AQUIDNECK ISLAND PASSENGER RAIL/ BICYCLE PATH PROJECT

Towns of Tiverton, Middletown, and Portsmouth and
City of Newport, Rhode Island

TASK I
RAILROAD OPERATIONS REPORT

September 2002

AQUIDNECK ISLAND PASSENGER RAIL/BICYCLE PATH PROJECT
TOWNS OF TIVERTON, MIDDLETOWN, AND PORTSMOUTH AND CITY OF NEWPORT, RHODE ISLAND

Task I
Railroad Operations Report

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TASK I: RAILROAD OPERATIONS REPORT

1.0 INTRODUCTION

Aquidneck Island experiences high levels of roadway congestion during commuting hours and peak tourist season weekends. This project was undertaken as a follow-up to the Rhode Island Rail Corridor Feasibility study (RIDOT 1994) to explore ways in which the underutilized Newport Secondary Rail corridor can be used to serve the transportation needs of Aquidneck Island and Tiverton. It explores the range of public transportation alternatives, which could use this corridor to help relieve traffic congestion on the Island's roadways, particularly during peak commuting hours and the peak tourist season.

Corridor Uses
Five alternative uses were considered for the Newport Secondary Rail corridor

Alternative 1: Dinner/Tourist Train Excursion Services as they are today

Alternative 2: Existing Excursion Services plus a bicycle path

Alternative 3: Scheduled passenger rail service is extended from Newport to stations at either Mt. Hope or Anthony Road and incorporates a bicycle path

Alternative 4: Scheduled passenger rail service is extended from Newport to the Fall River, MA, MBTA station to provide commuter service to Boston. It incorporates a bicycle path within the rail corridor

Alternative 5: A 2-lane on-island busway and bicycle path would be built between Newport and Anthony Road

The busway was dropped from further analysis because it would require two lanes for safety, which in turn would widen the transportation corridor, impact a much larger area, and cost over 40% more than other alternatives. However, passenger rail service can be restored and a bicycle path built within the existing rail corridor. One set of infrastructure improvements can satisfy the requirements for simultaneous operation of existing Excursion Service trains, an On-island visitor shuttle, and a commuter shuttle to Fall River, MA. The bicycle path and/or rail service can be added incrementally, provided the follow the proposed alignments.

Rail Service Alternatives
A set of alternative passenger service structures was developed to facilitate evaluation of rail facility improvements. Each alternative can include the existing excursion services and the proposed bicycle path. The alternatives considered in detail include:

- *Year-Round On-island Shuttle between Mt. Hope Terminal and Newport:*
  A half-hourly shuttle service between Mt. Hope and Newport during the hours of 8AM till 11PM on weekdays. The service would include two intermediate stops, at Melville and Ranger Road.

- *Seasonal On-island Shuttle between Mt. Hope Terminal and Newport*
  The year round on-island shuttle could also be operated on a seasonal basis during the summer and on weekends in the spring and fall. The service would include two same intermediate stops, at Melville and Ranger Road and would be operated predominantly for visitor trips with a higher one-way fare to achieve more favorable operating economics.

- *Year-Round On-island Shuttle between Newport Terminal and Anthony Road*
  A half-hourly shuttle scheduled between Anthony Road and Newport during the hours of 8AM till 11PM on weekdays. The service would include two intermediate stops, at Melville and Ranger Road.

- *Year-Round Fall River Commuter/Anthony Road Shuttle*
  Since the On-island shuttle and Fall River commuter services are oriented toward two distinctly different travel markets, overlaying them provides a shuttle service that approximates the half-hourly service to Anthony Road with the through service between Newport and Fall River.

Several variations of each potential service structure were analyzed to arrive at a single set of infrastructure improvements that would allow simultaneous operation of the existing excursion trains, an on-island rail shuttle, commuter rail service to Fall River, and the bicycle path.

Report

This report consists of three parts: **Executive Summary**, **Task I: Railroad Operations Report**, and **Task II: Design Concept Report**. Collectively, the three reports describe the process and technical requirements for proceeding with any of the alternatives that were studied. They are not intended to initiate environmental permitting, design, or construction. They are a resource designed to provide local decision makers with technical transportation information needed to help make land use planning and permitting decisions on the west side of the island and in Tiverton.

The **Task I: Railroad Operations Report** presents a detailed analysis of all aspects of operating rail service within the Newport Secondary Rail corridor. It presents 2020 ridership forecasts and summarizes the various possible service structures and railway equipment possibilities. It evaluates capital, operating, and maintenance costs, ridership and revenue forecasts, and presents a financial analysis, project labor obligations, and an economic analysis of the project. The Task I report also details existing public transportation service on Aquidneck Island.

The **Task II: Design Concept Report** describes the existing conditions within the rail corridor, the railroad infrastructure that is required, details the bicycle path design, and discusses potential environmental impacts and permitting requirements.

2.0 SERVICE STRUCTURE

A set of alternative service structures (scenarios) was constructed to facilitate evaluation of transportation improvements that could be developed on the underutilized railway corridor. The various alternatives each contain a different mix of rail, bike, pedestrian and bus transportation services

Table 2-1
Summary of Alternative Service Structures

	Excursion Train	Bike Path	On-Island Shuttle Train	Fall River Commuter Shuttle	Busway
No Build					
Bike Path with Excursion Train					
1. Year Round Mount Hope Shuttle	Optional				
2. Seasonal Mount Hope Shuttle	Daily in Summer, Weekends in Spring and Fall				
3. Anthony Road Shuttle	Optional				
4. Fall River Commuter Shuttle	Optional				
5. Fall River/Anthony Road Shuttle	Optional				
6. Busway with Bike Path					

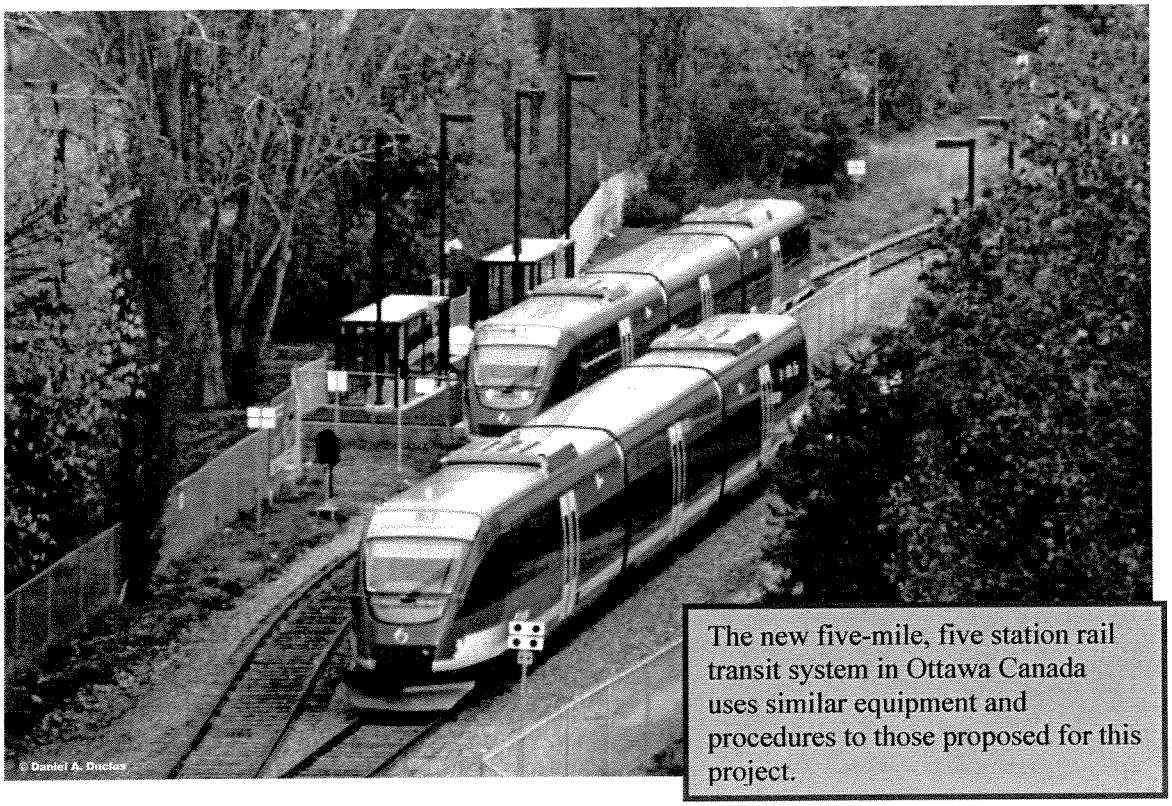
Each service alternative supports one or more of the following transportation elements

Excursion Train – Provides low speed low frequency service using historic or vintage rail equipment. Excursion service provides scenic train rides for tourists and diners during the summer and on weekends. Presently two excursion operators use the corridor, offering up to three scenic trips along the coast each day.

Bike Path – Provides a safe scenic path for bicycle and pedestrian travel in or adjacent to the state owned right of way currently occupied by the railway.

On-Island Rail Shuttle – Provides fast frequent rail passenger service between a park and ride lot on the north end of the island and Newport's Gateway Center. The primary target market for this service includes both residents and visitors who wish to avoid the "hassle" of traveling between the northern end of the island and Newport via roadway. Trains would use single self-propelled railway cars. Trains would stop at the Gateway Center, CCRI, Melville Marina and a northern terminal at Mount Hope Bay or Anthony Road. Each one-way trip would take 17 to 19 minutes with a cash fare of $1.25. Summer service would operate nearly every half-hour over a 15 hour service day.

Both a year round and a seasonal shuttle were considered. The seasonal shuttle would operate daily between Memorial Day and Labor Day and weekends only from mid April to Memorial Day and from Labor Day to Columbus Day. No service would be offered from mid October to mid April for the seasonal shuttle. Cash fares for the seasonal shuttle would be as high as $3.00 per trip to cover more of the operating cost of the service from its users.



The new five-mile, five station rail transit system in Ottawa Canada uses similar equipment and procedures to those proposed for this project.

Fall River Commuter Shuttle – Provides fast rail passenger service between Newport and Fall River for the primary purpose of connecting with MBTA trains to and from Boston. The primary target market for this service includes persons traveling between the Boston area and Newport for work, business or pleasure. The service would also serve local trips among corridor communities. Trains would use single self-propelled railway cars. Trains would stop at Gateway Center, CCRI, Melville, Mount Hope, Anthony Road, Tiverton and Fall River. Each one way trip would take 30 to 32 minutes with a cash fare of $1.25.

Busway[1] – Provides a new two lane north-south highway route between Anthony Road and Newport reserved for the exclusive use of commercial passenger vehicles with a capacity exceeding eight seated passengers including vehicles operated by RIPTA, Bonanza, charter operators and school systems[2]. RIPTA would operate a busway shuttle from Memorial Day to Labor Day. The target market for the service would be residents and visitors. Residents would use busway services as park-n-ride services. Visitors could use that busway as a remote park-n-ride service to avoid the "hassle" of traveling between the northern end of the island and Newport via roadway or as the southern end of bus trip originating elsewhere in Rhode Island or New England.

[1] The busway alternative was dropped from further study when it was determined that the required cross-section would entail costs and environmental impacts/mitigation that would be clearly unacceptable in the context of the right of way and the island community.
[2] Emergency responders will also be able to use the busway for police, fire and ambulance trips.

For each of the five structures that include rail service, the study team constructed a workable daily timetable of service that could be operated.

Table 2-2
Summary of Railway Service Structures

	Excursion Train	Bike Path	On-Island Shuttle Train	Fall River Commuter Shuttle	Busway
1. Year Round Mount Hope Shuttle	Optional				
2. Seasonal Mount Hope Shuttle	Daily in Summer, Weekends in Spring and Fall				
3. Anthony Road Shuttle	Optional				
4. Fall River Commuter Shuttle	Optional				
5. Fall River/Anthony Road Shuttle	Optional				

The service structures were designed to operate with the minimum allowable rail infrastructure. The set of service structures was also designed to provide an expansion path wherein service could be incrementally expanded from a shuttle service to a commuter-feeder service, and to a combined shuttle and commuter-feeder service. The basic characteristics of the five service structures and their minimum infrastructure requirements are listed in Table 2-3. The proposed schedules assume that all services would be operated with modern self propelled railcars with good to superior acceleration and braking characteristics. Railcar braking and acceleration rates were based on a 1995 KKO survey of manufacturers that was used to develop a composite of operating characteristics for potential vehicles. Scheduling and siding locations should be verified when vehicles are actually selected to operate the proposed service.

Table 2-3
Summary of Service Characteristics by Service Structure

Service Structure Alternative	Route Miles	Max Daily One Way Trips	Max Daily Rev. Miles	Max Daily Train Hours	Max Peak Vehicles	Minimum Rail Infrastructure
1. Year Round Mount Hope Shuttle	10.0	52	520	26	2	Single track railway with single short passing siding at Melville Station
2. Seasonal Mount Hope Shuttle	10.0	52	520	26	2	Single track railway with single short passing siding at Melville Station
3. Anthony Road Shuttle	12.4	52	645	26	2	Single track railway with single short passing siding at Melville Station
4. Fall River Commuter Shuttle	18.0	28	504	35	2	Same as #1 plus additional passing siding and station at Anthony Road and two track station at Newport.
5. Fall River/ Anthony Road Shuttle	18.0	50	724	42	3	Same as #1 plus additional passing siding and station at Anthony Road and three track station at Newport.

2.1 Year Round On-island Shuttle between Mt. Hope and Newport

A half-hourly shuttle service between Mt. Hope and Newport can be provided with two sets of equipment (see Appendix A). Train service is scheduled between Mt. Hope and Newport during the hours of 8AM till 11PM on weekdays. The service would include two intermediate stops, at Melville and Ranger Road. Running time for this service structure is 17 minutes. Dwell times at the terminal stations was set at a minimum of ten minutes to ensure schedule adherence. During the high season there are 52 scheduled daily trips, with a total daily mileage of 520 revenue miles. There is a total of 26 daily train hours during the high season.

Table 2-4
Service Statistics
Service Structure 1: Year Round Mount Hope Shuttle

Season	First Train	Last Train	Service Frequency	Daily One Way Trips	Daily Revenue Miles	Daily Train Hours
Summer	8:00	22:30	30 minutes until 18:30 Hourly until 22:30	52	520	26
Spring/Fall	8:00	20:30	30 minutes until 18:30 Hourly until 20:30	48	480	24
Winter	8:00	18:30	Hourly	22	220	10.5

Table 2-5
Northbound Sample Running Times

Station	Milepost	Sample Time
Newport	0.0	8:00AM
Ranger Road	1.7	8:03AM
Melville	7.1	8:10AM
Mt Hope	10.0	8:17AM

The service could be operated with a single short passing siding[3] located at Melville Station at MP7.1. All meets between opposing trains could be made during the station stop at Melville. Locating the siding at this station supports half-hourly service on the line with a minimum of 10 minute turns at the terminal stations. To help ensure that all meets are made on schedule, extra dwell time was added to all trains with meets at Melville Station. Dwell times at Melville station are set at one minute for northbound trips and two minutes 30 seconds for southbound trips. While this distribution of excess dwell to ensure quality meets is sub-optimal, it is the best that can be achieved with the location of Melville Station relative to the two terminal stations. Also to help ensure all meets are made on timely basis, all trains are allowed a minimum of ten minutes to "turn" at the end of each trip before the start of the return trip. Three minutes of excess running time ("pad") was allowed at Mount Hope terminal to ensure on time arrival at the terminal. One minute of pad was allowed at Newport.

2.2 Seasonal On-island Shuttle between Mt. Hope and Newport

The year round on-island shuttle could also be operated on a seasonal basis. During the summer and on weekends in the spring and fall, train service would be operated between Mt. Hope and Newport. The service would include two intermediate stops, at Melville and Ranger Road.

[3] Allowing room for a four car train to sit on the siding at the station without fouling opposing traffic.

Table 2-6 Service Statistics Service Structure 2: Seasonal Mount Hope Shuttle						
Season	**First Train**	**Last Train**	**Service Frequency**	**Daily One Way Trips**	**Daily Revenue Miles**	**Daily Train Hours**
Summer	8:00	22:30	30 minutes until 18:30 Hourly until 22:30	52	660	26
Spring/Fall (Weekends only)	8:00	20:30	30 minutes until 18:30 Hourly until 20:30	48	610	24

Table 2-7 Northbound Sample Running Times		
Station	**Milepost**	**Sample Time**
Newport	0.0	8:00AM
Ranger Road	1.7	8:03AM
Melville	7.1	8:10AM
Mount Hope	10.0	8:17AM

This service would be operated predominantly for visitor trips with a higher one-way fare to achieve more favorable operating economics.

2.3 Anthony Road Shuttle

A half-hourly shuttle service between Anthony Road and Newport can be provided with two sets of equipment (see Appendix A). Train service is scheduled between Anthony Road and Newport during the hours of 8AM till 11PM on weekdays. The service would include two intermediate stops, at Melville and Ranger Road. Running time for this service structure is 19 minutes. Dwell times at the terminal stations was set at a minimum of ten minutes to ensure schedule adherence. During the high season there are 52 scheduled daily trips, with a total daily mileage of 645 revenue miles. There is a total of 26 daily train hours.

Table 2-8 Service Statistics Service Structure 1: Anthony Road Shuttle						
Season	**First Train**	**Last Train**	**Service Frequency**	**Daily One Way Trips**	**Daily Revenue Miles**	**Daily Train Hours**
Summer	8:00	22:30	30 minutes until 18:30 Hourly until 22:30	52	645	26
Spring/Fall	8:00	20:30	30 minutes until 18:30 Hourly until 20:30	48	595	24
Winter	8:00	18:30	Hourly	22	273	10.5

Table 2-9 Northbound Sample Running Times		
Station	**Milepost**	**Sample Time**
Newport	0.0	8:00AM
Ranger Road	1.7	8:03AM
Melville	7.1	8:10AM
Anthony Road	12.4	8:19AM

2.4 Fall River Commuter Shuttle

A schedule and string line of the proposed service can be found in Appendix A. The study team assumed that a replacement bridge would exist roughly in the location of the existing (out-of-service) Sakonnet River bridge with no dramatic changes in track alignment or elevations. The study team also assumed that the service would have five intermediate stops with an end to end running time of approximately 30 minutes, with two to three minutes of schedule "pad" to ensure schedule adherence. Two passing sidings would be required; one at Anthony Road (MP12.7), and the other at Melville Station (MP7.1) in order for most of the MBTA trains to be met by service from and to Newport. The location of the passing sidings is relatively inflexible and is based on the MBTA planned schedule for Fall River service. A two track station at Newport is required to operate all the peak and evening service. The service provides 35 daily hours of train time, with 28 scheduled daily trips and a total of 504 daily revenue miles.

Table 2-10
Northbound Sample Running Times for Local Service

Station	Milepost	Sample Time
Newport	0.0	8:00AM
Ranger Road	1.7	8:03AM
Melville	7.1	8:10AM
Mt Hope	10.0	8:15AM
Anthony Road	12.4	8:19AM
Tiverton	13.7	8:22AM
Fall River	18.0	8:30AM

Precautions taken to ensure that the schedule can be reliably operated with short passing sidings at the two stations include a minimum of one minute of dwell time at the stations where meets occur, and the minimum of ten minutes recovery time at the end of all trips. There is also two minutes of scheduled pad time for arrivals at Newport Station and three minutes for arrivals at Fall River.

2.5 Fall River/Anthony Road Shuttle

Since the on-island shuttle and Fall River commuter services are oriented toward two distinctly different travel markets, the study team explored the possibility of overlaying the two services onto the minimum physical plant that would be required to operate the proposed 28 train per day service between Newport and Fall River. The combined service provides a shuttle service that approximates the half-hourly service to Anthony Road with the through service between Newport and Fall River. Short passing sidings are required at Melville Station and at Anthony Road. A new passenger station at Anthony Road is also provided for additional service at the meet point. A three track station at Newport is also required. A schedule and string line of the combined service can be found in Appendix A. A peak requirement of three train sets is required to provide this combined service. The service provides 42 hours of train time, with 28 scheduled daily trips to and from Fall River, and 22 scheduled daily trips to and from Anthony Road. The service covers 724 daily revenue miles.

Precautions taken to ensure schedule adherence with the short passing sidings at stations include: an extra minute of dwell time for at least one of the trains making a meet at a specific station, a minimum of 10 minutes recovery time at the end of all trips, and a two or three minute pad of time at the terminal station to help ensure that all trips arrive on time at their terminal station.

2.6 Operating Excursion Services with Other Shuttle Services

The various excursion[4] services on the line could be accommodated with the proposed On-island Shuttle and Fall River commuter shuttle. In order to operate these services as well as the new passenger shuttle, additional railway infrastructure would be required including - a three track Newport Station and passing sidings located at Coddington Cove and McAllister's Point. The on-island shuttle service would terminate at Anthony Road, and the Fall River commuter shuttle service would terminate at Battleship Cove in Fall River.

The analysis indicates the excursion services could be commingled with the shuttle services on the railway with the development of passing, storage and station tracks generally equivalent to those required to support commingling of the most extensive service option. In order to accommodate the excursion services with the less extensive service structures, the two new passing sidings would still be required but Newport would only require a two track station.

Excursion Service

- Summary of planned and past service can be found in a memorandum to David Nelson dated March 6, 2002. (Appendix B)

Fall River Commuter Shuttle and Anthony Road Shuttle (Planned service)

- A summary of the planned service can be found in a memorandum to Adel Foz dated January 18, 2002 and revised on January 21, 2002. It provides for on-island shuttle service between Anthony Road and Newport, and commuter shuttle service between Fall River and Newport over a 19 hour service day. (See Appendix A)

2.7 Constraints, Considerations and Assumptions

In planning the joint excursion/ shuttle and commuter service operation, the study team assumed:

- Excursion trains cannot travel faster than 15mph.
- Excursion train equipment stored in the vicinity of Melville Layover with a stub end storage and turning track north of Melville station.
- Passing sidings located at MP4.2 (McAllister's Point) and MP2.0 (Coddington Cove).
- Planned passing siding at Melville Station.
- Three track station at Newport.
- Schedule of MBTA trains to be met in Fall River conforms to the New Bedford/ Fall River Commuter Rail Extension Environmental Impact Report prepared by Vanasse Hangen Brustlin, Inc in July 2000.

2.8 Rescheduling the Excursion Trains

Minor adjustments to the excursion trains schedules that would allow both the shuttles and excursion trains to operate without double tracking the railroad between Newport and Melville were explored. The analysis found that with two passing sidings located at MP4.2 (McAllister's Point) and MP2.0 (Coddington Cove), the service shown in Table 2-11 could be accommodated[5]. The study team endeavored to make the train trips as close in duration to the existing service as possible given the frequent schedule of the Anthony Road Shuttle and Fall River Commuter Shuttle. No changes were made to the planned service schedules.

[4] Excursion trains encompass the various lunch, dinner and tourist trains operated at low speeds along the line, using mature equipment.

[5] These are the same passing siding locations found to be sufficient to support shuttle and excursion service in the February 26, 2002 analysis.

Table 2-11
Proposed Excursion Service on the Old Colony and Newport Railroad (Shuttle, Commuter and Excursion Services)

	Tourist Train[6]	Lunch Train	Dinner Train
Depart Newport	11:10AM	12:00PM	6:30PM
Arrive Newport	1:00PM	1:48PM	8:32PM
Trip Length (miles)	10	10	10
Trip Time (hours)	1:50	1:48	2:02

Appendix C shows a proposed schedule that would allow tourist, lunch and dinner trains to be operated with the Anthony Road Shuttle and Fall River Commuter Shuttle services. Some adjustments in the schedules of the excursion services are required. Two new passing sidings are required. A three track Newport Station is also required. The storage track at Melville (immediately north of the shuttle/commuter passing siding) is used by the excursion trains as a siding to allow the On-island and Fall River shuttle trips to pass each other in the Melville station siding while the excursion train is waiting in Melville to make its southward return trip to Newport. Necessary adjustments to the schedules of the excursion trains are summarized below.

2.9 Excursion (Tourist) Train

- Train operates at 15mph
- Consist departs Melville at 9:57AM, and arrives at Newport at 10:32AM
- Departs Newport at 11:10AM
- Waits for 11 minutes in the southern siding closer to Newport Station (Coddington Cove) in the northbound direction
- Waits for four minutes in the siding closer to Melville Station (McAllister's Point) in the northbound direction
- Changes direction at Melville Station, rather than at Green's Lane (14 minute turn)
- Waits for 12 minutes in McAllister's Point in the southbound direction
- Waits for 10 minutes in Coddington Cove in the southbound direction
- Arrives Newport at 1:00PM
- Consist departs for storage in Melville at 1:52PM, arriving in Melville at 2:34PM

Lunch Train

- Train operates at 15mph
- Consist departs Melville at 10:20AM, and arrives at Newport at 10:59AM
- Departs Newport at 12:00PM
- Waits for 13 minutes in Coddington Cove in the northbound direction
- The train turns at Melville Station (23 minute turn)
- Waits 12 minutes in McAllister's Point in the southbound direction
- Arrives Newport at 1:48PM
- Consist departs Newport at 2:50PM, arriving in Melville at 3:25PM

Dinner Train

- Train operates at 15mph
- Consist departs Melville at 5:05PM, and arrives at Newport at 5:47PM
- Departs Newport at 6:30PM
- Waits for 20 minutes in McAllister's Point in the northbound direction
- The train turns at Melville Station (19 minute turn)

[6] On Sundays, a second Tourist train could be scheduled to depart Newport at 2:10pm for a 2 hour excursion to and from Melville.

- Waits for 21 minutes in McAllister's Point in the southbound direction
- Arrives Newport at 8:32PM
- Consist departs Newport at 9:03PM arriving at Melville at 9:32PM

Infrastructure requirements for this option (over and above the rail infrastructure necessary to support the shuttle and commuter service as a stand alone operation) include:

- Two signal controlled passing sidings in the vicinity of Coddington Cove and McAllister's Point.
- A signal controlled stub end storage and station track immediately north of the passing siding at Melville to allow the excursion trains to turn at that location while shuttle and commuter trains pass.

3.0 RAILWAY EQUIPMENT

For the Aquidneck Island Shuttle Service, three alternative rail rolling stock strategies were considered.

1. Locomotive Hauled Diesel Push-Pull
2. Conventional Railroad Diesel Rail Car
3. Light Diesel Rail Car

This analysis describes each of these three strategies in terms of its operational and economic characteristics for the proposed Aquidneck rail services. Since forecast ridership is not high and because of neighborhood sensitivity to the nuisance of noise and vibration, the study team recommends that self propelled single car trains be considered for the service alternatives. These vehicles will have the capacity to carry projected ridership with less noise and vibration than the heavier and more powerful locomotive hauled train alternative. For the on-island shuttle alternatives, where the new services are not commingled with excursion trains, the study team recommends that light diesel rail cars be considered. For service structures where the new passenger trains would potentially share the track with MBTA trains or vintage excursion equipment, federal safety regulations rule out the use of light diesel rail cars. Consequently, conventional railroad diesel cars are recommended for those service alternatives.

3.1 Locomotive Hauled Diesel Push-Pull

Locomotive hauled diesel push-pull operations characterize most of the commuter railroads in North America. In this configuration, a diesel electric locomotive is employed to provide propulsion, lighting and HVAC power for the train. The diesel engine drives an electric generator that supplies power to electric motors on the locomotive's drive-wheels. A separate diesel engine and generator typically provides electric power to heat, cool and light the passenger coaches. The typical minimum length for a push pull train is a locomotive and three coaches. Trains with two cars are occasionally deployed, but are not favored. It is assumed that a two car train could be deployed for Aquidneck services. The typical diesel locomotive is 60 to 70 feet long and weighs 125 tons. The maximum practical train length for a single passenger locomotive is typically 8 or 9 cars.

The locomotive hauls the train in pull configuration. When the consist reaches the end of its trip and turns to head back toward its origin the engineman shifts the locomotive into push mode and changes his seating position from the locomotive to a work station at the far end of the last car in the consist. This workstation provides a throttle, brakes and other controls that allow him to operate the locomotive and the train in the push configuration.

The passenger coaches are unpowered trailers. Coaches can be either single-level or bi-level. The typical coach regardless of height is 85 feet long. A single level car generally weighs about 50 tons. A bi-level weighs approximately 60 tons. The MBTA in Boston operates a mix of single level and bi-level equipment.

For shorter commuter type trips each single level coach typically seats 100 to 125 passengers. Higher seating capacities are achieved by narrowing the center aisle of the car and providing 5 seats in every row - two seats

on one side of the aisle and three seats on the other. Structurally, the typical single level coach rests on a center sill above the wheel sets ("trucks") at either end of the car. Passenger entry and egress from the car requires either a high level platform designed to match the height of the car floor or uses short three step stairways (called "traps") located at each corner of the car.

NJT Comet Cab Car on Passaick Valley Line

With the "trap" door, coaches can serve passengers at both high and low level platforms. Using low platforms and traps for passenger entry and egress slows operations in stations but this delay can be accommodated at low volume stations. For low platform operations, a train attendant is typically employed to supervise boarding at each set of traps. At high-level platforms, automatic door opening and closing mechanisms can be employed to reduce manpower requirements. High platforms are not favored on lines that are used by freight operations because they impose a side clearance constraint that potentially limits other rail operations on the line.

Very few single level coaches are currently being built for North American commuter railroads. Most railroads are migrating to bi-level coaches. Three manufacturers have been producing most of bi-level coaches used on this continent. Bombardier builds a large high capacity unit that is favored by western and southern railways. Kawasaki builds a more compact unit the fits with the tighter vertical clearance profiles typical of established eastern commuter railways. Nippon Sharyo is building "gallery cars" for Chicago and San Francisco. This discussion focuses on the Bombardier and Kawasaki cars.

Bi-level coaches are generally employed to provide more passenger capacity at a maintenance and operating cost equivalent to a single level coach. With 3-2 seating capacities exceeding 180 passengers can be achieved. The typical bi-level coach has a depressed seating level below the center sill (between the "trucks") and a second higher level above. Stairs provide access to the higher level.

In addition to the obvious benefit of carrying more passengers in each coach, the bi-level coach can offer other less obvious operating benefits. Bombardier bi-level equipment is configured with a center door for passenger entrance and egress. The center door on the lower level allows for level boarding from low platforms. This allows for shorter dwell times, automatic door operations, and reduced train manning requirements without the adverse impacts of high platforms.

Low floor, center entry bi-level coaches with automatic doors from Bombardier are almost universally employed on newer commuter rail systems in North America. Passengers enjoy the bi-level coaches. The visibility from the upper deck of the coach allows passengers to enjoy sights along the line from a perspective that is not possible for passengers on single level coaches.

Bombardier bi-level coaches require vertical clearances that are not always available on rail lines especially in the Northeastern United States. The Kawasaki bi-level coaches used by the MBTA, Long Island Railroad and others in this region have been especially engineered to address these height restrictions. These cars use do not employ low-level

center entrance boarding due the older commuter railroads' prior investment in high level platforms. Stairwells and traps are employed instead where stations with low level platforms are served. Low-level center entrance boarding is physically incompatible with high-level platforms.

Crewing for a push-pull train requires an engineman and generally at least one conductor to check fares, supervise boarding and alighting, ensure order on the train. For on-board fare collection, one conductor is typically deployed for every two coaches in the train. For a high density of short passenger trips a higher level of train manning might be required to support on-board fare collection.
The typical new commuter railroad locomotive costs between $2 and 3 million for a standard 125 ton 3000 HP model. New single level coaches can be purchased for as little as $1 million, but $1.3 million is more typical. Prices in excess of $1.5 million can be expected for small quantity orders. Bi-level coaches of the most common North American design (Bombardier) are typically available for $1.7 million. The special design bi-levels employed by the MBTA and Long Island Rail Road are more expensive. A two-car single level push-pull train set should be expected to cost approximately $5.1 million based on typical prices. With bi-level cars it would cost $5.9 million.

Remanufactured locomotives and used coaches can be employed to reduce capital outlay for equipment. This draft analysis does not cover remanufactured or used equipment.

Fuel consumption for a push pull operation is typically measured in gallons per mile, with 3 to 4 gallons per mile a common rate of fuel consumption.

The push-pull configuration offers several advantages and disadvantages for the proposed Aquidneck Island Shuttle.

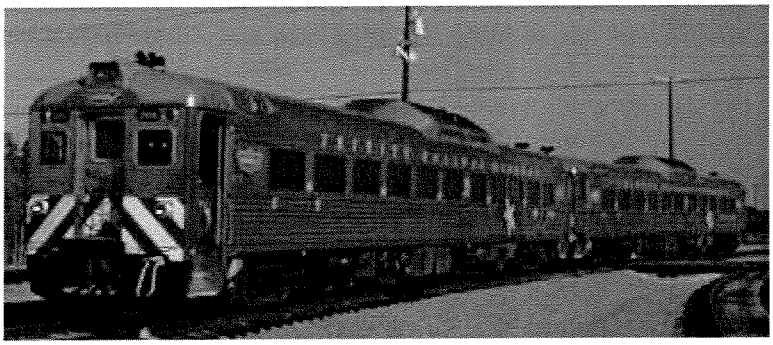
3.1.1 Advantages

- The rail technology is proven off the shelf hardware that is readily available in the North American market.
- The mode of operation is well understood by the US railroad industry
- The equipment meets FRA standards for operation on the North American general railway network.
- Capital cost per seat declines as train length increases.
- Used and remanufactured equipment is potentially available at substantial capital savings.
- With high level platforms a single level train can be fully accessible for the disabled population.
- Established contract maintenance services for locomotives are available in the Rhode Island region.

3.1.2 Disadvantages

- The minimum operable train length will require train lengths that may exceed ridership requirements.
- The 3000 HP 125 ton locomotive creates noise and vibration that may pose a problem for neighbors.
- The need to attend the locomotive in pull configuration makes one person train operation impractical.
- High fuel consumption
- Transporting 125 ton locomotive to Newport may pose a larger logistical problem than would lighter equipment.
- Potential flexibility in sequencing and setup of trains may be limited by locomotive availability.

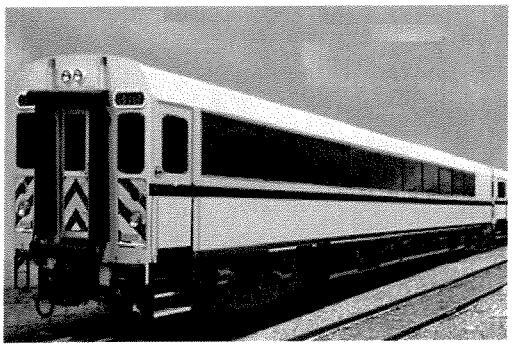
3.2 Conventional Railroad Diesel Rail Car



The conventional railroad diesel rail car was designed to overcome the disadvantages of locomotive hauled equipment for light density rail passenger services. Each car is self-propelled allowing shorter train lengths while avoiding the costs of locomotives. In short trains the self propelled cars can offer better fuel economy than a push-pull train and can be potentially adapted to one-person train operation. The self-propelled cars can also offer more attractive acceleration than the locomotive trains.

The conventional railroad diesel rail car is a special case of the diesel multiple unit (DMU) vehicle. The Transportation Research Board defines the DMU as a "self-propelled rail car using on-board sources of motive power." Motive power may be diesel internal combustion engines or an alternative self-contained, on-board source. Most current DMUs' rely on diesel engines. The conventional railroad diesel rail car (RDC) is unusual among DMUs' in that it meets Federal Railroad Administration safety regulations for operation in mixed traffic on the North American conventional railroad network. Most modern day DMU's are too lightly constructed to meet FRA safety requirements that focus on minimizing the potential for catastrophe should a light passenger vehicle collide with a much heavier rail freight vehicle.

The archetypal conventional rail diesel car is the Budd RDC. Hundreds of Budd cars were built in the 1950's for operation on rail passenger branch lines and some main line services. The Boston and Maine and New Haven railroads owned more Budd cars than any other railways in the world. With changes in transportation regulation and economics in the late 1950's the market for RDCs' to operate on light density passenger routes almost vanished. Nearly all remaining and restored rail passenger services have all enjoyed traffic densities that favor push-pull operations or the operation of electric cars under overhead catenary lines. In the last 40 years very few DMU vehicles qualified to operate in general railroad service have been manufactured in North America. Where RDCs' have been required, units remaining from the 1950's have been kept in service or restored to operating condition. Most recently the new Dallas/Fort Worth commuter rail service began operations with a fleet of 14 remanufactured RDCs purchased from VIA. (VIA is the Canadian Amtrak.)

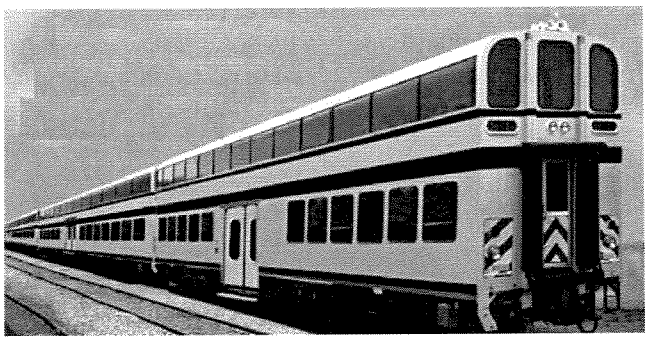


Most Budd Cars were originally built with 2x2 seating but some 3x2 high capacity units were built. The RDC is designed like a conventional single level rail coach with traps to allow for high level or low level boarding. It is not practical to board en-route through the corner of the car where the engineman is working. Level boarding from a low platform is not possible. Most units were bi-directional (e.g. have an engineman's control stand at both ends of the car). The remanufactured RDCs supplied for the new Dallas commuter rail service cost approximately $1.8 million each.

This year Colorado Railcar Manufacturing LLC is building a new DMU it hopes to sell to the Alaskan Railroad (ARRC) to supplement and replace the ARRC's aging fleet of RDCs. The Colorado car complies with federal standards for operation in mixed traffic with conventional railcars. Colorado Railcar is offering two models of its new DMU: a bi-level seating up to 185 passengers and a single level car seating 104

passengers. Both cars are 85 feet long. The tare (empty) weight of the bi-level car is 82 tons. The single level weighs 74 tons.

The bi-level Colorado DMU features a center entrance door that allows level boarding at the "mid car vestibule" of the units from a relatively low platform. The low level vestibule car includes a lavatory and positions for wheelchairs. Bicycles can be stored in the lowest level when the wheelchair positions are not occupied.



The bi-level does pose vertical clearance problems for some applications. At 18 feet in height it is reportedly the tallest passenger rail car on earth.

These new models may be especially attractive for the proposed shuttle service because they were designed for tourist traffic. They can be configured with dome windows to facilitate sightseeing. Vista domes are available for either the single level or bi-level car. The manufacturer has indicated that it can produce small orders of the single level car for $2.5 million each. Bi-levels will cost $3.2 to $3.5 each.

Conversations with Colorado Railcar indicate that they are confident they can build units that are bi-directional and compatible with one person train operation.

The conventional railroad rail diesel car can offer some distinct advantages and disadvantages for the small and unique Aquidneck shuttle service.

3.2.1 Advantages

- The technology is compatible with FRA regulations for general use on North America's conventional railroad network.
- Fuel economy may more attractive than push pull due to lower vehicle weights.
- Colorado car may be adaptable to one-person train operations with automatic doors.
- Less noise and vibration than with push pull train due to lower vehicle weights.
- It is possible that lower weight DMU's may be easier than locomotives to transport over roads to Aquidneck Island.
- It may be easier to maintain DMU's on-island without elaborate shop facilities.
- Acceleration for the Colorado Railcar offering can be much more attractive than for a push pull train.
- Potentially smaller minimum fleet size than with push-pull trains.
- Greater flexibility to mix and match cars into multiple trains without the need for a locomotive.
- No need for redundant locomotive power in reserve for spare capacity

3.2.2 Disadvantages

- High bi-level DMU may pose vertical clearance problems
- Capital cost per seat does not decline with heavier passenger loads and longer train lengths.
- Pool of used or remanufactured vehicles for capital cost savings is thin.

3.3 Light Diesel Rail Car

Over the last half century North American rail transportation policies and economics have not prevailed over the rest of the world. During this era, European and Asian nations have been continuing to develop and extensively deploy DMU trains for use on light density passenger lines and for urban transit networks of smaller cities. Owing to a variety of factors these vehicles however are generally too lightly constructed for operation on North America's general railroad system in compliance with federal safety regulations. At this time the operation of such vehicles in North America is restricted to lines where no conventional railroad

rolling stock is operated or where strict time of day separation between the light rail cars and the conventional rail traffic can be enforced. However, these lighter cars may be very attractive for the Aquidneck shuttle because they are even lighter than conventional rail diesel cars, offer greater fuel economy, are designed for one person train operation and operate with a minimum of noise and vibration impacts on neighbors.

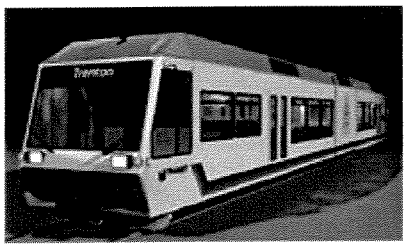
Operation of light rail diesel cars on the island is facilitated by the fact that the Newport rail line is not connected to the nation's general railroad system. Because of this circumstance, the shuttle system could be designed as a standalone diesel light rail transit system that is not subject to the regulations of the Federal Railroad Administration. Under these circumstances other potentially onerous federal regulations may not apply. For instance, the State of Rhode Island would establish standards for grade crossing safety that might be quieter than the federal standards that require considerable whistle blowing.

Literally scores of alternative models of light diesel rail cars are available in Europe and Asia. Two units that are in the process of being deployed in North American applications similar to the Aquidneck case are discussed below along with a discussion of a third vehicle that has been extensively demonstrated in North America. These vehicles are:

1. Adtranz GTW 2/6
2. Bombardier Talent 643
3. Siemens RegioSprinter

These three vehicles are generally representative of the range of European design vehicles that could be used on Aquidneck Island. Of the three, the Adtranz vehicle is most like a light rail trolley vehicle with a short turning radius and high horsepower to tonnage rating. The Bombardier is vehicle is closest to a traditional railroad passenger train with relatively few seats per unit of length and a relatively low horsepower rating for its weight. The RegioSprinter is the lightest unit with the most bus technology incorporated into the design.

3.3.1 Adtranz GTW 2/6



New Jersey Transit has awarded a contract to a consortium including Adtranz and Bechtel to design, build, operate and maintain a unique 34-mile light rail transit system between Trenton and Camden. It will be the United States' first application of a diesel light rail transit system on an existing freight corridor and the first time such a system has been imported from Europe. The New Jersey system will use a maximum of 11 trains during peak hours on 15 minute headways using a combination of street-running railways and rights-of-way shared with freight railroads. The system will include 20 station stops with a total trip time of approximately 64 minutes each way. Service will be offered seven days per week 16 hours per day from 6 am to 10 pm. Late night and early morning hours will be reserved for freight operations on the shared railway.

For this project Adtranz is supplying a fleet of 20 GTW 2/6 lightweight articulated DMUs, designed and manufactured by Adtranz Switzerland, the GTW features two passenger modules on either side of a diesel electric propulsion module. According to material presented by Adtranz and NJT, each 58-ton car is 103 feet long and accommodates up to 102 seated passengers and 100 standees[7]. The double articulated car can negotiate very tight curves with radii as short as 131 feet. The GTW 2/6 has a rated top speed of 60 mph using a single 737 HP diesel engine to drive electric traction motors in the center truck. The car design is predominantly a low floor with level boarding

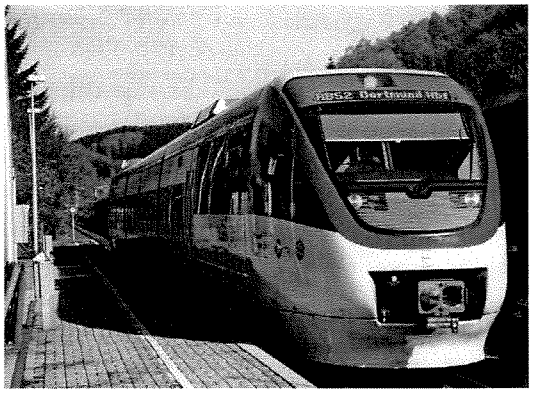
[7] Subsequent modifications in cars ordered by New Jersey have reduced seating availability to allow more room for handicapped passengers, bicycles and standees.

from low platforms. The car is designed for one person operation with a proof of payment fare scheme. Estimated fuel consumption is 2 mpg. The car is designed to accommodate wheel chair passengers. The interior design can allow for the transport of bicycles in racks at the wheelchair positions when not in use by disabled persons.

A unique feature of the car design is the central propulsion module. The central module can be removed from a car for maintenance or repair and replaced with a spare module in a matter of hours. The modular design will facilitate maintenance and help reduce vehicle downtime. Presently diesel GTW 6/2 cars are employed by the Swiss Railway for branch line service. A large fleet of electric GTW 6/2 units is used in Poland.

New Jersey Transit reports the purchase price of the vehicles at $3.6 million each.

3.3.2 Bombardier Talent



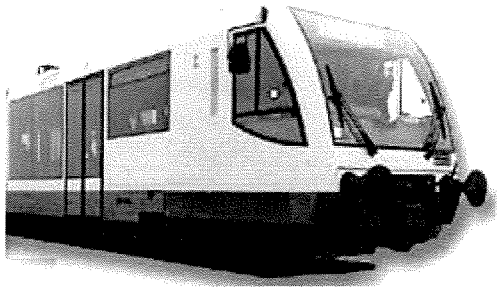
OCTranspo of Ottawa, Ontario has just acquired a small fleet of Talent BR643 DMU's for a new rail shuttle service it opened in October of 2001. The shuttle route is approximately five miles of single track with a passing siding at a station at the middle of the line. The proposed shuttle schedule offers two-way, 20-minute service all day at regular fare. Weekend service operates at 20 minute headways on Saturdays and at 20 or 40 minute headways (depending on time of day) on Sundays and holidays. End to end running time is approximately 15 minutes along the five station line. The maximum speed on the line is 50 mph. The service will operate: Monday to Friday 06:30 to 23:30, Saturdays 07:00 to 23:30, Sundays and holidays 07:30 to 23:00. Ridership for 2001 was in the range of 6,400 boardings per day.

The three Bombardier Talents are three car articulated train sets. The three cars are permanently married. Among the three cars, the train has four trucks each with two axles. The trucks on the end cars are powered with a diesel mechanical propulsion system. The middle car has no propulsion capacity and shares trucks with the end cars. Each 80-ton three car train has the capacity to carry 137 seated passengers and 150 standees, at a maximum speed of 75 mph. Each train is approximately 160 feet in length. The reported purchase price for each of the three trainsets is $3.9 million (US).

Bombardier has sold approximately 180 Talent trainsets in Europe. Most are in service in Germany.

The styling of the Talent is very futuristic. The cars feature large low-floor sections and low-floor entries, air conditioning, and large tinted windows for excellent visibility throughout the complete trainset.

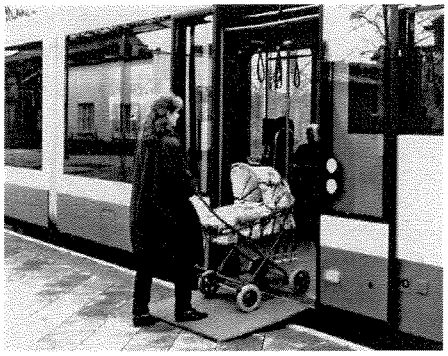
3.3.3 Siemens RegioSprinter



The RegioSprinter manufactured by Siemens Transportation Systems toured North America in the late 1990's for a series of diesel light rail demonstrations. Stops on the tour included but were not limited to Santa Cruz, Tampa, Calgary, Austin, Raleigh, and Boise. No permanent North American services using the RegioSprinter are planned at this time. Reports from the North American demonstrations were overwhelmingly favorable. Passengers were very impressed with the quality of the ride experience. The vehicle was reportedly very quiet. The single largest barrier to implementation in the US has been FRA prohibition against operation in mixed traffic with conventional railroad rolling stock.

The vehicle was designed in Germany to respond to a change in national transportation policy that created a larger market for light-weight, low-cost vehicles that could be operated cost-effectively.

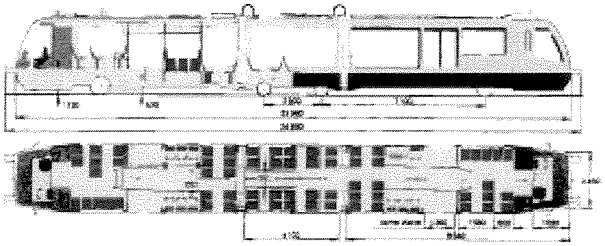
- The Sprinter features low air pollution due to its low weight and modern diesel engines.
- The car provides 75% low-floor design and appealing and modern interior furnishings.



- The cars have wide passenger doors and low level loading. There is a retractable ramp to facilitate boarding with wheeled vehicles such as wheel chairs, bikes and baby carriages.
- The car design includes ample space for wheelchairs, beach chairs, and baby strollers. The design also features interior bike racks.
- Safety is enhanced by the light vehicle's short stopping distance under emergency conditions.

Siemens believes the vehicle offers an attractive price/performance ratio using service-proven production components adopted from municipal bus designs. The RegioSprinter is a low floor single articulated car self propelled passenger vehicle. Each vehicle weighs approximately 35 tons and is capable of top speeds of 60mph. The vehicle provides for 74 seated passengers with room for 100 standees. There are forty of these units providing urban transit service in three European cities including suburban service near Copenhagen and Cologne.

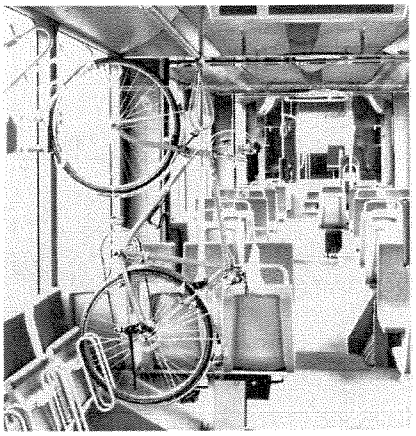
A 2001 contact with Siemens indicated that with current favorable exchange rates that a small fleet of RegioSprinters could be provided for the Aquidneck line at the cost of approximately $1.8 million per car.



The light rail diesel car can offer some distinct advantages and disadvantages for the Aquidneck shuttle service.

3.3.4 Advantages

- Fuel economy is attractive
- Designed for one-person train operations with automatic doors.
- Lower weight may create less noise and vibration than with push pull train.
- Light RDC may be easier than locomotive to transport over roads to Aquidneck Island.
- Light RDC may be easier to maintain on the island without elaborate shop facilities.
- Most light units will offer better acceleration than push pull train.
- Self propelled units may offer potentially smaller minimum fleet size than with push-pull trains.
- More flexibility to mix and match cars into multiple trains without the need for a locomotive.
- No need for redundant locomotive power in reserve for spare capacity



3.3.5 Disadvantages

- North American experience with these units is limited.
- Capital cost per seat does not decline with heavier passenger loads and longer train lengths.
- Pool of used or remanufactured vehicles for capital cost savings is virtually nonexistent.
- Regulatory resistance to implementation with light foreign built equipment may be substantial.

3.4 Comparison and Evaluation of Alternatives

Three general equipment alternatives for the Aquidneck Shuttle Service were identified and evaluated.

1. Locomotive Hauled Diesel Push-Pull
2. Conventional Railroad Diesel Rail Car
3. Light Diesel Rail Car

Each equipment alternative is not completely homogeneous but some general observations bear out. Details on the eight equipment configurations analyzed are summarized in the table below.

Table 3-1
Comparison of Equipment Types

Summary of Characteristics of Equipment Options	Push Pull		Conventional Railroad RDC			Light Diesel Rail Car		
	Typical New Two-Car Push-Pull Trainset (Single Level)	Typical New Two-Car Push-Pull Trainset (Bi-level)	Typical Re-manufactured Budd RDC	Colorado Single Level DMU	Colorado Bi-level DMU	Adtranz GTW 6/2	Bombardie r Talent	Siemens Regio-Sprinter
Seating Capacity	210	328	96	104	185	100	137	74
Capital Cost (Millions)	$5.1	$5.9	$1.8	$2.5	$3.5	$3.6	$3.9	$1.8
Horsepower	3000	3000	600	1200	1200	737	845	530
Weight (Tons)	225	245	68	74	82	58	80	35
Length (Feet)	235	235	85	85	85	103	160	
Tons/Seat	1.1	0.7	0.7	0.7	0.4	0.6	0.6	0.5
Capital Cost/Seat	$24,286	$17,988	$18,750	$24,038	$18,919	$36,000	$28,467	$24,324
HP/Ton	13	12	9	16	15	13	11	15
Low or Midlevel Boarding?	No	No	No	No	Yes	Yes	Yes	Yes
Noise and Vibration	High	High	Medium	Medium/ Low	Medium/ Low	Low	Low	Low
1-Person Train Operation	No	No	No	Maybe	Yes	Yes	Yes	Yes
Minimum capital cost for three complete trainsets	$15.30	$17.70	$5.40	$7.50	$10.50	$10.80	$11.70	$5.40
Capacity for Bicycles	Medium	Medium	Medium	Medium	Low	High	Medium	High

In general terms, the **push-pull** configuration generally offers the most capacity for the lowest cost per seat. However for low volume operations it may offer more capacity than is required. It has the highest potential environmental impact in terms of noise and vibration and may be the most expensive alternative to maintain as a separate shuttle service on the island. The acceleration performance of the push pull sets will likely be the weakest of the three alternatives. Push-pull operations would likely yield the highest shuttle operating costs to due to crewing requirements and fuel consumption. Spare locomotive capacity will be required to maintain reliable service.

The **conventional railroad RDC** offers more flexibility in train size for low ridership levels than push-pull operations. It also offers the potential for lower operating costs to due to lower fuel consumption and potentially lower crewing requirements. The Colorado Rail Car offering would also certainly offer superior acceleration to the push pull train. A single RDC would be much lighter than a locomotive and two coaches leading to a potential reduction in noise and vibration impacts. Maintenance logistics may be more favorable than with a locomotive hauled train set.

The **light diesel rail car** was designed with applications like the Aquidneck Shuttle in mind. It offers low floor operations, low noise and vibration impacts, one person train operation and relative fuel economy. Like the conventional RDC, the light RDC offers more flexibility in train size for low ridership levels than push-pull operations. It also offers lower operating costs due to lower fuel consumption and crewing requirements. The Adtranz and Siemens units would also certainly offer superior acceleration to the push pull train. A single light RDC would be much lighter than a locomotive and two coaches leading to reduced noise and vibration impacts. On island maintenance logistics for the light units could be favorable compared with push-

pull locomotives. The Adtranz and Siemens offering might offer significant relief from onerous maintenance expense due to their light weight and modular configuration. However, the capital cost per total seat in the fleet for these alternatives may tend to be higher than for equipment that is more commonly used in North America.

Since forecast ridership is not high and because of neighborhood sensitivity to the nuisance of noise and vibration, the study team recommends that self propelled single car trains be considered for the service alternatives. These vehicles will have the capacity to carry projected ridership with less noise and vibration than the heavier and more powerful locomotive hauled train alternative.

- For the on-island shuttle alternatives, where the new services are not commingled with excursion trains, the study team recommends that light diesel rail cars be considered.
- For service structures where the new passenger trains would potentially share the track with MBTA trains or vintage excursion equipment, federal safety regulations rule out the use of light diesel rail cars. Consequently, conventional railroad diesel cars are recommended for those service alternatives.

For cost analysis purposes, the study team has assumed that the Colorado Rail car single level DMU would be used for service structures that operated off island or where excursion service was offered. For service structures where the new rail cars would have exclusive use of the track, it was presumed that the Siemens RegioSprinter would be employed.

4.0 CAPITAL, OPERATING, AND MAINTENANCE COSTS

This chapter of the report presents forecasts of capital, operating and maintenance costs for each of the ten service structures considered in this report.

4.1 Capital Costs

Each of railway service structures will require an investment in railway infrastructure and equipment. The service structures that are longer, are more varied or include multiple types of trains on the line simultaneously will require more infrastructure including tracks, sidings, station, bridges, etc. A list of infrastructure required to support each alternative is found in Table 4-1. Forecast expense to provide the required infrastructure elements is documented in Table 4-2. Rolling stock requirements for each service alternative with anticipate costs to purchase equipment are listed in Table 4-3. Overall forecast capital costs for each of the five service structures with and without the excursion services are summarized in Table 4-4.

Table 4-1
Railway Infrastructure Requirements Matrix

Service	Without Excursion Service	With Excursion Service
None	N/A	Maintain existing track and structures to Class I standard
Mount Hope Shuttle	10.0 miles of continuously welded rail mainline track CTC Signal System Four stations (Newport, Ranger Road, Melville, Mt. Hope) One 400 ft signal controlled spring switch passing siding at Melville Station Three track layover/carbarn maintenance facility for fleet of three self-propelled rail cars Upgrade 21 at-grade crossings	**Passenger service infrastructure plus** Signal controlled two track Newport Station Two remote signal controlled 400ft sidings at MP2.0 and MP4.2 One remote signal controlled stub end storage track immediately North of Melville Station
Seasonal Mount Hope Shuttle	Same as above	Same as above
Anthony Road Shuttle	13.5 miles of continuously welded rail mainline track CTC Signal System Four stations (Newport, Ranger Road, Melville, Anthony Road) One 400 ft signal controlled spring switch passing siding at Melville Station Three track layover/carbarn maintenance facility for fleet of three self-propelled rail cars Upgrade 26 at-grade crossings	**Passenger service infrastructure plus** Signal controlled two track Newport Station (add one track to station) Two remote signal controlled 400ft sidings at MP2.0 and MP4.2 One remote signal controlled stub end storage track immediately North of Melville Station
Fall River Commuter Shuttle	18 miles of continuously welded rail main line track CTC Signal System Seven stations (Newport, Ranger Road, Melville, Mt. Hope, Anthony Road, Tiverton, Fall River) One 400 ft signal controlled spring switch passing siding at Melville Station One 400 ft signal controlled spring switch passing siding at Anthony Road Station Upgrade 30 at-grade crossings Signal controlled two track Newport Station Three track layover/carbarn maintenance facility for fleet of three self-propelled rail cars Restore/ rebuild Sakonnet River Bridge	**Passenger service infrastructure plus** Signal controlled three track Newport Station (add one track to station) Two remote signal controlled 400ft sidings at MP2.0 and MP4.2 One remote signal controlled stub end storage track immediately North of Melville Station
Fall River Commuter Shuttle and Anthony Road Shuttle	18 miles of continuously welded rail main line track CTC Signal System Seven stations (Newport, Ranger Road, Melville, Mt. Hope, Anthony Road, Tiverton, Fall River) One 400 ft signal controlled spring switch passing siding at Melville Station One 400 ft signal controlled spring switch passing siding at Anthony Road Station Signal controlled three track Newport Station Upgrade 30 at-grade crossings Four track layover/carbarn maintenance facility for fleet of four self-propelled rail cars Restore/ rebuild Sakonnet River Bridge	**Passenger service infrastructure plus** Two remote signal controlled 400ft sidings at MP2.0 and MP4.2 One remote signal controlled stub end storage track immediately North of Melville Station

Table 4-2
Railway Infrastructure Capital Cost Forecast

Service	Without Excursion Service		With Excursion Service	
	Rail Infrastructure Requirements	**Forecast Costs**	**Rail Infrastructure Requirements**	**Forecast Costs**
Mount Hope Shuttle (Year round and seasonal)	10.1 miles track reconstruction Removal of existing track structure 4 Railroad stations 21 Grade crossings 4 w/quad gates and signals CTC signals Layover facility building	$24,100,000	**Passenger service infrastructure plus** Signal controlled two track Newport Station Two remote signal controlled 400 ft sidings at MP 2.0 and MP 4.3 One remote signal controlled stub end storage track immediately north of Melville Station	$25,600,000
Anthony Road Shuttle	13.5 miles track reconstruction Removal of existing track structure 4 Railroad stations 26 Grade crossings w/4 quad gates and signals CTC signals Layover facility building	$31,400,000	**Passenger service infrastructure plus** Signal controlled two track Newport Station (add one track to station) Two remote signal controlled 400 ft sidings at MP 2.0 and MP 4.3 One remote signal controlled stub end storage track immediately north of Melville Station	$32,900,000
Fall River Commuter Shuttle	18.5 miles track reconstruction Removal of existing track structure 7 Railroad stations 30 Grade crossings w/4 quad gates and signals CTC signals Layover facility building Reconstruction of Sakonnet River bridge	$69,100,000	**Passenger service infrastructure plus** Signal controlled three track Newport Station (add one track to station) Two remote signal controlled 400 ft sidings at MP 2.0 and MP 4.3 One remote signal controlled stub end storage track immediately north of Melville Station	$70,600,000
Fall River Commuter Shuttle and Anthony Road Shuttle	18.5 miles track reconstruction Removal of existing track structure 7 Railroad stations 30 Grade crossings w/4 quad gates and signals CTC signals Layover facility building Reconstruction of Sakonnet River bridge	$69,100,000	**Passenger service infrastructure plus** Two remote signal controlled 400 ft sidings at MP 2.0 and MP 4.3 One remote signal controlled stub end storage track immediately north of Melville Station	$70,600,000

Table 4-3
Rail Rolling Stock Requirements and Capital Costs

	Without Excursion Service		With Excursion Service	
Service	**Recommended Equipment**	**Estimated Cost (millions)**	**Recommended Equipment**	**Estimated Cost (millions)**
Mount Hope Shuttle	Three Light Diesel Rail Cars	$5.4	Three Conventional Railroad Diesel Rail Cars	$7.5
Seasonal Mount Hope Shuttle	Three Light Diesel Rail Cars	$5.4	Three Conventional Railroad Diesel Rail Cars	$7.5
Anthony Road Shuttle	Three Light Diesel Rail Cars	$5.4	Three Conventional Railroad Diesel Rail Cars	$7.5
Fall River Commuter Shuttle	Three Conventional Railroad Diesel Rail Cars	$7.5	Three Conventional Railroad Diesel Rail Cars	$7.5
Fall River Commuter Shuttle and Anthony Road Shuttle	Four Conventional Railroad Diesel Rail Cars	$10.0	Four Conventional Railroad Diesel Rail Cars	$10.0

Table 4-4
Forecasts of Overall Capital Costs:
Railway Infrastructure and Rail Rolling Stock

	Without Excursion Service	With Excursion Service
Service	**Estimated Cost (millions)**	**Estimated Cost (millions)**
Mount Hope Shuttle	$29.5	$33.1
Seasonal Mount Hope Shuttle	$29.5	$33.1
Anthony Road Shuttle	$36.8	$40.4
Fall River Commuter Shuttle	$76.6	$78.1
Fall River Commuter Shuttle and Anthony Road Shuttle	$79.1	$80.6

4.2 Operating and Maintenance Costs

This section presents the study team's estimation methodology and estimates of operating and maintenance costs for the ten (10) rail service structures under consideration by this project. The estimates, summarized in Table 4-5 range between $0.99 million per year and $3.74 million per year.

Table 4-5 Forecasts of Annual Operating and Maintenance Costs: Summary		
	Without Excursion Service	With Excursion Service
Service	Estimated Cost (millions)	Estimated Cost (millions)
Mount Hope Shuttle	$1.94	$2.05
Seasonal Mount Hope Shuttle	$0.99	$1.04
Anthony Road Shuttle	$2.28	$2.39
Fall River Commuter Shuttle	$3.36	$3.47
Fall River Commuter Shuttle & Anthony Road Shuttle	$3.63	$3.74

Four major classes of operating costs were estimated.

- Transportation, including fuel, vehicle operation, supervision and drawbridge operations
- Maintenance of Equipment (rolling stock) including labor and materials
- Maintenance of Way including right of way, track, signal, stations and structures
- Administration including system management, administration, accounting, claims and marketing

The methodologies employed to estimate each of these classes of expense are described below.

4.2.1 Transportation Expense

The transportation cost estimates assume that all operations would be conducted with One Person Train Operations (OPTO) using single self-propelled rail cars operating as independent trains. A "proof-of-payment fare collection methodology would be employed. An internal combustion engine using diesel fuel would power the cars. These vehicles are typically called Diesel Multiple Units (DMU's) in transit industry jargon. DMU's are commonly used for light density rail transit operations outside North America. Since there are very few light density rail transit operations in North America, DMU's are seldom used on this continent[8]. Use of an alternative fuel for the internal combustion engine would add to operating costs. Use of electric cars powered by overhead trolley wires would significantly increase operating costs. Consequently such technology was not considered by this feasibility study.

Propulsion costs were based on average fuel consumption information from a 1995 KKO survey of vehicle manufacturers and January 2002 prices for diesel fuel for Rhode Island as reported by the US Department of Energy.

A proof of payment fare scheme would be employed. Proof of payment is commonly used by overseas transit operations to provide a higher level of service within available operating funds. In North America, proof of payment is used on a variety of rail systems including the light rail systems in Baltimore and Buffalo, the commuter rail system in South Florida and the new DMU operation in Ottawa. Proof-of-payment is planned for the New Jersey DMU light rail operation that will open in 2003.

Under a proof of payment system, vehicle operators are not be responsible for fare collection. All patrons would need to have purchased a valid time stamped ticket from a vending machine on the station platform prior to boarding the train. Supervisors would randomly ride trains inspecting tickets. Passengers discovered without a valid ticket would be subject to a substantial fine. A local ordinance (or state law) would be necessary to empower the transit fare inspector to enforce the fare evasion fine. The fare evasion fine is typically administered like a traffic ticket.

[8] Ottawa, Canada opened a three-vehicle 6-mile DMU system in 2001. New Jersey Transit plans to open a 34-mile 21-vehicle system in 2003. Both systems feature OPTO and other light rail operating practices.

To facilitate OPTO, the car-to-platform interface would require level boarding with either low floor cars or high level platforms. Automatic passenger doors that can be opened from the operator's cab would be required.

Since the operation of single self-propelled cars with OPTO more closely approximates light rail service than traditional commuter rail operations, it was assumed that the Aquidneck rail services would operate using a blend of transit labor and conventional railway work practices. This blended operating methodology would be consistent with the two other rail transit systems in North America operating with single self-propelled cars. If transit labor is used for vehicle operation, specially trained RIPTA staff would be used to operate the cars. Consequently RIPTA labor costs were used to calculate operator expense.

A staff of two or more supervisors would be responsible for overseeing vehicle operations, providing customer service support, inspecting fares, coordination with local officials, responding to passenger emergencies, and providing line dispatch functions where necessary.[9] Supervisor compensation was estimated by factoring up RIPTA operator costs.

Transportation costs were also estimated to include staff to operate the moveable bridge spanning the Sakonnet River for service to Fall River.

Estimated annual transportation costs range between $190,000 and $1,100,000 per year. The costs of the on-island services are estimated to be approximately half the operating costs of the services that provide for operation to Fall River. Fall River service costs would be higher primarily due to increased operator hours, the need for increased supervision and the need to staff the Sakonnet River drawbridge.

4.2.2 Maintenance of Equipment Expense

Costs for equipment maintenance were estimated based on the number of self-propelled rail vehicles in the fleet. Labor for maintenance was based on the most recent average labor cost per vehicle reported for the three smallest light rail vehicle fleets in the United States[10]. Materials costs were developed from KKO's 1995 survey of rail vehicle manufacturers, and were adjusted for inflation to 2001 dollars.

Estimated total maintenance equipment costs for both labor and parts were approximately $100,000 per vehicle per year.

4.2.3 Maintenance of Way (MOW)

Maintenance of way includes costs for maintenance of the roadway, track, control signals, automatic highway crossing warning devices, stations, parking, bridges and other structures.

The study team estimated MOW expense using three methods. One method relied upon average annual costs for various maintenance items from a recent commuter railway expense budget. The second method considered average overall costs per track mile for light rail systems in the United States. The third method averaged the non-vehicle maintenance per track mile for six rail services in the United States. Results from the three methods were averaged to yield the estimates presented here.

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[9] It has been assumed that the rail line would operate using a Centralized Traffic Control (CTC) signal system with onboard vehicle transponders for route selection at the entrances to passing sidings and with Automatic Trains Stop (ATS) trips to prevent trains from passing into occupied blocks. This typical light rail mode of operation eliminates the routine need for a train dispatcher. Supervisors would serve as train dispatchers in the event of an equipment failure or other unusual circumstance. Adding human train dispatchers to the line to replace or augment the proposed system would add substantially to operating costs. It is possible that the Federal Railroad Administration could prohibit operation without a human train dispatcher to augment the proposed signal system when excursion trains are operated or if the railway is permanently connected to the MBTA network at Fall River.

[10] Memphis, Galveston and Seattle (1998)

The average annual cost method employed actual reported costs for a diesel passenger rail operation in the Northeastern United States. Maintenance of way cost elements included:

- Miles of Right of Way
- Miles of Track
- Number of Bridges
- Number of Interlockings
- Number of Grade Crossings
- Number of Stations

For each scenario, the study team determined the units of each cost MOW cost element required to operate services. The average total maintenance of way cost per track mile estimated using this method ranged between $108,000 and $130,000 per track mile.

The methodology based on light rail costs calculated average costs per track mile for non-vehicle maintenance reported by the 12 US light rail operations in 1998. Light rail properties included systems from Philadelphia, Cleveland, Sacramento, Los Angeles, Baltimore, San Diego, Dallas, Pittsburgh, Denver, St. Louis, San Jose and Portland (OR). The average non-vehicle maintenance cost per track mile reported was approximately $102,000 per year.

Using the commuter rail methodology, the average cost per mile for non-vehicle maintenance was calculated. Commuter rail properties included the following systems: San Diego, New Jersey, Chicago, Boston, Philadelphia, and South Florida. The average non-vehicle maintenance cost per track mile reported was approximately $50,700 per year.

Synthesizing the three forecasts to yield a composite estimate for maintenance of way expense, the study team found that total maintenance of way expenses ranged between $0.56 million and $1.7 million per year depending upon the extent of the physical plant required to support the proposed service structure.

4.3.4 Administration

In addition to the costs of operating trains, maintaining equipment and maintaining the railway, passenger railroads also incur administrative costs. These typically include, but are not always limited to functions including: general management, planning, general accounting, payroll, disbursements, revenue control, marketing, customer service, community relations, human resource administration, legal counsel, and claims. Across US passenger railways, costs for administrative activities are typically 15% of direct costs for transportation staff, fuel, maintenance of equipment and maintenance of way. A 15% factor for administration was employed for the estimates reported in Table 4-6.

Table 4-6
Summary of Operating Costs

Service Structure	Service Concept	Operating Costs	Without Excursion Service	With Excursion Service
None	Continue current operations of low speed low frequency excursion services on existing rail infrastructure. Provide scenic train rides for tourists and dinners during the high season and off season weekends.		NA	NA
Mount Hope Shuttle	Provide fast frequent rail passenger service between Mount Hope Terminal area and downtown Newport Station using single car self-propelled railway cars. Trains would stop at Gateway Center, CCRI, Melville and Mount Hope. Each one way trip would take 17 minutes.	Transportation	$433,785	$433,785
		Maintenance of Equipment	$304,627	$304,627
		Maintenance of Way	$949,473	$1,045,114
		Administration (15%)	$253,183	$267,529
		Total	**$1,941,068**	**$2,051,055**
Seasonal Mount Hope Shuttle	Provide fast frequent rail passenger service between Mount Hope Terminal area and downtown Newport Station using single car self-propelled railway cars, as above during the high season and off season weekends. No service from October 14 to April 15.	Transportation	$188,823	$188,823
		Maintenance of Equipment	$105,159	$105,159
		Maintenance of Way	$562,989	$610,809
		Administration (15%)	$128,546	$135,719
		Total	**$985,516**	**$1,040,510**
Anthony Road Shuttle	Provide fast frequent rail passenger service between Park and Ride Lot at Anthony Road and downtown Newport Station using single car self-propelled railway cars. Trains would stop at Gateway Center, CCRI, Melville and Anthony Road. Each one way trip would take 19 minutes.	Transportation	$450,048	$450,048
		Maintenance of Equipment	$304,627	$304,627
		Maintenance of Way	$1,225,192	$1,320,833
		Administration (15%)	$296,980	$311,326
		Total	**$2,276,848**	**$2,386,834**
Fall River Commuter Shuttle	Provide fast rail passenger service between Newport and Fall River for the primary purpose of connecting with MBTA trains to and from Boston. Trains would stop at Gateway Center, CCRI, Melville, Mount Hope, Anthony Road, Tiverton and Fall River. Each one way trip would take 33 minutes.	Transportation	$973,119	$973,119
		Maintenance of Equipment	$304,627	$304,627
		Maintenance of Way	$1,641,245	$1,736,886
		Administration (15%)	$437,849	$452,195
		Total	**$3,356,840**	**$3,466,826**

Table 4-6
Summary of Operating Costs

Service Structure	Service Concept	Operating Costs	Without Excursion Service	With Excursion Service
Fall River Commuter Shuttle and Anthony Road Shuttle	Provide fast convenient rail passenger service for both Boston commuters and on-island travelers. Many trains would operate between Newport and Fall River for the primary purpose of connecting with MBTA trains to and from Boston. Seasonal shuttle trains would operate between Newport and Anthony Road.	Transportation	$1,101,204	$1,101,204
		Maintenance of Equipment	$406,170	$406,170
		Maintenance of Way	$1,646,106	$1,741,747
		Administration (15%)	$473,022	$487,368
		Total	**$3,626,501**	**$3,736,488**

5.0 RIDERSHIP AND REVENUE FORECASTS

This chapter presents integrated ridership and revenue estimates for each of the five alternative Aquidneck Island rail service structures. These are as summarized in Table 5-1 and detailed in the balance of the chapter.

Table 5-1
Annual Ridership and Revenue Estimates

Service Structure	Annual Ridership	Annual Revenue
Mount Hope Shuttle	84,265	$79,513
Seasonal Mount Hope Shuttle	47,715	$118,523
Anthony Road Shuttle	84,265	$79,513
Fall River Commuter Shuttle	143,949	$138,639
Fall River and Anthony Road Shuttles	164,619	$158,505

5.1 Developing Ridership and Revenue Forecasts for Year Round Services

These figures have been produced based on the daily ridership forecasts for Aquidneck Island Rail ridership, which are detailed in four separate documents found in Appendix D to this report [11]

Given the large differences in the expected characteristics of resident and visitor ridership, estimates were produced for both resident and visitor ridership by day and season. For both resident and visitor travel, however, detailed data is not available for work trips or visitation levels by day. In the absence of this data, a number of assumptions were made to develop weekday, Saturday, and Sunday estimates. These were:

- For resident trips, Saturday ridership would be 50% of weekday ridership, and Sunday ridership would be 25% of weekday ridership.
- For visitor trips, 50% of ridership would occur on weekends (equally split between Saturday and Sunday), and 50% would be on weekdays.

Data is available on visitation levels by time of year, at least at the Gateway Visitors Center (see Table 5-2). For the purposes of these estimates, it was assumed that seasonal variations in total visitor levels were equivalent to seasonal variations to visits to the visitor center.

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1. Untitled Louis Berger document that provides estimates of within study area resident and visitor ridership. The estimates presented in this memorandum use the within study area resident forecasts described in this document, with certain adjustment, but not the visitor estimates, which were subsequently revised (as described below).
2. KKO Technical Memorandum, "Aquidneck Island Rail Feasibility Study, Proposed Adjustments to Resident On-Island Forecasts", April 18, 2002, which presents proposed adjustments to the Louis Berger study area resident ridership.
3. KKO Technical Memorandum, "Aquidneck Island Rail Feasibility Study, Projections of Aquidneck Rail Ridership for Trips to and from the Boston Area," April 4, 2002, which describes projections of resident travel to and from the Boston area.
4. KKO Technical Memorandum, "Aquidneck Island Rail Feasibility Study, Projections of Aquidneck Rail Visitor Ridership," April 17, 2002, which presents estimates of visitor use of Aquidneck rail.

Table 5-2
Gateway Visitor Center Visitation Levels by Month

Month	1997	1998	1999	2000	Total/Avg	Percent
January	5,364	7,022	5,682	4,940	5,752	0.8%
February	13,462	16,500	17,652	12,290	14,976	2.1%
March	14,656	14,010	14,638	22,044	16,337	2.2%
April	26,070	25,732	30,490	35,820	29,528	4.1%
May	49,145	53,185	54,998	87,950	61,320	8.4%
June	71,169	79,527	95,118	120,000	91,454	12.6%
July	97,557	113,964	121,920	157,269	122,678	16.9%
August	117,744	133,872	135,243	160,011	136,718	18.8%
September	77,280	99,456	99,891	167,436	111,016	15.3%
October	78,996	94,332	102,522	125,661	100,378	13.8%
November	15,090	23,916	21,370	17,494	19,468	2.7%
December	15,854	19,132	20,524	16,918	18,107	2.5%
May - Oct Total	491,891	574,336	609,692	818,327	623,562	85.7%
Year Total	**582,387**	**680,648**	**720,048**	**927,833**	**727,729**	**100.0%**

Individual estimates were developed for each of four seasons, which were defined as follows (see also Table 5-3):

- Spring: April 16 (Patriot's Day in Massachusetts) to Memorial Day
- Summer: Memorial Day to Labor Day
- Fall: Labor Day to Columbus Day
- Winter: Columbus Day to Patriot's Day

Table 5-3
Seasons and Number of Days by Season

			Holidays		Days & Day Equivalents in Season			
Season	Start	End	Saturday Holidays	Sunday Holidays	Weekdays	Saturdays	Sundays	Total
Spring	Apr 16	May 27	1	0	29	7	6	42
Summer	May 28	Sep 3	2	0	68	16	14	98
Fall	Sep 4	Oct 14	1	0	29	7	6	42
Winter	Oct 15	Apr 15	4	3	124	30	29	183
		Total	**8**	**3**	**52**			**365**

Annual forecasts for each of the four service structures were developed using the figures summarized above. The annual forecasts disaggregate travel into three trip types (resident local travel, resident travel to and from the Boston area, and visitor travel), three day types (weekdays, Saturdays and Sundays), and four seasons.

5.2 Development of Revenue Estimates

Revenue estimates were based on the use of Rhode Island's "One State-One Rate" fare of $1.25 for single trips, with adjustments to reflect transfers and discounts for senior citizens, students, 10 ride ticket, and monthly pass users.

- For local trips, the mix of full fare and discount trips should be roughly comparable to those for riders of RIPTA services, and for these trips, RIPTA's current average fare of $0.76[12] was used.

- For resident trips to Boston and visitor trips, there would likely be more full fare riders and fewer transfers. For these trips, assumptions on the expected ridership mix were made based upon typical patterns in other areas, including the MBTA's commuter rail system (see Table 5-4).

Table 5-4
Average Fares

	Price	Cost/Trip	Resident Local	Resident to Boston	Visitors
Adult Cash	$1.25	$1.25		20.0%	80.0%
Adult Cash Transfer	$0.25	$0.25		4.0%	1.0%
Adult Monthly Pass	$35.00	$0.88		60.0%	0.0%
Adult 10-Ride Ticket	$11.25	$1.13		7.0%	0.0%
Student Token	$10.60	$1.06		1.0%	0.0%
Senior/Disabled Cash Fare	$0.60	$0.60		4.0%	9.0%
Senior/Disable Transfer	$0.10	$0.10		1.0%	0.0%
Visitor Pass	$5.00	$1.25		0.0%	10.0%
Authorized Free	$0.00	$0.00		3.0%	0.0%
Total				100.0%	100.0%
Average Fare			**$0.76**	**$0.90**	**$1.18**

5.2.1 Seasonal and Annual Ridership and Revenue Estimates

Ridership estimates were developed for each of the year round alternative service structures:

- On-island shuttles to Mount Hope or Anthony Road, both of which would have similar ridership levels.
- Fall River Commuter Shuttle
- Fall River Commuter Shuttle and Anthony Road Shuttle

5.2.2 On-Island Shuttles Forecasts

The two on-island shuttle alternatives would primarily focus on satisfying the mobility needs of residents for on-island trips and for park-and-ride trips by visitors to Newport. Total ridership, for the two on-island shuttle service alternatives are projected to be essentially identical, at 84,000 trips per year (see Table 5-5). By day, ridership would vary from an average low of 121 trips on Winter Sundays to an average high of 481 trips on tourist season Saturdays.

Based on the average fares presented in Table 5-4, annual fare revenue would be $80,000 per year.

[12] Provided via email from Tim McCormick of RIPTA, April 23, 2002

Table 5-5
Mount Hope and Anthony Road Shuttle Ridership

	Average Daily Ridership				Annual Ridership			
	Resident Trips				Resident Trips			
	Local Trips	To/from Boston	Visitor Trips	Total Trips	Local Trips	To/from Boston	Visitor Trips	Total Trips
Spring								
Weekdays	162	0	48	210	4,698	0	1,378	6,076
Saturdays	81	0	400	481	567	0	2,800	3,367
Sundays	41	0	400	441	243	0	2,400	2,643
Summer								
Weekdays	162	0	95	257	11,016	0	6,460	17,476
Saturdays	81	0	400	481	1,296	0	6,400	7,696
Sundays	41	0	400	441	567	0	5,600	6,167
Fall								
Weekdays	162	0	19	181	4,698	0	551	5,249
Saturdays	81	0	400	481	567	0	2,800	3,367
Sundays	41	0	400	441	243	0	2,400	2,643
Winter								
Weekdays	162	0	10	172	20,042	0	1,175	21,217
Saturdays	81	0	80	161	2,442	0	2,411	4,853
Sundays	41	0	80	121	1,180	0	2,331	3,512
Totals								
Ridership					47,559	0	36,707	84,265
Average Fare					$0.76	$0.90	$1.18	
Fare Revenue					**$36,145**	**$0**	**$43,369**	**$79,513**

5.2.3 Fall River Commuter Shuttle

Extending the railway service across the Sakonnet River to Fall River and focusing the service design on providing connections for travel via MBTA rail service between Fall River and Boston would make the service attractive to markets not served by the on-island shuttles.

Overall, this alternative would carry significantly more passengers than Service Structures 1 and 2 because the service would be used by approximately 154 commuters to and from Boston per weekday. This increase would be somewhat offset by slightly lower on-island ridership (due to lower service levels), but overall, total ridership would be 144,000 trips per year, or 71 percent higher than Service Structures 1 and 2. By day, ridership would range from a low of 229 trips per day on Winter Sundays, to a high of 715 trips on tourist season Saturdays.

At this level of ridership and based on the average fare discussed above, annual revenue would be $139,000 per year.

Table 5-6
Fall River Commuter Shuttle Ridership

	Average Daily Ridership				Annual Ridership			
	Resident Trips				Resident Trips			
	Local Trips	To/from Boston	Visitor Trips	Total Trips	Local Trips	To/from Boston	Visitor Trips	Total Trips
Spring								
Weekdays	179	154	34	367	5,191	4,466	986	10,643
Saturdays	58	77	576	711	406	539	4,034	4,979
Sundays	29	38	576	643	174	228	3,458	3,860
Summer								
Weekdays	140	154	145	439	9,520	10,472	9,885	29,877
Saturdays	61	77	576	715	980	1,232	9,220	11,432
Sundays	31	38	576	645	429	532	8,068	9,028
Fall								
Weekdays	189	154	34	377	5,481	4,466	986	10,933
Saturdays	61	77	576	715	429	539	4,034	5,002
Sundays	31	38	576	645	184	228	3,458	3,869
Winter								
Weekdays	140	154	15	309	17,320	19,052	1,798	38,170
Saturdays	95	77	143	315	2,849	2,321	4,322	9,492
Sundays	47	38	143	229	1,377	1,107	4,179	6,664
Totals								
Ridership					44,339	45,182	54,428	143,949
Average Fare					$0.76	$0.90	$1.18	
Fare Revenue					**$33,698**	**$40,635**	**$64,306**	**$138,639**

5.2.4 Fall River Commuter and Anthony Road Shuttle

The Fall River Commuter and Anthony Road Shuttle alternative was designed to provide services that would be most attractive for both resident and visitor on-island mobility, and for travel between Newport and Boston. Overall, this alternative would service local resident travel better than Service Structures 1 and 2, and resident travel to and from Boston as well as Service Structure 3. As a result, total ridership would be the highest, at 165,000 boardings per year. By day ridership would range from a low of 229 on winter Sundays to a high of 889 on tourist season Saturdays.

Annual passenger revenues forecast for this service structure would be approximately $159,000 per year.

Table 5-7
Fall River Commuter and Anthony Road Shuttles Ridership

	Average Daily Ridership				Annual Ridership			
	Resident Trips				Resident Trips			
	Local Trips	To/from Boston	Visitor Trips	Total Trips	Local Trips	To/from Boston	Visitor Trips	Total Trips
Spring								
Weekdays	179	154	34	367	5,191	4,466	986	10,643
Saturdays	90	77	717	884	627	539	5,019	6,185
Sundays	45	39	717	800	269	231	4,302	4,802
Summer								
Weekdays	189	154	170	513	12,852	10,472	11,560	34,884
Saturdays	95	77	717	889	1,512	1,232	11,472	14,216
Sundays	47	38	717	802	662	532	10,038	11,232
Fall								
Weekdays	189	154	34	377	5,481	4,466	986	10,933
Saturdays	95	77	717	889	662	539	5,019	6,220
Sundays	47	38	717	802	284	228	4,302	4,814
Winter								
Weekdays	189	154	17	360	23,382	19,052	2,103	44,537
Saturdays	95	77	143	315	2,849	2,321	4,322	9,492
Sundays	47	38	143	229	1,377	1,107	4,179	6,664
Totals								
Ridership					55,145	45,185	64,289	164,619
Average Fare					$0.76	$0.90	$1.18	
Fare Revenue					**$41,910**	**$40,638**	**$75,957**	**$158,505**

5.3 Developing Ridership and Revenue Forecasts for the Seasonal Shuttle

The seasonal Mount Hope Shuttle Service Structure was developed after the other service to explore methods for improving the economic performance of the railway service. The service was designed to reduce operating costs and to improve revenue by raising base fares. This section of the report details how ridership and revenue projections for the seasonal service were derived. (For more detail on development of the forecasts for the seasonal service see Appendix D of this report.)

The seasonal alternative was designed to reduce operating costs and to increase fare revenues. The new alternative restricts the operating season to the peak tourist season and increases base fares from $1.25 to $3.00. In more detail, the alternatives would:

- Provide shuttle service between Newport and Mount Hope.
- In order to reduce operating costs, operate only seasonally, from mid-April to Columbus Day, with daily service in the summer, and weekend only service in late spring and early fall.
- In order to increase fare revenues, set adult cash fares or $3.00 (as compared to $1.25 for the initial alternatives).
- Eliminate the discounted parking for transit customers at the Gateway Visitor center so that rail service with higher fares will remain price competitive with the cost of parking at the Gateway Visitor Center.

Table 5-8 Operating Characteristics			
	Year Round Mt Hope Shuttle	**Seasonal Mt Hope Shuttle**	**Alternative B**
Adult Cash Fare	$1.25	$3.00	$2.50
Operating Seasons	Year 'Round	Mid-April to Columbus Day	Mid-April to Columbus Day
Days of Service	Spring Daily Summer Daily Fall Daily Winter Daily	Spring Weekends Summer Daily Fall Weekends Winter No service	Spring Weekends Summer Daily Fall Weekends Winter No service
Gateway Visitor Center Parking Fee	$1.00	$9.00	$9.00
Number of Daily Trips	Spring 48 Summer 52 Fall 48 Winter 22	Spring 48 Summer 52 Fall 42 Winter 0	Spring 26 Summer 30 Fall 26 Winter 0

5.4 Summary of Results

As shown in Table 5-9, the Seasonal Shuttle would significantly improve financial performance and increase farebox returns. The change would also reduce operating deficits from $1.8 million per year to $800,000 to $880,000 per year.

Table 5-9 Ridership and Financial Performance		
	Year Round Mount Hope Shuttle	**Seasonal Mount Hope Shuttle**
Annual Riders	80,780	47,715
Annual Revenue	$75,878	$118,523
Annual Operating Cost[13]	$1,941,008	$985,516
Annual Operating Deficit	$1,865,130	$866,993
Farebox Return	3.9%	12.0%

The improved in financial performance is largely due to two factors:

- The operation of service only during peak tourist season would reduce operating costs from $1.9 million per year to $1.0 million per year.
- Higher fares would increase fare revenue from $75,000 per year to up to as much as $119,000.

5.5 Impacts of Changes in Days of Operation, Fares, and Parking Fees

The estimates for the Seasonal Shuttle were developed based on the initial ridership estimate produced for the Mount Hope Shuttle alternative, with adjustments for changes in days of operation, fares, and parking fees. These adjustments are described in the balance of this section

[13] Operating Costs from KKO Memorandum "Newport Passenger Rail Feasibility Study: Alternative Service Structure Evaluation," David Nelson and Geoff Slater, May 13, 2002. See Appendix D.

5.5.1 Days of Service

The seasonal service would only operate from mid-April to Columbus Day, or approximately 121 days per year (see Table 5-10).

5.5.2 Fares

Adult cash fares would be set at $3.00. The estimates assume that regular RIPTA monthly passes would continue to be accepted, and that various discounts would be provided. Discount fare and average fare assumptions and calculations are as shown in Table 5-11.

Table 5-10
Days of Service

		Mount Hope Shuttle	Seasonal Shuttle
Spring	Weekdays	29	0
	Saturdays	7	5
	Sundays	6	5
Summer	Weekdays	68	68
	Saturdays	16	16
	Sundays	14	14
Fall	Weekdays	29	0
	Saturdays	7	6
	Sundays	6	7
Winter	Weekdays	124	0
	Saturdays	30	0
	Sundays	29	0
Total		**365**	**121**

Table 5-11
Fares and Average Fare Calculations

	Price	Cost/Trip	Resident Local	Resident to Boston	Visitors
$3.00 Adult Cash Fare					
Adult Cash	$3.00	$3.00	20.0%	20.0%	30.0%
Adult Cash Transfer	$1.75	$1.75	4.0%	4.0%	1.0%
Adult Monthly Pass	$35.00	$0.88	50.0%	60.0%	0.0%
Adult 10-Ride Ticket	$27.00	$2.70	5.0%	7.0%	0.0%
Student Token	$24.00	$2.40	1.0%	1.0%	0.0%
Senior/Disabled Cash Fare	$1.50	$1.50	12.0%	4.0%	9.0%
Senior/Disable Transfer	$0.25	$0.25	3.0%	1.0%	0.0%
Visitor Pass	$7.00	$3.00	0.0%	0.0%	60.0%
Authorized Free	$0.00	$0.00	5.0%	3.0%	0.0%
Total			100.0%	100.0%	100.0%
Average Fare			**$1.45**	**$1.47**	**$2.25**

As shown, residents and visitors would be expected to purchase different types of fares, with large proportions of resident riders purchasing passes to take advantage of monthly discounts. Similarly, large proportions of visitors would be expected to purchase visitor passes, which would be the best value for visits of short duration. These differences mean that each of the three ridership markets paying different average fares, and these average fares were used to estimate the impacts of the different fare levels.

To estimate the impact of fare changes, elasticities of –0.10 to –0.20 were used, which represent the approximate range of values for observed impacts of fare changes on commuter rail and rapid transit systems as reported in the Traveler Response to Transportation System Changes handbook. In this case, visitors were deemed to be less sensitive to fare changes than resident riders, with an elasticity of –0.10 applied to visitor travel, and –0.20 applied to resident travel.

5.5.3 Gateway Center Parking Fees

A large majority of Newport area visitors travel in parties of two (72%)[14]. As a result, to encourage the use of Aquidneck rail for park and ride to Newport, rail fares must be set at levels that would be competitive with the cost of parking at the Gateway Visitor Center. Gateway parking currently costs $1.00 with the purchase of a transit day pass for $5. In the various base alternatives, the total rail cost for a party of two was $5 ($1.25 each way for two people), versus a combined parking/transit cost of $11.00 for parties that parked at the Gateway Centers (see Table 5-12).

Table 5-12
Parking and Round Trip Transit Costs for Two Persons

	Year Round Services		Higher Fare Seasonal Service	
	Park & Ride at Gateway Center	Original Alternatives ($1.25 fare)	Park & Ride at Gateway Center	With a $3.00 Fare
Parking Fees				
Gateway Center	$1.00		$9.00	
Rail Station		$0.00		$0.00
Transit Fare	$10.00[15]	$5.00	$0.00[16]	$12.00
Total	**$11.00**	**$5.00**	**$9.00**	**$12.00**

With the higher rail fares associated with the new seasonal service, the cost for two travelers to use the rail shuttle for park and ride would increase to $10.00 or $12.00. For a party of two, this new higher rail fare is essentially the same as the current cost of driving to the Gateway Center and parking. Therefore, to maintain a competitive advantage for rail, the discounted parking at the Gateway Visitor Center could be eliminated. Cars parked at the Gateway Visitor Center would pay $9 per day. This new higher parking charge would still be cheaper than using the rail shuttle as a park and ride service, but would not provide visitors with the day transit pass that they currently receive (or could receive with their rail shuttle park and ride trip).

Significant market field research would be required to better understand how to optimize pricing and service options for an Aquidneck rail service. Without the benefit of such research it is difficult to specifically assess the impacts of eliminating the parking discount for transit travelers in Newport. Several factors must be weighed and considered including, but not limited to:

- Price competition - Even with elimination of the parking discount the rail service would still lose much of its price advantage if fares are increased.
- Access to low cost transit service – Using the rail shuttle with a visitor pass would provide visitors with access to a day pass facilitating local travel in and around Newport.

[14] Per survey conducted by Newport County Visitors Bureau
[15] $1.00 parking fee requires the purchase of a transit day pass at $5 per person.
[16] $9.00 is regular daily parking rate and does not require purchase of transit pass.

- Scenic values - The impact of the scenic quality of the rail trip on demand for service is not well understood. The scenic attributes of the trip may support higher fares and a smaller price differential compared with driving to and parking in Newport.

Market surveys and more formal research would be necessary to better understand tourist demand and pricing options for visitor use of the proposed Aquidneck rail services. However, based on what is understood at this time, it appears that the elimination of discounted parking at the Gateway Visitor Center would likely be necessary to support rail fares of $3.00 (rather than $1.25) without significant losses in forecast visitor ridership.

6.0 EXISTING PUBLIC TRANSPORTATION SERVICE ON AQUIDNECK ISLAND

6.1 Introduction

This chapter documents existing public transportation services within the study area.

This chapter describes existing conditions and presently planned improvements for fixed route bus service to and on Aquidneck Island operated by the Rhode Island Public Transportation Authority (RIPTA), passenger boat service to the island operated by RIPTA, and other transportation services operated by private carriers.

6.2 Overview

Once the average tourist reaches the Gateway Center in Newport, there is little real need for a personal automobile. Substantial public transportation to and from most attractions in the City of Newport is available at the Gateway Center. Any railroad service that reaches the Gateway Center will be complimented by the existing local public transportation.

Service between Newport and off-Island points is available, but is not as comprehensive as the on-island service within the City of Newport. Substantial service by bus (via the Mount Hope Bridge) and by boat is available to/from Providence. Bonanza Bus lines runs frequent daily service to/from Boston. Service to/from New York and points south and west (via the Pell Bridge) is limited. Service is augmented during the peak tourist season – both to/from the Island and on the Island.

Except for the Route 67 bus, which has been aggressively promoted to both the student and tourist populations, ridership on the RIPTA on-island routes has not substantially increased in recent years.

Table 6-1 summarizes all available services. Table 6-2 summarizes ridership on the RIPTA services.

Table 6-1
Existing Public Transportation to and on Aquidneck Island

Provider	Service	Description	Local service on the Island	Notes
RIPTA	Bus Route 60	Providence - Newport	Mount Hope Bridge – Newport via Route 114, W. Main & Broadway	Year-round. Parallels railroad.
RIPTA	Bus Route 62	Thames - Fort Adams - Towne Center	North to Newport Towne Center; Southwest to Fort Adams State Park	Year-round. Extra service in summer
RIPTA	Bus Route 63	Broadway – Middletown	Northeast to Middletown	Year-round.
RIPTA	Bus Route 64	Newport - URI		Connects with Amtrak at Kingston
RIPTA	Bus Route 67	Bellevue - Mansions - Salve	Southeast to Mansions and Cliff Walk; west to Goat Island	Year-round. Heavily augmented in summer
RIPTA	Special Bus Route	Middletown / Newport – Quonset Point	Middletown - Newport	One round trip per day. Not aimed at tourism market.
RIPTA	Bus Route 61	Beach	East to Cliff Walk, 1st & 2nd beaches	Summer only
RIPTA	Newport Ferry	Providence - Newport		Seasonal (7-days April – October; 5-days Oct - Apr)

Table 6-1
Existing Public Transportation to and on Aquidneck Island

Provider	Service	Description	Local service on the Island	Notes
Bonanza Bus Lines	Boston - Fall River - Newport	Boston - Fall River - Newport	Portsmouth - Middletown - Newport	Year-round. Roughly parallels railroad
Jamestown & Newport Ferry Service	Ferry	Jamestown – Newport		Seasonal (May - September)
Interstate Navigation Company	Block Island Ferry	Newport – Block Island		Seasonal from Fort Adams State Park
Adventure East Bus Services	Newport	New York City - Newport		Seasonal
Van & limo services		(Various)	(Various)	Including shuttles to Green Airport
Old Port Marine Services	Launch service		Newport Harbor points	

Extensive on-island service to attractions in the City of Newport radiates from the Gateway Center.

Table 6-2
Ridership on RIPTA's Newport Services
(2000 data)

Route	Passengers per one-way trip	Passengers per revenue hour	Average estimated one-way passengers per operating day	Days of operation
60	**35.9**	**28.8**	*1,928 (note 2)*	7 days per week all year
61	**2.3**	**15.3**	*41*	7 days per week all year
62	**3.5**	**8.6**	*128*	Except Sundays in winter
63	**13.6**	**22.7**	*645*	7 days per week all year
64	**8**	**6.5**	*124 (note 2)*	Except Sundays all year
67	**10.7**	**33**	*395*	Except Sundays in winter
QP	**12**	*12*	*24*	Monday through Friday all year
Ferry	*45*	*31.8*	**386** (note 4)	7 days per week April - October

Note 1: RIPTA-supplied data shown in bold type; calculated or estimated data shown in italics.
Note 2: Route 60 and 64 data includes substantial ridership not involving Aquidneck Island
Note 3: Daily passengers on routes 60 - 67 estimated from on average annual operating frequency
Note 4: Ferry ridership is based on summer 2000 data; no winter data is available.
Passengers per revenue hour are fewer than the 1998 RIPTA system average of 37.2 for buses.
Capacity exists for additional riders.

The principal year round services between Newport and off-Island points are RIPTA's Providence -Newport bus, RIPTA's Newport - URI bus, and Bonanza Bus Lines Boston - Fall River - Newport service. Among these three, the Providence and Bonanza buses also provide on-island local north-south service that roughly parallels the railroad. There is also one private sector entity (Adventure East Bus Services) that indicates it provides service between New York City and Newport.

The principal intra-Island year round services are three RIPTA bus routes (numbers 62, 63 and 67) radiating from the Gateway Center in Newport to points in Newport and Middletown. None of these three duplicate the potential rail service. All three compliment a potential rail service by providing connecting service at Gateway Center to various attractions.

Spring, summer, and fall service is substantially augmented by the addition of RIPTA ferry service between Providence and Newport, an additional RIPTA intra-island bus route (number 61) connecting Gateway Center with additional Newport attractions, increased service on the year round RIPTA buses in the City of Newport, and private-sector ferries operating between Newport and Jamestown and between Newport and Block Island.

Finally, RIPTA offers a year round "special" commuter service between Quonset Point and the Island. A launch service operates in Newport Harbor. A number of van and limo services offer service on the Island and between the Island and TF Green Airport.

6.3 Service details

The carriers serving Aquidneck Island and their service to and on Aquidneck Island are described below in greater detail in the following order:

- RIPTA services between Aquidneck Island and off-Island points
- RIPTA intra-Island services
- RIPTA Newport revenue and rider ship trends
- Future RIPTA plans
- Private carrier services

Near the beginning of the discussion of the service(s) of a given carrier there is description of the background and history of that carrier and any general information that applies to more than one of the services of that carrier. Within the discussion of individual services there is a discussion regarding whether that particular service is complimentary to (or partially redundant with) a potential Aquidneck Island rail service.

6.4 Rhode Island Public Transit Authority (RIPTA)

6.4.1 RIPTA History

What is now Rhode Island Public Transportation Authority began in the early 1860's as a group of horse-drawn omnibuses. By 1865, the "Union Railroad", a horse-drawn rail service was in operation. Expansion of the system was rapid, and electrification began in 1889. In addition to electric trolleys, the system included a cable car line in Providence. Ridership reached 34 million in 1897.

As was typical with trolley companies in the early 20th century, a series of corporate reorganizations took place – including operation as a subsidiary of the New Haven Railroad from 1906 to 1921. "United Electric Railways" emerged in 1921 and received some financial help from the State in the form of tax exemptions. Ridership peaked at 154 million in 1923.

Also typical among similar properties, ridership and quality of service rapidly decreased during the depression, rebounded during World War II (to a peak of 151 million in 1944), and began a substantial decline immediately thereafter. After the war, trolleys were replaced by trackless trolleys and then by diesel buses. By 1955, the property[17] was 100% diesel bus. Ridership continued to decline to the point where private operation was no longer viable.

Rhode Island Public Transit Authority was created in 1964 and took over operations in mid-1966. RIPTA was the first statewide public transit authority in the United States. Under State ownership, route miles and

[17] Then known as the United Transit Company

bus miles were increased. Ridership responded. Major replacement of buses with new vehicles took place in the early 1970's[18], so that by 1974, the entire fleet was only a few years old. By the end of the 1970's, approximately 70% of the Rhode Island population had access to RIPTA.

The past two decades have seen continued expansion of the RIPTA fleet and area of coverage. RIPTA enhancements in Rhode Island transit service have included:

- aggressive marketing of seasonal services aimed at the tourism market;
- "trolley bus" local services in downtown areas, including Providence and Newport;
- a system of express buses (with a "guaranteed ride home feature");
- alternative-fueled vehicles;
- bike racks on buses;
- free service on days with dangerous air quality; and
- an on-demand "flex service" serving less-densely populated areas of the State.

In 1998, RIPTA reported 13.9 million boardings on its fixed route bus network.

6.4.2 RIPTA Today

RIPTA serves nearly the entire state of Rhode Island[19] with city, suburban, interurban, and rural scheduled bus routes and with a passenger ferry service between Providence and Newport.

RIPTA provides its services with a fleet of approximately 200 full size buses as well as 35 vans and buses less then 35 feet in length[20]. RIPTA's fleet ranks #68 among public transit bus operators in North America. RIPTA meets ADA requirements and provides bike racks[21] on its buses.

RIPTA service includes 41 major year round fixed routes and approximately 15 "special" routes (seasonal and special-purpose services). RIPTA also offers "flex service" in some communities – an on-demand van service connecting less-densely populated areas with RIPTA hubs and other destinations. RIPTA's principal route hub is at Kennedy Plaza[22] in Providence. The Gateway Center in Newport also is a route hub served by all RIPTA bus and ferry routes to and on the Island.

Most (but not all) RIPTA services operate on a seven-day week. On some routes, weekend service is less comprehensive than on weekdays. On others (including the Newport Ferry in summer and some of the Newport buses) weekend service is more comprehensive, reflecting the weekend tourism demand.

RIPTA vehicles are stored and maintained at a number of facilities statewide including a garage on Aquidneck Island in Middletown.

6.4.3 RIPTA Fare Structure

RIPTA has adopted a simplified State-wide bus fare structure aimed at encouraging use of monthly passes and encouraging riders to take trips that involve transfer from one route to another. In Newport, one-day passes bundled with reduced-rate central parking are aimed at the visitor who would otherwise drive among the local attractions. RIPTA's Newport ferry has its own (higher) fare structure that is bundled with a package of promotional discounts at shops, restaurants, and attractions in Newport.

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[18] Preceding by a number of years the massive Federal funding of transit bus fleets by UMTA (now FTA).
[19] Except a few small communities including Block Island and the islands in Narragansett Bay not connected to the mainland by bridge.
[20] Mid 2000 data.
[21] There is a limit of two bikes per bus. Bike rack service is seasonal – coinciding with daylight savings time.
[22] Currently undergoing major reconstruction.

The basic cash fare on the RIPTA bus is $1.25 per ride[23]. There is no zone premium for long trips. For trips involving more than one bus, transfers are available for $0.25 per trip (not per transfer). Thus, the maximum one-way bus fare is $1.50 – even if three or more buses are used.

A monthly pass (good on all buses) is available for $35.00. This represents a discount between 34% and 45% (respectively) below the $1.25 and $1.50 single trip fares.

In addition to the monthly pass, there are a number of other discount fares for riders who do not commute every workday:

Table 6-3
RIPTA Discount Bus Fares
(in addition to monthly pass)

Applicability	Description	Cost	Discount
Students	10-ride packets of tokens	$10.60	15%
All riders	10-ride "RIPTIKS"	$11.25	10%
Seniors / disabled	Off-peak (one bus)	$0.60	52%
Seniors / disabled	Off-peak with transfer	$0.70	53%
Seniors / disabled	Low income	Free	100%

RIPTA's Newport Ferry fare structure is higher than that of the bus:

Table 6-4
RIPTA Newport Ferry Fares
(Boat fare only)[24]

Applicability	One Way	Round Trip	10-Ride	Monthly Pass
Adult	$4.00	$8.00	$34.00	$75.00
Age 65 & older	$2.00	$4.00	$17.00	$37.50
Age 5-11	$2.00	$4.00	$17.00	$37.50
Under age 5	Free	Free	Free	Free
ADA / disabled	$2.00	$4.00	$17.00	$37.50

Bus tickets and monthly bus passes are not honored on the Newport Ferry.

RIPTA's ferry tickets come bundled with a free package of discounts and special offers at local Newport establishments, but they do not include free rides on RIPTA buses in Newport.

6.4.4 Special RIPTA Newport Fares:

RIPTA offers one-day passes for unlimited travel in the "Newport Service Area" for $5.00 per person and $10.00 per family. These passes do not provide free travel off-Island on the Providence - Newport bus or the Newport - URI bus[25].

[23] There is a $0.50 reduced fare for short-distance rides (without transfer) on "Providence Link" trolley shuttle routes in downtown Providence.

[24] A slightly higher fare structure exists for a combination ticket that allows use of the on "Providence Link" trolley shuttle routes in downtown Providence. (Adult one way = $4.50; adult round trip = $8.50; adult 10-ride = $39; adult monthly = $90.) A similar combination ticket involving use of local Newport buses is not currently offered.

[25] A person traveling from off-Island on either of these buses would pay $1.25 each way. Alternatively, the person could pay $1.50 including a single transfer at Gateway Center to/from a local Newport route. However, the time limit on transfers would effectively prevent additional free rides in Newport.

For people arriving in Newport by car, RIPTA offers all-day parking for $1.00 at the Gateway Center to those who have purchased a RIPTA Newport pass for that day.

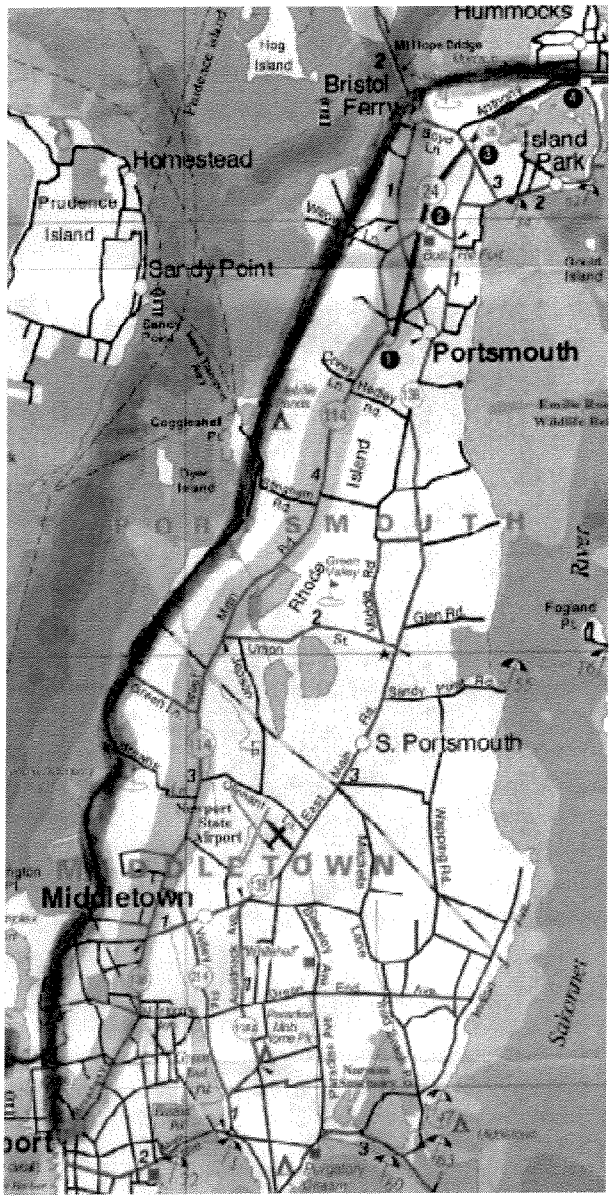
6.4.5 Individual RIPTA Routes Between off-Island Points and Aquidneck Island

RIPTA offers four services between off-Island points and Aquidneck Island:

- Route 60: Providence – Newport
- Route 64: Newport – URI
- Special Route: Middletown / Newport – Quonset Point / Davisville
- Newport Ferry

Route 60 Providence – Newport

Figure 6-1: Relationship of Route 60 to Rail Line



RIPTA offers 30 round trips per weekday between downtown Providence (Kennedy Plaza) and the Newport Gateway Center. Weekday service operates in both directions from before 5:30 AM until after midnight. Headways are 30 minutes or less, except between 9:00 AM and 1 PM and after 6 PM when the headways are 1 hour or less. For all but two of these trips, the route operates via Barrington, Warren, and Bristol, over the Mount Hope Bridge, to Newport.

One daily round trip, aimed at commuters working in Providence, operates express between the two endpoints via I-95 and the Jamestown and Pell (Newport) bridges. One daily round trip, also aimed at commuters working in Providence, operates via East Main Road on the Island rather than via route 114 and West Main.

The first bus from Providence leaves at 5:30 AM. The last bus from Newport leaves at 12:15 AM. Published trip times are between 62 and 75 minutes. Route 60 is highlighted in orange, and the rail line in violet in Figure 6-1.

Published on-island trip times between the Mount Hope Bridge and the Gateway Center range from 17 to 22 minutes. Service is subject to off-Island traffic congestion, especially during rush hours; and on-island congestion on route 114, especially during peak tourism periods.

The 28 round trips operating via route 114 and West Main provide local on-island service roughly paralleling the path of the railroad.

On Saturdays, RIPTA runs 21 round trips, all via

route 114 and West Main.

Saturday headways are generally 45 minutes throughout the day. The first bus from Providence leaves at 7:15 AM. The last bus from Newport leaves at leaves at 11:15 PM.

Sunday and Holiday service consists of 17 round trips operating on 60-minute headways. The first bus from Providence leaves at 8:15 AM and the last bus from Newport leaves at 11:15 PM.

Use of the Route 60 bus by Newport visitors is not limited to persons originating in downtown Providence. Over 35 other RIPTA routes from various parts of the state connect with the Route 60 bus at Kennedy Plaza in downtown Providence. There is no additional charge above the $1.50 basic trip rate with transfer for persons making RIPTA connections. Kennedy Plaza is also within walking distance of the MBTA commuter rail trains and Amtrak at Providence Union Station.

In 2000, the Route 60 bus averaged 35.9 passengers per one-way trip or 28.8 passengers per revenue hour[26]. This translates to an estimated average of 1,928 one-way passengers use the Route 60 bus each day.

Much of the ridership on Route 62 consists of trips between two off-Island points and does not involve any on-island travel. Ridership data for trips to, from, or within Aquidneck Island is not available, but Island ridership is substantially less than 1,928 trips per day.

Route 64 Newport – URI

RIPTA offers service between the west side of Narragansett Bay and the Newport Gateway Center via the Newport (Pell) and Jamestown bridges. On the Island of Jamestown, all Route 64 buses serve the Jamestown Ferry Landing. The westernmost terminus of most trips is the Kingston Amtrak Station.

Seven weekday round trips operate between Newport and the west side of the bay. Of these, five weekday round trips operate over the entire route and two weekday round trips operate between Newport and the University of Rhode Island campus in Kingston but do not continue on to the railroad station.

Headways range from slightly less than one hour to over three hours. Published trip times between the endpoints are between 85 and 90 minutes. Westbound service departs Newport between 6:25 AM and 5:15 PM. Eastbound service departs Kingston (or URI) between 8:05 AM and 6:55 PM.

In addition, three one-way trips[27] operate on the extreme eastern portion of the route between Newport and the Jamestown ferry landing[28].

Three round trips operate on Saturday between the Kingston Railroad station and Newport Gateway Center. There is no Sunday or Holiday service.

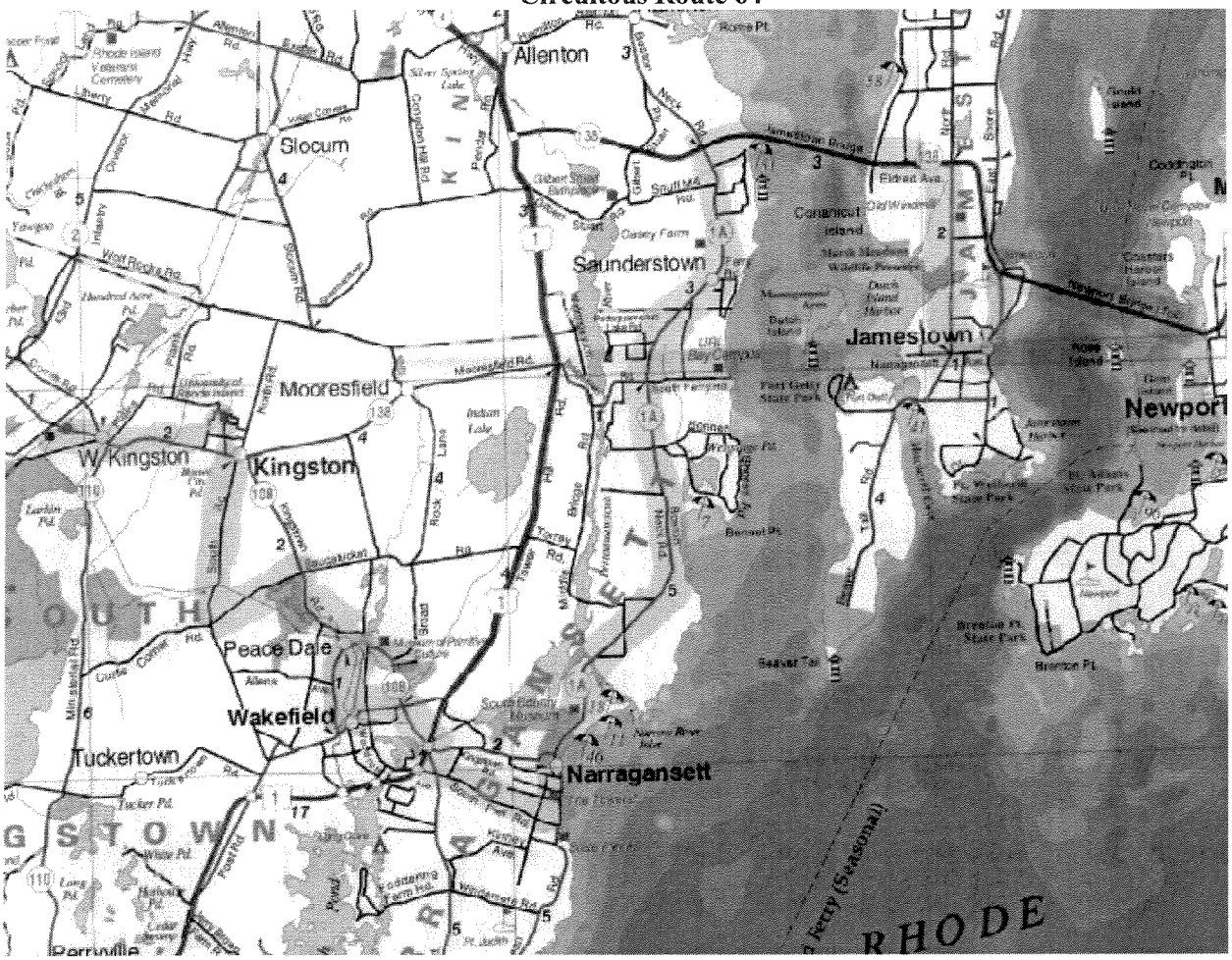
The route of the bus on the west side of the bay (west of the Jamestown bridge) is somewhat circuitous, passing through several villages in the Towns of Narragansett and South Kingstown and making detours to the URI Bay Campus, to the Wakefield Mall, and through the URI Main Campus. On the Island of Jamestown, the route detours south to the Ferry Pier, and in Newport the route detours to Newport Towne Center. The net result is approximately an hour is added to the optimum direct travel time between the Gateway Center and Amtrak station endpoints.

[26] By comparison, RIPTA's system-wide average is 37.2 passengers per revenue hour for bus service (not including "Flex" service which is provided by vans).
[27] Two early morning trips from Jamestown to Newport and one mid-afternoon trip from Newport to Jamestown.
[28] See discussion of Jamestown and Newport Ferry service for additional summer service between these two points.

In 2000, the Route 64 bus averaged 8.0 passengers per trip or 6.5 passengers per revenue hour. This translates to an estimated average of 124 one-way passengers use the Route 64 bus each operating day (Monday through Saturday). Much of the ridership consists of trips between two off-Island points. Ridership data for trips to, or from Aquidneck Island is not available, but is substantially less than 124 trips per day.

In theory, Route 64 offers a connection at Kingston with Amtrak trains to provide through service to/from New York and points south and west. In actuality, the circuitous route of the bus on the west side of the bay (west of the Jamestown Bridge) and on Jamestown Island (to serve the ferry landing) works against the widespread use of this through service.

Figure 6-2
Circuitous Route 64



Circuitous routing adds approximately an hour to the trip times between Newport Gateway Center and the Kingston Amtrak Station.

In addition, the length of connections between the RIPTA route 64 bus services and the Amtrak trains at Kingston may have a negative impact on the widespread use of the through service by tourists from New York and other points south and west. As indicated in Tables 6-5 and 6-6, bus and train schedules are not coordinated to provide optimum transfers.[29]

[29] When asked, the Newport County Convention and Visitors Bureau actually discouraged the connection with Route 64 at Kingston and recommended a connection with Route 60 at Providence.

RIPTA has indicated an ongoing desire to operate a direct service between the Kingston station and Newport as part of Amtrak's "Thruway Connecting Motorcoach" program. However, attempts to negotiate an agreement with Amtrak have not been successful.

Table 6-5
Weekday Bus – Rail Connections at Kingston

Monday through Friday				Monday through Friday		
To Newport				From Newport		
Eastbound train arrives at Kingston	Eastbound bus departs from Kingston	Length of connection (hh:mm)		Westbound bus arrives at Kingston	Westbound train departs from Kingston	Length of connection (hh:mm)
4:57 AM	9:05 AM	4:08			7:14 AM	
11:44 AM	12:35 PM	0:51		8:31 AM	9:02 AM	0:31
1:34 PM	3:40 PM	2:06			10:48 AM	
3:55 PM	4:35 PM	0:40		12:01 PM	1:38 PM	1:37
5:34 PM	6:50 PM	1:16		3:31 PM	5:16 PM	1:45
7:15 PM				4:31 PM	5:16 PM	0:45
10:55 PM					6:31 PM	
				6:41 PM	8:01 PM	1:20
					10:03 PM	

Bus and rail connections are not coordinated.
Connecting times at Kingston are longer than optimum.

Table 6-6
Saturday Bus – Rail Connections at Kingston

Saturday				Saturday		
To Newport				From Newport		
Eastbound train arrives at Kingston	Eastbound bus departs from Kingston	Length of connection (hh:mm)		Westbound bus arrives at Kingston	Westbound train departs from Kingston	Length of connection (hh:mm)
4:57 AM					7:27 AM	
9:33 AM	10:40 AM	1:07			9:27 AM	
11:33 AM					10:14 AM	
1:03 PM	1:50 PM	0:47		10:31 AM	12:09 PM	1:38
3:53 PM	5:00 PM	1:07		1:41 PM	2:39 PM	0:58
5:34 PM				4:51 PM	6:10 PM	1:19
7:27 PM					8:01 PM	
9:55 PM					10:03 PM	

Saturday bus and rail connections are limited to three in each direction.
No connections are available at Kingston rail station on Sundays.

Special RIPTA Route – Middletown / Newport – Quonset Point / Davisville
RIPTA offers a single daily round trip between the Aquidneck Island and the industrial facilities at the former Quonset Point Naval Air Station in Davisville on the west side of Narragansett Bay and the Newport Gateway Center via the Newport (Pell) and Jamestown (Verrazano) bridges. The target ridership is commuters living on Aquidneck Island and working at the Electric Boat facility at Quonset. Stops are made on the west side of the bay at other work destinations in Wickford and Davisville. On Aquidneck Island, this bus makes stops at several locations in Newport and Middletown that are also served by the Route 62 and 63 buses.

The morning (westbound) bus picks up passengers in Newport and Middletown between 5:45 and 6:15 AM and arrives at the Electric Boat plant at 6:45 AM. The afternoon (eastbound) bus departs Electric Boat at 3:40 and drops off its passengers on Aquidneck Island between 4:10 and 4:30 PM.

Because of its schedule and the locations of its stops west of the bay, the Middletown / Newport – Quonset Point / Davisville bus is not a factor in the Aquidneck Island tourist market. Likewise, the early morning departure from Gateway Center (5:55 AM) probably precludes connections from any potential rail service on the Island.

Ridership on this bus averages 12 one-way passengers per trip (also: 12 passengers per revenue hour). Thus there are 24 one-way passenger trips each operating day (Monday through Friday). Reportedly, all of these passengers begin or end their trip on Aquidneck Island.

RIPTA's Providence / Newport Ferry

RIPTA's ferry operates seven days a week during an extended peak season (mid-April through mid-October). During the rest of the year[30], service operates on weekdays only.

The terminus in Providence at Point Street Landing is served by RIPTA's Gold Line (a downtown trolley service) that, in turn, connects with over 35 other RIPTA routes at Kennedy Plaza. The terminus in Newport is at Perrotti Park, a short walk from the Gateway Center.

The ferry service is extremely reliable, essentially immune to traffic delays and all but the most severe weather conditions. However, RIPTA does provide a supplemental bus service to provide a guaranteed ride if weather prevents the ferry from running or if vessel capacity is exceeded.

Ridership on the ferry averaged 2,700 passengers per week during summer 2000. This translates into an average of 386 one-way passengers per summer day, 45 passengers per one-way trip, and 31.8 passengers per revenue hour. Reliable off-season ridership data is not yet available.

A previous ferry service between Providence and Jamestown was discontinued by RIPTA due to poor ridership.

Published travel time is 85 minutes in each direction. A single vessel operates four round trips on weekdays and a fifth round trip on Friday and Saturday nights. Headways range from 3 ½ hours to over 5 hours.

Table 6-7
Providence / Newport Ferry Summer Schedule

Depart Newport	Arrive Providence	Depart Providence	Arrive Newport
6:30AM	7:55AM	8:15AM	9:40AM
10:05AM	11:30AM	12:00PM	1:25PM
3:25PM	4:50PM	5:20PM	6:45PM
7:15PM	8:40PM	9:10PM	10:35PM
10:50PM*	12:15AM*	12:30AM*	1:15AM*

** Friday and Saturday nights (Saturday and Sunday mornings) only.*

RIPTA's Ferry does not follow the general RIPTA fare structure (see Table 6-4). Bus tickets and passes are not honored on the ferry. Tickets come bundled with a free package of discounts and special offers at local Newport establishments, but they do not include free rides on RIPTA buses in Newport.

[30] It is not yet clear whether the ferry will continue to operate through the entire winter season.

6.4.6 Individual RIPTA intra-Island Services on Aquidneck Island

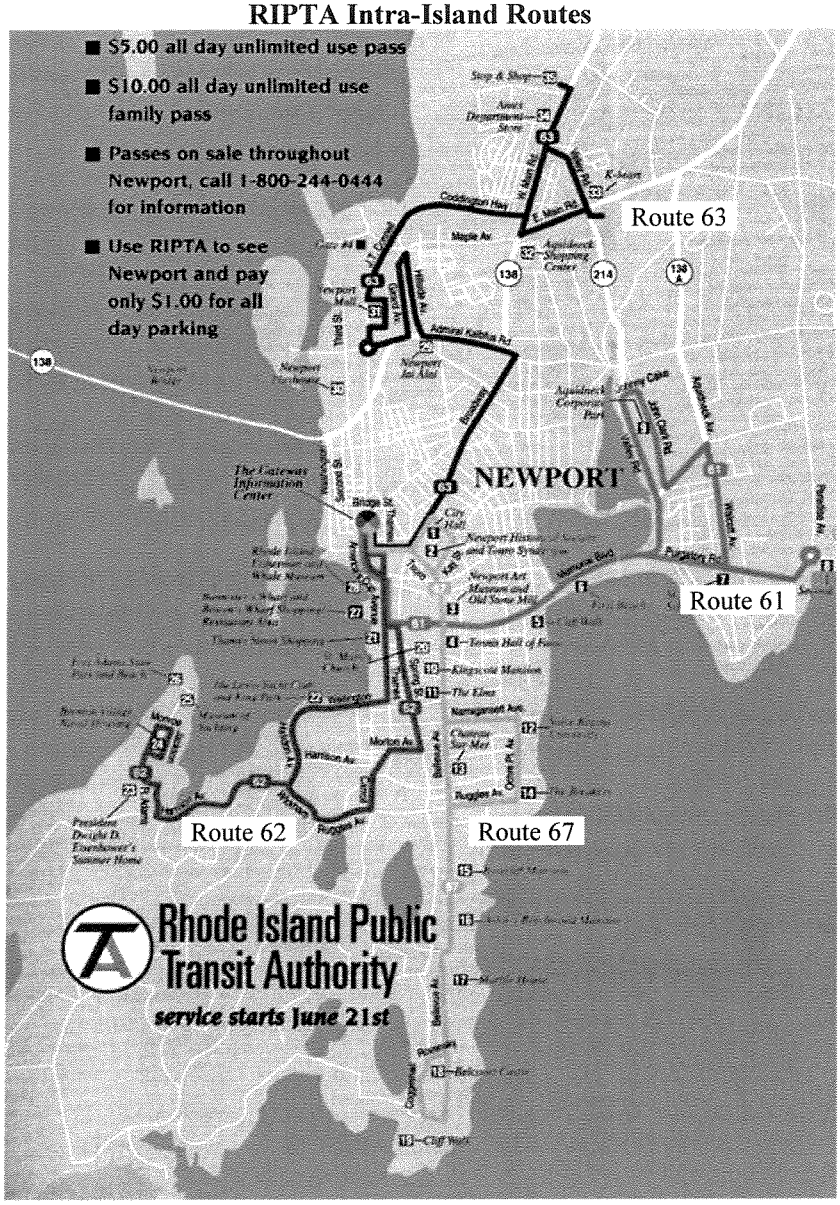
RIPTA offers four local bus routes that operate entirely within the municipalities of Middletown and Newport on Aquidneck Island:

- Route 62: Thames - Fort Adams - Towne Center
- Route 63: Broadway – Middletown shopping centers
- Route 67: Bellevue - Mansions - Salve
- Seasonal Route 61: Beach

All four of these routes radiate from the Gateway Center. Routes 61, 62, and 67 are heavily augmented during the tourist season. These four routes are color-coded in Figure 6-3[31]:

- Route 62: Red
- Route 63: Blue / Violet
- Route 67: Yellow
- Seasonal Route 61: Orange

Figure 6-3
RIPTA Intra-Island Routes

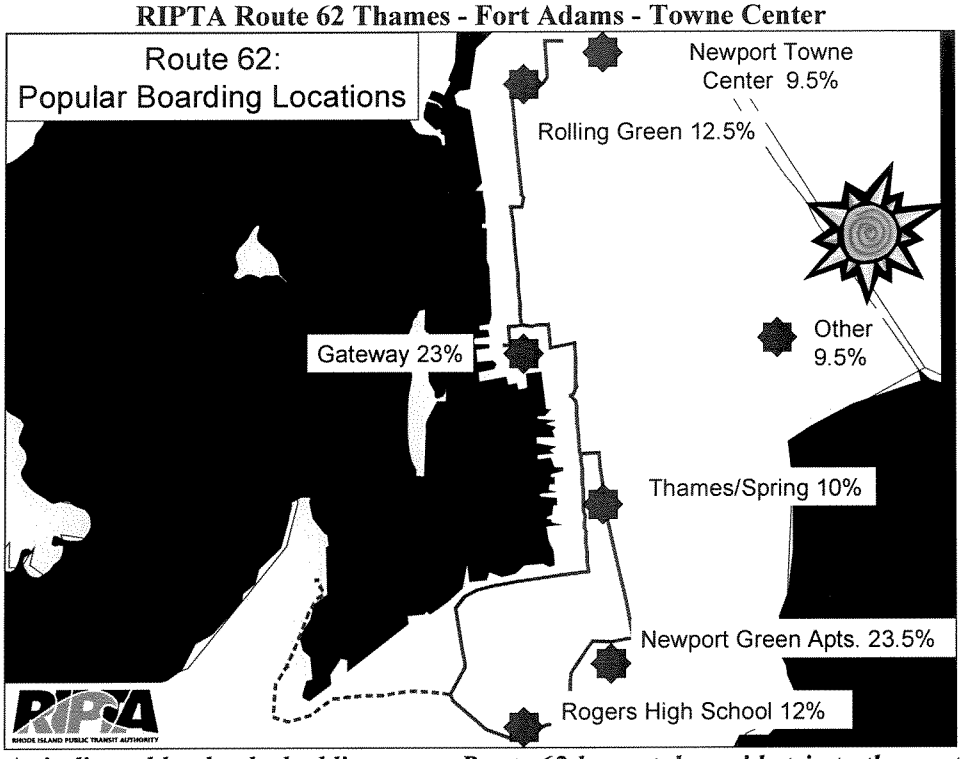


[31] Although not shown on Figure 5-3, Route 67 (yellow) now also extends westward from Gateway Center to nearby Goat Island.

Route 62 Thames - Fort Adams - Towne Center

RIPTA offers service between the Gateway Center[32] north to Newport Towne Center, south to Ruggles and Carroll Streets, and southwest toward Fort Adams State Park. The southern portion of the route is essentially a one-way loop.[33] Some, but not all, buses take a side trip into Fort Adams State Park (a tourist attraction and the site of concerts). The side trip to Fort Adams State Park leaves and returns to the one-way loop at the intersection of Brenton and Wickham Streets.

Figure 6-4
RIPTA Route 62 Thames - Fort Adams - Towne Center



As indicated by the dashed line, some Route 62 buses take a side trip to the west into Fort Adams State Park prior to reaching Rogers High School.

This service operates year round from early morning until approximately 7:00 PM, but service levels vary from season to season. More buses are scheduled on all portions of the route in summer than in winter. Sunday service is extensive during the summer, very limited during spring and fall, and not operated in the winter. Fort Adams service operates all days in the summer, on Saturdays only in the winter, and on Saturdays and Sundays in the spring and fall. Summer weekday service to Fort Adams starts after 9:30 AM. Trip time between the Gateway Center and Fort Adams is approximately 15 minutes in either direction. Trip time between the Gateway center and Newport Towne Center is 10 minutes. Tables 6-8, 6-9, and 6-10 show the seasonal variability.

[32] Gateway Center is in the middle of the route.
[33] Counterclockwise

Table 6-8
Monday - Friday Service on RIPTA Route 62

			North of Gateway Center		South of Gateway Center		Fort Adams	
Season	Total daily round trips	Approximate hours of operation	Daily round trips	Typical headway (minutes)	Daily round trips	Typical headway (minutes)	Daily round trips	Typical headway (minutes)
Winter	15	6:00 - 18:00	15	30 - 60	15	30 - 60	0	n/a
Summer	25	6:00* - 19:00	18	30 - 60	25	30	9	60
Spring / Fall	15	6:00 - 18:30	15	30 - 60	15	30 - 60	0	n/a

** Fort Adams service begins at 9:30 AM on summer weekdays.*
Weekday service to Fort Adams is only provided during the summer.

Table 6-9
Saturday Service on RIPTA Route 62

			North of Gateway Center		South of Gateway Center		Fort Adams	
Season	Total daily round trips	Approximate hours of operation	Daily round trips	Typical headway (minutes)	Daily round trips	Typical headway (minutes)	Daily round trips	Typical headway (minutes)
Winter	15	6:00 - 18:00	15	30 - 60	15	30 - 60	0	n/a
Summer	21	7:30 - 19:00	21	30	21	30	21	30
Spring / Fall	21	7:30 - 18:00	21	30	21	30	21	30

Saturday service to Fort Adams is provided throughout the operating day in spring, summer, and fall.

Table 6-10
Sunday Service on RIPTA Route 62

			North of Gateway Center		South of Gateway Center		Fort Adams	
Season	Total daily round trips	Approximate hours of operation	Daily round trips	Typical headway (minutes)	Daily round trips	Typical headway (minutes)	Daily round trips	Typical headway (minutes)
Winter	(none)	(none)	(none)	(none)	(none)	(none)	(none)	(none)
Summer	18	9:30 - 19:00	18	30	18	30	18	30
Spring / Fall	(varies)	(varies)	(varies)	(varies)	(varies)	(varies)	(varies)	(varies)

No Sunday service is provided in winter. Sunday headways on the entire route are 30 minutes in summer.

In summer, Route 62 connects with the Block Island Ferry at Fort Adams seven days per week.

During the summer and on weekends in the spring, fall and winter, the Route 62 bus compliments any potential Aquidneck Island rail service by providing frequent connections at Gateway Center to Fort Adams State Park and related attractions.

In 2000, the Route 62 bus averaged 3.5 passengers per one-way trip or 8.6 passengers per revenue hour. This translates into an estimated average of 128 passengers per operating day. (The route does not operate on Sundays during the winter.)

The 2000 data contrasts with 1998 data of 3.0 passengers per trip or 12.0 passengers per revenue hour. Part of this change may be due to an intervening extension of Route 62 northward to Newport Towne Center.

Route 63 Broadway – Middletown Shopping Centers

The Route 63 bus provides service from the Gateway Center northeast to Middletown, making stops at a number of shopping centers, but not connecting the Gateway Center with any major tourist attractions.

Twenty-seven round trips are operated on weekdays. Weekday service operates between 6:30 AM and 6:45 PM over the entire route. Weekday service continues until 9:15 PM over the southern portion of the route (between Gateway Center and Newport Towne Center). Headways are 30 minutes.

Twenty-five round trips are operated on Saturdays between 7:15 AM and 8:30 PM on the southern portion of the route and between 8:30 AM and 7:00 PM on the entire route. Saturday headways are 30 minutes until 5:00 PM and hourly thereafter.

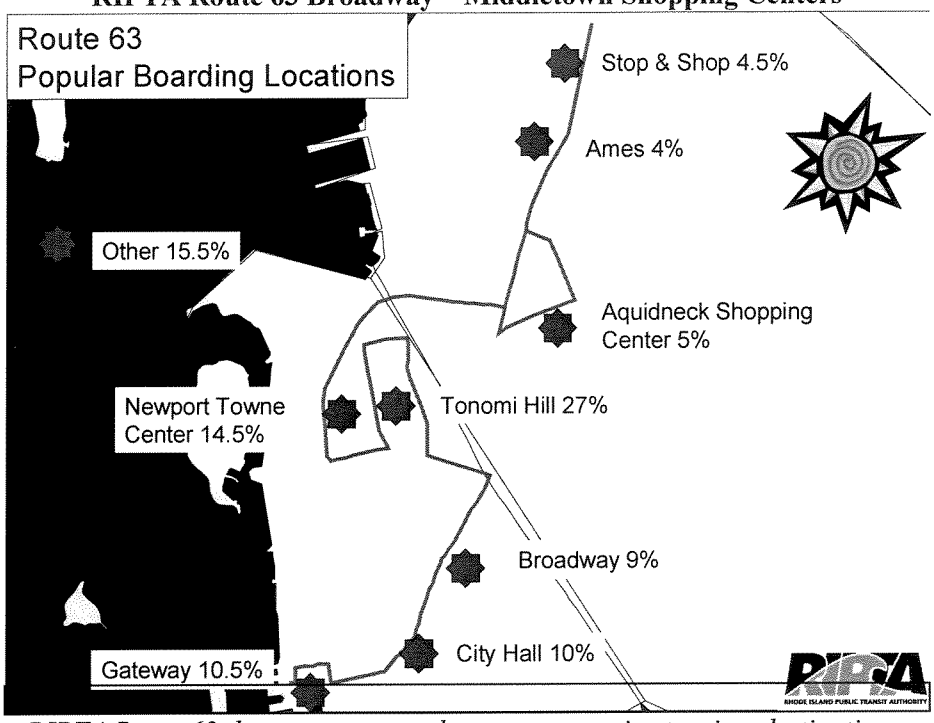
Six round trips are operated over the entire route on Sundays from 10:15 AM until 6:15 PM on 90-minute headways.

Schedules and level of service on Route 63 do not change from season to season.

Published end-to-end running time is approximately 27 minutes.

Because of its service area and lack of tourist attractions, the Route 63 bus does not appear to substantially compliment potential Aquidneck Island rail service for the tourist market. However, as the most heavily patronized on-island RIPTA route, this bus might provide a convenient connection with the train for Island residents who live in the north portion of the Island and work along the bus route. If the rail service were ever extended off-Island to Fall River, a connection between the Route 63 bus and the rail service might serve a commuter market for Newport and Middletown residents working in Boston.

Figure 6-5
RIPTA Route 63 Broadway – Middletown Shopping Centers



RIPTA Route 63 does not connect downtown to major tourism destinations.

In 2000, the Route 63 bus averaged 13.6 passengers per one-way trip or 22.7 passengers per revenue hour. This translates into an estimated average of 645 one-way passengers per operating day. However, ridership appears to vary from day-to-day, with substantially less ridership on Sundays.

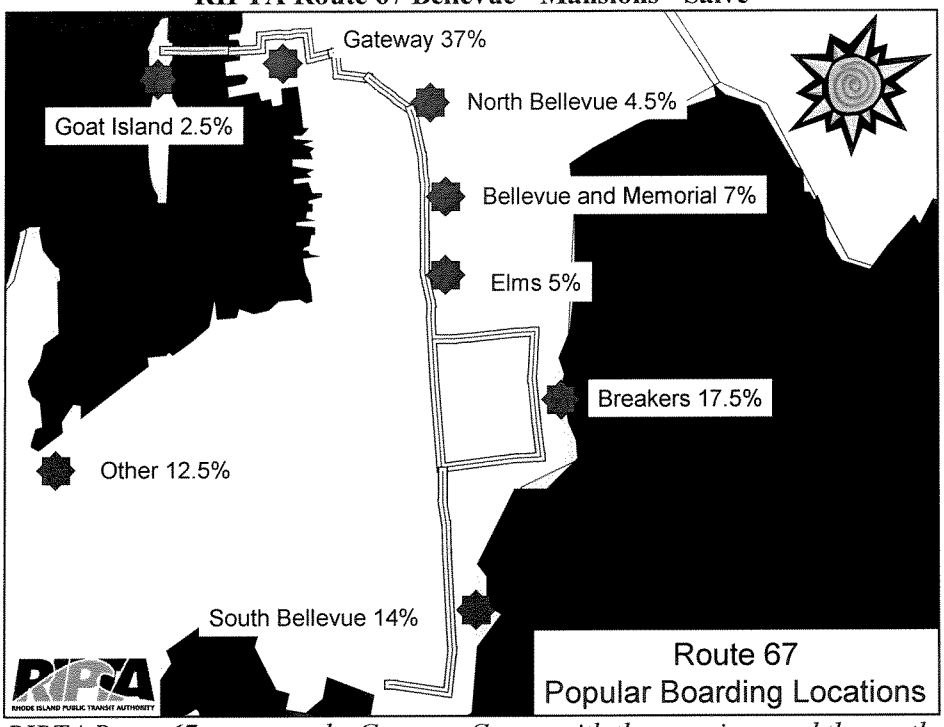
The 2000 data contrasts with 1998 data of 15.0 passengers per trip or 25.0 passengers per revenue hour. Part of this change may be due to an intervening extension of Route 62 northward to Newport Towne Center, which could have diverted some ridership from Route 63.

Route 67 Bellevue - Mansions - Salve

The Route 67 bus provides year round service southeast from Gateway Center to Salve Regina University, the mansions, the Tennis Hall of Fame, and the south end of the Cliff Walk. As such, it is the dominant tourist bus in RIPTA's Newport service area. This bus also connects Gateway Center to Goat Island (to the west).

Published trip times are approximately 15 minutes between Gateway Center and the endpoint at Bellevue and Ledge, 10 minutes between Gateway Center and Salve Regina, and 2 minutes between Gateway Center and Goat Island.

Figure 6-6
RIPTA Route 67 Bellevue - Mansions - Salve



RIPTA Route 67 connects the Gateway Center with the mansions and the southern end of the cliff walk

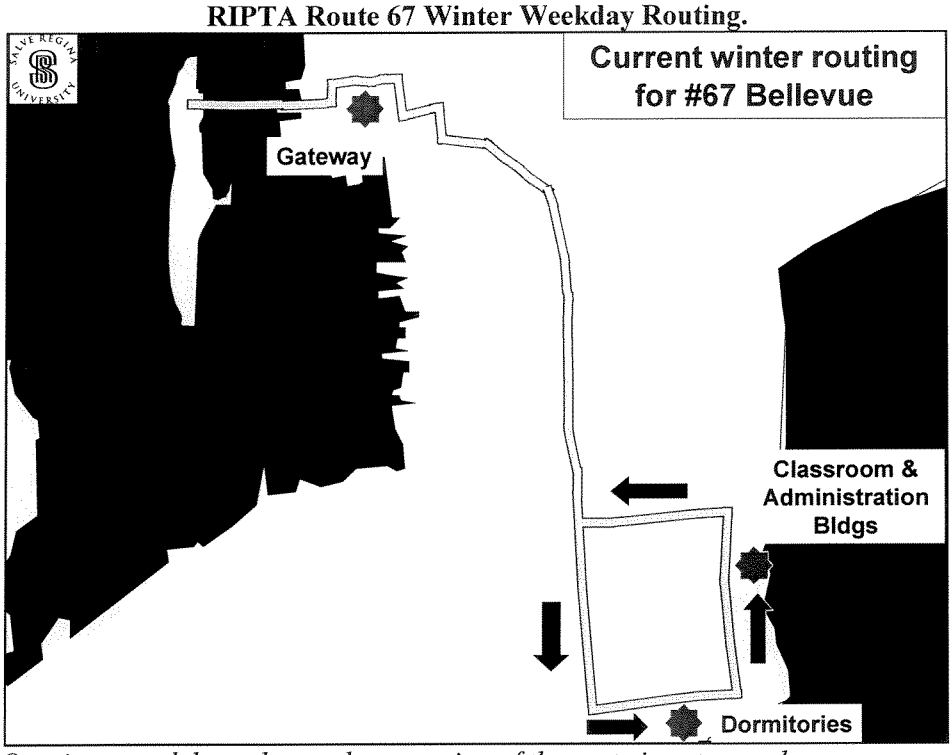
Service is augmented in summer with more frequent service and by the use of tourist-orientated "trolley" buses. In the winter, headways throughout most of day are 60 minutes on weekdays and 30 minutes on weekends. In the summer, headways are 20 minutes seven days per week.

The winter service day is from 7:00 AM until 6:00 PM on weekdays, 8:00 AM until 6:00 PM on Saturday, and 10:00 AM until 6:00 PM on Sunday. In summer, Saturday service continues until 9:00 PM.

The entire route is operated every day in summer and on weekends year round. The southernmost portion of the route (beyond the Breakers and Salve Regina University) is not operated on winter weekdays.

On Friday and Saturday during the college year, additional late night service, aimed at the student market, is provided on Route 67 by extending the final runs of Route 60 buses from Providence beyond Gateway Center to the Salve Regina campus. As many as four full-size buses are sometimes needed to cover the ridership demand on the final scheduled run of the night.

Figure 6-7
RIPTA Route 67 Winter Weekday Routing.



On winter weekdays, the southern portion of the route is not served

The Route 67 bus compliments any potential Aquidneck Island rail service by providing frequent connections at Gateway Center to, and between, many popular tourist attractions.

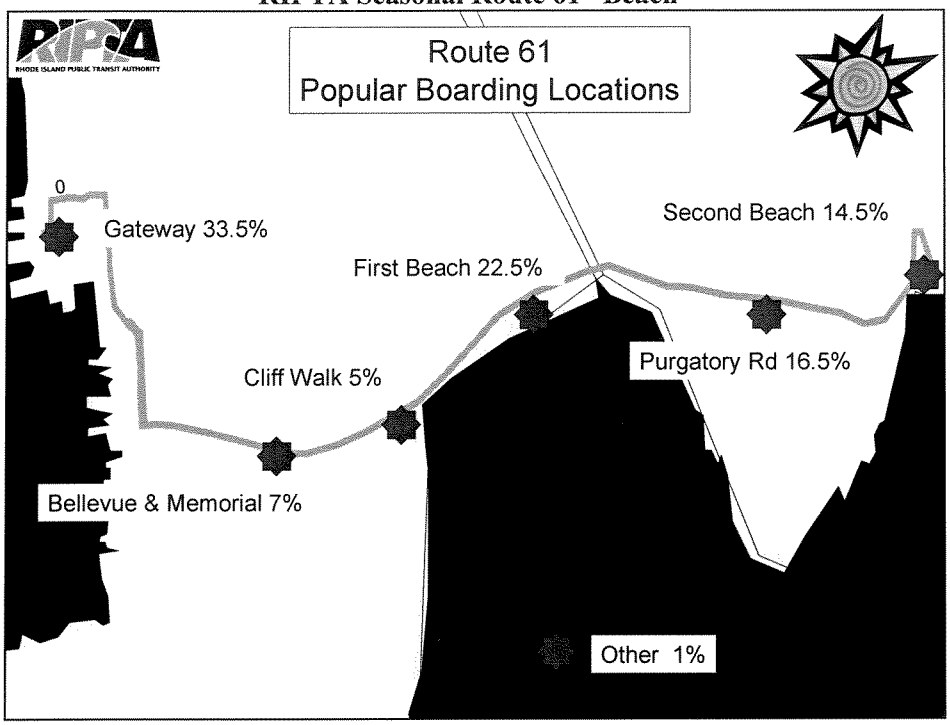
In 2000, the Route 67 bus averaged 10.7 passengers per trip or 33.0 passengers per revenue hour. This contrasts sharply with 1998 data of 2.5 passengers per trip or 7.7 passengers per revenue hour. The increase in ridership is due to a number of factors, including a new mandatory student pass program at Salve Regina, schedule augmentations aimed at the student population, aggressive marketing of the bundled parking and pass program to the tourist market, and the use of "trolley" buses during the tourist season.

Seasonal Route 61 "Beach"

The Route 61 bus operates during the summer only. The route runs east from the Gateway Center to the north end of the Cliff Walk, and to First and Second Beaches. The Newport Art Museum and the Tennis Hall of Fame (both also served by the Route 67 bus) can be reached via the Route 61 bus.

The summer-only service day is 8:55 AM to 5:15 PM on weekdays, 8:15 AM to 5:15 PM on Saturday, and 10:15 AM to 5:55 PM on Sunday. Headways are one hour on all days.

Figure 6-8
RIPTA Seasonal Route 61 "Beach"



RIPTA route 61 operates during the summer only and connects the Gateway Center with the north end of the cliff walk and with two popular beaches.

In 2000, the Route 61 bus averaged 2.3 passengers per trip or 15.3 passengers per revenue hour. This is similar to 1998 data of 2.4 passengers per trip or 16.0 passengers per revenue hour.

6.4.7 RIPTA Newport Revenue and Ridership Trends

RIPTA revenue attributable to the Newport Garage appears to be increasing, partially due to increased marketing of the Newport passes, but partially due to other factors.

Table 6-11
Revenue Trends at RIPTA Newport Garage

	1997	1998	1999	2000
Farebox revenue	$115,000	$119,000	$99,000	$138,000
Individual passes	1,859	895	1,047	4,244
Family passes	365	186	289	878

Only part of the increased revenue is due to increased sales of passes.

When the passes in Table 6-9 are converted into cash, total revenue on the four Newport on-island routes increased by 31% between 1998 and 2000.[34] Passengers per revenue hour increased by 33.7 percent between 1998 and 2000.

All of these increases are due to the success of Route 67. The other three Newport routes have experienced little or no increase.

[34] Years 1998 and 2000 are used for comparison because RIPTA has doubts about some 1997 data and because full 1999 ridership data is not available.

Part of the recent success of Route 67 is attributable to the "Ochre Point Plan", a partnership between RIPTA and Salve Regina University. Under this plan, a RIPTA pass is bundled into the mandatory fees assessed by the University to its students. Each year, RIPTA and the University agree in advance on the expected percentage of students who will actually use the pass. The University purchases the passes at a reduced rate based on this agreed-upon percentage, and passes the cost on to all students. Thus, in effect, the students who use the pass get the pass at a reduced rate, subsidized by the students who do not use the pass.

Other contributors to the success of Route 67 are the aggressive marketing of the bundled parking and pass program, the seasonal use of "trolley" buses (which have more appeal to tourists), and minor enhancements to the Route 67 schedule to attract evening ridership by students.

6.4.8 Future RIPTA Plans

As described above, recent changes to RIPTA Aquidneck Island service have included:

- Improved Ferry Service, including supplemental bus for guaranteed ride home
- Extension of Route 62 to Towne Center
- Longer service day on route 63
- Trolley service on Route 67 to attract tourist market
- 20-minute headways on Route 67 during tourist season
- Extension of Route 67 to Goat Island
- Aggressive marketing of pass programs to student and tourist markets
- Through routing of Route 60 and Route 67 buses on weekend evenings during Salve school year

Additional changes are contemplated by RIPTA:

- Institution of flex service in the Thames area
- Additional evening service on Route 67
- No-transfer service between Salve and off-campus housing

6.5 Private Sector Public Transportation Services on Aquidneck Island

In addition to services provided by RIPTA, several private sector entities offer public transportation to and within Aquidneck Island:

- Bonanza Bus Lines: Boston - Fall River – Newport
- Jamestown & Newport Ferry Service: Jamestown – Newport
- Interstate Navigation Co.: Newport – Block Island
- Adventure East Bus Services: New York City – Newport
- Old Port Marine: Launch service between Newport Harbor points
- Various van, limo, and tour bus services: Guided tours, shuttles to off-Island points including TF Green Airport

6.5.1 Bonanza Bus Lines: Boston - Fall River – Newport

Bonanza operates a year round daily service between Boston and Newport.

Bonanza is a regional interstate bus company based in Providence. The company's principal route is between Providence and Boston (including Logan Airport). Other routes connect Providence with New York City, Hartford and other points in Connecticut, Cape Cod, western Massachusetts, southern Vermont, and Albany.

Bonanza is a well-established, reliable company and has been in operation for several decades. In Providence, Bonanza serves as the terminal agent for Greyhound.

In addition to the routes radiating from Providence, Bonanza operates year round daily service between Boston (South Station transportation center) and Newport. Most of this route is via limited access highway, but intermediate stops are made in Fall River at the transit authority terminal and in Portsmouth and Middletown on Aquidneck Island.

Bonanza operates six round trips each day to Boston. An additional round trip on Mondays through Fridays is aimed at the Boston commuter market.

The first bus to Newport departs from Boston at 8:00 AM on Monday through Saturday and 10:00 AM Sunday. The last bus from Newport departs at 6:00 PM Monday through Saturday and at 8 PM on Sunday. Published trip time is 95 minutes.

The fares between Boston and Newport are $16.75 one-way and $30.25 round trip. A one-day round trip excursion fare of $21.95 is also available.

On Aquidneck Island, Bonanza travels on East Main Street and accepts local passengers for $1.00 one-way. This competes with the single weekday round trip round trip of RIPTA's Route 60, which operates via East Main rather than via route 114 and West Main.

Bonanza's route on Aquidneck Island is roughly parallel to, but substantially east of, the rail line.

In theory, it is possible to travel on Bonanza between Providence and Newport by transferring between the Providence - Cape Cod route and the Boston - Fall River - Newport route at Fall River. However, the two schedules are not coordinated to readily enable such a transfer.[35]

6.5.2 Jamestown & Newport Ferry Service

The Jamestown & Newport Ferry Service operates a seasonal passenger ferry between the Jamestown ferry landing and three points in Newport.

Today's Jamestown & Newport Ferry is a successor to the large automobile ferry which was the most direct highway link between Newport and the west side of Narragansett Bay until the opening of the Newport (now Pell) bridge over thirty years ago.[36]

The Newport terminals are at Goat Island, Bowens Wharf, and Fort Adams. The Goat Island and Bowens Wharf piers are within walking distance of the Gateway Center. Goat Island is also connected to the Gateway Center by the RIPTA Route 67 bus.

Service starts before 9:00 AM and runs to after 10:00 PM. All boats throughout the day stop at Goat Island and Bowens Wharf. Fort Adams service ends at approximately 5:30 PM. Trip times vary, depending on the destination in Newport, but are in the order of 25 to 35 minutes.

The service operates between late May and September.

Fares are $7.00 one-way and $12 round trip. Children under age 10 ride for $3.00 (one way). Reduced-rate 10-ride tickets are available.
Bicycles are carried on the ferry for $1.00 extra.

[35] When asked about service between Providence and Newport, Bonanza refers potential riders to the RIPTA Route 60 service.
[36] Prior to the opening of the bridge, the ferry was actually designated as part of State Route 138 and displayed standard highway signs to that effect.

This service duplicates the Newport - Jamestown service provided Monday through Saturday by RIPTA's Route 64 bus. However, it appears to be the only public transportation between Newport and Jamestown on Sundays and holidays.

The Jamestown & Newport Ferry provides potential rail users with another daytime destination that can be reached by public transportation from the vicinity of the Gateway center.

6.5.3 Interstate Navigation Company

Interstate Navigation Company provides a single daily round trip between Fort Adams State Park in Newport and Block Island during the summer.

The company connects Block Island with New London, Connecticut; Point Judith, Rhode Island; and Newport, Rhode Island.

The vessel departs from Newport at 10:15 AM and arrives back at Newport at 6:45 PM. Trip times are approximately two hours in each direction, allowing approximately 4 ½ hours on the ground at Block Island.

Fares are $8.25 one-way and $11.85 same-day round trip. Children under age 12 ride for $3.65 one-way and $5.25 same-day round trip. Seniors receive a 50-cent discount each way. Bicycles are carried on the ferry for $2.30 extra. Parking at Fort Adams State Park is free.

The RIPTA Route 62 bus connects the ferry pier with the Gateway center.

In theory, a user of a Newport rail service could make a multi-modal (car, train, bus, boat, and possibly bicycle) day trip using the Newport – Block Island Ferry. However, free parking at Fort Adams, and a faster (one hour) alternative ferry from Point Judith offer the one-day visitor from north of Aquidneck Island faster and less expensive options to get to Block Island.

The Fort Adams to Block Island ferry does compliment a potential Newport rail service in that it provides another tourist attraction to persons who are staying more than one day at Newport.

6.5.4 Adventure East Bus Services

Adventure East Bus Services appears to be a somewhat informal enterprise offering seasonal transportation from New York City to Newport and the Block Island ferry docks in the summer and from New York City to ski destinations in Vermont in the winter. The enterprise appears to have offered the Newport service in previous years, but had disappeared (phone disconnected, etc.) by early 2001. Now, they have reappeared (with a new phone number) and indicate that they are again offering the Newport service.

Adventure East Bus Services indicates that they offer seasonal passenger service by bus or van between New York City and Newport six or seven[37] days per week.

There are two scheduled round trips Monday through Friday departing New York City at 6:00 AM and mid-day[38] and departing Newport at 9:45 AM and 4:30 PM. The morning round trip is also scheduled on Saturday. A Sunday return is scheduled to depart from Newport at 6:15 PM, but the Sunday trip from New York to Newport is scheduled on an *ad hoc* basis.
Published trip times are four hours – subject to traffic delays.[39]

Fares are $55 one-way and $95 round trip.

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[37] Sunday service from New York appears to be *ad hoc* – running on some weeks but not on others depending on demand.
[38] 11:00 AM Monday through Thursday and 12:30 PM on Friday.
[39] This would appear to make on-time return departures from Newport impossible.

The terminals in New York are two street corners in mid-Manhattan[40]. The Newport stop is at the back entrance to the Newport County Convention and Visitors Bureau.

The study team could not independently confirm that the published schedules are run on all days or on a reliable basis. Attempts to reach a person (rather than a voice mail announcement) at Adventure East Bus Services by phone were unsuccessful. Published literature indicated a need to call and confirm a trip the day before departure. Published literature also indicated that:

> "Weekend schedules are subject to change. Times may change; runs may be added or cancelled due to demand. No refunds, credit only. ... We use different vehicles, determined by the amount of passengers on a given date. ... Do not have someone meet you until you know what time you will be arriving."

Adventure East Bus Services appears to neither compete with nor compliment any potential rail service on Aquidneck Island.

6.5.5 Old Port Marine Services

Old Port Marine provides launch service between Sayer's Wharf (within walking distance of the Gateway Center) and other Newport Harbor points.

Although this service is primarily intended as an on-demand service to bring persons to and from vessels in the harbor, some land point-to-land point trips can be made.

During summer months, two or more vessels, each capable of carrying approximately 30 passengers, are used, providing almost-continuous departures.

Old Port Marine's launch service would tend to compliment a potential Aquidneck Island rail service to the Gateway Center area. Depending on the locations of rail stations north of Newport, the rail/launch combination could allow persons staying on vessels moored in the harbor to reach golf courses and other attractions on the north part of Aquidneck Island without renting an automobile.

6.5.6 Various van, limo, and tour bus services

A number of van, limo, and tour bus enterprises serve Newport, including, but not limited to:

- ABR Transport
- B & E Taxi Van
- Designer Limousine
- Lands End Limousine
- Newport Limousine
- Viking Bus Tours

These enterprises vary widely in size, scope, and vehicle type. However, each appears to serve the Gateway Center area, each appears to offer guided tours, and most appear to offer transportation to on-island attractions not served by RIPTA bus routes. As such, these services would tend to compliment a potential Aquidneck Island rail service to the Gateway Center area. Some of these enterprises also offer shuttle service to off-Island points including the TF Green Airport.

[40] 2nd Ave and 85th Street on the east side and 79th Street off Broadway on the west side.

7.0 FINANCIAL ANALYSIS

This chapter of the report synthesizes the forecasts of demand, revenue and costs to project a financial appraisal of the various rail passenger service options. The chapter provides separate estimates of the operating and capital costs for scenarios where it is decided to operate the various excursion trains (dinner, lunch, tourist) on the same days that the new passenger services are operating. Preserving the option to commingle the passenger and excursion trains adds slightly to both the capital and operating costs of developing the passenger service. The forecasts for service structures implemented without the excursion service are presented in Table 7-1. Forecasts with the excursion service option are presented in Table 7-2. This chapter compares the various service structures relative to their financial performance.

7.1 Ridership and Revenue Forecasts

The various service structures are forecast to carry between 48,000 and 165,000 annual passengers. The Fall River/Anthony Road Shuttle provides the most extensive service and is forecast to carry the most passengers each year. The seasonal service scenario has the lowest forecast annual ridership.

Forecast revenues are also highest for the combined Fall River/Anthony Road Shuttle, at $159,000 per year. Forecast revenues for the seasonal shuttle are also relatively high ($119,000/year) due to higher fares and parking fees associated with that scenario. The year round on-island shuttles are forecast to have the lowest annual revenue at $80,000 per annum.

Average revenue per passenger for the four low fare year round service structures would be less than $1.00 per year boarding. Average revenue per passenger for the higher fare seasonal shuttle with a $3.00 base fare would approach $2.50 per boarding.

There is no difference in the shuttle ridership and revenue forecasts for service structures that would allow excursion services to be operated on the same days that passenger shuttles would be operated.

7.2 Operating and Capital Costs

Forecast operating costs range between $1.9 million and $3.7 million for the year round service structures. Seasonal service would have substantially lower operating costs in the vicinity of $1 million per year. Making accommodation for the excursion services adds approximately $100,000 per year to annual operating expense for the year round alternatives.

Capital costs for the various alternatives are greatest for the alternatives that require restoration of the Sakonnet River Bridge. Railway infrastructure costs are lowest for the Mount Hope Shuttle alternatives.
Railway infrastructure necessary to allow excursion service to run with the new passenger service adds approximately $1.5 million to the infrastructure capital costs for additional trackage, switches and signals. Rolling stock acquisition costs are lowest for alternatives that can use light diesel rail cars, avoiding the added expense of purchasing conventional railroad equipment.

7.3 Operating Cost Evaluation Measures

When comparing forecast ridership and revenue with forecast operating costs, various ratios are typically developed allowing comparisons of efficiency and effectiveness for the various alternatives.

Forecast operating cost per passenger carried for all alternatives is in the range of $20 to $28 per boarding. This cost ratio is generally unfavorable for a fixed route transit service and more typical of the "dial-a-ride" door-to-door paratransit services provided for handicapped persons. By comparison, RIPTA's overall cost per passenger in 1998 for all services (including both bus and paratransit services) was $2.65. Operating costs per passenger for various existing US rail transit services are reported in Table 7-3. Only Connecticut's Shore Line East service reports costs per passenger that are comparable to the proposed Newport services with a operating cost of $25 per boarding.

Forecast operating subsidy per passenger ranges between $18 and $27 per boarding. This level of cost not covered by passenger fares is also generally unattractive. By comparison, RIPTA's overall subsidy per passenger in 1998 as reported to the Federal Transit Administration for all services was $2.04. Reported subsidy per passenger for various existing US rail transit services are reported in Table 7-3.

The forecast fare box recovery ratios for the various alternatives generally fall with the range of 3% to 4% of operating costs being offset by passenger revenues. The forecast fare box recovery ratio for the seasonal shuttle (which was specifically crafted to improve economic performance) is 12% without excursion service. RIPTA's overall farebox recovery ratio in 1998 reported to FTA for all services was 23%. Fare box recovery ratios for various existing US rail transit services are reported in Table 7-3. Only Connecticut's Shore Line East service reports a fare box recovery ratio (14.2%) comparable to any of the proposed Newport services.

7.3.1 Capital Cost Evaluation Measures

Comparing the forecast ridership levels and operating costs for the various alternatives it is found that the forecast overall capital cost per typical peak day rider on the new systems would range between $50,000 and $109,000. This level of expenditure per daily transit passenger trip is relatively high compared with similar projects proposed elsewhere.

7.3.2 Federal Cost Effectiveness Index

Although the purpose of this analysis does not include the development of an application for federal funding to build the proposed passenger railway, it is instructive to consider how the forecast financial performance compares other projects seeking federal funding.

The Federal Transit Administration uses a variety of measures to evaluate the relative merits of projects seeking federal assistance. One measure used is a cost-effectiveness index calculated for all new start transit projects seeking federal funds for construction. The index considers the incremental cost per incremental passenger in the forecast year. The measure is based on the annualized total capital investment and annual operating costs divided by the forecast change in annual transit system ridership. For the FY 2000 submissions, the cost-effectiveness indices range from $2.54 per new rider to $48.82 per new rider, with a median reported of $10.39 per new rider[41]. By comparison the approximate 2020 estimates for the cost effectiveness index for the various Aquidneck alternates range between $34.69 and $44.30 per new annual rider (assuming a 30 year life for proposed Aquidneck Island railway project).

The FTA ranks projects according to the cost-effectiveness index and assigns a "high", "medium-high", "medium", "low-medium" or "low" rating based on its relative ranking compared to the other New Starts projects reported. For a proposed project to be rated as "recommended", it must be rated at least "medium" in all indicators evaluated by the FTA including financial considerations. Only a fraction of submissions are recommended for FTA funding. It would seem likely based on economic criteria that the proposed services would rank relatively low in terms of recommendations for FTA funding.

[41] Federal Transit Administration, New Starts Evaluation and Rating Process as illustrated for application to Fiscal Year 2002 funds as reported at http://www.fta.dot.gov/library/policy/ns/ns.htm.

Table 7-1
Aquidneck Passenger Rail Study
Performance Evaluation of Proposed Service Structure Packages

Packages without Excursion Services	1	2	3	4	5
Evaluation Measures	Mount Hope Shuttle	Seasonal Mount Hope Shuttle	Anthony Road Shuttle	Fall River Shuttle	Fall River / Anthony Road Shuttle
Forecast Performance					
Transit Passengers per Year (2020)	84,265	47,715	84,265	143,949	164,619
Average Daily Ridership (2020)	231	394	231	394	451
Typical Peak Day Ridership (2020)	481	580	481	715	889
Annual Fare Revenue (2002 $'s)	$79,513	$118,523	$79,513	$138,639	$158,505
Annual Operating Cost (2002 $'s)	$1,941,068	$985,516	$2,276,848	$3,356,840	$3,626,501
Capital Costs for Railway Infrastructure (2002 $'s)	$24,064,785	$24,064,785	$31,390,975	$41,677,725	$41,677,725
Replace Sakonnet River Bridge (2002 $'s estimate)				$27,400,000	$27,400,000
Capital Costs for Rolling Stock (2002 $'s)	$5,400,000	$5,400,000	$5,400,000	$7,500,000	$10,000,000
Total Capital Cost (2002 $'s)	$29,464,785	$29,464,785	$36,790,975	$76,577,725	$79,077,725
Annualized Capital Cost (assuming 30 year project life)	$982,160	$982,160	$1,226,366	$2,552,591	$2,635,924
Operating Cost Evaluation Measures					
Operating Cost per Passenger	$23.04	$20.65	$27.02	$23.32	$22.03
Total operating costs not covered by fare revenue	1,861,554	866,993	2,197,334	3,218,201	3,467,996
Required Operating Subsidy per Passenger	$22.09	$18.17	$26.08	$22.36	$21.07
Fare Box Recovery Ratio (Passenger Revenue/Operating Cost)	4.1%	12.0%	3.5%	4.1%	4.4%
Capital Cost Evaluation Measures					
Capital Cost per Annual Passenger	$350	$618	$437	$532	$480
Capital Cost for Typical Peak Day Passenger	$61,257	$50,801	$76,489	$107,175	$89,001
Approximate FTA Cost-Effectiveness Index	$34.69	$41.24	$41.57	$41.05	$38.04

Table 7-2
Aquidneck Passenger Rail Study
Performance Evaluation of Proposed Service Structure Packages

Packages with Excursion Services	1	2	3	4	5
Evaluation Measures	Mount Hope Shuttle	Seasonal Mount Hope Shuttle	Anthony Road Shuttle	Fall River Shuttle	Fall River / Anthony Road Shuttle
Forecast Performance					
Transit Passengers per Year (2020)	84,265	47,715	84,265	143,949	164,619
Average Daily Ridership (2020)	231	394	231	394	451
Typical Peak Day Ridership (2020)	481	580	481	715	889
Annual Fare Revenue (2002 $'s)	$79,513	$118,523	$79,513	$138,639	$158,505
Annual Operating Cost (2002 $'s)	$2,051,055	$1,040,510	$2,386,834	$3,466,826	$3,736,488
Capital Costs for Railway Infrastructure (2002 $'s)	$25,559,785	$25,559,785	$32,885,975	$43,172,725	$43,172,725
Replace Sakonnet River Bridge (2002 $'s estimate)				$27,400,000	$27,400,000
Capital Costs for Rolling Stock (2002 $'s)	$7,500,000	$7,500,000	$7,500,000	$7,500,000	$10,000,000
Total Capital Cost (2002 $'s)	$33,059,785	$33,059,785	$40,385,975	$78,072,725	$80,572,725
Annualized Capital Cost (assuming 30 year project life)	$1,101,993	$1,101,993	$1,346,199	$2,602,424	$2,685,758
Operating Cost Evaluation Measures					
Operating Cost per Passenger	$24.34	$20.36	$28.33	$24.08	$22.70
Total operating costs not covered by fare revenue	1,971,541	853,121	2,307,321	3,328,188	3,577,983
Required Operating Subsidy per Passenger	$23.40	$17.88	$27.38	$23.12	$21.73
Fare Box Recovery Ratio (Passenger Revenue/Operating Cost)	3.9%	12.2%	3.3%	4.0%	4.2%
Capital Cost Evaluation Measures					
Capital Cost per Annual Passenger	$392	$693	$479	$542	$489
Capital Cost for Typical Peak Day Passenger	$68,731	$57,000	$83,963	$109,268	$90,684
Approximate FTA Cost-Effectiveness Index	$37.42	$43.46	$44.30	$42.16	$39.01

Table 7-3
Financial Indicators for Proposed Rail Services and Various US Rail Transit Operations[42]

Agency	Annual Operating Cost (000 Dollars)	Annual Passenger Boardings	Annual Farebox Revenue (000 Dollars)	Average Revenue per Passenger Trip	Average Operating Cost per Passenger Trip	Average Operating Subsidy per Passenger Trip	Farebox Recovery Ratio
Proposed Aquidneck Island Rail Passenger Services (without excursion services)							
Mount Hope Shuttle	$1,941.07	84,265	$79.51	$0.94	$23.04	$22.09	4.1%
Seasonal Mount Hope Shuttle	$985.52	47,715	$118.52	$2.48	$20.65	$18.17	12.0%
Anthony Road Shuttle	$2,276.85	84,265	$79.51	$0.94	$27.02	$26.08	3.5%
Fall River Commuter Shuttle	$3,356.84	143,949	$138.64	$0.96	$23.32	$22.36	4.1%
Fall River/Anthony Road Shuttle	$3,626.50	164,619	$158.51	$0.96	$22.03	$21.07	4.4%
Selected US Commuter Railroads							
Connecticut Shore Line East[43]	$7,486.28	299,216	$1,061.51	$3.55	$25.02	$21.47	14.2%
Vermont Champlain Flyer[44]	N/A	N/A	N/A	N/A	N/A	N/A	23.0%
South Florida -TRI RAIL	$20,835.70	2,348,592	$4,880.61	$2.08	$8.87	$6.79	23.4%
San Francisco-CalTrain	$44,622.47	8,632,319	$18,165.61	$2.10	$5.17	$3.07	40.7%
Virginia Railway Express	$14,998.82	1,902,142	$6,475.68	$3.41	$7.89	$4.48	43.2%
Los Angeles-Metrolink	$56,837.61	6,218,557	$27,237.89	$4.38	$9.14	$4.76	47.9%
Long Island Rail Road – NY	$623,742.33	99,639,350	$334,471.68	$3.36	$6.26	$2.90	53.6%

[42] Information concerning various US rail transit operations on based on 1998 reports to Federal Transit Administration unless otherwise noted
[43] Statistics for the Shore Line East are based on FY2001 data provided by Peter Richter of Connecticut DOT in May 2002.
[44] Statistics for the Champlain Flyer are based on telephone interview with James Fitzgerald, General Manager of the Champlain Flyer on May 21, 2002 .

Table 7-3
Financial Indicators for Proposed Rail Services and Various US Rail Transit Operations[42]

Agency	Annual Operating Cost (000 Dollars)	Annual Passenger Boardings	Annual Farebox Revenue (000 Dollars)	Average Revenue per Passenger Trip	Average Operating Cost per Passenger Trip	Average Operating Subsidy per Passenger Trip	Farebox Recovery Ratio
Chicago-South Shore Railway	$22,934.79	3,367,811	$12,635.01	$3.75	$6.81	$3.06	55.1%
Light Rail Transit Railway							
San Diego Trolley	$26,494.22	23,038,453	$18,589.02	$0.81	$1.15	$0.34	70.2%
Summary Statistics for Existing Rail Transit Services							
Median	$33,778.63	2,858,202	$9,555.35	$3.48	$8.38	$4.62	43.2%
Mean	$1,034,428.22	15,325,172	$50,967.29	$4.65	$11.99	$7.34	39.5%

8.0 IDENTIFICATION OF PROJECT LABOR OBLIGATIONS

Under federal law, implementation of proposed passenger rail service requires labor protection, as well as the protection of existing public transit operators. As part of the Aquidneck Island Rail study, these implications were examined within the context of several alternatives:

Alt. 1 No Build: Dinner/Tourist Train as currently operated.
Alt 2 Dinner/Tourist Train
Alt 3 On-island: Shuttle plus Off Peak Dinner/Tourist Train
Alt 4 Off Peak Dinner/Tourist Train and Commuter Shuttle to Fall River.

Alternative 5, On-island Busway, has not been examined since the alternative was dropped due to cost and environmental concerns.

8.1 Summary of Potential Impacts

In general, the following Labor Protection Obligations will apply to the Aquidneck project:

- Davis Bacon Act, which sets Prevailing Wages for laboros and mechanics engaged in construction of the project.
- US DOL Work Hours and Safety Standards, which apply to construction activities.
- So-called 13C labor protection guidelines, which protect employees of existing mass transit operators.
- Section 5323 guidelines, which protect existing mass transit providers impacted by the new service.

The specifics of these requirements are addressed below. In summary, the Prevailing Wage and other DOL standards will be the same as those used on most FTA and FHWA projects. 13C and Section 5323 protections should not impose a significant impediment to implementation of the Aquidneck project.

8.2 Labor Protection Guidelines

Under FTA guidelines, RIDOT will have to address to labor concerns which arise in two phases:

Construction Phase: RIDOT must adhere to certain minimum labor standards as defined in federal law.

O&M Phase: When implementing the Operation & Maintenance Phase of the project, the existing transit labor force must be protected against any negative impact from the project. In addition, any impacts on operators of existing systems must be mitigated.

The specific legal requirements are set forth under federal law and under the standard FTA Master Agreement dated 10-1-2001.

8.3 Labor Protection Requirements During Construction Phase

Several labor protection requirements are applicable to the construction phase of federally funded projects. These requirements would apply to all Alternatives involving construction work.

In accordance with 49 USC 5333(a), the awarding authority must ensure that all laborers and mechanics employed by contractors or subcontractors working on the project receive the Prevailing Wage for the locality under the Davis Bacon Act, 40 USC 276A-276b and US DOL standards 29 CFR Part 5.

From a practical standpoint, Davis Bacon Prevailing Wages and DOL standards would be of little concern if the project is constructed in accordance with the usual contractual terms and conditions applicable to federally funded state contracts. These standard terms are utilized on federal aid highway projects, FTA funded projects and other federally funded projects.

The standard federal terms related to Davis Bacon and Hours of Service applicable to FTA projects are included in the Appendix.

8.4 Labor Protection During Implementation of O&M Phase

Labor protection requirements are applicable to individual rail or transit workers upon implementation of new service. These requirements are commonly referred to as 13C requirements. The term 13C refers to Section 13C of the old Urban Mass Transportation Act. The labor protection requirements were recodified several years ago and are now set forth in 49 USC 5333(b).

13C requires that the state provide "fair and equitable" protection of the interests of employees impacted by the project.

These protections usually include the following:

a. Preservation of rights, privileges, and benefit under existing collective bargaining agreements.

b. Protection of employees against a "worsening of their positions", such as reduction in seniority, loss of base income or overtime, etc.

c. Assurances of continued employment, including priority of re-employment to those workers laid off or terminated as a result of the new project, and paid training/retraining programs.

In a worst case scenario, displaced employees may be eligible to receive up to six (6) years pay.

Compliance with 13C is a prerequisite for receipt of FTA funds. When RIDOT files a grant application for an FTA funded project, it will be required to provide:

a. An estimate of the impact on existing employees; and
b. Specific mitigation measures to address these impacts.

The FTA is required to submit the foregoing information for review by DOL, which will determine if the mitigation measures are fair and equitable. As part of this process, DOL will consult with any labor unions whose members are affected by the project, and DOL encourages the state and unions to negotiate acceptable provisions to protect employees.

FTA funds cannot be released without DOL certification of the project. DOL guidelines allow a party 15 days to object to the proposed terms of a grant. If no objections are raised or the objections are legally insufficient, DOL will certify the project. If DOL finds that the objections are sufficient, it will direct the state to negotiate with the unions and reach an agreement within 30 days.

If an agreement cannot be reached within 30 days, DOL may issue an interim certification which permits FTA to release funds (provided that no employees would be irreparably harmed). DOL would then direct the parties to negotiate a final agreement within 60 days.,

The 13C language generally required in FTA capital assistance grants is included in the Appendix. The standard FTA Capital Assistance Protective Arrangement agreement is also included.

It must be noted that 13C provisions generally do not apply to employees of excursion or sightseeing services, including sightseeing buses, rail museums or the dinner train operator.

8.5 Protection of Existing Mass Transit Operators

49 USC 5323 sets forth certain specific requirements with regard to funding of projects for the acquisition of existing mass transit assets, or the implementation of a new project in competition with an existing mass transit service.

The term "mass transit" includes both public and private entities providing transit service, but does not include sightseeing or excursion operators. The FTA defines "transit" as follows:

> Transit means transportation by a conveyance, either publicly or privately owned, that provides regular and continuing general or special public transportation to the public, but does not include school bus, charter, or sightseeing transportation. The term "transit" also includes "mass transportation" and "public transportation."

49 USC 5323 provides that funding would be available for the Aquidneck project only if:

> a. the Secretary of Transportation finds the assistance is essential to a program of projects required under sections 5303-5306 of this title.
>
> b. the Secretary of Transportation finds that the program, to the maximum extent feasible, provides for the participation of private mass transportation companies.
>
> c. just compensation under State or local law will be paid to the company for its franchise or property.
>
> d. the Secretary of Labor certifies that the assistance complies with section 5333(b) of this title. [The reference to section 5333(b) refers to so-called 13C requirements.]

The statute does not define the specific compensation to be paid to a private carrier impacted by a federal project, but rather indicates that federal funding will only be available if the private carrier is paid "just compensation" for its assets or franchise under applicable state or local law. A recent example of an agreement between a state authority and private carrier is the SEMPCA agreement related to inception of the MBTA's Old Colony service.

In Massachusetts, the applicable state statute, MGL c. 161A, § 14, states "[i]f the authority [the MBTA] shall operate...a mass transportation service or route which is not substantially similar to a service or route previously operated by the authority...and which is in competition with a pre-existing mass transportation service or route provided by a private company, and if such competition causes substantial economic damage to such company, the company may file a claim for relief with the authority within six months of the commencement of such new operation."

With regard to the Old Colony Project, the MBTA determined that the project might adversely affect all six members of the Southeastern Massachusetts Private Carriers Association (SEMPCA), and that this would require fair compensation under c. 161A, § 14 and Section 5323 of the Federal Transit Act. MBTA and SEMPCA therefore entered into a settlement agreement under which the MBTA was required to make a lump sum payment of $13.7 million to SEMPCA An arrangement was also developed giving employees of SEMPCA carriers priority in hiring for Old Colony positions.

The state statutes applicable to RIPTA and RIDOT appear to be less clear on the subject. RIPTA's statute, Section 39-18, does not appear to contain a provision permitting compensation of private carriers impacted by new RIPTA service. It may be possible to apply RIPTA's eminent domain powers to compensate the private carrier, but this complex question is best left to agency counsel.

If compensation to a private carrier were required, RIDOT may be able to fall back on its general authorization under Section 39-6.1(9) which permits RIDOT "To do all things otherwise necessary to maximize federal assistance to the state under 49 U.S.C. § 1654 or other applicable federal laws." Another alternative might be the adoption of special legislation, applicable to the Aquidneck Project, permitting the compensation of private carriers in accordance with federal law. These statutory questions must be ultimately determined by RIDOT's legal counsel.

8.6 Service Descriptions

Existing mass transit services currently operate within the proposed rail service area on Aquidneck Island. These are described in a memorandum by KKO & Associates.

Table 8-1
Existing Public Transportation to and on Aquidneck Island

Provider	Service	Description	Local service on the Island	Notes
RIPTA	Bus Route 60	Providence - Newport	Mount Hope Bridge – Newport via Route 114, W. Main & Broadway	Year-round. Parallels railroad.
RIPTA	Bus Route 62	Thames - Fort Adams - Towne Center	North to Newport Towne Center; Southwest to Fort Adams State Park	Year-round. Extra service in summer
RIPTA	Bus Route 63	Broadway – Middletown	Northeast to Middletown	Year-round.
RIPTA	Bus Route 64	Newport - URI		Connects with Amtrak at Kingston
RIPTA	Bus Route 67	Bellevue - Mansions - Salve	Southeast to Mansions and Cliff Walk; west to Goat Island	Year-round. Heavily augmented in summer
RIPTA	Special Bus Route	Middletown / Newport – Quonset Point	Middletown - Newport	One round trip per day. Not aimed at tourism market.
RIPTA	Bus Route 61	Beach	East to Cliff Walk, 1st & 2nd beaches	Summer only
RIPTA	Newport Ferry	Providence - Newport		Seasonal (7-days April – October; 5-days Oct - Apr)
Bonanza Bus Lines	Boston - Fall River - Newport	Boston - Fall River - Newport	Portsmouth - Middletown - Newport	Year-round. Roughly parallels railroad
Jamestown & Newport Ferry Service	Ferry	Jamestown – Newport		Seasonal (May - September)
Interstate Navigation Company	Block Island Ferry	Newport – Block Island		Seasonal from Fort Adams State Park
Adventure East Bus Services	Newport	New York City - Newport		Seasonal
Van & limo services		(Various)	(Various)	Including shuttles to Green Airport
Old Port	Launch		Newport Harbor points	

Table 8-1 Existing Public Transportation to and on Aquidneck Island				
Provider	**Service**	**Description**	**Local service on the Island**	**Notes**
Marine Services	service			

With regard to the Aquidneck project, it is clear that RIDOT will be required to mitigate any negative effects on labor or existing mass transit carriers. An analysis of the existing and proposed services, however, demonstrates that the negative impacts will be minor, at most.

Based on KKO's studies, it appears that proposed rail service will complement most existing transit services, which serve places not serviced by the railroad. KKO projects that the proposed rail service may actually increase ridership on these lines by providing convenient new connections. The question becomes more difficult, however, with regard to stops and markets served both by existing carriers and the proposed rail service.

The following routes would be served by both existing carriers and the proposed rail service:

RIPTA Route 60: parallels the railroad on Aquidneck Island. The bus route will be retained under all the proposed rail service alternatives. In addition, KKO has not indicated that there will be reductions in service on this line due to rail service.

Bonanza Bus, Boston - Fall River - Newport: This interstate private carrier, now owned by Coach USA, operates a route parallel to the railroad on Aquidneck and continues on to Boston.

Dinner & Tourist Train Operators: A dinner train and tourist excursion train currently run on the line. This service appears to fall under the "sightseeing" category, meaning that 13C and Section 5323 protections will not generally apply.

Unscheduled Charter Buses- Some unscheduled or charter buses serve Newport. Routes, schedules and destinations are unknown at this time, but some may operate in parallel with the railroad on the island or between Newport and Boston. These operators probably fall under the "sightseeing" or "charter" exceptions.

8.7 Potential Impacts

An exiting mass transit provider would have a claim under Section 5323 if it loses ridership or revenue as a result of the proposed rail service. Similarly, the employees of these existing services would have 13C claims if they suffer negative impacts as a result of the new service.

RIPTA: With regard to 13C claims by RIPTA employees, KKO's studies suggest that there will be no reduction in RIPTA service as a result of the proposed rail service. If existing bus lines are negatively affected, the impacts would probably be offset through the provision of new feeder buses serving rail stations.

Dinner & Tourist Trains: As mentioned above, dinner and tourist trains currently operate on the Newport Secondary. These services appear to fall in the "sightseeing category", meaning that employees would generally not be entitled to 13C protections. The exception might be dinner train employees whose function supports mass transit or freight operation (e.g., track maintenance personnel and dispatchers).

If RIDOT revises the dinner train lease to shift track maintenance and other functions (such as dispatching) to the new rail shuttle operator, it is possible that some dinner train employees could attempt to file a 13C claim. However, RIDOT's liability exposure should be minimal for two reasons:

- Dinner train and excursion service can co-exist with all rail alternatives.
- It is believed that much of the track work on the line is currently performed by volunteers and third party contractors, rather than railroad employees.

Bonanza Bus Lines: Bonanza bus lines presents a more difficult question. The railroad will compete with Bonanza for a handful of local passengers on Aquidneck under all rail service alternatives. RIPTA also currently operates service on the same route, which may have the effect of negating any claim by Bonanza. In any event, Bonanza charges these local passengers a fare of one dollar, so the state's liability exposure for claims under Section 5323 is clearly minimal regarding on-island business.

The cross platform alternative, which provides a Newport/Boston connection, would present a greater level of potential liability. Rail travel would compete head to head with Bonanza in the Boston to Newport market. The bus has the advantage of being a one seat ride and will likely have a more frequent schedule, but train fare will likely be cheaper and train passengers will have no worries about traffic tie ups. Thus, the train might ultimately acquire a significant share of Bonanza's existing business.

In order to maintain a claim against RIDOT, Bonanza or its employees would have to demonstrate that the new rail service negatively impacts the existing bus service. Bonanza does not publicize ridership numbers, but they currently operate six round trips per day. Under the rail shuttle alternative, KKO has projected that seventy five (75) daily riders would travel each way between Boston and Newport on Bonanza.

RIDOT could quantify and limit its exposure by monitoring bus ridership and employment both before and after implementation of new rail service. If there is a measurable loss of ridership or employment, this could serve as the basis for a financial settlement or mitigation.

Unscheduled Charter Bus Service: Finally, operators or employees of unscheduled charter bus services could attempt to raise claims against RIDOT; however, such claims would be difficult to prove and risk exposure is likely very small. Charter and sightseeing services do not fall within the FTA's definition of "transit".

8.8 Mitigation

49 USC 5323 does not provide a fixed formula for compensating bus carriers impacted by new rail operations. Under a worst case scenario, a private carrier might claim that its operation is no longer viable with the new competing rail service. The measure of compensation in this case would likely be the value of the bus line's business. On the other hand, a minimal impact might be mitigated without financial payments.

With regard to 13C claims by employees, it must be remembered that startup of rail service would present new employment opportunities. Thus, employees displaced from bus service employment could be offered new positions with the rail carrier. This would require several steps for implementation. First, the loss of positions and other negative employee impacts must be quantified. Second, an agreement would need to be negotiated with the appropriate union(s) to provide offers of employment to displaced employees. In the event that no railroad positions were available, the individual employees would be entitled to compensation.

It should also be noted that Newport/Fall River service could be in place before Boston/Fall River MBTA service. This raises an interesting point: would the MBTA or RIDOT be responsible for claims by Bonanza and its employees? In the very least, MBTA and RIDOT should be able to share the burden. However, if Newport/Fall River service comes on line first, an argument could be made that the MBTA should be responsible for the negative impacts on Bonanza.

9.0 ECONOMIC ANALYSIS

9.1 Summary of Economic Impacts of Proposed Project

The proposed project(s) provides direct economic benefits to the State of Rhode Island. These benefits accrue from expenditures for the labor and materials needed to construct the project, and for the labor and materials needed to operate and maintain the rail system, station areas and bicycle path facilities once the project is constructed. The proposed project(s) also contributes to the economy of Rhode Island indirectly through increased economic activity in those businesses that supply services, materials, and machinery necessary to support the project.

This economic analysis provides a preliminary quantitative assessment of the economic effects directly and indirectly attributable to the proposed project. These effects accrue to the local economy based on the size of investment associated with each of the project alternatives and operational characteristics and associated new tourist activities attributable to each of the proposed alternatives under consideration for the Aquidneck Rail Passenger Rail/Bicycle Path project.

Using a regionalized input-output model designed to capture both the direct and indirect effects of constructing the proposed rail and bicycle path alternatives, preliminary estimates indicate that the project could generate between $14.6 and $27.7 million in direct economic impacts associated with construction of the project, and between $1.0 million and $1.8 million in direct annual benefits due to operations, maintenance and new, induced tourism activity (see Table 9-1).

Construction effects are assumed to be spread out over the two-year construction period of the project. Between 320 and 750 Rhode Island workers are expected to be employed during the construction period. These workers are expected to earn between $9.2 million and $21.6 million from their work on this project – earnings that will go directly into the economy of the state.[45]

After construction is completed, between 18 and 56 in-state workers will be required to operate and maintain the rail shuttle and bikeway systems. These workers are expected to earn just under $450,000 operating and maintaining the seasonal shuttle service, and up to $1.4 million for a year-round service serving Fall River.

[45] The total employment figure cited covers the entire 24-month construction period. Although a more detailed assessment of the skilled trades, construction schedule and phasing of operations would be required to yield an exact determination of the numbers of employees on an annual basis, these initial estimates are roughly equivalent to between 160 and 375 full-time equivalent (FTE) employees per year.

Table 9-1
Summary of Direct Economic Effects in Rhode Island (millions of 2002 $)

	Alternative			
	Mt. Hope Shuttle (seasonal)	Mt. Hope Shuttle (year-round)	Anthony Road Shuttle	Fall River/Anthony Road Shuttle
Construction				
Output	$14.6	$14.6	$16.5	$27.7
Employment	320	320	385	750
Earnings	$9.2	$9.2	$11.1	$21.6
Annual Operations & Maintenance				
Output	$0.1	$0.2	$0.3	$0.4
Employment	18	32	36	56
Earnings	$0.4	$0.8	$0.9	$1.4
Annual New Tourists (2002)				
Output	$0.8	$0.8	$0.8	$1.4
Employment	32	31	31	55
Earnings	$0.2	$0.2	$0.2	$0.4
Total Annual Economic Effects				
Output	$1.0	$1.0	$1.1	$1.8
Employment	50	63	67	110
Earnings	$0.7	$1.0	$1.1	$1.7

Source: The Louis Berger Group, 2002

Based on ridership projections for the various seasonal and year-round services under consideration, somewhere between 35,000 and 64,000 visitor trips are expected. Based on the expectation that up to 20% of these visitors will be attributable to the operation of the proposed rail shuttle, and taking into account both daily and overnight expenditure patterns, the proposed shuttle will support between 32 and 55 new employees in the tourism industry on Aquidneck Island, providing between $209,000 and $360,000 in new earnings for these workers, and generating between $820,000 and $1.4 million in new revenues for the tourism industry.

9.2 Direct Economic Impacts

The direct economic impact of the proposed project is the sum total of spending on labor and materials resulting from construction as well as operation and maintenance-related activities. In addition, the proposed project is expected to stimulate tourism in the area that would not occur without the operation of the rail shuttle services (either on a seasonal or year-round basis). The three categories of direct impacts are defined as follows:

- ***Construction Impacts*** – Cost of materials and supplies required to construct the project, and the costs associated with labor and services to design and build the proposed project(s) and to rehabilitate or demolish existing trackage and structures (including both in-state and out-of-state economic effects);

- ***Operation and Maintenance Impacts*** – Payments to suppliers of parts and materials, and labor costs for employees arising from the operation of proposed project, including costs that reflect the operating characteristics (including seasonal variations) of each proposed alternative.

- ***Tourism Impacts*** – Net new revenues to businesses operating in Rhode Island that support the tourism and travel industry on Aquidneck Island, including the effects on employment and earnings for these employees.

9.2.1 Construction Expenditures

The economic effects of any major transportation project depends on the capital expenditures required for investment in fixed facilities, rolling stock and ancillary structures such as stations and parking. In the case of this project, the costs of developing the proposed bikeway from Newport to the Massachusetts state line is also included in each of the alternatives. The capital costs involved in each major component of the project are presented in Table 9-2.

Table 9-2
Capital Costs for Project Infrastructure Improvements (including excursion service)
(in millions of 2002 $)

Project Component	Alternative			
	Mt. Hope Shuttle (seasonal)	Mt. Hope Shuttle (year-round)	Anthony Road Shuttle	Fall River/Anthony Road Shuttle
Rail Infrastructure	$25.6	$25.6	$32.9	$43.2
Naval Base Grade Separation	$3.0	$3.0	$3.0	$3.0
Sakonnet Rail Bridge	$0.0	$0.0	$0.0	$27.4
Total Fixed Capital Costs	**$28.6**	**$28.6**	**$35.9**	**$73.6**
Rolling Stock	$7.5	$7.5	$7.5	$10.0
Total Rail Capital Costs	**$36.1**	**$36.1**	**$43.4**	**$83.6**
Bicycle Path	$8.0	$8.0	$8.0	$8.0
Total Project Capital Costs	**$44.0**	**$44.0**	**$51.3**	**$91.5**

Source: The Louis Berger Group, 2002

Major differences between each of the four alternatives under consideration involve the reconstruction of the Sakonnet River Bridge (for the Fall River/Anthony Road Shuttle) and the additional requirement in rolling stock necessary to provide the requisite level of service for this alternate. These capital outlays are for the entire construction period – estimated to last approximately two years.[46]

9.2.2 Operations and Maintenance Expenditures

In addition to capital outlays for construction, development of each of the proposed projects will require an expenditure of money for routine maintenance and periodic repair and replacement of major elements of either the bikeway or the rail system. Based on the annual cost of maintenance and the reserve requirements for major repairs and rehabilitation over the life of the system(s) involved, a set of annual operation and maintenance costs have been developed for each alternative. These cost are shown in Table 9-3.

[46] No detailed breakdown by construction phase has been developed at this stage, nor have specific suppliers been identified for rolling stock or major providers of structural steel or other major cost items (e.g., signalization). Therefore, the ensuing analysis is based on a uniform, annual outlay of project capital over the proposed two-year construction period.

Table 9-3
Annual Operation & Maintenance Costs (in millions of 2002 $)

Project Component	Alternative			
	Mt. Hope Shuttle (seasonal)	Mt. Hope Shuttle (year-round)	Anthony Road Shuttle	Fall River/Anthony Road Shuttle
Rail	$1.0	$2.1	$2.4	$3.7
Bicycle Path	$0.3	$0.3	$0.3	$0.3
Total	$1.3	$2.3	$2.6	$4.0

Source: The Louis Berger Group, 2002

Costs to maintain the rail system involve both the length and the duration of use during the course of the year. Bikeway maintenance assumes that both the bicycle path and the parking areas are part of the overall costs of operating and maintaining these facilities. Both the capital costs and the annualized operations and maintenance costs contribute to determination of the direct economic effects of the proposed project(s).

9.3 Assessment of Economic Effects

An input-output model, as described below, was used to estimate the indirect and induced economic effects of the capital investments and annual operating costs involved in constructing and operating each of the proposed alternatives. The indirect and induced impacts of the project are the sum total of economic activity stimulated by the direct spending described above. When considered in combination with the effects of direct investments and operating and maintenance costs, these indirect and induced economic effects describe the full effects of capital investments associated with each of the alternatives under consideration.

The modeling approached used in this analysis involves both national income accounts and state-level adjustments that reflect the unique characteristics of the Rhode Island economy. The methodology is based on the Regional Input-Output (I-O) Modeling System (RIMS-II) approach developed by the U.S. Department of Commerce, Bureau of Economic Analysis (BEA). Berger's I-O model assesses economic impacts by utilizing multipliers specific to the State of Rhode Island. The model involves creation of a matrix of production requirements so that the effect of a change in final demand in one industry can be estimated for all other industries in the economy, arriving at a "multiplier effect." An input-output table includes information on intermediate production (commodity output required for industry output), total output (intermediate production and sales to final users), and value-added inputs (such as compensation and indirect business activity).

National data from the BEA regarding inter-industry flows was regionalized to reflect the industry mix in Rhode Island. Multipliers for output, earnings, and employment, were derived from this data and applied to direct impacts to estimate the total impact due to capital investments and rail operations and maintenance as well as visitor spending. Multipliers representing the induced impact of consumer re-spending were applied to the estimated labor costs attributable to rail operations.[47]

[47] As mentioned above, tax revenue estimates were not developed for this preliminary analysis. In the future, they can be developed by applying local and state tax rates to the estimates for total output (for sales and corporate taxes) and earnings (for income taxes) by jurisdiction and amount. Employment effects estimated in the model were updated to reflect the effects of recently revised productivity estimates on an industry-by-industry basis.

9.3.1 Definition of Indirect Effects

Indirect impact includes increased demand in industries supporting both the construction and operation of the combined rail/bicycle path projects, and also includes new earnings and output for tourist industries that benefit from estimated induced travel and tourist activity associated with operation of the proposed project.

For example, goods purchased by the retail stores visited by tourists, or the materials that go into meeting the demands for goods and services purchased by the people employed to operate and maintain the proposed project add to the economic activity in Rhode Island that can be attributed to the proposed project. Induced impact arises from the spending of wage earners directly employed in the construction, operating and maintenance activities, and tourism industry, and all the wage earners in industries supplying and supporting the these sectors. The chain of indirect and induced impacts ripple through the economy, multiplying the impact of the direct effects, and are followed until they become insignificant in size or "leak out" of the local and regional economies to out-of-state locations.

The purpose of analyzing these indirect and induced impacts is to determine how large they are and how much of the effect occurs in Rhode Island. Together with the direct impact, these effects constitute the total economic impact of proposed project. Indirect effects can be summarized in terms of their total economic impact in terms of three measures[48]:

- ***Output*** – the total value of goods and services produced (i.e., sales) as a result of increased demand attributable to operating and maintaining of the project;
- ***Earnings*** – the total wages and personal income produced as a result of increased demand attributable to operating and maintaining of the project; and
- ***Employment*** – the number of full and part-time jobs created as a result of increased demand attributable to operating and maintaining of the project.

9.3.2 Description of Methods

An economic impact study involves the assessment of three distinct but related effects arising from a project, investment, or the operation of a business entity. These impacts and the methods for their estimation are described below and illustrated in Figure 9-1. A basic assumption of input-output analysis is that an increase in the demand for a final good or service will generate increases in the outputs of many intermediate goods and services that are directly and indirectly required in production of the final product. As a result, total economic activity is expected to increase by some multiple of the initial increase in the demand for the final goods or services.

Direct Impact – The direct impact of a project is defined as the change in economic activity, in the industries under study, resulting from a particular project, investment or business operation. The impact can be quantified by examining the revenues or expenditures involved, including sales, disbursements to vendors, wages paid, and taxes and fees paid.

Indirect Impact – The indirect impact is defined as the effect of increased economic activity in those sectors that supply services, materials, and machinery necessary to support the proposed project(s). For example, an increase in orders for a variety of structural components for a new rail system will result in an increased demand for steel (direct impact). This increase in demand for steel generates additional activity in industries involved in providing raw materials, energy, and transportation to the steel industry, which in turn provides stimulus to the industries supplying those industries. This ripple effect stemming from a change in final

[48] Taxes - the total value of sales taxes, income taxes, and corporate taxes generated by the increase in output and earnings, have been omitted from the present analysis. Pending more detailed assessments of diversions from auto mode (for purposes of determining impacts on gas tax revenues) and more detailed engineering estimates (for purposes of estimating in-state and out-of-state earnings and materials expenditures), the tax implications for the proposed project can be more reliably estimated.

demand for products and services from steel suppliers is multiplied throughout the economy and can account for a significant portion of the total effect.

Induced Impact – Induced impacts are the effects of increased consumer spending by wage earners supported by new construction, operations and maintenance, and new visitors as it translates into the businesses and services supporting these workers. The ripple effect from this spending can also be followed through the economy.

Multiplier Effect – Together, the indirect and induced impacts constitute the multiplier effect, the extent to which the direct impact results in other economic activity. Expressed numerically, a multiplier of 2.5 indicates that for every dollar directly generated by the industry under study, an additional $1.50 of ripple effects are felt within the local region, for a total impact of $2.50.

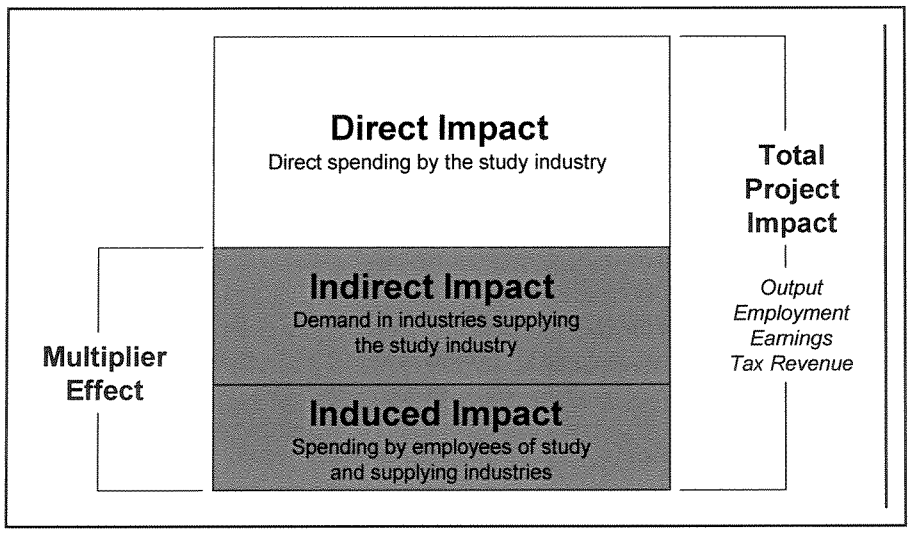


Figure 9-1 Economic Impacts

In this study, the multiplier effect is derived by employing an input-output modeling methodology. Estimates of the multiplier effect arising from the direct economic impact of the proposed project are presented in the following series of tables. They show the full direct effects (i.e., both the in-state Rhode Island effects and the total effects, which include the "leakages" from the local economy), the multiplier effects described above, and the induced effects that are characterized as multiplier effects attributable to material purchases.

Input-Output Models – Berger has developed a methodology for applying national input-output accounts to local industries. The technique relies on the latest data regarding the interrelationships between producing and supplying sectors of the U.S. economy supplied by the Bureau of Economic Analysis. The database supplies interindustry relationships, including observed ratios of materials needed for production in various industries.

After the project and the various alternatives to be evaluated are defined and cost data related to construction and operations and maintenance are developed, there are four major steps in the economic analysis process:

- *Regionalization.* Because the dataset is nationally based, the model must be regionalized. Location quotients are used to adjust for local production patterns. These ratios are calculated using measures of local employment or earnings measures.[49] The primary goal of regionalization is to estimate the relative availability of the local region to supply requisite materials, services, and labor needed in the production process.[50]

[49] Location quotients represent the ratio of regional activity in an industry to the amount of activity in the industry nationally. The model can be modified based on the regional industry concentrations reflected in the location quotients.

[50] Other measures can also be employed to aid in regionalizing the national data: payroll and earnings by industry, regional purchase coefficients, journey to work data, and savings rates.

- *Vector Identification*. If the industry in question is not represented in the national I-O tables, a unique vector must be constructed by disaggregating the industry into component parts, and reaggregating based on cross referencing to sectors that are listed in the I-O accounts. This reaggregation is commonly referred to as a "second-round" approach.

- *Calculation of Multipliers*. Once these two steps of regionalization and vector identification have been taken, it is possible to derive a multiplier by inverting the production requirements matrix and summing across the categories.

- *Estimation of Effects*. Multipliers permit estimation of the indirect and induced effects once direct project impacts are known. The sum of all these elements constitutes the total economic effects of a proposed project.

9.3.3 Economic Effects of Construction

The full economic effects of construction for each of the four alternatives are presented in Tables 9-4 and 9-5. Table 9-4 presents economic effects directly influencing the Rhode Island economy (as summarized in Table 9-1 and described as local expenditures, wages and material purchases in Table 9-4) and direct economic effects attributable to construction that extend beyond Rhode Island's borders (Total Employment, payroll and material purchases as presented in Table 9-4.)

Direct Economic Effects

Based on estimates of construction ranging from $44.0 million to $91.5 million, direct payroll expenditures shown in Table 9-4 range from $21.9 million to $51.3 million. Net local take home wages reflect both the "leakages" associated with out-of-state workers employed on the project(s) and the effects of taxes, benefits and other payroll deductions. Material purchases range from $22.1 million to $40.3 million, with local purchases reflecting those materials most likely to be purchased in Rhode Island.[51]

Table 9-4
Direct Construction Economic Effects (in millions of 2002 $)

	Alternative			
	Mt. Hope Shuttle (seasonal)	**Mt. Hope Shuttle (year-round)**	**Anthony Road Shuttle**	**Fall River/Anthony Road Shuttle**
Total Construction Budget	$44.0	$44.0	$51.3	$91.5
Payroll Expenditures	$21.9	$21.9	$26.3	$51.3
- Local Net Take Home Wages After Taxes, Benefits and Savings	$9.2	$9.2	$11.1	$21.6
Material Purchases	$22.1	$22.1	$25.0	$40.3
- Local Material Purchases	$14.6	$14.6	$16.5	$27.7
Total Employment (Person-Years)	377	377	453	883
- Local Employment Capture (Person-Years)	320	320	385	750

Source: The Louis Berger Group, 2002 **NOTE: Includes construction of the bikeway and related facilities.**

[51] Local material purchases have been developed conservatively, reflecting the likelihood that purchases of rolling stock, signalization systems and certain structural steel components will be primarily from out-of-state suppliers. As designs and construction plans are finalized, these amounts may change based on more detailed specifications and plans.

Total employment estimates, ranging from 377 person-years for the seasonal Mt. Hope Shuttle service to 883 person-years for the Fall River/Anthony Road Shuttle service cover the total person-years required to construct each of the alternatives. These figures represent employment over the entire length of the construction period. Thus, if the duration of construction were to last for 24 months, as currently planned, the seasonal Mt. Hope Shuttle service would require approximately 189 construction and related trade workers per year.[52]

Indirect Economic Effects

When indirect and induced effects are considered, the total economic impact of each of the alternatives evaluated for this project is shown in Table 9-5. These expenditures are separated into two distinct components: the effects of direct labor expenditures on the local economy, and the economic effects of purchases of materials and supplies attributable to each of the proposed projects.

Table 9-5
Indirect and Induced Construction Economic Effects (in millions of 2002 $)

	Alternative			
	Mt. Hope Shuttle (seasonal)	**Mt. Hope Shuttle (year-round)**	**Anthony Road Shuttle**	**Fall River/ Anthony Road Shuttle**
Output				
- Direct Labor Spending (Output) Multiplier Impacts	$13.8	$13.8	$16.5	$32.2
- Material Purchase Sales Multiplier Impacts	$30.6	$30.6	$34.7	$57.9
Total Output Impacts	$44.4	$44.4	$51.2	$90.1
Employment				
- Direct Labor Employment Multiplier Impacts	398	398	478	932
- Material Purchases Employment Multiplier Impacts	670	670	759	1,262
Total Employment Impacts	1,068	1,068	1,237	2,194
Earnings				
- Direct Labor Earnings Multiplier Impacts	$3.7	$3.7	$4.4	$8.6
- Material Purchases Earnings Multiplier Impacts	$8.7	$8.7	$9.9	$16.5
Total Earnings Impacts	$12.4	$12.4	$14.3	$25.1

Source: The Louis Berger Group, 2002

Direct labor multiplier (induced) effects are attributable to wages paid to local employees during construction and reflect the ripple effect stemming from demand for products and services by workers employed during construction as their demand for goods and services are multiplied throughout the economy. These economic effects of construction mean that between 386 and 908 people will be employed in industries and businesses serving construction workers during the course of construction of the project (see Employment – Direct Labor Employment Multiplier Impacts). The value of goods and services consumed by construction-related employment will range from $13.8 million to $32.2 million (see Output – Direct Labor Employment

[52] Yearly employment estimates assume a uniform distribution of workers on-site during the construction period. Often construction requires large numbers of persons on-site during certain phases of work and lesser concentrations of on-site workers at other stages in the construction cycle. Once more detailed plans are available, annual construction estimates are likely to change and may not be as uniformly distributed over the course of construction as assumed in this discussion.

Multiplier Impacts). The take home earnings of those workers involved in providing these goods and services will range from $3.7 million to $8.6 million (see Earnings – Direct Labor Employment Multiplier Impacts).

Multiplier (indirect) effects associated with materials purchases represent the impact of spending on construction-related materials on employment, output and earnings of support industries. These effects also take into consideration the ripple effects of these expenditures as they stimulate spending by employees working in these industries and in the secondary and tertiary industries providing material and labor inputs to material suppliers. These material purchase multiplier effects range from $30.6 million to $57.9 million with regard to their impacts on economic output, and generate between 670 and 1,262 jobs in industries involved in materials supply and various support industries. This activity generates between $8.7 million and $16.5 million in wages for workers in industries involved in material support activities.

The total combined indirect and induced effects of economic activity associated with construction are presented in Table 9-5 as total output, employment and earnings.

9.3.4 Economic Effects of Operations and Maintenance

Just as with construction, the annual operations and maintenance (O&M) activities associated with each of the four alternative shuttle proposals will generate direct employment, earnings and output effects, and will also produce a number of induced and indirect effects related to purchased materials and services. Unlike the economic effects of construction, which will only last for the two-year construction period, these operations and maintenance effects will accrue on an annual basis for as long as each of the projects is operated in its planned service mode.

The full extent of the direct impacts associated with O&M for each alternative are shown in Table 9-6. The total annual budget is divided into payroll expenditures and materials purchases. Local net take home earnings reflect the net expenditures after taxes, benefits and savings that will be available for purchases of goods and services by employees involved in the operation and maintenance of both the proposed shuttle services and the bikeway. Material purchases show both total materials purchases and those that will likely be spent within the local economy. The difference is attributable to the "leakage" associated with out-of-state expenditures on repairs and replacement of rolling stock, equipment and materials.

Table 9-6
Direct Operation And Maintenance Economic Effects (in millions of 2002 $)

	Alternative			
	Mt. Hope Shuttle (seasonal)	Mt. Hope Shuttle (year-round)	Anthony Road Shuttle	Fall River/ Anthony Road Shuttle
Total O&M Budget	$1.3	$2.3	$2.6	$4.0
Payroll Expenditures	$1.0	$1.9	$2.1	$3.3
- Local Net Take Home Wages After Taxes, Benefits and Savings	$0.4	$0.8	$0.9	$1.4
Material Purchases	$0.3	$0.5	$0.5	$0.7
- Local Material Purchases	$0.1	$0.2	$0.3	$0.4
Total Employment (Person-Years)	20	35	41	62
- Local Employment Capture (Person-Years)	18	32	36	56

NOTE: Includes operation and maintenance of bikeway and related facilities.

Based on current estimates for O&M expenditures, between 20 and 62 people will be employed annually, most of whom will be from Rhode Island. Employee earnings will range from $1.0 million to $3.3 million and material purchases will range from $250,000 to $721,000.

Indirect and induced O&M effects are presented in Table 9-7. As with the effects attributable to construction, the indirect and induced effects of O&M activities show how spending by those employed in O&M activities and spending on the materials, goods and services required to maintain each of the proposed alternatives ripple through the economy of the region. However, unlike construction effects, these indirect and induced O&M effects represent annual expenditures.[53]

The total indirect and induced effects of the rail shuttle and bikeway projects (including both the effects of direct labor spending and material purchases) would produce a total annual increase in output ranging from between $940,000 and $2,870,00 per year, support indirect and induced employment ranging from 26 to 80 persons per year, and produce between $250,000 and $770,000 per year in total earnings.

Table 9-7
Indirect and Induced Operation and Maintenance Economic Effects (in millions of 2002 $)

	Alternative			
	Mt. Hope Shuttle (seasonal)	**Mt. Hope Shuttle (year-round)**	**Anthony Road Shuttle**	**Fall River/ Anthony Road Shuttle**
Output				
- Direct Labor Spending (Output) Multiplier Impacts	$0.7	$1.2	$1.4	$2.1
- Material Purchase Sales Multiplier Impacts	$0.3	$0.5	$0.6	$0.8
Total Output Impacts	$0.9	$1.7	$1.909	$2.9
Employment				
- Direct Labor Employment Multiplier Impacts	19	34	39	60
- Material Purchases Employment Multiplier Impacts	7	13	14	20
Total Employment Impacts	26	47	53	80
Earnings				
- Direct Labor Earnings Multiplier Impacts	$0.2	$0.3	$0.4	$0.6
- Material Purchases Earnings Multiplier Impacts	$0.1	$0.1	$0.2	$0.2
Total Earnings Impacts	$0.3	$0.5	$0.5	$0.8

Source: The Louis Berger Group, 2002

9.3.5 Economic Effects of New and Induced Tourism and Travel

Operation of the proposed rail shuttle services is expected to support ridership levels ranging from between 35,000 and 64,000 visitor trips per year.[54] While most of these trips represent visitors who would have used

[53] These expenditures represent average annual estimates. Some spending will occur at intervals rather than on a continuous basis – such as for periodic upgrades and replacement of signalization or for repaving of the bikeways. These costs have been averaged over the life of the project and included as average annualized payments in the computation of direct and indirect O&M costs.

[54] We have assumed that each visitor makes approximately 2 trips on the shuttle. Thus, we have assumed that the number of visitors corresponds to roughly half the number of boardings forecast for each shuttle service.

autos during their stay, independent ridership forecasts suggest that approximately one trip in five is "induced", representing new visitors to Aquidneck Island based on the attractiveness of the proposed rail shuttle. Using these data, the direct and indirect effects of new visitors to the region have been developed. These effects are presented in Table 9-8.

Based on the most recent estimates of visitor expenditures for both day trips and overnight visitors, the direct expenditures associated with each alternative range from $390,000 for the seasonal Mt. Hope Shuttle service to $675,000 for the year-round Fall River/Anthony Road Shuttle service.[55] These expenditures are in 2002 dollars, and represent current new travel and tourism expenditures if each of the projects were to be constructed and in operation in the year 2002.

The effects of these expenditures on the local economy are shown as multiplier effects in Table 9-8. Total increases in output for tourist and travel-related industries would range from $820,000 to $1,402,000. This would translate into between 32 and 55 additional jobs representing total earnings of between $210,000 and $360,000 per year.

Table 9-8
Economic Impacts of New Visitors (in millions of 2002 $)

	Alternative			
	Mt. Hope Shuttle (seasonal)	**Mt. Hope Shuttle (year-round)**	**Anthony Road Shuttle**	**Fall River/ Anthony Road Shuttle**
DIRECT EFFECTS				
Expenditures	$0.39	$0.38	$0.38	$0.67
MULTIPLIER EFFECTS				
Output	$0.82	$0.80	$0.80	$1.40
Employment	32	31	31	55
Earnings	$0.21	$0.20	$0.20	$0.36

Source: The Louis Berger Group, 2002

[55] Rhode Island Travel and Tourism Research Report, Office of Travel, Tourism and Recreation, Department of Resource Economics, University of Rhode Island, Volume 18, Number 1, May 2001.

APPENDICES/TECHNICAL MEMORANDA

Appendix A Service Structure Alternatives
Schedules and String lines

Appendix B Summary of Planned and Past Excursion Service
Technical Memorandum to David Nelson of KKO and Associates dated March 6, 2002.

Appendix C Excursion Services with Fall River/Anthony Road Shuttle
Schedules and String lines

Appendix D Ridership and Revenue Support Documentation
1. Untitled Louis Berger document that provides estimates of within study area resident and visitor ridership.
2. KKO Technical Memorandum, "Aquidneck Island Rail Feasibility Study, Proposed Adjustments to Resident On-Island Forecasts", April 18, 2002, which presents proposed adjustments to the Louis Berger study area resident ridership.
3. KKO Technical Memorandum, "Aquidneck Island Rail Feasibility Study, Projections of Aquidneck Rail Ridership for Trips to and from the Boston Area," April 4, 2002, which describes projections of resident travel to and from the Boston area.
4. KKO Technical Memorandum, "Aquidneck Island Rail Feasibility Study, Projections of Aquidneck Rail Visitor Ridership," April 17, 2002, which presents estimates of visitor use of Aquidneck rail.

Appendix E Labor Protection Obligations
Davis Bacon Act & DOL Standards

APPENDIX A
SERVICE STRUCTURE ALTERNATIVES
Schedules and String lines

Technical Memorandum

DATE:	January 18, 2002 ***Revised January 21, 2002***
TO:	Adel Foz, LBG
FROM:	David Nelson Yawa Duse-Anthony
SUBJECT:	**Newport Passenger Rail Feasibility Study** Proposed Final Rail Service Structures and Minimum Infrastructure Requirements
DISTRIBUTION:	*Domenic Bua, Gary Gordon – Transystems* *Kay O'Neil, Gerry Pieri, Scott Friemann – KKO*

Introduction

This memorandum describes the three proposed final service structures for evaluation in the Aquidneck passenger rail feasibility study. They include

1. On island shuttle service between Mt. Hope and Newport at half hourly headways[1]
2. Commuter service to Fall River
3. On island shuttle combined with commuter service to Fall River

The service structures were designed to operate with the minimum allowable rail infrastructure. The set of service structures was also designed to provide an expansion path wherein service could be incrementally expanded from a shuttle service to a commuter-feeder service, and to a combined shuttle and commuter-feeder service. The basic characteristics of the three service structures and their minimum infrastructure requirements are listed in Table 1. The proposed schedules assume that all services would be operated with modern DMU railcars with good to superior acceleration and braking characteristics. DMU braking and acceleration rates were based on a 1995 KKO survey of DMU manufacturers that was used to develop a composite of operating characteristics for potential vehicles. Scheduling and siding locations should be verified when vehicles are actually selected to operate the proposed service.

[1] An Anthony Road shuttle was also evaluated in detail but discarded because the sum of the anticipated running time, the allowances for meets and the required turn time at terminal stations exceeded thirty minutes, making a clock face half hourly schedule impossible.

Table 1 Summary of Service Characteristics by Service Structure						
Service Structure Alternative	**Route Miles**	**Daily One Way Trips**	**Daily Rev. Miles**	**Daily Train Hours**	**Peak Vehicles**	**Minimum Rail Infrastructure**
1. Mt Hope Shuttle	10.1	52	525	26	2	Single track railway with single short passing siding at Melville Station
2. Commuter Service to Fall River	20.1	28	563	35	2	Same as #1 plus additional passing siding and station at Anthony Road and two track station at Newport.
3. Combined shuttle and commuter service	20.1	50	840	42	3	Same as #2

1. On Island Shuttle between Mt. Hope and Newport

A half hourly shuttle service between Mt. Hope and Newport can be provided with two sets of equipment (see Appendix A). Train service is scheduled between Mt. Hope and Newport during the hours of 8AM till 11PM on weekdays. The service would include two intermediate stops, at Melville and Ranger Road. Running time for this service structure is 17 minutes. Dwell times at the terminal stations was set at a minimum of ten minutes to ensure schedule adherence. There are 52 scheduled daily trips, with a total daily mileage of 525 revenue miles. There is a total of 26 daily train hours.

Table 2 Northbound Sample Running Times		
Station	**Milepost**	**Sample Time**
Newport	0.0	8:00AM
Ranger Road	2.7	8:04AM
Melville	7.3	8:11AM
Mt Hope	10.1	8:17AM

The service could be operated with a single short passing siding[2] located at Melville Station at MP7.3. All meets between opposing trains could be made during the station stop at Melville. Locating the siding at this station supports half hourly service on the line with a minimum of 10 minute turns at the terminal stations. To help ensure that all meets are made on schedule, extra dwell time was added to all trains with meets at Melville Station. Dwell times at Melville station are set at one minute for northbound trips and two minutes 30 seconds for southbound trips. While this distribution of excess dwell to ensure quality meets is sub-optimal, it is the best that can be achieved with the location of Melville Station relative to the two terminal stations. Also to help ensure all meets are made on timely basis, all trains are allowed a minimum of ten minutes to "turn" at the end of each trip before the start of the return trip. Three minutes of

[2] Allowing room for a four car train to sit on the siding at the station without fouling opposing traffic.

excess running time ("pad") was allowed at Mount Hope terminal to ensure on time arrival at the terminal. One minute of pad was allowed at Newport.

2. Commuter Service to Fall River

A schedule and string line of the proposed service can be found in Appendix B. KKO assumed that a replacement bridge would exist roughly in the location of the existing (out-of-service) Sakonnet River bridge with no dramatic changes in track alignment or elevations. KKO also assumed that the service would have five intermediate stops with an end to end running time of approximately 33 minutes, with two to three minutes of schedule "pad" to ensure schedule adherence. Two passing sidings would be required; one at Anthony Road (MP12.6), and the other at Melville Station (MP7.3) in order for most of the MBTA trains to be met by service from and to Newport. The location of the passing sidings is relatively inflexible and is based on the MBTA planned schedule for Fall River service. A two track station at Newport is required to operate all the peak and evening service. The service provides 35 daily hours of train time, with 28 scheduled daily trips and a total of 563 daily revenue miles.

Table 3
Sample Running Times for Local Service

Station	Milepost	Sample Time
Newport	0.0	8:00AM
Ranger Road	2.7	8:05AM
Melville	7.3	8:12AM
Mt Hope	10.1	8:17AM
Anthony Road	12.6	8:21AM
Tiverton	13.3	8:24AM
Fall River	20.1	8:33AM

Precautions taken to ensure that the schedule can be reliably operated with short passing sidings at the two stations include a minimum of one minute of dwell time at the stations where meets occur, and the minimum of ten minutes recovery time at the end of all trips as noted earlier. There is also two minutes of scheduled pad time for arrivals at Newport Station and three minutes for arrivals at Fall River.

3. Combined Shuttle and Commuter Service

Since the shuttle and commuter services are oriented toward two distinctly different travel markets, KKO explored the possibility of overlaying the two services onto the minimum physical plant that would be required to operate the proposed 28 train per day service between Newport and Fall River. The combined service provides a shuttle service that approximates the half hourly service to Anthony Road with the through service between Newport and Fall River. Short passing sidings are required at Melville Station and at Anthony Road. A new passenger station at Anthony Road is also provided for additional service at the meet point. A two track station at Newport is also required. A schedule and string line of the combined service can be found in Appendix C. A peak requirement of three train sets is required to provide this combined service. The service provides 42 hours of train time, with 28 scheduled daily trips to

and from Fall River, and 22 scheduled daily trips to and from Anthony Road. The service covers 840 daily revenue miles.

Precautions taken to ensure schedule adherence with the short passing sidings at stations include: an extra minute of dwell time for at least one of the trains making a meet at a specific station, a minimum of 10 minutes recovery time at the end of all trips, and a two or three minute pad of time at the terminal station to help ensure that all trips arrive on time at their terminal station.

Appendix A

On-Island Shuttle Service to Mt. Hope

Schedules
String Lines

Mt. Hope Weekday Half Hourly Shuttle Service Schedule

Northbound Service

STATION	100	102	104	106	108	110	112	114	116	118	120	122	124
Newport	7:56	8:26	8:56	9:26	9:56	10:26	10:56	11:26	11:56	12:26	12:56	13:26	13:56
Ranger Road	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00
Melville	8:06	8:36	9:06	9:36	10:06	10:36	11:06	11:36	12:06	12:36	13:06	13:36	14:06
Mt Hope	8:13	8:43	9:13	9:43	10:13	10:43	11:13	11:43	12:13	12:43	13:13	13:43	14:13

Northbound Service

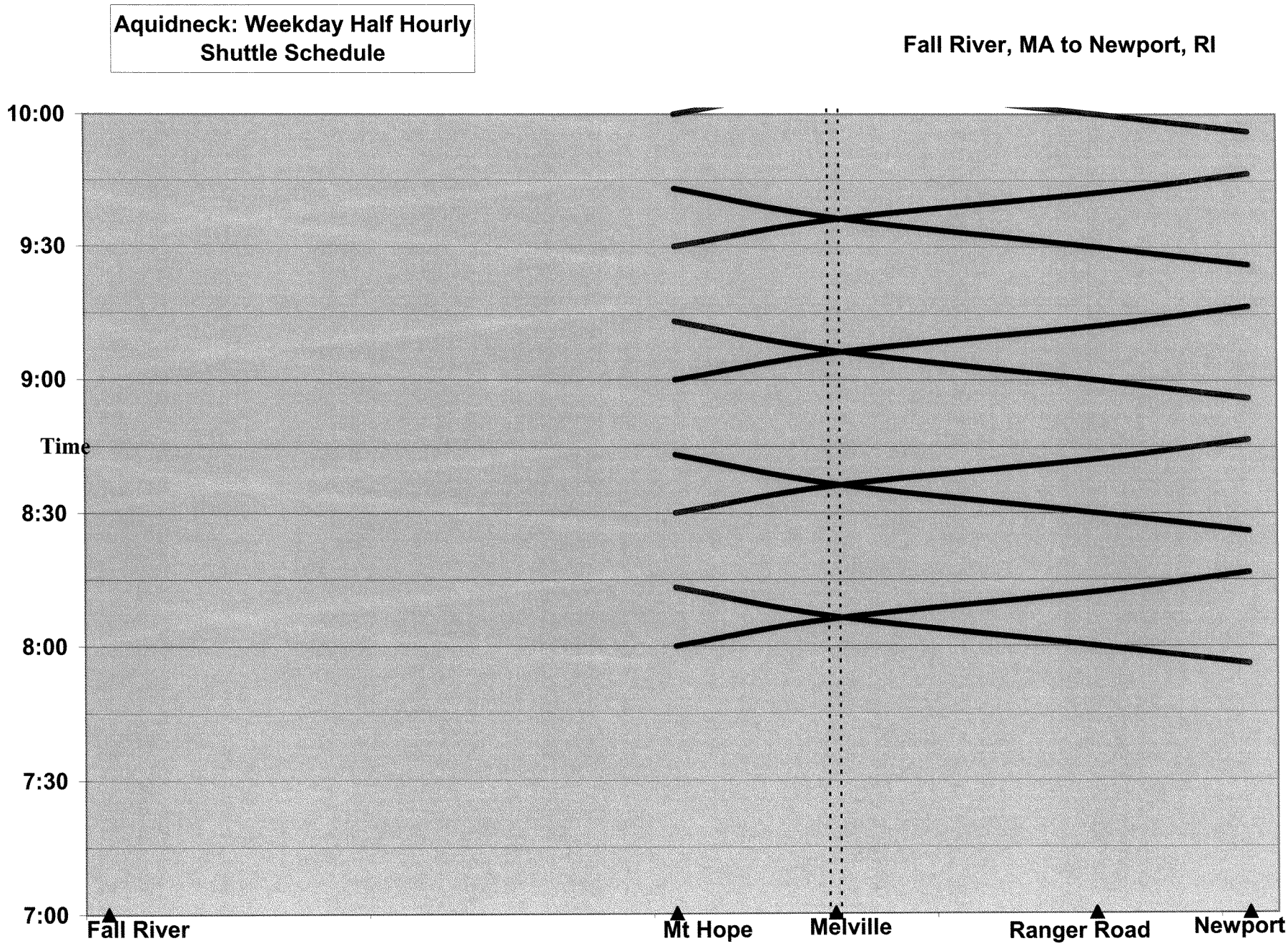
STATION	126	128	130	132	134	136	138	140	142	146	150	154	160
Newport	14:26	14:56	15:26	15:56	16:26	16:56	17:26	17:56	18:26	19:26	20:26	21:26	22:26
Ranger Road	14:30	15:00	15:30	16:00	16:30	17:00	17:30	18:00	18:30	19:30	20:30	21:30	22:30
Melville	14:36	15:06	15:36	16:06	16:36	17:06	17:36	18:06	18:36	19:36	20:36	21:36	22:36
Mt Hope	14:43	15:13	15:43	16:13	16:43	17:13	17:43	18:13	18:43	19:43	20:43	21:43	22:43

Southbound Service

STATION	101	103	105	107	109	111	113	115	117	119	121	123	125
Mt Hope	8:00	8:30	9:00	9:30	10:00	10:30	11:00	11:30	12:00	12:30	13:00	13:30	14:00
Melville	8:06	8:36	9:06	9:36	10:06	10:36	11:06	11:36	12:06	12:36	13:06	13:36	14:06
Ranger Road	8:12	8:42	9:12	9:42	10:12	10:42	11:12	11:42	12:12	12:42	13:12	13:42	14:12
Newport	8:16	8:46	9:16	9:46	10:16	10:46	11:16	11:46	12:16	12:46	13:16	13:46	14:16

Southbound Service

STATION	127	129	131	133	135	137	139	141	143	145	149	153	159
Mt Hope	14:30	15:00	15:30	16:00	16:30	17:00	17:30	18:00	18:30	19:00	20:00	21:00	22:00
Melville	14:36	15:06	15:36	16:06	16:36	17:06	17:36	18:06	18:36	19:06	20:06	21:06	22:06
Ranger Road	14:42	15:12	15:42	16:12	16:42	17:12	17:42	18:12	18:42	19:12	20:12	21:12	22:12
Newport	14:46	15:16	15:46	16:16	16:46	17:16	17:46	18:16	18:46	19:16	20:16	21:16	22:16



KKO and Associates, L.L.C.

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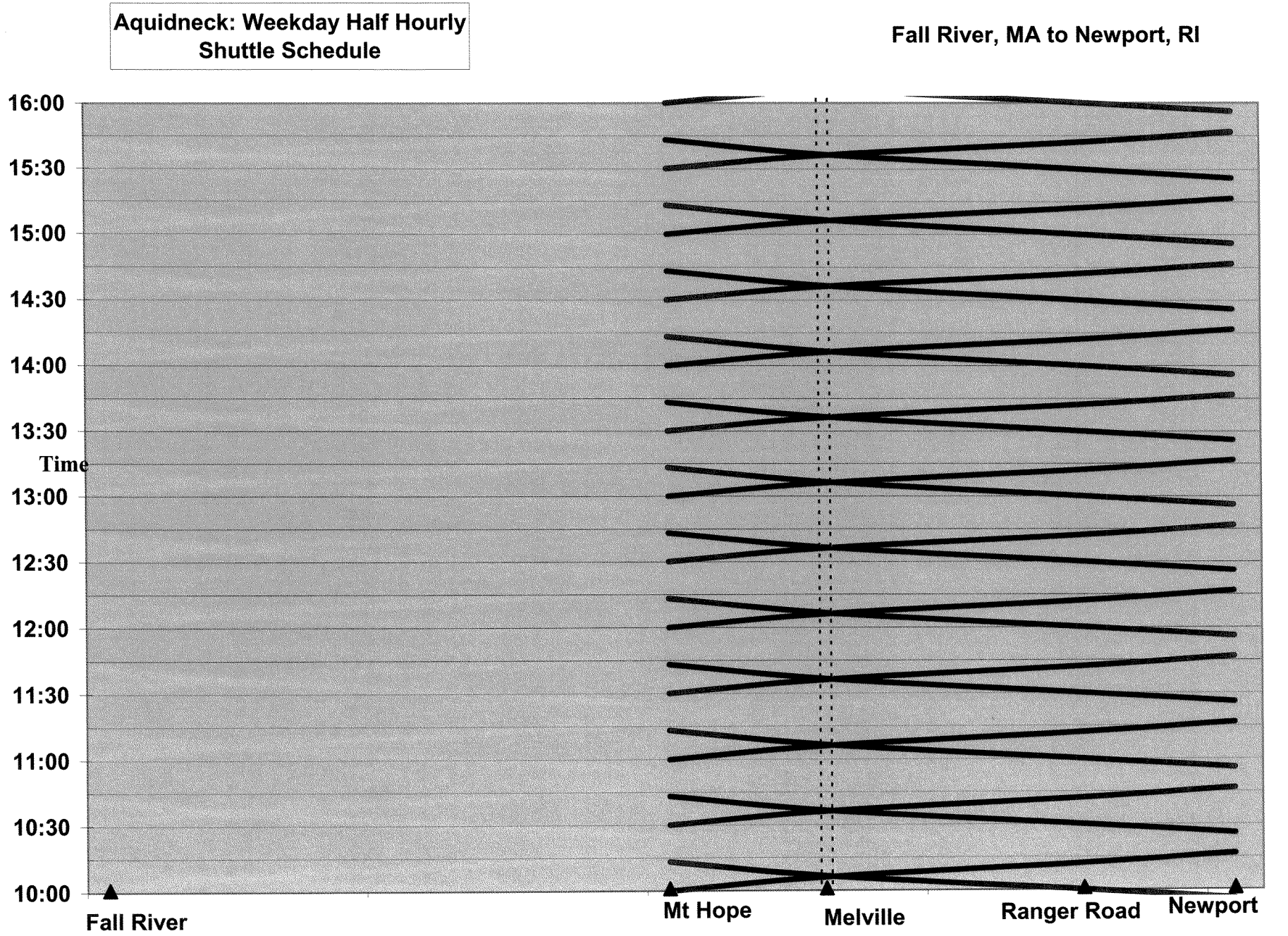

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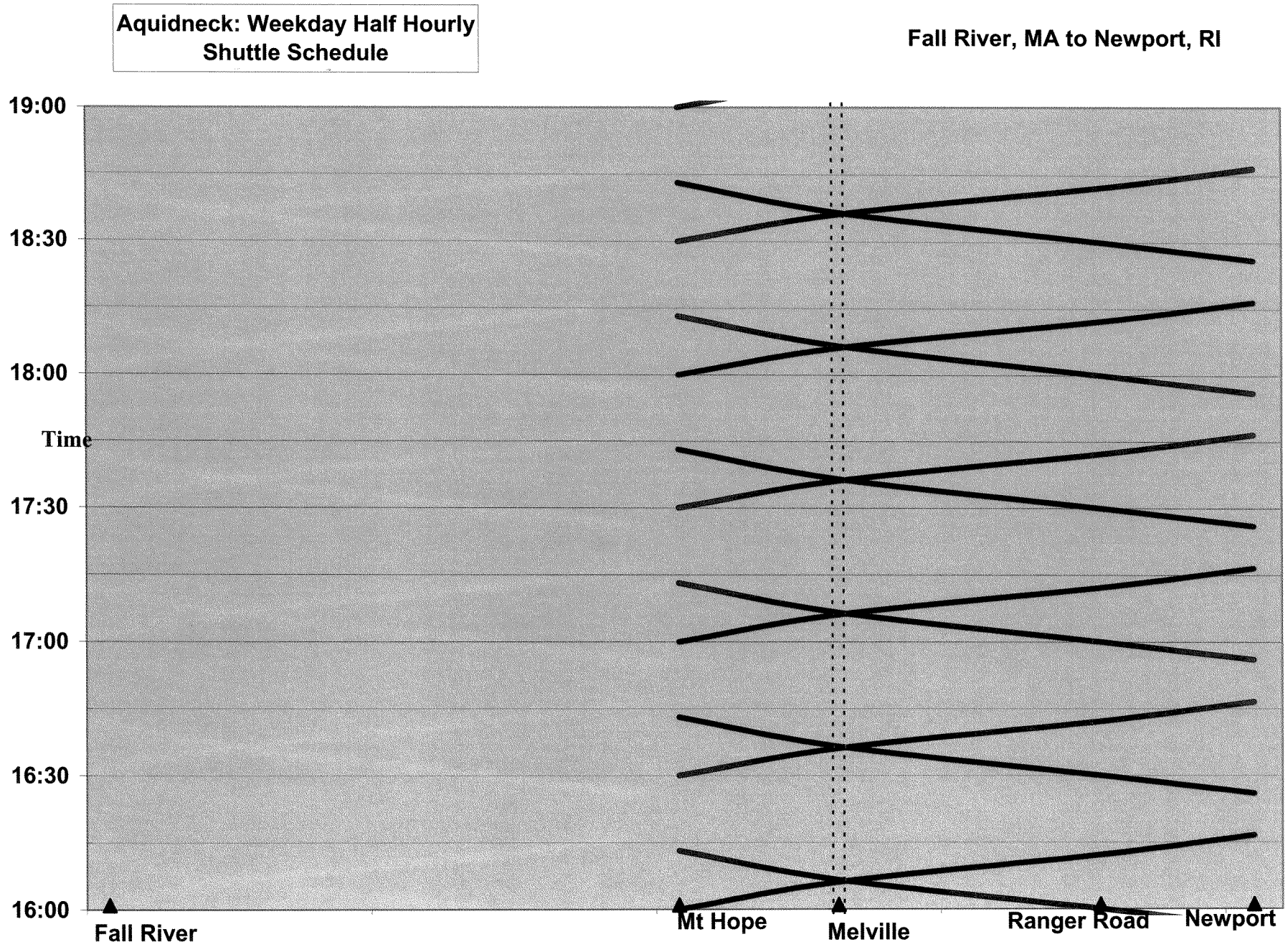
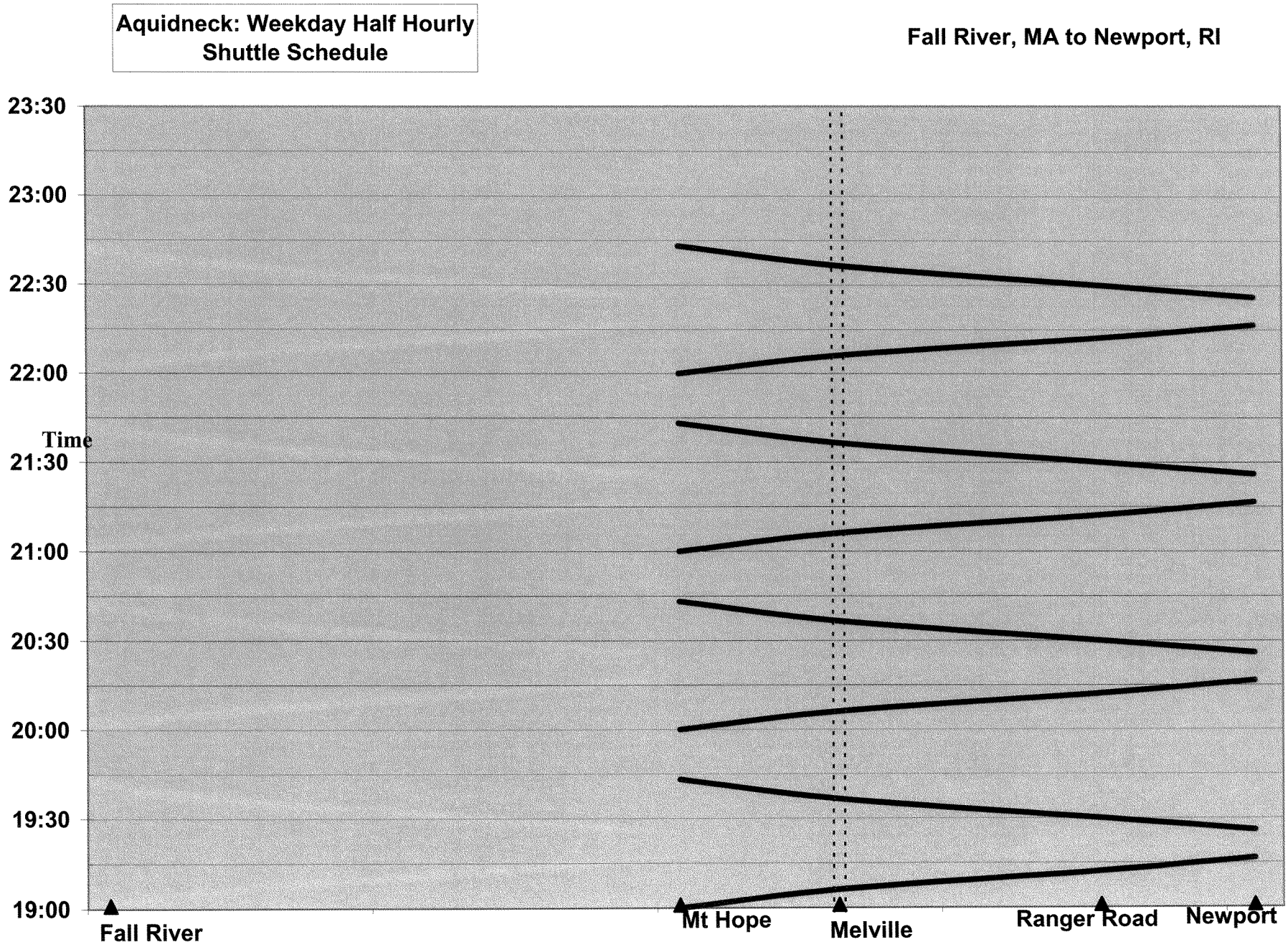

Aquidneck: Weekday Half Hourly Shuttle Schedule
Fall River, MA to Newport, RI
19:00
18:30
18:00
Time
17:30
17:00
16:30
16:00
Fall River
Mt Hope
Melville
Ranger Road
Newport



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Appendix B

Through Commuter Service to Fall River

Schedules
String Lines

Fall River Weekday Through Service Schedule

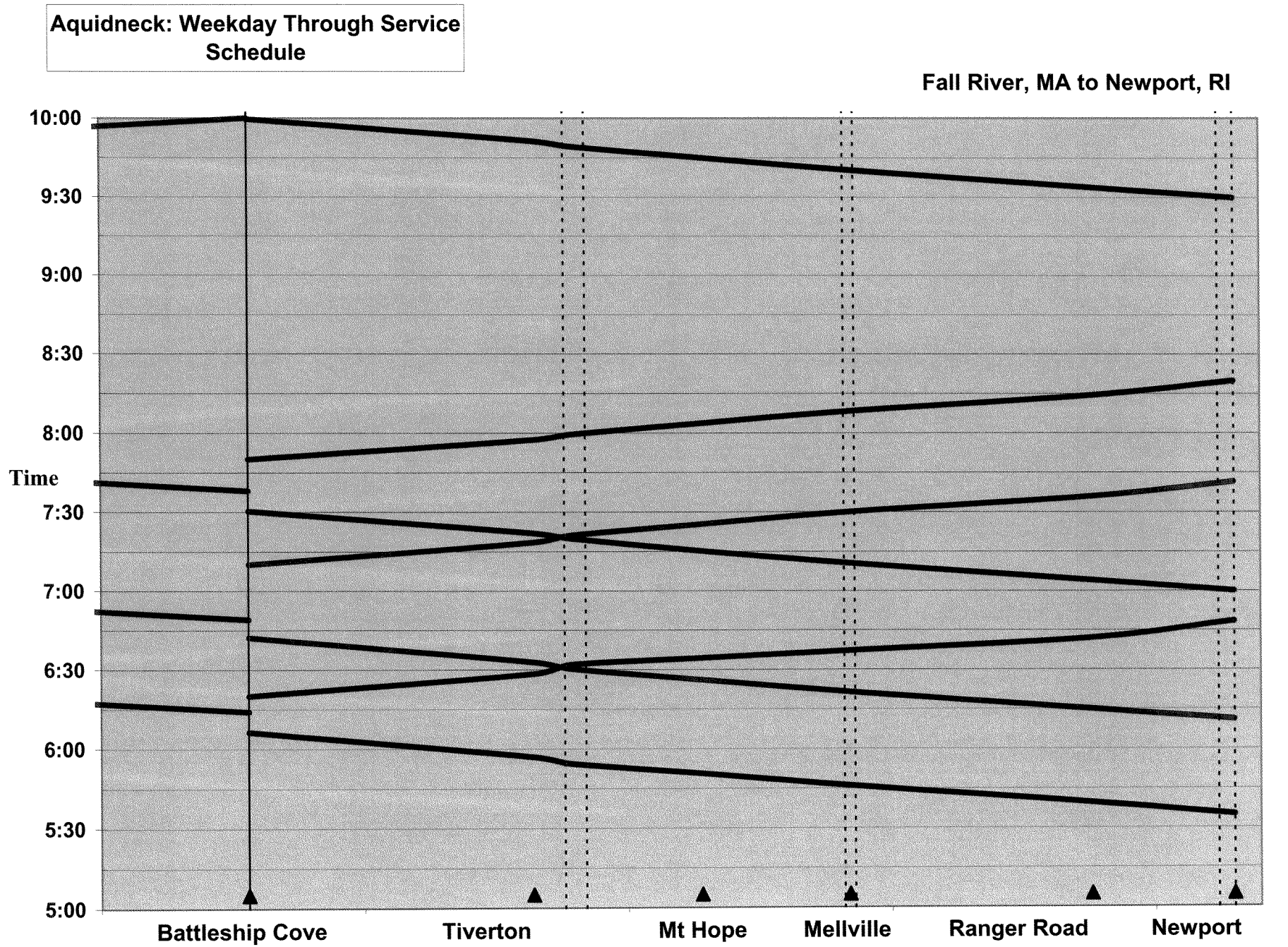
Northbound Service

Equipment Set	A	B	A	A	B	A	B	A	B	A	B	A	A	B
	100	**102**	**104**	**106**	**108**	**110**	**112**	**114**	**116**	**118**	**120**	**122**	**124**	**126**
STATION	**9902**	**9904**	**9906**		**9908**		**9910**		**9912**		**9914**			**9916**
Newport	5:35	6:11	7:00	9:30	10:04	12:15	13:13	14:45	15:12	16:45	17:55	18:25	20:35	21:50
Ranger Road	5:39	6:14	7:04	9:33	10:08	12:18	13:17			16:49		18:28	20:39	
Mellville	5:46	6:21	7:10	9:40	10:14	12:25	13:23	14:54	15:21	16:55	18:04	18:35	20:45	21:58
Mt Hope	5:50	6:25	7:15	9:44	10:18	12:29	13:28	14:58	15:25	16:59	18:08	18:39	20:50	22:02
Anthony Road	5:54	6:30	7:19	9:49	10:21	12:33	13:32		15:32	17:02		18:44	20:53	
Tiverton	5:56	6:32	7:21	9:51	10:24	12:36	13:34	15:03	15:34	17:04	18:13	18:46	20:56	22:07
Battleship Cove	6:06	6:42	7:30	9:59	10:32	12:45	13:44	15:13	15:42	17:14	18:22	18:55	21:05	22:15
Fall River	6:14	6:49	7:38		10:41		13:52		15:50		18:34			22:22
Boston	7:33	8:08	8:57		11:58		15:14		17:12		19:56			23:39

Southbound Service

Equipment Set	A	B	A	A	B	A	B	A	B	A	B	A	A	B
				9901		**9903**		**9905**		**9907**	**9909**	**9911**	**9913**	**9915**
STATION	**101**	**103**	**105**	**107**	**109**	**111**	**113**	**115**	**117**	**119**	**121**	**123**	**125**	**127**
Boston				8:44		11:34		13:58		16:02	17:03	17:45	19:50	22:40
Fall River				10:00		12:56		15:20		17:22	18:22	19:05	21:14	0:01
Battleship Cove	6:20	7:10	7:50	10:12	10:50	13:03	14:00	15:25	15:55	17:27	18:34	19:10	21:19	0:06
Tiverton	6:28	7:18	7:57	10:20	10:56	13:10	14:07		16:02		18:42	19:17	21:25	0:12
Anthony Road	6:31	7:21	7:59	10:24	10:58	13:12	14:09	15:34	16:04	17:34	18:45	19:19		0:14
Mt Hope		7:25	8:03	10:29	11:03	13:16	14:13	15:37	16:08	17:38	18:50	19:23	21:30	0:18
Mellville		7:29	8:08	10:33	11:07	13:22	14:18	15:42	16:13	17:42	18:54	19:28	21:34	0:22
Ranger Road		7:35	8:14	10:39	11:13	13:28	14:24	15:48	16:19		19:00	19:34	21:40	0:28
Newport	6:48	7:41	8:19	10:45	11:19	13:33	14:29	15:53	16:24	17:52	19:06	19:39	21:46	0:34

Date: 1/29/2002



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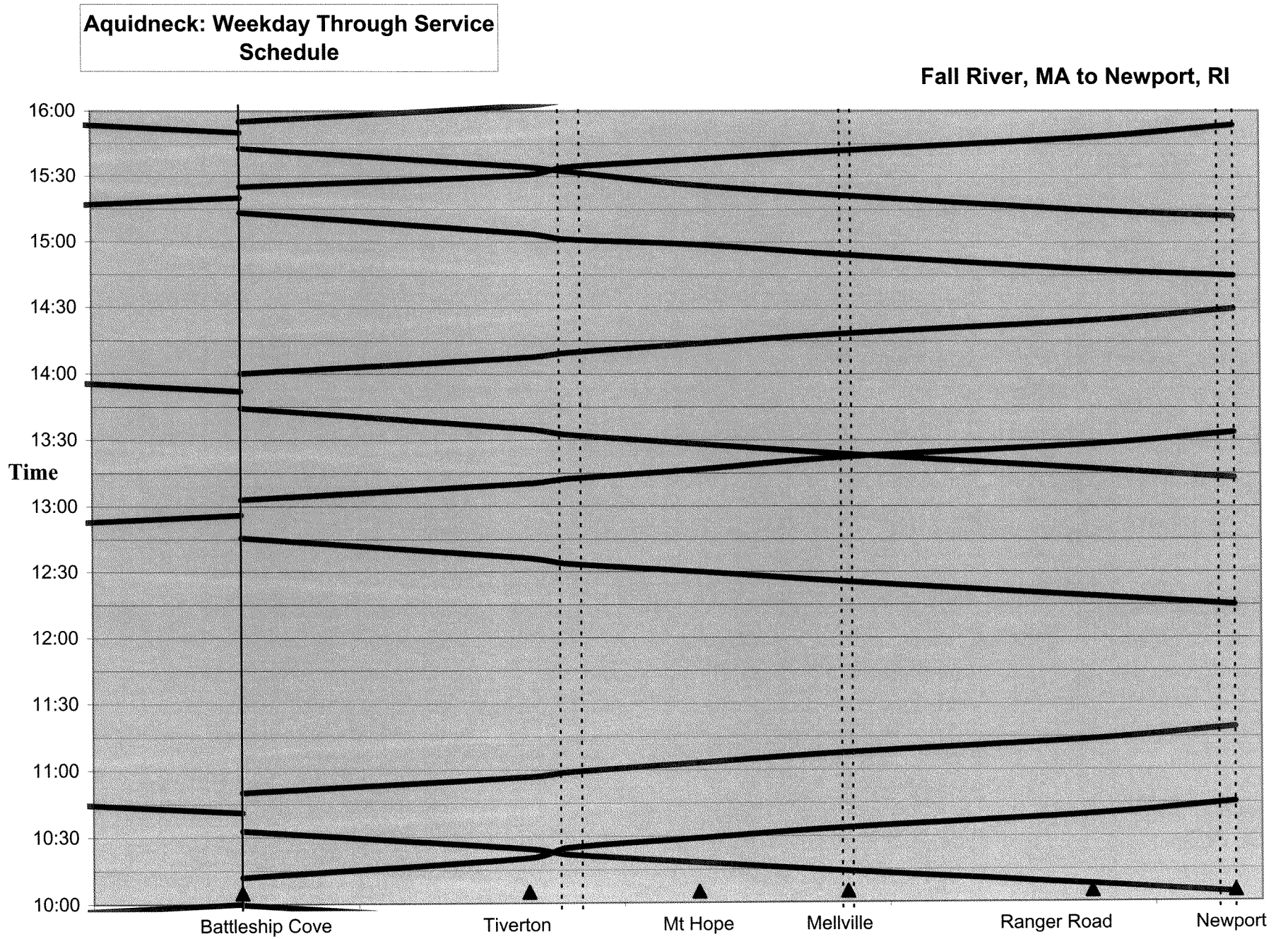

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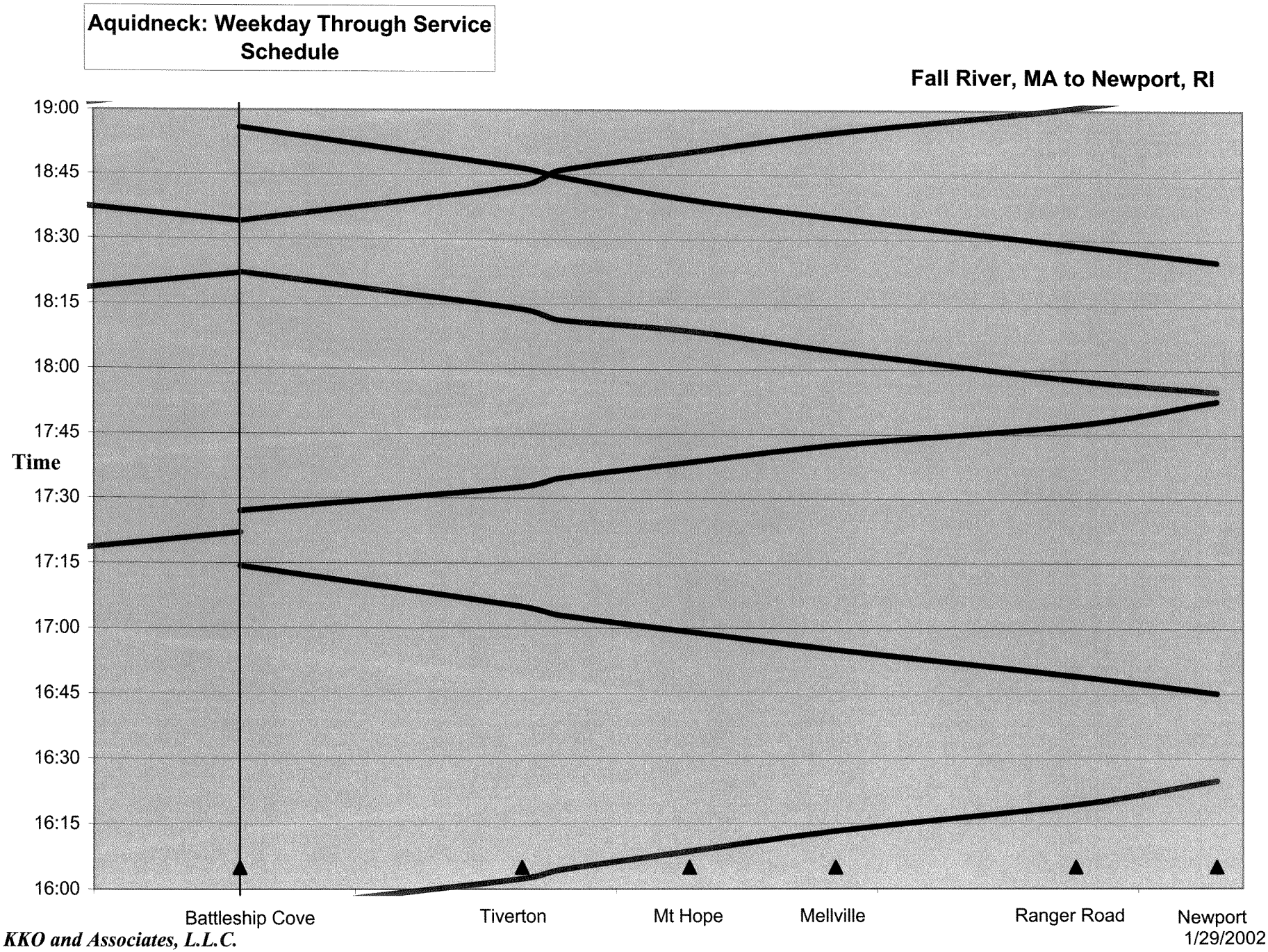

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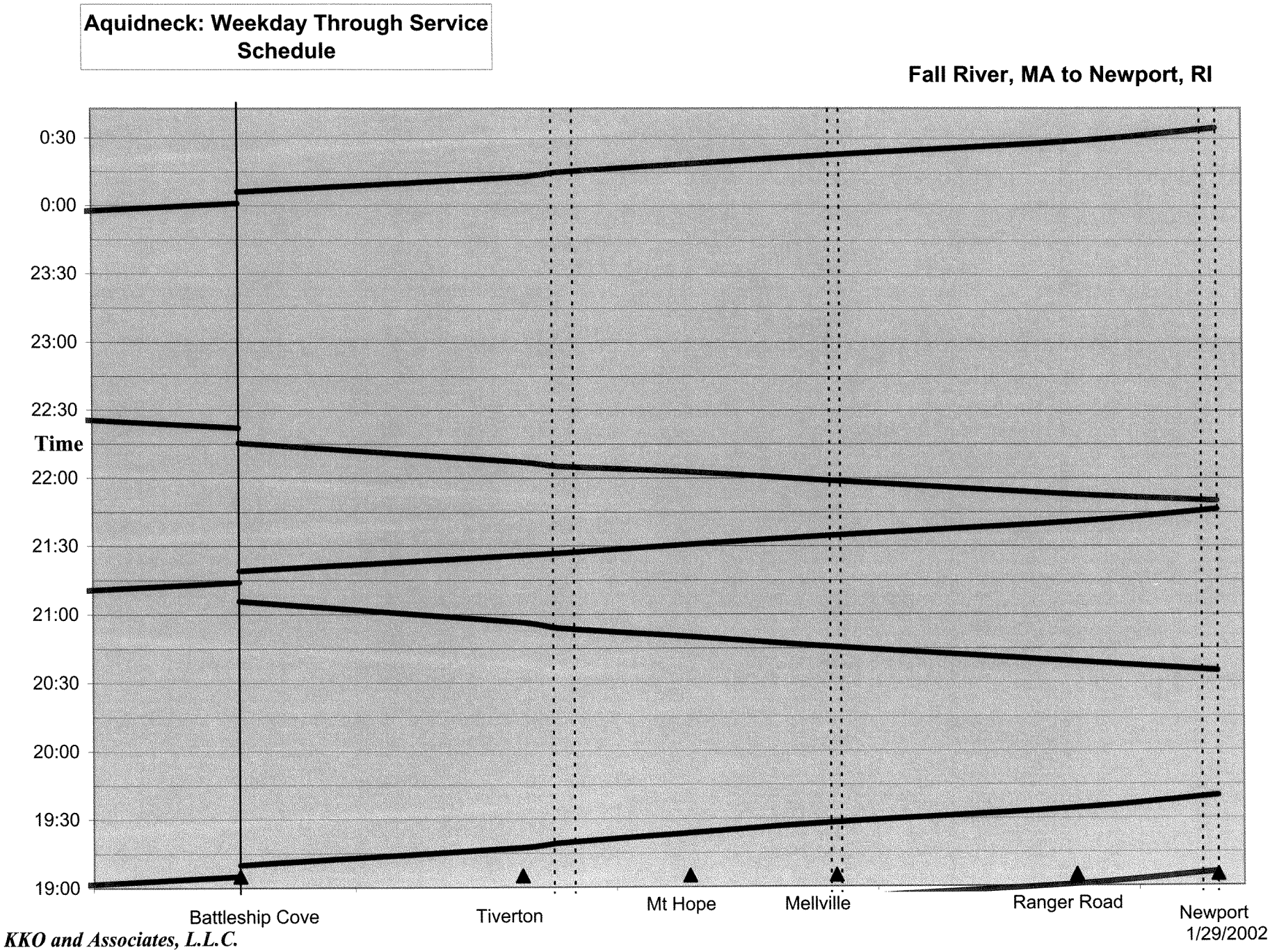

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Appendix C

Through Commuter Service to Fall River with Shuttle Service to Anthony Road

Schedules
String Lines

Fall River Weekday Through Service and Shuttle Schedule

Northbound Service														
Equipment Set	**A**	**B**	**A**	**B**	**C**	**B**	**A**	**B**	**C**	**A**	**A**	**C**	**B**	**B**
	100	**102**	**104**	**202**	**204**	**206**	**106**	**108**	**208**	**210**	**110**	**212**	**112**	**214**
STATION	**9902**	**9904**	**9906**					**9908**					**9910**	
Newport	5:39	6:12	7:03	7:58		9:00	9:28	10:04	10:45	11:25	12:17	12:45	13:12	14:05
Ranger Road	5:43	6:16	7:06	8:02		9:04	9:31	10:07	10:49	11:29	12:21	12:49	13:16	14:09
Mellville	5:49	6:23	7:13	8:09		9:10	9:39	10:13	10:55	11:36	12:27	12:55	13:23	14:17
Mt Hope	5:54	6:27	7:17	8:13		9:14	9:43	10:17	10:59	11:40	12:32	12:59	13:28	14:21
Anthony Road	5:57	6:32	7:23	8:17		9:17	9:47	10:23	11:04	11:45	12:36	13:05	13:32	14:26
Tiverton	5:59	6:35	7:25				9:50	10:25			12:38		13:34	
Battleship Cove	6:09	6:44	7:33				9:59	10:34			12:48		13:44	
Fall River	6:14	6:49	7:38					10:41					13:52	
Boston	7:33	8:08	8:57					11:58					15:14	

Northbound Service													
Equipment Set	**A**	**B**	**C**	**A**	**A**	**C**	**B**	**A**	**A**	**B**	**A**	**B**	**B**
	114	**116**	**216**	**218**	**118**	**220**	**120**	**122**	**222**	**224**	**124**	**126**	**128**
STATION		**9912**					**9914**					**9916**	
Newport	14:44	15:17	16:00	16:30	16:55	17:14	17:55	18:25	19:18	19:55	20:34	21:50	23:20
Ranger Road			16:04	16:34		17:18			19:22	19:59	20:37		23:24
Mellville	14:54	15:25	16:12	16:41		17:25	18:05	18:34	19:29	20:06	20:45	21:58	23:30
Mt Hope	14:58	15:29	16:16	16:45		17:30	18:09	18:38	19:33	20:10	20:49	22:02	23:34
Anthony Road	15:02	15:35	16:21	16:50		17:35	18:13	18:44	19:38	20:15	20:53	22:06	23:37
Tiverton	15:04	15:37					18:15	18:46			20:56	22:08	23:39
Battleship Cove	15:13	15:45			17:17		18:24	18:55			21:05	22:17	23:49
Fall River		15:50					18:34					22:22	
Boston		17:12					19:56					23:39	

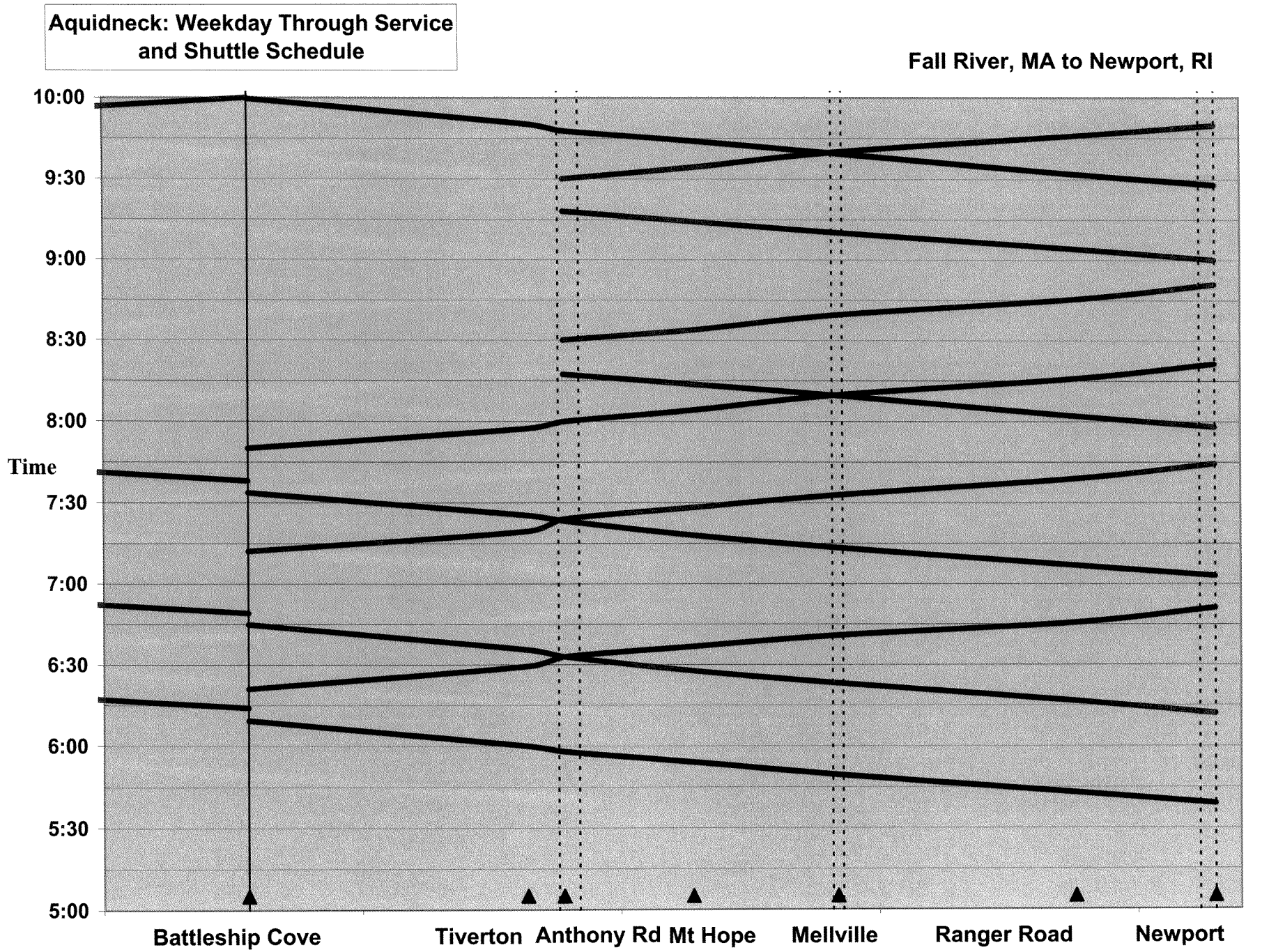
Fall River Weekday Through Service and Shuttle Schedule

Southbound Service

Equipment Set	**A**	**B**	**A**	**B**	**C**	**B**	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**
							9901				**9903**			
STATION	**101**	**103**	**105**	**201**	**203**	**205**	**107**	**109**	**207**	**209**	**111**	**211**	**113**	**213**
Boston							8:44				11:34			
Fall River							10:00				12:56			
Battleship Cove	6:21	7:12	7:50				10:11	10:55			13:04		13:59	
Tiverton	6:29	7:19	7:57				10:19	11:02			13:11		14:05	
Anthony Road	6:32	7:23	7:59	8:30		9:30	10:23	11:05	11:27	11:55	13:13	13:45	14:07	14:45
Mt Hope	6:36	7:28	8:04	8:33		9:34	10:27	11:09	11:31	11:58	13:18	13:49	14:11	14:48
Mellville	6:40	7:32	8:09	8:39		9:39	10:31	11:14	11:36	12:03	13:23	13:53	14:17	14:54
Ranger Road		7:38	8:15	8:45		9:45			11:42	12:09	13:29	13:59	14:23	15:00
Newport	6:51	7:44	8:21	8:50		9:49	10:40	11:24	11:48	12:15	13:35	14:05	14:28	15:05

Southbound Service

Equipment Set	**A**	**B**	**C**	**A**	**B**	**C**	**A**	**B**	**A**	**B**	**A**	**B**	**B**
	9905				**9907**		**9909**	**9911**			**9913**		**9915**
STATION	**115**	**117**	**215**	**217**	**119**	**219**	**121**	**123**	**221**	**223**	**125**	**127**	**129**
Boston	13:58				16:02		17:03	17:45			19:50		22:40
Fall River	15:20				17:22		18:22	19:05			21:14		0:01
Battleship Cove	15:25	15:55			17:27		18:33	19:10			21:19	22:30	0:06
Tiverton	15:31	16:02			17:33		18:40	19:17			21:25	22:36	0:12
Anthony Road	15:35	16:04	16:32	17:15	17:37	17:55	18:44	19:19	19:56	20:36	21:27	22:38	0:14
Mt Hope	15:39		16:35	17:18		17:58	18:48	19:24	20:00	20:40	21:32	22:42	0:18
Mellville	15:44	16:12	16:41	17:25	17:44	18:05	18:52	19:29	20:06	20:45	21:36	22:46	0:22
Ranger Road	15:50	16:19	16:47	17:31		18:11	18:58	19:35	20:12	20:51	21:43	22:52	0:28
Newport	15:55	16:24	16:52	17:36	17:54	18:16	19:03	19:41	20:18	20:57	21:48	22:58	0:34



KKO and Associates, L.L.C.

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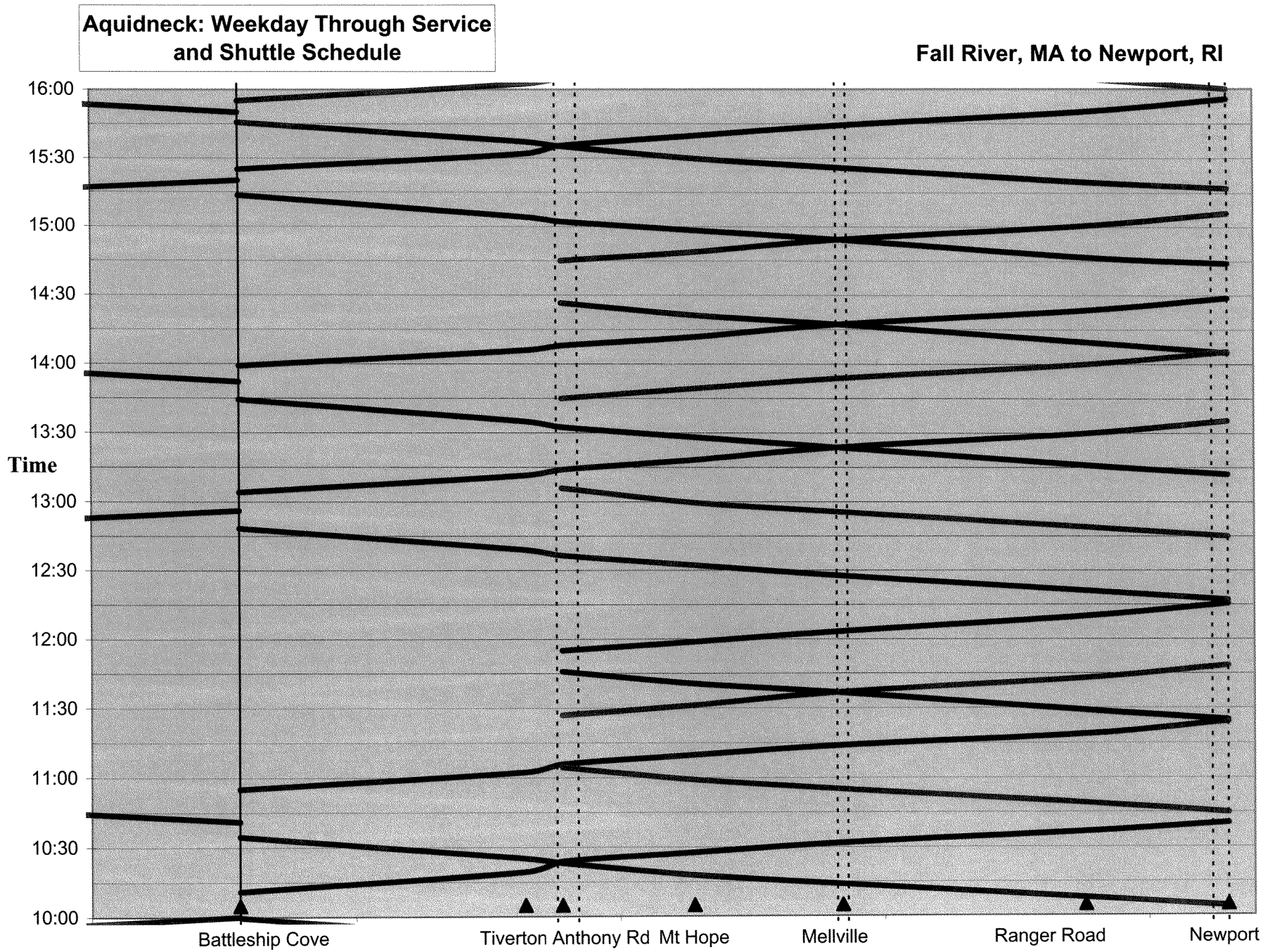

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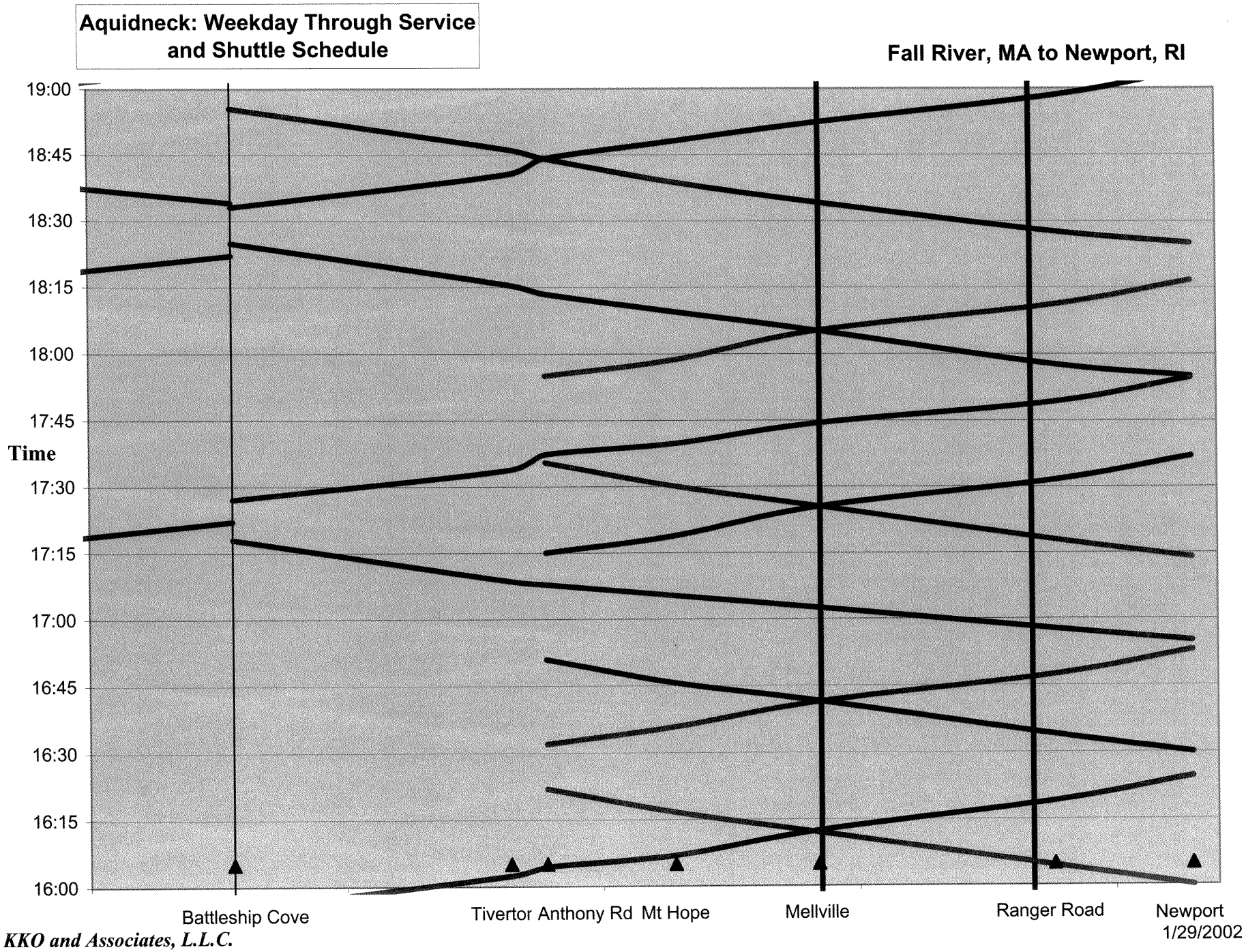

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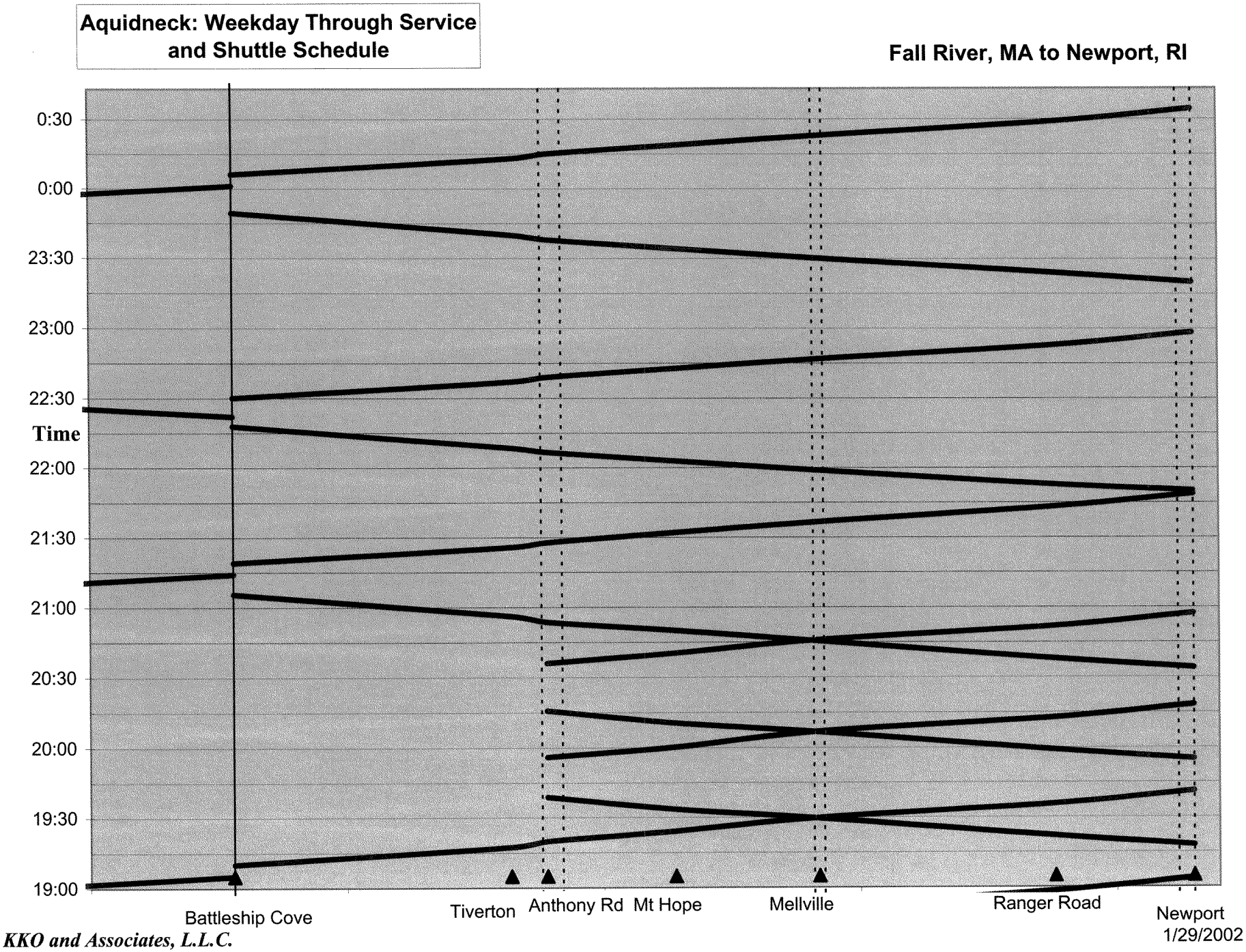


KKO and Associates, L.L.C.

APPENDIX B

SUMMARY OF PLANNED AND PAST EXCURSION SERVICE

Technical Memorandum to David Nelson of KKO and Associates dated March 6, 2002.

Memorandum

DATE:	March 6, 2002
TO:	David Nelson
FROM:	Yawa Duse-Anthony Yawa Duse-Anthony
SUBJECT:	**Newport Passenger Rail Feasibility Study** Schedule of Excursion Trains Overlaid on Option 3 – Combined Shuttle and Commuter Service
DISTRIBUTION:	*Adel Foz (5 copies)*

Introduction and Summary

The objective of the analysis outlined in this memorandum is to determine how the various excursion[1] trains on the line could be accommodated with the proposed shuttle and commuter service. The shuttle service terminates at Anthony Road, and the commuter service terminates at Battleship Cove in Fall River.

The analysis indicates the excursion services could be commingled with the shuttle and commuter services on the railway with the development of passing, storage and station tracks generally equivalent to those required to support commingling just the shuttle and excursion services.

Excursion Service

- Summary of planned and past service can be found in a memorandum to David Nelson dated February 26, 2002.

Commuter Service and Anthony Road Shuttle (Planned service)

- A summary of the planned service can be found in a memorandum to Adel Foz dated January 18, 2002 and revised on January 21, 2002. It provides for shuttle service between Anthony Road and commuter service between Fall River and Newport over a 19 hour service day.

Constraints, Considerations and Assumptions

In planning the joint excursion/ shuttle and commuter service operation, KKO assumed:

- Tourist and dinner trains cannot travel faster than 15mph.
- Passing sidings cannot be located in the secure area of the Naval Base, between MP52.1 (South of Greens Lane) and MP55.4 (Admiral Kalbfuss Road).
- Planned passing siding at Melville Station.
- Planned two track station at Newport.

[1] Excursion trains encompass the various lunch, dinner and tourist trains operated at low speeds along the line using mature equipment.

- Schedule of MBTA trains to be met in Fall River conforms to the New Bedford/ Fall River Commuter Rail Extension Environmental Impact Report prepared by Vanasse Hangen Brustlin, Inc in July 2000.

Method and Findings

KKO used the previously determined adjusted schedules (February 26, 2002) for the excursion trains as a basis for this analysis. Those schedules are detailed in Table 1. KKO explored minor adjustments to the excursion trains schedules that would allow both the shuttles and excursion trains to operate without double tracking the railroad between Newport and Melville. The analysis found that with two passing sidings located at MP50.8 (Siding 51) and MP55.3 (Siding 55), the service shown in Table 2 can be accommodated[2]. KKO endeavored to make the train trips as close in duration to the existing service as possible given the frequent schedule of the Mount Hope shuttle. The speed of the excursion trains was set at 15mph. Slower speeds could not be accommodated based on the distance between the passing sidings that are located on either end of the Navy secure zone. It was assumed that no meets between trains would be desirable within the limits of the Navy's secure area.] OK

Table 1
Proposed Excursion Service on the Old Colony and Newport Railroad
(February 26, 2002 Shuttle and Excursion Services Only)

	Tourist Train	Lunch Train	Dinner Train
Depart Newport	11:36AM	12:00PM	6:35PM
Arrive Newport	1:35PM	2:05PM	8:35PM
Trip Length (miles)	10	10	10
Trip Time (hours)	1:59	2:05	2:00

Adjusted Schedules

Table 2
Proposed Excursion Service on the Old Colony and Newport Railroad
(Shuttle, Commuter and Excursion Services)

	Tourist Train[3]	Lunch Train	Dinner Train
Depart Newport	11:36AM	12:05PM	6:30PM
Arrive Newport	1:21PM	2:00PM	8:35PM
Trip Length (miles)	10	10	10
Trip Time (hours)	1:45	1:55	2:05

Appendix A shows a proposed schedule that will allow tourist, lunch and dinner trains to be operated with the shuttle and commuter service. Some adjustments in the schedules of the excursion services are required. As for the shuttle service only, two new passing sidings are

[2] These are the same passing siding locations found to be sufficient to support shuttle and excursion service in the February 26, 2002 analysis.
[3] On Sundays, a second Tourist train could be scheduled to depart Newport at 2:36pm for a 2 hour excursion to and from Melville.

required. A four track Newport Station is also required. The storage track at Melville (immediately north of the shuttle/commuter passing siding) is used by both the Tourist and Lunch trains as a siding to allow the shuttle trips to pass each other in the Melville station siding. Necessary adjustments to the schedules of the excursion trains are summarized below.

Tourist Train

- Train operates at 15mph
- Consist departs Melville at 10:00AM, and arrives at Newport at 10:37AM
- Departs Newport at 11:36AM
- Waits for five minutes in the southern siding closer to Newport Station (Siding 55) in the northbound direction
- Waits for four minutes in the siding closer to Melville Station (Siding 51) in the northbound direction
- Changes direction at Melville Station, rather than at Green's Lane (31 minute turn)
- Waits for three minutes in Siding 51 in the southbound direction
- Waits for two minutes in Siding 55 in the southbound direction
- Arrives Newport at 1:21PM
- Consist departs for storage in Melville at 2:16PM, arriving in Melville at 3:04PM

Lunch Train

- Train operates at 15mph
- Consist departs Portsmouth at 10:35AM, and arrives at Newport at 11:19AM
- Departs Newport at 12:05PM
- Waits for ten minutes in Siding 51 in the northbound direction
- The train turns at Melville Station (45 minute turn)
- Arrives Newport at 2:00PM
- Consist departs Newport for Portsmouth at 2:55PM, arriving in Portsmouth at 3:52PM

Dinner Train

- Train operates at 15mph
- Consist departs Portsmouth at 5:05PM, and arrives at Newport at 5:52PM
- Departs Newport at 6:30PM
- Waits for four minutes in Siding One in the northbound direction
- The train turns at Melville Station (52 minute turn)
- Waits for eight minutes in Siding One in the southbound direction
- Arrives Newport at 8:35PM
- Consist departs Newport at 9:05PM arriving at Portsmouth at 9:45PM

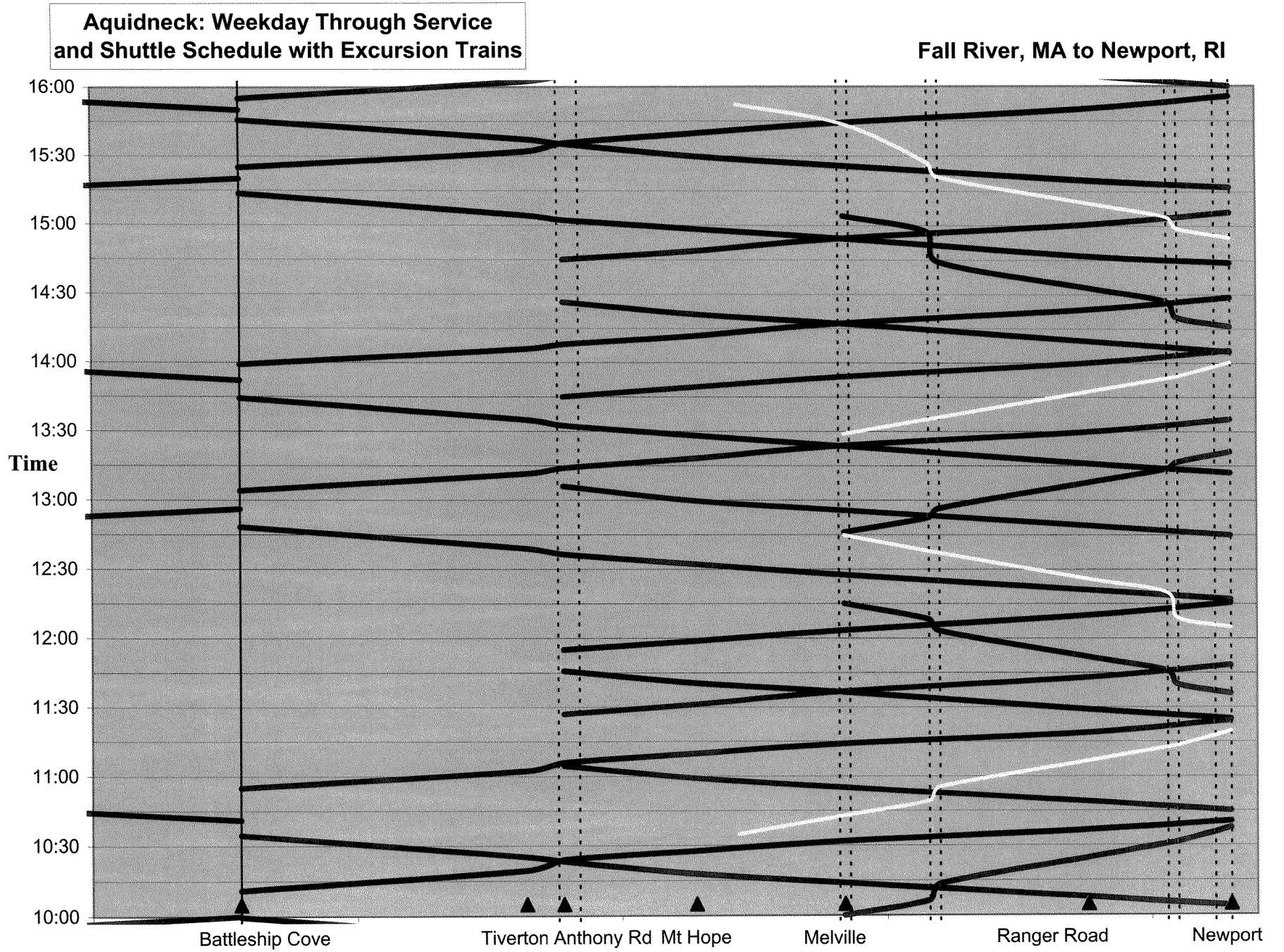
Infrastructure requirements for this option (over and above the rail infrastructure necessary to support the shuttle and commuter service as a stand alone operation) include:

- Two signal controlled passing sidings in the vicinity of MP51 and MP55.
- A signal controlled four track station in Newport.

- A signal controlled stub end storage and station track immediately north of the passing siding at Melville to allow the excursion trains to turn at that location while shuttle and commuter trains pass.

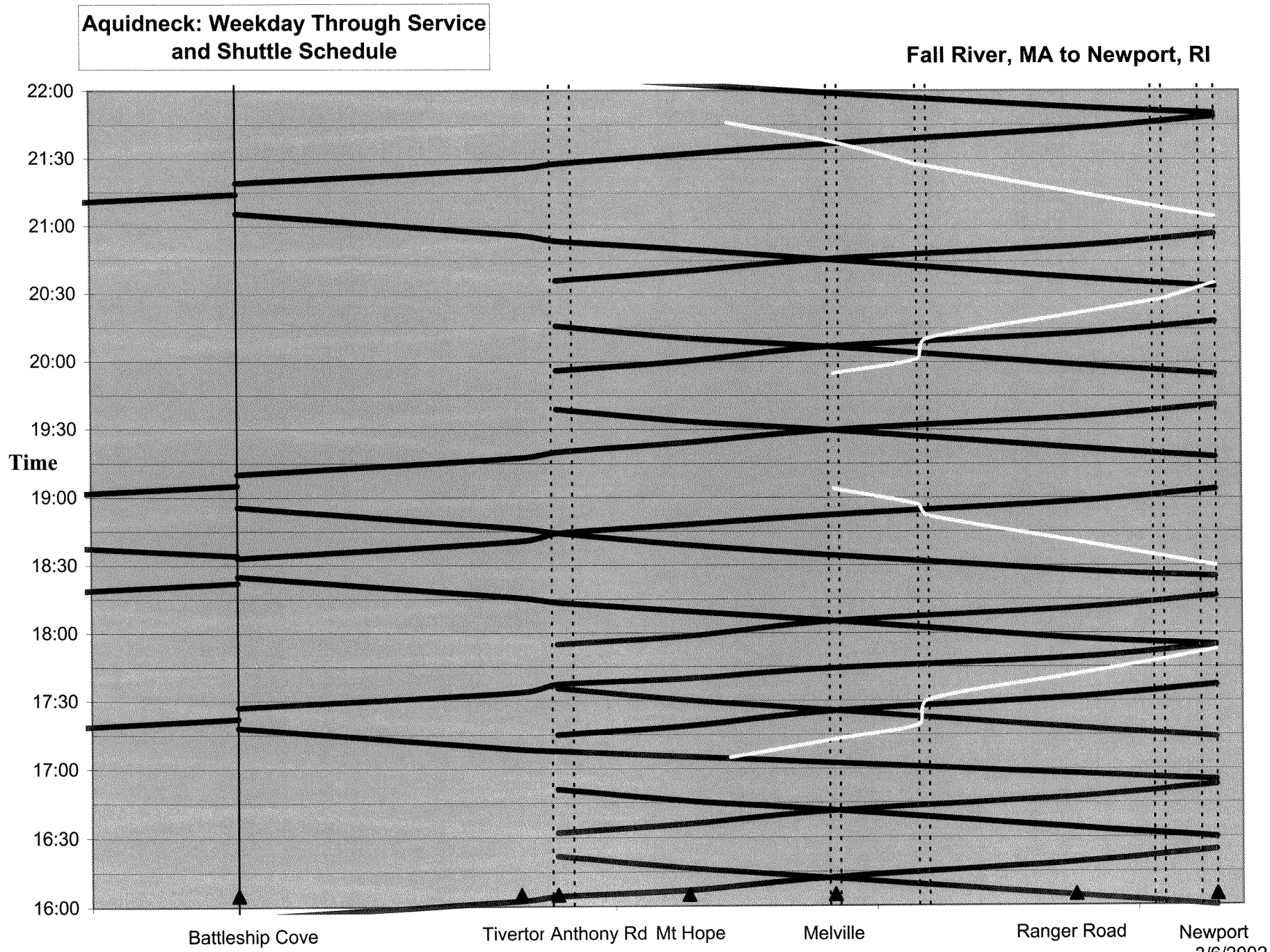
Appendix A

Proposed Tourist, Lunch and Dinner Train Service on Anthony Road Shuttle and Fall River Commuter Service



KKO and Associates, L.L.C.

3/6/2002



KKO and Associates, L.L.C.

3/6/2002

APPENDIX C
EXCURSION SERVICES WITH FALL RIVER/ANTHONY ROAD SHUTTLE
Schedules and String lines

Memorandum

DATE:	April 11, 2002
TO:	David Nelson
FROM:	Yawa Duse-Anthony Yawa Duse-Anthony
SUBJECT:	**Newport Passenger Rail Feasibility Study** Update of Schedule of Excursion Trains
DISTRIBUTION:	*Adel Foz (3 copies), Domenic Bua – Transystems, Bruce Leish – CRJ Associates Inc*

Introduction and Summary

The objective of the analysis outlined in this memorandum is to determine how the various excursion[1] trains on the line could be accommodated with the proposed On Island Shuttle and Fall River Commuter Shuttle, a three track Newport Station and passing sidings located at Coddington Cove and McAllister's Point. The On Island Shuttle service terminates at Anthony Road, and the Fall River Commuter Shuttle service terminates at Battleship Cove in Fall River.

The analysis indicates the excursion services could be commingled with the shuttle services on the railway with the development of passing, storage and station tracks generally equivalent to those required to support commingling just the Anthony Road shuttle and excursion services.

Excursion Service

- Summary of planned and past service can be found in a memorandum to David Nelson dated March 6, 2002.

Fall River Commuter Shuttle and Anthony Road Shuttle (Planned service)

- A summary of the planned service can be found in a memorandum to Adel Foz dated January 18, 2002 and revised on January 21, 2002. It provides for on island shuttle service between Anthony Road and Newport, and commuter shuttle service between Fall River and Newport over a 19 hour service day.

Constraints, Considerations and Assumptions

In planning the joint excursion/ shuttle and commuter service operation, KKO assumed:

- Excursion trains cannot travel faster than 15mph.
- Excursion train equipment stored in the vicinity of Melville Layover.
- Passing sidings located at MP4.2 (McAllister's Point) and MP2.0 (Coddington Cove).
- Planned passing siding at Melville Station.
- Planned three track station at Newport.

[1] Excursion trains encompass the various lunch, dinner and tourist trains operated at low speeds along the line using mature equipment.

- Schedule of MBTA trains to be met in Fall River conforms to the New Bedford/ Fall River Commuter Rail Extension Environmental Impact Report prepared by Vanasse Hangen Brustlin, Inc in July 2000.

Method and Findings

KKO used the previously determined adjusted schedules (March 6, 2002) for the excursion trains as a basis for this analysis. Those schedules are detailed in Table 1. KKO explored minor adjustments to the excursion trains schedules that would allow both the shuttles and excursion trains to operate without double tracking the railroad between Newport and Melville. The analysis found that with two passing sidings located at MP4.2 (McAllister's Point) and MP2.0 (Coddington Cove), the service shown in Table 2 can be accommodated[2]. KKO endeavored to make the train trips as close in duration to the existing service as possible given the frequent schedule of the Anthony Road Shuttle and Fall River Commuter Shuttle. The speed of the excursion trains was set at 15mph.

Table 1
Proposed Excursion Service on the Old Colony and Newport Railroad
(March 6, 2002 Shuttle, Commuter and Excursion Services)

	Tourist Train	Lunch Train	Dinner Train
Depart Newport	11:36AM	12:05PM	6:30PM
Arrive Newport	1:21PM	2:00PM	8:35PM
Trip Length (miles)	10	10	10
Trip Time (hours)	1:45	1:55	2:05

Adjusted Schedules

Table 2
Proposed Excursion Service on the Old Colony and Newport Railroad
(Shuttle, Commuter and Excursion Services)

	Tourist Train[3]	Lunch Train	Dinner Train
Depart Newport	11:10AM	12:00PM	6:30PM
Arrive Newport	1:00PM	1:48PM	8:32PM
Trip Length (miles)	10	10	10
Trip Time (hours)	1:50	1:48	2:02

Appendix A shows a proposed schedule that will allow tourist, lunch and dinner trains to be operated with the Anthony Road Shuttle and Fall River Commuter Shuttle services. Some adjustments in the schedules of the excursion services are required. As for the Anthony Road Shuttle service only, two new passing sidings are required. A three track Newport Station is also

[2] These are the same passing siding locations found to be sufficient to support shuttle and excursion service in the February 26, 2002 analysis.
[3] On Sundays, a second Tourist train could be scheduled to depart Newport at 2:36pm for a 2 hour excursion to and from Melville.

required. The storage track at Melville (immediately north of the shuttle/commuter passing siding) is used by the excursion trains as a siding to allow the On Island and Fall River shuttle trips to pass each other in the Melville station siding. Necessary adjustments to the schedules of the excursion trains are summarized below.

Tourist Train

- Train operates at 15mph
- Consist departs Melville at 9:57AM, and arrives at Newport at 10:32AM
- Departs Newport at 11:10AM
- Waits for 11 minutes in the southern siding closer to Newport Station (Coddington Cove) in the northbound direction
- Waits for four minutes in the siding closer to Melville Station (McAllister's Point) in the northbound direction
- Changes direction at Melville Station, rather than at Green's Lane (14 minute turn)
- Waits for 12 minutes in McAllister's Point in the southbound direction
- Waits for 10 minutes in Coddington Cove in the southbound direction
- Arrives Newport at 1:00PM
- Consist departs for storage in Melville at 1:52PM, arriving in Melville at 2:34PM

Lunch Train

- Train operates at 15mph
- Consist departs Melville at 10:20AM, and arrives at Newport at 10:59AM
- Departs Newport at 12:00PM
- Waits for 13 minutes in Coddington Cove in the northbound direction
- The train turns at Melville Station (23 minute turn)
- Waits 12 minutes in McAllister's Point in the southbound direction
- Arrives Newport at 1:48PM
- Consist departs Newport at 2:50PM, arriving in Melville at 3:25PM

Dinner Train

- Train operates at 15mph
- Consist departs Melville at 5:05PM, and arrives at Newport at 5:47PM
- Departs Newport at 6:30PM
- Waits for 20 minutes in McAllister's Point in the northbound direction
- The train turns at Melville Station (19 minute turn)
- Waits for 21 minutes in McAllister's Point in the southbound direction
- Arrives Newport at 8:32PM
- Consist departs Newport at 9:03PM arriving at Melville at 9:32PM

Infrastructure requirements for this option (over and above the rail infrastructure necessary to support the shuttle and commuter service as a stand alone operation) include:

- Two signal controlled passing sidings in the vicinity of Coddington Cove and McAllister's Point.
- A signal controlled three track station in Newport.
- A signal controlled stub end storage and station track immediately north of the passing siding at Melville to allow the excursion trains to turn at that location while shuttle and commuter trains pass.

Appendix A

Proposed Tourist, Lunch and Dinner Train Service on Anthony Road Shuttle and Fall River Commuter Shuttle Service

KKO and Associates, LLC

Fall River Weekday Through Service and Shuttle Schedule with Amended Excursion Trains

Northbound Service																
Equipment Set	**A**	**B**	**A**	**B**	**B**	**A**	**B**			**C**	**A**	**A**	**C**	**B**	**B**	
	100	**102**	**104**	**202**	**206**	**106**	**108**	**12**	**2**	**208**	**210**	**110**	**212**	**112**	**214**	**14**
STATION	**9902**	**9904**	**9906**				**9908**							**9910**		
Newport	5:40	6:12	7:03	7:58	9:00	9:28	10:04	11:10	12:00	10:45	11:25	12:17	12:45	13:12	14:05	13:52
Ranger Road	5:43	6:16	7:06	8:01	9:03	9:31	10:07			10:48	11:28	12:20	12:48	13:15	14:09	
Mellville	5:50	6:22	7:13	8:09	9:09	9:39	10:13	11:54	12:42	10:54	11:36	12:27	12:55	13:23	14:16	14:34
Mt Hope	5:55	6:27	7:17	8:13	9:14	9:43	10:17			10:59	11:40	12:32	12:59	13:28	14:21	
Anthony Road	5:58	6:32	7:23	8:17	9:17	9:47	10:23			11:04	11:45	12:36	13:05	13:32	14:26	
Tiverton	6:00	6:35	7:25			9:50	10:25					12:38		13:34		
Battleship Cove	6:09	6:44	7:33			9:59	10:33					12:47		13:43		
Fall River	6:14	6:49	7:38				10:41							13:52		
Boston	7:33	8:08	8:57				11:58							15:14		

Northbound Service																
Equipment Set	**A**		**B**	**C**	**A**	**A**	**C**	**B**	**A**		**A**	**B**	**A**		**B**	**B**
	114	**4**	**116**	**216**	**218**	**118**	**220**	**120**	**122**	**6**	**222**	**224**	**124**	**8**	**126**	**128**
STATION			**9912**					**9914**							**9916**	
Newport	14:44	14:50	15:17	16:00	16:30	16:55	17:14	17:55	18:25	18:30	19:18	19:55	20:34	21:03	21:50	23:20
Ranger Road				16:04	16:33		17:17				19:21	19:58	20:37			23:23
Mellville	14:54	15:25	15:25	16:11	16:41		17:25	18:05	18:34	19:21	19:29	20:06	20:45	21:32	21:58	23:29
Mt Hope	14:58		15:29	16:16	16:45		17:30	18:09	18:38		19:33	20:10	20:49		22:02	23:34
Anthony Road	15:02		15:35	16:21	16:50		17:35	18:13	18:44		19:38	20:15	20:53		22:06	23:37
Tiverton	15:04		15:37					18:15	18:46				20:56		22:08	23:39
Battleship Cove	15:12		15:44			17:17		18:24	18:54				21:04		22:17	23:49
Fall River			15:50					18:34							22:22	
Boston			17:12					19:56							23:39	

Southbound Service																
Equipment Set	**A**	**B**	**A**	**B**	**B**		**A**		**B**	**C**	**A**		**B**		**C**	**A**
							9901						**9903**			
STATION	**101**	**103**	**105**	**201**	**205**	**13**	**107**	**1**	**109**	**207**	**209**	**15**	**111**	**3**	**211**	**113**
Boston							8:44						11:34			
Fall River							10:00						12:56			
Battleship Cove	6:21	7:12	7:50				10:11		10:55				13:04			13:59
Tiverton	6:28	7:18	7:56				10:18		11:01				13:10			14:05
Anthony Road	6:32	7:23	7:59	8:30	9:30		10:23		11:05	11:27	11:55		13:13		13:45	14:07
Mt Hope	6:36	7:27	8:03	8:33	9:34		10:27		11:09	11:31	11:58		13:17		13:49	14:11
Mellville	6:40	7:32	8:09	8:39	9:39	9:57	10:31	10:20	11:13	11:36	12:03	12:08	13:23	13:05	13:53	14:16
Ranger Road		7:38	8:15	8:45	9:45					11:42	12:09		13:29		13:59	14:22
Newport	6:50	7:43	8:20	8:50	9:49	10:32	10:39	10:59	11:23	11:48	12:15	13:00	13:34	13:48	14:05	14:28

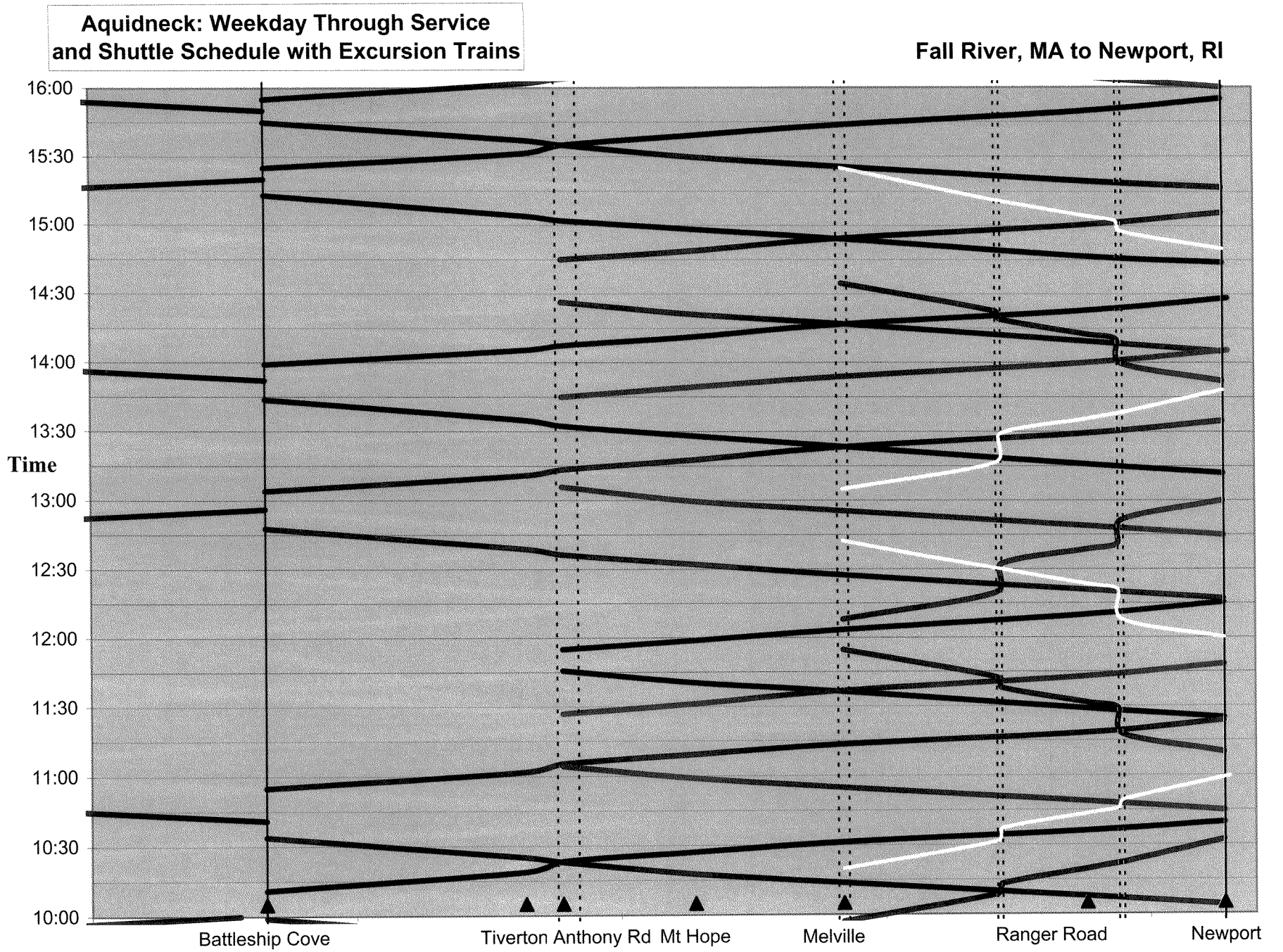
Southbound Service																
Equipment Set	**B**	**A**	**B**	**C**	**A**		**B**	**C**	**A**	**B**	**A**		**B**	**A**	**B**	**B**
		9905					**9907**		**9909**	**9911**				**9913**		**9915**
STATION	**213**	**115**	**117**	**215**	**217**	**5**	**119**	**219**	**121**	**123**	**221**	**7**	**223**	**125**	**127**	**129**
Boston		13:58					16:02		17:03	17:45				19:50		22:40
Fall River		15:20					17:22		18:22	19:05				21:14		0:01
Battleship Cove		15:25	15:55				17:27		18:33	19:10				21:19	22:30	0:06
Tiverton		15:31	16:01				17:33		18:40	19:16				21:25	22:36	0:12
Anthony Road	14:45	15:34	16:03	16:32	17:15		17:36	17:55	18:43	19:19	19:56		20:36	21:27	22:38	0:14
Mt Hope	14:48	15:39		16:35	17:18			17:58	18:47	19:23	20:00		20:40	21:31	22:42	0:18
Mellville	14:54	15:43	16:11	16:41	17:25	17:05	17:43	18:05	18:51	19:29	20:06	19:40	20:45	21:36	22:46	0:22
Ranger Road	15:00	15:49	16:18	16:47	17:31			18:11	18:57	19:35	20:12		20:51	21:42	22:52	0:28
Newport	15:05	15:55	16:23	16:52	17:36	17:47	17:53	18:16	19:03	19:40	20:18	20:32	20:57	21:48	22:57	0:33

Key:

Tourist Train

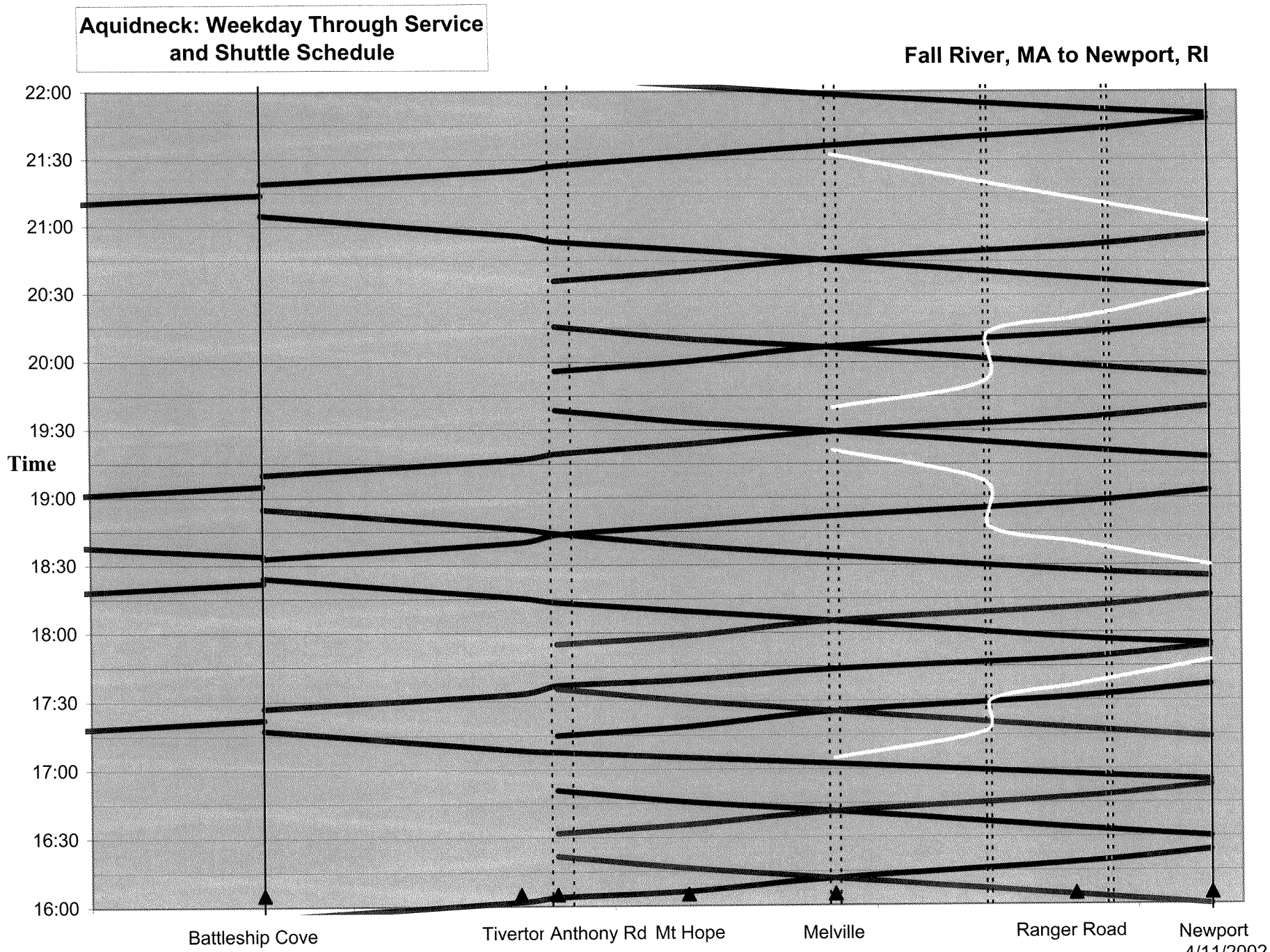
Dinner Train

Date: 4/11/2002



KKO and Associates, L.L.C.

4/11/2002



4/11/2002

KKO and Associates, L.L.C.

APPENDIX D

RIDERSHIP AND REVENUE SUPPORT DOCUMENTATION

1. **Untitled Louis Berger document that provides estimates of within study area resident and visitor ridership.**
2. **KKO Technical Memorandum, "Aquidneck Island Rail Feasibility Study, Proposed Adjustments to Resident On-Island Forecasts", April 18, 2002, which presents proposed adjustments to the Louis Berger study area resident ridership.**
3. **KKO Technical Memorandum, "Aquidneck Island Rail Feasibility Study, Projections of Aquidneck Rail Ridership for Trips to and from the Boston Area," April 4, 2002, which describes projections of resident travel to and from the Boston area.**
4. **KKO Technical Memorandum, "Aquidneck Island Rail Feasibility Study, Projections of Aquidneck Rail Visitor Ridership," April 17, 2002, which presents estimates of visitor use of Aquidneck rail.**

1.21.01 INTRODUCTION

This report presents ridership estimates for proposed improvements to the existing rail line between Newport, RI and Tiverton, MA. The estimates provide an understanding of the ability to alleviate roadway congestion on Aquidneck Island and also to determine what passenger demand exists, or can be foreseen, for proposed improvements to the existing rail line.

Ridership estimates were generated for the forecast years 2005 through 2020 in five-year increments based for two separate potential users of rail: daily commuters and visiting tourists. Commuter rail service has been proposed to serve potential commuters as well as tourists traveling between Newport and Fall River regions, while an on-island shuttle service has been conceived to cater exclusively to potential tourists visiting Aquidneck Island. The shuttle service is expected to run between Newport Gateway Center and the vicinity of Mount Hope Bridge.

1.21.02 METHODOLOGY

The methodology adopted for the analysis followed the basic procedure of travel demand modeling. A "sub-area model" was developed exclusively for the study area and was derived from the Rhode Island Statewide Model (RISM) to generate the ridership estimates. Travel demand modeling in its traditional form involves four fundamental stages: trip generation, trip distribution, mode-split, and trip assignment (See *Appendix 1* for description on four-step procedure). The ridership estimates were developed for potential commuters residing on and off the island and also tourists visiting the island during peak summer season. Figure 1.1 illustrates the study area and the island regions considered for analysis.

To understand the size of the market for the commuter rail ridership, a mode-split model was developed to determine the mode-shares corresponding to auto and transit. Individuals making only home-based work (HBW) related trips were considered to be the potential users of commuter rail. The other two categories of trip purposes: home-based non-work (HBNW) and non-home based (NHB) trips, were excluded from analysis on the assumption that individuals are more likely to travel by auto for non-work related purposes on Aquidneck Island.

The ridership estimates for the tourist traffic were determined based on the data obtained from different sources such as Newport County Convention & Visitor's Bureau. The forecasts estimated were independent of the mode-split model developed for the commuter rail. However, the proposed commuter rail, in addition to serving potential daily commuters, is assumed to cater to tourist traffic as well during peak summer season.

The potential route system for the proposed commuter rail and the on-island shuttle followed the alignment of the secondary track serving the Dinner Train. The potential station locations were included in the network. The stations corresponding to each rail service are presented in Table 1.1. The proposed route system for the commuter rail service and station stops are illustrated in Figure

1.2. The route system for the on-island shuttle service is similar to the route system of commuter rail except that the service ends at Mount Hope station location.

Figure 1.1: Study Area for Aquidneck Island Ridership Estimates

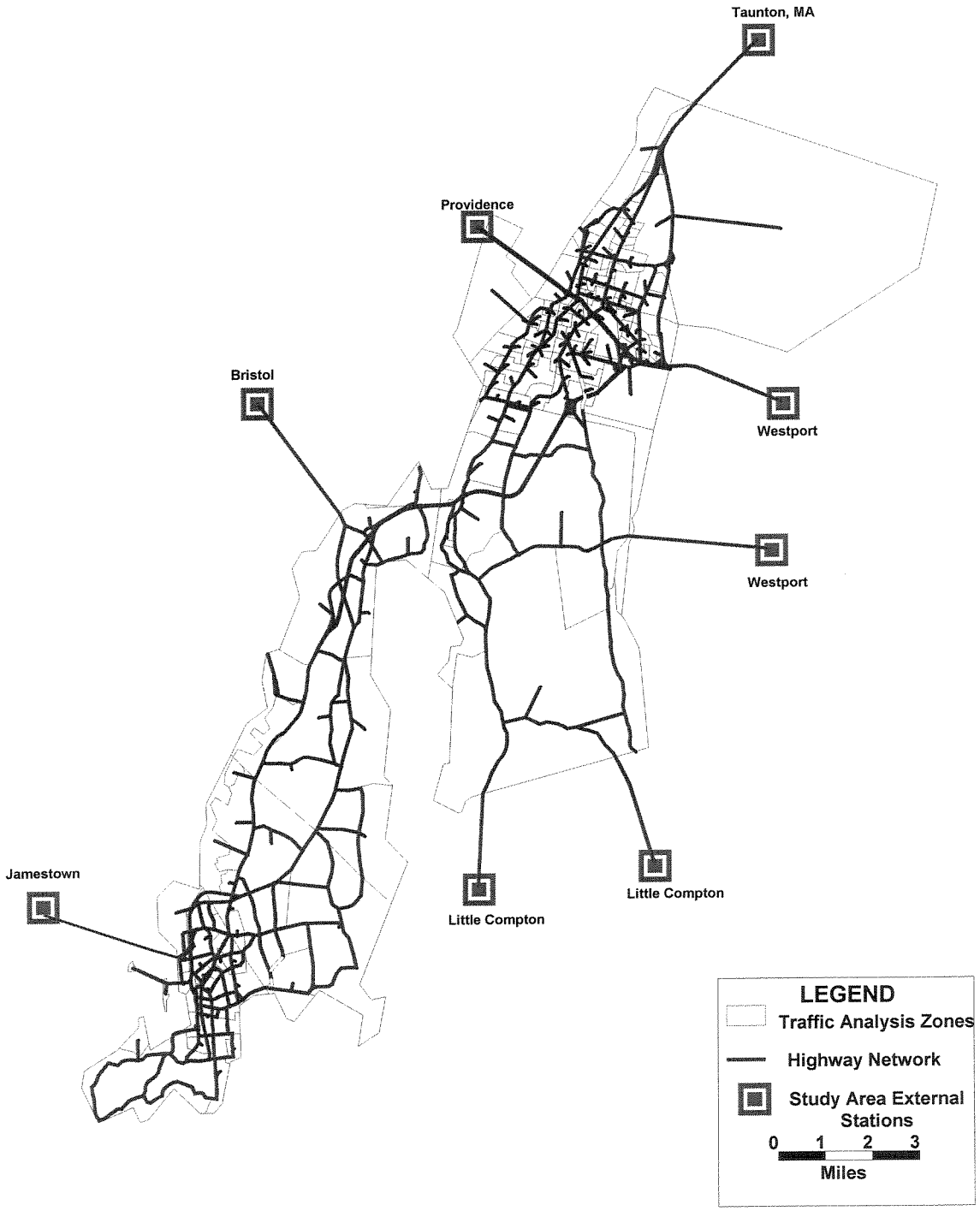


Figure 1.2: Route System and Station Locations for Proposed Commuter Rail

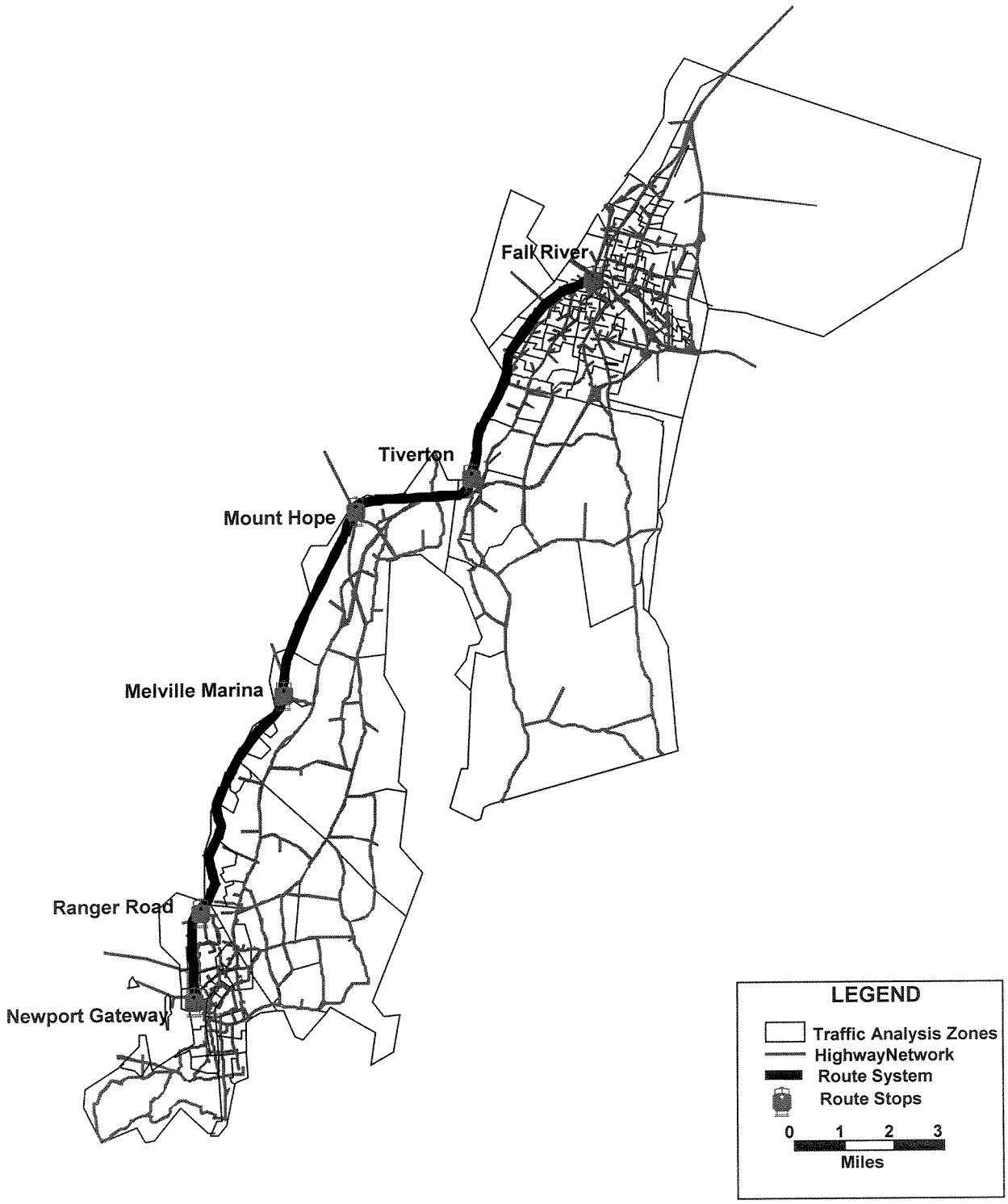


Table 1.1: Potential Station Locations

Stop	Station Location	On-Island Shuttle	Commuter Rail
1	Newport Gateway, Bridge Street	X	X
2	Ranger Road, Newport	X	X
3	Melville Marina, Stringham Lane	X	X
4	Mount Hope Marine, Bristol Ferry Road	X	X
5	Starwood, Tiverton		X
6	Fall River Downtown		X

A flat-fare of $1.25 was used for both commuter rail and on-island shuttle with free parking at the stations. Free parking was intended to attract more passengers to ride the train and thereby divert a portion of trips made essentially by autos. According to a study conducted by KKO Associates, speed varied on different segments along the length of the railroad. Hence the equivalent of an average speed of 35 mph with headway of 30 minutes was used as an input to the mode-split model. Access time, wait time, and transfer times in the form of penalties (disutilities) were added to the person trips.

The methodology was intended at explaining the fundamental approach adopted for the task undertaken in this study. The method is consistent with the statewide model and the highway network used conforms to the Transportation Improvement Program (TIP) and Long Range Plan. The railroad network was the only new addition to the model. It should however be noted that the analysis was aimed at improving the rail line in Aquidneck Island only, between Newport and Fall River areas, and did not include the Fall River rail line under development for the MBTA.

1.21.03 RESULTS AND DISCUSSION

Section A summarizes the ridership estimates obtained from running the four-step travel demand modeling with respect to commuter rail for the four forecast years. The ridership estimates for the tourist traffic have been summarized in section B, while section C summarizes the combined ridership estimates.

A. Potential Commuter Rail Ridership

From the mode split model it was observed that more than four percent of the total person trips equivalent to over 8,000 daily commuters are made by transit, while the remainder travel primarily by autos. Transit represents all modes of transportation other than passenger cars such as buses, trolley cars, and railroad. Commuter rail and on-island shuttle services are assumed to fall in the 'railroad' category. The following table indicates the total number of on-island and off-island daily HBW trips made by auto and transit, and their respective share of trips for the year 2005.

Table 1.2: Mode-Split Model Results

Mode	On-Island	Off-Island	Total Daily Person Trips (HBW)	Share
Auto	142,744	24,428	167,172	95.42%
Transit	6,850	1,174	8,024	4.58%

The 1990 Census Transportation Planning Package (1990 CTPP Data– See *Appendix 2*) data for the island region was analyzed to compare with the results obtained. For 1990, the overall transit mode share for Aquidneck Island region was less than two percent, with railroad representing only 0.03 percent. As the CTPP data does not indicate the actual scenario of transit shares and as no secondary data source were available, it was considered feasible to assume at least two percent mode share for commuter rail. The assumption is made to reflect the growth observed in railroad transportation over the last decade and that expected in future. The use of 1990 data was perceived as more of a conservative approach as the 2000 CTPP data is due in the near future.

An estimated 71 commuters are expected to travel daily by rail one-way on the entire segment in the year 2005. Considering different time constraints, for 2020 the total travel time required for a trip in either direction between Newport and Fall River is estimated to be 21-22 minutes long. The ridership estimate is projected to grow to 88 one-way riders in 2020. A majority of these passengers travel daily for work or business related purposes from the Newport downtown stop to the Ranger Road stop in the Newport area and back. The Ranger Road stop is in the vicinity of the US Naval Base that currently employs over 4,000 people.

Figure 1.3 illustrates the segment daily ridership estimates for each of the forecast years and Table 1.3 summarizes the results obtained. It should be noted that the figure indicates the ridership estimates for potential commuters only and do not account for any tourist traffic. (See *Appendix 3* for Boarding and Alighting Counts at each station location)

Figure 1.3: One-Way Daily Ridership Estimates for Commuter Rail

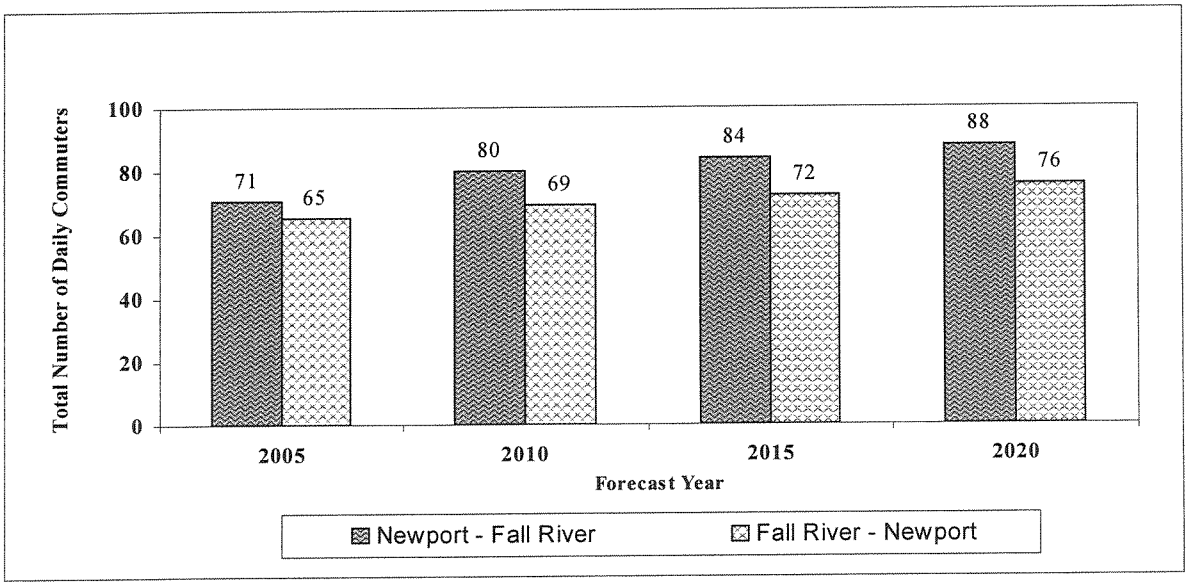


Table 1.3: Ridership Estimates for Commuter Rail

Segment		Number of Daily Commuters / Journey to Work Only							
Newport - Fall River		**2005**		**2010**		**2015**		**2020**	
From	**To**	**Riders**	**Travel Time**	**Riders**	**Travel Time**	**Riders**	**Travel Time**	**Riders**	**Travel Time**
NP Gateway	Ranger Rd., NP	45	5.67	46	6.25	48	6.85	49	7.54
Ranger Rd., NP	Melville	9	4.30	15	4.33	16	4.37	18	4.42
Melville	Mt Hope	3	3.48	5	3.48	6	3.48	6	3.48
Mt Hope	Tiverton	5	2.31	7	2.31	7	2.31	7	2.31
Tiverton	Fall River	8	4.27	6	4.27	7	4.27	7	4.27
	Total	71	**20.03**	80	**20.63**	84	**21.26**	88	**22.01**
Fall River - Newport		**2005**		**2010**		**2015**		**2020**	
From	**To**	**Riders**	**Travel Time**	**Riders**	**Travel Time**	**Riders**	**Travel Time**	**Riders**	**Travel Time**
Fall River	Tiverton	8	4.27	7	4.27	7	4.27	7	4.27
Tiverton	Mt Hope	3	2.30	4	2.30	4	2.30	4	2.30
Mt Hope	Melville	3	3.48	4	3.48	4	3.48	5	3.48
Melville	Ranger Rd., NP	8	4.30	11	4.32	12	4.34	14	4.37
Ranger Rd., NP	NP Gateway	43	5.40	44	5.81	46	6.29	47	6.85
	Total	65	**19.76**	69	**20.18**	72	**20.68**	76	**21.27**

The model thus developed was basically intended to estimate the number of potential commuters traveling between Newport and Fall River regions and to assist in understanding the size of the potential transit market. Only the home-based work (HBW) trips made by individuals were considered to predict the mode shares. Work trips made by persons residing off the island were also included while estimating the ridership estimates, although the number of trips was very low.

B. Potential On-Island Shuttle Ridership

The data obtained from Newport County Convention & Visitor's Bureau was used to estimate the tourist demand. Table 1.4 summarizes past and current tourist flow for Newport County. Summer months from May through August are assumed to be the peak season and hence only the tourist data for this season are used to forecast into the future years. The data were then assigned to the proposed network of the on-island shuttle and its station locations to arrive at the ridership counts.

Table 1.4: Current Tourist Flow into Newport County

Month/Year	1997	1998	1999	2000	2001
Jan	5,364	7,022	5,682	4,940	6,444
Feb	13,462	16,500	17,652	12,290	18,358
Mar	14,656	14,010	14,638	22,044	16,092
Apr	26,070	25,732	30,490	35,820	43,662
May	49,145	53,185	54,998	87,950	92,862
Jun	71,169	79,527	95,118	120,000	120,678
Jul	97,557	113,964	121,920	157,269	NA*
Aug	117,744	133,872	135,243	160,011	NA*
Sep	77,280	99,456	99,891	167,436	NA
Oct	78,996	94,332	102,522	125,661	NA
Nov	15,090	23,916	21,370	17,494	NA
Dec	15,854	19,132	20,524	16,918	NA
Summer Total	**335,615**	**380,548**	**407,279**	**525,230**	**213,540**
Year Total	**582,387**	**680,648**	**720,048**	**927,833**	**298,096**

*Source: Newport County Convention & Visitor's Bureau / *NA: Not Available*

Past and current tourist activity indicate an inflow of 3-3.5 million visitors per year to Aquidneck Island. Newport County reportedly accounted for approximately 2 million visitors in the base year. Future tourist flow was computed for a period of 120 days equivalent to the four months of summer season, assuming an average tourist growth of 1.5 to 2 percent per year. The growth was based on analyzing the population and overall development of the region for future years (*Source*: *Rhode Island Statewide Model*). Table 1.5 summarizes the forecast tourist inflow for Newport County.

Table 1.5: Peak Summer Day Tourist Inflow for Newport County

	Base Year	2005	2010	2015	2020
Annual No. of Visitors to Aquidneck Island	3,500,000	3,864,283	4,266,480	4,710,539	5,200,816
Reported No. of Visitors to Newport County	927,833	1,024,403	1,131,023	1,248,741	1,378,711
Total Summer Visitors to Newport County	525,230	579,896	640,252	706,890	780,464
Actual No. of Visitors to Newport County	1,981,289	2,187,503	2,415,180	2,666,554	2,944,091
Total No. of Visitors Per Day in Summer	16,511	18,229	20,126	22,221	24,534

From the available data it was also observed that an estimated 12 percent tourists (*Source: Newport County Convention & Visitor's Bureau*) travel by other modes of transportation than by auto. Although, no clear data were available indicating the modes of transportation, it was assumed that approximately two percent of these tourists travel by on-island shuttle. The assumption was based on maintaining consistency with the mode shares used for the commuter rail and in the absence of data of any tourist growth after the year 2020.

As indicated previously, the route system for the on-island shuttle service consists of four station stops. The Newport downtown and the Mount Hope station locations are considered to be the potential stops that will attract the majority of tourist traffic. These two stops are located in the vicinity of the three main bridges: Newport Bridge, Mount Hope Bridge, and the Sakonnet Bridge that connect the island to the main land. Hence, the stops near the northern bridges serve as potential transfer points for tourists to park their cars and ride the shuttle.

Table 1.6 presents the ridership estimates obtained for the proposed on-island shuttle. The estimates represent the total number of one-way riders using the shuttle during a peak summer day. Accurate boarding and alighting estimates cannot be determined for the on-island shuttle at each station stop because no information is available on the exact destination of tourists. However, based on the current tourist movement, it was assumed that maximum tourist activity could be foreseen at the Newport and Mount Hope stations.

Table 1.6: One-Way Daily Ridership Estimates for On-Island Tourist Shuttle

	Base Year	2005	2010	2015	2020
Total No. of Visitors Per Day in Summer	16,511	18,229	20,126	22,221	24,534
Total No. of Visitors Using Transit (12%)	1,981	2,188	2,415	2,667	2,944
Total No. of Visitors Using Shuttle (2%)	40	44	48	53	59

C. Combined Commuter and Tourist Ridership

Table 1.7 summarizes the combined ridership estimates for the forecast years during the peak summer reason. The commuter service would be expected to serve both commuter and tourist traffic. It can be observed from the table that the number of individuals using the rail service is significant for a peak summer day. An estimated 115 riders will be using the commuter rail in 2005 with a consistent increase thereafter.

Table 1.7: Combined Ridership Estimates for Peak Summer Day

Forecast Year	2005	2010	2015	2020
Commuter Rail Ridership	71	80	84	88
On-Island Shuttle Ridership	44	48	53	59
Combined Ridership	115	128	137	147

1.21.04 CONCLUSIONS

The study was carried out to determine the ridership estimates for a proposed commuter rail serving potential daily commuters and for an on-island shuttle rail service catering to potential tourists visiting the island. The estimates of ridership provide understanding the size of the rail transit market for Aquidneck Island. The key elements studied can be summarized as follows:

- The station locations for each rail service were selected based on a comprehensive study conducted by *KKO Associates*. The mode-split model established was tested for different combinations of station locations to check for any changes in the final estimates. The test indicated no significant difference in the ridership and remained consistent. The station locations tested for sensitivity were Mount Hope stop vs. Willow Lane location and Ranger Road stop vs. Coddington Cove location.

- Parking at the station locations was considered as one of the important factors affecting the ridership estimates. Parking is assumed to be free at the station locations considered for the study. Parking spaces required at the stations is determined based on assuming a vehicle occupancy factor. A vehicle occupancy factor of 1.5 for commuters and 2.5 for tourists was used to arrive at the number of parking spaces at each station location.

  Table 1.8 illustrates the overall number of parking spaces required for the complete segment. According to the results, the maximum number of boardings occurs at Gateway Center station in Newport, with at least 50 parking spaces required for regular commuters. However, other station locations along the segment including Fall River, are expected to attract a less significant ridership. Therefore, it is reasonable to provide a minimum of 15 to 20 parking spaces at these stations.

Table 1.8: Total Parking Spaces Required

Forecast Year	Total Commuters	No. of Spaces	Total Tourists	No. of Spaces	Total Spaces
2005	71	47	44	18	65
2010	80	53	48	19	73
2015	84	56	53	21	77
2020	88	59	59	24	82

- The ridership estimates reflect the potential requirement for a rail service connecting Newport and Fall River regions. The rail service provides an alternative mode to travel between the two places and thus alleviates roadway congestion on the island. However, the ridership is expected to remain stable after 2020 with no significant growth foreseen in population of the island.

APPENDIX 1

Data

The process of estimating the ridership estimates for Aquidneck Island involved obtaining and analyzing relevant data from available resources. The data obtained through different sources in the form of geographic files for the study area included traffic analysis zones (TAZs), a highway network, and the existing railroad. TAZs form the basis for analyses of travel movements within, into, and out of the urban area and are based on achieving homogeneous socioeconomic characteristics for each zone's population. The highway network reflects the main corridors of travel, such as state highways and arterial roads, within the study area, while the railroad exhibits the existing profile of the 'Dinner Train' that runs on 10 miles of secondary track on Aquidneck Island.

The traffic analysis zones specific to Aquidneck Island, Tiverton and Fall River, were identified and extracted for model refinement purposes. A total of 161 original zones were considered for the study area. The zone database for the year 2000 included information on the demographics of each community by county and census tract. The zonal system is devised in such a manner that the number of households, population, employment, and the number of trips produced and attracted are approximately equal in each zone. A total of eight external stations were selected for model development purposes to estimate the number of trips made by off-island residents. These stations are referred to as 'external stations' as they are located outside the study area and do not necessarily mean external to Rhode Island only. Figure 1.1 in the Methodology section illustrates the regions considered in the study area and their traffic analysis zones.

The existing highway network of the island was incorporated as a base platform to serve as auto links connecting the railroad at its station locations and included data such as length, number of lanes, travel time, area type, and capacity. Although the railroad had some information on the existing conditions, additional data were coded to the model. Such data included station locations, speed, mileposts, and headway.

Model Development

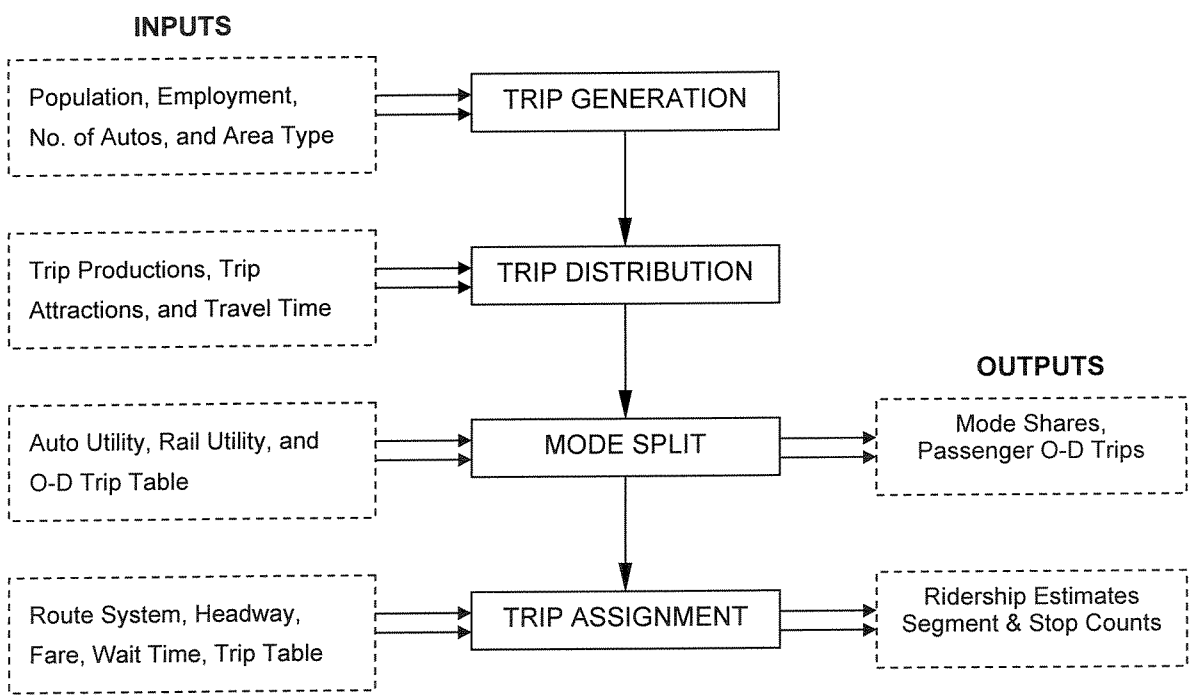
The development of the model for generating the rail ridership estimates was based on four-step travel demand modeling procedure that involved a sequential decision making process. A typical modeling process is presented in Figure A.1. The four steps can be summarized as:

1. Trip Generation
2. Trip Distribution
3. Mode Split
4. Trip Assignment

Trip generation involved predicting the number of "person trips" produced by and attracted to each traffic analysis zone of the study area. The number of productions and attractions were estimated using the default values (macro resources) that are part of the Rhode Island Statewide Model. The trips were generated corresponding to work and non-work based activities considering different socioeconomic characteristics of Aquidneck Island such as, population, number of households, auto ownership, and employment (retail or non-retail) data.

Trip distribution involved allocating the trip ends spatially, based on origins and destinations. The flows between origins and destinations were predicted using the gravity model of aggregate trip distribution. The gravity model explicitly relates flows between zones to inter-zonal impedance to travel (*Travel Demand Modeling*, TransCAD 3.5). The basic input thus included an impedance matrix based on highway travel time between different traffic analysis zones. The gravity model was established and applied to both trip purposes of interest, home-based non-work and non-home based, to generate a zone-to-zone trip matrix as the output. Because the trip assignment stage required origins and destinations as inputs, the zone-to-zone trip matrix was suitably converted to an origin and destination (OD) format.

Figure A.1: Modeling Process Adapted for Ridership Estimate Study



In *Mode Split* stage, a model was established to estimate the choice made by individuals in selecting between different modes of travel available to them. In this study, it was assumed that only two modes of transportation were available: auto and the proposed rail service. The model predicted the share of person trips attracted to each of the two modes based on "utility" of each. Utility, as a relative measure of attractiveness, is defined by factors such as travel time, travel cost,

access time, and wait time that affects the level of service. These factors were estimated based on available information and the impact (whether positive or negative) they had on the utility of the modes. Two separate utility matrices were created corresponding to auto and rail that were then applied to the OD trip table generated from the trip distribution procedure to estimate the mode shares.

Trip assignment was the final stage in the development of travel demand model for ridership estimates. The inputs required in performing a trip assignment were a route system of the proposed rail line defining the stops (station locations), railroad network, and the passenger origin-destination matrix with zone-to-zone demand. It should be noted that because the study concentrated on estimating the ridership projections, only the share of person trips pertaining to the railroad was used for the assignment and not the trips made by autos. The route system with the designated stops was constructed using the underlying railroad network layer in TransCAD. The passenger OD demand matrix, as obtained from establishing the mode-split model was assigned to the route system (rail network) to determine the ridership projections.

APPENDIX 2

1990 CTPP Journey to Work Data		
Mode	Total Commuters	Share
Drove Alone	34863	73.60%
2-Person Carpool	4293	9.06%
3-Person Carpool	600	1.27%
4-Person Carpool	179	0.38%
5-Person Carpool	59	0.12%
6-Person Carpool	53	0.11%
7 to 9 Person Carpool	29	0.06%
10+ Person Carpool	51	0.11%
Bus or Trolley Bus	641	1.35%
Streetcar or Trolley Car	16	0.03%
Subway or Elevated	22	0.05%
Railroad	16	0.03%
Ferryboat	0	0.00%
Taxicab	33	0.07%
Motorcycle	89	0.19%
Bike	216	0.46%
Walked	3083	6.51%
Other	321	0.68%
Worked at Home	2804	5.92%
Grand Total	47368	100.00%

Highlighted text indicates transit

APPENDIX 3

Boarding and Alighting Counts of Potential Commuters

Segment	Daily Counts							
Newport - Fall River	**2005**		**2010**		**2015**		**2020**	
Station Location	**On**	**Off**	**On**	**Off**	**On**	**Off**	**On**	**Off**
Newport Gateway	40	0	41	0	43	0	44	0
Ranger Road, Newport	4	38	6	38	7	38	8	39
Stringham Ln., Melville Marina	1	5	1	7	1	9	1	10
Bristol Ferry Road, Mt Hope	2	2	2	2	2	3	2	3
Starwood, Tiverton	5	1	3	2	4	2	4	2
Fall River Downtown	0	6	0	4	0	5	0	5
Total	**52**	**52**	**54**	**54**	**56**	**56**	**59**	**59**
Fall River - Newport	**2005**		**2010**		**2015**		**2020**	
Station Location	**On**	**Off**	**On**	**Off**	**On**	**Off**	**On**	**Off**
Fall River Downtown	5	0	4	0	4	0	4	0
Starwood, Tiverton	1	4	1	3	1	3	1	3
Bristol Ferry Road, Mt Hope	1	1	1	1	2	1	2	1
Stringham Ln., Melville Marina	5	1	7	1	9	1	10	1
Ranger Road, Newport	37	4	37	6	38	6	38	7
Newport Gateway	0	39	0	40	0	42	0	43
Total	**49**	**49**	**50**	**50**	**53**	**53**	**55**	**55**

KKO

KKO and Associates, LLC
Transportation Systems Analysis
Management Consulting

Memorandum

RECEIVED
APR 22 2002
THE LOUIS BERGER GROUP
NEEDHAM

DATE: April 18, 2002

TO: Adel Foz, Louis Berger

FROM: Geoff Slater D Helsin for GPS

SUBJECT: Aquidneck Island Rail Feasibility Study
Proposed Adjustments to Resident On-Island Forecasts

DISTRIBUTION: *Charlie Crevo, Louis Berger*
David Nelson, Yawa Duse-Anthony, KKO

This memorandum proposes adjustments to Louis Berger's resident on-island ridership forecasts (termed "commuter rail" in Louis Berger's untitled ridership estimate report) to (1) provide estimates for the on-island shuttle alternatives, and (2) include non-work trips. We need confirmation on these adjustments in order to produce the revenue estimates.

Interpretation of Original Louis Berger Estimates

To begin, some of the results in the Louis Berger report are unclear. I interpreted the resident on-island forecasts as follows, and this interpretation needs to be confirmed (I also sent an email to Charlie Crevo yesterday asking for clarification):

> *The text on page 4 states that ridership would be "88 one-way riders in 2020." However, the associated Table 1.3 and Figure 1.3 indicate that the 88 trips are northbound trips ("Newport – Fall River"), and that there would also be 76 southbound trips ("Fall River – Newport"). Furthermore, although the northbound and southbound number do not match exactly, the figures in Table 1.3 indicate that the southbound trips are the reverse of the northbound trips. On this basis, I used the total of these two figures–146–as the projected 2020 ridership for the Fall River Shuttle alternative.*

Proposed Adjustments to Louis Berger On-Island Work Trip Estimates

To develop revenue estimates, we need ridership estimates for both the Fall River Shuttle and the On-Island Shuttle alternatives. Also, the Louis Berger resident forecasts are only for work trips. There would also be some non-work local resident ridership, and we propose to use a factor to include these non work local resident trips. The results of these adjustments are shown in Table 1 and described below.

CW 12/12 Leyes, Foz

Table 1
Local Resident Ridership Forecasts After Adjustments

	Fall River Shuttle	On-Island Shuttles
Work Trips	164	139
Non-Work Trips	25	23
Total	189	162

Estimates for On-Island Shuttles The Louis Berger estimates project that there would be 14 northbound trips and 11 southbound trips between Mount Hope/Anthony Road Station and Fall River. Therefore, to estimate ridership for the on-island shuttles, we would simply subtract these 25 riders from the Fall River Shuttle estimate of 164 work trip riders, for a total of 139 resident work trips.

Non-Work Trip Estimates For the resident to Boston forecasts, we assumed that non-work trip ridership would be proportionally similar to non-work trip ridership from other stations on the MBTA commuter rail network beyond I-495 in Massachusetts, or approximately 13.1% of total ridership. We propose to use this same factor for the local resident trips, and on this basis, there would be 25 non-work trips per day on the Fall River Shuttle, and 23 per day on the on-island shuttles.

Memorandum

DATE: April 4, 2002

TO: Adel Foz, The Louis Berger Group

FROM: Geoff Slater

SUBJECT: Aquidneck Island Rail Feasibility Study
Projections of Aquidneck Rail Ridership for Trips to and from the Boston Area

DISTRIBUTION: *David Nelson, KKO*
Yawa Duse-Anthony

This memorandum presents estimates of the number of riders who would use the Aquidneck rail Fall River commuter shuttle service to connect to the MBTA's planned New Bedford-Fall River Line for trips to and from the Boston area. Note that these estimates only apply to the Fall River commuter shuttle option. Other options that would not connect to MBTA service in Fall River would carry only negligible number of Boston-bound riders. The memorandum also describes the methodology used to develop the estimates.

SUMMARY OF RESULTS

In total, in 2020, the Aquidneck Fall River commuter shuttle would carry approximately 154 trips per weekday to and from Fall River for connecting trips to and from Boston via the MBTA's planned Boston – Fall River Line, or 68 in each direction. Of these trips, 87%, or 133, would be work trips, and the remainder would be for other purposes.

METHODOLOGY

Forecasts of ridership to and from the Boston area were estimated using quick-response travel estimation techniques described in National Cooperative Highway Research Program (HCHRP) reports 187 and 365.[1] The overall method is a simplified version of traditional four-step transportation modeling, and produces estimates of the percentage of trips that would be made by

[1] NCHRP Report 187, "Quick-Response Urban Travel Estimation Techniques and Transferable Parameters, Transportation Research Board, 1978, and NCHRP Report 365, "Travel Estimation Techniques for Urban Planning, Transportation Research Board, 1998.

transit. These percentages are then applied to estimates of the total trip market to produce forecasts of the number of riders that would use the service.

The overwhelming majority of trips made by rail to Boston from distant locations are work trips—according to the MBTA's 1993 Commuter Rail Survey, 87% of all trips from beyond I-495 are work trips. For this reason, the major focus of these estimates was on work trips, with factors then applied to account for work trips to location other than Boston and for non-work trips.

Work Trip Market

For trips to the Boston area, considering the options available, Aquidneck rail would be an attractive transit option for residents of Newport, Middletown, Portsmouth, Tiverton, Bristol, and Jamestown. Residents from other nearby towns, for example Warren, would not likely be attracted to Aquidneck rail for Boston trips since their drive times to Fall River would be significantly shorter than the combined drive, rail, and transfer times to use Aquidneck rail to Fall River.

As described above, consistent with regional commuting patters to Boston from farther flung areas, most trips made to and from Boston on via Aquidneck rail would be work trips. Not surprisingly, since the towns that would be served by Aquidneck rail are relatively far from Boston (up to 75 miles), the size of the market for work trips to Boston from the Aquidneck rail market area is relatively small, and will likely stay small. In 1990, only 172 work trips (round trips) were made to and from Boston per weekday (see Table 1). Between 1990 and 2020, the total number of work trips made by residents of the Aquidneck Island and Tiverton is expected to increase by 23.4%.[2] Specific estimates of the projected number of trips to Boston in 2020 are not available, but using the 23.4% overall projected for Boston trips, the total market for Boston trips will increase to only 203 round trips in 2020.

These work trips to Boston will account for most of the transit market. Based on the MBTA's 1993 commuter rail survey, 71.2% of commuter rail trips from beyond I-495 were to the city of Boston, and 28.8% were to other locations, primarily Cambridge and intermediate stops. To develop these quick response Aquidneck estimates, specific estimates were developed for trips to and from Boston, with a factor of 1.40 subsequently applied to account for work trips made to other locations. This factor of 1.40 assumes that, as from other locations, 28.8% of Aquidneck work trips would be to locations outside of Boston (100% / 71.2% = 1.40).

[2] Increase based on 1990 Census Journey-to-Work data and 2020 projections from the RI State Model.

Table 1
Area Population and Work Trips to Boston (All Modes)

	New-port	Middle-town	Ports-mouth	Tiverton	Bristol	James-town	Total
Population							
1990	28,227	19,460	16,875	14,312	21,625	4,999	107,488
2000	26,475	17,334	19,474	15,260	22,469	5,622	108,634
2010	28,068	22,185	18,531	14,787			
2020	28,007	24,246	19,897	15,134			
% Change	-0.8%	24.6%	17.9%	5.7%			
Total Work Trips							
1990	28,754	17,126	16,778	13,952			
2005	32,988	14,253	18,454	11,912			
2020	36,257	16,058	26,382	16,304			
% Change	26.1%	-6.2%	57.2%	16.9%			
Work Trips to Boston							
1990 JTW	47	43	13	26	43	0	172
2020 JTW	59	40	20	30	53	0	203
% Change	26.1%	-6.2%	57.2%	16.9%	23.4%	NA	18.3%

Aquidneck Rail Share of Work Trip Market

Estimates of the share of work trips that would be made by transit were developed using a multinomial logit model which splits travel between modes on the basis of differences in travel times and out-of-pocket costs. The logit model used for these forecasts was in the form of:

$$ms_t = \frac{1}{1+\left[\frac{I_t}{I_a}\right]^b}$$

where:
ms_t = transit share
I_t = the transit impedance
I_a = the auto impedance
b = model coefficient equal to 2.0 for HBW trips (from HCRP Report 365)

The impedances used in this formula represent the total time equivalent of using transit or driving, with time values applied to in-vehicle times, out-of-vehicle times, and out-of-pocket costs.

Transit Trip Impedances

Transit impedance is a measure of the equivalent time value of the transit trip, with out-of-pocket costs translated into an equivalent time value. The transit impendence includes the equivalent time value of the entire trip, including drive times and costs from home, the Aquidneck rail trip, the transfer to the Fall River Line at Fall River, the rail trip to Boston, and the time from the rail station in Boston to the final destination.

As recommended in HCRP Report 365:

- Out-of-vehicle travel times were set to be the equivalent of two times in-vehicle travel times (since wait times are viewed as more onerous than in-vehicle travel times).
- Time equivalents of costs were based on a value of time at one-third of average household income. For example, a person making $15 per hour would view the value of their own time at $5 per hour, or put in reverse, $1 of cost would equal 12 minutes of time. For these Aquidneck forecasts, average household incomes were based on US Census Bureau 1997 county level estimates.

Specific time and cost values were calculated as described below and shown in Table 2:

- **Drive time from home to Aquidneck rail station** was estimated at 5 minutes for all communities except Jamestown, which was estimated at 7 minutes (to Ranger Road).

- **The wait time at all Aquidneck stations** was estimated at 7.5 minutes. This wait time assumes that rail users will time their departures from home to minimize wait times and allow for a small time allowance.

- **Train travel times to Fall River** were based on the operating plans developed as part of this study for service to and from Fall River. Times for each station to Fall River are as shown below. For communities with more than one station, the average travel time was used.

Station	Travel Time
Newport	31
Ranger Road	28
Melville	21
Mt Hope	17
Anthony Road	12
Tiverton	10

- **The transfer time from the Aquidneck Line to the Fall River Line** was set at 5 minutes. This figure represents a "best case" scenario, but a transfer time that could be achieved for peak period, peak direction trips (see Table 3).

Table 2

Ridership Estimates: Trips to and from Boston

Town County	Newport Newport	Middletown Newport	Portsmouth Newport	Tiverton Newport	Bristol Bristol	Jamestown Newport	Total
WORK TRIPS TO/FROM BOSTON							
Automobile Impedances							
Automobile In-Vehicle Travel Time: Freeflow (1)							
Origin Town to Fall River	27	17	11	6	14	30	
Fall River to Boston	59	59	59	59	59	59	
Total	86	76	70	65	73	89	
Automobile In-Vehicle Travel Time: Congested (2)	107	97	91	86	94	110	
Miles	71	67	63	60	65	75	
Automobile Out-Of-Vehicle Time (3)	6	6	6	6	6	6	
Auto Out-of-Pocket Cost							
Gasoline	$4.14	$3.91	$3.68	$3.50	$3.79	$4.38	
Parking	$3.88	$3.88	$3.88	$3.88	$3.88	$3.88	
Total	$8.02	$7.78	$7.55	$7.38	$7.67	$8.25	
Annual Household Income (4)	$43,684	$43,684	$43,684	$43,684	$47,141	$43,684	
Value of Time (per Hour)	$6.55	$6.55	$6.55	$6.55	$7.07	$6.55	
Auto Out-of-Pocket Cost in Minutes	73	71	69	68	65	76	
Impedence	192.4	180.3	172.1	165.5	171.1	197.5	
Transit Impedances							
Drive Time to Train Station	5	5	5	5	5	7	
Miles to Train Station	3	3	3	3	3	5	
Wait Time at Station	7.5	7.5	7.5	7.5	7.5	7.5	
Train Travel Time to Fall River	29.5	21.0	19.0	10.0	17.0	28.0	
Transfer Time	5	5	5	5	5	5	
Train Travel Time: Fall River to Boston	80	80	80	80	80	80	
Travel Time to Destination							
Walk Trips (67%) (5)	15	15	15	15	15	15	
Transit Trips (33%)							
Wait Time	2	2	2	2	2	2	
Walk Time	6	6	6	6	6	6	
In-Vehicle Time	7	7	7	7	7	7	
Out-of-Pocket Costs							
Auto cost	$0.18	$0.18	$0.18	$0.18	$0.18	$0.29	
Fare							
Aquidneck	$1.25	$1.25	$1.25	$1.25	$1.25	$1.25	
MBTA to Boston	$4.23	$4.23	$4.23	$4.23	$4.23	$4.23	
Subtotal	$5.48	$5.48	$5.48	$5.48	$5.48	$5.48	
Total	$5.65	$5.65	$5.65	$5.65	$5.65	$5.77	
Annual Household Income (1)	$43,684	$43,684	$43,684	$43,684	$47,141	$43,684	
Value of Time (per Hour)	$6.55	$6.55	$6.55	$6.55	$7.07	$6.55	
Travel Cost in Minutes	52	52	52	52	48	53	
Total In-vehicle Travel Time	119	111	109	100	107	120	
Total Out-of-Vehicle Travel Time	25	25	25	25	25	25	
Impedence	221.3	212.8	210.8	201.8	205.0	222.9	

Table 2

Ridership Estimates: Trips to and from Boston

Town County	Newport Newport	Middletown Newport	Portsmouth Newport	Tiverton Newport	Bristol Bristol	Jamestown Newport	Total
Transit Mode Share	27.3%	23.8%	19.5%	20.0%	22.0%	30.1%	
To/from Boston							
2020 JTW Market (Round Trips)	59	40	20	30	53	0	203
2020 JTW Aquidneck Rail Trips (Round Trips)	16	10	4	6	12	0	48
2020 JTW Aquidneck Rail Trips (One-Way Trips)	32	19	8	12	23	0	95
Trips to/from Other Boston Area Locations							
Percent of Trips to City of Boston	71.2%	71.2%	71.2%	71.2%	71.2%	71.2%	
2020 Trips to Other Boston Area Locations	13	8	3	5	9	0	38
Total Work Trips	**45**	**27**	**11**	**17**	**33**	**0**	**133**
NON-WORK TRIPS TO/FROM BOSTON							
Work Trips as Percent of Total Rail Trips	86.9%	86.9%	86.9%	86.9%	86.9%	86.9%	
2020 Non-Work Aquidneck Trips	**7**	**4**	**2**	**3**	**5**	**0**	**20**
TOTAL 2020 TRIPS TO/FROM BOSTON AREA	**52**	**31**	**13**	**20**	**38**	**0**	**154**

Input Variables

Value of Time as Percent of Medium Income	30%	(NCHRP Report 365)
OVTT vs IVTT	2.0	(NCHRP Report 365)
Gasoline (per gallon)	$1.40	(Assumed)
Miles per Gallon	24	(EPA average fuel economy figures for 2002)
Average Daily Parking Cost	$7.75	(Estimated based on 1997 CTPS Survey of average cost per day of $15.50, and that 50% park for free)
Work Trips as Percent of Total Rail Trips	86.9%	(From 1993 MBTA Commuter Rail Survey for stations outside of I-495)
Percent of Trips to City of Boston	71.2%	(From 1993 MBTA Commuter Rail Survey for stations outside of I-495)

Notes:

1. Freeflow auto travel times are from town center to town center as calculated by Street Atlas USA.
2. Congested auto time based on 39 mph from Fall River to Boston, with 39 mph value from CTPS New Bedford-Fall River Extension work.
3. Out-of-Vehicle times assume 1 minute at home end and 5 minutes at work end
4. Household incomes are 1997 estimates from US Census Bureau.
5. Percent breakdown between walk and transit egress from 1993 MBTA commuter rail survey, rounded.

Table 3
Preliminary Service Structure for Fall River Commuter Shuttle

Northbound			
MBTA Train Number	**Newport Train arrives in Fall River**	**MBTA Departs for Boston**	**Connection Time (minutes)**
9902	6:08AM	6:14AM	5
9904	6:44AM	6:49AM	5
9906	7:33AM	7:38AM	5
9908	10:35AM	10:41AM	6
9910	*(1:40PM)*	1:52PM	12
9912	3:45PM	3:50PM	5
9914	*(6:17PM)*	6:34PM	17
9916	10:13PM	10:22PM	9
Southbound			
MBTA Train Number	**MBTA Arrives from Boston**	**Newport Train Departs from Fall River**	**Connection Time (minutes)**
9901	10:00AM	10:06AM	6
9903	12:56PM	*(1:09PM)*	13
9905	3:20PM	3:25PM	5
9907	5:22PM	5:27PM	5
9909	6:22PM	6:27PM	5
9911	7:05PM	7:10PM	5
9913	9:14PM	9:20PM	6
9915	12:01AM	12:06AM	5

- **The rail travel time from Fall River to Boston** was set at 80 minutes. This time is based on preliminary schedules developed as part of the MBTA's New Bedford-Fall River commuter rail project (see Attachment 1).

- **Travel time from Boston rail station (Back Bay or South Station) to destination**: This time was assumed to be 15 minutes, with two-thirds of riders walking to their final destination and one-third using rapid transit. This split between walk and rapid transit trips is a rounded figure from the MBTA's 1993 Commuter Rail Survey. For those who took rapid transit, it was assumed that the 15 minutes consisted of 2 minutes of wait time, 6 minutes of walk time, and 7 minutes of in-vehicle travel time.

- **Auto out-of-pocket costs**: These costs were based on the cost of gasoline for the auto trip from home to the Aquidneck rail station, with distances estimated at 3 miles for all communities except Jamestown, which was estimated at 5 miles. The cost was computed using a cost per gallon of $1.50, and average fuel consumption of 24 mpg, which is the EPA's average fuel economy figure for 2002.

- **Transit fares** were estimated at $1.25 for the Aquidneck rail trip, and $4.23 for the Fall River Rail trip, which is based on the MBTA's planned monthly pass price for Fall River service, translated into a per trip cost based on 40 one-way trips per month.

Automobile Trip Impedances

Automobile impedance is a measure of the equivalent time value of automobile trips. In the same manner as for transit trips, out-of-pocket costs are translated into an equivalent time value, and the transit impendence includes the equivalent time value of the entire trip. In-vehicle and out-of-vehicle times, and costs, are also treated in the same manner as for transit impediences.

- **Automobile in-vehicle times** are based on freeflow travel times from the origin town to Fall River and congested travel times from there to Boston. The freeflow times were estimated using StreetAtlas USA. The congested travel time of 59 minutes from Fall River to Boston were provided by Boston's Central Transportation Planning Staff, and is the same time used for the demand projections prepared for the MBTA's New Bedford – Fall River Commuter Rail project.
- **Automobile out-of-vehicle times** were estimated at 6 minutes, which primarily represent the walk time from the parking location in Boston to the final destination.
- **Automobile out-of-pocket costs** consisted of costs for parking and gasoline. As for the transit impedances, gasoline costs were estimated based on gasoline costs at $1.50 per gallon, and average fuel economy of 24 miles per gallon. Distances were as calculated by StreetAtlas USA.

Estimated Rail Shares and Work Trip Ridership

Using the logit model and the impedances calculated as described above, Aquidneck rail service would capture 19% to 28% of the work trips made to Boston (see Table 2), or 95 one way trips per weekday. Factoring in that riders will also make work trip to other location, and that these riders will account for approximately 28.8% of work trips, then total work trip ridership would be approximately 133 one-way trips per weekday.

<u>Non-Work Trip Ridership</u>

For the purposes of these estimates, it was assumed that non-work trip ridership would be proportionally similar to non-work trip ridership from other stations on the MBTA commuter rail network beyond I-495 in Massachusetts, or approximately 13.1% of total ridership. On this basis, non-work trip ridership would be 19 one-way trips per weekday (see Table 2).

TOTAL RIDERSHIP

Total estimated ridership via Aquidneck rail to and from Boston would be 154 one-way trips per weekday in 2020, or which 133 trips would be work trips and 19 trips would be non-work trips.

Stoughton Alternative: Preliminary Schedule

New Bedford/Fall River Operating Plan *(Stoughton Alternative)*

	Yard	Yard	Yard	Yard	Yard	Yard	9001	9901	9003	903	9903	9005	9905	905	9007	9909	9011	9913	
INBOUND	**9002**	**9902**	**9004**	**9904**	**9006**	**9906**	**9008**	**9908**	**9010**	**910**	**9910**	**9012**	**9912**	**912**	**9014**	**9914**	**9016**	**9916**	
	New Bedford	Fall River	New Bedford	Fall River	New Bedford	Fall River	New Bedford	Fall River	New Bedford		Fall River	New Bedford	Fall River		New Bedford	Fall River	New Bedford	Fall River	
Fall River		6:14 AM		6:49 AM		7:38 AM		10:41 AM			1:52 PM		3:50 PM			6:34 PM		10:22 PM	**Fall River**
Freetown		6:22 AM		6:57 AM		7:46 AM		10:49 AM			2:00 PM		3:58 PM			6:42 PM		10:30 PM	**Freetown**
New Bedford	5:34 AM		6:25 AM		7:10 AM		9:45 AM		12:28 PM			2:43 PM			6:15 PM		9:12 PM		**New Bedford**
East Taunton	5:54 AM	6:35 AM	6:46 AM	7:10 AM	7:31 AM	7:59 AM	10:04 AM	10:59 AM	12:47 PM		2:10 PM	3:02 PM	4:08 PM		6:34 PM	6:52 PM	9:31 PM	10:40 PM	**East Taunton**
Dean Street	5:59 AM		6:51 AM		7:36 AM		10:09 AM	11:04 AM	12:52 PM	1:46 PM	2:15 PM	3:07 PM	4:13 PM	4:38 PM	6:39 PM	6:57 PM	9:36 PM	10:45 PM	**Dean Street**
Raynham	6:07 AM		6:59 AM		7:44 AM		10:17 AM	11:11 AM	1:00 PM	1:53 PM	2:23 PM	3:15 PM	4:21 PM	4:46 PM	6:49 PM	7:05 PM	9:44 PM	10:53 PM	**Raynham**
Easton	6:19 AM	6:51 AM	7:11 AM	7:26 AM	7:56 AM	8:15 AM	10:31 AM	11:21 AM	1:09 PM	2:07 PM	2:32 PM	3:24 PM	4:30 PM	5:00 PM	7:00 PM	7:14 PM	9:53 PM	11:02 PM	**Easton**
Stoughton	6:23 AM	6:55 AM		7:30 AM		8:19 AM	10:36 AM	11:25 AM	1:13 PM	2:11 PM	2:37 PM	3:28 PM	4:35 PM	5:05 PM	7:05 PM	7:19 PM	9:57 PM	11:07 PM	**Stoughton**
Canton Center	6:32 AM	7:04 AM		7:39 AM		8:28 AM	10:45 AM	11:34 AM	1:22 PM	2:20 PM	2:46 PM	3:37 PM	4:43 PM	5:09 PM	7:13 PM	7:28 PM	10:06 PM	11:16 PM	**Canton Center**
Canton Junction	6:36 AM	7:08 AM	7:23 AM	7:43 AM	8:08 AM	8:32 AM	10:49 AM	11:38 AM	1:26 PM	2:24 PM	2:49 PM	3:41 PM	4:47 PM	5:18 PM	7:17 PM	7:31 PM	10:10 PM	11:19 PM	**Canton Junction**
Route 128		7:13 AM		7:48 AM		8:37 AM	10:54 AM	11:43 AM	1:31 PM	2:29 PM	2:54 PM	3:46 PM	4:52 PM	5:23 PM	7:22 PM	7:36 PM	10:15 PM	11:24 PM	**Route 128**
Hyde Park	6:45 AM	7:18 AM	7:32 AM	7:53 AM	8:17 AM	8:42 AM	10:59 AM			2:34 PM	2:59 PM	3:50 PM	4:57 PM	5:28 PM	7:26 PM	7:41 PM			**Hyde Park**
Ruggles					8:27 AM		11:09 AM												**Ruggles**
Back Bay	6:55 AM	7:28 AM	7:42 AM	8:03 AM	8:31 AM	8:52 AM	11:13 AM	11:53 AM	1:41 PM	2:44 PM	3:09 PM	4:00 PM	5:07 PM	5:38 PM	7:35 PM	7:51 PM	10:25 PM	11:34 PM	**Back Bay**
South Station	7:00 AM	7:33 AM	7:47 AM	8:08 AM	8:36 AM	8:57 AM	11:18 AM	11:58 AM	1:46 PM	2:49 PM	3:14 PM	4:05 PM	5:12 PM	5:43 PM	7:40 PM	7:56 PM	10:30 PM	11:39 PM	**South Station**
Turns to	*DH*	*9001*	*DH*	*9901*	*DH*	*9003*	*9903*	*9905*	*9005*	*905*	*9907*	*9007*	*9911*	*9011*	*9913*	*9013*	*9915*	*9015*	*Turns to*
South Station Layover		*0:11*		*0:36*		*1:01*	*0:16*	*1:02*	*0:12*	*0:36*	*0:48*	*0:38*	*0:33*	*0:14*	*0:10*	*0:28*	*0:10*	*0:17*	

Turns from	*9902*	*9904*	*9906*	*9008*	*DH*	*9908*	*9010*	*910*	*9910*	*9012*	*DH*	*DH*	*9912*	*912*	*9014*	*9914*	*9016*	*9916*	*Turns from*
OUTBOUND	**9001**	**9901**	**9003**	**9903**	**903**	**9005**	**9905**	**905**	**9907**	**9007**	**9909**	**9009**	**9911**	**9011**	**9913**	**9013**	**9915**	**9015**	
	New Bedford	Fall River	New Bedford	Fall River		New Bedford	Fall River		Fall River	New Bedford	Fall River	New Bedford	Fall River	New Bedford	Fall River	New Bedford	Fall River	New Bedford	
South Station	7:44 AM	8:44 AM	9:58 AM	11:34 AM	12:31 PM	1:00 PM	1:58 PM	3:25 PM	4:02 PM	4:43 PM	5:03 PM	5:20 PM	5:45 PM	5:57 PM	7:50 PM	8:24 PM	10:40 PM	11:56 PM	**South Station**
Back Bay	7:49 AM	8:49 AM	10:03 AM	11:39 AM	12:36 PM	1:05 PM	2:03 PM	3:30 PM	4:07 PM	4:48 PM	5:08 PM	5:25 PM	5:50 PM	6:02 PM	7:55 PM	8:29 PM	10:45 PM	12:01 AM	**Back Bay**
Ruggles				11:42 AM	12:39 PM	1:08 PM	2:06 PM	3:33 PM	4:10 PM	4:51 PM	5:11 PM	5:28 PM	5:53 PM	6:05 PM	7:58 PM	8:32 PM	10:48 PM	12:04 AM	**Ruggles**
Hyde Park			10:12 AM	11:50 AM		1:16 PM	2:14 PM	3:41 PM			5:19 PM	5:36 PM			8:06 PM	8:40 PM		12:12 AM	**Hyde Park**
Route 128	8:00 AM	9:00 AM	10:18 AM	11:56 AM	12:50 PM	1:22 PM	2:20 PM	3:47 PM		5:05 PM		5:42 PM		6:19 PM	8:12 PM	8:46 PM	10:59 PM	12:18 AM	**Route 128**
Canton Junction	8:06 AM	9:06 AM	10:24 AM	12:02 PM	12:56 PM	1:28 PM	2:26 PM	3:53 PM	4:26 PM	5:11 PM	5:29 PM	5:48 PM	6:09 PM	6:25 PM	8:18 PM	8:52 PM	11:05 PM	12:24 AM	**Canton Junction**
Canton Center	8:09 AM	9:09 AM	10:27 AM	12:05 PM	12:59 PM	1:31 PM	2:29 PM	3:56 PM		5:14 PM		5:51 PM		6:28 PM	8:21 PM	8:55 PM	11:08 PM	12:27 AM	**Canton Center**
Stoughton	8:17 AM	9:17 AM	10:35 AM	12:13 PM	1:07 PM	1:39 PM	2:37 PM	4:04 PM		5:22 PM		5:59 PM		6:36 PM	8:29 PM	9:03 PM	11:16 PM	12:35 AM	**Stoughton**
Easton	8:22 AM	9:22 AM	10:40 AM	12:18 PM	1:12 PM	1:44 PM	2:42 PM	4:09 PM	4:42 PM	5:27 PM	5:42 PM	6:04 PM	6:25 PM	6:41 PM	8:34 PM	9:08 PM	11:21 PM	12:40 AM	**Easton**
Raynham	8:31 AM	9:31 AM	10:49 AM	12:27 PM	1:21 PM	1:53 PM	2:51 PM	4:18 PM	4:51 PM		5:51 PM		6:34 PM		8:43 PM	9:17 PM	11:30 PM	12:49 AM	**Raynham**
Dean Street	8:39 AM	9:39 AM	10:57 AM	12:35 PM	1:29 PM	2:01 PM	2:59 PM	4:26 PM	4:59 PM		5:59 PM		6:42 PM		8:51 PM	9:25 PM	11:38 PM	12:57 AM	**Dean Street**
East Taunton	8:43 AM	9:43 AM	11:01 AM	12:39 PM		2:05 PM	3:03 PM		5:04 PM		6:04 PM	6:21 PM	6:47 PM	6:58 PM	8:56 PM	9:29 PM	11:43 PM	1:01 AM	**East Taunton**
New Bedford	9:03 AM		11:21 AM			2:25 PM				6:00 PM		6:43 PM		7:20 PM		9:49 PM		1:21 AM	**New Bedford**
Freetown		9:53 AM		12:49 PM			3:13 PM		5:15 PM		6:15 PM		6:58 PM		9:07 PM		11:54 PM		**Freetown**
Fall River		10:00 AM		12:56 PM			3:20 PM		5:22 PM		6:22 PM		7:05 PM		9:14 PM		12:01 AM		**Fall River**
Turns to	*9008*	*9908*	*9010*	*9910*	*910*	*9012*	*9912*	*912*	*DH*	*9014*	*9914*	*DH*	*DH*	*9016*	*9916*	*DH*	*DH*	*DH*	
Layover at outlying terminal	*0:42*	*0:41*	*1:07*	*0:56*	*0:17*	*0:18*	*0:30*	*0:12*		*0:15*	*0:12*			*1:52*	*1:08*				

KKO

KKO and Associates, LLC
Transportation Systems Analysis
Management Consulting

Memorandum

DATE: April 17, 2001

TO: Adel Foz cc Leger

FROM: David Nelson and Gerry Pieri DHelson

SUBJECT: **Aquidneck Island Passenger Rail/Bicycle Path Project**
Shuttle service fares integrated with RIPTA services

DISTRIBUTION: *Yawa Duse-Anthony*

KKO examined existing RIPTA fare structures and potential shuttle train fares. Our recommendations are summarized below and discussed in the attached appendix:

1. **"One Rate – Ocean State"** – The base fare for the 9-mile rail service should be consistent with other Rhode Island transit services. Offer tickets on the train for $1.25 one-way and consider selling a $0.25 transfer with a bus or rail ticket. Parking at the outlying park and ride lots should be free to railroad passengers.

2. **Super Newport Pass** – Market a one-day "Super Newport Pass" priced at $6 to $6.50 per person, $12 to $13 for families.

   - Honor the "Super Newport" pass on the train and on the four local bus routes in Newport.
   - Include parking at stations at the north end of the island in the "Super Newport" pass.
   - Do not honor the "Super Newport" pass for reduced rate parking in Newport.
   - Do not honor the regular Newport pass on the train.
   - Consider bundling the "Super Newport" pass with the same merchant promotions available with the Providence Newport Ferry Ticket.

3. **Monthly Commuter Pass** – Honor the RIPTA monthly commuter pass ($35) on the rail shuttle, to encourage commuter use of the shuttle.

4. **Bundled Parking** – The price of parking at Willow Lane, Melville, and Coddington Cove should be bundled with the rail fare for economy of administration and consistency with other transit park and ride operations in Rhode Island.

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5. **Proof of Payment** - Employ a proof-of-purchase system on the train rather than a more traditional fare collection system.

The proof-of-purchase system may be the key to efficient fare collection on the rail shuttle. Such systems are widely used in Europe and have been introduced successively on a number of newer properties in the United States.

For the Newport application, the proof-of-purchase system could have four elements:

1. Emphasis on selling passes and tickets by vending machines prior to boarding the train.

2. Machine "validation" of tickets (time and date stamping) prior to or immediately upon boarding the train.

3. Random spot checking of passes (or properly validated tickets) on board the train.

4. Assessment of a "super fare" (probably 20 times the one-way fare -- $25.00) for riders who fail to produce proper proof-of-purchase during a spot check.

Reported compliance to such a system is usually high. However, an even greater advantage to the Newport application is the minimization of fare collection and transportation crew costs, especially if DMU equipment is used.

With proof-of-purchase, one-person operation of a DMU train[1] is possible. There is no need for a conductor or fare collector. A single conductor on a push-pull train could spot-check proof-of-purchase as time allows without concern that every rider be checked on every train.

[1] Assuming automatic door operation and no stairwell traps.

APPENDIX

This analysis is based on the following assumptions:

1. The principal target ridership falls into two types of day-trip visitors to Newport who drive onto the island from the north:

   - Those who want to obtain a RIPTA pass for travel within the city.

   - Those who only want to travel to/from downtown Newport and do not want to take RIPTA to other points in the city.

2. The service will be publicized to the extent that there will be some public perception that the shuttle is fun and that, assuming all other factors are equal, the service should be taken because it is fun.

3. The principal goal of the fare structure is to maximize the number of automobiles that are diverted to the rail service in the northern portion of the island rather than driving south into the city.

Given the above, several fare structures were considered.

1. **Free Service** – Service may be free during an introductory period, but a permanently free service may be unwise. Research from other properties generally indicates that the gains in ridership from a free service are not very great and questions of equity would arise with respect to other Rhode Island transit services. A free service could also result in many visitors who have parked downtown taking "joy rides" on the train and taxing its capacity. It may actually be less effective in diverting automobiles from driving into the city because the "fun" benefit of the service can be enjoyed even by those who do not use the service as intended and still drive to Newport.

2. **Standard Commuter Rail Fares** – Standard fares for large urban commuter rail services for trips of approximately ten miles tend to be $0.25 per mile or higher. Newer railroad services for smaller cities tend to be lower. For instance, Vermont's 14-mile Champlain Flyer charges a $1.00 flat fare. A $2.50 one-way fare on the rail shuttle would not be consistent with fares for other RIPTA services and would tend to discourage ridership on the short train trip. A standard commuter rail fare is <u>not</u> recommended for the shuttle service.

3. **"One Rate Ocean State"** – The statewide transit fare policy of a $1.25 flat one-way fare with a $0.25 transfer available appears to be consistent with the objectives of the shuttle service. The relatively low one-way fare with an inexpensive transfer would not stand as

a barrier to ridership growth and would be consistent with surface transit fares for services over the balance of the state. The fare would be perceived to be equitable and would be relatively easy to administer. It is presumed that parking at the park-n-ride lots on the northern portion of the line would be free (e.g. parking would be included in the price of the rail ticket).

To be completely consistent with the "One Rate Ocean State" RIPTA pricing, the one-way ticket could include an option to purchase a bus transfer for $0.25. Inclusion of his option should be evaluated with care. With the ability to purchase a transfer for $0.25, the fare would be extremely attractive, but might undercut the marketability of the "Super Newport" pass. Without the ability to purchase a transfer for $0.25, the $1.25 one-way train fare could still be a attractive price for many travelers in comparison with the cost of parking in Newport. Parking at the Gateway Center (without a RIPTA Newport pass) is $9 per day[2].

4. **The Newport Day Pass** – Currently, there is a special Newport-only tourist day ticket available from RIPTA. The ticket costs $5.00 for individuals and $10.00 for families. It is good for unlimited travel on the four RIPTA local routes serving Newport and is bundled with a reduced $1.00 fare for parking at the Gateway Center. (Without the RIPTA pass the fee at the same site is $9.00 per day.) Given the $1.00 parking provision, including a free rail pass in the standard RIPTA Newport pass might be unwise. Incentive to use the shuttle as an alternative to driving into Newport would be compromised. People could continue to drive to Newport, buy a RIPTA pass, park all day for a dollar, and still "joy ride" on the train.

   With the advent of the rail shuttle, RIPTA may wish to raise the $1.00 parking charge associated with the Newport Day pass or eliminate the associated parking discount altogether. If the Gateway parking discount associated with the Newport Day pass were eliminated, RIPTA could avoid the need for a Super Pass (discussed below). However, it is not clear how such an approach would impact the evaluation of parking and local circulation travel options for visitors from the west reaching Newport via the Pell Bridge.

5. **"Super Newport Pass"** – A new day pass with a rail element should be considered. This pass would be honored on buses just like the standard RIPTA Newport pass. However it would <u>not</u> enable all day parking in Newport for a dollar. It would also be honored on the rail shuttle and it would include free parking at the park-and-ride lots further north on the island.

   The price of the RIPTA "Super Newport" pass could be:

[2] Telephone interview with Tim McCormick of RIPTA April 12, 2001

- Equal to the price of the standard RIPTA Newport pass to provide maximum motivation to use the rail shuttle. ($5.00 for individuals; $10.00 for families.)

- Somewhat more, perhaps $1.00 to $1.50, if it is believed that the "fun" factor will still motivate people to use the service even if it costs more than driving to the city.

The family "Super Newport" pass could be priced at twice the one-person "Super Newport" pass. This would be in keeping with the current RIPTA policy for the Newport pass.

One could increase the value of the "Super Newport" pass by incorporating into it the discount packages that local merchants offer to holders of Newport Ferry tickets.

If a "Super Newport" pass is available, the regular Newport pass should not be valid on the train. Making the regular pass valid on the train would both invite joy riding on the train and make the "Super Newport" pass essentially unmarketable.

6. **Monthly Commuter Pass** - To seek commuters to Newport as a secondary market, a monthly pass, probably priced at $35 (the same as a RIPTA bus monthly commuter pass) could be offered. Or, the existing RIPTA bus monthly commuter pass could be honored on the train.

7. **The Kalfbus Shuttle Ticket** - If a rail shuttle service for automobile travelers using the Pell Bridge is offered from a parking garage just south of Admiral Kalfbus Highway, it might be advisable to bundle the price of the rail shuttle into the parking fee. The parking ticket would also serve as a rail fare instrument. Checking fares on the short rail trip would pose a problem. Fare evasion could be high. It is unlikely that parking would be free, so including the rail fare into the parking fee would create administrative efficiencies for the state and incentives for the visitors to use the rail service.

APPENDIX E
LABOR PROTECTION OBLIGATIONS
Davis Bacon Act & DOL Standards

Appendix E

1. Davis Bacon Act & DOL Standards

The following are the standard federal terms related to Davis Bacon and Hours of Service applicable to FTA projects:

DAVIS-BACON ACT

40 USC &167; 276a -276a-5 (1998)
29 CFR § 5 (1999)

Applicability to Contract
Construction contracts over $2,000.00

Flow Down
Applies to third party contractors and subcontractors

Model Clause/Language
(The language in this clause is mandated under the DOL regulations at 29 C.F.R. § 5.5.)

(1) Minimum wages - (i) All laborers and mechanics employed or working upon the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), will be paid unconditionally and not less often than once a week, and without subsequent deduction or rebate on any account (except such payroll deductions as are permitted by regulations issued by the Secretary of Labor under the Copeland Act (29 CFR part 3)), the full amount of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment computed at rates not less than those contained in the wage determination of the Secretary of Labor which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor and such laborers and mechanics.

Contributions made or costs reasonably anticipated for bona fide fringe benefits under section 1(b)(2) of the Davis-Bacon Act on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of paragraph (1)(iv) of this section; also, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs which

cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in 29 CFR Part 5.5(a)(4). Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein: Provided, That the employer's payroll records accurately set forth the time spent in each classification in which work is performed. The wage determination and the Davis-Bacon poster (WH-1321) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers.

(ii)(A) The contracting officer shall require that any class of laborers or mechanics, including helpers, which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefore only when the following criteria have been met:

(1) Except with respect to helpers as defined as 29 CFR 5.2(n)(4), the work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) With respect to helpers as defined in 29 CFR 5.2(n)(4), such a classification prevails in the area in which the work is performed.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the

Wage and Hour Division, Employment Standards Administration, U.S. Department of Labor, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(ii) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(iii) Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor shall either pay the benefit as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly cash equivalent thereof.

(iv) If the contractor does not make payments to a trustee or other third person, the contractor may consider as part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, Provided, That the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

(v)(A) The contracting officer shall require that any class of laborers or mechanics which is not listed in the wage determination and which is to be employed under the contract shall be classified in conformance with the wage determination. The contracting officer shall approve an additional classification and wage rate and fringe benefits therefor only when the following criteria have been met:

(1) The work to be performed by the classification requested is not performed by a classification in the wage determination; and

(2) The classification is utilized in the area by the construction industry; and

(3) The proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination.

(B) If the contractor and the laborers and mechanics to be employed in the classification (if known), or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, DC 20210. The Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(C) In the event the contractor, the laborers or mechanics to be employed in the classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Administrator for determination. The Administrator, or an authorized representative, will issue a determination with 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

(D) The wage rate (including fringe benefits where appropriate) determined pursuant to paragraphs (a)(1)(v) (B) or (C) of this section, shall be paid to all workers performing work in the classification under this contract from the first day on which work is performed in the classification.

(2) Withholding - The [insert name of grantee] shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld from the contractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements, which is held by the same prime contractor, so much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work (or under the United States Housing Act of 1937 or under the Housing Act of 1949 in the construction or development of the project), all or part of the wages required by the contract, the [insert name of grantee] may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

(3) Payrolls and basic records - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B)

of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

(ii)(A) The contractor shall submit weekly for each week in which any contract work is performed a copy of all payrolls to the [insert name of grantee] for transmission to the Federal Transit Administration. The payrolls submitted shall set out accurately and completely all of the information required to be maintained under 29 CFR part 5. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal Stock Number 029-005-00014-1), U.S. Government Printing Office, Washington, DC 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

(B) Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his or her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) That the payroll for the payroll period contains the information required to be maintained under 29 CFR part 5 and that such information is correct and complete;

(2) That each laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in Regulations, 29 CFR part 3;

(3) That each laborer or mechanic has been paid not less than the applicable wage rates and fringe benefits or cash equivalents for

the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

(C) The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph (a)(3)(ii)(B) of this section.
(D) The falsification of any of the above certifications may subject the contractor or subcontractor to civil or criminal prosecution under section 1001 of title 18 and section 231 of title 31 of the United States Code.

(iii) The contractor or subcontractor shall make the records required under paragraph (a)(3)(i) of this section available for inspection, copying, or transcription by authorized representatives of the Federal Transit Administration or the Department of Labor, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the Federal agency may, after written notice to the contractor, sponsor, applicant, or owner, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available may be grounds for debarment action pursuant to 29 CFR 5.12.

(4) Apprentices and trainees - (i) Apprentices - Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the U.S. Department of Labor, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State Apprenticeship Agency recognized by the Bureau, or if a person is employed in his or her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State Apprenticeship Agency (where appropriate) to be eligible for probationary employment as an apprentice. The allowable ratio of apprentices to journeymen on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any worker listed on a payroll at an apprentice wage rate, who is not registered or

otherwise employed as stated above, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman's hourly rate) specified in the contractor's or subcontractor's registered program shall be observed. Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeymen hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator of the Wage and Hour Division of the U.S. Department of Labor determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination. In the event the Bureau of Apprenticeship and Training, or a State Apprenticeship Agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(ii) Trainees - Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the U.S. Department of Labor, Employment and Training Administration. The ratio of trainees to journeymen on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Every trainee must be paid at not less than the rate specified in the approved program for the trainee's level of progress, expressed as a percentage of the journeyman hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall

be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman wage rate on the wage determination which provides for less than full fringe benefits for apprentices. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. In the event the Employment and Training Administration withdraws approval of a training program, the contractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

(iii) Equal employment opportunity - The utilization of apprentices, trainees and journeymen under this part shall be in conformity with the equal employment opportunity requirements of Executive Order 11246, as amended, and 29 CFR part 30.

(5) Compliance with Copeland Act requirements - The contractor shall comply with the requirements of 29 CFR part 3, which are incorporated by reference in this contract.

(6) Subcontracts - The contractor or subcontractor shall insert in any subcontracts the clauses contained in 29 CFR 5.5(a)(1) through (10) and such other clauses as the Federal Transit Administration may by appropriate instructions require, and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for the compliance by any subcontractor or lower tier subcontractor with all the contract clauses in 29 CFR 5.5.

(7) Contract termination: debarment - A breach of the contract clauses in 29 CFR 5.5 may be grounds for termination of the contract, and for debarment as a contractor and a subcontractor as provided in 29 CFR 5.12.

(8) Compliance with Davis-Bacon and Related Act requirements - All rulings and interpretations of the Davis-Bacon and Related

Acts contained in 29 CFR parts 1, 3, and 5 are herein incorporated by reference in this contract.

(9) Disputes concerning labor standards - Disputes arising out of the labor standards provisions of this contract shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the Department of Labor set forth in 29 CFR parts 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the U.S. Department of Labor, or the employees or their representatives.

(10) Certification of eligibility - (i) By entering into this contract, the contractor certifies that neither it (nor he or she) nor any person or firm who has an interest in the contractor's firm is a person or firm ineligible to be awarded Government contracts by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(ii) No part of this contract shall be subcontracted to any person or firm ineligible for award of a Government contract by virtue of section 3(a) of the Davis-Bacon Act or 29 CFR 5.12(a)(1).

(iii) The penalty for making false statements is prescribed in the U.S. Criminal Code, 18 U.S.C. 1001.

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US DOL
CONTRACT WORK HOURS
AND SAFETY STANDARDS ACT

40 U.S.C. §§ 327 -333 (1999)
29 C.F.R. § 5 (1999)
29 C.F.R. § 1926 (1998)

Applicability to Contracts
Section 102 of the Act, which deals with overtime requirements, applies to:

- all construction contracts in excess of $2,000 and;

- all turnkey, rolling stock and operational contracts (excluding contracts for transportation services) in excess of $2,500.

(The dollar threshold for this requirement is contained in the current regulation 29 C.F.R. § 5.5(a).)

Section 107 of the Act which deals with OSHA requirements applies to construction contracts in excess of $2,000 only. The requirements of this section do not apply to contracts or subcontracts for the purchase of supplies or materials or articles normally available on the open market.

Flow Down
Applies to third party contractors and subcontractors.

Model Clauses/Language
Pursuant to Section 102 (Overtime):

(These clauses are specifically mandated under DOL regulation 29 C.F.R. § 5.5 and when preparing a construction contract in excess of $2,000 these clauses should be used in conjunction with the Davis-Bacon Act clauses as discussed previously. For nonconstruction contracts, this is the only section required along with the payroll section.)

(1) Overtime requirements - No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers or mechanics shall require or permit any such laborer or mechanic in any workweek in which he or she is employed on such work to work in excess of forty hours in such workweek unless such laborer or mechanic receives compensation at a rate not less than one and one-half times the basic rate of pay for all hours worked in excess of forty hours in such workweek.

(2) Violation; liability for unpaid wages; liquidated damages - In the event of any violation of the clause set forth in paragraph (1) of this section the contractor and any subcontractor responsible therefor shall be liable for the unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer or mechanic, including watchmen and guards, employed in violation of the clause set forth in paragraph (1) of this section, in the sum of $ 10 for each calendar day on which such individual was required or permitted to work in excess of the standard workweek of forty hours without payment of the overtime wages required by the clause set forth in paragraph (1) of this section.

(3) Withholding for unpaid wages and liquidated damages - The (write in the name of the grantee or recipient) shall upon its own action or upon written request of an authorized representative of the Department of Labor withhold or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph (2) of this section.

(4) Subcontracts - The contractor or subcontractor shall insert in any subcontracts the clauses set forth in this section and also a clause requiring the subcontractors to include these clauses in any lower tier subcontracts. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with the clauses set forth in this section.

(Section 102 nonconstruction contracts should also have the following provision:)

(5) Payrolls and basic records - (i) Payrolls and basic records relating thereto shall be maintained by the contractor during the course of the work and preserved for a period of three years thereafter for all laborers and mechanics working at the site of the work (or under the United States Housing Act of 1937, or under the Housing Act of 1949, in the construction or development of the project). Such records shall contain the name, address, and social security number of each such worker, his or her correct classification, hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalents thereof of the types described in section 1(b)(2)(B) of the Davis-Bacon Act), daily and weekly number of hours worked, deductions made and actual wages paid. Whenever the Secretary of Labor has found under 29 CFR 5.5(a)(1)(iv) that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in section 1(b)(2)(B) of the Davis-Bacon Act, the contractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible,

and that the plan or program has been communicated in writing to the laborers or mechanics affected, and records which show the costs anticipated or the actual cost incurred in providing such benefits. Contractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprenticeship programs and certification of trainee programs, the registration of the apprentices and trainees, and the ratios and wage rates prescribed in the applicable programs.

****

Section 107 (OSHA):

(This section is applicable to construction contracts only)

Contract Work Hours and Safety Standards Act - (i) The Contractor agrees to comply with section 107 of the Contract Work Hours and Safety Standards Act, 40 U.S.C. section 333, and applicable DOL regulations, " Safety and Health Regulations for Construction " 29 C.F.R. Part 1926. Among other things, the Contractor agrees that it will not require any laborer or mechanic to work in unsanitary, hazardous, or dangerous surroundings or working conditions.

(ii)Subcontracts - The Contractor also agrees to include the requirements of this section in each subcontract. The term "subcontract" under this section is considered to refer to a person who agrees to perform any part of the labor or material requirements of a contract for construction, alteration or repair. A person who undertakes to perform a portion of a contract involving the furnishing of supplies or materials will be considered a "subcontractor" under this section if the work in question involves the performance of construction work and is to be performed: (1) directly on or near the construction site, or (2) by the employer for the specific project on a customized basis. Thus, a supplier of materials which will become an integral part of the construction is a "subcontractor" if the supplier fabricates or assembles the goods or materials in question specifically for the construction project and the work involved may be said to be construction activity. If the goods or materials in question are ordinarily sold to other customers from regular inventory, the supplier is not a "subcontractor." The requirements of this section do not apply to contracts or subcontracts for the purchase of

supplies or materials or articles normally available on the open market.

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2. Excerpt from FTA Master Agreement

Section 24. Employee Protections.

a. Construction Activities. The Recipient agrees to comply, and assures the compliance of each third party contractor at any tier and each subrecipient at any tier, with the following employee protection requirements for construction employees:

(1) Davis-Bacon Act, as amended, 40 U.S.C. §§ 276a - 276a(7), FTA's enabling legislation requiring compliance with the Davis-Bacon Act, at 49 U.S.C. § 5333(a), and U.S. DOL regulations, "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction (also Labor Standards Provisions Applicable to Nonconstruction Contracts Subject to the Contract Work Hours and Safety Standards Act)," 29 C.F.R. Part 5;

(2) Contract Work Hours and Safety Standards Act, as amended, particularly with the requirements of section 102 of the Act, 40 U.S.C. §§ 327 - 332; and U.S. DOL regulations, "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction (also Labor Standards Provisions Applicable to Nonconstruction Contracts Subject to the Contract Work Hours and Safety Standards Act)," 29 C.F.R. Part 5; and with section 107 of the Act, 40 U.S.C. § 333, and U.S. DOL regulations, "Safety and Health Regulations for Construction," 29 C.F.R. Part 1926; and

(3) Copeland "Anti-Kickback" Act, as amended, 18 U.S.C. § 874 and 40 U.S.C. § 276c, and U.S. DOL regulations, "Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in part by Loans or Grants from the United States," 29 C.F.R. Part 3.

b. Activities Not Involving Construction. The Recipient agrees to comply, and assures the compliance of each third party contractor and each subrecipient at any tier, with any applicable employee protection requirements for nonconstruction employees of section 102 of the Contract Work Hours and Safety Standards Act, as amended, 40 U.S.C. §§ 327 - 332, and U.S. DOL

regulations, "Labor Standards Provisions Applicable to Contracts Governing Federally Financed and Assisted Construction (also Labor Standards Provisions Applicable to Nonconstruction Contracts Subject to the Contract Work Hours and Safety Standards Act)," 29 C.F.R. Part 5.

c. State and Local Government Employees. The Recipient agrees that the minimum wage and overtime provisions of the Fair Labor Standards Act, as amended, 29 U.S.C. §§ 206 and 207, apply to employees performing Project work involving commerce, and apply to any State or local government employees that are public transit authority employees. Thus, the Recipient, including a State or local government recipient, agrees to comply with the Fair Labor Standards Act's minimum wage and overtime requirements for employees performing Project work.

d. Transit Employee Protective Arrangements. If the Grant Agreement or Cooperative Agreement indicates that transit employee protective arrangements required by U.S. DOL apply to transit operations performed in connection with the Project, the Recipient agrees to comply with the applicable requirements for its Project as follows:

(1) Standard Transit Employee Protective Arrangements. To the extent that the Project involves transit operations, the Recipient agrees to implement the Project in compliance with terms and conditions the U.S. Secretary of Labor has determined to be fair and equitable to protect the interests of any employees affected by the Project and that meet the requirements of 49 U.S.C. § 5333(b), and of the U.S. DOL guidelines, "Section 5333(b), Federal Transit Law," 29 C.F.R. Part 215 and any amendments thereto. These terms and conditions are identified in U.S. DOL's certification of transit employee protective arrangements to FTA, the date of which appears in the Grant Agreement or Cooperative Agreement. The Recipient agrees to implement the Project in compliance with the conditions stated in that U.S. DOL certification. That U.S. DOL certification and any documents that may be cited therein are incorporated by reference and made part of the Grant Agreement or Cooperative Agreement. The requirements of this Subsection 24.d(1) of this Master Agreement do not apply to Projects for the elderly and persons with disabilities that are authorized by 49 U.S.C. § 5310(a)(2) or to Projects for nonurbanized areas that are authorized by 49 U.S.C. § 5311; separate requirements for those Projects are contained in Subsections 24.d(2) and 24.d(3), respectively, of this Master Agreement.

(2) Transit Employee Protective Arrangements for Projects for Elderly and Persons with Disabilities Authorized by 49 U.S.C. § 5310(a)(2). To the extent that the U.S. Secretary of Transportation has determined or determines in the future that employee protective arrangements required by 49 U.S.C. § 5333(b) are necessary or appropriate for a public body subrecipient under the Project, the Recipient agrees to carry out the Project in compliance with the terms and conditions determined by the U.S. Secretary of Labor as necessary to meet the requirements of 49 U.S.C. § 5333(b), and the U.S. DOL guidelines, "Section 5333(b), Federal Transit Law," at 29 C.F.R. Part 215, and any amendments thereto. These terms and conditions are identified in U.S. DOL's certification of transit employee protective arrangements to FTA, the date of which appears in the Grant Agreement. The Recipient agrees to implement the Project in compliance with the conditions stated in that U.S. DOL certification. That U.S. DOL certification and any documents that may be cited therein are incorporated by reference and made part of the Grant Agreement.

(3) Transit Employee Protective Arrangements for Projects in Nonurbanized Areas Authorized by 49 U.S.C. § 5311. The Recipient agrees to comply with the terms and conditions of the Special Warranty for the Nonurbanized Area Program agreed to by the U.S. Secretaries of Transportation and Labor, dated May 31, 1979, U.S. DOL implementing procedures, and any revisions thereto.

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3. 13C Requirements

The following constitutes the 13C language generally required in FTA capital assistance grants:

CAPITAL ASSISTANCE PROTECTIVE ARRANGEMENT
PURSUANT TO SECTION 5333(b) OF
TITLE 49 OF THE U.S. CODE, CHAPTER 53
For
[Name of Recipient] and [Name of Union]
[Date of Arrangement]
FTA GRANT
[- -]

The following language shall be made part of the contract of assistance:

The terms and conditions set forth below shall apply for the protection of the transportation related employees in the transportation service area of the project represented by [name of union or unions]. The term "Recipient," as used herein, shall refer to the [name of recipient(s) (this will include the applicant if it is also a recipient and has no protections)].

(1) The Project shall be carried out in such a manner and upon such terms and conditions as will not adversely affect employees of the Recipient and of any other surface public transportation provider in the transportation service area of the Project. It shall be an obligation of the Recipient to assure that any and all transportation services assisted by the Project are contracted for and operated in such a manner that they do not impair the rights and interests of affected employees. The term "Project," as used herein, shall not be limited to the particular facility, service, or operation assisted by Federal funds, but shall include any changes, whether organizational, operational, technological, or otherwise, which are a result of the assistance provided. The phrase "as a result of the Project," shall when used in this arrangement, include events related to the Project occurring in anticipation of, during, and subsequent to the Project and any program of efficiencies or economies related thereto; provided, however, that volume rises and falls of business, or changes in volume and character of employment brought about solely by causes other than the Project (including any economies or efficiencies unrelated to the Project) are not within the purview of this arrangement.

An employee covered by this arrangement, who is not dismissed, displaced or otherwise worsened in his/her position with regard to his/her employment as a result of the Project, but who is dismissed, displaced or otherwise worsened solely because of the total or partial termination of the Project or exhaustion of Project funding shall not be deemed eligible for a dismissal or displacement allowance within the meaning of paragraphs (6) and (7) of the National (Model) Section 13(c) Agreement.

(2)(a) Where employees of a Recipient are represented for collective bargaining purposes, all Project services provided by that Recipient shall be provided under and in accordance with any collective bargaining agreement applicable to such employees which is then in effect.

(2)(b) The Recipient shall provide to all affected employees sixty (60) days' notice of intended actions which may result in displacements or dismissals or rearrangements of the working

forces as a result of the Project. In the case of employees represented by a union, such notice shall be provided by certified mail through their representatives. The notice shall contain a full and adequate statement of the proposed changes, and an estimate of the number of employees affected by the intended changes, and the number and classifications of any jobs within the jurisdiction and control of the Recipient, including those in the employment of any entity bound by this arrangement pursuant to paragraph (11), available to be filled by such affected employees.

(2)(c) The procedures of this subparagraph shall apply to cases where notices involve employees represented by a union for collective bargaining purposes. At the request of either the Recipient or the representatives of such employees negotiations for the purposes of reaching agreement with respect to the application of the terms and conditions of this arrangement shall commence immediately. These negotiations shall include determining the selection of forces from among the urban mass transportation employees who may be affected as a result of the Project, to establish which such employees shall be offered employment for which they are qualified or can be trained. If no agreement is reached within twenty (20) days from the commencement of negotiations, any party to the dispute may submit the matter to dispute settlement procedures in accordance with paragraph (4) of this arrangement. Unless the parties otherwise mutually agree in writing, no change in operations, services, facilities or equipment within the purview of this paragraph (2) shall occur until after either: 1) an agreement with respect to the application of the terms and conditions of this Arrangement to the intended change(s) is reached; 2) the decision of the arbitration panel has been rendered pursuant to this subparagraph (c); or 3) an arbitration board selected pursuant to Paragraph (4) of this Arrangement determines that the intended change(s) may be instituted prior to the finalization of implementing arrangements.

(2)(d) In the event of a dispute as to whether an intended change within the purview of this paragraph (2) may be instituted at the end of the 60-day notice period and before an implementing agreement is reached or a final arbitration decision is rendered pursuant to subparagraph (c), any involved party may immediately submit that issue to arbitration under paragraph (4) of this arrangement. In any such arbitration, the arbitrator shall rely upon the standards and criteria utilized by the Surface Transportation Board (and its predecessor agency, the Interstate Commerce Commission) to address the "preconsummation" issue in cases involving employee protections pursuant to 49 U.S.C. Section

11326 (or its predecessor, Section 5(2)(f) of the Interstate Commerce Act, as amended). If the Recipient demonstrates, as a threshold matter in any such arbitration, that the intended action is a trackage rights, lease proceeding or similar transaction, and not a merger, acquisition, consolidation, or other similar transaction, the burden shall then shift to the involved labor organization(s) to prove that under the standards and criteria referenced above, the intended action should not be permitted to be instituted prior to the effective date of a negotiated or arbitrated implementing agreement. If the Recipient fails to demonstrate that the intended action is a trackage rights, lease proceeding, or similar transaction, it shall be the burden of the Recipient to prove that under the standards and criteria referenced above, the intended action should be permitted to be instituted prior to the effective date of a negotiated or arbitrated implementing agreement. For purposes of any such arbitration, the time period within which the parties are to respond to the list of potential arbitrators submitted by the American Arbitration Association (as provided under Labor Arbitration Rule 12) shall be reduced from ten (10) to five (5) days, the notice of hearing (as provided under Labor Arbitration Rule 19) may be given orally or by facsimile, the hearing will be held promptly, and (notwithstanding any contrary provision of Labor Arbitration Rule 37) the award of the arbitrator shall be rendered promptly and, unless otherwise agreed to by the parties, no later than fourteen (14) days from the date of closing the hearings, with five (5) additional days for mailing if posthearing briefs are requested by either party. The intended change shall not be instituted during the pendency of any arbitration proceedings under this subparagraph (d).

(2)(e) If an intended change within the purview of this paragraph (2) is instituted before an implementing agreement is reached or a final arbitration decision is rendered pursuant to subparagraph (c), all employees affected shall be kept financially whole, as if the noticed and implemented action has not take place, from the time they are affected until the effective date of an implementing agreement or final arbitration decision. This protection shall be in addition to the protective period defined in paragraph (14) of the National (Model) Section 13(c) Agreement executed July 23, 1975, which period shall begin on the effective date of the implementing agreement or final arbitration decision rendered pursuant to subparagraph (c).

An employee selecting, bidding or hired to fill any position established as a result of a noticed and implemented action prior to the consummation of an implementing agreement or final

arbitration decision shall accumulate no benefits under this arrangement as a result thereof during that period prior to the consummation of an implementing agreement or final arbitration decision pursuant to subparagraph (c).

(3) For the purpose of providing the statutory required protections including those specifically mandated by 49 U.S.C, Section 5333(b), the Recipient agrees to be bound by the terms and conditions of the National (Model) Section 13(c) Agreement executed July 23, 1975.[2]

(4) Any dispute, claim, or grievance arising from or relating to the interpretation, application or enforcement of the provisions of this arrangement, not otherwise governed by Section 12(c) of the Model Agreement, the Labor-Management Relations Act, as amended, Railway Labor Act, as amended, or by impasse resolution provisions in a collective bargaining or protective arrangement involving the Recipient and the Union, which cannot be settled by the parties thereto within thirty (30) days after the dispute or controversy arises, may be submitted at the written request of the Recipient or the union to arbitration administered by the American Arbitration Association under its Labor Arbitration Rules. The parties further agree to accept the arbitrator's award as final and binding.

In the event of any dispute as to whether or not a particular employee was affected by the Project, it shall be his/her obligation to identify the Project and specify the pertinent facts of the Project relied upon. It shall then be the burden of the Recipient to prove that factors other than the Project affected the employee. The claiming employee shall prevail if it is established that the Project had an effect upon the employee even if other factors may also have affected the employee.

(5) The Recipient will be financially responsible for the application of these conditions and will make the necessary arrangements so that any employee covered by these arrangements, or the union representative of such employee, may file claim of violation of these arrangements with the Recipient within sixty (60) days of the date he/she is terminated or laid off as a result of the Project, or within eighteen (18) months of the date his/her position with respect to his/her employment is otherwise worsened as a result of the Project. In the latter case, if the events giving rise to the claim have occurred over an extended period, the 18-month limitation shall be measured from the last such event. No benefits shall be

payable for any period prior to six (6) months from the date of the filing of any claim.

(6) Nothing in this arrangement shall be construed as depriving any employee of any rights or benefits which such employee may have under existing employment or collective bargaining agreements, nor shall this arrangement be deemed a waiver of any rights of any union or of any represented employee derived from any other agreement or provision of federal, state or local law.

(7) In the event any employee covered by these arrangements is terminated or laid off as a result of the Project, he shall be granted priority of employment or reemployment to fill any vacant position within the jurisdiction and control of the Recipient, including those in the employment of any entity bound by this arrangement pursuant to paragraph (11) hereof, for which he is, or by training or retraining within a reasonable period, can become qualified. In the event training or retraining is required by such employment or reemployment, the Recipient shall provide or provide for such training or retraining at no cost to the employee.

(8) The Recipient will post, in a prominent and accessible place, a notice stating that the Recipient has received federal assistance under the Federal Transit statute and has agreed to comply with the provisions of 49 U.S.C., Section 5333(b). This notice shall also specify the terms and conditions set forth herein for the protection of employees. The Recipient shall maintain and keep on file all relevant books and records in sufficient detail as to provide the basic information necessary to the proper application, administration, and enforcement of these arrangements and to the proper determination of any claims arising thereunder.

(9) The Recipient(s) and the labor organization(s) referenced in the second introductory paragraph of this arrangement shall be deemed a party to these arrangements.

(10) In the event the Project is approved for assistance under the statute, the foregoing terms and conditions shall be made part of the contract of assistance between the federal government and the applicant for federal funds and between the applicant and any recipient of federal funds; provided, however, that this arrangement shall not merge into the contract of assistance, but shall be independently binding and enforceable by and upon the parties thereto, and by any covered employee or his/her representative, in accordance with its terms, nor shall any other employee protective agreement merge into this arrangement, but each shall be

independently binding and enforceable by and upon the parties thereto, in accordance with its terms.

(11) This arrangement shall be binding upon the successors and assigns of the parties hereto, and no provisions, terms, or obligations herein contained shall be affected, modified, altered, or changed in any respect whatsoever by reason of the arrangements made by or for the Recipient to manage and operate the system.

Any person, enterprise, body, or agency, whether publicly - or privately-owned, which shall undertake the management, provision and/or operation of the Project services or the Recipient's transit system, or any part or portion thereof, under contractual arrangements of any form with the Recipient, its successors or assigns, shall agree to be bound by the terms of this arrangement and accept the responsibility with the Recipient for full performance of these conditions. As a condition precedent to any such contractual arrangements, the Recipient shall require such person, enterprise, body or agency to so agree.

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"MODEL AGREEMENT" PARAGRAPHS INCORPORATED IN THE "CAPITAL ASSISTANCE PROTECTIVE ARRANGEMENT" PURSUANT TO PARAGRAPH (3) THEREOF:

(3) All rights, privileges, and benefits (including pension rights and benefits) of employees covered by this agreement (including employees having already retired) under existing collective bargaining agreements or otherwise, or under any revision or renewal thereof, shall be preserved and continued; provided, however, that such rights, privileges and benefits which are not foreclosed from further bargaining under applicable law or contract may be modified by collective bargaining and agreement by the Recipient and the union involved to substitute other rights, privileges and benefits. Unless otherwise provided, nothing in this agreement shall be deemed to restrict any rights the Recipient may otherwise have to direct the working forces and manage its business as it deemed best, in accordance with the applicable collective bargaining agreement.

(4) The collective bargaining rights of employees covered by this agreement, including the right to arbitrate labor disputes and to maintain union security and checkoff arrangements, as provided by applicable laws, policies and/or existing collective bargaining agreements, shall be preserved and continued. Provided, however,

that this provision shall not be interpreted so as to require the Recipient to retain any such rights which exist by virtue of a collective bargaining agreement after such agreement is no longer in effect.

The Recipient agrees that it will bargain collectively with the union or otherwise arrange for the continuation of collective bargaining, and that it will enter into agreement with the union or arrange for such agreements to be entered into, relative to all subjects which are or may be proper subjects of collective bargaining. If, at any time, applicable law or contracts permit or grant to employees covered by this agreement the right to utilize any economic measures, nothing in this agreement shall be deemed to foreclose the exercise of such right.

(6)(a) Whenever an employee, retained in service, recalled to service, or employed by the Recipient pursuant to paragraphs (5), (7)(e), or (18) hereof is placed in a worse position with respect to compensation as a result of the Project, he shall be considered a "displaced employee", and shall be paid a monthly "displacement allowance" to be determined in accordance with this paragraph. Said displacement allowance shall be paid each displaced employee during the protective period so long as the employee is unable, in the exercise of his seniority rights, to obtain a position producing compensation equal to or exceeding the compensation he received in the position from which he was displaced, adjusted to reflect subsequent general wage adjustments, including cost of living adjustments where provided for.

(b) The displacement allowance shall be a monthly allowance determined by computing the total compensation received by the employee, including vacation allowances and monthly compensation guarantees, and his total time paid for during the last twelve (12) months in which he performed compensated service more than fifty per centum of each such months, based upon his normal work schedule, immediately preceding the date of his displacement as a result of the Project, and by dividing separately the total compensation and the total time paid for by twelve, thereby producing the average monthly compensation and the average monthly time paid for. Such allowance shall be adjusted to reflect subsequent general wage adjustments, including cost of living adjustments where provided for. If the displaced employee's compensation in his current position is less in any month during his protective period than the aforesaid average compensation (adjusted to reflect subsequent general wage adjustments, including cost of living adjustments where provided for), he shall be paid the

difference, less compensation for any time lost on account of voluntary absences to the extent that he is not available for service equivalent to his average monthly time, but he shall be compensated in addition thereto at the rate of the current position for any time worked in excess of the average monthly time paid for. If a displaced employee fails to exercise his seniority rights to secure another position to which he is entitle under the then existing collective bargaining agreement, and which carriers a wage rate and compensation exceeding that of the position which he elects to retain, he shall thereafter be treated, for the purposes of this paragraph, as occupying the position he elects to decline.

(c) The displacement allowance shall cease prior to the expiration of the protective period in the event of the displaced employee's resignation, death, retirement, or dismissal for cause in accordance with any labor agreement applicable to his employment.

(7)(a) Whenever any employee is laid off or otherwise deprived of employment as a result of the Project, in accordance with any collective bargaining agreement applicable to his employment, he shall be considered a "dismissed employee" and shall be paid a monthly dismissal allowance to be determined in accordance with this paragraph. Said dismissal allowance shall first be paid each dismissed employee on the thirtieth (30th) day following the day on which he is "dismissed" and shall continue during the protective period, as follow:

Employee's length of service prior to adverse effect	Period of protection
1 day to 6 years	equivalent period
6 years or more	6 years

The monthly dismissal allowance shall be equivalent to one-twelfth (1/12th) of the total compensation received by him in the last twelve (12) months of his employment in which he performed compensation service more than fifty per centum of each such months based on his normal work schedule to the date on which he was first deprived of employment as a result of the Project. Such allowance shall be adjusted to reflect subsequent general wage adjustments, including cost of living adjustments where provided for.

(b) An employee shall be regarded as deprived of employment and entitled to a dismissal allowance when the position he holds is abolished as a result of the Project, or when the position he holds is

not abolished but he loses that position as a result of the exercise of seniority rights by an employee whose position is abolished as a result of the Project or as a result of the exercise of seniority rights by other employees brought about as a result of the Project, and he is unable to obtain another position, either by the exercise of his seniority rights, or through the Recipient, in accordance with subparagraph (e). In the absence of proper notice followed by an agreement or decision pursuant to paragraph (5) hereof, no employee who has been deprived of employment as a result of the Project shall be required to exercise his seniority rights to secure another position in order to qualify for a dismissal allowance hereunder.

(c) Each employee receiving a dismissal allowance shall keep the Recipient informed as to his current address and the current name and address of any other person by whom he may be regularly employed, or if he is self-employed.

(d) The dismissal allowance shall be paid to the regularly assigned incumbent of the position abolished. If the position of an employee is abolished when he is absent from service, he will be entitled to the dismissal allowance when he is available for service. The employee temporarily filling said position at the time it was abolished will be given a dismissal allowance on the basis of that position, until the regular employee is available for service, and thereafter shall revert to his previous status and will be given the protections of the agreement in said position, if any are due him.

(e) An employee receiving a dismissal allowance shall be subject to call to return to service by his former employer after being notified in accordance with the terms of the then-existing collective bargaining agreement. Prior to such call to return to work by his employer, he may be required by the Recipient to accept reasonably comparable employment for which he is physically and mentally qualified, or for which he can become qualified after a reasonable training or retraining period, provided it does not require a change in residence or infringe upon the employment rights of other employees under then-existing collective bargaining agreements.

(f) When an employee who is receiving a dismissal allowance again commences employment in accordance with subparagraph (e) above, said allowance shall cease while he is so reemployed, and the period of time during which he is so reemployed shall be deducted from the total period for which he is entitled to receive a dismissal allowance. During the time of such reemployment, he

shall be entitled to the protections of this agreement to the extent they are applicable.

(g) The dismissal allowance of any employee who is otherwise employed shall be reduced to the extent that his combined monthly earnings from such other employment or self-employment, any benefits received from any unemployment insurance law, and his dismissal allowance exceed the amount upon which his dismissal allowance is based. Such employee, or his union representative, and the Recipient shall agree upon a procedure by which the Recipient shall be kept currently informed of the earnings of such employee in employment other than with his former employer, including self-employment, and the benefits received.

(h) The dismissal allowance shall cease prior to the expiration of the protective period in the event of the failure of the employee without good cause to return to service in accordance with the applicable labor agreement, or to accept employment as provided under subparagraph (e) above, or in the event of his resignation, death, retirement, or dismissal for cause in accordance with any labor agreement applicable to his employment.

(i) A dismissed employee receiving a dismissal allowance shall actively seek and not refuse other reasonably comparable employment offered him for which he is physically and mentally qualified and does not require a change in his place of residence. Failure of the dismissed employee to comply with this obligation shall be grounds for discontinuance of his allowance; provided that said dismissal allowance shall not be discontinued until final determination is made either by agreement between the Recipient and the employee or his representative, or by final arbitration decision rendered in accordance with paragraph (15) of this agreement that such employee did not comply with this obligation.

(8) In determining length of service of a displaced or dismissed employee for purposes of this agreement, such employee shall be given full service credits in accordance with the records and labor agreements applicable to him and he shall be given additional service credits for each month in which he receives a dismissal or displacement allowance as if he were continuing to perform services in his former position.

(9) No employee shall be entitled to either a displacement or dismissal allowance under paragraphs (6) or (7) hereof because of the abolishment of a position to which, at some future time, he could have bid, been transferred, or promoted.

(10) No employee receiving a dismissal or displacement allowance shall be deprived, during his protected period, of any rights, privileges, or benefits attaching to his employment, including, without limitation, group life insurance, hospitalization and medical care, free transportation for himself and his family, sick leave, continued status and participation under any disability or retirement program, and such other employee benefits as Railroad Retirement, Social Security, Workmen's Compensation, and unemployment compensation, as well as any other benefits to which he may be entitled under the same conditions and so long as such benefits continue to be accorded to other employees of the bargaining unit, in active service or furloughed as the case may be.

(11)(a) Any employee covered by this agreement who is retained in the service of his employer, or who is later restored to service after being entitled to receive a dismissal allowance, and who is required to change the point of his employment in order to retain or secure active employment with the Recipient in accordance with this agreement, and who is required to move his place of residence, shall be reimbursed for all expenses of moving his household and other personal effects, for the traveling expenses for himself and members of his immediate family, including living expenses for himself and his immediate family, and for his own actual wage loss during the time necessary for such transfer and for a reasonable time thereafter, not to exceed five (5) working days. The exact extent of the responsibility of the Recipient under this paragraph, and the ways and means of transportation, shall be agreed upon in advance between the Recipient and the affected employee or his representatives.

(b) If any such employee is laid off within three (3) years after changing his point of employment in accordance with paragraph (a) hereof, and elects to move his place of residence back to his original point of employment, the Recipient shall assume the expenses, losses and costs of moving to the same extent provided in subparagraph (a) of this paragraph (11) and paragraph (12)(a) hereof.

(c) No claim for reimbursement shall be paid under the provisions of this paragraph unless such claim is presented to the Recipient within ninety (90) days after the date on which the expenses were incurred.

(d) Except as otherwise provided in subparagraph (b), changes in place of residence, subsequent to the initial changes as a result of the Project, which are not a result of the Project but grow out of the

normal exercise of seniority rights, shall not be considered within the purview of this paragraph.

(12)(a) The following conditions shall apply to the extent they are applicable in each instance to any employee who is retained in the service of the employer (or who is later restored to service after being entitled to receive a dismissal allowance), who is required to change the point of his employment as a result of the Project, and is thereby required to move his place of residence.

If the employee owns his own home in the locality from which he is required to move, he shall, at his option, be reimbursed by the Recipient for any loss suffered in the sale of his home for less than its fair market value, plus conventional fees and closing costs, such loss to be paid within thirty (30) days of settlement or closing on the sale of the home. In each case, the fair market value of the home in question shall be determined, as of a date sufficiently prior to the date of the Project, so as to be unaffected thereby. The Recipient shall, in each instance, be afforded an opportunity to purchase the home at such fair market value before it is sold by the employee to any other person and to reimburse the seller for his conventional fees and closing costs.

If the employee is under a contract to purchase his home, the Recipient shall protect him against loss under such contract, and in addition, shall relieve him from any further obligation thereunder.

If the employee holds an unexpired lease of a dwelling occupied by him as his home, the Recipient shall protect him from all loss and cost in securing the cancellation of said lease.

(b) No claim for loss shall be paid under the provisions of this paragraph unless such claim is presented to the Recipient within one year after the effective date of the change in residence.

(c) Should a controversy arise in respect to the value of the home, the loss sustained in its sale, the loss under a contract for purchase, loss and cost in securing termination of a lease, or any other question in connection with these matters, it shall be decided through a joint conference between the employee, or his union, and the Recipient. In the event they are unable to agree, the dispute or controversy may be referred by the Recipient or the union to a board of competent real estate appraisers selected in the following manner: one (1) to be selected by the representatives of the employee, and one (1) by the Recipient, and these two, if unable to agree within thirty (30) days upon the valuation, shall endeavor by agreement with ten (10) days thereafter to select a third appraiser

or to agree to a method by which a third appraiser shall be selected, and failing such agreement, either party may request the State and local Board of Real Estate Commissioners to designate within ten (10) days a third appraiser, whose designation will be binding upon the parties and who jurisdiction shall be limited to determination of the issues raised in this paragraph only. A decision of a majority of the appraisers shall be required and said decision shall be final, binding, and conclusive. The compensation and expenses of the neutral appraiser including expenses of the appraisal board, shall be borne equally by the parties to the proceedings. All other expenses shall be paid by the party incurring them, including the compensation of the appraiser selected by such party.

(d) Except as otherwise provided in paragraph (11)(b) hereof, changes in place of residence, subsequent to the initial changes as a result of the Project, which are not a result of the Project but grow out of the normal exercise of seniority rights, shall not be considered within the purview of this paragraph.

(e) "Change in residence" means transfer to a work location which is either (A) outside a radius of twenty (20) miles of the employee's former work location and farther from his residence

than was his former work location, or (B) is more than thirty (30) normal highway route miles from his residence and also farther from his residence than was his former work location.

(13) A dismissed employee entitled to protection under this agreement may, at his option within twenty-one (21) days of his dismissal, resign and (in lieu of all other benefits and protections provided in this agreement) accept a lump sum payment computed in accordance with section (9) of the Washington Job Protection Agreement of May 1936:

Length of Service	Separation Allowance
1 year and less than 2 years	3 months' pay
2 " " " " 3 "	6 " "
3 " " " " 5 "	9 " "
5 " " " " 10 "	12 " "
10 " " " " 15 "	12 " "
15 " " over	12 " "

In the case of an employee with less than one year's service, five days' pay, computed by multiplying by 5 the normal daily earnings (including regularly scheduled overtime, but excluding other overtime payments) received by the employee in the position last occupied, for each month in which he performed service, will be paid as the lump sum.

(a) Length of service shall be computed as provided in Section 7(b) of the Washington Job Protection Agreement, as follows:

For the purposes of this agreement, the length of service of the employee shall be determined from the date he last acquired an employment status with the employing carrier and he shall be given credit for one month's service for each month in which he performed any service (in any capacity whatsoever) and twelve (12) such months shall be credited as one year's service. The employment status of an employee shall not be interrupted by furlough in instances where the employee has a right to and does return to service when called. In determining length of service of an employee acting as an officer or other official representative of an employee organization, he will be given credit for performing service while so engaged on leave of absence from the service of a carrier.

(b) One month's pay shall be computed by multiplying by 30 the normal daily earnings (including regularly scheduled overtime, but excluding other overtime payments) received by the employee in the position last occupied prior to time of his dismissal as a result of the Project.

(14) Whenever used herein, unless the context requires otherwise, the term "protective period" means that period of time during which a displaced or dismissed employee is to be provided

protection hereunder and extends from the date on which an employee is displaced or dismissed to the expiration of six (6) years therefrom, provided, however, that the protective period for any particular employee during which he is entitled to receive the benefits of these provisions shall not continue for a longer period following the date he was displaced or dismissed than the employee's length of service, as shown by the records and labor agreements applicable to his employment prior to the date of his displacement or his dismissal.

(16) Nothing in this agreement shall be construed as depriving any employee of any rights or benefits which such employee may have under any existing job security or other protective conditions or arrangements by collective bargaining agreement or law where applicable, including P.L. 93-236, enacted January 2, 1974; provided that there shall be no duplication of benefits to any employees, and, provided further, that any benefit under the agreement shall be construed to include the conditions, responsibilities, and obligations accompanying such benefits.

(17) The Recipient shall be financially responsible for the application of these conditions and will make the necessary arrangements so that any employee affected as a result of the Project may file a claim through his union representative with the Recipient within sixty (60) days of the date he is terminated or laid off as a result of the Project, or within eighteen (18) months of the date his position with respect to his employment is otherwise worsened as a result of the Project; provided, in the latter case, if the events giving rise to the claim have occurred over an extended period, the 18-month limitation shall be measured from the last such event; provided, further, that no benefits shall be payable for any period prior to six (6) months from the date of the filing of the claim. Unless such claims are filed with the Recipient with said time limitations, the Recipient shall thereafter be relieved of all liabilities and obligations related to said claims. The Recipient will fully honor the claim, making appropriate payments, or will give notice to the claimant and his representative of the basis for denying or modifying such claim, giving reasons therefor. In the event the Recipient fails to honor such claim, the Union may invoke the following procedures for further joint investigation of the claim by giving notice in writing of its desire to pursue such procedures. Within ten (10) days from the receipt of such notice, the parties shall exchange such factual material as may be requested of them relevant to the disposition of the claim and shall jointly take such steps as may be necessary or desirable to obtain from any third party such additional factual materials as may be

relevant. In the event the claim is so rejected by the Recipient, the claim may be processed to arbitration as hereinabove provided by paragraph (15). Prior to the arbitration hearing, the parties shall exchange a list of intended witnesses.

In conjunction with such proceedings, the impartial arbitrator shall have the power to subpoena witnesses upon the request of any party and to compel the production of documents and other information denied in the pre-arbitration period which is relevant to the disposition of the claim.

Nothing included herein as an obligation of the Recipient shall be construed to relieve any other urban mass transportation employer of the employees covered hereby of any obligations which it has under existing collective bargaining agreements, including but not limited to obligations arising from the benefits referred to in paragraph (10) hereof, nor make any such employer a third-party beneficiary of the Recipient's obligations contained herein, nor deprive the Recipient of any right of subrogation.

(18) During the employee's protective period, a dismissed employee shall, if he so requests, in writing, be granted priority of employment to fill any vacant position within the jurisdiction and control of the Recipient, reasonably comparable to that which he held when dismissed, for which he is, or by training or retraining can become, qualified; not, however, in contravention of collective bargaining agreements related thereto. In the event such employee requests such training or re-training to fill such vacant position, the Recipient shall provide for such training or re-training at no cost to the employee. The employee shall be paid the salary or hourly rate provided for in the applicable collective bargaining agreement for such position, plus any displacement allowance to which he may be otherwise entitled. If such dismissed employee who has made such request fails, without good cause, within ten (10) days to accept an offer of a position comparable to that which he held when dismissed for which he is qualified, or for which he has satisfactorily completed such training, he shall, effective at the expiration of such ten-day period, forfeit all rights and benefits under this agreement.

As between employees who request employment pursuant to this paragraph, the following order where applicable shall prevail in hiring such employees:

(a) Employees in the craft or class of the vacancy shall be given priority over employees without seniority in such craft or class;

(b) As between employees having seniority in the craft or class of the vacancy, the senior employees, based upon their service in that craft or class, as shown on the appropriate seniority roster, shall prevail over junior employees;

(c) As between employees not having seniority in the craft or class of the vacancy, the senior employees, based upon their service in the crafts or classes in which they do have seniority as shown on the appropriate seniority rosters, shall prevail over junior employees.

(20) The employees covered by this agreement shall continue to receive any applicable coverage under Social Security, Railroad Retirement, Workmen's Compensation, unemployment compensation, and the like. In no event shall these benefits be worsened as a result of the Project.

(21) In the event any provision of this agreement is held to be invalid, or otherwise unenforceable under the federal, State, or local law, in the context of a particular Project, the remaining provisions of this agreement shall not be affected and the invalid or unenforceable provision shall be renegotiated by the Recipient and the interested union representatives of the employees involved for purpose of adequate replacement under 5333(b) of the Act. If such negotiation shall not result in mutually satisfactory agreement, any party may invoke the jurisdiction of the Secretary of Labor to determine substitute fair and equitable employee protective arrangements for application only to the particular Project, which shall be incorporated in this agreement only as applied to that Project, and any other appropriate action, remedy, or relief.

(25) If any employer of the employees covered by this agreement shall have rearranged or adjusted its forces in anticipation of the Project, with the effect of depriving an employee of benefits to which he should be entitled under this agreement, the provisions of this agreement shall apply to such employee as of the date when he was so affected.