

7 EVALUATION OF ATTRIBUTES, CONCLUSIONS AND NEXT STEPS

This chapter provides an analysis of the short-listed build alternatives presented in Section 6.4 based on attributes such as ridership, costs, and selected performance measures to inform regional decision-makers to advance transit improvement projects that effectively and efficiently satisfy the identified transportation and development needs in the study area. The alternatives under consideration are:

- **AV-CR:** Commuter Rail from downtown Pittsburgh to Arnold
- **AV-LRT:** Light Rail from downtown Pittsburgh to Arnold
- **EB-LRT (Monroeville/Murrysville):** Conversion of the East Busway to Light Rail from downtown Pittsburgh to Swissvale, Monroeville and eventually to Murrysville
- **EB-BW (Monroeville):** Extension of the East Busway from Swissvale to Monroeville
- **SL-LRT (Wilksburg):** Light Rail from downtown Pittsburgh to Oakland and Wilksburg
- **SL-LRT (Homestead):** Light Rail from downtown Pittsburgh to Oakland and Homestead
- **MV-LRT:** Light Rail from downtown Pittsburgh to Etna and McKeesport
- **NS-CR:** Commuter Rail from downtown Pittsburgh to Greensburg

7.1 EVALUATION MEASURES DEFINED

Seven measures were developed and applied to each alternative as follows:

- **Daily Transit Boardings (2025)** – The number of daily rides projected on each of the major transit investments described in Section 6.4. This measure represents the potential demand for the new investment based on the number of rides that it serves. Alternatives with higher boardings can reflect a system with sufficient service, competitive travel times, and travel within a densely populated service area. Lower boardings are indicative of a system with insufficient service, non-competitive travel times, and travel within a less populated service area. Lower boardings can also be attributed to the levels of service provided by the new investment and the markets served. For example, commuter rail alternatives typically have lower service frequencies than bus or light rail routes, where they seek to serve peak period commuters from long distances. In this case, lower ridership may be a result of lower service levels calibrated to the particular markets they serve and does not necessarily mean poor configuration of the alternative.
- **New Systemwide Daily Transit Passengers** – The increase in daily linked trips on the entire PAAC and WCTA transit systems due to the implementation of each alternative. This measure represents the alternative's ability to increase new riders on the entire regional transit system based on the implementation of the new investment. This measure captures new transit ridership resulting from the new investment's influence on the entire regional transit network through its enhancements to benefits such as regional transfers, total travel times, and overall convenience.
- **Capital Cost** – The cost to build each major transit investment, as described in Section 6.2. This measure represents the capital cost in 2002 dollars to implement the alternative and includes "hard" costs such as structures, trackwork, facilities, vehicles, and right-of-way, and "soft" costs such as environmental mitigation, project engineering, construction management, insurance, and contingency funds. Higher capital costs can be a function of the size of the alternative (i.e. length, number of vehicles) or complexity of the alternative (e.g. use of tunnel or elevated structures, right-of-way purchase, electrification). Lower capital costs would indicate a smaller alternative or one with less complexity (e.g. primarily at-grade, few stations). Note that this measure does not

indicate the performance of an alternative and is provided to represent the cost to implement an alternative in its entirety.

- **Annualized Capital Costs** – To facilitate the comparison of alternatives, which have annual operating and maintenance costs, plus lump sum capital costs, FTA requires that the capital costs be annualized. As noted in Section 6.2, this is done by multiplying the cost of each type of asset (such as vehicles, track, signaling, structures, etc.) by an annualization factor. This factor is based on the assumed life of the asset (25 years for rail vehicles, 12 years for buses, 30 years for structures, etc.) and a 7.0 percent discount rate as specified by the Federal Office of Management and Budget. When annualized costs are totaled for all of the assets in an alternative, the sum represents the equivalent uniform annualized capital cost for that alternative, and also represents the amount of money that would have to be invested annually to keep that alternative functioning in perpetuity. Conversion of the capital costs to annualized costs in this manner facilitates the comparison of alternatives' total costs on a normalized basis. The OMB specified methodology specifically excludes consideration of the impact of inflation.
- **Operating and Maintenance (O&M) Costs** – This measure, as described in Section 6.3, represents the additional annual costs in 2002 dollars for each alternative as compared to the No-Build, to operate and maintain the alternative on a daily basis and to keep the system in a state of good repair. O&M costs include labor, fuel or electricity, vehicle maintenance, non-vehicle maintenance (including guideway), fare collection, insurance, and administrative costs. Higher O&M costs are typical of alternatives with long service distances, frequent service, large vehicle fleets, and high ridership levels. Lower O&M costs can reflect alternatives with less frequent service, shorter alignments, and fewer riders. Note that this measure does not indicate the performance of an alternative and is provided to represent the cost to operate and maintain an alternative in its entirety.
- **Capital Cost per New Route Mile** – This measure represents the capital cost per new route mile constructed for the alternative enabling a comparison of the alternatives against costs. Total capital costs (2002 dollars) for the alternative were divided by the new route miles of the alternative. A higher capital cost per new route mile can be a function of the size of the alternative and/or complexity of the alternative as discussed above. Lower costs per new route mile could indicate a smaller alternative or one with less complexity.
- **Daily Transit Boardings per Route Mile** – This measure represents the alternative's ability to attract/generate transit trips in relation to the amount of new alignment constructed for its operation. While the distribution of passengers, especially the peak load, is not uniform across the entire alignment, this measure gives an overall view of how intensively the system is being utilized in relation to its length, an indication of its level of overall effectiveness. Daily transit boardings on the alternative are divided by route miles of the alignment. Higher daily transit boardings per new route mile can indicate a more efficient alternative.

The build alternatives and their attributes are discussed below. The TSM was not evaluated since its corridor components will automatically move forward should any of the build alternatives move to the next phases of project development.

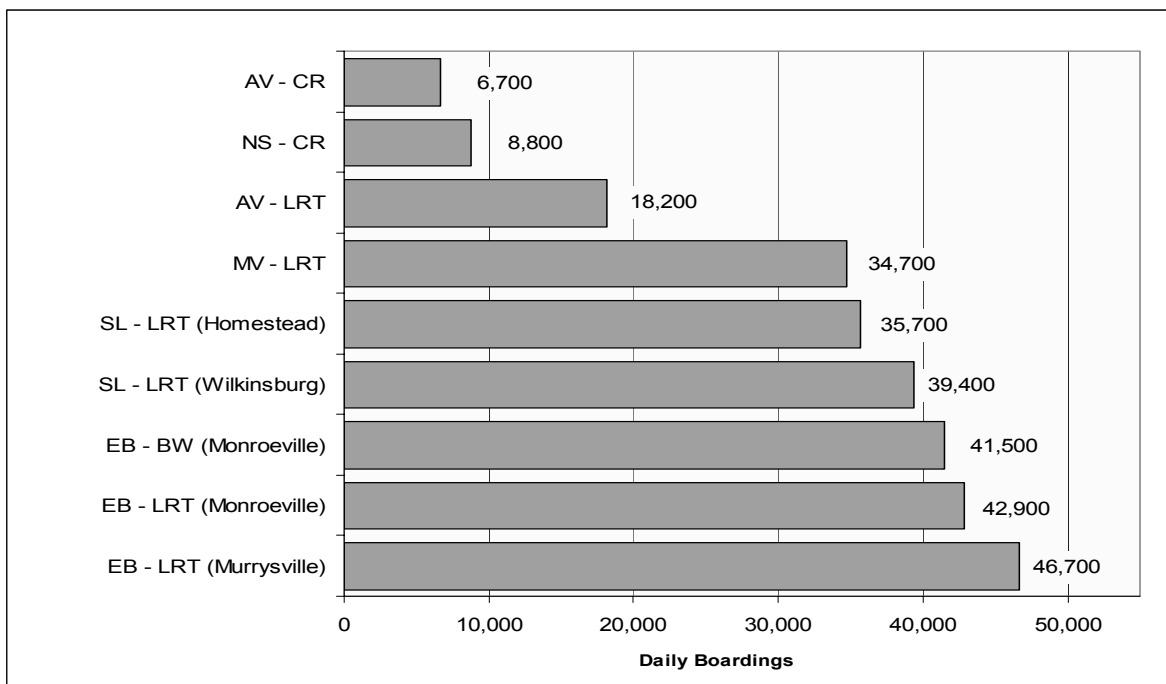
7.2 EVALUATION OF ALTERNATIVES

Values for the evaluation measures defined above are presented below for each of the build alternatives.

7.2.1 DAILY TRANSIT BOARDINGS (2025)

Exhibit 7-1 provides estimated daily transit boardings for each alternative that includes both existing transit riders attracted from currently operating transit services and new riders that did not previously use public transit.

Exhibit 7-1: Daily Transit Boardings (2025)



Daily transit boardings range from a low of 6,700 on the AV-CR alternative, to a high of 46,700 on the EB-LRT (Murrysville) alternative. Key highlights include:

- AV-CR** is projected to attract 6,700 daily transit boardings, nearly two-thirds less than projected for light rail in the same corridor. However, this estimate is based on a lower frequency service and a reduced number of stations when compared to the light rail alternative. This alternative performs well as a commuter rail service tapping into an underserved market within the study area.
- NS-CR** is estimated to attract 8,800 daily transit boardings, the second lowest among all alternatives but slightly higher than AV-CR, the only other commuter rail alternative. In general, the commuter rail alternatives have lower ridership levels than the light rail and busway alternatives due to their lower service frequencies and greater station spacings.

- **AV-LRT** is estimated to attract 18,200 daily transit boardings, which is significantly fewer than the Spine Line and East Busway corridor alternatives. Considering the low density of development in much of the area it serves, ridership projections for this alternative are relatively good.
- **MV-LRT** is estimated to attract 34,700 daily transit boardings, slightly less than the SL-LRT (Homestead) alternative discussed above. The MV-LRT alternative is composed of two separate branches, one to McKeesport and one to Etna that would produce 19,800 and 14,900 daily transit boardings, respectively. This alternative provides a high quality and attractive transit service to Etna and McKeesport, areas that are currently served by fixed route bus only.
- **SL-LRT (Wilkinsburg)** estimated at 39,400 daily transit boardings and **SL-LRT (Homestead)** at 35,700 daily transit boardings illustrate the next strongest potential for attracting total ridership among all alternatives. These alternatives serve the second and third largest activity centers in the state of Pennsylvania, downtown Pittsburgh and Oakland, where heavy traffic congestion and slow travel times are common, and transit usage is high based on existing bus service ridership levels in the corridor.
- **EB-LRT (Murrysville)** estimated at 46,700 daily transit boardings, **EB-LRT (Monroeville)** at 42,900 daily transit boardings and **EB-BW** at 41,500 daily transit boardings illustrate the alternatives showing the highest levels of ridership potential. The East Busway Corridor is well established from a development perspective with an existing high capacity, exclusive transit service that currently attracts high levels of ridership. Each of the proposed alternatives builds on these characteristics as evidenced by the significant ridership levels. It is important to note that the EB-LRT (Murrysville) has the highest ridership projections because it extends farther to the east than either of the other two East Busway alternatives.

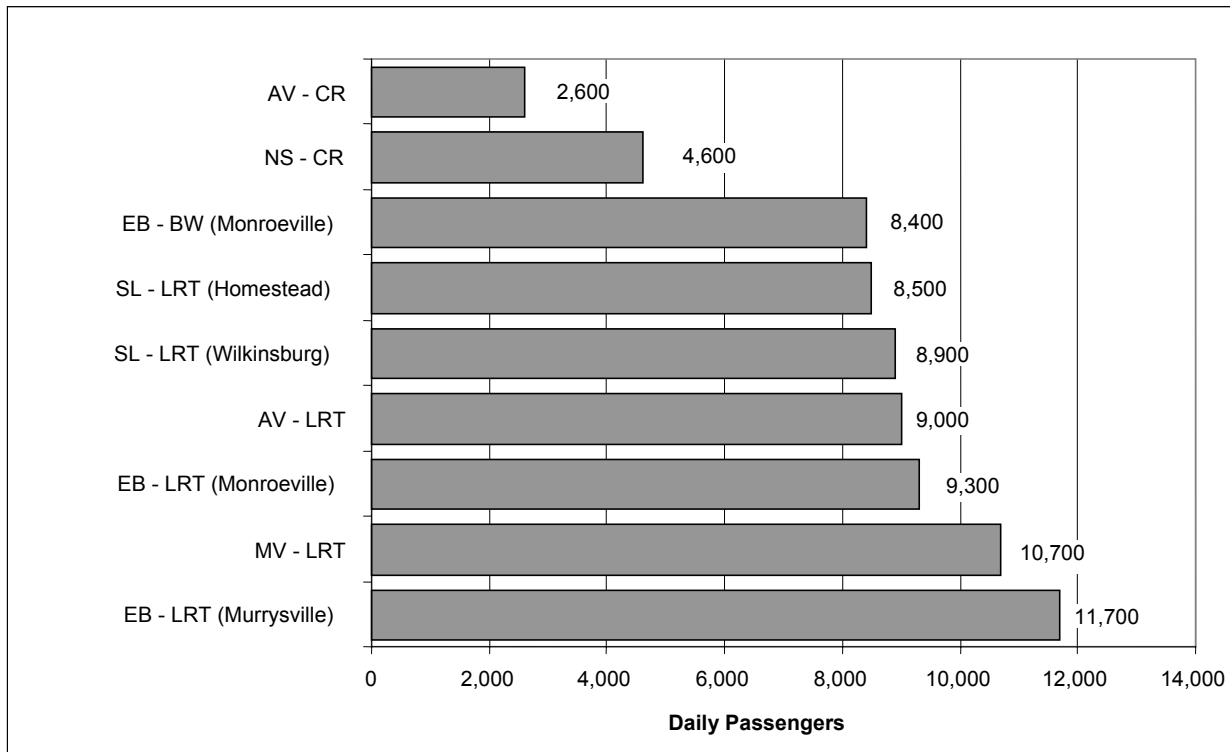
7.2.2 SYSTEMWIDE NEW DAILY TRANSIT PASSENGERS (2025)

Exhibit 7-2 illustrates estimated systemwide new daily transit passengers attracted to the entire transit system that would result from implementation of each alternative. These figures include only new transit riders that would not have used transit without the implementation of the new alternative.

New systemwide daily transit passengers range from a low of 2,600 on the AV-CR to a high of 11,700 on the EB-LRT (Murrysville). Key highlights include:

- **AV-CR** with an estimated 2,600 new transit passengers is lowest among all alternatives and just slightly lower than the **NS-CR** at 4,600, the only other commuter rail alternative. However, the lower level of new passengers can partially be attributed to the low level of service configured for this commuter rail type operation.
- **EB – BW (Monroeville)** at 8,400, **SL – LRT (Homestead)** at 8,500, **SL – LRT (Wilkinsburg)** at 8,900, **AV – LRT** at 9,000 and **EB – LRT (Monroeville)** at 9,300 all fall within the same range for new systemwide daily transit passengers.

Exhibit 7-2: New Systemwide Daily Transit Passengers (2025)



- MV-LRT** is estimated to attract 10,700 new systemwide daily transit passengers, second highest among all alternatives. This alternative provides a significant improvement to existing transit service given the high quality connections from the Etna area to Downtown along Route 28, and from the Mon-Valley. Both areas are currently served by several bus routes, but daily traffic congestion degrades their level of service. It also serves two distinct areas of the study corridor, the northeast (Etna) and the southeast (McKeesport), compared to one corridor served by each of the other alternatives.
- EB-LRT (Murrysville)** is estimated to attract 11,700 new systemwide transit passengers, highest among all alternatives but just slightly higher than the MV-LRT. The extension to Murrysville adds 2,400 more riders than LRT to Monroeville by providing high quality LRT service in an elevated alignment over Route 22.

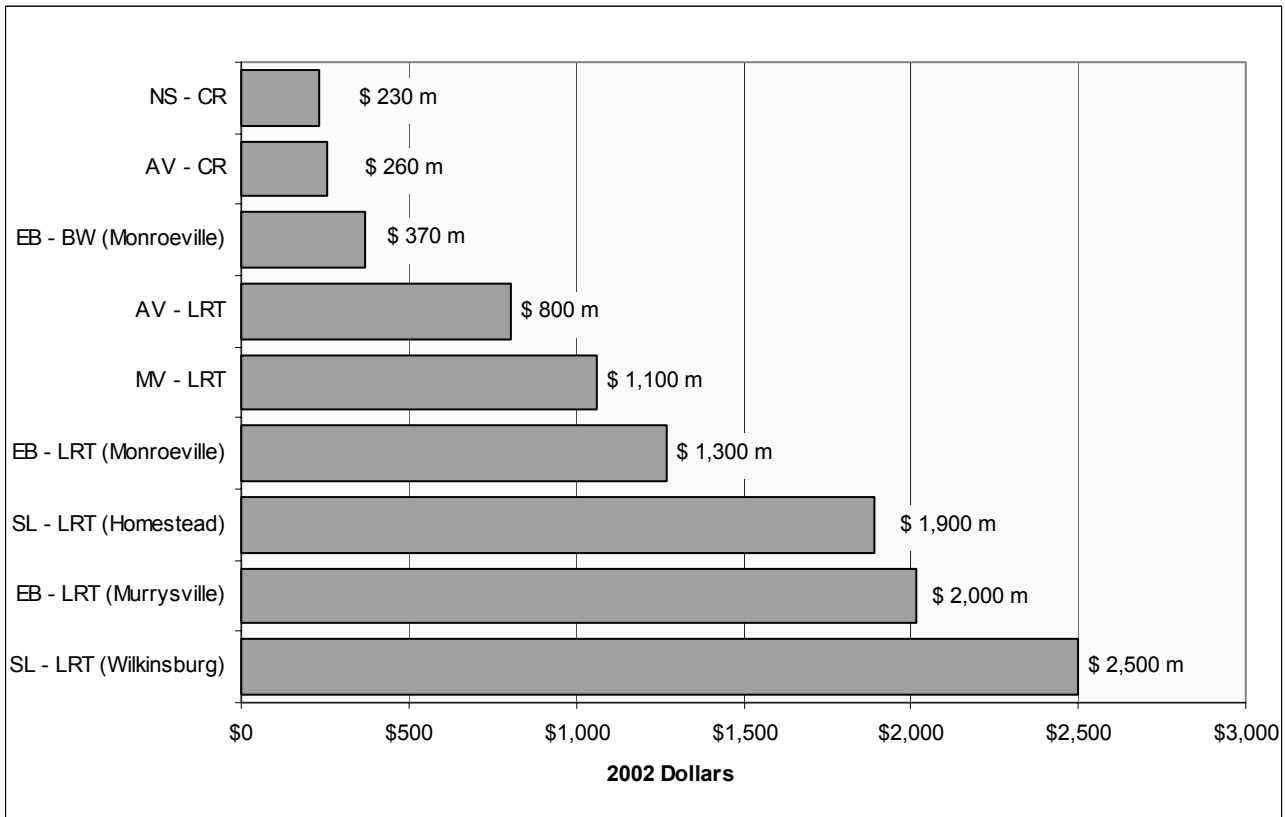
7.2.3 CAPITAL COST

The estimated capital cost for each alternative is presented in **Exhibit 7-3** and the annualized capital cost for each alternative is shown in **Exhibit 7-4** (annualized capital costs are shown for informational purposes only). These costs were calculated in accordance with the methodology detailed in Section 6.2 of this report.

Capital costs range from a low of \$230 million (\$19 million annualized) for the AV-CR to a high of \$2.5 billion (\$189 million annualized) for the EB-LRT (Murrysville). Key highlights include:

- NS-CR and AV-CR** are the least expensive among all alternatives at \$230 million (\$19 million annualized) and \$260 million (\$21 million annualized) respectively. Both of these alternatives assume the use of existing freight railroad rights-of-way for the operation of vehicles meeting the Federal Railroad Administration’s (FRA’s) vehicle requirements for simultaneous operation with freight vehicles. In the case of the NS-CR, given the excellent condition of the right-of-way and existing track, few upgrades would be required to implement a high quality commuter rail service with the exception of adding a third track from Greensburg to East Pittsburgh, park & ride and station facilities. Although the AV-CR is shorter than the NS-CR, the costs assume significant upgrades to track and systems given the poor quality of the existing infrastructure. Additionally, the AV-CR costs include allowances for park & ride facilities, new vehicles and ownership of the railroad property because of the large investment in the infrastructure.

Exhibit 7-3: Capital Costs (2002 Dollars)

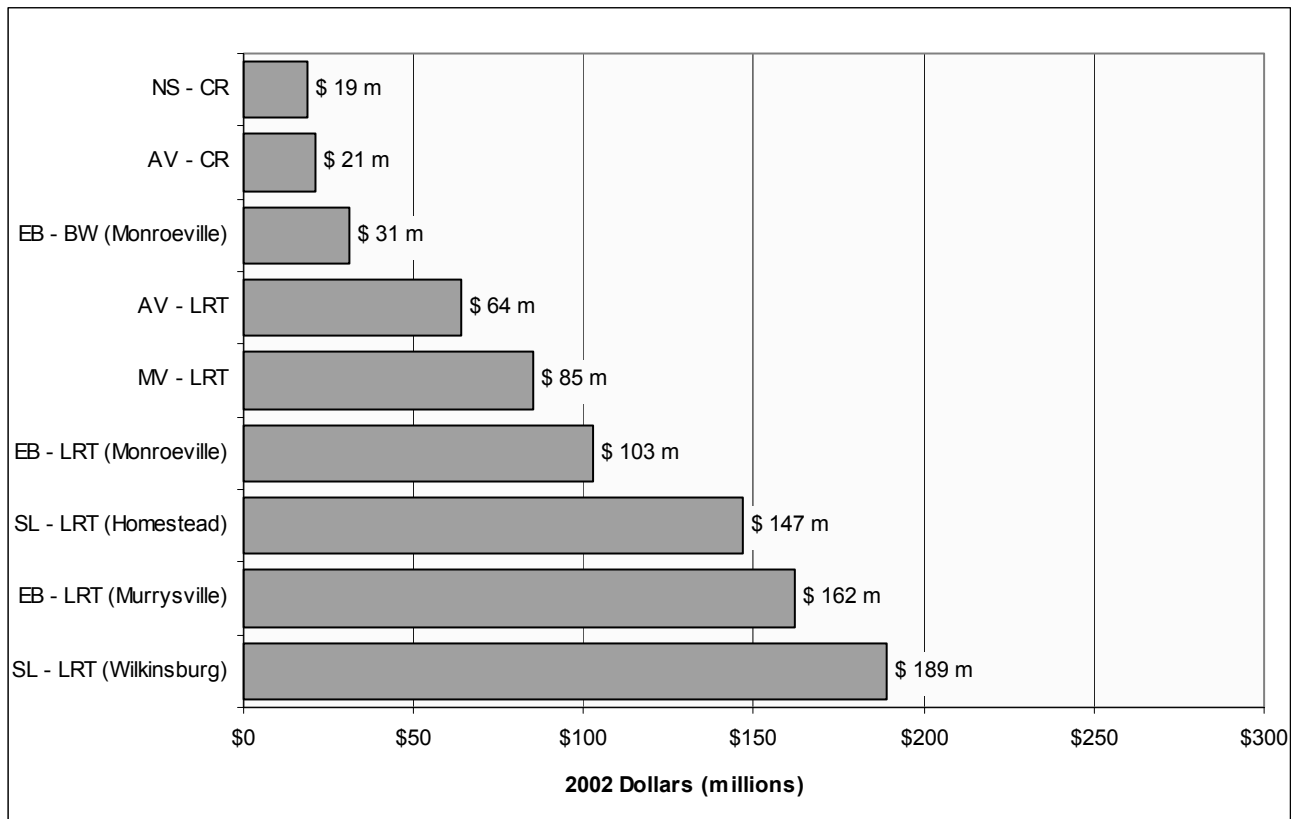


- EB-BW (Monroeville)** at \$370 million (\$31 million annualized) is among the least expensive of the alternatives to construct due to its relatively short route length (6.6 miles), extension of an existing facility (i.e. East Busway), compatibility with existing bus fleet, and slightly lower typical cost on a per mile basis when compared to light rail.
- AV-LRT and MV-LRT** are estimated at \$800 million (\$64 million annualized) and \$1.1 billion (\$85 million annualized) respectively. Both alternatives require a new short tunnel connection to the Convention Center station below 14th Street for access into the Downtown “T” system. The MV-LRT requires an elevated ramp structure to the CSX bridge at 33rd Street and a widening of Schenley Tunnel under Oakland for double tracking. Both alternatives require the purchase of railroad

rights-of-way, the AVR for AV-LRT and CSX railroad property for MV-LRT, and significant investments in vehicles and maintenance/storage facilities.

- **EB-LRT (Monroeville)** is estimated to cost approximately \$1.3 billion (\$103 million annualized) for a complete conversion of the existing East Busway to light rail and an extension to Monroeville Mall from East Pittsburgh along railroad right-of-way and on a retained cut on the high grade toward the mall.
- **SL-LRT (Homestead)** at \$1.9 billion (\$147 million annualized), is the third most expensive of the alternatives. Although the SL-LRT (Homestead) alternative travels at-grade from Oakland to Homestead in existing CSX right-of-way, it requires underground infrastructure from Steel Plaza to Oakland. SL-LRT (Homestead) costs could be reduced by using entirely at-grade guideway or could be spread over a larger time period by using phased construction.

Exhibit 7-4: Annualized Capital Costs (2002 Dollars)



- **EB-LRT (Murrysville)** at \$2.0 billion (\$162 million annualized) is the second most expensive alternative. This alternative requires a complete conversion of the existing East Busway to light rail, a partially-elevated extension to Monroeville Mall, and a fully-elevated extension to Murrysville to avoid large disruption impacts to development on Route 22.
- **SL-LRT (Wilkinsburg)** at \$2.5 billion (\$189 million annualized) is the most expensive of the alternatives due to its underground construction from Steel Plaza through the Hill District, Oakland and Squirrel Hill to Wilkinsburg. Costs for this alternative could be reduced with the use of at-grade guideway or spread over a longer period of time by phasing the construction.

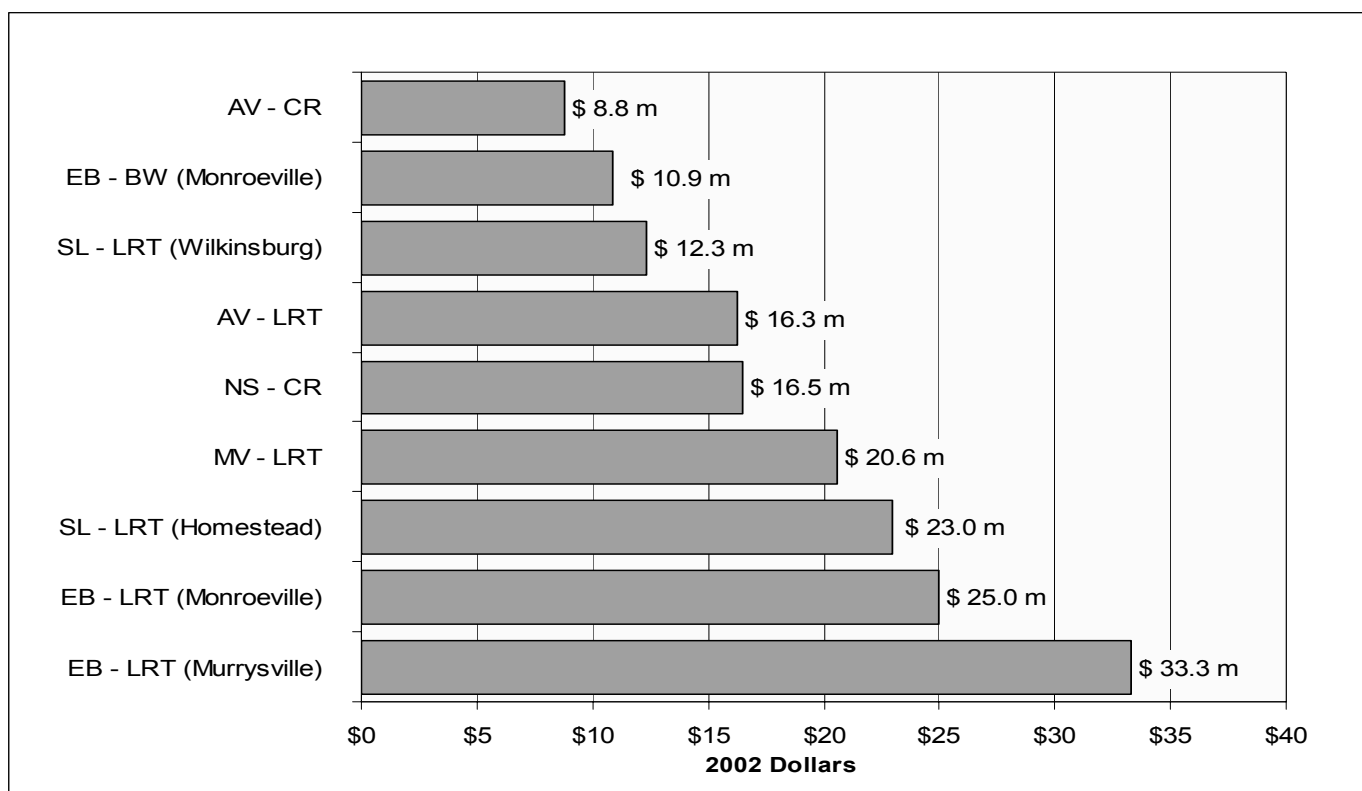
7.2.4 ANNUAL INCREMENTAL OPERATING AND MAINTENANCE COST

Exhibit 7-5 presents the operating and maintenance costs for each alternative.

Operating and maintenance costs range from a low of \$8.8 million for the AV-CR to a high of \$33.3 million on the EB-LRT (Murrysville). Key highlights include:

- **AV-CR** Incremental O&M costs are estimated at \$8.8 million annually, lowest among all alternatives. This estimate is based on 30-minute peak and 90-minute off-peak headways between Arnold and downtown Pittsburgh. Five-car trains are required to serve peak-hour passenger demand. The estimate does include the O&M costs to operate the frequent shuttle bus service between the 16th Street Station and downtown Pittsburgh.

Exhibit 7-5: Annual Incremental O&M Costs (2002 Dollars)



- **EB-BW (Monroeville)** Incremental O&M costs are estimated at \$10.9 million annually, second lowest among all alternatives. This estimate is based on three main service lines from Downtown to Oakland, Downtown to Monroeville Mall and Oakland to Monroeville Mall with each line providing 10-minute peak and 15-minute off-peak service.
- **SL-LRT (Wilkinsburg)** Incremental O&M costs are estimated at \$12.3 million annually based on a 5-minute peak and 7.5-minute off-peak service with two-car trains to serve peak hour passenger demand. This alternative is shorter than the SL-LRT (Homestead), has a lower peak load factor, and included more reductions in existing bus services in the corridor.

- **AV-LRT** Incremental O&M costs are estimated at \$16.3 million annually based on a 10-minute peak and 20-minute off-peak service with three-car trains to serve peak hour passenger demand.
- **NS-CR** Incremental O&M costs are estimated at \$16.5 million annually and are based on 30-minute peak and 90-minute off-peak headways between Greensburg and downtown Pittsburgh. Four-car trains are required to serve peak hour passenger demand. This estimate also includes a train-mile fee that would be paid to NS for the use of their railroad right-of-way based on the assumption that the alignment would not be available for purchase.
- **MV-LRT** and **SL-LRT (Homestead)** Incremental O&M costs are estimated at \$20.6 million and \$23.0 million annually. MV-LRT provides service on two lines, Downtown to McKeesport and Downtown to Etna on 10-minute peak and 20-minute off-peak headways with three-car trains for each service line. SL-LRT (Homestead) provides 5-minute peak and 7.5-minute off-peak service with three car trains to serve peak hour passenger demand.
- **EB-LRT (Monroeville)** and **EB-LRT (Murrysville)** Incremental O&M costs are estimated at \$33.3 million and \$25.0 million annually, both alternatives offer the same three main service lines as the busway alternative, but EB-LRT (Murrysville) provides those services over greater distances than any of these alternatives.

7.2.5 CAPITAL COST PER NEW ROUTE MILE

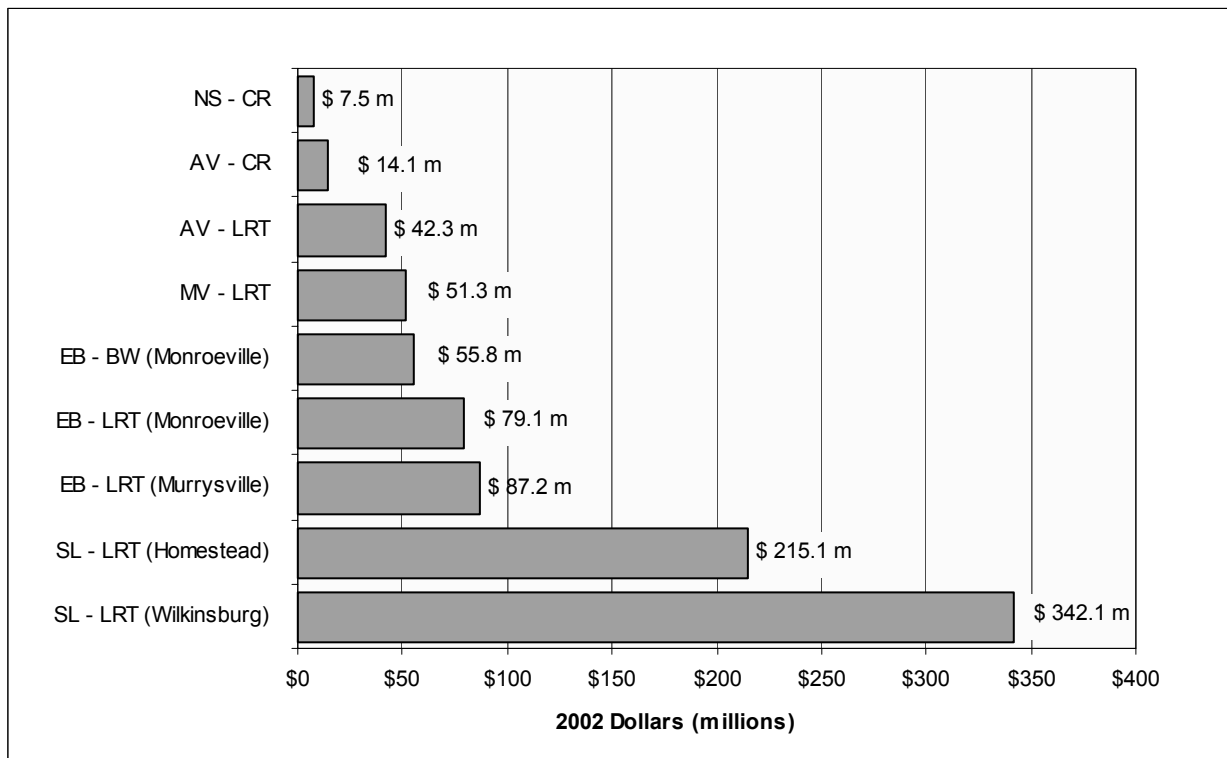
Capital cost per new route mile, which is the total capital costs normalized by the length of the alignment, is presented for each alternative in **Exhibit 7-6**. This measure allows a more level comparison of the capital costs for each alternative.

Capital cost per new route mile ranges from a low of \$7.5 million for the NS-CR to a high of \$342.1 million on the SL-LRT (Wilkinsburg). Key highlights include:

- **NS-CR** at \$7.5 million and **AV-CR** at \$14.1 million are the least expensive alternatives on a per new route mile basis given the use of existing right-of-way, lower number of stations on a per mile basis and lower service frequencies which directly affect the amount of rolling stock required for implementation of service.
- Three alternatives fall between \$42 million per mile and \$56 million per mile:
 - **AV-LRT** is estimated at \$42.3 million per mile based on the use of the AVR to provide light rail service from Downtown to Arnold.
 - **MV-LRT** is estimated at \$51.3 million per mile based on its two-branch service which is primarily at-grade except for the ramp to, and use of, the 33rd Street bridge, widening of Schenley Tunnel, and tunnel connection to the Convention Center Station.
 - **EB-BW (Monroeville)** is estimated at \$55.8 million per mile based on the use of the NS Railroad right-of-way from Swissvale to East Pittsburgh and elevated guideway up through the Union Railroad right-of-way prior to the approach to Monroeville Mall.
- **EB-LRT (Monroeville)** at \$79.1 million per new route mile is significantly higher than the EB-BW (Monroeville) due to the need to convert the existing busway to light rail and for the complex approach to Monroeville Mall combined with the need for substantial rolling stock for the three services between Downtown, Oakland, and Monroeville.

- **EB-LRT (Murrysville)** is third highest among the alternatives at \$87.2 million per mile due to the costly requirements for conversion of the existing busway and the need for elevated structure beyond Monroeville Mall along Route 22 and large fleet requirements.
- **SL-LRT (Homestead)** and **SL-LRT (Wilkinsburg)** are the most expensive alternatives per new route mile at \$342.1 and \$215.1 million respectively. It is important to note that both include long sections of underground alignment that significantly increase construction costs for both the guideway and stations. The SL-LRT (Wilkinsburg) alternative was estimated with its entire alignment underground, while the SL-LRT (Homestead) included both underground and at-grade alignment with the use of the CSX right-of-way for access to Hazelwood and Homestead. Costs for these alternatives could be reduced with the use of an at-grade alignment through Oakland, or financed over a longer time period by phasing construction.

Exhibit 7-6: Capital Cost per New Route Mile (2002 Dollars)

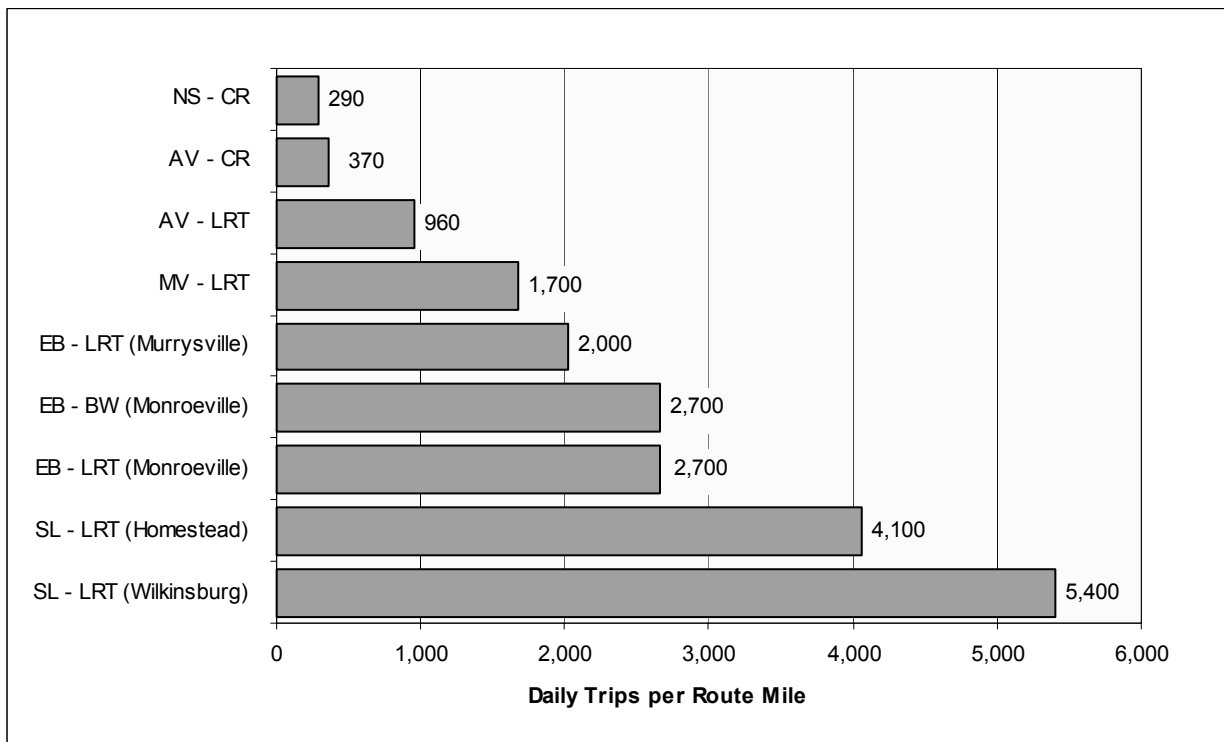


7.2.6 DAILY TRANSIT BOARDINGS PER ROUTE MILE

Exhibit 7-7 provides daily transit boardings on each transit investment per new route mile. This is a measure of the productivity of a transit investment normalized by its length.

Daily transit boardings on the transit investments per new route mile range from a low of 290 trips for the NS-CR to a high of 5,400 trips for the SL-LRT (Wilkinsburg). Key highlights include:

Exhibit 7-7: Daily Transit Boardings per Route Mile



- **NS-CR** and **AV-CR**, the two commuter rail alternatives, have the lowest number of daily transit boardings per new route mile at 290 and 370 trips respectively. The alignment for NS-CR is the longest of all alternatives at approximately 31 miles with the second lowest number of daily boardings causing its lowest ranking. AV-CR is approximately the same length as the light rail alternative in the same corridor, but attracts fewer riders than the light rail since it stops at fewer stations and operates significantly less frequently, giving it the second lowest ranking among the short-listed alternatives.
- **AV-LRT** would attract 960 daily transit boardings per route mile, significantly fewer than most of the other light rail alternatives. This is primarily due to the alignment’s location in less densely developed communities.
- **MV-LRT** as a whole alternative would attract approximately 1,700 passengers per route mile. When split into the two branches, it becomes apparent that the branch to Etna is more productive in terms of boardings per route mile with 2,900 as compared to 1,150 to McKeesport.
- **EB-LRT (Murrysville)** would attract approximately 2,000 daily transit boardings per route mile, slightly more than the AV-LRT and MV-LRT light rail alternatives but less than EB-LRT and EB-BW (Monroeville).
- **EB-BW (Monroeville)** and **EB-LRT (Monroeville)** would each attract 2,700 boardings per route mile. Both alternatives are among the highest in daily transit boardings and have similar alignment lengths causing them to be ranked second only to the Spine Line Corridor alternatives.
- **SL-LRT (Homestead)** and **SL-LRT (Wilkinsburg)** are ranked the two highest among the alternatives at 4,000 and 5,400 boarding per route mile respectively. As discussed in previous

sections, both of these two alternatives travel through some of the densest and most active areas in the study area, attracting significant numbers of riders on relatively short alignment lengths.

7.3 CONCLUSIONS AND IMPLEMENTATION STRATEGIES

The detailed analysis conducted in this study provides information on each of the short-listed alternatives with regard to specific attributes that allow for an evaluation and identification of those alternatives that provide the greatest opportunities to satisfy the identified transportation and development needs in the ECTS study area. Each alternative has advantages and disadvantages associated with its implementation as a major transportation investment in the study area. This section suggests advancing several of the alternatives into subsequent phases of planning and environmental analysis. The alternatives under consideration are:

- **AV-CR:** Commuter Rail from downtown Pittsburgh to Arnold
- **AV-LRT:** Light Rail from downtown Pittsburgh to Arnold
- **EB-LRT (Monroeville/Murrysville):** Conversion of the East Busway to Light Rail from downtown Pittsburgh to Swissvale, Monroeville and eventually to Murrysville
- **EB-BW (Monroeville):** Extension of the East Busway from Swissvale to Monroeville
- **SL-LRT (Wilkinsburg):** Light Rail from downtown Pittsburgh to Oakland and Wilkinsburg
- **SL-LRT (Homestead):** Light Rail from downtown Pittsburgh to Oakland and Homestead
- **MV-LRT:** Light Rail from downtown Pittsburgh to Etna and McKeesport
- **NS-CR:** Commuter Rail from downtown Pittsburgh to Greensburg

It is important to note the conclusions or implementation strategies herein for next steps are made in relation to the federal process, in order to be eligible to use federal funds. If federal funds are not to be used, a different process to advance alternatives might be pursued. Furthermore, even if federal funds are to be pursued, the decision on level of effort to be followed is a collaborative one, that is identified at the time the decision is at hand, and takes into account local and regional conditions.

7.3.1 AV-CR

This alternative has the potential to attract a reasonable level of ridership including new transit trips systemwide with a low capital investment and performed well based on total capital costs, incremental O&M costs and capital cost per new route mile. In addition, this alternative has wide public support to move forward including confirmed cooperation from the AVR. The following steps are suggested for this alternative:

- Move forward into a full Alternatives Analysis and Environmental Analysis (e.g. DEIS or EA) to more fully assess and define commuter rail in the corridor and to identify the environmental impacts that could be encountered during implementation.
- Investigate more thoroughly the three different levels of investment for commuter rail within this corridor including the Full Build Alternative, Starter System and Minimal Investment System. This effort should also include an evaluation of various rolling stock technologies that would be applicable in the corridor.
- Develop, as part of this investigation, an option to improve the connection into downtown Pittsburgh, as this alternative currently must utilize a shuttle bus from a terminus at 16th Street. A

possible modification could involve extending the "T" to meet the AV-CR in the Strip District for an improved connection to downtown Pittsburgh. This would provide better service to the pedestrian-oriented Strip District, allow for a possible future light rail extension, and provide single-transfer access to major Downtown destinations and stations along the "T".

- Continue coordination with the AVR to ensure a smooth transition to passenger service with regard to use or purchase of the right-of-way and co-existence with freight railroad service.

7.3.2 AV-LRT

This alternative also has the ability to attract a reasonable level of ridership, albeit at a more significant level of investment than for commuter rail and with a modest increase in patrons over AV-CR, given the additional cost. AV-LRT has the lowest ridership levels among the light rail alternatives and is slightly less expensive on a cost-per-mile basis. The following steps are suggested for this alternative:

- Consider light rail only on the segment from the Convention Center to one of the proposed commuter rail stations in the Strip District (as described under and as part of AV-CR). That would be the most logical use of this technology due to good pedestrian access in this area. Extension of the light rail through the Strip District would result in a core light rail system linking four major activity centers in the heart of Pittsburgh: Downtown, Station Square, North Shore, and the Strip District.
- Do not move the remainder of this alternative forward into the next phases of project development given the findings on the commuter rail alternative in this corridor.

7.3.3 EB-BW (MONROEVILLE)

The extension of the existing East Busway to Monroeville builds upon an existing and well-utilized transit service and facility that currently operates between Downtown and Swissvale. This alternative performed relatively well, especially in the categories of capital costs and incremental O&M costs. It is important to note that costly infrastructure would be needed at the east end of the alignment in order to traverse the topography of the Turtle Creek area and to access Monroeville Mall. The following steps are suggested for this alternative:

- Move this alternative forward into a full Alternatives Analysis and Environmental Analysis (e.g. DEIS) to detail the available busway options and environmental impacts of the project.
- Examine the options for reducing the alignment length to the area of East Pittsburgh as a first phase in an effort to manage construction costs and expedite implementation. Consider use of the future extension of the Mon-Fayette Expressway facility for a combined and more cost-effective facility to access Monroeville with the extension from East Pittsburgh traveling within the existing expressway lanes or on an exclusive lane. Coordinate future planning efforts with the Pennsylvania Turnpike Commission's efforts to implement the Mon-Fayette Expressway.

7.3.4 EB-LRT (MONROEVILLE & MURRYSVILLE)

Both of these alternatives require significant capital investments with the conversion of the existing East Busway to a light rail facility at \$1.3 billion, including the extension to Monroeville and an additional \$881 million for the further expansion to Murrysville. When compared to EB-BW (Monroeville), the EB-LRT (Monroeville) does not perform well. For example, the conversion and extension of the busway to light rail at \$1.3 billion only attracts 1,400 more boardings than the East Busway extension that would cost approximately \$368 million (nearly one-billion less). More importantly, the funding to convert the existing East Busway to light rail would likely not be available from the Federal Transit Administration since it funded a significant portion of the current busway and would be deemed as a redundancy of investment and funding for a transit service that achieves little to no incremental mobility benefits.

Although the segment from Monroeville to Murrysville shows some promise for attracting new ridership, it does not warrant the costly and disruptive infrastructure required to provide adequate service along Route 22 at a cost of approximately \$750 million. Bus rapid transit in the form of an express bus service along Route 22 would serve this area more efficiently. The following steps are suggested for these alternatives:

- Eliminate these two alternatives from further study based on their performance, high cost to implement, and redundancy with the existing and recently extended East Busway to Swissvale.
- Coordinate transit planning efforts with the communities and businesses along the Route 22 corridor to increase the effectiveness of the existing public transportation system through more improved and expanded bus service and increased park & ride facilities and access.
- Implement use of cleaner-fuel buses in the East Busway Corridor as per 2006 EPA regulations.

7.3.5 SL-LRT (WILKINSBURG/HOMESTEAD)

As defined in this study, these alternatives share a common alignment to reach and serve Oakland with SL-LRT (Wilkinsburg) continuing through Squirrel Hill to Wilkinsburg and SL-LRT (Homestead) continuing through Hazelwood on CSX right-of-way to Homestead. Both alternatives attract similar and reasonable levels of total ridership, new systemwide boardings, and boardings per route mile but at high capital costs. It is important to note however, that total incremental O&M costs for both alternatives appear reasonable due to the substitution of light rail service for the existing bus services that traverse the corridor. As discussed in the previous chapter, at-grade options through Oakland can significantly reduce the overall capital costs for these projects and phasing of project construction could spread those costs over a longer time period to allow for more incremental funding. In addition, both of these alternatives received strong public support based on the high quality connection between Oakland and downtown Pittsburgh. The following steps are suggested for these alternatives:

- Move the SL-LRT (Homestead) forward into a full Alternatives Analysis and Environmental Analysis (e.g. DEIS) to detail the available alignment and structural options for providing access to the Hill District, 5th/Forbes corridor, Oakland, and Homestead. SL-LRT (Homestead) received strong public support, particularly due to its east/west accessibility through Oakland in combination with service to Hazelwood and Homestead, two areas not currently served by a major high-quality transit investment. The possibility of extending service from Oakland to Wilkinsburg or from Oakland to

McKeesport as in MV-LRT should also be examined in this effort to fully understand the benefits and trade-offs of each option.

- At-grade scenarios should be examined in detail and the effort coordinated with the City of Pittsburgh Engineering and Construction, and Planning departments as well as stakeholders in Oakland such as community organizations, businesses, hospitals (e.g. University of Pittsburgh Medical Center), and institutions (e.g. The Carnegie, Carnegie Mellon University, University of Pittsburgh).
- Coordinate and/or combine effort with results of the AMM-MIS to test needs and opportunities from Oakland and Downtown to the Airport. This would connect three major destinations in the region (Downtown, the Airport, and Oakland) that have been identified in the major transportation studies that were initiated in 2001.
- Examine phased construction scenarios such as Downtown to Oakland, Oakland to Hazelwood, and Hazelwood to Homestead to offset capital expenditures in an effort to stage implementation of the project and work within funding constraints.
- Perform a core capacity analysis of impacts of this alternative on the existing Downtown "T" operation given the service levels from the South Hills and additional constraints that will be realized with the onset of the North Shore Connector. This analysis should include a careful engineering review of the connection options available at Steel Plaza for a new service line from the East.
- Perform a detailed operational analysis of the potential benefits that can be achieved by replacing the extensive bus service between Downtown and Oakland with a trunkline light rail system as per this alternative.
- Continue communications with CSX Railroad and begin discussions on possible usage scenarios of existing track alignment including the outright purchase of the right-of-way from Etna to Glenwood yard and beyond to Homestead.

7.3.6 MV-LRT

This alternative illustrates the potential to attract a high level of ridership and new systemwide boardings with a moderate capital cost and incremental O&M costs. However, a review of the two service lines, Etna on the north shore of the Allegheny River and McKeesport along the Monongahela River, have independent merit and can be considered as separate components combined with other alternatives already recommended for further consideration in the Allegheny Valley and Spine Line corridors. The following steps are suggested for these alternatives:

- Examine, as part of an Alternatives Analysis, light rail service to Etna from Downtown. This analysis can be completed independently or in tandem with the AV-CR alternatives analysis and environmental analysis.
- Evaluate the service line to McKeesport as part of the analysis of the SL-LRT (Homestead) alternative that is similar in service levels and accessibility. MV-LRT offers an alternative alignment between Downtown and Oakland, and a third possible destination for a further extension beyond

Oakland to McKeesport. The evaluation should include a close review and analysis of an appropriate feeder bus network to supplement the investment.

7.3.7 NS-CR

This alternative demonstrates the ability to attract a reasonable level of total ridership and new systemwide boardings at a moderate level of capital investment and incremental O&M costs. The implementation of this alternative assumes the use of the NS right-of-way from Greensburg to downtown Pittsburgh with minimal enhancements to existing infrastructure. This alternative appears to provide increased access and mobility to the corridor between Greensburg and downtown Pittsburgh. The following steps are suggested for these alternatives:

- Move this alternative forward into a full Alternatives Analysis and Environmental Analysis (e.g. DEIS or EA) to provide additional detail on service levels, operational issues, and costs associated with the use of the NS right-of-way. This analysis can be combined with the effort discussed above for the AV-CR as part of a two-pronged study that would maximize the use of resources for these two similar transportation investments in different corridors between Allegheny and Westmoreland Counties.
- Establish communications with NS Railroad and begin discussions on providing commuter rail service in this corridor including any necessary infrastructure improvements (e.g. installation of a third track from Greensburg to East Pittsburgh) that may be needed to accommodate both freight and passenger service with the greatest flexibility.

7.3.8 TRANSPORTATION SYSTEM MANAGEMENT

Several key opportunities were developed for the TSM Alternative including:

- BRT application between Downtown and Oakland
 - Potential for sizeable ridership increases with travel time improvement
 - Operational issues require further analysis in next phase
- New Routes and Service Increases
 - Identified underserved markets in Allegheny County
 - Identified unmet demand in Westmoreland County (e.g. Sony Plant to Greensburg)
- Incline between Strip and Hill Districts identified unmet travel need
- Park & rides in Westmoreland County exhibited high potential for increased usage, especially locations at Greensburg, I-76/Irwin, and Delmont

The next steps for the TSM include further refinement and evaluation as part of any AA/DEIS phases for the build alternatives. In addition, given the level of interest and ridership potential, WCTA should pursue the planning and further development of park & ride facilities at the locations discussed above.

A summary of the conclusions for moving projects forward is presented in

Exhibit 7-8. It should be noted that funding for future planning and environmental phases will be a prerequisite along with stakeholder and consensus from the general public.

Exhibit 7-8: Summary of Conclusions and Potential Implementation Schedule

Alternative	Next Steps	Approach & Opportunities	Priority	Schedule Planning/ Construction
AV-CR Allegheny Valley Commuter Rail	Advance to AA/DEIS or EA	<ul style="list-style-type: none"> Investigate lower cost options Evaluate "T" extension to Strip District station Coordinate and partner with AVR from the outset 	High	2004/2007
AV-LRT Allegheny Valley Light Rail	No Advancement			
EB-BW (Monroeville) East Busway to Monroeville	Advance to AA/DEIS	<ul style="list-style-type: none"> Evaluate project phasing including extension to Braddock and East Pittsburgh Coordinate with the Turnpike Commission (i.e. Mon-Fayette Expressway) for transit accommodations 	High	2004/2010
EB-LRT (Monroeville) East Busway Light Rail to Monroeville	No Advancement			
EB-LRT (Murrysville) East Busway Light Rail to Murrysville	No Advancement			
SL-LRT (Wilkinsburg) Spine Line Light Rail to Wilkinsburg	Advance as Part of SL-LRT (Homestead)	<ul style="list-style-type: none"> Evaluate as part of SL-LRT to Homestead AA/DEIS Analysis of trade-offs for extensions from Oakland to Wilkinsburg, Homestead or McKeesport 		
SL-LRT (Homestead) Spine Line Light Rail to Homestead	Advance to AA/DEIS	<ul style="list-style-type: none"> Investigate lower cost options Coordinate and partner with City Planning Develop phasing scenarios and core capacity analysis Coordinate with CSX for use/acquisition of railroad right-of-way Analysis of trade-offs for extension from Oakland to Wilkinsburg, Homestead or McKeesport 	Medium	2006/2015
MV-LRT Mon-Valley Light Rail to Etna & McKeesport	Advance Downtown to Etna line to AA/DEIS and examine service to McKeesport	<ul style="list-style-type: none"> Evaluate LRT to Etna in separate study from LRT to McKeesport. Evaluate LRT to McKeesport as part of SL-LRT (Homestead) analysis Coordinate with CSX for use/acquisition of railroad rights-of-way 	Medium (LRT to Etna)	2005/2012
NS-CR Norfolk Southern Commuter Rail to Greensburg	Advance to AA/DEIS or EA	<ul style="list-style-type: none"> Investigate lower cost options Coordinate with NS for use of railroad right-of-way Coordinate or combine with AV-CR next steps 	High	2004/2007
TSM	Advance simultaneously with above recommendations	<ul style="list-style-type: none"> Refinement parallel to the advancement of build alternatives Move forward with park & rides in Westmoreland County 	Medium To High	2004/2015

7.4 GENERAL GUIDANCE FOR NEXT STEPS

The following section provides guidance on the next steps in the project development process that would be applicable for any of the proposed alternatives recommended for future phases of implementation.

7.4.1 PROJECT DEVELOPMENT PHASES

The Eastern Corridor Transit Study is intended to provide an evaluation of needs and transit solutions for major transportation investments in the area from downtown Pittsburgh east to Westmoreland County (see **Exhibit 2-1** for a map of the study area). The following steps would be undertaken to move any of the recommended projects forward in the project development process.

- **Long Range Plan (LRP) Adoption** – The first step in advancing a major transit investment forward to the next stage of project development is adoption in the SPC's LRP project listing. Additionally, the financial requirements for the next phase of study (e.g. AA, DEIS) should be included in the financially constrained portion of the LRP to indicate that funding exists to complete the next phase of development.
- **Alternatives Analysis (AA)** – For any identified long term and capital intensive transit initiatives, the AA phase will be initiated. This represents the highest level of transportation planning for major investments and includes a detailed purpose and need for the project, full definition of alternatives, travel demand modeling, financial analysis, and detailed capital and operating costs in an effort to select a Locally Preferred Alternative (LPA). AA is required for any investments that seek Federal New Starts Funding. This phase includes development of the Transportation System Management alternative, as a lower cost comparison to justify the major investments. The final step in this level of planning would be the development of an FTA New Starts Application to Request Entry into Preliminary Engineering.
- **Draft Environmental Impact Statement (DEIS)** – The analysis of environmental impacts and mitigations for major transportation investments and the no-build alternative as required by NEPA. Categorical examples of environmental impacts include noise and vibration, natural resources, traffic impacts, cultural resources, air quality, wetlands, and land use. An Environmental Assessment (EA) would be a lower level of environmental analysis that could be warranted depending on the expected impacts of any given alternative.
- **Final Environmental Impact Statement (FEIS)** – The documentation of mitigations and responses addressing comments and concerns raised during the DEIS as required by NEPA. Refinement of the transportation investment and additional analysis of select potential environmental impacts are also documented in the FEIS with the goal of receiving the Record of Decision (ROD) required from the supporting agency in order to proceed with construction of the investment.
- **Preliminary Engineering (PE)** – The first level of engineering that advances a project to the 30% design level and includes full development of a plan and profile for the major investment, refined capital and operating costs and ridership estimates, and identification of stable and reliable revenue sources.

- **Final Design (FD)** - The final level of engineering that takes a project to the 90-100% design level and includes final development of a plan and profile for the major investment, absolute capital and operating costs and ridership estimates, and fully committed revenue sources.
- **Construction** – The actual construction of the major investment including purchase of right-of-way, construction of infrastructure, installation of systems, manufacture and delivery of rolling stock, start-up and testing.

7.4.2 MENU OF FUNDING SOURCES

One of the most important aspects of implementing a major transportation investment is the identification of stable and reliable capital and operating funds for an extended period of time to ensure the completion of construction and continued operation and maintenance of the new system for decades to come. Building infrastructure, procuring transit vehicles and equipment, operating services, and maintaining the investment require continual funding throughout the lifetime of the transit project. Sound financial planning is necessary to ensure that funds are available when needed, in order to keep construction on schedule and provide uninterrupted service to the public.

The following discussion provides a menu of funding options that could be available for the future implementation of any of the ECTS alternatives. The discussion highlights traditional federal, state, and local sources as well as incremental transit-dedicated sources and finally, innovative funding techniques to supplement these primary sources.

Capital Sources (Existing):

- **Section 5307** - Section 5307 is a formula grant program for urbanized areas providing capital, operating (for small systems only), and planning assistance for mass transportation. This program was initiated by the Surface Transportation Act of 1982 and became FTA's primary transit assistance program in FY 1984. Funds are apportioned to urbanized areas utilizing a formula based on population, population density, and other factors associated with transit service and ridership. Section 5307 is funded from both General Revenues and Trust Funds. Section 5307 urbanized area formula funds are available for transit improvements for 34 urbanized areas over 1 million population, 91 urbanized areas with populations between 200,000 and 1 million, and 283 urbanized areas between 50,000 and 200,000 population. For urbanized areas over 200,000 in population, funds flow directly to the designated recipient. For areas under 200,000, the funds are apportioned to the Governor of each state for distribution.

Several changes became effective to this program in fiscal year 1998 with the passage of TEA-21. One percent of appropriated Section 5307 funds are set-aside to be used for transit enhancement projects that physically or functionally enhance transit service or use. Preventive maintenance, defined as all maintenance costs, became eligible for FTA capital assistance at an 80 percent Federal share. FY 2000 operating assistance is available only to urbanized areas with populations under 200,000. An exception is made for urbanized areas over 200,000 in population if the number of total bus revenue vehicle miles operated is under 900,000 and the number of buses operated does not exceed 15. Up to 10% of an area's apportionment may be used for complementary ADA paratransit service costs.

- **Section 5309** - The Federal Section 5309 program provides funding for the establishment of new rail or busway projects (New Starts – 40% of all 5309 appropriations), the improvement and maintenance of existing rail and other fixed guideway systems (40%), and the upgrading of bus systems (20%). Funding for fixed guideway modernization is based on a formula that considers route miles and revenue vehicle miles in systems at least seven years old. Typically, these funds are used for infrastructure improvements such as track and right-of-way rehabilitation, station modernization, rolling stock renewal, safety-related improvements, and signal and power modernization. Section 5309 also funds bus and bus-related assets including acquisition of bus and rolling stock and ancillary equipment, and the construction of bus facilities (i.e., maintenance facilities, garages, storage areas, bus terminals, and the like). Under the Transportation Equity Act for the 21st Century (TEA-21), funding for New Starts projects can provide up to 80% federal funds, and a 20% local match must cover the project's remaining capital cost. However, the FTA's policies seek a maximum of 60% federal and a 40% local match. It should be noted that the next transportation bill (SAFETEA) could reduce the federal contribution further to a maximum of 50%.
- **Federal Highway Flexible Funding** – These are Surface Transportation Program highway funds that can be transferred to transit capital projects through the State and the Metropolitan Planning Organization with the permission of both the Federal Highway Administration (FHWA) and FTA. TEA-21 provides considerable flexibility in the use of FHWA and FTA funds for either highway or transit investments. The flexibility provisions of these transportation acts allow:
 - Broad highway, transit, and bicycle/pedestrian eligibility under major funding programs;
 - Transfer from one category of FHWA funds to another to capitalize on the new eligibility; and
 - Transfer of funds from FHWA to FTA and vice versa.

It is important to remember that the metropolitan and statewide transportation planning processes are the contexts for reconciling State and regional transportation needs with proposed transportation projects and activities. All projects must be included in the regional LRP, the short-term transportation improvement program (TIP), and the approved Statewide Transportation Improvement Program (STIP). The following procedures generally describe the process for flexing transportation revenues from FHWA to FTA:

- Funds that are transferred from FHWA to FTA are to be administered under the requirements of the Chapter 53 of Title 49, U.S.C. Funds transferred to or from FHWA or FTA can only be used for purposes eligible under the original program that the funds are transferred from.
- Some categories of FHWA funds that do not have transit eligible activities may be used for transit purposes if transferred to a FHWA funding category that has transit eligibilities (e.g., Interstate Maintenance transferred to the Surface Transportation Program).
- For a formal transfer from FHWA to FTA, the State Transportation Department requests the transfer of funds, with the concurrence of the MPO, in a letter to the FHWA Division Office.
- Funding transfers are permitted only for projects contained in the approved TIP/STIP.

Potential Highway Sources that can be flexed to transit projects include:

- **Surface Transportation Program (STP)** – Eligible for transit capital projects, vehicles, and facilities publicly or privately held, and for transit safety improvements.
- **Congestion Mitigation and Air Quality (CMAQ)** – Eligible for transit capital and operating expenses for new services in non-attainment areas only. Projects must demonstrate that benefits to air quality and operating uses are limited to three years.

- **National Highway System (NHS)** – Eligible for transit improvements within a National Highway System Corridor (may apply depending on interpretation).
 - **Interstate Maintenance** – Eligible for transit purposes identical to NHS or STP funds, after transfer to these funds then to transit.
 - **Highway Bridge Replacement and Rehabilitation** – Eligible for transit purposes identical to NHS or STP funds, after transfer to these funds and then to transit.
 - **National Corridor Planning and Development Program** – Eligible for transit planning, coordination, design and locations studies, environmental review, and construction.
- **State Bond Funds** – Derived from state bond proceeds where the Commonwealth matches the FTA's allocation of Section 5307 and Section 5309 formula funds. Specifically, to match FTA funds, the Commonwealth would provide 5/6 of the non-federal amount with the remaining 1/6 provided by Allegheny County or other local sources.
 - **Act 3 Dedicated Sales Tax** – These are state funds derived from the Supplemental Public Transportation Assistance Account (Act 3 of 1997), which allocates revenues at a rate of 1.22% of the state sales tax (and is capped at \$75 million statewide). Beginning in 1998, the state also committed additional funding to the account in the form of additional state bond funds (\$50 million per year) and Federal Flexible Highway funding of \$25 million.
 - **Act 26 Capital** – These are state funds from the Public Transportation Assistance Fund (Act 26 of 1991). Act 26 generates revenue from several sources including: a flat fee of \$1.00 per new highway motor vehicle tire sold, a 3.0 percent tax imposed on the total lease price of a motor vehicle in addition to the current tax imposed, a \$2.00 fee per day imposed on the rental of a motor vehicle, an additional 7.6 mills per dollar to the Utility Realty Tax levied against public utility companies, 0.18 percent of the current utilities gross receipts tax, and 0.53 percent of the current sales tax.

Operating Sources (Existing)

- **Act 26 Operating** – The fund is comprised of revenues derived from several different sources and is referred to as the Public Transportation Assistance Fund (PTAF). PTAF revenues are derived from: a \$1.00 fee per tire sold; a 3% tax on motor vehicle leases; a \$2.00 per day fee on car rental transactions; 0.53% of the Commonwealth's sales and use tax and hotel tax revenue; an additional tax assessment on public utility realty; and a 0.18% gross receipts tax on electricity sales in the Commonwealth. Impacts, such as the Commonwealth's deregulation of the electrical utility industry have affected the growth rate of some of these sources. While the overall outlook is positive for these funds to grow, PAAC and WCTA have been forced at times to constrain their operating budget to adjust for a shortfall in anticipated PTAF revenues. These revenues are matched on a 1:29 basis by Allegheny and Westmoreland Counties for their respective transit authorities.
- **Pennsylvania Mass Transit Assistance** – State operating assistance is subject to annual appropriation by the Legislature and concurrence by the Governor. Historically, this revenue source has escalated about 3 percent every three years. This assistance has a local match requirement of 1:3 for each dollar received.
- **State Bond Funds, Vehicle Overhaul (VOH) and Infrastructure Renewal Program (ISRP)** – These programs are funded as part of a \$30 million per year allocation from an annual, \$125-million statewide pool for capital investment and depreciation-related rehabilitation. A maximum of

\$18.5 million can be applied to these two programs from the \$30 million allocation. The ISRP and VOH funds are 100 percent state dollars and require no local match.

Potential New Sources

- **Local Sales Tax** – Earmarking a portion of the existing sales tax revenue for transit or proposing an additional levy would provide a revenue stream dedicated to transit.
- **Local Income Tax** – A potential source for transit funds would be the local income tax, currently generating \$1.2 billion in the nine-county southwestern Pennsylvania region through a 1% earned income tax and 2% school tax for resident employees and a \$10 per year occupation tax for those employed in the City of Pittsburgh, regardless of residency.
- **Vehicle Registration Fees** – Current vehicle registration surcharge is \$40 per vehicle, with 1.9 million vehicles registered in the nine-county region. An additional surcharge for dedicated transit funding could provide revenue for transit operations.
- **Gas Tax** - Pennsylvania motorists currently pay 18.4 cents in federal tax and 26 cents in state tax for each gallon of fuel used for automobiles. These revenues are used to fund highway improvements only. Recent state budget concerns have prompted consideration of increasing the state gas tax further. However, use of these proceeds for public transit would require an amendment to the Pennsylvania Constitution. As an example, the state of New Jersey's Transportation Trust Fund draws upon a state-wide gas tax to fund highway, bridge and public transit projects (e.g. Southern New Jersey Light Rail - River Line).

Innovative Funding Sources:

- **Benefits Assessment District** – Creation of a special district that taxes commercial property owners in partial compensation for the benefits from improved accessibility resulting from the project. Such a district could be considered for dense, commercialized areas surrounding station locations to help defray localized costs for maintenance and upkeep of facilities.
- **Joint Development** – Joint development involves a partnership or joint venture between a transit agency and a private developer to develop certain assets. Joint development is seen as a method by which private funds are used to develop transit property resulting in a profit for the private developer and a developed asset for the transit agency. Risks related to the development are either shared or borne by the transit agency or the private developer.
- **Certificates of Participation** – Certificates of Participation (COPs) are securities that represent interest in a stream of payments, typically a lease or installment sales agreement. A purpose-formed State entity issues tax-exempt bonds with maturities that match the lease term of assets (typically transit vehicles) that are purchased by the State entity with the proceeds from the bond issue. Assets are then leased back to transit agencies and the use of this financing mechanism versus up front payments, allows transit agencies to make larger purchases of vehicle assets sooner, thereby enhancing service.
- **Cross Border Lease** – Cross border leasing transactions are designed to enable a foreign entity to receive in its county the tax benefits associated with ownership of an item of equipment. These transactions are attractive to many transit agencies because the foreign entity, the "lessor" of the

equipment, will pay the "lessee" (the transit agency) between approximately 3 percent and 7 percent of the cost of the equipment for entering into the transaction. These revenues are then available to the transit agency for any purpose.

- **Delayed Local Match** – The ability to delay the local contribution to a transportation project may allow better utilization of local funds that may be currently encumbered. While other local funding mechanisms are secured, the uneven expenditure of Federal and local funds (i.e. 100% Federal funding for design, engineering) may help assure smooth progression of the project.
- **State Infrastructure Bank** – Also referred to as State Revolving Loan Funds, this mechanism allows the State to use the initial capital, provided by federal transit allocations, to make loans, provide credit enhancement, serve as a capital reserve for bond or debt financing, subsidize interest rates, issue letters of credit, finance purchase and lease agreements, provide debt financing security, or provide other forms of financial assistance for construction of qualifying projects. Among other benefits, this provides an ongoing source of local capital in support of the State's transit operators.
- **TIFIA** – The Transportation Infrastructure Finance and Innovation Act (TIFIA) provides for a loan guarantee program through the USDOT. It enables the FTA to provide loans and loan guarantees for up to 33 percent of a major project's construction costs. Loans are made at U.S. Treasury rates, and may be repaid over as long as 40 years. Special eligibility requirements, selection criteria, and a favorable credit rating are used to determine projects to receive TIFIA funding.

More detailed financial plans will be developed for each alternative that advances into AA/DEIS resulting from this study.