost-effective/efficient travel option, protecting the environment, preserving the quality of life, and supporting economic development. After conducting a thorough evaluation of the alternatives only these alternatives were recommended for further study.

7.2 Background and Assumptions

To develop the evaluation measures, the Southwest Technical Advisory Committee (TAC) considered the Southwest Transitway goals and the Federal Transit Administration (FTA) New Starts Project Justification Evaluation Criteria.

7.2.1 Southwest Transitway Goals

The goals adopted by the Southwest Policy Advisory Committee (PAC) include the following:

1. Improve Mobility
2. Provide a Cost-Effective and Efficient Travel Option
3. Protect the Environment
4. Preserve the Quality of Life
5. Support Economic Development

7.2.2 Federal Transit Administration New Starts Evaluation Criteria

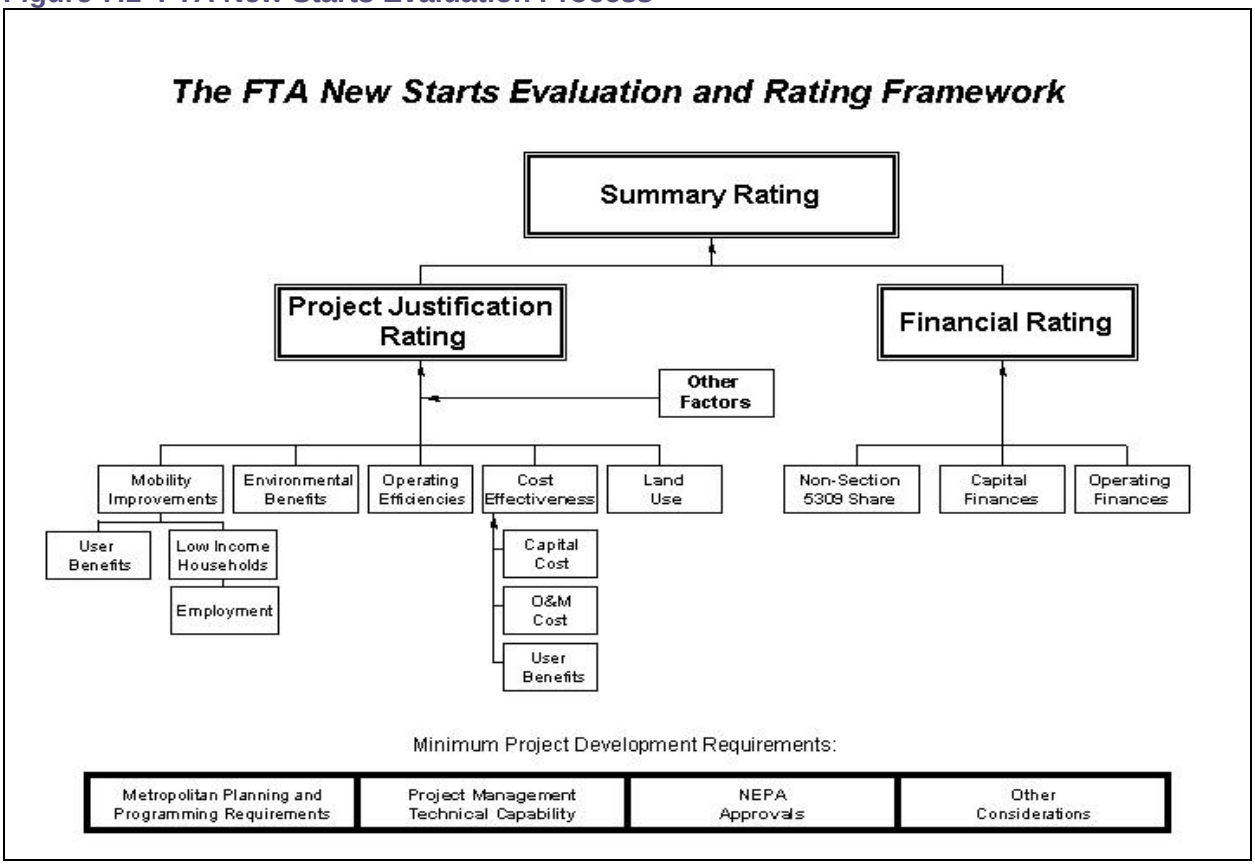
The FTA rates projects requesting Section 5309 New Starts funding in the areas of project justification and local financial commitment. These ratings are then combined into an overall project rating. Figure 7.1 graphically depicts the FTA New Starts Evaluation Process.

The FTA New Starts project evaluation is an on-going process. FTA evaluation and rating occurs annually in support of budget recommendations presented in the *Annual Report on New Starts* and when a project sponsor requests FTA approval to advance their proposed New Starts project into Preliminary Engineering and Final Design. Consequently, as proposed New Starts projects proceed through the project development process, information concerning costs, benefits and impacts are updated as the project becomes more refined and the ratings are updated to reflect this new information.

7.2.3 Project Justification Rating

The FTA requires that proposed New Starts projects be justified based upon their performance in the areas of mobility improvement, environmental benefits, operating efficiencies, cost-effectiveness and land use. These five criteria comprise the New Starts Project Justification Criteria, which are outlined in more detail in Table 7.1.

Figure 7.1 FTA New Starts Evaluation Process



Source: Annual Report on New Starts, Proposed Allocation of Funds for Fiscal Year 2007, Report of the Secretary of Transportation to the United States Congress, Pursuant to 49 U.S.C. 5309(k), Appendix B: FY 2007 Evaluation and Rating Process, page B-6.

Table 7.1 New Starts Project Justification Criteria and Supporting Measures and Categories

Criterion	Measures/Categories
Cost Effectiveness	• Incremental Cost per Hour of Transportation System User Benefit
Transit-Supportive Land Use and Future Patterns	• Existing Land Use • Transit-Supportive Plans and Policies • Performance and Impacts of Policies
Mobility Improvements	• Normalized Travel Time Savings (Transportation System User Benefit per Project Passenger Mile) • Low-Income Households Served • Employment Near Stations
Operating Efficiencies	• System Operating Cost per Passenger Mile
Environmental Benefits	• Change in Regional Pollutant Emissions • Change in Regional Energy Consumption • EPA Air Quality Designation

Source: *Annual Report on New Starts, Proposed Allocation of Funds for Fiscal Year 2007, Report of the Secretary of Transportation to the United States Congress, Pursuant to 49 U.S.C. 5309(k)(1), Appendix B: FY 2007 Evaluation and Rating Process*, page B-8.

7.2.4 Local Financial Commitment Rating

In addition to meeting the project justification criteria, the FTA requires that proposed New Starts projects be supported by an acceptable degree of local financial commitment, including evidence of stable and dependable financing sources to construct, maintain and operate the transit system.

The FY 2007 Local Financial Commitment evaluation measures were:

- The proposed share of total project costs from sources other than the Section 5309 New Starts program, including Federal formula and flexible funds, the local match required by Federal law, and any additional capital funding;
- The strength of the proposed capital financing plan; and
- The ability of the sponsoring agency to fund operation and maintenance of the entire system as planned once the guideway project is built.

7.3 Southwest Transitway Evaluation Process

After reviewing the FTA New Starts Criteria and considering the Southwest Transitway goals, the Southwest TAC developed and the Southwest PAC approved a set of evaluation measures. These evaluation measures attempt to incorporate the FTA New Starts Project Justification Criteria while at the same time addressing the adopted Southwest Transitway goals. For the most part the FTA New Starts Project Justification Criteria are included in the Southwest Transitway evaluation measures. However, the New Starts Local Financial Commitment Criteria were not included in the Southwest Transitway AA evaluation measures because the Southwest TAC and PAC considered it premature to focus on financing until it was known if a viable project existed.

Future project entry into the later Preliminary Engineering phase will require FTA approval based on the FTA's assessment of the material produced in the AA and the agency's project ratings. The complete Federal evaluation process for the Southwest Transitway will occur during a future phase of project development; however, as discussed above, many of the local evaluation measures mirror the current FTA evaluation measures, and thus give some early indication as to how the Southwest Transitway may be rated by FTA once a locally preferred alternative is submitted to FTA.

For purposes of evaluating the alternatives, the Southwest Transitway PAC prioritized the goals into two tiers. Tier One goals are those that must be achieved in order for a viable project to exist. Tier Two goals are those that should be achieved assuming a viable project exists. Tier One goals are (1) Improve Mobility and (2) Provide a Cost-Effective, Efficient Travel Option. Tier Two goals are (3) Protect the Environment, (4) Preserve the Quality of Life in the Study Area and the Region, and (5) Support Economic Development.

Both quantitative and qualitative data for the alternatives was developed for all transitway alternatives. The raw data was translated into ratings indicating how well each alternative addressed the Southwest Transitway goals and evaluation measures. The following ratings were used:

- Alternative strongly supports goal
- Alternative supports goal
- Alternative does not support goal

Tables 7.2 through 7.6 identify the ratings for each alternative with respect to the five goals. Tables containing the raw data for each of the evaluation measures can be found in *Technical Memorandum No. 4, Evaluation Process and Results*.

7.4 Southwest Transitway Evaluation Measures

The evaluation measures for each goal are listed below.

Goal 1: Improve Mobility

- Project Ridership (2030)
- New Transit Riders (2030)
- Travel Time Savings (2030)
- Transportation Capacity
- Travel Time Competitiveness
- System Integration
- Transit Dependent Populations Served
- Jobs and Population Served

Goal 2: Provide a Cost-Effective and Efficient Travel Option

- Capital Cost (2015)
- Operating Cost (2015)
- Preliminary Cost-Effectiveness Index (CEI)
- Peer City Comparisons
- Potential Impact to Street Network

Goal 3: Protect the Environment

- Vehicle Miles of Travel
- Emissions
- Potentially affected natural environment
- Potentially affected residences
- Inventory of compact land use at stations

Goal 4: Preserve the Quality of Life

- Anticipated impact of vehicle technology on property values
- Access to community amenities (libraries, parks, trails)
- Access to employment opportunities for low-income households (2030)
- Intermodal connections
- Integration and documentation of transit-oriented development (TOD) opportunities/plans in local comprehensive plans
- Transit ridership forecast (2030)
- Potential for intensification of land use around stations
- Consistency with regional growth plans
- Impact of park-and-ride lots on existing and planned development at stations
- Access to and accommodation of the existing and future trail system

Goal 5: Support Economic Development

- TOD potential at station locations
- Jobs within 1/2 mile of stations (2030)
- Other activity generators (schools, medical facilities, entertainment venues, etc.) within ½ mile of stations.
- Consistency with local comprehensive plan goals regarding economic development and redevelopment at stations, including park-and-ride sites

7.5 Evaluation Results

7.5.1 Goal 1: Improve Mobility

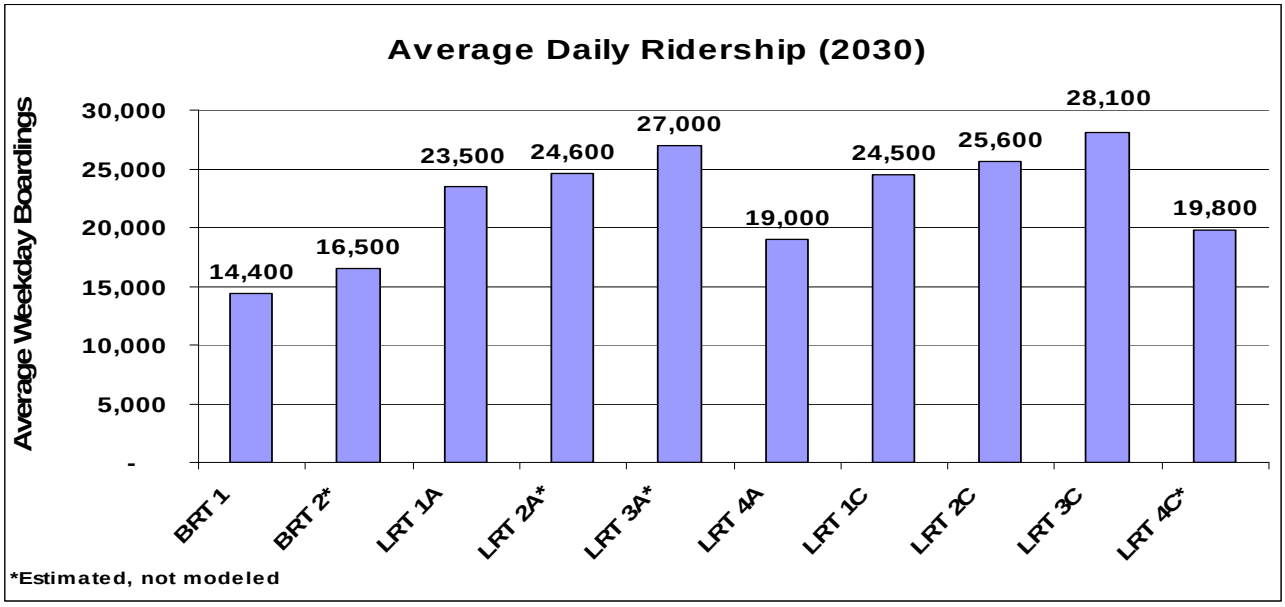
Each of the evaluation measures for Goal 1 was applied to the build alternatives described in Chapter 5, Definition of Alternatives. Resulting ratings are described below and summarized in Table 7.2.

Transit Ridership Forecast (2030) – Defined as the estimated number of transit riders in the forecast year of 2030 using the Metropolitan Council's travel demand model.

Ratings:	Strongly supports goal =	More than 20,000 passengers per day
	Supports goal =	15,000 to 20,000 passengers per day
	Does not support goal =	Less than 15,000 passengers per day

Results:

Figure 7.2 Average Daily Ridership (2030)



LRT 1A, LRT 2A, LRT 3A, LRT 1C, LRT 2C and LRT 3C attract an average weekday ridership of over 20,000 passengers a day, and are therefore considered to strongly support the goal of improving mobility.

BRT 2, LRT 4A and LRT 4C attract an average weekday ridership of between 15,000 and 20,000 passengers a day, and are therefore considered to support the goal of improving mobility.

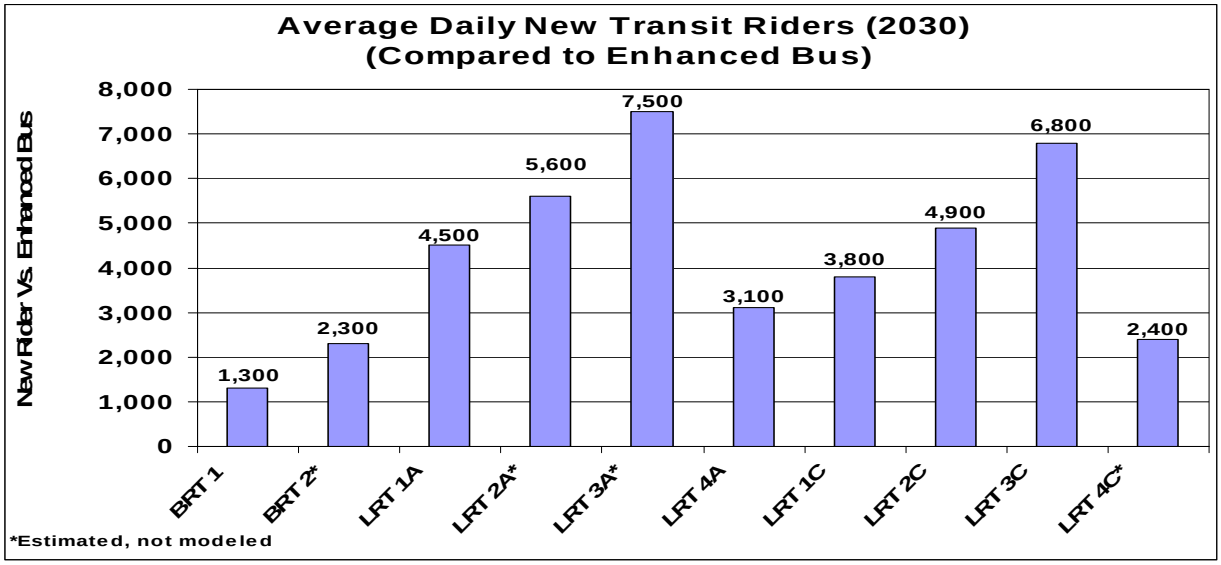
BRT 1 attracts an average weekday ridership of less than 15,000 and is therefore considered to not support the goal of improving mobility.

New Transit Riders (2030) - Defined as the estimated number of new transit riders compared to the Enhanced Bus alternative in the forecast year of 2030 using the Metropolitan Council's travel demand model.

Ratings:	Strongly supports goal =	More than 4,000 new passengers per day
	Supports goal =	2,000 to 4,000 new passengers per day
	Does not support goal =	Less than 2,000 new passengers per day

Results:

Figure 7.3 Average Daily New Transit Riders (2030) Compared to Enhanced Bus



LRT 1A, LRT 2A, LRT 3A, LRT 2C and LRT 3C attract an average of over 4,000 new transit riders a day, and are therefore considered to strongly support the goal of improving mobility.

BRT 2, LRT 4A, LRT 1C and LRT 4C attract an average of between 2,000 and 4,000 new transit riders a day, and are therefore considered to support the goal of improving mobility.

BRT 1 attracts less than 2,000 new transit riders a day, and is therefore considered to not support the goal of improving mobility.

Travel Time Savings (2030) - Defined as the change in annual vehicle hours traveled (VHT) relative to the Enhanced Bus alternative in the forecast year of 2030 using the Metropolitan Council's travel demand model. This applies to automobile trips only.

Ratings:	Strongly supports goal =	More than a 1% savings in VHT
	Supports goal =	0 to 1% savings in VHT
	Does not support goal =	Increased VHT

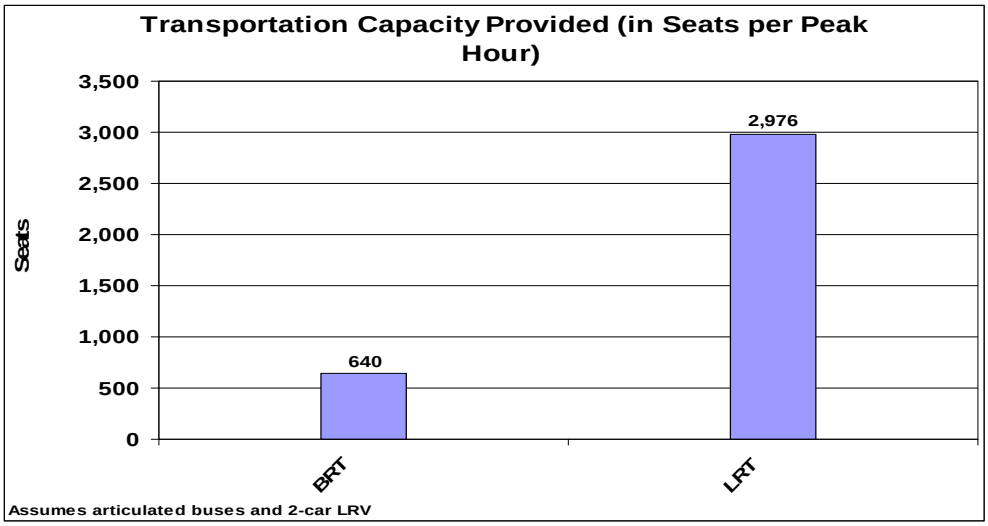
Results:
All 10 alternatives are projected to result in a reduction of vehicle hours of travel (VHT) of less than 1% and are therefore considered to support the goal of improving mobility.

Transportation Capacity Provided - Defined as the number of transit spaces provided by the alternative based upon vehicle capacity and frequency of service.

Ratings:	Strongly supports goal =	More than 2,000 seats during a peak hour.
	Supports goal =	1,000 to 2,000 seats during a peak hour.
	Does not support goal =	Less than 1,000 seats during a peak hour.

Results:

Figure 7.4 Transportation Capacity Provided (in Seats per Peak Hour)



The BRT alternatives were estimated to provide 640 transit spaces during a peak hour; the LRT alternatives were estimated to provide 2,976 transit spaces during a peak hour. This was calculated by multiplying the vehicle capacity of the alternative by the number of trips during a peak hour. Using a 7.5 minute peak frequency, both the BRT and LRT alternatives would provide 8 trips per peak hour per direction. Because the BRT vehicles cannot be coupled into multiple-car trains, their passenger capacity is limited to 80 transit spaces per vehicle, assuming an articulated vehicle. This equates to 640 transit spaces per peak hour per direction. Because the LRT vehicles (LRVs) can be coupled into 2-and 3-car trains, with each LRV carrying 186 passengers, the passenger capacity per 2-car train set is 372. This equates to 2,976 transit spaces per peak hour per direction.

All LRT alternatives with 2-car trains can provide a peak hour, peak direction passenger capacity of 2,976 and are therefore considered to strongly support the goal of improving mobility.

BRT 1 and BRT 2 can provide a peak hour, peak direction passenger capacity of 640, and are therefore considered to not support the goal of improving mobility.

Travel Time Competitiveness - Defined as the estimated afternoon rush hour travel time via the proposed transitway versus the single occupant vehicle for a number of origin/destination pairs.

Ratings:	Strongly supports goal =	2 minutes faster than auto in 3 + cases.
	Supports goal =	+/- 2 minutes of auto in 3 + cases.
	Does not support goal =	2 minutes slower than auto in 3 + cases.

Results:
LRT 2C is the only alternative that provides travel times at least two minutes faster than an auto for three or more of the origin/destination pairs and is therefore considered to strongly support the goal of improving mobility.

LRT 1A, 2A, 3A, 4A, 1C, 3C and 4C provide travel times equivalent to automobile travel times in at least 3 of the origin/destination pairs and are therefore considered to support the goal of improving mobility.

The BRT alternatives provide travel times that are 2 minutes slower than an auto in three or more of the origin/destination pairs and are therefore considered to not support the goal of improving mobility.

System Integration - Defined as an alternative's ability to connect to existing and proposed transitways as identified in the Metropolitan Council's *Transportation Policy Plan* (TPP).

Ratings:	Strongly supports goal =	Can be easily interlined with existing and planned transitways.
	Supports goal =	Transfer required at either north or south end.
	Does not support goal =	Transfer required at both north and south end.

Results:
LRT 1A, 2A and 3A can be interlined with the Hiawatha and proposed Central LRT lines and are therefore considered to strongly support the goal of improving mobility.

LRT 1C, LRT 2C and LRT 3C require a transfer at the north end in downtown Minneapolis and LRT 4A requires a transfer at the south end and therefore are considered to support the goal of improved mobility.

The BRT and LRT 4C alternatives require transfers at both the north and south ends and therefore considered to not support the goal of improving mobility.

Transit Dependent Populations Served - Defined as the number of elderly (65 and older), youth (18 and younger), disabled, and zero-car households within ½ mile of stations based upon socioeconomic data contained in the 2000 Census. At the request of the Southwest Policy Advisory Committee (PAC), low income was also used as an indicator of transit dependency. Low-income households were defined as households with annual incomes less then 60% of the Median Family Income (MFI) in the 7-county metropolitan area. The MFI in 2000 was $59,358; 60% of that is $35,614.

Ratings:	Strongly supports goal =	Significant improvement over the Enhanced Bus alternative
	Supports goal =	Similar to or moderate improvement over the Enhanced Bus alternative
	Does not support goal =	Significantly below the Enhanced Bus alternative

Results:

Figure 7.5 Number of Transit Dependent Persons Living Within ½-Mile of Stations

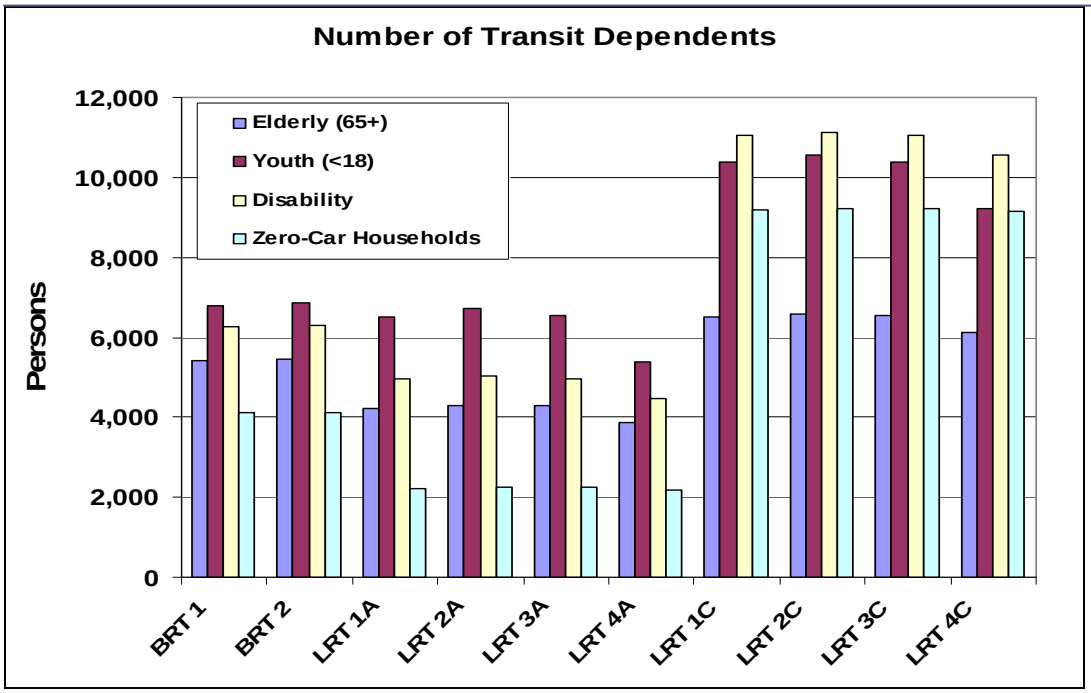
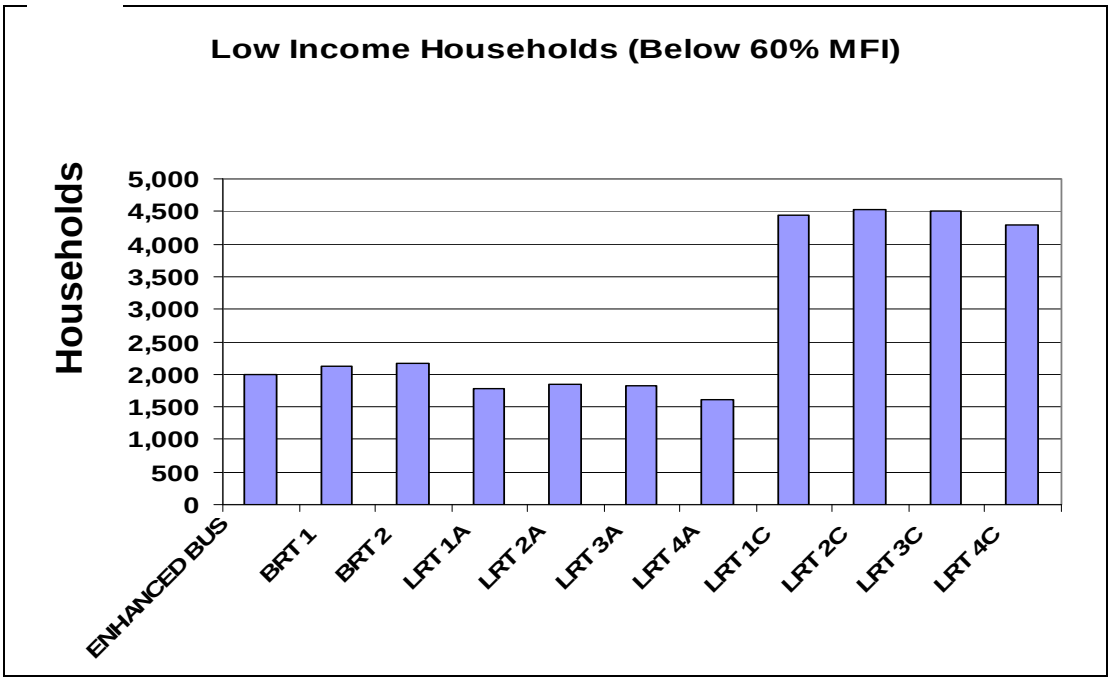


Figure 7.6 Low Income Households Living Within ½-Mile of Stations



Among the alternatives, LRT 1C, LRT 2C, LRT 3C and LRT 4C have the highest numbers of elderly (65 and older), youth (18 and younger), disabled, and zero-car households within ½ mile of stations in the forecast year of 2030 (Figure 7.5). LRT 1C, LRT 2C, LRT 3C and LRT 4C also have significantly higher populations of low income households within ½ mile of stations than does the Enhanced Bus alternative (Figure 7.6), and are therefore considered to strongly support the goal of serving transit dependent populations.

Compared to the LRT C alternatives, LRT 1A, LRT 2A, LRT 3A, LRT 4A, BRT 1 and BRT 2 have lower numbers of elderly (65 and older), youth (18 and younger), disabled, and zero-car households within ½ mile of stations in the forecast year of 2030. LRT 1A, LRT 2A, LRT 3A, LRT 4A, BRT 1 and BRT 2 also have similar or moderately higher populations of low income households within ½ mile of stations than the Enhanced Bus alternative, and are therefore considered to support the goal of transit dependent populations served.

It is important to note that LRT A alternatives terminate at the proposed Intermodal Station, and therefore do not extend into downtown Minneapolis as Southwest alternatives, but rather through the Hiawatha LRT line. Populations within ½ mile of the Hiawatha LRT stations (Warehouse, Nicollet, Government Center, and Metrodome) that would be accessed by the LRT 1A, LRT 2A, LRT 3A and LRT 4A alternatives are not included in these calculations because these stations are not technically considered part of those Southwest LRT alternatives.

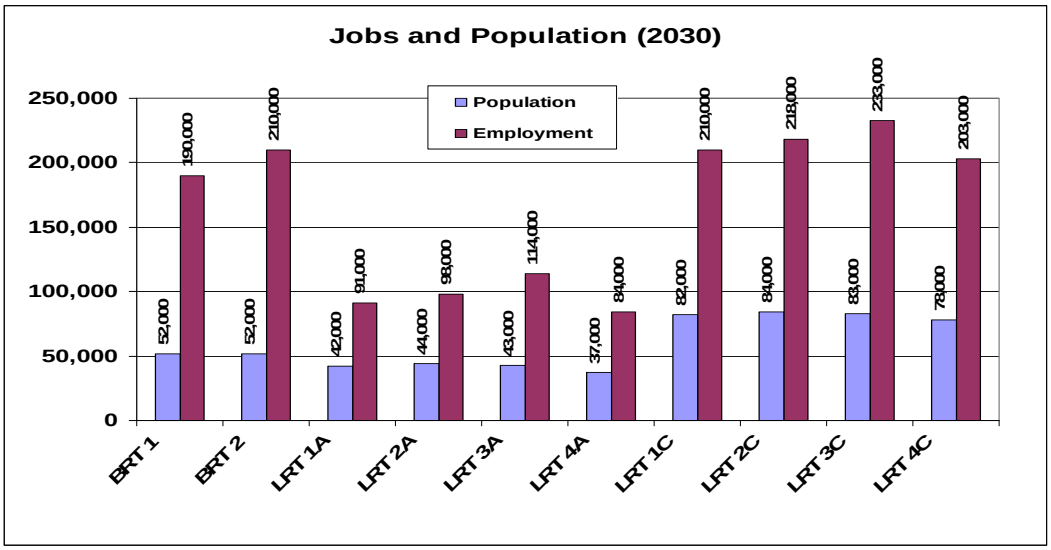
Jobs and Population within 1/2 mile of station (Year 2030) - Defined as jobs and population within ½ mile of stations in the forecast year of 2030 based upon socioeconomic forecasts contained in the Metropolitan Council's travel demand model. As explained previously, jobs and population within ½ mile of the Hiawatha LRT stations (Warehouse, Nicollet, Government Center and Metrodome) that would be utilized by the LRT 1A, LRT 2A, LRT 3A and LRT 4A alternatives are not included in these

calculations.

Ratings:	Strongly supports goal =	More than 70,000 people More than 175,000 jobs
	Supports goal =	35,000 to 70,000 people 75,000 to 175,000 jobs
	Does not support goal =	Less than 35,000 people Less than 75,000 jobs

Results:

Figure 7.7 Jobs and Population Within ½-Mile of Stations (2030)



LRT 1C, 2C, 3C and 4C serve more than 70,000 people and 175,000 jobs and are therefore considered to strongly support the goal of improving mobility.

LRT 1A, 2A, 3A and 4A serve between 35,000 to 70,000 people and between 75,000 to 175,000 jobs, and are therefore considered to support the goal of improving mobility. BRT 1 and BRT 2 serve between 35,000 to 70,000 people and over 175,000 jobs, and are therefore considered to support the goal of improving mobility.

Table 7.2 Goal 1 Evaluation Ratings – Improve Mobility

Alternatives	Forecast Ridership (2030)	New Transit Riders (2030)	Travel Time Savings (2030)	Transitway Transportation Capacity Provided in Peak Hour	Travel Time Competitiveness (Transit vs. Auto)	System Integration	Transit Dependent Populations	Population and Employment[2] (2030)	
BRT 1 Eden Prairie to Minneapolis, HCRRA	●	●	◑	●	●	●	◑	◑	○
BRT 2[1] **-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/ TH 169/HCRRA	◑	○	◑	●	●	●	◑	◑	○
LRT 1A - Eden Prairie to Minneapolis, HCRRA/Kenilworth/ Royalston	○	○	◑	○	◑	○	◑	◑	◑
LRT 2A[1] **-** Eden Prairie to Minneapolis, I-494/HCRRA/ Kenilworth/Royalston	○	○	◑	○	◑	○	◑	◑	◑
LRT 3A[1] **-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/HCRRA/ Kenilworth/ Royalston	○	○	◑	○	◑	○	◑	◑	◑
LRT 4A - Hopkins to Minneapolis, HCRRA/ Kenilworth/Royalston	◑	◑	◑	○	◑	◑	◑	◑	◑
LRT 1C - Eden Prairie to Minneapolis, HCRRA/ Midtown/ Nicollet	○	◑	◑	○	◑	◑	○	○	○
LRT 2C - Eden Prairie to Minneapolis, I-494/HCRRA / Midtown/Nicollet	○	○	◑	○	○	◑	○	○	○
LRT 3C - Eden Prairie to Minneapolis, Golden Triangle/ Opus/HCRRA/ Midtown/Nicollet	○	○	◑	○	◑	◑	○	○	○
LRT 4C[1] **-** Hopkins to Minneapolis, HCRRA/Midtown/ Nicollet	◑	◑	◑	○	◑	●	○	○	○
[1] Estimated not modeled									
[2]Because LRT A alternatives end at the Intermodal Station, these alternatives access downtown employment via the Hiawatha line. Downtown employment is therefore not reflected in "A" station area numbers.									
Evaluation Breakpoints									
● Does not support goal	< 15 thousand	<2 thousand	Increased VHT	<1000 seats	>2 min slower than auto in 3 or more O/D pairs	Transfer required at north and south end	Below baseline alternative	<35 thousand	<75 thousand
◑ Supports goal	15-20 thousand	2-4 thousand	0-1% savings	1000-2000 seats	Equivalent to auto (w/in 2 min) in 3 or more O/D pairs	Transfer required at either north or south end	Moderate improvement over baseline alternative	35-70 thousand	75-175 thousand
○ Strongly supports goal	> 20 thousand	>4 thousand	>1% savings	>2000 seats	>2min faster than auto in 3 or more O/D pairs	Interlined with existing/planned transitway	Significant improvement over baseline alternative	>70 thousand	>175 thousand

[1]Estimated not modeled

7.5.2 Goal 2: Provide a Cost-Effective and Efficient Travel Option

The performance of the alternatives under the evaluation measures for Goal 2 is described below and summarized in Table 7.3.

Capital Costs (2015) - Defined as the one-time costs to construct the transitway (guideway, stations, structures, right-of-way, engineering/design, administrations and contingencies), escalated from 2006 to 2015 using a 2.7% inflation rate.

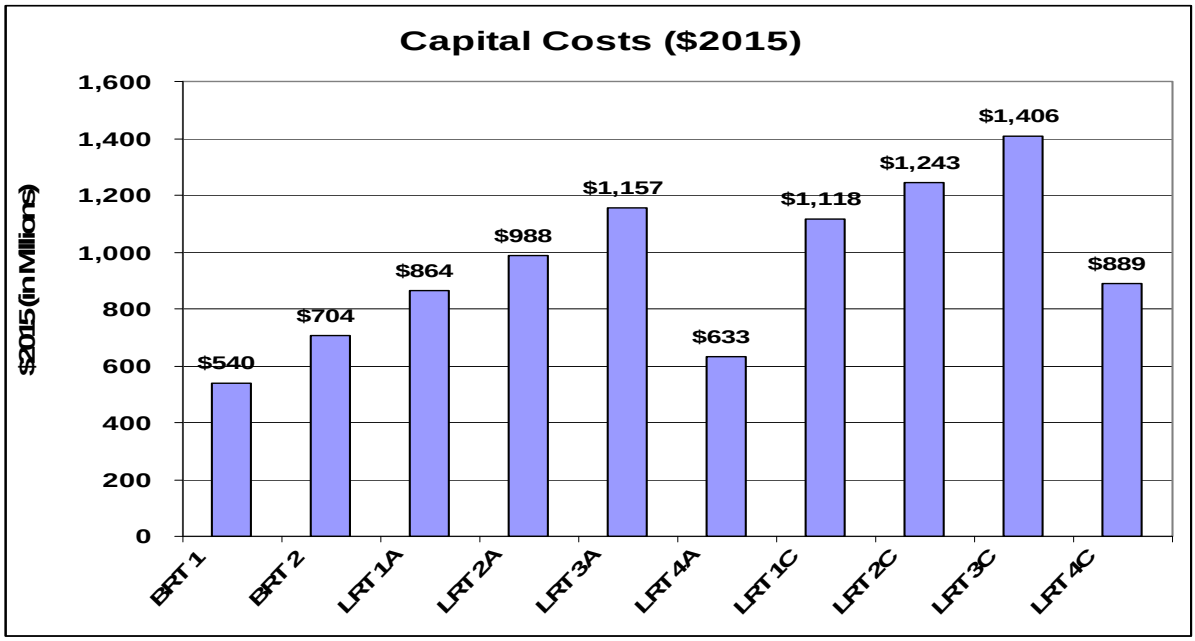
Ratings:	Strongly supports goal =	Less than $750 million total Less than $40 million per mile
	Supports goal =	$750 million to $1.5 billion total $40 to $90 million per mile
	Does not support goal =	More than $1.5 billion total More than $90 million per mile

Results:

BRT 1, BRT 2 and LRT 4A have estimated capital costs less than $750 million and are therefore considered to strongly support the goal of providing a cost-effective/efficient travel option.

LRT 1A, LRT 2A, LRT 3A, LRT 1C, LRT 2C, LRT 3C and LRT 4C have estimated capital costs between $750 million and $1.5 billion and are therefore considered to support the goal of providing a cost-effective/efficient travel option.

Figure 7.8 Capital Costs (2015)

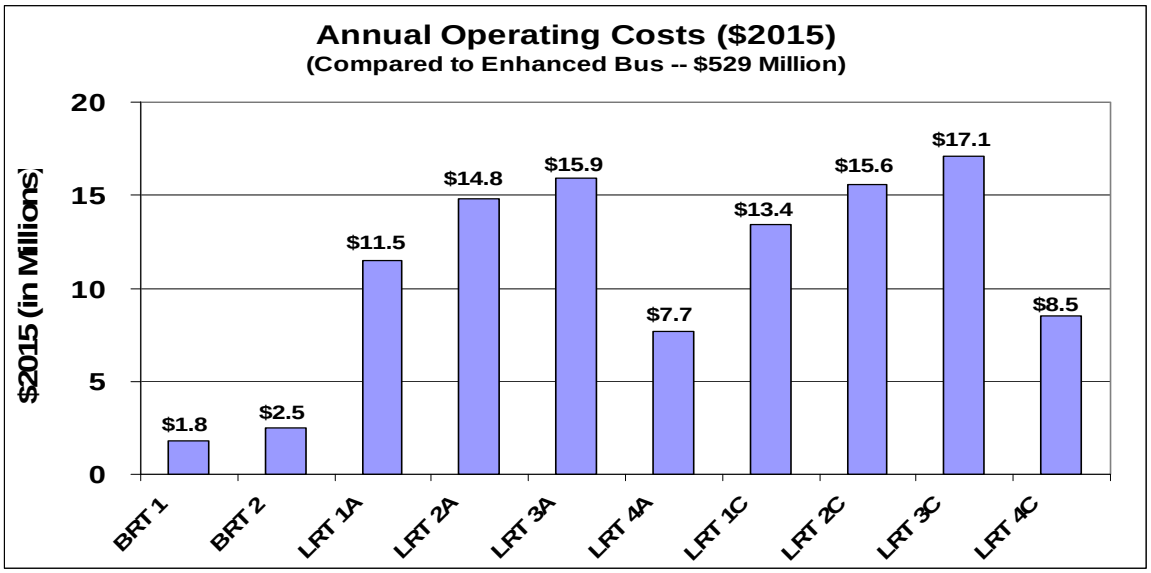


Operating Costs (2015) - Defined as the ongoing annual costs to operate and maintain the transitway alternative compared to the Enhanced Bus alternative, escalated from 2005 to 2015 using a 2.7 % inflation rate.

Ratings:	Strongly supports goal =	Less than $12 million annually
	Supports goal =	$12 million to $23 million annually
	Does not support goal =	More than $23 million annually

Results:

Figure 7.9 Annual Operating Costs ($2015) Above Enhanced Bus



BRT1, BRT 2, LRT 1A and LRT 4A have projected operating costs of less than $12 million annually and are therefore considered to strongly support the goal of providing a cost-effective/efficient travel option.

LRT 2A, LRT 3A, LRT 1C, LRT 2C, LRT 3C and LRT 4C have projected operating costs between $12 million and $23 million annually and are therefore considered to support the goal of providing a cost-effective/efficient travel option.

FTA Cost-Effectiveness Index (CEI) - Defined as an alternative's annualized project cost (above the Enhanced Bus alternative) divided by its transportation system user benefits (above the Enhanced Bus alternative). User benefits are the traveler's time savings. Preliminary CEIs were calculated using the capital and operating costs and ridership estimated and/or projected at the AA-level of analysis.

The FTA CEI threshold for approving a transitway to enter into Preliminary Engineering is $28.99 or less.

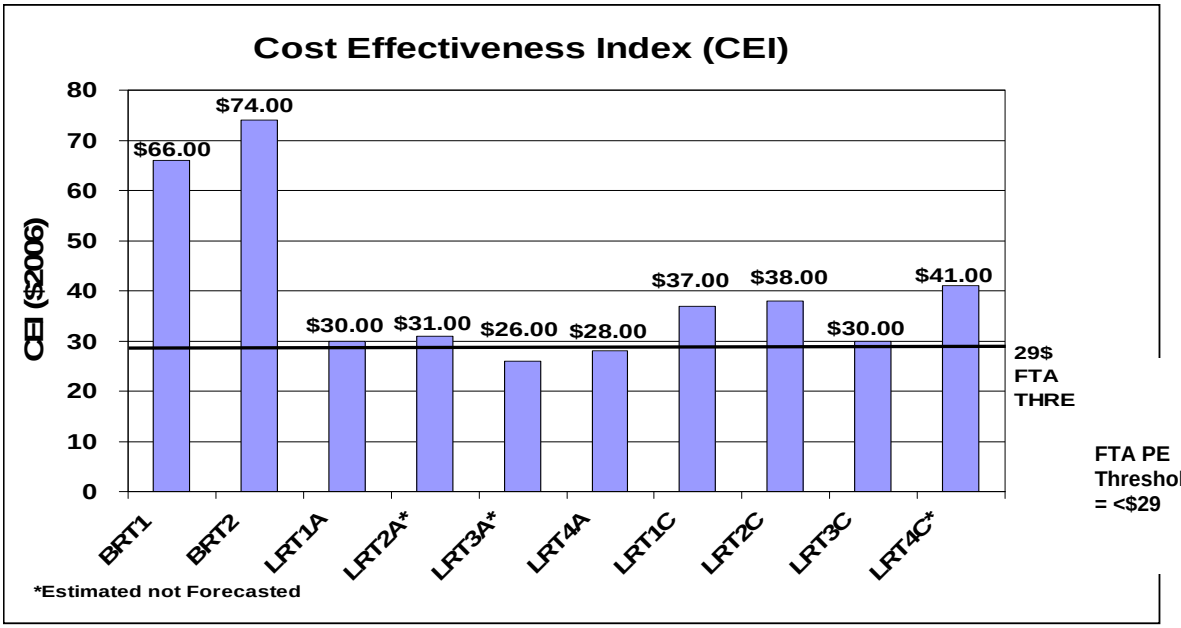
Ratings:	Strongly supports goal =	Less than $29 (under FTA threshold for PE)
	Supports goal =	$30 to $35 (exceed FTA threshold by no more

than 20%)

Does not support goal = More than $35 (exceeds FTA threshold by more than 20%)

Results:

Figure 7.10 Cost Effectiveness Index (CEI)



LRT 3A and LRT 4A have preliminary CEIs that fall under the FTA threshold of $29 and are therefore considered to strongly support the goal of providing a cost-effective and efficient travel option.

LRT 1A, LRT 2A and LRT 3C have preliminary CEIs that exceed the FTA threshold by no more than 20% and are therefore considered to support the goal of providing a cost-effective and efficient travel option.

BRT1, BRT 2,LRT 1C, LRT 2C and LRT 4C have preliminary CEIs that exceed the FTA threshold by more than 20% and are therefore considered to not support the goal of providing a cost-effective and efficient travel option.

Peer City Comparisons – This evaluation compared the Southwest AA alternatives to existing peer city systems for operating costs/passenger mile, operating costs/trip, operating costs/revenue hour, and passengers/revenue hour. These are standard measures in the transit industry for effectiveness and efficiency. The data source is the 2004 National Transit Database (NTD).

Ratings: Strongly supports goal = Better than range of peer systems

Supports goal = Within range of peer systems

Does not support goal = Worse than range of peer systems

Results:
All LRT and BRT alternatives perform better than their peers in terms of passengers/revenue hour, and fall within the range of their peer cities for the three other comparisons (operating costs / trip, and operating costs / revenue hour). All LRT and BRT alternatives are therefore considered to support the goal of cost effectiveness and efficiency.

Potential Impact to Street Network - Defined as the identification of intersections likely to require a traffic analysis during future detailed environmental study phase.

Ratings:	Strongly supports goal =	Avoids impact to street network
	Supports goal =	Some potential impact to street network
	Does not support goal =	Potentially significant impact to street network

Results:
BRT 1, BRT 2, LRT 1A, LRT 2A, LRT 3A and LRT 4A are considered to have some potential impact to the street network and are therefore considered to support the goal of providing a cost-effective/efficient travel option.

LRT 1C, LRT 2C, LRT 3C and LRT 4C are considered to have potentially significant impacts to the street network, particularly in downtown Minneapolis, and are therefore considered to not support the goal of providing a cost-effective/efficient travel option.

Table 7.3 Goal 2 Evaluation Ratings – Provide a Cost-Effective and Efficient Travel Option

Alternatives	Transitway Capital Cost (2015)		Transitway Operating Costs (Annual Increment over Enhanced Bus) (2015)	Preliminary Cost Effectiveness Index (CEI) (2006$)[1]	Peer City Comparison (2004)				Intersections identified for analysis during EIS
	Total	Per Mile			Operating cost / passenger mile[2]	Operating cost / trip	Operating cost / revenue vehicle hour	Passengers / hour	
BRT 1 - Eden Prairie to Minneapolis, HCRRA	○	○	○	●	◑	◑	◑	○	◑
BRT 2[1]**-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/ TH 169/ HCRRA	○	○	○	●	◑	◑	◑	○	◑
LRT 1A - Eden Prairie to Minneapolis, HCRRA/ Kenilworth/ Royalston	◑	◑	○	◑	◑	◑	◑	○	◑
LRT 2A[1] **-** Eden Prairie to Minneapolis, I-494/ HCRRA / Kenilworth/ Royalston	◑	◑	◑	◑	◑	◑	◑	○	◑
LRT 3A[1] **-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Kenilworth/ Royalston	◑	◑	◑	○	◑	◑	◑	○	◑
LRT 4A - Hopkins to Minneapolis, HCRRA/ Kenilworth/ Royalston	○	◑	○	○	◑	◑	◑	○	◑
LRT 1C - Eden Prairie to Minneapolis, HCRRA/ Midtown/ Nicollet	◑	◑	◑	●	◑	◑	◑	○	●
LRT 2C - Eden Prairie to Minneapolis, I-494/ HCRRA / Midtown/ Nicollet	◑	◑	◑	●	◑	◑	◑	○	●
LRT 3C - Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Midtown/ Nicollet	◑	◑	◑	◑	◑	◑	◑	○	●
LRT 4C[1] **-** Hopkins to Minneapolis, HCRRA/ Midtown/ Nicollet	◑	◑	◑	●	◑	◑	◑	○	●
[1] Estimated not modeled									
[2]FTA New Starts Evaluation Measure									
Evaluation Breakpoints									
● Does not support goal	>$1.5 billion	>$90 million	>$23 million (2015)	>$35.00 Exceeds FTA New Starts Threshold by >20%	Cost above range of peer systems	Cost above range of peer systems	Cost above range of peer systems	Below range of peer systems	Potentially significant impact to street network
◑ Supports goal	$750-1.5 billion	$40-90 million	$12 million - $23 million (2015)	$20-35 Within 20% of FTA New Starts Threshold	Cost within range of peer systems	Cost within range of peer systems	Cost within range of peer systems	Within range of peer systems	Some impact to street network likely
○ Strongly supports goal	<$750 million	<$40 million	<$12 million (2015)	<$29.00 Consistent w/FTA New Starts Threshold	Cost below range of peer systems	Cost below range of peer systems	Cost below range of peer systems	Above range of peer systems	Avoids impact to street network

[1]Estimated not modeled

7.5.3 Goal 3: Protect the Environment

The performance of alternatives under the evaluation measures for Goal 3 is described below and summarized in Table 7.4.

Change in vehicle miles of travel (VMT) (2030) - Defined as the change in VMT in the forecast year of 2030 using the Metropolitan Council's travel demand model.

Ratings:	Strongly supports goal =	More than a 5% reduction
	Supports goal =	0 to 5% reduction
	Does not support goal =	No reduction

Results:
All 10 alternatives are expected to result in a reduction in VMT of less than 5% and are therefore all considered to support the goal of protecting the environment.

Reduction in emissions of hydrocarbons (HC), volatile organic compounds (VOC), nitrous oxides (NO_x) and carbon monoxide (CO) in annual metric tons (Year 2030) - Defined as the change/reduction in emissions in the forecast year of 2030, based on change in VMT using the Metropolitan Council's travel demand model.

Ratings:	Strongly supports goal =	More than a 5% reduction
	Supports goal =	0 to 5% reduction
	Does not support goal =	No reduction

Results:
BRT 1, BRT 2, LRT 1A, LRT 2A, LRT 3A, LRT 1C, LRT 2C and LRT 3C are expected to result in a reduction in HC, VOC, NO_X and CO of less than 5% and are therefore considered to support the goal of protecting the environment.

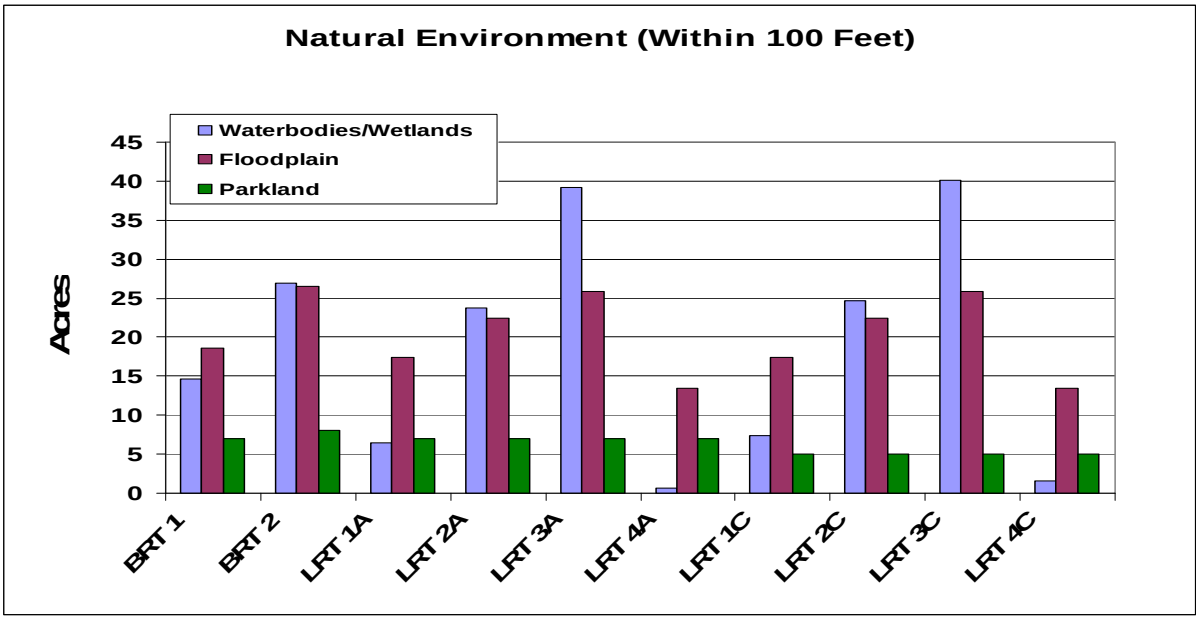
LRT 4A and LRT 4C are not expected to result in a reduction in HC, VOC, NO_X and CO, and are therefore considered to not support the goal of protecting the environment.

Potentially affected natural environment (wetlands, waterbodies, parklands and floodplains) within 100 feet - Defined as the number of wetlands, waterbodies, parklands and floodplains within 100 feet of the center line of the proposed transitway. The MetroGIS database was used to compile this information.

Ratings:	Strongly supports goal =	Less than 25 acres combined
	Supports goal =	20 to 50 acres combined
	Does not support goal =	More than 50 acres combined

Results:

Figure 7.11 Natural Environment (Within 100 Feet)



Due to their shorter routes, LRT 4A and LRT 4C affect less than 25 acres of the natural environment and are therefore considered to strongly support the goal of protecting the environment.

BRT 1, LRT 1A and LRT 1C are expected to affect between 25 and 50 acres of the natural environment and are therefore considered to support the goal of protecting the environment.

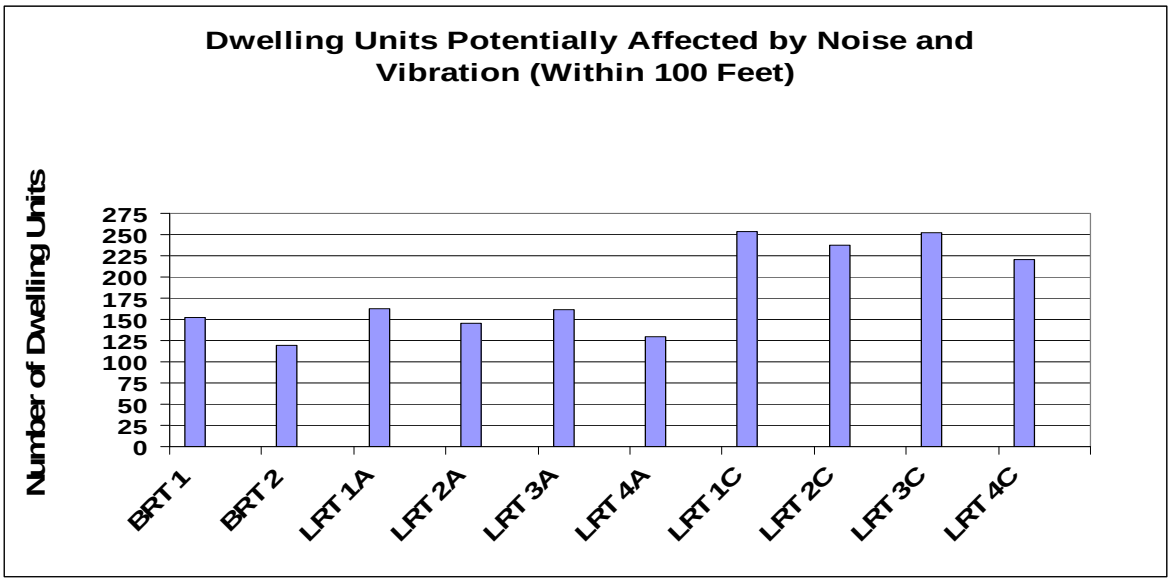
BRT 2, LRT 2A, LRT 3A, LRT 2C and LRT 3C are expected to affect more than 50 acres of the natural environment and are therefore considered to not support the goal of protecting the environment.

Residents potentially affected by noise or vibration - Defined as the number of dwelling units within 100 feet of the center of the proposed transitway which could potentially be affected by noise and vibration. It should be noted that detailed noise and vibration studies need to be conducted to identify dwelling units actually affected by noise and vibration. These detailed noise and vibration studies will be conducted at a later phase in the project development process.
For this analysis the MetroGIS database and county property information were used to compile the information.

Ratings:	Strongly supports goal =	Less then 50 units
	Supports goal =	50 to 200 units
	Does not support goal =	More than 200 units

Results:

Figure 7.12 Dwelling Units Potentially Affected by Noise and Vibration (Within 100 Feet)



BRT 1, BRT 2, LRT 1A, LRT 2A, LRT 3A and LRT 4A may affect between 50 and 200 dwelling units and are therefore considered to support the goal of protecting the environment.

LRT 1C, LRT 2C, LRT 3C and LRT 4C may affect more than 200 dwelling units and are therefore considered to not support the goal of protecting the environment.

Inventory of efficient, compact land use at station locations - Consistent with FTA New Starts criteria, this evaluation criterion utilizes population density per square mile and total corridor employment within ½ mile of stations as quantitative guidelines to assign land use ratings. Denser development at station areas promotes transit use and helps protect the environment by reducing auto trips and emissions, as well as the amount of land used by development (sprawl).

Ratings:		
	Strongly supports goal =	More than 10,000 persons per square mile More than 175,000 jobs within ½ mile of stations
	Supports goal =	3,333 to 10,000 persons per square mile 75,000 to 175,000 jobs within ½ mile of stations
	Does not support goal =	Less then 3,333 persons per square mile Less than 75,000 jobs within ½ miles of stations

Population

BRT 1, BRT 2, LRT 1A, LRT 2A, LRT 4A, LRT 1C, LRT 2C, LRT 3C and LRT 4C are projected to have a population density of between 3,333 to 10,000 persons per square mile in 2030 and are therefore considered to support the goal of protecting the environment.

LRT 3A is projected to have a population density of less than 3,333 persons per square mile in 2030 and is therefore considered to not support the goal of protecting the environment.

Results:

Figure 7.13 Population Density Within ½ Mile of Station (2030)

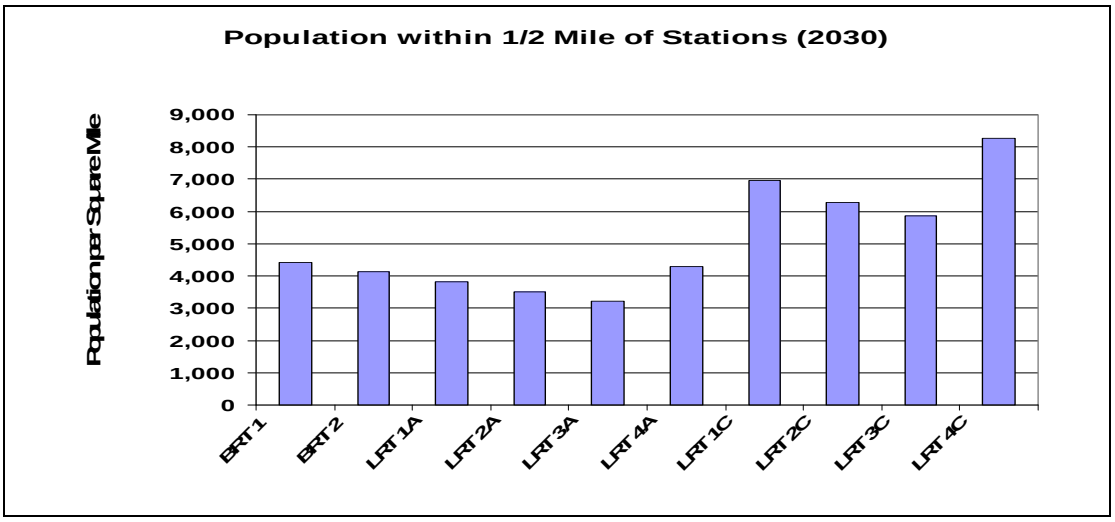
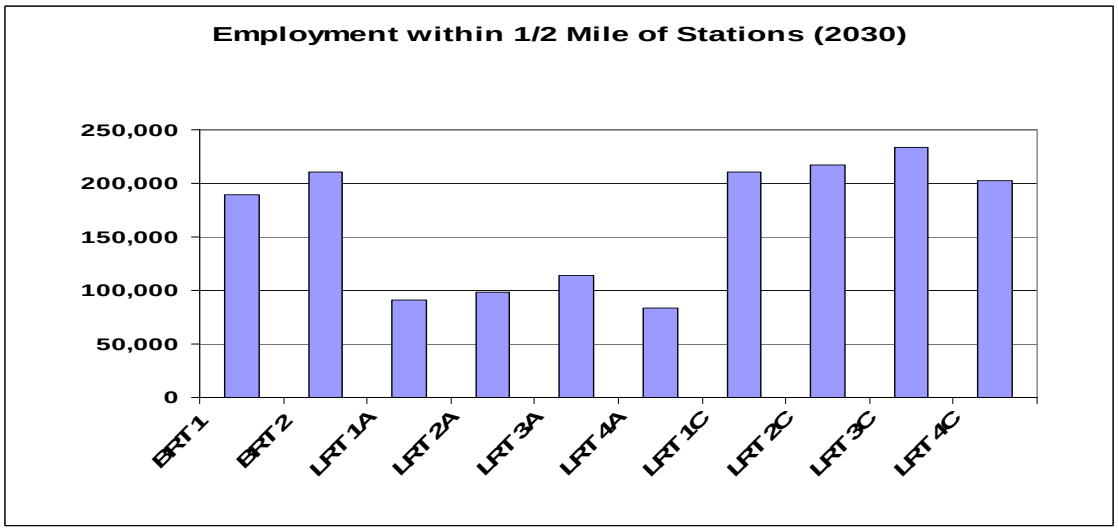


Figure 7.14 Employment Within ½ Mile of Station (2030)



Employment

BRT 1, BRT 2, LRT 1C, LRT 2C, LRT 3C and LRT 4C are projected to have more than 175,000 jobs within ½ mile of stations in 2030 and are therefore considered to strongly support the goal of protecting the environment.

LRT1A, LRT 2A, LRT 3A and LRT 4A are projected to have between 75,000 and 175,000 jobs within ½ mile of stations in 2030 and are therefore considered to support the goal of protecting the environment.

Table 7.4 Goal 3 Evaluation Ratings – Protect the Environment

Alternatives	Change in vehicle miles of travel (VMT) (Year 2030)	Reduction in VOC, NOX, CO in annual metric tons[2] (Year 2030)	Potentially affected natural environment within 100 feet	Dwelling units potentially affected by noise or vibration	Inventory of efficient, compact land use within 1/2 mile of stations FTA New Starts Criteria	
					Population Density per Square Mile	Employment[3]
BRT 1 - Eden Prairie to Minneapolis, HCRRA	◑	◑	◑	◑	◑	○
BRT 2[1]**-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/ TH 169/ HCRRA	◑	◑	●	◑	◑	○
LRT 1A - Eden Prairie to Minneapolis, HCRRA/ Kenilworth/ Royalston	◑	◑	◑	◑	◑	◑
LRT 2A[1] **-** Eden Prairie to Minneapolis, I-494/ HCRRA / Kenilworth/ Royalston	◑	◑	●	◑	◑	◑
LRT 3A[1] **-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Kenilworth/ Royalston	◑	◑	●	◑	●	◑
LRT 4A - Hopkins to Minneapolis, HCRRA/ Kenilworth/ Royalston	◑	●	○	◑	◑	◑
LRT 1C - Eden Prairie to Minneapolis, HCRRA/ Midtown/ Nicollet	◑	◑	◑	●	◑	○
LRT 2C - Eden Prairie to Minneapolis, I-494/ HCRRA / Midtown/ Nicollet	◑	◑	●	●	◑	○
LRT 3C - Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Midtown/ Nicollet	◑	◑	●	●	◑	○
LRT 4C[1] **-** Hopkins to Minneapolis, HCRRA/ Midtown/ Nicollet	◑	●	○	●	◑	○
[1]Estimated not modeled						
[2] FTA New Starts Evaluation Measure. Note: HC, a component of VOC, not picked up separately by Mobile6 model						
[3]Because LRT A alternatives end at the Intermodal Station, these alternatives access downtown employment via the Hiawatha line. Downtown employment is therefore not reflected in "A" station area numbers.						
Evaluation Breakpoints						
● Does not support goal	0% Reduction	0% Reduction	>50 acres of combined potentially affected wetland, parkland and floodplain	>200 units	<3,333	<75,000 FTA Threshold for Low ranking
◑ Supports goal	0-5% Reduction	0-5% Reduction	25-50 acres	50-200 units	3,333-10,000	75,000-175,000 FTA Threshold for Low-Medium/ Medium ranking
○ Strongly supports goal	>5% Reduction	>5% Reduction	<25 acres	<50 units	>10,000	>175,000 FTA Threshold for High-Med/ High ranking

[1]Estimated not modeled

7.5.4 Goal 4: Preserve the Quality of Life

The performance of the alternatives under the evaluation measures for Goal 4 is described below and summarized in Table 7.5.

Anticipated impact of vehicle technology on property values - Defined as the anticipated impact of LRT or BRT on property values based upon the results of national case studies.

Ratings:	Strongly supports goal =	Research indicates a definite positive impact at stations
	Supports goal =	Research indicates generally positive impact at stations
	Does not support goal =	Research does not support positive impact at stations.

Results:
Numerous national studies indicate that property values often increase around well designed, fixed guideway transit stations. An annotated bibliography by Smith and Gihring[1] is included in the *Southwest Transitway AA Land Use Technical Memorandum.*

The national studies focus primarily on fixed guideway modes (LRT, commuter rail, heavy rail, dedicated BRT). The studies found a correlation between increased property values and proximity to fixed guideway stations.[2] While BRT has demonstrated viability for land use intensification[3], there are suggestions in the studies that BRT infrastructure can be perceived as less permanent than that of fixed rail systems, and therefore, developers may be less likely to invest in the adjacent land. The studies suggest that the closer the operation of a BRT system is to a local street bus service, the less likely it would be to influence an increase in property values. Conversely, the closer the operation of a BRT system becomes to a fixed guideway system, the more likely it would be to increase property values.

LRT 1A, LRT 2A, LRT 3A , LRT 4A, LRT 1C, LRT 2C, LRT 3C and LRT 4C are exclusive guideways and are therefore considered to strongly support the goal of preserving the quality of life.

The routes for BRT 1 and BRT 2 consist of a majority of exclusive bus-only guideways, with the remainder of the route being bus-only shoulders, and are therefore more like the fixed guideways of LRT than Enhanced Bus service. Therefore, BRT 1 and BRT 2 are considered to support the goal of preserving the quality of life.

[1] Jeffery Smith and Thomas Gihring. “Financing Transit Systems Through Value Capture, An Annotated Bibliography”, Victoria Transport Policy Institute, 2006.

[2] Litman, Todd, “Rail Transit in American, A Comprehensive Evaluation of Benefits”, October 2004 Victoria Transport Policy Institute Produced with Support from the American Public Transportation Association.

[3] *TCRP Report 90: Bus Rapid Transit: Volume 1: Case Studies in Bus Rapid Transit*; Transportation Research Board, Washington D.C., 2003.

Access to community amenities (libraries, parks, trails) - Defined as the number of existing libraries, parks, and trails within ½ mile of station locations.

Ratings:	Strongly supports goal =	Amenities within ½ mile of all stations
	Supports goal =	Amenities within ½ mile of several stations
	Does not support goal =	No amenities within ½ mile of stations

Results:
BRT 1, BRT 2, LRT 1A, LRT 2A, LRT 3A, LRT 4A, LRT 1C, LRT 2C, LRT 3C and LRT 4C have libraries, parks and trails within ½ mile of all stations and are therefore all considered to strongly support the goal of preserving the quality of life.

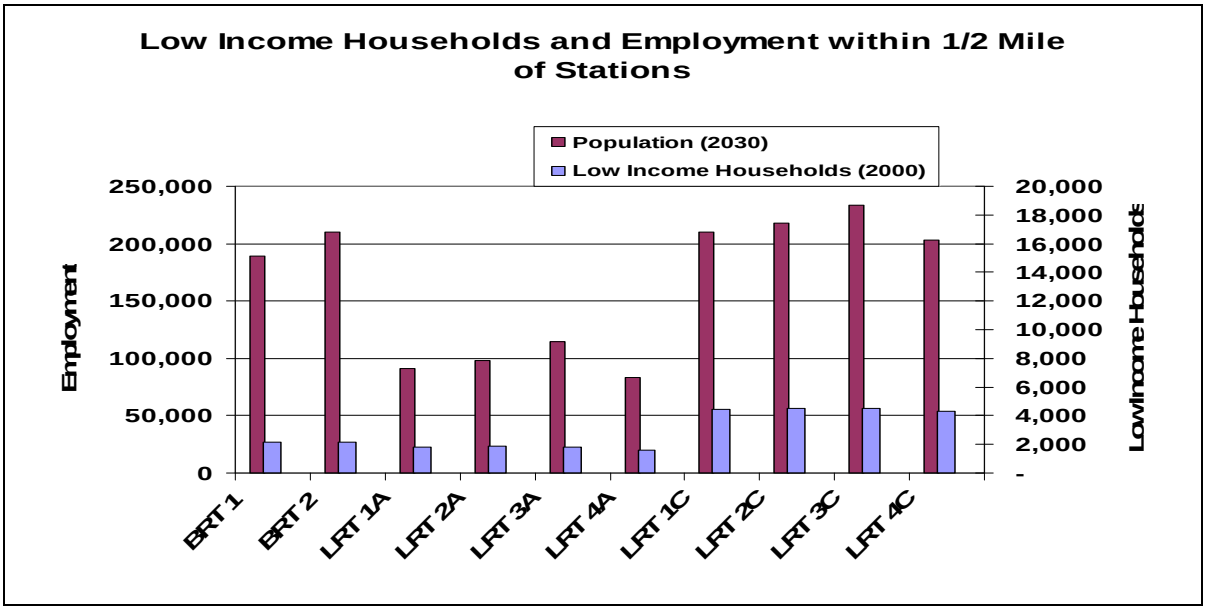
Access to employment opportunities for low-income households(2030) - Defined as the number of jobs and low-income households (below poverty level) within ½ mile of stations in the forecast year of 2030 based upon socioeconomic projections contained in the Metropolitan Council's travel demand model. Again, the jobs within ½ mile of the Hiawatha LRT stations (Warehouse, Nicollet, Government Center and Metrodome) that would be utilized by the LRT 1A, LRT 2A, LRT 3A and LRT 4A alternatives are not included in these calculations.

Ratings:	Strongly supports goal =	More than 4,000 low-income households More than 175,000 jobs
	Supports goal =	1,000 to 4,000 low-income households 75,000 to 175,000 jobs
	Does not support goal =	Less than 1,000 low-income households Less than 75,000 jobs

Results:
LRT 1C, LRT 2C, LRT 3C and LRT 4C are projected to have more than 4,000 low-income households within ½ mile of stations, and over 75,000 jobs within ½ mile of stations, and are therefore considered to strongly support the goal of preserving the quality of life.

BRT 1, BRT 2, LRT 1A, LRT 2A, LRT 3A and LRT 4A are projected to have between 1,000 and 4,000 low-income households within ½ mile of stations, and over 75,000 jobs within ½ of stations, and are therefore considered to support the goal of preserving the quality of life.

Figure 7.15 Low Income Households and Employment Within ½ Mile of Station



Intermodal connections - Defined as a measure of the quality of the pedestrian, bicycle, transit, and auto connections to/from station locations.

Ratings:	Strongly supports goal =	High at majority of stations
	Supports goal =	Moderate at majority of stations
	Does not support goal =	Poor at majority of stations

Results:
BRT 1, LRT 1A, LRT 4A, LRT 1C and LRT 4C have a high number of stations with direct connections to the bike/ pedestrian trail, moderately good access to the majority of stations for connecting buses, and moderately good access to the majority of stations for automobiles at stations that provide park-and-ride, and are therefore considered to strongly support the goal of preserving the quality of life in terms of pedestrian and bicycle access, and to support the goal of preserving the quality of life in terms of other transit and auto connections.

BRT 2, LRT 2A, LRT 3A, LRT 2C and LRT 3C have a moderate number of direct connections to the bike/ pedestrian trail at the stations, moderately good access to the majority of stations for connecting buses, and moderately good access for the majority of stations that provide park-and-ride, and are therefore considered to support the goal of preserving the quality of life in terms of pedestrian and bicycle access and to support the goal of preserving the quality of life in terms of other transit and auto connections.

Integration and documentation of transit-oriented development (TOD) opportunities/plans in local comprehensive plans – Defined as documentation of general transit-supportive development provisions in approved municipal comprehensive plans.

Ratings:	Strongly supports goal =	TOD exists and is planned throughout the alternative alignment
	Supports goal =	TOD exists and is planned in a majority of the alternative alignment
	Does not support goal =	No TOD planning in major portions of the alternative alignment

Results:
Local comprehensive plans in all study area cities contain transit-supportive policies.

The LRT 3C alignment has existing TOD, and the majority of the stations have special area studies completed as part of their city's comprehensive plan. LRT 3C is therefore considered to strongly support the goal of preserving the quality of life.

The majority of stations in alternatives BRT 2, LRT 3A, LRT 4A, LRT 1C, LRT 2C and LRT 4C have special area studies completed as part of their city's comprehensive plan, and are therefore considered to support the goal of preserving the quality of life.

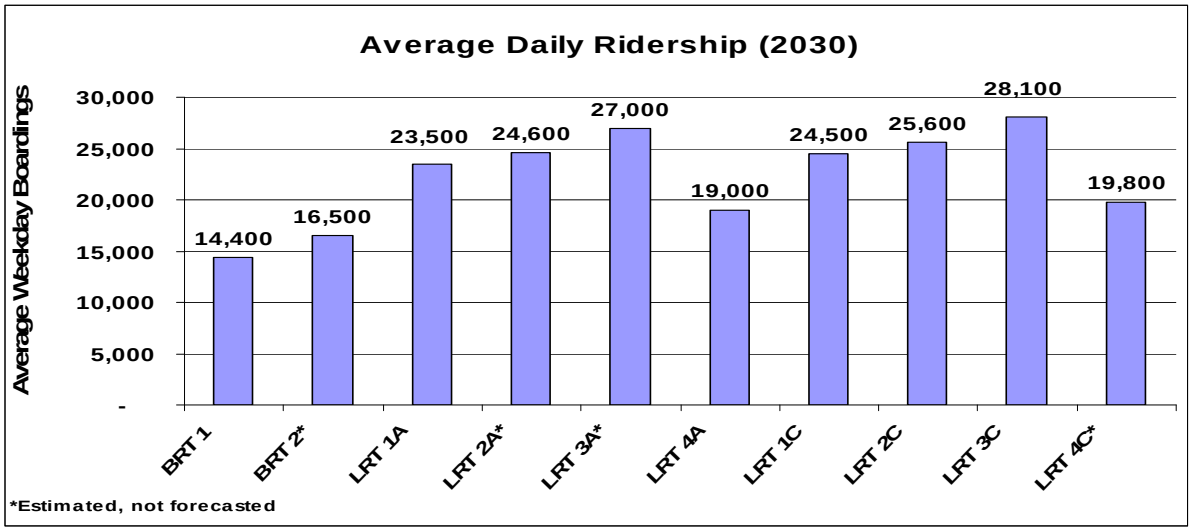
Less than half of the stations in alternatives BRT 1, LRT1A and LRT 2A have been identified for station area studies as part of their city's comprehensive plan. These alternatives are therefore considered to not support the goal of preserving the quality of life.

Transit Ridership Forecast (2030) – Defined as the number of transit riders in the forecast year of 2030, estimated using the Metropolitan Council's travel demand model.

Ratings:	Strongly supports goal =	More than 20,000 passengers per day
	Supports goal =	15,000 to 20,000 passengers per day
	Does not support goal =	Less than 15,000 passengers per day

Results:

Figure 7.16 Average Daily Ridership (2030)



LRT 1A, LRT 2A, LRT 3A, LRT 4A, LRT 1C, LRT 2C, LRT 3C and LRT 4C attract an average weekday ridership of over 20,000 passengers a day, and are therefore considered to strongly support the goal of preserving the quality of life.

BRT 2, LRT 4A and LRT 4C attract an average weekday ridership of between 15,000 and 20,000 passengers a day, and are therefore considered to support the goal of preserving the quality of life.

BRT 1 attracts an average weekday ridership of less than 15,000 and is therefore considered to not support the goal of the goal of preserving the quality of life.

Potential for intensification of land use around stations - Defined as the anticipated intensification of land use around stations for LRT and BRT based upon the results of national studies.

Ratings:	Strongly supports goal =	Research documents significant intensification likely
	Supports goal =	Research limited but supports intensification for bus transit if fixed guideway
	Does not support goal =	Research does not support intensification

Results:
National reports identify circumstances whereby intensification of land use (development or redevelopment) can be initiated by the introduction or enhancement of transit.[4] These

[4] Jeffery Smith and Thomas Gihring. "Financing Transit Systems Through Value Capture, An Annotated Bibliography," Victoria Transport Policy Institute, 2006

TCRP Report 90:Bus Rapid Transit: Volume 1: Case Studies in Bus Rapid Transit; Transportation Research Board, Washington D.C., 2003

studies and experiences also suggest that while transit by itself does not guarantee development around transit stations, transit can enhance and spur development, and supportive public policies can initiate or promote this effect.

Based on national research and the experience of other cities, LRT alternatives are anticipated to present the most significant potential for intensification of land use by virtue of the mode's success in attracting higher density development around fixed-guideway investments. The current intensification of development underway at Hiawatha LRT stations supports this assessment. LRT alternatives 1A, 2A, 3A, 4A, 1C, 2C, 3C and 4C are therefore considered to strongly support the goal of preserving the quality of life.

While BRT has demonstrated a modal viability for land use intensification,[5] there are suggestions in the studies that BRT can be perceived as less permanent than fixed rail systems, and therefore developers may be less likely to invest in the adjacent land. A reasonable hypothesis is that the closer the operation of a BRT system is to local street bus service, the less likely it would be to leverage the availability of transit to enhance and spur development.

The routes for BRT 1 and BRT 2 consist of a majority of exclusive bus-only guideways, with the remainder of the route being bus-only shoulders, and are therefore more like the fixed guideways of LRT than Enhanced Bus service. Therefore, BRT 1 and BRT 2 are considered to support the goal of preserving the quality of life.

Consistency with regional growth plans - Defined as documentation of consistency with *Metropolitan Council Blueprint, Transportation Policy Plan* (TPP) and *2030 Transit Plans*.

Ratings:	Strongly supports goal =	Fully consistent
	Supports goal =	Partially consistent
	Does not support goal =	Not consistent

Results:
BRT1, BRT2, LRT 1A, LRT 2A, LRT 3A, LRT 4A, LRT 1C, LRT 2C, LRT 3C and LRT 4C are all fully consistent within the area of corridor adopted in the *Metropolitan Council Blueprint, Transportation Policy Plan* (TPP) and *2030 Transit Plan*, and are therefore considered to strongly support the goal of preserving the quality of life.

Impact of park-and-ride lots on existing and planned development at stations - Defined as calculation of percent of land used by park-and-ride related to station area parking supply.

Ratings:	Strongly supports goal =	Station able to accommodate demand in planned area

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Robert Dunphy, et. al "Ten Principles for Successful Development Around Transit," Urban Land Institute 2003.

[5] *TCRP Report 90:Bus Rapid Transit: Volume 1: Case Studies in Bus Rapid Transit*; Transportation Research Board, Washington D.C., 2003

	Supports goal =	Station demand indicates shift to adjacent station required
	Does not support goal =	Stations unable to accommodate demand

Results:
Park-and-ride demand in BRT 1, BRT 2, LRT 1A, LRT 2A, LRT 3A, LRT 4A, LRT 1C, LRT 2C, LRT 3C and LRT 4C indicates a shift of parking is required from the Hopkins Station to adjacent stations. The Shady Oak and Blake Stations can accommodate the overflow parking. BRT 2, LRT 3A and LRT 3C park-and-ride demand indicates a shift of parking is required from the Eden Prairie Town Center Station to the SouthWest Metro Station, which can accommodate the demand. The westerly end of all the alternates requires some structured parking, which can be accommodated. All BRT and LRT alternatives are therefore considered to support the goal of preserving the quality of life.

Access to and accommodation of the existing and future trail system - Defined as access to existing and planned trails, and accommodation of trail system within the proposed transit project.

Ratings:	Strongly supports goal =	Continuous access throughout corridor, trail function maintained
	Supports goal =	Limited gaps in predominately available access, trail function maintained
	Does not support goal =	No access in significant segments of corridor

Results:
BRT 1, LRT 1A, LRT 4A and LRT 4C have direct connections to the trail system throughout the corridor, and the trail system along these alternatives is maintained. These alternatives are therefore considered to strongly support the goal of preserving the quality of life.

LRT 3A and LRT 1C have limited gaps southwest of Shady Oak along LRT 3A and north of 28th Street along LRT 1C, but predominately have access to the trail elsewhere throughout the corridor and are therefore considered to support the goal of preserving the quality of life.

LRT 2A and LRT 2C have no access west of Rowland for a significant segment of the corridor and are therefore considered to not support the goal of preserving the quality of life.

Table 7.5 Goal 4 Evaluation Ratings – Preserve the Quality of Life

Alternatives	Anticipated impact on property values[2]	Community amenities within 1/2 mile of stations	Employment opportunities for low income households within 1/2 mile of stations[3]		Intermodal Connections at Stations				Integration and documentation of TOD in local comprehensive plans	Intensification of land use around stations by mode	Forecast Ridership (2030)	Consistency with regional growth plans (qualitative)	Impact of park/ride lots on development at stations
			Low Income Households	Employment[4]	Pedestrian	Bicycle	Other Transit	Auto					
BRT 1 - Eden Prairie to Minneapolis, HCRRA	◑	○	◑	○	○	○	◑	◑	●	◑	●	○	◑
BRT 2[1] **-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/ TH 169/HCRRA	◑	○	◑	○	◑	◑	◑	◑	◑	◑	◑	○	◑
LRT 1A - Eden Prairie to Minneapolis, HCRRA/ Kenilworth/ Royalston	○	○	◑	◑	○	○	◑	◑	●	○	○	○	◑
LRT 2A[1] **-** Eden Prairie to Minneapolis, I-494/ HCRRA/ Kenilworth/ Royalston	○	○	◑	◑	◑	◑	◑	◑	●	○	○	○	◑
LRT 3A[1] **-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Kenilworth/ Royalston	○	○	◑	◑	◑	◑	◑	◑	◑	○	○	○	◑
LRT 4A - Hopkins to Minneapolis, HCRRA/ Kenilworth/ Royalston	○	○	◑	◑	○	○	◑	◑	◑	○	◑	○	◑
LRT 1C - Eden Prairie to Minneapolis, HCRRA/ Midtown/ Nicollet	○	○	○	○	○	○	◑	n/a	◑	○	○	○	◑
LRT 2C - Eden Prairie to Minneapolis, I-494/ HCRRA / Midtown/ Nicollet	○	○	○	○	◑	◑	◑	n/a	◑	○	○	○	◑
LRT 3C - Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Midtown/ Nicollet	○	○	○	○	◑	◑	◑	n/a	○	○	○	○	◑
LRT 4C[1] **-**Hopkins to Minneapolis, HCRRA/ Midtown/ Nicollet	○	○	○	○	○	○	◑	n/a	◑	○	◑	○	◑

[1]Estimated not modeled

[2]Based on national studies or national data

[3]Low Income Households from 2000 Census and defined as 60% of 7-county median family income ($59,358/$35,615); 2030 jobs from regional forecasts

[4]Because LRT A alternatives end at the Intermodal Station, these alternatives access downtown employment via the Hiawatha line. Downtown employment is therefore not reflected in "A" station area numbers.

Evaluation Breakpoints

● Does not support goal	Research does not support positive impact at stations	No amenities w/in 1/2 mi.	<1,000	<75,000	Poor at majority of stations	No TOD planning in major portions of the alternative	Research does not support intensification	< 15 thousand	Not consistent	Stations unable to accommodate demand
◑ Supports goal	Research supports general positive impact at stations	Amenities w/in 1/2 mi. of several stations	1000-4,000	75,000 - 175,000	Moderate at majority of stations	TOD exists and is planned in a majority of the alternative	Research limited but supports intensification for bus transit if fixed guideway	15-20 thousand	Partially consistent	Station demand indicates shift to adjacent station required
○ Strongly supports goal	Research supports definite postive impact at stations	Amenities w/in 1/2 mi. of all stations	>4000	>175,000	High at majority of stations	TOD exists and is planned throughout alternative	Research documents significant intensification	> 20 thousand	Fully consistent	Stations able to accommodate demand in planned area

[1]Estimated not modeled

7.5.5 Goal 5: Support Economic Development

The performance of the alternatives under the evaluation measures for Goal 2 is described below and summarized in Table 7.6.

TOD potential at station locations - Defined as description of adaptability of station area land for TOD, and corridor and station economic development market potential for transit oriented and supportive development.

Ratings:	Strongly supports goal =	Local comprehensive plans contain transit-supportive policies. TOD already present and/or multiple special area studies completed
	Supports goal =	Local comprehensive plans contain transit-supportive policies, special area studies proposed
	Does not support goal =	Limited TOD potential and/or planning

Results:
LRT 3C has existing TOD and the majority of the stations are within a planned growth area, and is therefore considered to strongly support the goal of supporting economic development.

BRT 2, LRT 3A, LRT 4A, LRT 1C, LRT 2C and LRT 4C have the majority of stations within a planned growth area and are therefore considered to support the goal of supporting economic development.

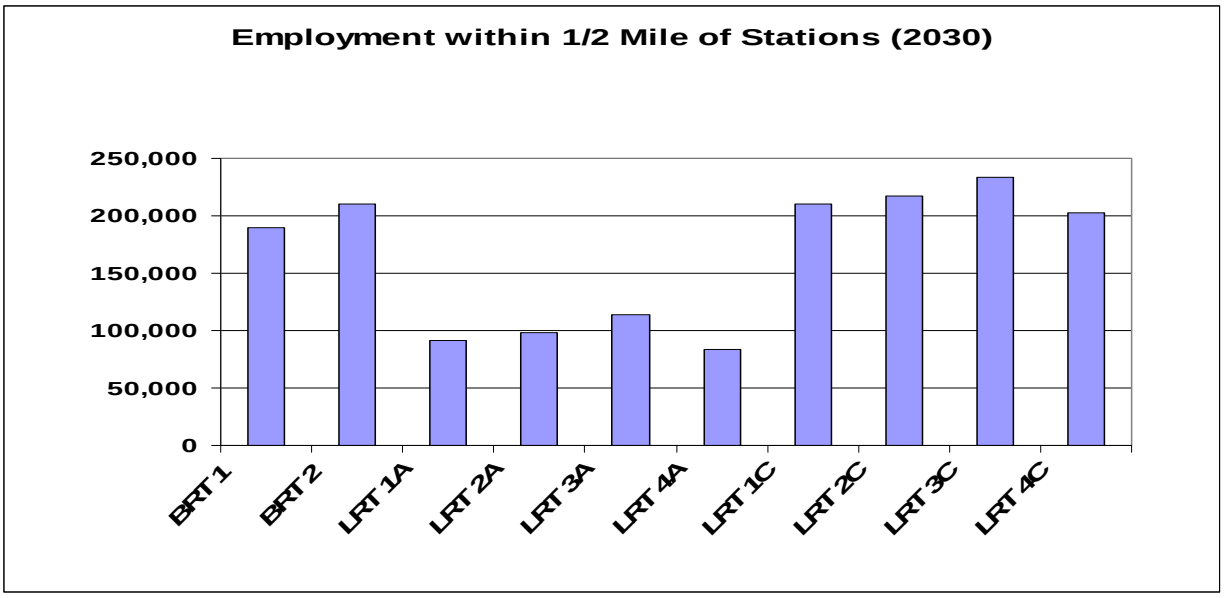
BRT 1, LRT1A and LRT 2A have major portions of the alternative outside a planned growth area and are therefore considered to not support the goal of supporting economic development.

Jobs within 1/2 mile of station (2030) - Defined as the number of jobs within ½ mile of stations based upon the Metropolitan Council's socioeconomic projects for the forecast year of 2030. As described previously, the jobs and population within ½ mile of the Hiawatha LRT stations that would be utilized by the LRT 1A, LRT 2A, LRT 3A and LRT 4A alternatives are not included in these calculations.

Ratings:	Strongly supports goal =	More than 175,000 jobs
	Supports goal =	75,000 to 175,000 jobs
	Does not support goal =	Less then 75,000 jobs

Results:

Figure 7.17 Employment Within ½ Mile of Stations (2030)



BRT 1, BRT 2, LRT 1C, LRT 2C, LRT 3C and LRT 4C are projected to serve more than 175,000 jobs and are therefore considered to strongly support the goal of supporting economic development.

LRT 1A, LRT 2A, LRT 3A and LRT 4A are projected to serve between 75,000 and 175,000 jobs and are therefore considered to support the goal of supporting economic development.

Other generators (schools, medical facilities, entertainment venues, etc.) - Defined as the number of schools, medical facilities, entertainment venues and other trip generators within ½ mile of stations.

Ratings:	Strongly supports goal =	More than 90
	Supports goal =	50 to 90
	Does not support goal =	Less than 50

Results:
Maps showing the other generators within ½ mile of stations can be found in *Technical Memorandum No. 4, Evaluation Process and Results.*

BRT 2, LRT 1C, LRT 2C and LRT 3C would serve more than 90 activity generators and are therefore considered to strongly support the goal of supporting economic development.

BRT 1, LRT 1A, LRT 2A, LRT 3A, LRT 4A and LRT 4C would serve between 50 and 90 activity generators and are therefore considered to support the goal of supporting economic development.

Consistency with local comprehensive plan goals regarding economic development and redevelopment at stations, including park-and-ride sites - Defined as documentation of specific station area transit-supportive development provisions in approved municipal comprehensive plans

Ratings:	Strongly supports goal =	Comprehensive plans support TOD in all segments of alignment; redevelopment planning underway throughout the alignment
	Supports goal =	Comprehensive plans support development at stations in all segments of alignment
	Does not support goal =	Comprehensive plans do not support development in significant segment of alignment

Results:
BRT 1, BRT 2, LRT 3A, LRT 4A, LRT 1C, LRT 3C and LRT 4C have comprehensive plans that support development in all segments of the alignment. Redevelopment planning is underway in all segments of these alignments and these alternatives are therefore considered to strongly support the economic development goal.

LRT 1A has comprehensive plans that support development at all the stations in all the segments of the alignment and therefore is considered to support the economic development goal.

LRT 2A and 2C have comprehensive plans that do not support development in a significant segment of the alignment along I-494, and these alternatives are therefore considered to not support the economic development goal.

Table 7.6 Goal 5 Evaluation Ratings – Support Economic Development

Alternatives	Existing & Planned TOD Potential at Station Locations (Qualitative)	Planned Jobs within 1/2 mile of station[2,3] (Year 2030)	Existing Other Generators within 1/2 mile of Stations	Consistency with local comprehensive plan goals regarding economic development & redevelopment at stations
BRT 1 - Eden Prairie to Minneapolis, HCRRA	●	○	◑	○
BRT 2[1] **-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/ TH 169/ HCRRA	◑	○	○	○
LRT 1A - Eden Prairie to Minneapolis, HCRRA/ Kenilworth/ Royalston	●	◑	◑	◑
LRT 2A[1] **-** Eden Prairie to Minneapolis, I-494/ HCRRA/ Kenilworth/ Royalston	●	◑	◑	●
LRT 3A[1] **-** Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Kenilworth/ Royalston	◑	◑	◑	○
LRT 4A - Hopkins to Minneapolis, HCRRA/ Kenilworth/ Royalston	◑	◑	◑	○
LRT 1C - Eden Prairie to Minneapolis, HCRRA/ Midtown/ Nicollet	◑	○	○	○
LRT 2C - Eden Prairie to Minneapolis, I-494/ HCRRA/ Midtown/ Nicollet	◑	○	○	●
LRT 3C - Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Midtown/ Nicollet	○	○	○	○
LRT 4C[1] **-** Hopkins to Minneapolis, HCRRA/ Midtown/ Nicollet	◑	○	◑	○

[1] Estimated not modeled

[2] FTA New Starts Evaluation Measure

[3] Because LRT A alternatives end at the Intermodal Station, these alternatives access downtown employment via the Hiawatha line. Downtown employment is therefore not reflected in "A" station area numbers.

Evaluation Breakpoints

● Does not support goal	Local comprehensive plans contain transit supportive policies. TOD already present and/or multiple special area studies completed	<75K	<50	Comprehensive plans do not support development in significant segment of alignment
◑ Supports goal	Local comprehensive plans contain transit supportive policies, special area studies proposed	75-175K	50-90	Comprehensive plans support development at stations in all segments of alignment
○ Strongly supports goal	Limited TOD potential and/or planning	>175K	>90	Comprehensive plans support TOD in all segments of alignment; redevelopment planning underway throughout alignment

[1] Estimated not modeled

7.6 Summary of Evaluation

Tier 1 Goals: Improve Mobility and Provide a Cost-Effective/Efficient Travel Option

Based upon the evaluation, LRT 1A, LRT 2A, LRT 3A and LRT 3C are considered to meet the goals of improving mobility and providing a cost-effective and efficient travel option.

BRT 1 and BRT 2 are considered to not meet the goals of improving mobility and providing a cost-effective/efficient travel option.

- Lower ridership than LRT - 14,400 to 16,500 vs. 23,500 to 28,100 passengers/day.
- Fewer new riders attracted to system - 1,300 to 2,300 vs. 3,800 to 7,500 new riders/day.
- Passenger capacity significantly lower than LRT - During a peak hour with a 7.5 minute headway a BRT system can serve 640 passengers while a LRT system can serve 2976 passengers. (This is due to LRT's ability to train vehicles)..
- System cannot accommodate peak hour demand - The estimated peak hour demand for BRT service is 2,000 passengers/hour which cannot be accommodated by a BRT operating on a 7.5 minute headway.
- Estimated to significantly exceed FTA's $29 CEI threshold for Preliminary Engineering - Estimated CEI of $66 to $74.

LRT 4A

LRT 4A does not meet the Tier 1 goals because it does not adequately serve the travel demand that exists in the Southwest metro area. LRT 4A is already encompassed in the full-length "A" alternatives. A shortened version of the preferred alignments may be identified as a future minimum operating segment (MOS) if required in the future. In the event an MOS is required as the initial phase of staged implementation of the full alternative selected, detailed analysis of impacts and mitigation required to serve as an interim route terminus would be undertaken.

- Sufficient ridership demand to extend line to Eden Prairie
- Relatively high per mile capital cost

LRT 1C, LRT 2C and LRT 4C

While LRT 1C, LRT 2C and LRT 4C are estimated to generate ridership levels equivalent to their "A" counterparts, they do not attract as many new transit riders, cannot be interlined with the Hiawatha and proposed Central LRT lines in downtown Minneapolis, are approximately $250 million higher in capital costs, and have a cost-effectiveness index that makes them unlikely to compete well for FTA New Starts Funding.

- Higher capital and operating costs compared to LRT 1A, 2A and 4A (approximately $250 million in 2015 dollars)

- Attract an equivalent number of passengers to LRT 1A, 2A and 4A
  (the “C” alternatives attract approximately 100 more passengers/day than the “A” alternatives)

- Attract fewer new riders than LRT 1A, 2A and 4A
  (the “C” alternatives attract approximately 700 fewer new passengers/day than the “A” alternatives)

- Cannot be interlined with the Hiawatha and/or Central LRT lines

- Estimated to exceed the FTA <$29 CEI threshold by more than 20%
  (LRT 1C = $ 37, LRT 3A = $ 38, LRT 3C = $ 41)

Tier 2 Goals: Protect the Environment, Preserve Quality of Life, and Support Economic Development

LRT 1A, LRT 3A and LRT 3C are considered to meet the goals of protecting the environment, preserving the quality of life, and supporting economic development.

LRT 2A is considered to not meet the Tier 2 goal of supporting economic development.

LRT 1A, LRT 3A and LRT 3C are considered to meet the goals of preserving the environment, protecting the quality of life, and supporting economic development. LRT 2A was considered to not adequately meet the Tier 2 goals because it does not provide the reverse commute and economic development opportunities of LRT 3A and LRT 3C, nor the capital and operating cost advantages of LRT 1A.

- Lack of good opportunity for TOD

- No current city planning for development/redevelopment west of Shady Oak Road

Table 7.7 summarizes the evaluation ratings under each goal for each alternative.

Table 7.7 Summary of Evaluation Ratings

Alternatives	Tier 1 Goals			Tier 2 Goals			Recommendation
	Goal 1: Improve Mobility	Goal 2: Provide a Cost-Effective, Efficient Travel Option	Results	Goal 3: Protect the Enviroment	Goal 4: Preserve and Protect the Quality of Life in the Study Area and Region	Goal 5: Support Economic Development	
Enhanced Bus (Baseline)	**Carry forward as Baseline alternative (Required)**			**Carry forward as Baseline alternative (Required)**			**Carry forward as Baseline Alternative**
BRT 1 - Eden Prairie to Minneapolis, HCRRA	●	●	Does not meet Tier 1 Goals; Do not carry forward				
BRT 2[1] - Eden Prairie to Minneapolis, Golden Triangle/Opus/TH 169/HCRRA	●	●	Does not meet Tier 1 Goals; Do not carry forward				
LRT 1A - Eden Prairie to Minneapolis, HCRRA/ Kenilworth/ Royalston	◑	◑	Meets Tier 1 Goals; Carry Forward to Tier 2	◑	◑	◑	**Carry forward for further analysis**
LRT 2A[1] - Eden Prairie to Minneapolis, I-494/HCRRA /Kenilworth/Royalston	◑	◑	Meets Tier 1 Goals; Carry Forward to Tier 2	◑	◑	◑	**Other alternatives better meet Tier 2 Goals. Do not carry**
LRT 3A[1] - Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Kenilworth/ Royalston	◑	◑	Meets Tier 1 Goals; Carry Forward to Tier 2	◑	◑	○	**Carry forward for further analysis**
LRT 4A - Hopkins to Minneapolis, HCRRA/ Kenilworth/ Royalston	●	◑	Part of full alternative. Do not carry forward				
LRT 1C - Eden Prairie to Minneapolis, HCRRA/ Midtown/ Nicollet	◑	●	Does not meet Tier 1 Goals; Do not carry forward				
LRT 2C - Eden Prairie to Minneapolis, I-494/ HCRRA/ Midtown/ Nicollet	◑	●	Does not meet Tier 1 Goals; Do not carry forward				
LRT 3C - Eden Prairie to Minneapolis, Golden Triangle/ Opus/ HCRRA/ Midtown/ Nicollet	◑	◑	Meets Tier 1 Goals; Carry Forward to Tier 2	◑	◑	○	**Carry forward for further analysis**
LRT 4C[1] - Hopkins to Minneapolis, HCRRA/ Midtown/ Nicollet	●	●	Part of full alternative. Do not carry forward				
[1]Estimated not modeled							
Evaluation Breakpoints							
● Does not support goal				Supports goal on fewer than 4 of 6 measures	Supports goal on fewer than 7 of 10 measures	Supports goal on fewer than 3 of 4 measures	
◑ Supports goal				Supports goal on 4 of 6 measures	Supports goal on 7 of 10 measures	Supports goal on 3 of 4 measures	
○ Strongly supports goal				Supports goal on all measures	Supports goal on all measures	Supports goal on all measures	

[1]Estimated not Modeled