Florida High Speed Rail Authority

2002 Report to the Legislature

■ JANUARY 2002

FLORIDA HIGH SPEED RAIL AUTHORITY

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2002 *Report to the Legislature*

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Summary of Findings, Recommendations and Actions

As required by Title XXVI, Chapter 341.821-341.822, the Florida High Speed Rail Authority (FHSRA) presents findings, recommendations and actions related to the implementation of a High Speed Rail system in the State of Florida.

Findings

The major findings of the FHSRA to date (through December 2001) are as follows:

1. The Authority finds, based on preliminary ridership, revenue and cost estimates for the corridor, and subject to more detailed engineering, environmental and ridership studies currently underway, that the first segment of a high speed rail system in the St. Petersburg – Tampa – Orlando corridor can have operating revenues that exceed operating costs and meet Federal Railroad Administration (FRA) standards of commercial feasibility. The Authority further finds, based on the same preliminary studies and subject to more detailed work underway, that the economic benefits of high speed rail to the residents and visitors of the State of Florida exceed the costs of the initial segment. Future segments that extend service to the large populations of Southeast Florida and other urban areas should produce similar, or better results.

2. The Authority finds that the segment from St. Petersburg to Tampa needs more study than the segment from Tampa to Orlando, and that the construction on the Tampa to Orlando segment may be feasible to begin in November 2003 – as mandated by Article X, Section 19 of the Constitution of the State of Florida – with construction on the St. Petersburg to Tampa segment beginning in 2005.

3. The Authority finds that it is in the best interests of the state to evaluate the high speed rail system in the context of a statewide system that will benefit the residents and visitors to the State of Florida. To support this finding, the Authority has adopted a Vision Plan that identifies five urban areas in the state that could be linked with a high speed rail system.

4. The Authority finds that a high speed rail system can be implemented using private funds exclusively for operations and maintenance of the system, and a mixture of private and public funding for construction of the infrastructure and on-going capital requirements.

5. The Authority finds that all major modes of passenger transportation in the State of Florida have had their infrastructure elements constructed using public funding at different levels. These modes include highways, transit systems, airports, and seaports.

6. The Authority finds that federal funding is an essential component of financing a high speed rail system, and should be vigorously pursued.

7. The Authority finds that it is in the best interests of the State not to choose or recommend a specific technology for the project. This should be determined competitively based on standards that will be developed by the Authority.

8. The Authority finds that corridors requiring major right-of-way acquisitions may not begin construction before November 2003, as mandated by Article X, Section 19, and that to meet this date, the first construction segment will likely be located in the existing highway and/or rail corridors.

9. The Authority finds that when high speed rail crosses motor vehicle traffic, these crossings should be vertically separated (grade-separated).

10. The Authority finds that in order to develop a high speed rail system, it must comply with the National Environmental Protection Act (NEPA) and all applicable state and federal rules that apply to the planning and construction of a high speed rail system.

11. The Authority finds that in order to construct a high speed rail system, either in the median of an Interstate highway or along an existing railroad, it must coordinate with the Federal Railroad Administration, the Federal Highway Administration, CSX Corporation, AMTRAK and others to develop appropriate rules and conditions for safe operation of a high speed rail system in these environments.

12. The Authority finds that an investment-grade ridership study for high speed rail from St. Petersburg to Orlando is essential to the project, and that this study needs to be conducted in 2002. A similar study needs to be expedited for the extension to Miami.

13. The Authority finds that intermodal connections at the planned high speed rail stations are critical to the success of the system. The Authority further finds that the FHSRA must have a role in working with local communities to develop appropriate feeder systems such as light rail.

14. The Authority finds that investments in high speed rail must be encouraged from those who would benefit, including local communities and private developers. The Authority further finds that the FHSRA must have a role in working with these entities to maximize their participation in funding of the project.

15. The Authority finds that it must implement a flexible procurement process for this project and that the Design-Build-Operate-Maintain and Finance (DBOM&F) procurement method can be structured to allow the necessary flexibility.

Recommendations

Based on the Authority's actions and findings to date, the Authority offers the recommendations that follow to the Governor and the Legislature of the State of Florida.

1. The Authority recommends that the Legislature of the State of Florida

approve the Authority's amended funding request for FY 2002-2003.

2. The Authority recommends that the Legislature of the State of Florida amend Title XXVI, Chapter 341.821-341.822 during the 2002 legislative session to provide the Authority with authorization to procure, seek funding, engage in rule making, use state-owned right-of-way and other measures consistent with the Authority's mission.

3. The Authority recommends that any state funding for this project should not affect projects included in the FDOT's adopted work plan. The Authority further recommends that the existing Transportation Outreach Program (TOP) is a viable source for funding due to its historical genesis from previous high speed rail funding sources.

4. The Authority recommends that a Request for Qualifications (RFQ) and/or Letters of Interest (LOI) be issued early in 2002 to pre-qualify potential providers for the initial segments of high speed rail system between St. Petersburg, Tampa and Orlando.

5. The Authority recommends that a report of the Authority's findings, recommendations and actions be provided to the Legislature in January of 2003.

Actions

1. The FHSRA held its first meeting in Tallahassee on July 16, 2001. At this meeting, the Authority elected its Chairman, Vice-chairman, Secretary and Treasurer. Members of the Authority are:

- Frederick Dudley, *Chairman*
- John Browning, *Vice-Chairman*
- Norman Mansour, *Secretary*
- Lee Chira, *Treasurer*
- William Dunn, P.E.
- C. C. "Doc" Dockery
- James "Skip" Fowler
- Leila Nodarse
- Heidi Eddins
- Thomas Barry, Jr., P.E. *(ex-officio)*

2. The Authority conducted meetings in six locations throughout the state to receive input, testimony and public opinion. Panel discussions were held with technology representatives, environmental groups, and transportation agencies. Meetings were held in Tallahassee, Orlando, Tampa, Lakeland, St. Petersburg and via statewide teleconference.

3. The Authority selected and contracted with a General Consultant to support the activities of the Authority.

4. The Authority selected and contracted with a Project Development and Environmental (PD&E) Consultant to prepare preliminary engineering and environmental studies. These studies are underway.

5. The Authority has advertised for contract executive staff.

6. The Authority has prepared and submitted this report to the Florida legislature.

1 Introduction

In November of 2000, an amendment to the Constitution of the State of Florida was adopted addressing a high speed ground transportation system. Article X, Section 19 of the Constitution of the State of Florida reads:

"To reduce traffic congestion and provide alternatives to the traveling public, it is hereby declared to be in the public interest that a high speed ground transportation system consisting of a monorail, fixed guideway or magnetic levitation system, capable of speeds in excess of 120 miles per hour, be developed and operated in the State of Florida to provide high speed ground transportation by innovative, efficient and effective technologies consisting of dedicated rails or guideways separated from motor vehicular traffic that will link the five largest urban areas of the State as determined by the Legislature and provide for access to existing air and ground transportation facilities and services. The Legislature, the Cabinet and the Governor are hereby directed to proceed with the development of such a system by the State and/or by a private entity pursuant to state approval and authorization, including the acquisition of right-of-way, the financing of design and construction of the system, and the operation of the system, as provided by specific appropriation and by law, with construction to begin on or before November 1, 2003."

In June of 2001, the Legislature of the State of Florida enacted Florida Statutes 341.821 – 341.822 and created the Florida High Speed Rail Authority. The Authority is charged with responsibility for planning, administering and management of preliminary engineering and a preliminary assessment of a high speed rail system in the State of Florida – Intrastate High Speed Rail. Chapter 341.822 sets forth the criteria required by the act, which are:

"(a) The system shall be capable of traveling speeds in excess of 120 miles per hour consisting of dedicated rails or guideways separated from motor vehicle traffic;

(b) The initial segments of the system will be developed and operated between St. Petersburg, Tampa, and Orlando, with future service to Miami;

(c) The authority is to develop a model that uses, to the maximum extent feasible, nongovernmental sources of funding for the design, construction, and operation of the system;"

Vision Since its first meeting in Tallahassee on July 16, 2001, the Authority has focused its efforts on the initial segments of the system between St. Petersburg, Tampa and Orlando with future service to Miami as defined in the High Speed Rail Act. The Authority has considered the initial segments in the context of a statewide vision plan that ultimately could connect to a national high speed ground transportation network.

The Authority has focused its efforts on the initial segments of the system between St. Petersburg, Tampa and Orlando with future service to Miami as defined in the High Speed Rail Act.

On November 13, 2001 the Authority adopted a long-term vision for high speed ground transportation in the State of Florida. The Authority's Vision Plan anticipates a high-speed ground transportation network that closely parallels the Florida Intrastate Highway System (FIHS) and serves communities, cities, airports and seaports throughout the State. As stated by the Legislature, the Vision Plan ensures that the 5 major urban areas, or urban regions that are referenced in the Constitutional amendment will be linked by the high speed rail system.

History of High Speed Rail in Florida

High speed ground transportation has been under study in Florida and along the Interstate 4 / CSX rail corridors for the last 25 years. Since 1984, the State of Florida has invested just over $28 million in high speed rail. In addition, approximately $39 million has been expended by the private

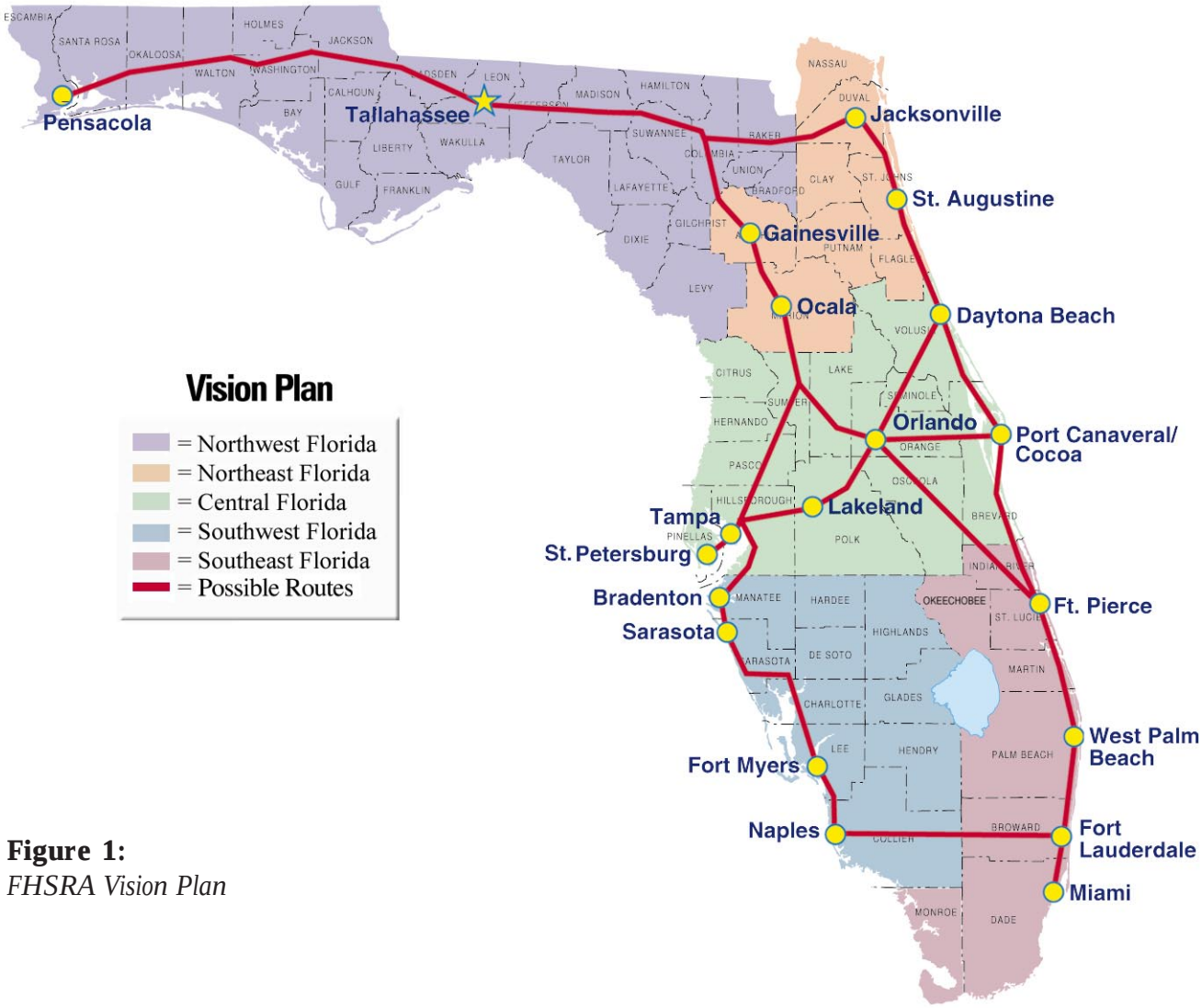


Figure 1:
FHSRA Vision Plan

sector for planning and development of high speed rail projects in Florida.

The Florida High Speed Rail Commission

In 1984, the Florida Legislature created the Florida High Speed Rail Commission. The Commission requested proposals for High Speed Rail serving Tampa, Orlando and Miami. Proposals were received from Florida TGV, Inc. and The Florida High Speed Rail Corporation in 1988. The Florida TGV, Inc. proposal was withdrawn in 1988 due to a lack of support for public funding.

A revised proposal was submitted by The Florida High Speed Rail Corporation in 1990, that substituted benefit assessment districts, tax increment financing, impact fees and gas tax for the extensive reliance on real estate development rights that was included in the original proposal. The revised proposal submitted by The Florida High Speed Rail Corporation was rejected by Governor Chiles in 1991.

Florida Overland Express (FOX)

The responsibilities for high speed rail in the State of Florida were transferred from The Florida High Speed Rail Commission to the Florida Department of Transportation (FDOT) as part of the High Speed Rail Act created in 1992. This act also streamlined the franchise and certification process and placed limits on the use of real estate development as a funding source. The act is still in effect.

In 1995, FDOT announced a commitment to fund high speed rail in the amount of $70 million per year (escalated at 4%/year). In that same year FDOT issued a Request for Proposals. Five proposals were received and from these the proposal of the FOX Consortium was selected.

Above: *TGV*

The FOX proposal was based on the construction of a new high speed rail system connection from Tampa to Orlando and Miami using the French TGV technology. The cost of the system was estimated at $6.1 billion. By 2010, ridership was projected to reach 8.5 million passengers per year.

FOX proposed financing the system with bonds that would be repaid by the State's contribution of $70 million per year for 40 years (escalated at 4%) and net operating revenues. An additional $350 million was to be provided as equity by the FOX Consortium.

In 1997, FOX and FDOT signed franchise and pre-certification agreements. The following year (1998), preliminary engineering and environmental studies were underway. These studies were approximately 10% complete when in 1999, the State withdrew funding support and the FOX project effectively ended.

Coast to Coast Rail

In 2000, the Florida Legislature provided funds to FDOT to study high speed ground transportation from St. Peters-

burg through Tampa and Orlando to Port Canaveral. The Central Florida Technology Transit Corridor Consortium (known as Coast to Coast Rail) was a catalyst for this study. The final report, known as the Cross-State Rail Feasibility Study, was completed in June 2001. The study recommend an initial phase of construction from Tampa Union Station to Orlando International Airport using non-electrified, steel wheel technology. The cost of the recommended project (excluding rolling stock) is $1.05 billion. The study also recommends that an "investment grade" ridership study be conducted.

Below: *Acela*

Specific Objectives of this Report

This report is structured to follow the requirements set forth in FS Chapters 341.821 and 341.822. Specifically, the report addresses a legislative requirement that the Authority issue a report of its actions, findings and recommendations to the Governor, President of the Senate and the Speaker of the House of Representatives on, or before, January 1, 2002.

Previous high speed ground transportation studies were reviewed as part of the preparation of this report. Independent analyses were undertaken to verify and update capital, operating and maintenance cost estimates from the previous studies.

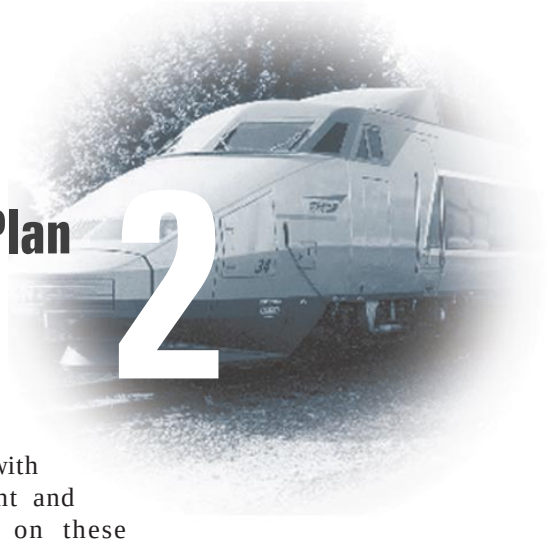
A detailed planning level ridership study was prepared as part of this report. The forecasts developed in the planning level ridership study are suitable for the purpose of this report, but do not replace the need to conduct even more detailed estimates of ridership. The Authority intends to begin an investment-grade ridership study in early 2002.

The scope of this report addresses the first phase of a high speed ground transportation system capable of speeds in excess of 120-mph while operating on a dedicated guideway between St. Petersburg and Orlando. Consistent with the legislative requirements and criteria, the Authority addressed the following:

- Recommendations concerning the format and content of a business plan for high speed ground transportation.
- Recommendations concerning preferred routes, stations and locomotive technology.
- Recommendations for any changes that may be needed in state statutes or federal laws.
- An operating plan that addresses frequency of service, fare structure, trip times, passenger capacity, passenger accommodations and amenities.

- Methods to ensure compliance with applicable environmental standards and regulations.
- A marketing plan including marketing strategies to enhance ridership.
- A detailed, planning level ridership study.
- Consideration of nonfare revenues including, development rights, license, franchise, lease fees and advertising.
- Estimates of the cost of the system including stations, guideway, right-of-way, rolling stock and the costs to operate and maintain the system.
- An estimate of the value of assets the state or its political subdivisions may provide as in-kind contributions for the system.
- An estimate of the funding required per year from state funds for the next 30 years.

Preliminary Implementation Plan 2



The Authority has requested additional funding from the legislature for FY 2002-2003 in order to maintain a schedule that allows construction to begin by November 2003. In addition to the Authority's regular activities, key activities that are to be undertaken by the Authority in 2002 include:

- Continuation of the Project Development and Environmental (PD&E) studies currently underway.
- Preparation of an investment grade ridership study for the initial segment from St. Petersburg to Tampa and Orlando.
- Development and issuance of a Request for Qualifications that would identify and pre-qualify potential vendors.
- Development and drafting of procurement documents (Request for Proposals) and standards.
- Identify and pursue opportunities for funding including Federal, local and private sources.
- Prepare and submit a second report to the Governor and Legislature of the State of Florida summarizing the Authority's actions, findings and recommendations in January of 2003.
- Finalize station locations, identify potential intermodal connections, feeder systems (such as light rail) and negotiate with local government and private parties on these matters.

Procurement Strategies

The Authority plans to implement procurement methods that provide maximum flexibility to bidders and the best potential outcome for the State. Design-Build-Operate-Maintain & Finance (DBOM&F) is one method that the Authority is reviewing. There are several factors that make DBOM&F attractive, as noted below:

Start of Construction (November 2003): The current schedule does not allow for the use of a traditional design-bid-build process. The DBOM&F option is a viable procurement method that could achieve the November 2003 date for start of construction.

Open Competition for Technology: The Authority has repeatedly and consistently expressed the importance of encouraging open competition for viable technologies to bid on the high speed rail system. There are several elements related to procurement that rise from this mandate for open competition. These include:

- *Determination of Viable Technologies:* The Authority plans to issue a Request for Qualifications and/or request for Letters of Interest. This process will pro-

The Authority plans to implement procurement methods that provide maximum flexibility to bidders and the best potential outcome for the State.

vide interested parties with the minimum standards which they are to achieve if they wish to respond to the later "Request for Proposals". Through this process, the FHSRA will be able to evaluate differing technologies and determine if they meet the standards set. Only entities meeting this standard will be able to propose.

- *An Environmental Process That Does Not Constrain Technology:* The PD&E process that is underway is being performed without constraint on technology. Rather, it maximizes the "envelope" in which a system could be constructed so that any viable technology could build their system within it. Similarly, the level of engineering that will be developed will be limited so that it will allow maximum flexibility for bidders, and yet be in sufficient detail to measure environmental impacts.
- *Balanced Competition for Future Phases of the System:* The procurement rules should not unduly penalize technologies that are more suited for future segments of the system than for the initial segment. The physical constraints of this first segment may create an initial disadvantage for certain technologies. The DBOM&F procurement process will therefore utilize a "best value" selection process that properly rewards a proposer's technology for better likelihood of performance on future segments of the system.

Operations & Maintenance: The operations and maintenance of the system should be for a stated amount of time. The DBOM&F approach provides an incentive for minimizing the operations & maintenance costs through competition. This methodology also instills a vested interest in the contractor during the design/build phase, as he is responsible for the maintenance costs, resulting in a higher quality product.

Financing: The Authority plans to encourage qualified vendors to invest in the system as a private partner in order to minimize the State's financial participation in the project. The procurement process will reward this factor.

Below: *Talgo*

Schedule

The Authority has proposed a schedule that addresses implementation of the first two Phases of the statewide system: St. Petersburg to Orlando (Phase 1) and Orlando to Miami (Phase 2). Phase 1 begins in November of 2003 and consists of two parts. Part 1 is from Tampa to Orlando, and Part 2 is from St. Petersburg to Tampa. For the purposes of this schedule, the Authority defines start of construction as when the Authority has executed a contract for construction of any portion of the initial segment.

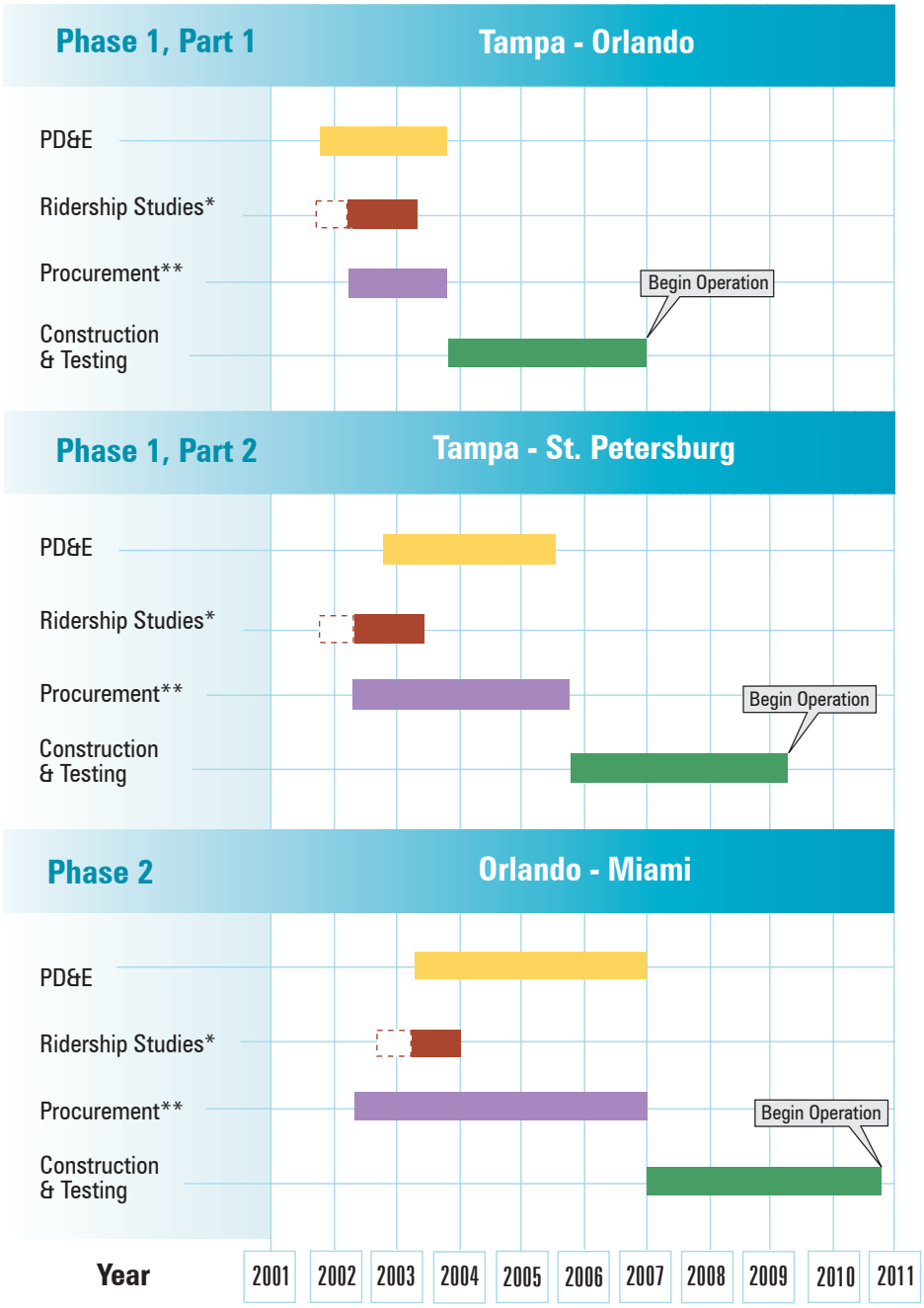
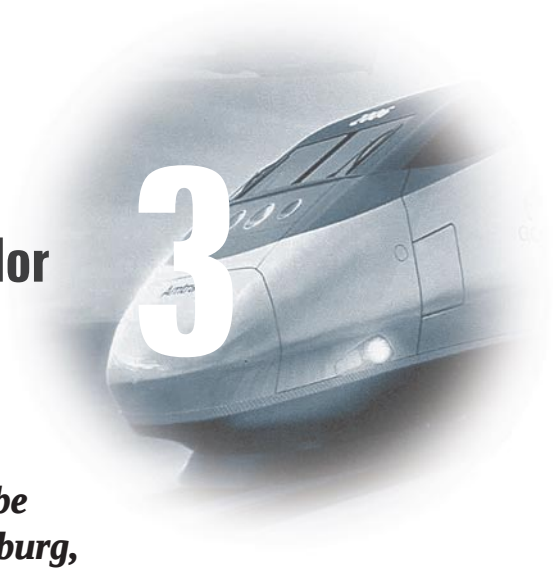


Figure 2
Implementation Schedule

* *Dashed lines represent "planning level" ridership studies, solid bar indicates "investment-grade" ridership studies.*

** *The procurement process for individual phases and/or parts may be combined.*

3 Description of the Corridor



"The initial segments of the system will be developed and operated between St. Petersburg, Tampa and Orlando with future service to Miami;"

—- FS Chapter 341.822

Within the St. Petersburg – Tampa – Orlando corridor, the Authority has considered a wide range of options. An important consideration in the Authority's evaluation is the constitutionally mandated construction start date of November 1, 2003.

Routes

Two major transportation assets run nearly the full length of the corridor. Interstate 4 begins at I-275 in Tampa, passes through Orlando and ends at I-95 near Daytona Beach. The CSX railroad alignment roughly parallels Interstate 4 from Tampa to Orlando. The Authority has concluded that a new alignment independent of either Interstate 4 or CSX cannot realistically be developed and permitted for construction to start by November 2003. The Authority recommends that the first segment of the project maximize use of the Interstate 4 and/or the CSX rail alignments.

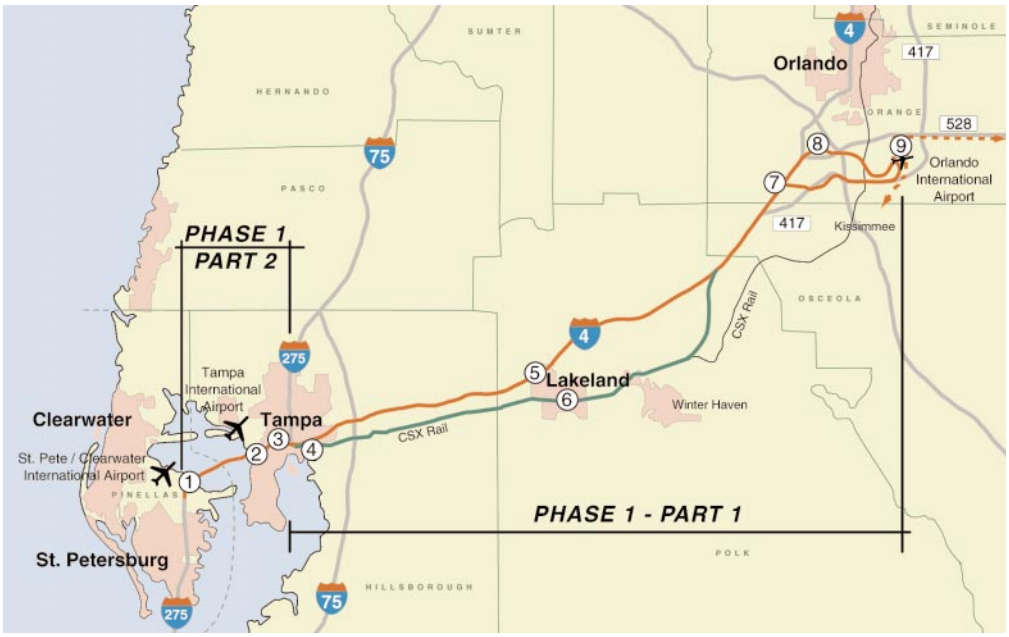
Previous high speed rail studies for the corridor have focused on Tampa to Orlando. As a result, more information is available for the Tampa – Orlando segment than is available for the segment from St. Petersburg to Tampa. The Authority recognizes that it will take longer to study and permit the segment from St. Petersburg to Tampa than it will take for the more advanced Tampa – Orlando segment. In order to meet a start of construction date of November 2003, the Authority recommends that the initial phase of high speed rail have two parts.

Phase 1/ Part 1:
Tampa to Orlando with start of construction November 2003

Phase 1/ Part 2:
Tampa to St. Petersburg with start of construction in 2005

An important consideration in the Authority's evaluation is the constitutionally mandated construction start date of November 1, 2003.

Figure 3
St. Petersburg-Tampa-Orlando Corridor



Station Locations

Nine candidate station locations have been preliminarily identified. These locations will be evaluated in detail in the preliminary engineering and environmental studies currently underway for the corridor.

In St. Petersburg, one station location has been considered at the Gateway Area ① near the airport.

In Tampa, three candidate locations have been identified. These locations are in the Westshore Area ②, north of the Tampa CBD ③ and at Tampa Union Station ④. The Tampa Union Station location is served by the existing CSX rail line. The Westshore and Tampa CBD locations are west of the Interstate 4 / Interstate 275 interchange.

There are two candidate station locations in the Lakeland area. One of these is located near Kathleen Road at Interstate 4 ⑤. The second is located along the CSX alignment in downtown Lakeland at the existing Amtrak Station ⑥. The choice of a station location in Lakeland is dependent on the route – either Interstate 4 or CSX – that is ultimately selected.

There are three station locations under consideration in the Orlando area. These include locations at the Walt Disney World Resort ⑦, the Orange County Convention Center ⑧, and Orlando International Airport ⑨.

The Authority recognizes that a final determination of the station locations for the initial phase is a complex and critical issue. Cost, revenue and financing of the proposed stations will be studied in detail by the Authority in 2002.

4 Preliminary Evaluation

"The system shall be capable of traveling speeds in excess of 120 miles per hour…"

—- FS Chapter 341.822

As part of its activities in 2001, the Authority conducted a preliminary evaluation in order to develop a funding model (consistent with the requirements of FS Chapter 341.822) that identifies the State of Florida's potential contribution to the system. This section of the report addresses that requirement by presenting a preliminary analysis of technologies, infrastructure, operating plans, ridership, revenue and benefits/cost ratios. Key assumptions are summarized in Appendix A.

The Authority recognizes that detailed engineering studies, an investment grade ridership study and environmental evaluations need to be completed to further develop the high speed rail concept and to validate the conclusions that can be drawn from this preliminary analysis. These results should therefore be considered subject to change.

A wide-range of alignments, station locations and technologies were reviewed as input to this analysis. This preliminary analysis is not intended to rule out any of the possible options in the corridor. The Authority has repeatedly and consistently expressed the importance of encouraging open competition for viable technologies and business plans.

Technologies

A wide array of equipment choices is available. Choices range from conventional diesel-electric propulsion operating on steel rails to innovative magnetic levitation technology. Modern passenger car technology can be either "tilt" that allow for higher comfortable speeds for a given alignment, or conventional "non-tilt" design.

High speed technologies can be generically grouped into four classes corresponding to operating speed. The 120-mph and 150-mph technologies are self powered, either conventional diesel-electric or the emerging gas-turbine technology. The 180-mph technology uses electric power fed directly from an overhead wire catenary system. An example of the 180-mph technology is the French TGV system. Magnetic levitation, or Maglev, is the sole option for high speed ground transportation at speeds of 250-mph, or greater. With this

The Authority has repeatedly and consistently expressed the importance of encouraging open competition for viable technologies and business plans.

Below: Maglev Technology

technology, vehicles are magnetically levitated and propelled along guideways. Maglev technology is operating at test tracks in Japan and Germany.

The characteristics of high speed technologies are summarized in Tables 4.1 and 4.2. It should be noted that each of the technologies is described in terms of best-case operation rather than equivalent operation. Factors such as number of trainsets, size of trainsets and frequency differ among the four technologies compared.

Table 4.1
Train Technology Specifications

	120+mph	150+mph	180+mph	250+mph
Consist[1]	1+7+1	1+4+1[2]	1+5+1	2-car unit
Motive Power	Diesel-electric	Gas-turbine	25 KV 50Hz Electric	Electromagnetic Magnetic Levitation
Power Car/Locomotive Weight (tons)	45 each	115 each	75 each	---
Total Horsepower	2,000 - 3,000	4,000 - 5,000	12,000	---
Maximum Axle Load (tons)	20	27	19	---
Buff Strength (tons)	268[3]	400	200	---
Maximum Design Speed (mph)	125	150	185	310
Maximum Commercial Speed (mph)	120	150	185	300
Seating Capacity (per coach) [4]	36	65	60	96
Seating Capacity (per train)	252	260	300	192

Notes: *(1) For the three steel-wheel-on-steel-rail technologies, the first number indicates the lead locomotives in the consist; the second, the number of passenger cars; and the third number, if present, is the trailing locomotive and/or cab car (see note 2).*

(2) The 150+ mph technology includes 1 locomotive and 1 cab car.

(3) The 120+ mph technology examined in this study is currently undergoing redesign to make it compliant with FRA requirements.

(4) All passenger cars in this study are configured as having only one class, with a minimum seat pitch of 39 inches.

	120+mph	150+mph	180+mph	250+mph
Consist [1]	1+7+1	1+4+1	1+5+1	2-car unit
Cost per Trainset (millions)	$16	$17	$18	$15 [2]
Required Initial Number of Trainsets [3]	6	6	7	7
Rolling Stock (millions)	$96	$102	$126	$105
Cost per Seat (thousands)	$63	$65	$60	$78

Table 4.2
Rolling Stock Cost Summary

Notes: *(1) For the three steel-wheel-on-steel-rail technologies, the first number indicates the lead locomotives in the consist; the second, the number of passenger cars; and the third number, if present, is the trailing locomotive and/or cab car.*

(2) Other recent studies included a 25-40 percent non-production contingency on Maglev costs, which was not applied in this case.

(3) For each of the technologies, the trainset requirement includes a spare trainset.

Capital Cost of Infrastructure

Preliminary estimates of capital cost have been prepared for a wide range of route options in the corridor including routes using the Interstate 4 and CSX alignments. The options also include variations in station locations along the corridor.

From St. Petersburg to Tampa, the preliminary alignment used for this analysis is located in the I-275 corridor and crosses Tampa Bay on a new bridge adjacent to the Howard Frankland Bridge. From Tampa to the vicinity of the Orange County line, alternatives were evaluated that primarily used either the Interstate 4 or the CSX alignments.

The preliminary estimates of capital cost examined three basic technology options for the alignments that were evaluated. These were non-electrified rail (120-150-mph), electrified rail (180-mph) and Maglev (250-mph).

Preliminary cost estimates were prepared in 2000 dollars as shown in Table 4.3. Key assumptions and unit costs are summarized in Appendix A.

Segment	Non-electric (120-150 - mph)	Electrified (180 - mph)	Maglev (250 - mph)
Phase 1, Part 1 - Tampa - Orlando	$1,090 - $1,300	$1,470 - $1,650	$5,820 - $6,140
Phase 1, Part 2 - St. Petersburg - Tampa	$700	$740	$1,100
TOTAL	$1,790 - $2,000	$2,210 - $2,390	6,920 - $7,240

Table 4.3
Range of Preliminary Capital Cost Estimates by Technology
($ Millions)

Note: *A 25% contingency was used for all technologies*

Grade Separated Crossings

Grade separated crossings vertically separate automobile and pedestrian traffic from high speed rail. The preliminary cost estimates for Maglev and for steel rail segments within the right-of-way of Interstate highways have included grade-separated crossings. Certain options include use of the CSX alignment to approach existing rail stations in urban areas. For these segments, costs were examined both with and without grade separated crossings.

The Authority reviewed the issue of grade separated crossings and concluded that high speed rail should be grade separated from automobile and pedestrian traffic in order to provide reliable and efficient service. However, there may be instances where at-grade crossing may be considered due to factors such as physical constraints, cost and community impacts. In exceptional cases, the Authority agreed that at-grade crossings could be considered on a case by case basis.

Preliminary Operating Plan

Preliminary operating plans were prepared for a range of routes and technologies. The operating plans addressed travel times, frequencies and schedules.

Travel Times

Travel times were estimated based upon the alignment, station locations and the operating characteristics of various technologies. Key assumptions used in the development of travel time estimates included recovery times in the event of unanticipated delays (between 5% and 8% of estimated travel time), 2-minute station dwell times and 20-minute turn around time.

Table 4.4 compares the range of travel times by technology option for the alternatives studied. The results show that the travel time estimates vary only slightly by technology, indicating that the alignments or routes between Tampa and Orlando limit the operating speeds of the higher level technologies.

Table 4.4
Range of Travel Time Estimates by Technology
(Hours : Minutes)

Segment	120 - mph	150 - mph	180 - mph	250 - mph
Phase 1, Part 1 - Tampa - Orlando	1:01 - 1:19	0:56 - 1:17	0:58 - 1:09	0:55 -1:08
Phase 1, Part 2 - St. Petersburg - Tampa	N/A	0:09	N/A	N/A
TOTAL	N/A	1:05 - 1:26	N/A	N/A

Notes: *(1) For this preliminary evaluation, Phase 1, Part 2 from St. Petersburg to Tampa was estimated for a single route and the 150-mph technology.*

(2) The alignments, or routes, considered between Tampa and Orlando limit the ability of technologies to achieve maximum speeds resulting in similar travel times.

Service	120 - mph	150 - mph	180 - mph	250 - mph
St. Petersburg[1] - Tampa - Lakeland - Orlando	12	14	18	20
Orlando Urban Area Service Area[2]	8	6	8	10

Table 4.5
Assumed Frequency of Service by Technology
(Daily Roundtrips)

Notes: *(1) Frequency to St. Petersburg is only considered for the 150-mph technology.*

(2) Orlando Urban Area Service circulates between Orlando International Airport and Orlando Area Attractions.

Frequency of Service

Frequency of service is a key input to the operating plan and the planning level ridership forecast. Frequencies were determined on the basis of providing convenience to passengers and sufficient capacity to accommodate anticipated ridership. For this analysis, more frequent service was assumed as the speed of technology was increased. The assumption of increased frequencies and a better quality of service for the higher speed technologies has a significant impact on the ridership forecasts for the various technologies.

Planning Level Ridership and Revenue Estimates

For this preliminary evaluation, a series of planning level ridership estimates was prepared for alternatives within the St. Petersburg, Tampa and Orlando corridor. The alternatives addressed differences in routes, technologies and station locations within the corridor.

Several existing data sources were used as input for the ridership and revenue estimates. These included origin-destination data from previous studies. A number of weaknesses were noted with the existing data sets, and while these were addressed in this study, a much more detailed ridership study will need to be conducted to improve upon the current planning level estimates. The Authority plans to conduct detailed origin-destination surveys and prepare a study that meets investment grade requirements in 2002.

Ridership Forecast

Ridership forecasts were prepared for the various technology options and routes. In all cases, the first year of service was assumed to be 2007 from Tampa to Orlando. Service from St. Petersburg is assumed to be operational in 2009.

Many of the alternative studies were only evaluated for the Tampa – Orlando segment of the corridor as there is considerably more information available for this segment. At this time, information for St. Petersburg to Tampa is only available for the 150-mph technology. It is also worth noting again that the frequencies of service vary by technology. A more detailed explanation of the preparation of the ridership forecasts and revenue estimates is available as a separate technical report. Table 4.6 summarizes the preliminary ridership forecasts.

Table 4.6
Ridership Forecasts by Segment and Technology
(Trips per Year in Millions)

Segment / Technology	Frequency (trains / day)	2007	2010	2020	2036
Tampa - Orlando					
120 - mph	12	1.05	2.58	3.41	5.32
150 - mph	14	1.30	2.96	4.06	6.51
180 - mph	18	1.35	3.17	4.34	6.97
250 - mph	20	1.52	3.58	4.91	7.87
St. Petersburg - Tampa - Orlando					
150 - mph	14	N/A	3.51	4.81	7.72

Notes: *(1) For this preliminary evaluation, Phase 1, Part 2 from St. Petersburg to Tampa was estimated for a single route and the 150-mph technology.*

(2) Although travel times are similar for each of the technologies (see Table 4.4), differences in ridership are largely attributable to frequency of service.

Table 4.7
Average Fares by Technology

Segment	120 - mph	150 - mph	180 - mph	250 - mph
Fare per Passenger Mile	$0.30	$0.35	$0.37	$0.40

Table 4.8
Revenue Estimates by Segment and Technology
(Millions)

Segment / Technology	2007	2010	2020	2036
Tampa - Orlando				
120 - mph	$18.01	$43.01	$58.93	$94.56
150 - mph	$25.54	$60.22	$82.52	$132.42
180 - mph	$29.36	$69.18	$94.79	$152.10
250 - mph	$37.19	$87.84	$120.36	$193.14
St. Petersburg - Tampa - Orlando				
150 - mph	N/A	$71.41	$97.85	$157.02

Revenue Estimates

A revenue structure was developed for each of the four technologies. Due to the competitive nature of the corridor, where auto mode travel is currently highly popular, fares were kept at relatively low unit (per passenger mile) levels. The average fares based on full and different types of discount fares were determined for the four technologies and are summarized in Table 4.7.

In addition to the farebox revenues, total system revenues also include ancillary revenues. The ancillary revenues were estimated and found to add eight percent to the farebox revenues for the system. This factor is based on empirical evidence and can be attributed to the aggregate of revenues from concessions and parking at stations (3 percent), express parcel service (2.5 percent), and on board services (2.5 percent). The projections of total annual revenues and their breakdown are summarized in Table 4.8.

Disney Contract Ridership

Walt Disney Company has furnished written documentation of travel between the Walt Disney World Resort and Orlando International Airport. This documentation indicates that 841,000 passengers per year were transported by contracted bus services in 2000.

Assuming an $8 fare per trip, the Disney ridership has a value of about $6.7 million per year if it were diverted to high speed rail. Disney representatives have consistently stated that this ridership could be redirected to a direct, non-stop system running between the Walt Disney World Resort and Orlando International Airport. For this preliminary analysis, the Disney ridership has not been included.

Operating and Maintenance Costs

Operating and maintenance costs were derived from a variety of sources including suppliers, operator history, testing programs and previous studies. The operating and maintenance unit costs may be found in Appendix A. These were applied to annual train miles developed for the frequency and schedules for each technology. The range of annual operating and maintenance cost estimates (current year dollars) for the alternatives studied are summarized in Table 4.9.

Operating Ratios

A key measure of success of a high speed rail passenger service is its ability to produce operating revenues that equal or exceed the operating costs for the system. The projected operating ratios for the various technologies are summarized in Table 4.10 where an operating ratio greater than 1.00 indicates that operating revenues exceed operating costs.

Benefits to Costs Comparison

The proposed high speed rail service is expected to provide a wide range of benefits, contribute to regional economic growth,

Segment	120 - mph	150 - mph	180 - mph	250 - mph
Phase 1, Part 1 - Tampa - Orlando	$26.2 - $31.3	$32.2 - $36.8	$40.8 - $44.9	$40.8 - $45.4
Phase 1, Part 2 - St. Petersburg - Tampa	N/A	$6.0	N/A	N/A
TOTAL	$26.2 - $31.3	$38.2 - $42.8	$40.8 - $44.9	$40.8 - $45.4

Table 4.9
Range of Estimated Annual Operating and Maintenance Costs by Technology ($ Millions)

Note: *For this preliminary evaluation, Phase 1, Part 2 from St. Petersburg to Tampa was estimated for a single route and the 150-mph technology.*

Table 4.10
Projected Operating Ratios by Segment and Technology in 2010

Segment / Technology	Total Operating Revenues ($ millions)	Total Operating Costs ($ millions)	Operating Ratio
Tampa - Orlando			
120 - mph	$43.01	$31.19	1.38
150 - mph	$60.22	$36.49	1.65
180 - mph	$69.17	$46.34	1.49
250 - mph	$87.84	$46.90	1.87
St. Petersburg - Tampa - Orlando			
150 - mph	$71.41	$41.42	1.71

Table 4.11
Benefits to Costs Comparison
(30-year Present Value in $ Millions)

Segment / Technology	120 - mph	150 - mph	180 - mph	250 - mph
Tampa - Orlando				
Total Benefits	$1,486	$2,009	$2,285	$2,839
Total Costs	$1,502	$1,577	$1,985	$5,563
Ratio of Benefits to Costs	0.99	1.27	1.15	0.51
St. Petersburg - Tampa - Orlando				
Total Benefits	N/A	$2,380	N/A	N/A
Total Costs	N/A	$2,138	N/A	N/A
Ratio of Benefits to Costs	N/A	1.11	N/A	N/A

Note: *Operating revenue includes farebox and ancillary revenues*

Table 4.12
Estimated Indirect Benefits of HSR
(Tampa to Orlando)

Employment (New Jobs)	Average Household Income ($'s / year for corridor households)	Aggregate Property Value Increase ($ millions)
5,000 - 8,000	$250 - $450	$750 - $1,500

and improve mobility between the major corporate, industrial and tourism centers of Florida. The economic benefits reflect how travelers benefit from the proposed high speed rail system, and community benefits, which show how the individuals living in the corridor benefit through supply side impacts.

Indirect Benefits

Transportation efficiency has long been recognized as one of the potential drivers of economic growth. Indirect/supply side benefits may be derived from an improvement in transportation efficiency, as measured by increases in accessibility and connectivity, which decrease the actual and perceived total cost of traveling to market centers. Preliminary estimates of indirect benefits in terms of employment, income and property value increases throughout the corridor are shown in Table 4.12.

Future Service to Miami

Florida Statute Title XXVI, Chapter 341.822 defines the initial system as St. Petersburg, Tampa and Orlando with future service to Miami. In order to understand the characteristics of the future service in terms of ridership, revenues and cost, a preliminary planning level analysis was prepared for the proposed system with an extension to Miami.

Preliminary cost estimates for a future extension to Miami were developed based on the unit costs developed for the St. Petersburg to Orlando segments. In 2000 dollars, these costs are shown in Table 4.13.

Operational characteristics of a system that includes St. Petersburg, Tampa, Orlando and Miami were estimated on a generalized basis. For these estimates a single technology (150-mph) was examined and service would begin in 2010.

Table 4.13
Indicative Capital Cost Estimates - Orlando to Miami
($ Millions)

Non-electric (120-150 mph)	Electrified (180 mph)	Maglev (250 mph)
$3,500	$4,600	$17,100

Table 4.14
Indicative Characteristics of Future Service to Miami

	2011
Annual Operating and Maintenance Cost	$123.7 million
Annual Ridership	7.8 million
Annual Revenue	$300 million
Operating Ratio	2.42
Ratio of Benefits to Costs	1.41

5 Funding Sources

Florida Statutes require the Authority to minimize state funding of the proposed high speed rail system, and to identify the level of state funding over the next 30 years. The Authority is fully committed to implementing a plan that will indeed minimize funding by the State of Florida. However, at this early stage of the project, the amount of the State's contribution cannot be reliably determined. This amount will be determined when proposals are received from the private sector.

Florida Statutes also require that the Authority identify the value of in-kind contributions required from the State and its political subdivisions. The Authority anticipates that use of publicly owned right-of-way will be the most significant in-kind contribution of the State and its political subdivisions. The value of use of public right-of-way and, if applicable, other in-kind contributions will be estimated in the preliminary engineering phase of the project.

The Authority recognizes that similar to other transportation systems in the State, public participation in the construction of the infrastructure will be required for the system to be financially viable. This section identifies possible funding sources and incentives that may be used to finance the proposed high speed rail system.

Federal Funding Sources

This section provides an overview of the existing federal programs that may be utilized in the implementation of Florida high speed rail. Additionally, pending federal legislation that is currently being considered by the U.S. Congress is described below. The State of Florida Miami-Tampa-Orlando corridor is a high speed rail corridor designated under section 104(d)(2) of title 23, United States Code.

High Speed Rail Assistance Program: This program extends the life of the existing high speed rail corridor planning and technology development program created in the Swift Rail Development Act of 1994. The Secretary is authorized to provide financial assistance for up to 50 percent of the publicly financed costs of corridor planning activities and up to the full cost of technology improvements.

The TEA-21 authorization covers fiscal years 1998 through 2001 and is a General Fund authorization, which means that the fund must be made available in an Appropriations Act before the program can be implemented. In fiscal year 2001, $10 million was authorized for high speed rail corridor planning activities, and $25 million was authorized to sup-

The Authority is fully committed to implementing a plan that will indeed minimize funding by the State of Florida.

port the development of high speed rail technology improvements. No authorization levels are specified under TEA-21 for fiscal years 2002 or 2003; the remaining period covered under TEA-21.

High Speed Rail Grade Crossing Improvement Program: The purpose of this program is to reduce or eliminate the hazards at highway-rail grade crossings in designated high speed corridors. Administered by the Highway Trust Fund (rather than the Mass Transit Account) funding is provided for fiscal years 1998-2003 totaling $31.5 million. An authorization for an appropriation is provided for an additional $75 million for the fiscal years 1999-2003.

Magnetic Levitation Transportation Technology Deployment Program: This program encourages the development and construction of an operating transportation system employing magnetic levitation capable of safe use by the public at a speed in excess of 240 miles per hour. Contract authority is out of the Highway Account of the Highway Trust Fund. The funds associated with this program are already allocated to existing projects underdevelopment.

The *High Speed Rail Investment Act of 2001 (Proposed):* The legislation would authorize between $7 and $12 billion in bonding authority to the National Railroad Passenger Corporation (Amtrak) for fiscal years 2002 through 2011. The "Qualified Amtrak Bonds" would be issued by Amtrak and the interest on the bonds would be supported by federal tax credits provided to the bond holders in lieu of interest payments made by Amtrak, or any other "eligible intercity rail provider".

The Rail Infrastructure Development and Expansion Act of 2001 – Young Bill (Proposed): Currently under review in the U.S. House of Representatives, this legislation would permit states to issue up to $3.6 billion annually in tax exempt bonds or a 10-year total of $36 billion. One primary benefit of this bill is that the "private activity bond" limitation would be lifted, allowing states to finance high speed rail projects on privately-owned freight lines or where the service operator would not otherwise allow the utilization of tax-exempt debt. For example, FHSRA could enter into a long-term operating franchise with a private company and still potentially issue tax-exempt revenue bonds to finance capital costs. Unlike the tax credit bonds proposal, debt issued under this act would require the issuer to repay both principal and interest.

The draft bill states that the Secretary of Transportation may authorize the issuance of high speed rail infrastructure bonds for projects on viable corridors that eliminate at-grade crossings. The Secretary is to give priority to projects that will receive state funding and will promote intermodal coordination of transportation facilities.

The proposed RIDEA legislation would also increase the existing RRIF program (described under Innovative Finance Programs) to $35 billion. The money would be available as loans or credit enhancement for passenger rail projects.

Federal Credit Programs: U.S. DOT has two credit/loan programs available that could be used for high speed rail: the RRIF program and the TIFIA program. These are not funding programs, but rather provide for credit enhancement of or loans to projects whose revenues and other attributes limit traditional financial market access. RRIF and TIFIA are discussed in more detail in the financing strategies section.

State Funding Sources

This section describes the potential state funding sources, incentives and in-kind contributions that could be considered in developing a plan of finance for Florida high speed rail.

Use of Public Right-of-Way: The Authority is requesting (see Section 6 - Legislation) similar powers to those currently used by the Florida Department of Transportation to donate publicly owned rights-of-way for the high speed rail system.

Tax Exemptions, Credits or Rebates: A common way for government to provide incentives to private sector economic development projects is with tax exemptions, tax credits, or tax rebates. Examples of how these incentives may be applied on this project include:

- Exemption from property taxes
- Exemptions on intangible property tax
- Tax credits or rebates
- Sales or use tax incentives through exemptions, credits or rebates for purchase o f goods and materials for the rail system infrastructure, rolling stock, energy taxes (fuel or electricity) and sales tax on ticket sales.
- Exemptions, credits or rebates for capital investments expanded from those currently provided for major capital investment.

Tax Deferment: Defer the payment of taxes for a number of years such as when the project becomes profitable.

Waiver of Regulatory Fees, Impact Payments and Certification Fees: Current statutes provide for a certification fee of $2,000 per mile of alignment, with a minimum fee of $60,000. The Statute could be revised to reduce or eliminate the fee. Similarly, current statutes allow local governments to impose fees on the development of a high speed rail system, including stations and associated developments. The Statute could be modified to reduce or eliminate the fees.

Limitation on Liability and Special Insurance Provisions: Legislation could be enacted to limit the liability for a high speed rail operator to a specific amount and require insurance to that amount. This would also enhance the financibility of the project by establishing a known risk factor for potential liability.

Tax Exempt Bonds: The Internal Revenue Code provides for tax exempt private activity bonds for high-speed intercity rail facilities (not including rolling stock), using vehicles that are reasonably expected to operate at speeds in excess of 150 miles per hour between scheduled stops, but only if such a facility will be made available to members of the general public as passengers. Seventy-five percent of such bonds do not count against the state volume cap imposed for private activity bonds.

Florida Department of Transportation and State Transportation Trust Fund: State contributions would likely be made over the long-term (e.g. 20 to 30 years) and would be funded through the State Transportation Trust Fund (STTF). A potential source of funding within the STTF for high speed rail might be the Transportation Outreach Program (TOP). This program is funded at approximately 1-cent state gas tax from the funds previously used to pay for the southeast Florida rail corridor and once targeted for high speed rail.

FDOT currently does not have the statutory authority to issue debt to support the proposed high speed rail project. As

an alternative, recurring FDOT contributions could support a long-term rail car lease and/or revenue bonds issued by the FHSRA. Any FDOT payments would be subject to annual appropriations and not a pledge from FDOT to the FHSRA or a lessor. Annual appropriations require FDOT to approve within its annual budget the committed contribution as well as approval by the Florida Legislature. In this case, the lessor would be assuming appropriation risk should the Florida Legislature decide to not appropriate the contributions in the State's annual budget.

Local Funding Strategies

Due to the economic benefits of rail development, local municipalities or districts in which stations are located should be considered as potential funding partners in the introduction of high speed rail. Local funding strategies might include:

Tax Increment Financing: Tax increment financing is a method for "capturing" the value of property tax revenue created by development within a specified area, over and above that which existed at the time the tax increment financing district was established. The existing tax revenues continue to be distributed to the city, county, school district and special districts in their historical relationships. Any new tax revenues over and above this base become "tax increment" and are available to the tax increment district.

Benefit Assessment Financing: This refers to the application of an annual fee to property owners located within a specific radius of high speed rail station locations. The fee is imposed based on the estimated value to the property owners created by the implementation of high speed rail service.

Station Development Area Revenues/ Contributions: Much of the benefit from high speed rail (e.g. increased access which can promote commercial and dense residential development and lead to increased property value) accrue to the immediately surrounding station areas. As such, station areas and the municipalities that encompass them should be looked to as a potential funding source.

Ancillary Revenues

For the purposes of this preliminary report, ancillary revenues are only addressed as reasonably estimated percentages of revenue as shown in Section 4. The contractual mechanisms required to rely on such revenues will be reviewed by the Authority in more detail in 2002. Ancillary revenues typically include advertising, naming rights, concessions and parking revenues.

Financing and Revenue Enhancement Strategies

This section identifies the components underlying the decision to utilize debt financing. Specific financing strategies follow:

Municipal Bonds*:* Referred to generically as interest-bearing obligations issued by state and local governmental entities, municipal bonds are used to finance capital costs. Municipal bonds have certain common characteristics, can take many forms and can be payable from different sources. The principal characteristic that has traditionally set municipal securities apart from all other capital market securities is the federal tax exemption. As FHSRA considers different forms of private sector involvement in the proposed system, close watch should be kept of tax-exempt bonding consequences.

General Obligation/Full Faith and Credit Bonds: General obligation securities are backed by the full faith and credit of state and local governments. The taxing power of the government is subject to only the broadest constitutional or statutory limitations, if any. As such, they are the most secure credit ratings of municipal bonds. Like the FHSRA, most municipal authorities and agencies do not have taxing power nor general obligation bonding capacity.

Revenue Bonds: Revenue bonds have enabled state and local governments to finance a wide range of projects. Toll roads and bridges, airports, water and sewer system facilities, health care facilities, and electric utility projects have been generally financed by non-recourse revenue bonds. Revenue bonds are typically secured solely by a revenue pledge, by related covenants of the issuer to assure the adequacy of the pledge revenue sources, and sometimes by a lien on the assets financed by the issuance of the revenue bonds. Bond holders have no recourse to any other revenues or assets of the issuing entity. This report assumes that any bonds issued by FHSRA would be revenue bonds and would not carry the full faith and credit of the State.

Grant Anticipation Notes (GANs): These are short-term notes issued in anticipation of grant monies to be received from some other governmental body or agency. GANs are used particularly to initiate the construction, operation, etc., of a project despite the fact that the grant monies have not been received. One new development in transportation finance is to issue GANs backed by the future receipt of federal discretionary grant proceeds pursuant to a Full Funding Grant Agreement (FFGA) or some similar grant contract.

Lease Financing: Lease financings are structured to take advantage of a government's general credit without the pledge of a specific revenue source and, usually, without the need to secure voter approval. In most cases, facilities financed through lease-purchase are essential to the operation of the governmental entity (e.g. maintenance facilities, rolling stock, etc.). As a result, the investor has added security against a default in lease payments. Lease financing of the high speed rail rolling stock could be a very important piece to the overall financing plan.

Innovative Finance Programs

The tax-exempt bond market has grown in the past decade to become a major component of the domestic securities industry. The introduction of new and expanded financing devices has contributed to this growth. Debt financing for rolling stock, stations and fixed guideway is now commonplace, particularly in light of the U.S. DOT's overmatch and innovative financing initiatives. The entire spectrum of conceivable revenue streams has been used to provide security for the bonds including sales tax, gas tax, transit farebox revenues, grant proceeds, and developer contributions.

In addition to more creative use of municipal debt financing, the Federal Transit Administration (FTA), FHWA and FDOT have created and encouraged the use of innovative financing and related programs. Several of these programs that the FHSRA may want to consider are described below.

Railroad Rehabilitation and Improvement Financing: The Railroad Rehabilitation and Improvement Financing program is intended to make funding available

through loans and loan guarantees for railroad capital improvements. RRIF program funds may be used to provide direct loans and loan guarantees to: State and local governments, government sponsored authorities, corporations, railroads, and joint ventures that include at least one railroad. These loans are to be used to acquire, improve, develop or rehabilitate intermodal or rail equipment or facilities, including track, bridges, yards and shops. One version of proposed high speed rail legislation may greatly expand upon RRIF or at least upon the credit program concept for high speed rail.

Transportation Infrastructure Finance and Innovation Act (TIFIA): The Transportation Infrastructure Finance and Innovation Act of 1998 (TIFIA) provides Federal credit assistance to major transportation investments of critical national importance, such as intermodal facilities, border crossing infrastructure, expansion of multi-State highway trade corridors, and other investments with regional and national benefits. The TIFIA credit program is designed to fill market gaps and leverage substantial private coinvestment by providing supplemental and subordinate capital. The TIFIA credit program consists of three distinct types of financial assistance (product lines), designed to address projects' varying requirements throughout their life cycles: secured loans, loan guarantees, standby lines of credit.

GARVEE Bonds: GARVEE bonds (Grant Anticipation Revenue Vehicles) are quickly becoming the newest financing "avenue" for many transportation projects. Ohio, Massachusetts, Michigan, and New Mexico have led the way by issuing debt for highway projects guaranteed in total or in part by anticipated Federal Highway Administration (FHWA) aid grants. New Jersey has done the same for transit projects. In general, there are two types of GARVEEs: "Naked" and "Double Barrel." The former is a transaction where the debt service is paid solely from Federal funds, and the latter is a scenario where some other means (such as agency dedicated tax revenues) backs up the federal funding.

Florida State Infrastructure Bank: Florida's State Infrastructure Bank ("SIB") is an investment fund that offers loans, credit enhancements, and other forms of financial assistance to surface transportation projects that meet program standards. Recently passed Florida legislation increased State funding to Florida's SIB in order to assist projects not eligible under Title 23. However, the State General Fund budget shortfall may limit this additional capitalization of the SIB program.

6 Legislative Actions

During the 2001 session of the Florida Legislature, the Florida High Speed Rail Authority was created under Chapters 341.821 and 341.822, Florida Statutes. The statutes require that the Authority include in its report to the Legislature recommended changes to state statutes and/or federal law.

Florida Statutes

The majority of the recommended changes listed in this section relate to Article X, Section 19 of the Florida Constitution, which states that the construction of the high speed rail system must begin on or before November 1, 2003. In order to meet this Constitutional requirement, the Authority must seek additional powers during the 2002 session of the Florida Legislature. Those additional powers are outlined in this section. The outline below intends no priority order on the topics to be addressed.

The following topics should be amended into Chapter 341 to allow the Authority to fulfill both its constitutional and legislative requirements:

1. Add findings and legislative intent. A number of the legislative findings and intent language from the existing Florida High Speed Rail Transportation Act (Title XXVI, Chapter 341.321-341.501) should be amended into the Authority's legislation.
2. Add definitions. A number of definitions from the existing Florida High Speed Rail Transportation Act should be amended into the Authority's legislation to enhance reader understanding.
3. Add language to allow the Authority to function as an enterprise. Add language from the draft of HB 261, creating the Turnpike Enterprise, to provide flexibility for the Authority and to emphasize the Authority's intent to operate like a business.
4. Add authority to procure services using the Design-Building-Operation-Maintenance and Finance (DBOM&F) method. These additional powers are necessary to design and build a system and begin operations.
5. Add authority to seek funding using the DBOM&F method. The Authority will need the power to seek funding from all levels of the public sector, as well as the private sector, to support the high speed rail system.
6. Add authority to provide project financing through revenue bonds, certificates of participation or other feasible financing options. The high speed rail system will be developed, built and operated over a number of years requiring a variety of financing tools to support its development and operation.

Chapter 341 should be amended to allow the Authority to fulfill both its constitutional and legislative requirements.

7. Add authority for rule making. The Authority may need to adopt rules and define processes in order to develop and operate the high speed rail system.

8. Add authority to set and collect fees, rates or other charges for the right to develop a high speed rail system. The high speed rail system will likely be developed and operated though a public-private partnership and may involve the collection of fees, rates, etc. to support the development and operation of the system.

9. Add authority to raise revenues to support the cost of the high speed rail system through associated development, station naming rights, and public and private donations. The development and operation of the high speed rail system will require a variety of revenue sources such as these to support its development.

10. Add authority to use state owned right- of- way at no cost, to develop the high speed rail system. It is likely that some portion of the high speed rail system alignment will be located within right-of-way owned by the State of Florida. It is important that the State/FDOT be able to convey the use of this right-of-way at no cost to the Authority in order to minimize the cost of the system.

11. Add authority for eminent domain and ownership of land. It is likely some privately owned land will have to be acquired to develop the high speed rail system. Since the system meets the definition of a public purpose, the Authority needs the power of eminent domain to acquire land expeditiously.

12. Add authority to resolve conflicts between the high speed rail system and local government comprehensive plans. A high speed rail system will traverse a number of local governments, each with their own adopted comprehensive plan under Florida's Growth Management laws. In the event a conflict arises between the development of the system and a local government comprehensive plan, the Authority needs the power to resolve such conflicts.

13. Add authority to set terms of a DBOM&F contract to develop a high speed rail system and provide exclusive rights for the contractor. In the event the Authority issues a contract to the private sector to develop, operate and maintain a high speed rail system, the rights of that contractor will have to be protected from unfair competition from another rail system.

14. Add authority to use any of the following methods for determining the alignment of a high speed rail system: follow the transportation planning process in 339.175; follow a certification process (as defined in the existing Florida High Speed Rail Transportation Act); or use the FDOT's new Efficient Transportation Decision-Making (ETDM) system.

15. Add liability provisions similar to federal provisions for AMTRAK. In order to attract private sector participation in the high speed rail system, it is important to recognize their concerns about liability. Current federal law includes limitations on the

liability for the AMTRAK system. Similar language should be included in state law to address this concern for a high speed rail system.

16. Repeal sections of Chapter 341, Florida Statutes, "Florida High Speed Rail Transportation Act". Many of the provisions of the existing Act are recommended for incorporation into the Authority's existing legislation. Therefore, there is no need to retain the current Act and it should be repealed.

17. Add provisions identifying the five urban areas that are to be serviced by high speed rail in accordance with the Florida Vision Plan shown in Section 1 of this report and as adopted at the November 13, 2001 Authority Board meeting in Lakeland.

Federal Laws/ Regulations

The most relevant federal laws/regulations that may require modification relate to funding and safety. On the funding side, there are several federal proposals under discussion (at the time this report was first issued) that specifically address high speed rail. These proposals are discussed in Section 5.

As far as the safety of the High Speed Ground Transportation system, initial discussions have been held with the Federal Railroad Administration regarding the possible use of a highway median for this system. Given the lack of precedent in the U.S., the FRA may issue a special rule of particular applicability that provides the conditions under which the FRA would accept this use. That language will be developed as the project moves forward. Based on previous experience, the development of this special rule (if required) will be a significant challenge within the allotted time frame.

Appendix A: Supplement to Section 4

Key Assumptions

Technology:

- All the technologies would be commercially available in time for beginning of operations.
- The trainset requirement includes an allowance for a spare trainset.
- Other studies done by FRA have included a 25-40% non-production contingency on Maglev rolling stock and on operating & maintenance costs. This contingency was not included in this report.

Infrastructure Assumptions:

- The new system alignment follows the curvature of the existing corridor without attempting to straighten curves.
- The study assumes that overpass bridges on curved segments of the interstate must be rebuilt.
- The study applies tight curves to the proposed rail alignment that will limit speeds in order to avoid costly highway lane reconstruction.
- The cost of right-of-way within the existing CSX, FDOT, Expressways and OIA limits was not included in the capital cost estimates. Cost of new right-of-way outside of these limits was included.
- A 44-ft. wide envelope was assumed for HSR within the Interstate 4 and Greeneway medians and sufficient space exists within the medians of I-4 and the Greeneway to install a new system without significant reconstruction to the adjacent highway.
- The section of I-275 needed for Phase 1, Part 2 extension to St. Petersburg will be reconstructed as necessary to provide sufficient median under a highway capital program prior to construction of the high speed rail system.
- FRA and FHWA safety requirements will allow high speed rail to operate within a 44 ft. envelope as defined by the FDOT specification.
- CSX will allow construction of the new system on the existing railroad alignment with a horizontal separation between modes, not less than 25 ft.
- The report assumes that for sections of the project located in the highway median, separation barriers capable of restraining a train will only be required on curves. Normal, vehicular highway barriers are used on the remaining sections.

Operations:

- Travel time estimates include recovery time of 5% on the I-4 routes and 8% on the CSX routes.
- The assumed train turnaround time was 20 minutes.
- The variable O & M costs were escalated at the average annual growth rate of 3.1 percent to accommodate projected increases in ridership.

- Consistent with FRA methodology, the equipment maintenance costs allow the equipment to be fully maintained with both minor and major overhauls and any replacements needed over a 30-year life cycle. This is in effect equivalent to applying a depreciation charge.

Ridership:

- Traffic was assumed to grow at an average annual rate of 3.1 percent.
- Terminal time at rail stations was assumed to be 20 minutes for boarding time and 10 minutes for alighting time.
- For air travel, in addition to gate-to-gate time, terminal time of 60 minutes at the departing terminal and 30 minutes for the arriving terminal was assumed.
- Highway congestion was expected to increase, and as a result, highway travel times were assumed at the rate of less than 1 percent per annum.

Financial and Economic Analysis:

- The comparison of benefits to costs was based on the methodology used in the FRA's High-Speed Ground Transportation for America (Commercial Feasibility Study - CFS) study.
- Analysis in constant (year 2000) dollars.
- Real discount rate (long-term government bond less inflation) of 5% was used.
- The community/supply side benefits were estimated using the national rates and methodology developed for the Greater American Station Foundation (January 2001).

Table A.1
Preliminary Operating and Maintenance Costs by Technology
(per trainmile)

Operating and Maintenance Costs	Technology			
	120+mph	150+mph	180+mph	250+mph
Track Maintenance	$4.75	$4.42	$6.16	$2.00
Equipment Maintenance	$9.70	$11.01	$8.78	$9.23
Crew Costs	$6.69	$6.45	$6.06	$4.99
Fuel and Energy	$1.50	$3.13	$4.12	$5.68
OBS Costs	$1.90	$1.90	$1.90	$1.90
Station Costs	$1.98	$1.98	$1.98	$1.98
Insurance	$3.41	$3.07	$2.38	$2.12
Sales and Marketing	$1.86	$1.86	$1.86	$1.86
Administration	$2.70	$2.43	$2.38	$2.11
Operator Margin	$1.20	$1.34	$1.40	$1.45

Notes: *(1) Operating costs exclude financial charges such as depreciation.*

(2) Other recent studies included a 25-40 percent non-production contingency on Maglev costs, which was not applied in this case.

	Description	Unit	Unit Cost (Thousands)
Trackwork			
1.1	HSR on New Roadbed (Double Track)	per mile	$ 3,129
1.2	HSR on New Roadbed (New Embankment)	per mile	$ 1,865
1.3	Tie, Rail & Ballast (Class 6)	per mile	$ 670
1.4	Crash Wall, Type I (on curves)	per ft	$ 1.3
1.5	Crash Wall, Type II (on tangents)	per ft	$ 0.2
1.6	6 ft Chain Link Fence	per mile	$ 97
1.7	Land Acquisition (Tampa Area Urban)	per mile	$ 5,000
1.8	Land Acquisition (Orlando Area Suburban)	per mile	$ 2,500
1.9	Land Acquisition (Adjacent to RR property)	per mile	$ 300
1.10	Drainage	per mile	$ 528
1.11	Freight Separation	each	$ 100,000
1.12	Land Acquisition (St. Petersburg)	per mile	$ 5,000
1.13	New Double Track on Grade	per mile	$ 2,500
1.14	New Double Track on 10' Embankment	per mile	$ 4,200
1.15	CSX ROW (if applicable)		unknown
1.16	Station Area ROW		unknown
Stations/Maintenance Facilities			
2.1	TUS	each	$ 15,000
2.2	TUS with Elevated Platform	each	$ 30,000
2.3	Tampa Intermodal Station	each	$ 30,000
2.4	Lakeland Station	each	$ 10,000
2.5	Disney Station	each	$ 10,000
2.6	Orlando Convention Center Station	each	$ 10,000
2.7	OIA Station	each	$ 15,000
2.8	Maintenance Facility (for Non-Electrified Track)	each	$ 70,000
2.9	Maintenance Facility (for Electrified Track)	each	$ 85,000
2.10	St. Petersburg Gateway Station	each	$ 30,000
2.11	Tampa West Shore Station	each	$ 20,000
Turnouts			
3.1	Crossover #33	each	$ 1,700
3.2	Crossover #20	each	$ 500
3.3	Turnout #20	each	$ 236
Bridges			
4.1	Under (assume 4 lane hwy, 100 ' span)	each	$ 1,300
4.2	Over (assume 4 lane hwy bridge over Interstate)	each	$ 10,000
4.3	Flyovers/Viaducts (including direct fixation track)	per ft	$ 7
4.4	Structure over Old Tampa Bay	per ft	$ 9
4.5	High Structure over Old Tampa Bay	per ft	$ 14
Crossings			
5.1	Private Closure	each	$ 68
5.2	Four Quadrant Gates w/ Trap Vehicle	each	$ 560
5.3	Conventional Gates single mainline track	each	$ 231
5.4	Conventional Gates double mainline track	each	$ 261
5.5	Precast Panels (w/ rdwy approach improvements)	each	$ 152
5.6	Grade Separation	each	$ 3,000
Systems			
6.1	Signals, Communications & Dispatch	per mile	$ 1,500
6.2	Electrification (Double Track)	per mile	$ 3,000
6.3	Electrification (Single Track)	per mile	$ 1,500

Table A-2
Preliminary Unit Costs (Infrastructure)