



TRANSIT ALTERNATIVES

The purpose of this report is to evaluate potential transit technologies for consideration in the City of Easley, and to identify the most suitable alternatives.

Five technologies were identified for evaluation as potential circulator options in the Easley study area. The transit technologies analyzed include:

- Light Rail Transit (LRT) & Streetcar;
- Bus Rapid Transit (BRT);
- Express Bus;
- Bus; and
- Paratransit or Demand-Response Transport.

Light Rail Transit (LRT) & Streetcar

Light rail and streetcars are primarily at-grade rail modes with electrically powered vehicles receiving current from an overhead wire (catenary). This is in contrast to heavy rail vehicles that are powered from a track-level third contact rail. The overhead power collection feature allows LRT/streetcar systems to be integrated with other at-grade transportation modes and pedestrians.



Comparing the two vehicle types, light rail vehicles are faster and have higher capacity than streetcars. Therefore light rail is typically used in longer corridors than streetcars, with a greater proportion of exclusive right-of way. Streetcars typically operate entirely or predominantly in mixed traffic.



Modern light rail vehicles are typically articulated and 90 feet long. Streetcars are smaller, typically about 60 feet long. The maximum operating speed of modern LRT systems is 55 to 65 miles per hour making it suitable for medium distance trips in suburbs or between central business districts and other major activity centers. Streetcars typically have a top speed from 25 to 45 mph, and overall operating speeds are considerably slower due to mixed traffic operation and more frequent stops. Light rail



can operate as a single vehicle or in trains of up to four cars while streetcars usually operate as single vehicles.

LRT is currently operating in many North American cities including: Denver, Portland, Baltimore, St. Louis, Buffalo, Dallas, San Diego and Los Angeles. Streetcars are used in Portland, Tampa and Seattle.

Bus Rapid Transit (BRT)

Bus Rapid Transit uses a number of features to reduce delays and improve customer convenience. BRT systems typically use dedicated busways or bus lanes, although they can also include operation in HOV lanes or in mixed traffic on arterials with various priority techniques for buses such as signal priority. Other possible features include high-capacity, low-floor buses; fare collection prior to boarding and advanced information systems.



BRT systems can improve passenger convenience by using the same vehicle for the collection/distribution part of the trip and for the faster line-haul portion of the trip; reducing the number of required transfers is a major advantage of BRT systems.

The bus system of Curitiba, Brazil, is a model BRT system; it uses sheltered stations for fare collection and high-level boarding. Busways which provide a high level of service and allow high hourly passenger capacities are typically grade separated from cross streets, and have on-line stations with spacing comparable to light rail; prominent examples include Ottawa, Canada and Pittsburgh, PA. Low volume busways often are characterized by at-grade intersections with cross streets (Seattle, University of Minnesota, downtown Orlando “Lymmo” Busway). Buses may operate non-stop along the busway/bus lanes or make selected stops based on passenger demand. Buses may also exit the specially designated busway and operate along streets to provide local area circulation and distribution.

Express Bus

Express bus service is designed to transport commuters between suburban communities and major employment centers. As such the hours of operation are usually during peak hours of the day with limited weekend service. The Express Bus route has fewer stops than a regular bus route and is used in conjunction with park and ride lots where





commuters can leave their cars for the day. Express busses typically use guide ways such as mixed traffic or HOV lanes. This helps to lessen travel time. The express bus is generally a larger bus than a regular city bus with reduced seating, 40-45 passengers, and increased space and comfort for riders.

Express bus services are in use in the Atlanta metro area as well as other large metro areas such as Chicago, Seattle, Houston, Phoenix and San Francisco, to name a few. Stops are limited on an express bus route so as to maximize travel time for commuters.

Express busses can run on diesel fuel, Compressed Natural Gas (CNG) or on Liquefied Natural Gas (LNG). These alternatives keep consumer costs lower than gasoline-powered vehicles. Express bus service has typically charged a higher fare than traditional bus service. This compensates for the higher quality coach as well as for the increased distance that is traveled.

Bus

Buses are rubber-tired vehicles which operate on roadways in mixed traffic or in specially designated bus lanes. Buses represent the most common and most flexible type of public transportation. Local bus route stops are typically as frequent as every one to two blocks, or every one-eighth mile. Express service can operate nonstop on freeways or HOV lanes, or on arterial streets with limited stops. In the past, the majority of buses in operation were diesel powered. However, vehicles powered by alternative fuels are becoming more widespread as a means of reducing emissions. Alternate fuels include:



- Compressed natural gas (CNG);
- Battery-powered buses (most frequently used in smaller activity centers because of their short operating range); and
- Hybrid-propulsion buses

Bus transit encompasses a wide variety of vehicle sizes, ranging from converted vans to double-deck and articulated transit buses. Most new buses have at least partial low floors to facilitate boarding by elderly and disabled passengers.



Paratransit & Demand-Response Transport



Paratransit is an alternative mode of transport that does not use fixed routes such as those used by city busses. Typically Paratransit vehicles are smaller busses or even vans. Typical occupancy can range from 8-20 passengers. Demand-response transport operates much like a taxi service where customers can receive door to door service from any locale in the service area.

Paratransit and Demand-Response Transport services vary considerably on the type of transport they provide to their customers. Routes can range from semi-fixed to strictly on-demand pick up and return. Paratransit is used most often by the disabled and the elderly. Vans are typically equipped with machinery able to accommodate wheelchair transportation. Depending on equipment this can limit seating.





COST OVERVIEW

Capital Costs

There are a number of various bus types currently available in the transit bus market. Actual vehicle costs can fit into one of three categories, Light Duty, Medium Duty and Heavy Duty. Capital cost of light rail is determined by the miles of track specified.

Transit Type	On Demand / Paratransit (Light Duty)	Bus (Medium Duty)	Express Bus & BRT (Heavy Duty)	Light Rail (per mile)
Estimated Capital Cost	\$120,000- \$150,000	\$150,000- \$250,000	\$250,000- \$375,000	\$12.4M- \$118.8M

Operating Expense

Operating expenses vary greatly. Factors to consider include route mileage, number of vehicles run, number of stops, hours of operation, and employment type, to name a few. The National Transit Database provides a rough sketch of operation expenses per “vehicle revenue mile” and per “vehicle revenue hour”. Depending on the type of service either or both of these figures will be useful. The services of bus, BRT and Express bus fall into the general category of “Bus”. In actuality BRT and Express bus services will run a little higher than regular bus service. The following table shows a breakdown of the transit services highlighted in this report.

Transit Type	Expense per Vehicle Revenue Mile	Expense per Vehicle Revenue Hour
Bus	\$7.80	\$98.70
Demand-Response	\$3.50	\$51.70
Light Rail	\$14.40	\$214.30