



Bay Link

Miami • Miami Beach Transportation Corridor Study

September 2004

Locally Preferred Alternative Report

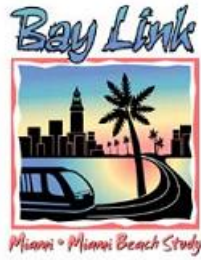


Miami-Dade Metropolitan
Planning Organization

and

U.S. Department of Transportation
Federal Transit Administration





MIAMI-MIAMI BEACH TRANSPORTATION (BAY LINK) CORRIDOR STUDY

REFINED LOCALLY PREFERRED ALTERNATIVE REPORT

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1.0 INTRODUCTION

The Miami-Miami Beach Transportation Corridor (Bay Link) Study investigates the feasibility of implementing a rapid transit connection between downtown Miami and south Miami Beach. The Federal Transit Administration (FTA) in cooperation with the Miami-Dade Metropolitan Planning Organization (MPO) completed the Alternatives Analysis and Draft Environmental Impact Statement (AA/DEIS) in October 2002. The AA/DEIS documents the Phase I development process for the Miami-Miami Beach Transportation Corridor (Bay Link) Study. The AA/DEIS phase of development provided:

- The engineering, conceptual design and analysis necessary to define the proposed alternatives and support the DEIS analysis and evaluation;
- The analysis necessary to identify adverse social, economic, and environmental impacts and opportunities to avoid, minimize, and mitigate those impacts;
- The implementation of a collaborative public involvement program necessary to gain support for the project and to reach consensus on an LPA for advancement into the Preliminary Engineering and Final Environmental Impact Statement (PE/FEIS) phase of development;
- Documentation of the development, selection, and adoption of the Locally Preferred Alternative (LPA); and,
- The development of a financial plan.

The AA/DEIS describes the alternatives considered and the process leading to the selection of the LPA. The DEIS report includes the purpose and need for the study; the formulation of goals, objectives and measures for evaluation; descriptions of the physical alignments; conceptual station locations; conceptual operating plans for the No-Build, TSM/Baseline and the Build Alternative (which also includes several design options); and, provides a review of the evaluation process. The DEIS also includes the capital cost estimates, operating and maintenance (O&M) cost estimates, forecast of transit riders, and the results of the user benefit calculations prepared for the proposed alternatives.

After an extensive public outreach process based on the goals and objectives supporting the Purpose and Need and the analysis contained in the DEIS, the public hearing for the Bay Link project was held on December 3, 2002. The MPO Governing Board selected the LPA on September 25, 2003. The adopted light rail technology (Streetcar) system was endorsed by the cities of Miami and Miami Beach.

In March 2004, the MPO Board approved an amendment to the consultant's contract for Phase 2 of the Bay Link Study. Phase 2 consists of refining the originally adopted LPA and preparing the Preliminary Engineering/Final Environmental Impact Statement (PE/FEIS) application (and supporting documentation) for submittal to the FTA.

1.1 Project Background

In 1995, an MIS/DEIS was prepared for the East-West Multimodal Corridor Study, which also included the Miami-Miami Beach Transportation Corridor. The study investigated the need for significant transportation improvements along State Road (SR) 836 to improve mobility in the corridor by examining several transportation options connecting the Florida International

University (FIU) campus, the Miami International Airport (MIA), downtown Miami, the Port of Miami and the Miami Beach Convention Center.

While the DEIS addressed the Miami-Miami Beach transit connection, this segment was not included in the LPA, and therefore was not advanced through the PE/FEIS phase of project development. A Record of Decision (ROD) for the East-West Study LPA was issued by FTA in September 1999. A referendum to increase the sales tax and provide a dedicated funding source for transit projects failed in November 2000. Without the necessary local funding match, the East-West Corridor Project was put on hold.

The Miami-Dade Expressway Authority (MDX) utilizing local and state funding has begun implementing the highway improvements proposed in the East-West Multimodal Corridor project. The proposed East-West transit connection still remains an important transportation concern for the region. With this in mind, the MPO has sought to identify a number of smaller scale transportation improvement projects that will have a positive impact on regional mobility through the Long Range Transportation Program (LRTP). These projects would be more manageable from a cost perspective and provide the much needed rapid transit connections required to increase the connectivity of the entire regional system. The Miami-Miami Beach transit connection (Bay Link) is one such project and has been listed as a priority project in the current LRTP.

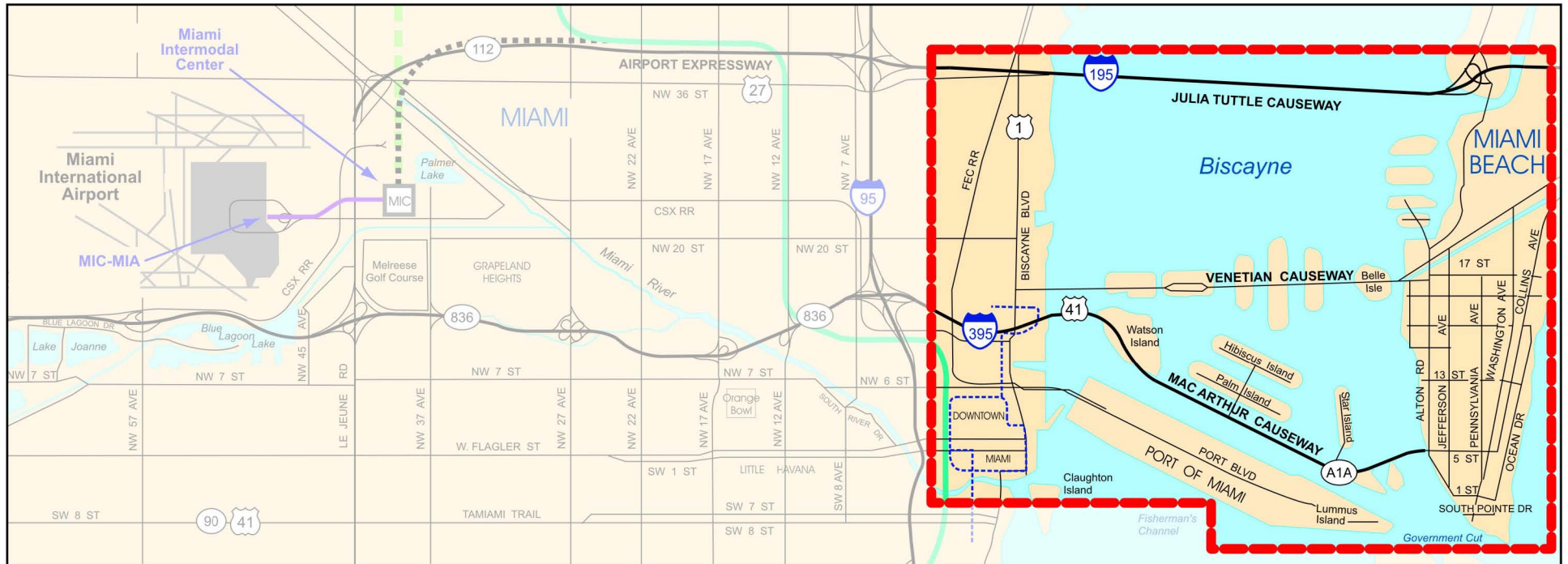
The alternatives from the East-West Multimodal Corridor Study DEIS and several new alignment and technology options were analyzed during the Bay Link AA/DEIS process. The Bay Link AA/DEIS supplements the previous efforts completed for the 1995 East-West Corridor DEIS by developing plans and engineering concepts, updating the data, and extending the design year from 2020 to 2025. Additionally, the study identified and analyzed potential impacts associated with the alignment modifications, facility locations, and other factors resulting from the scoping and public outreach processes.

1.2 Description of the Corridor

The study area (Figure 1) for the Bay Link AA/DEIS is bordered by I-95 on the west and the Atlantic Ocean on the east. The north-south boundaries extend from I-195 (Julia Tuttle Causeway) to the Miami River on the Miami side and along the south end of Miami Beach. The study area includes downtown Miami, south Miami Beach, Watson Island, the MacArthur Causeway, Terminal Island, as well as Star, Palm, and Hibiscus Islands.

The physical environment in the local study area is mostly “built-out” urban with high-intensity commercial development located in the downtown core along major roadways such as Biscayne Boulevard, Flagler Street, SE 1st Street and NE 1st Street. The development in downtown Miami tends to be largely retail, institutional, office and government services with Flagler and Bayside Marketplace as large shopping attractors. Public/private partnerships have also resulted in construction of the American Airlines Arena and the new Performing Arts Center. New high density residential/office development is planned along the Biscayne Boulevard corridor. Watson Island is also experiencing intense new development with the addition of the Children’s Museum, Parrot Jungle, and the proposed Island Gardens development, a new hotel/marina complex. In Miami Beach, the distribution of land use clearly shows the area’s adaptation to support the large tourist influx. Hotel, restaurant and retail trade dominate along Washington Avenue, Collins Avenue, Ocean Drive and Lincoln Road Mall. The Miami Beach Convention Center continues to be a major destination and economic engine for the region.

BAY LINK PHASE 2



LEGEND

-  Project Study Area
-  Earlington Heights Extension
-  Metrorail
-  Tri-Rail
-  Miami Metromover



There is also a large and increasing component of high-density residential development, concentrated in Miami Beach along West Avenue and in the South Pointe area, with lower-density, single-family residential development around Flamingo Park, Bayshore Golf Course and single-family residences on various Biscayne Bay islands. The high density residential condominiums are expanding rapidly to accommodate the influx of younger two income families.

1.3 Project Need

Downtown Miami and south Miami Beach continue to experience rapid growth and densification that has exceeded earlier population and employment projections. Growth in this area is constrained geographically by Biscayne Bay, the Miami River and the Atlantic Ocean. Relatively narrow streets and a chronic lack of parking results in congestion that makes access by private automobile increasingly difficult.

A high capacity transportation alternative that maintains mobility is essential to continue economic prosperity, sustainable growth and quality of life standards valued throughout the region. Several relevant study area statistics include:

- Existing resident population of 62,000 to increase to 80,000 by 2025;
- Approximately 98,000 jobs in the study area to increase to 121,000 by 2025;
- Approximately 4.7 million overnight visitors occupy the corridor per year; and,
- More than 500 Miami-Dade Transit (MDT) combined bus trips carry over 8,000 riders per day between Miami and Miami Beach along MacArthur Causeway.

Congestion is resulting in slower and less reliable travel times, longer trips and increasing levels of frustration. Based on the current peak period average level of service (LOS) ranging from D to F on area major roadways and a projected increase in congestion of over 24 percent in the next ten years, the Bay Link Project was designed to respond to the following needs:

- Provide the mobility and connections to assure that regional benefits from the substantial public/ private investment being made in the study area (Arena, Children's Museum, Parrot Jungle, Performing Arts Center, Convention Center expansion, Museum Park, etc.) are realized;
- Provide the added capacity and mobility offered by transit to support sustainable growth due to the natural features (Miami River, Biscayne Bay and other natural features) that limit any significant increase in roadway capacity;
- An effective transit link to tie the study area into the large transportation investments made to date in the region (4.2 billion 2004 \$'s) along with its planned expansion (additional 14.3 billion YOE \$'s);
- Emergence of downtown Miami as a residential area and tourism destination and the location of an increasing number of special events that will require greater accessibility;
- Good and reasonable access to jobs by transit is necessary to keep workers available and wages stable and competitive;
- Increased capacity and reliability is necessary to support the economic synergy between Miami and Miami Beach that fuels the region's economy; and,

- Provide circulation in the core of the cities to support current and future land use and serve as a focus for future system extensions.

2.0 DESCRIPTION OF ALTERNATIVES

The alternatives evaluated for the Bay Link DEIS phase included a No-Build, TSM/Baseline, Bus Rapid Transit (BRT) and several Light Rail Transit (LRT) alternatives. A Draft Locally Preferred Alternative Report for the originally adopted LPA was produced in October 2002. The focus of this report is on the refinement of the No-Build, TSM/Baseline (subject to FTA definition and approval) and the LPA proposed for use in the PE/FEIS Phase of Development and the New Starts Criteria Report. The Bay Link Project is currently reflected in the Miami-Dade LRTP and the PE/FEIS phase is included in the Transportation Improvement Program (TIP). The system is currently scheduled to start operations in 2023 under the December 2003 Board of County Commissioners approved Pro Forma. The design year for analysis of the Bay Link alternatives extends to 2025. The soonest the project could be placed in service, assuming reprioritization by the MPO Board, would be 2012.

2.1 No-Build Alternative

The No-Build Alternative includes the existing highway and transit facilities, transit services and those transit and highway improvements planned and programmed in the Miami-Dade MPO 2025 LRTP to be implemented by the 2025 design year. This alternative provided the baseline for establishing the environmental impacts of the project. All projects and improvements identified in the No-Build Alternative are also included in the LPA alternative.

2.1.1 No-Build Highway Improvements

The No-Build highway improvements include those projects that provide for an increase in capacity, such as new roadway construction, widening projects, and major interchanges. The project area improvements for the background highway network under the No-Build Alternative include the following:

- Express Lanes construction on SR 836 between NW 107th Avenue and NW 37th Avenue (Timeframe 2006-2010);
- Convert HOV to reversible HOV/HOT Lanes on I-95 (Timeframe 2016-2020);
- Add Lanes/Collector-Distributor Roads on I-395 (Timeframe 2016-2020);
- SR 836/I-95 Interchange Improvements (Timeframe 2016-2020); and
- Extend I-95 HOT lanes south of SR 112 (Timeframe 2020-2025).

2.1.2 No-Build Transit Improvements

The No-Build Alternative transit improvements identified in the 2025 LRTP (2004 Update) include:

- Construct Flagler Marketplace Passenger Activity Center (Timeframe 2006-2010);

- Extend Metrorail service from the Earlington Heights station to the Miami International Airport via the Miami Intermodal Center (Timeframe 2010-2015);
- Construct the North Corridor Metrorail extension to the Broward County line (Timeframe 2004–2012);
- Construct the Metrorail extension to SW 104th Street (Timeframe 2004–2009);
- Construct the South Miami Busway to Florida City (Timeframe 2004–2009);
- Construct the East-West transit line from FIU to the MIC (Timeframe 2010-2015);
- Construct Palmetto Metrorail extension (Timeframe 2004–2009); and,
- Improve bus service routes and level of service per MDT's Transit Development Program.

The major bus routes for the Bay Link study area are reflected in Figure 2. A detailed description of each of the bus routes is included in Appendix B.

2.2 TSM/Baseline Alternative

The TSM/Baseline Alternative (subject to FTA definition and approval) is defined as low cost, operationally-oriented improvements to address transportation problems identified within the corridor. It also provides a baseline against which all of the “Build” alternatives are evaluated. As a consequence, the TSM alternative has been designed to approximate as closely as possible the service and service levels provided by the build alternative short of significant capital investment in guideway. The Baseline Alternative includes all of the highway and transit improvements identified under the No-Build Alternative.

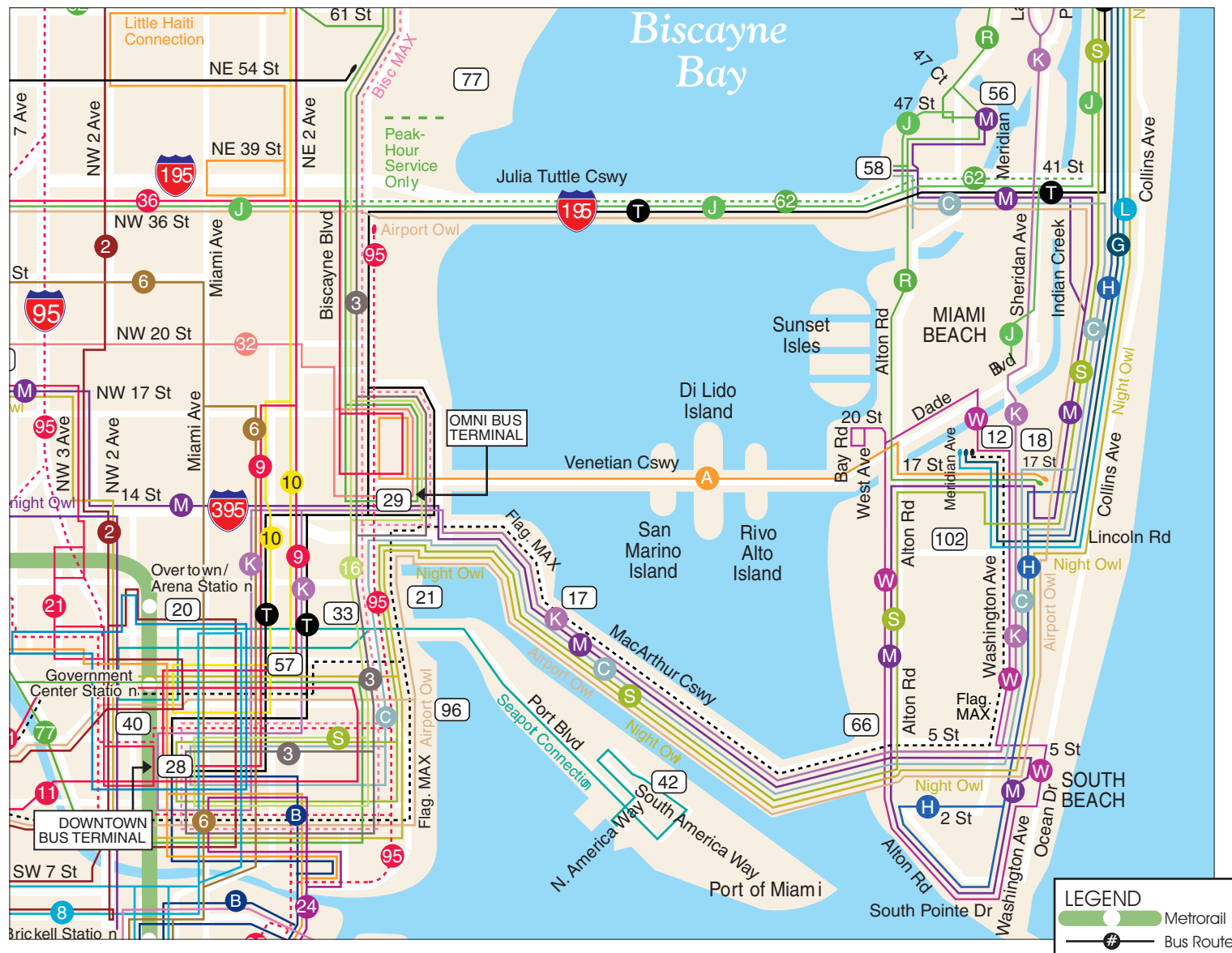
At the time that the East-West Multimodal Corridor Study DEIS was prepared, the TSM/Baseline Alternative consisted of low-cost operational improvements on SR 836, improved bus transit services, new transit centers, additional express bus routes, and new park-and-ride facilities. The highway improvements and new transit centers have subsequently been completed and are now part of the No-Build Alternative. Over 500 MDT buses and the Miami Beach Electrowave buses provide transit service in the study area over an extensive network of streets, major arterials and highways. As a result of the local combined bus frequencies, a number of the major roadways within the study area are currently saturated with bus service.

As a consequence, the defined TSM Alternative includes a number of limited road and street improvements along Washington Avenue, Alton Road, 5th Street, Biscayne Boulevard, Flagler Street, and NW 1st Avenue. These improvements consist of:

- Additional left-turn lanes and lengthened turning queues;
- Additional traffic signals and phasing modifications;
- Consolidation of bus stops at “station/superstop” locations similar to those identified for the streetcar LPA;
- Some removal of on-street parking (with off-street replacement lots);
- Improvements to access for buses and pedestrians;
- Signal pre-emption at key choke points;



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Figure 2
No-Build Alternative Bus Routes



- A new Bus Transfer Facility just south of 17th Street on the west side of Washington Avenue;
- Extension of West Avenue through to Dade Boulevard for traffic mitigation; and,
- Modification of the Terminal Island and MacArthur Causeway (Intercoastal Waterway) bridges to provide extra capacity for buses to mitigate these choke points.

The bus network for the TSM/Baseline Alternative is the same as previously described for the No-Build Alternative as shown in Figure 2. The background transit network for the No-Build, TSM/Baseline and the LPA 2025 network is reflected in Figure 3.

2.3 The Build Alternative - Light Rail (Streetcar) Transit

Based on the goals and objectives supporting the Purpose and Need and the DEIS analysis, the MPO Board adopted the LPA, a light rail (streetcar) system, endorsed by the cities of Miami and Miami Beach, on September 25, 2003. Phase 2 of the project, consisting of refining the LPA description, began in April 2004. A Preliminary Engineering/Final Environmental Impact Statement (PE/FEIS) application will be prepared and submitted to the Federal Transit Administration (FTA) along with the supporting documentation. Both the previous and current phases have benefited from an extensive public outreach process.

2.3.1 The Original Adopted LPA

The adopted LPA was approximately 10.4 route miles in length and included 25 stations. The Bay Link system includes two separate lines a Causeway Connector and a Beach Circulator exclusive to Miami Beach. The mileage does not include the lead track required to access the yard and shop site. The alignment and general station locations are shown in Figure 4 and the individual segments are discussed below:

- The downtown Miami segment of the system is approximately 2.8 route miles in length and is comprised of 12 stations (including the Watson Island station).
- The MacArthur Causeway segment which links downtown Miami and Miami Beach is approximately 3.3 route miles in length. The MacArthur Causeway segment includes the only two elevated stations in the system on Watson and Terminal Islands. The Watson Island station is located within the City of Miami and the Terminal Island station is located within the City of Miami Beach.
- The Miami Beach segment is approximately 4.3 route miles in length and includes 20 stations. Seven of these stations would be shared with the dedicated circulator that would provide service on Miami Beach only.
- The Beach Circulator overlaps with the Causeway Connector along Washington Avenue and Alton Road. The Beach Circulator loop from Dade Boulevard to South Pointe is approximately 5.1 route miles in length.

 Park & Ride Station

Figure 3

No-Build, TSM/Baseline and LPA Background Transit Network



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Figure 4

LPA Alternative (As Adopted by MPO Board September 25, 2003)



3.0 REFINING THE ADOPTED LPA

Since the September 25, 2003 approval, the adopted LPA has been subjected to an intensive technical and public review. Phase 2 of the Bay Link project development process consisted of the refinement of the LPA and the development of the PE/FEIS application request along with the New Starts Report and its supporting documentation. The process included “form and fit” meetings with the Planning and Public Works Departments from the Cities of Miami Beach and Miami to resolve any issues regarding the alignment or stations. The purpose of these meetings was to agree upon the starting point for the adopted baseline and define the process to be pursued in refining the LPA.

3.1 Public Involvement/Outreach

The public involvement/outreach program consisted of the formulation of the BLAC; an intensive station area planning process, and other means of communication. Figure 5 summarizes the Public Outreach Process, which identifies the public addressed, the items reviewed, the public comments, and the communication process/tools. The process was initiated by a discussion with the Public Involvement Management Team (PIMT) consisting of the project manager, lead technical disciplines, the communication consultants and the appropriate staff from the MPO, City of Miami and City of Miami Beach. After general concurrence on the scope, as reflected in Figure 5, the Public Involvement Plan (PIP) was updated accordingly. In general, the outreach process included the activities summarized below.

3.1.1 Bay Link Advisory Committee

A Bay Link Advisory Committee (BLAC) was established with nine members appointed by the City of Miami, the City of Miami Beach, Miami-Dade County, and the Florida Department of Transportation. The baseline and process for refining the LPA was reviewed with the BLAC along with the applicable technical data supporting the LPA. The BLAC consisted of 11 members listed below. The BLAC met on June 23 and July 21, 2004 during Phase 2 to review and comment on the direction and results of the study. The BLAC concluded their effort with a set of recommendations to the MPO Board supportive of Bay Links refined LPA.

Bruno Barreiro
Miami-Dade County Commissioner

Dr. Carlos Bonzon
Miami-Dade County Surface Transportation
Manager

Matti Bower
City of Miami Beach Commissioner

Mary Conway
City of Miami Director of Transportation

Luis Garcia
City of Miami Beach Commissioner

Dr. Jean-François Lejeune
City of Miami Beach Planning Board

Dr. Rolando Montoya
Miami-Dade College Wolfson Campus President

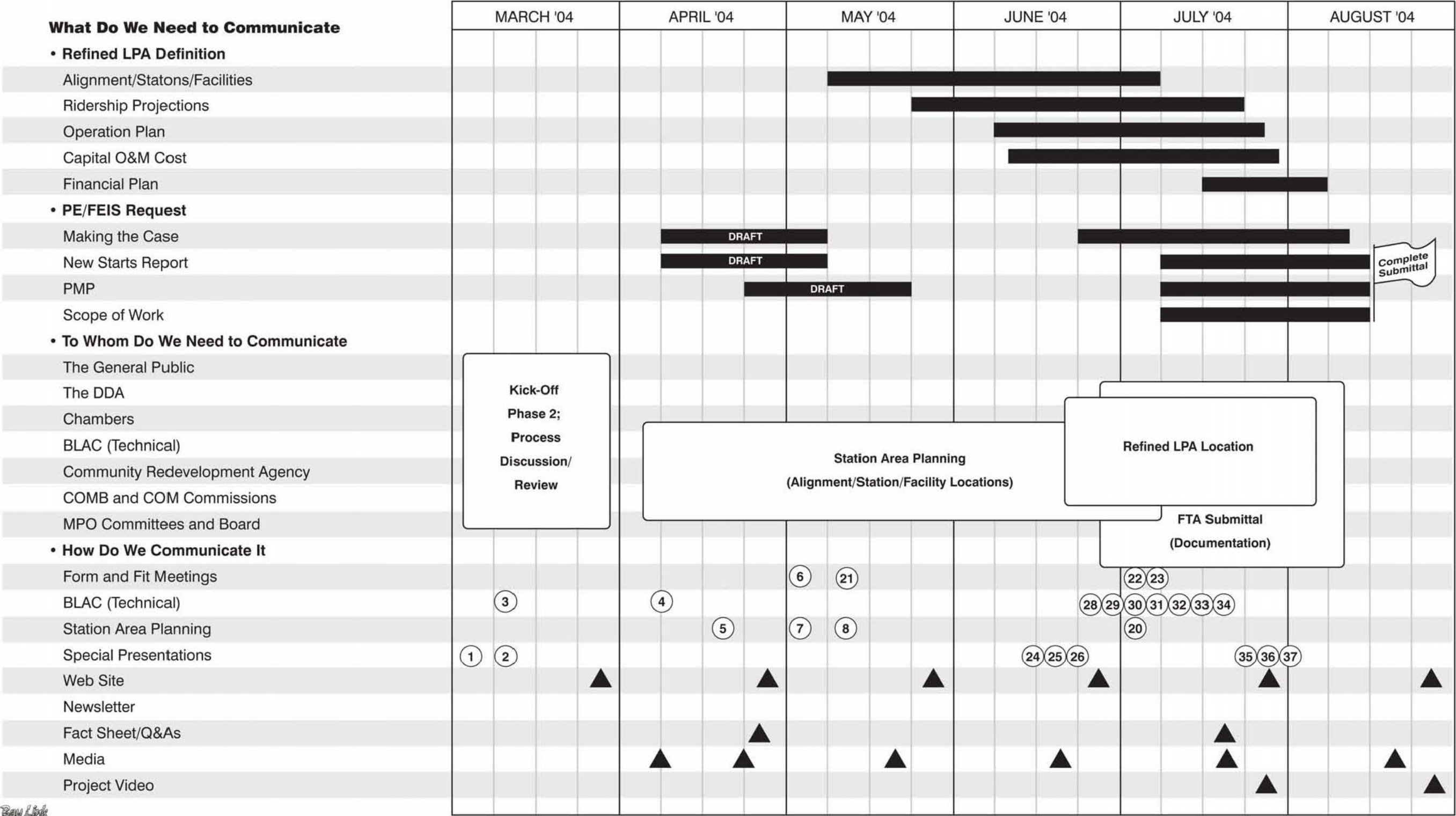
Stephen Nostrand
City of Miami Beach
Parking & Transportation Committee

Arthur Teele, Jr.
City of Miami Commissioner

Johnny Winton
City of Miami Commissioner

Javier Rodriguez
FDOT Director of Production

Figure 5. Public Outreach Matrix



3.1.2 Station Area Planning

This effort started with a “Form and Fit” meeting with the City of Miami Planning and Public Works departments and a similar meeting with the City of Miami Beach. The purpose of the meetings was to reach agreement on the baseline (starting point) for the LPA refinement and to agree on the process to be pursued with the public in its refinement.

The geographic area covered by the Bay Link alignment was divided into eight station area groups (Figure 6) and two station area planning (SAP) meetings were scheduled for each of the groups. The meetings were noticed in the newspapers, listed on the websites, and mail outs were distributed to persons who owned property or lived within 300 feet of either side of the alignment and station areas. The initial set of meetings included a discussion of the attractions, land use, planned development and other factors that drive the selection of station sites. A primer on the physical requirements and components of the prototypical station types (presented in Appendix A) was reviewed along with the fixed and variable needs for each station. The location of the various stations within each station area group was reviewed and discussed. The public was encouraged to provide input at each step in the process.

A second set of meetings was then held for each station area group to review the responses to the citizen's request, comment on canopy design concepts and reach general agreement on station configurations and locations. The more than 200 attendees participated in a very active and constructive manner, which led to conceptual station canopy designs for both the Cities of Miami and Miami Beach.

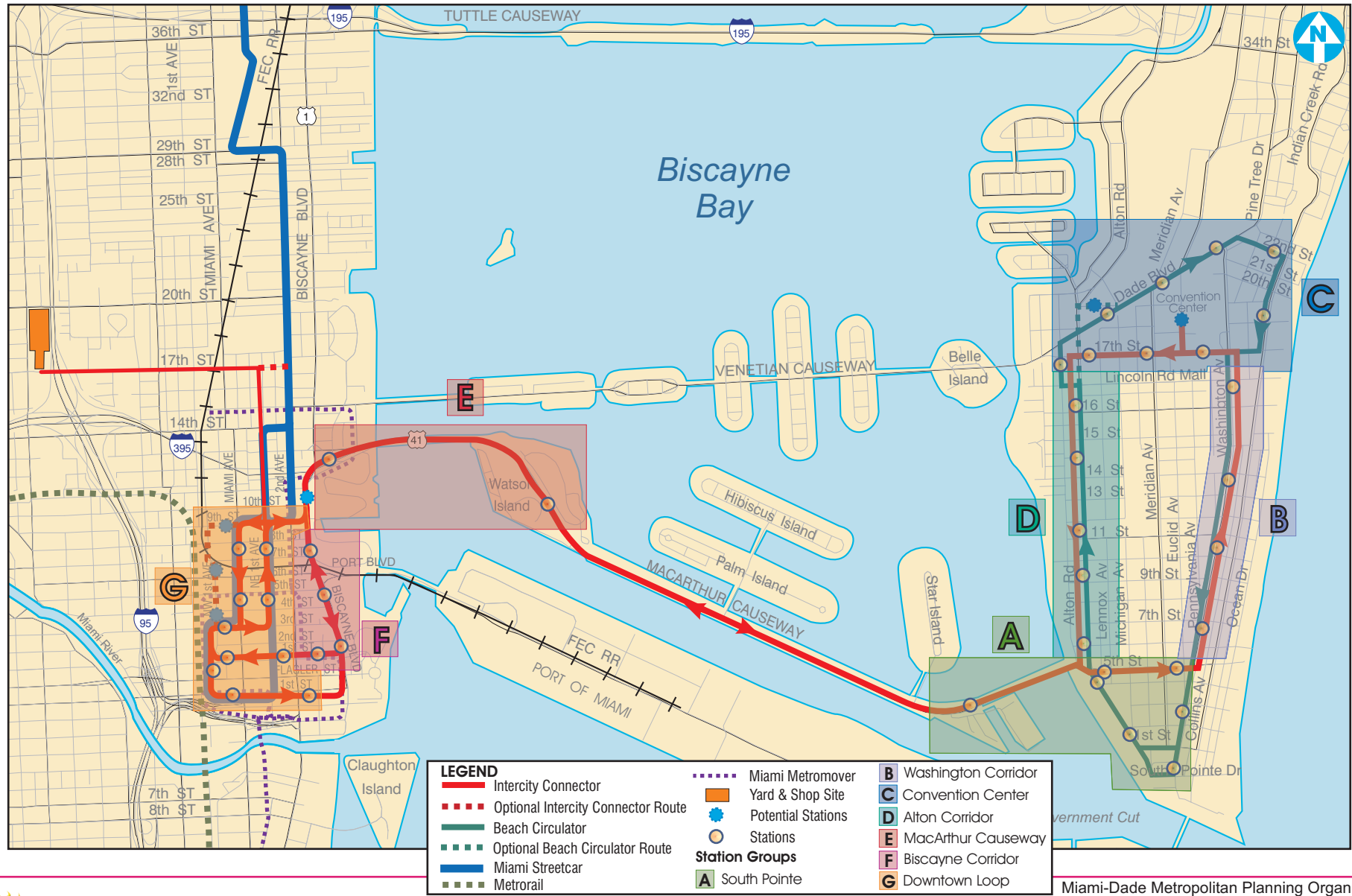
A second set of “Form and Fit” meetings was then held with the cities to review the citizens input and reach agreement on the general refinement of the LPA. Two meetings were then scheduled, one in Miami and one in Miami Beach, to review the final refinement of the LPA to serve as the baseline for the PE/FEIS and New Starts application.

Station Group	Group Name	Station Nos.	Meeting No. 1	Meeting No. 2	Meeting Location
A	South Pointe	1,2,3,4,5 & 20	5/11/04	6/2/04	1) Miami Beach Police Dept. 2) South Pointe Elementary
B	Washington Corridor	6,7,8 & 9	5/12/04	6/9/04	Miami Beach Police Dept.
C	Convention Center	10,11,12,13,14 & 15	5/19/04	6/16/04	Miami Beach Convention Ctr.
D	Alton Corridor	16,17,18 & 19	5/20/04	6/17/04	Police Athletic League

Station Group	Group Name	Station Nos.	Meeting No. 1	Meeting No. 2	Meeting Location
E	MacArthur Causeway	21 & 22	6/15/04	6/30/04	1) Parrot Jungle 2) Miami herald
F	Biscayne Corridor	23, 24 & 25	6/14/04	6/29/04	1) Intercontinental Hotel 2) Intercontinental Hotel
G	Downtown Loop	26, 27, 28, 29, 30, 31, 32, 33, 34 & 35	6/9/04	7/6/04	1) Culmer Overtown Neighborhood Center 2) Main Library



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Figure 6
Station Area Planning Groups



3.1.3 Special Presentations and Other Means of Communication

In total, some 44 meetings were conducted during this phase of the project to both inform and seek public input. In addition, to the public involvement/outreach process discussed above, a number of additional tools were used to involve the public. These efforts included regularly updated websites on the MPO's webpage with automated access to this page from the City of Miami and City of Miami Beach websites; a project newsletter; a series of fact sheets and Frequently Asked Questions and Answers; a number of media articles; and the preparation of a project video. In all, over 25,000 pieces of information were distributed.

Phase 2 Outreach Summary
City of Miami

- 2 "Form & Fit" Meetings
- 6 Station Area Planning Meetings
- Presentation to DDA
- 2 Bay Link Advisory Committee Meetings
- Presentation to City of Miami Commission
- Presentations to MPO Board and Subcommittees



Phase 2 Outreach Summary
City of Miami Beach

- 2 "Form & Fit" Meetings
- 9 Station Area Planning Meetings
- Presentation to Miami Beach Chamber
- 2 Bay Link Advisory Committee Meetings
- Presentation to Lincoln Road Marketing, Inc
- Presentation to Miami Beach Planning Board
- Presentation to Miami Beach Transportation & Parking Committee
- Presentations to MPO Board and Subcommittees



3.2 Public Involvement/Outreach Results

A series of 14 station area planning meetings and presentations to numerous focus groups and the general public were then conducted to solicit information and opinion regarding the baseline LPA. The comments from the meetings were reviewed by the Project Technical Team and reviewed through a second series of "form and fit" meeting with the cities technical staff. A refined LPA definition was agreed upon and a presentation to the BLAC included a summary of the process and conclusions. The BLAC adopted the refined LPA and a list of recommendations, which were forwarded to the City of Miami Commission, City of Miami Beach Commission and the Metropolitan Planning Commission (MPO). The recommendations from the BLAC are as follows:

1. Accept the LPA as further developed during Phase 2 as the basis for the application to the FTA for PE/FEIS.
2. Reiterate that the technology of the Bay Link LPA is Streetcars.
3. Assure that Bay Link Streetcars provide easily accessible connections to all existing and proposed modes of transportation within Miami-Dade County.
4. Direct that the submittal of the PE/FEIS be completed by mid August 2004 in order to be included in the upcoming New Starts cycle at the FTA.
5. Upgrade the Bay Link (Streetcar) corridor priority in the current Miami-Dade County Long Range Plan.

6. Continue the Bay Link (Streetcar) project development process, in cooperation with Miami-Dade Transit, through future phases such as preliminary engineering, final design and construction.

4.0 THE REFINED LPA

The alignment for the originally adopted LPA was refined based on recommendations obtained from the “form and fit” meetings, the BLAC, station area planning meetings, project stakeholders, and the public. As a result of the public involvement/outreach program, several changes/modifications were made to the originally adopted LPA. Modifications to the downtown segment of the originally adopted LPA include:

- Shifting the alignment from NW 1st Avenue to Miami Avenue.
- Counterclockwise loops configuration/operation
- Shifts in station locations
- Addition of 5 new stations
- Alignment shift on Watson Island

Modifications to the Miami Beach segment of the originally adopted LPA include:

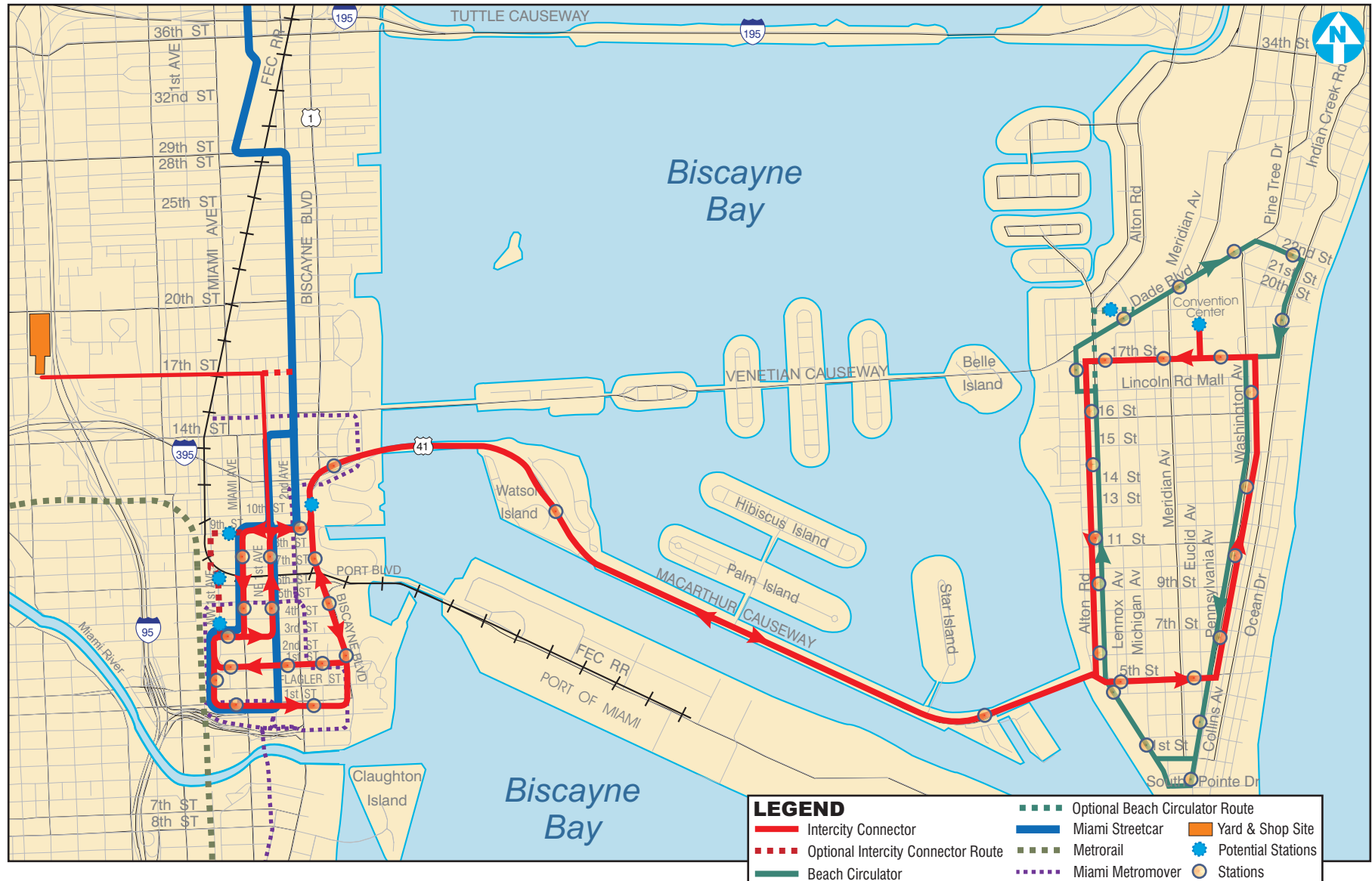
- Shifting the alignment from curbside to median; therefore, 10 stations were changed to center platform design.
- Shifts in station locations
- Addition of 12 new stations
- Alignment shift on Terminal Island

The refined LPA was increased to approximately 18.04 route miles in length and includes 42 stations. This route mileage does not include the lead track required to access the yard and shop site. The refined LPA is presented in Figure 7 and defined in the following sections.

The station locations and the configurations for the forty-two stations along the refined LPA alignment are shown in Table 1. The downtown Miami segment of the system is approximately 6.02 route miles in length and is comprised of 16 stations (including the Watson Island station). Eight of the stations in downtown Miami would be shared with the City of Miami Streetcar Project. The MacArthur Causeway segment is approximately 3.35 route miles in length and includes the Watson and Terminal Island stations. The Miami Beach segment is approximately 3.60 route miles in length and includes 26 stations. Nine of these stations would be shared with the dedicated Miami Beach Circulator (“green” line) which is approximately 5.05 route miles in length. The lead track for the Maintenance Yard and Shop facility will add approximately 0.96 route miles to the total length and is not included in the 18.04 route miles of revenue track cited earlier.



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Miami-Dade Metropolitan Planning Organization

Figure 7
Refined Locally Preferred Alternative

Table 1. Refined LPA Station Locations and Configurations

No.	Name	Type ⁽¹⁾	Configuration	Location ⁽²⁾
1	5th St/Alton Rd	CC	Curbside	MB
2	5th St/Euclid Ave	CC	Center	MB
3	Washington Ave/7th St	CC/BC	Center	MB
4	Washington Ave/10th St	CC/BC	Center	MB
5	Washington Ave/14th St	CC/BC	Center	MB
6	Washington Ave/Lincoln Rd	CC/BC	Center	MB
7	17th St/Drexel Ave (Convention Center) ⁽³⁾	CC	Center	MB
8	17th St/Meridian Ave	CC	Center	MB
9	17th St/Alton Rd	CC	Center	MB
10	Alton Rd/16th St	CC/BC	Center	MB
11	Alton Rd/Espanola Way	CC/BC	Center	MB
12	Alton Rd/12th St	CC/BC	Center	MB
13	Alton Rd/9th St	CC/BC	Center	MB
14	Alton Rd/6th St	CC/BC	Curbside split	MB
15	Terminal Island	CC	Aerial center	MB
16	Watson Island	CC	Aerial side	M
17	Museum Park/Performing Arts	CC	Center	M
18	Park West	CC	Curbside split	M
19	Miami Ave/NE 8th St	CC/MSC	Curbside	M
20	Miami Ave/NE 5th St	CC/MSC	Curbside	M
21	NW 3rd St/NW 1st Ave	CC/MSC	Curbside	M
22	Government Center (NW 1st Ave and NW 1st St)	CC/MSC	Curbside split	M
23	SW 1st St/Miami Ave	CC/MSC	Curbside	M
24	SE 1st St/SE 3rd Ave	CC/MSC	Curbside	M
25	Bayfront (Biscayne Blvd and NE 1st St)	CC	Curbside	M
26	Bayside (Biscayne Blvd)	CC	Curbside split	M
27	American Airlines Arena (Biscayne Blvd)	CC	Curbside split	M
28	NE 1st St/NE 3rd Ave	CC	Curbside	M
29	NE 1st St/NE 1st Ave	CC	Curbside	M
30	NE 1st Ave/NE 5th St	CC/MSC	Curbside	M
31	NE 1st Ave/NE 8th St	CC/MSC	Curbside	M
32	Alton Rd/5th St	BC	Curbside	MB
33	West Ave	BC	Curbside	MB
34	Dade Blvd/Michigan Ave	BC	Center	MB
35	Dade Blvd/Meridian Ave	BC	Center	MB
36	Dade Blvd/Washington Ave	BC	Center	MB
37	22nd St/Collins Ave	BC	Curbside	MB
38	Collins Ave/19th St	BC	Curbside	MB
39	Washington Ave/3rd St	BC	Center	MB
40	South Pointe	BC	Center	MB
41	Alton Rd/2nd St	BC	Center	MB
42	Convention Center (special event)	CC	Center	MB

Note:

- 1) Type refers to the Causeway Connector (CC), Beach Circulator (BC), and/or the Miami Streetcar (MSC).
- 2) Location refers to the City of Miami (M) or City of Miami Beach (MB).

- 3) An additional alignment spur and station are provided at the Convention Center for large special events.
- 4) Of the 42 total stations, 26 are located in the City of Miami Beach and 16 are located in the City of Miami.
- 5) Nineteen Circulator stations located in Miami Beach with 9 stations being shared with the Causeway Connector line.
- 6) Eight stations are shared with the Miami Streetcar project in the City of Miami.

Prototypical station configurations for the Bay Link project are presented in Appendix A.

4.1 City of Miami Streetcar Project

The Miami Streetcar Project is being pursued by the City of Miami with all local funds and is scheduled to be placed in service prior to the completion of Bay Link. The project, as currently envisioned, would be compatible with the Bay Link Project and use similar vehicles, stations, track work and power systems. The proposed projects would share alignments and stations, as described below:

- On NE 9th Street between Miami Avenue and NE 2nd Avenue;
- On Miami Avenue and on NE 1st Avenue between NE 9th Street and NE 3rd Street;
- One NE 3rd Street between Miami Avenue and NW 1st Avenue;
- One NW 1st Avenue between NW 3rd Avenue and SW 1st Street; and,
- On SW/SE 1st Street between NW 1st Avenue and NE 1st Avenue.

The two projects may also share a common yard and shop facility. The Miami Streetcar Project and portions of the Bay Link Project could be constructed together as an alternative phasing plan for the projects. The intent is to qualify the local expenditure for the Miami Streetcar Project, all or in part, as a local match against a future Section 5309 New Starts project.

4.2 City of Miami Alignment

The line coming into the City of Miami crosses Biscayne Bay on structure on the south side of the MacArthur Causeway and rises to an aerial side platform station at Watson Island. The station is located on the south side of the causeway roadway with access to venues on the north side, such as Parrot Jungle, by a pedestrian bridge. A shuttle service would also be operated from the station to key locations/destinations on Watson Island. The alignment continues to cross the Intercoastal Waterway on the south side of the modified MacArthur Causeway Bridge (also to be retrofitted to accommodate the Port of Miami Tunnel project roadways) and continues in exclusive right-of-way to Biscayne Boulevard. A station is located at Museum Park/Performing Arts Center adjacent to and north of the existing Bicentennial Park Metromover Station. A pedestrian bridge or specially designed walkway will provide access to the Performing Arts Center on the north side of I-395.

The southbound track would cross the northbound lanes of Biscayne Boulevard and transition into the median at a new traffic signal. The alignment continues south on Biscayne Boulevard to NE 9th Street. An optional station may be located south of NE 11th Street and will be analysis further during preliminary engineering.

At NE 9th Street the service splits with half the trains (designated by a headsign reading “Miami via NE 9th Street”) turning west on NE 9th Street and half continuing south along Biscayne Boulevard (designated by a headsign reading “Miami via Biscayne Boulevard”). The service is also characterized by one way pairs: along Miami Avenue (south) and NE 1st Avenue (north) between NE 9th Street and NE 3rd Street; and, along SE 1st Street (east) and NE 1st Street (west) between NW 1st Avenue and Biscayne Boulevard. The downtown segment of the refined alignment is reflected in Figure 8.

Counterclockwise loop service continues curbside along NE 9th Street to Miami Avenue with a station at Park West located just east of NE 2nd Avenue. The alignment turns south and remains curbside on Miami Avenue to NE 3rd Street with stations just south of NE 8th Street and NE 5th Street. At NE 3rd Street the alignment turns west where a station is located prior to turning south on NW 1st Avenue. On NW 1st Avenue, the alignment transfers to the west side curb lane and continues south to SW 1st Street. A station at Government Center provides a convenient transfer point to the Metrorail, Metromover and bus transfer facility. The alignment turns east on SW/SE 1st Street to the south curbside traffic lane continuing to Biscayne Boulevard. Stations are located to the west of Miami Avenue and SE 3rd Avenue. At Biscayne Boulevard the alignment turns north and transitions to the east curbside travel lane with stations at Bayfront Park, Bayside and the American Airlines Arena. At the American Airlines Arena, or just to the south along the FEC Railroad right-of-way, special provisions would be provided for the storage of additional trains to handle special events and facilitate schedule markup/recovery. An optional station would be located just south of NE 11th Street for analysis during PE/FEIS. The loop is completed at Biscayne Boulevard and NE 9th Street.

The clockwise loop on Biscayne Boulevard transitions at NE 9th Street from the median alignment to continue southbound in the median travel lane to NE 1st Street. Split inside curb stations serve the American Airlines Arena and Bayside. At NE 1st Street the track turns west into the south side curb lane and continues to NW 1st Avenue with stations serving Bayfront Park (at NE 3rd Avenue), at NE 1st Avenue and serving Government Center (at NW 1st Avenue).

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The alignment continues curbside north on NW 1st Avenue to NW/NE 3rd Street where it turns east into an exclusive right-of-way running on the south curb (3rd Street is currently one-way westbound). A split curbside station is located on NW 3rd St opposite the counterclockwise loop station. At NE 1st Avenue the alignment turns north to the east curb line and continues on to NE 9th Street with side platform stations at NE 5th Street and NE 8th Street. At NE 9th Street the alignment heads east and merge back with the northbound track on the east side of Biscayne Boulevard. The Park West Station is located opposite the counterclockwise loop station on NE 9th Street.

Completing the downtown Miami alignment, the northbound tracks run curbside on the Biscayne Boulevard and turn back to the west into exclusive right-of-way at 12th Street where the alignment proceeds back to the Museum/Performing Arts Center Station. Turning movements that cross traffic along the downtown service use either the existing traffic signal at the intersections or new signal phase to allow exclusive crossing for the trains.

An alignment option has been identified for further analysis during preliminary engineering. The variation would shift the alignment to NW 1st Avenue replacing the one-way pair service on Miami Avenue (southbound) and NE 1st Avenue (northbound). This option would place both tracks and stations for the counterclockwise and clockwise loops onto the curbside lanes of NW 1st Avenue between NW 9th Street and NW/SW 1st Streets. Curbside stations would be at NE 5th Street and NE 8th Street.

4.3 City of Miami Beach Alignment

The alignment on Miami Beach consists of the Causeway Connector ("red" line) and the Beach Circulator ("green" line). The Beach Circulator is a large single-track clockwise loop that provides service in Miami Beach with convenient transfers to the Causeway Connector line or MDT bus routes serving the Beach. The Causeway Connector line is a single-track counterclockwise loop providing a regional connection to Miami, the Beach Circulator and MDT buses. The Miami Beach segment of the refined alignment is reflected in Figure 9.

4.3.1 Causeway Connector

The Miami Beach segment of the alignment proceeds east from Watson Island on the south side of the MacArthur Causeway on special structure on exclusive trackway to an aerial center platform station on Terminal Island. The Terminal Island Station provides a convenient transfer point for the Terminal Island Ferry passengers and employees who work on the island. The alignment continues east to Miami Beach crossing to the south side of the bridge over Biscayne Bay.

The Causeway Connector departs the exclusive right-of-way at the traffic signal at Alton Road and 5th Street and crosses the Beach Circulator track to the first station on Miami Beach, a curbside station just east of Alton Road. This station provides the first opportunity to transfer between the Causeway and Circulator lines from a Circulator station just south of 5th Street on Alton Road. The alignment continues east along the curbside lane and at Jefferson Street transitions to the median travel lane on a special phase of the traffic signal to a median side platform station just west of Euclid Avenue. The alignment proceeds east, crossing the Beach Circulator track as it turns north onto Washington Avenue where it runs north in the median travel lane to 17th Street.

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This section of the connector alignment includes center platform stations in the median of Washington Avenue, which are shared with and provide convenient cross platform transfers to the Beach Circulator at 7th Street, 10th Street, 14th Street and Lincoln Road. Just north of Lincoln Road a bus transfer facility, located on the west side of Washington Avenue, will provide for a convenient transfer to Bay Link, Electrowave bus service and MDT bus routes. The transit system replaces a number of MDT bus routes in Miami Beach.

At 17th Street the alignment turns west and runs in the median travel lane to Alton Road. There are center platform stations located in the median at Drexel Avenue, Meridian Avenue and Alton Road. A double-track spur north from 17th Street along Convention Center Drive to a station at the Convention Center has been included for special events. The spur includes a siding providing the capacity to store additional transit cars for special events at the Convention Center and also to provide for make-up train service/schedule adherence. The spur may be extended through to Dade Boulevard to provide additional operational flexibility.

At Alton Road the alignment turns south transitioning to the median traffic lane on a special phase of the traffic signal and continues south crossing the Beach Circulator tracks at Lincoln Road. There are center platform stations in the median at 16th Street, Espanola Way, 12th Street and 9th Street shared with providing convenient transfer to the Beach Circulator system. At 8th Street the Causeway Connector line uses a special phase of the traffic light to transition from the median to the curbside traffic travel lane and continues south to a split curbside platform station just north of 6th Street. The alignment crosses 5th Street on a special traffic signal phase and re-enters the exclusive right-of-way onto westbound MacArthur Causeway to complete the Miami Beach loop.

4.3.2 Beach Circulator

The clockwise Beach Circulator provides a continuous loop to access many primary destinations in Miami Beach. Starting at the station on Alton Road just south of 5th Street, which is a major transfer point between the Causeway Connector and Circulator systems, the alignment crosses 5th Street and proceeds north on Alton Road along the curbside travel lane to a station just south of 6th Street. The alignment continues north on Alton Road to 8th Street where it transitions to the median traffic lane on a special phase of the traffic signal and proceeds north to Lincoln Road with stations at 9th Street, 12th Street, Espanola Way and 16th Street. These stations are shared with, and provide convenient transfer points to, the Causeway Connector.

At Lincoln Road, the Beach Circulator alignment turns west, crossing the Causeway Connector track, into the Lincoln Road median travel lane and then turns north onto West Avenue. On West Avenue, the alignment runs north in the curbside lane to a station just south of 17th Street. The alignment proceeds across a new auto/transit bridge to Dade Boulevard and turns to follow Dade Boulevard to the northeast in the median travel lane to 22nd Street. Along Dade Boulevard, three median stations would be located at Michigan Avenue, Meridian Avenue and Washington Avenue.

During PE an option would be explored to continue the Beach Circulator alignment on Alton Road from Lincoln Road across Dade Boulevard to 19th Street. The alignment would turn to the east on 19th Street and continue to realign with Dade Boulevard. A station would be located on 19th Street between Alton Road and Dade Boulevard. This would replace the alignment on West Avenue; however, the West Avenue bridge over the Dade Canal could still be constructed as a traffic mitigation measure.

At 22nd Street, the Beach Circulator alignment turns southeast onto a new transit bridge over the Dade Canal and continues on 22nd Street to Collins Avenue. Because of the existing narrow roadway section, this segment of track could be in exclusive right-of-way replacing the existing parking along 22nd Street. A station is located just to the northwest of Collins Avenue. The alignment turns south on Collins Avenue, transitions to the west curb lane and continues south to 17th Street. A curbside station is located just north of 18th Street. At 17th Street the alignment turns to the west and proceeds to Washington Avenue. A track connection is provided between the Causeway Connector and Circulator systems at Washington Avenue to provide Circulator streetcars access to the yard and shop. The Circulator turns south on Washington Avenue crossing the Causeway Connector track and transitions to the median south bound travel lane. Center platform median stations at Lincoln Road, 14th Street, 10th Street and 7th Street are shared with the Causeway Connector line and provide convenient transfer points between the systems. The station at Lincoln Road also provides a convenient location for transfer to MDT and Electrowave buses at the facility just south of 17th Street. The Circulator would replace the existing Electrowave bus service which would be re-deployed to emulate an extension of the Bay Link system providing a convenient connection between Bay Link and North Miami Beach.

The Beach Circulator continues south in the median lane to South Pointe Drive crossing the Causeway Connector at 5th Street. A station is located at 3rd Street on Washington Avenue. The alignment turns west on South Pointe Drive and then north onto Alton Road. A spur track is located on Commerce Street between Alton Road and Washington Avenue to provide for the storage of make-up cars. The alignment continues north on Alton Road to a median station at 2nd Street. At 2nd Street, using a special traffic signal phase, the alignment transitions to the curbside traffic lane and completes the loop at the 5th Street Station just south of Alton Road.

4.4 Streetcar System Operations

The Streetcar system would operate seven days per week and utilize a traffic signal prioritization system to facilitate train and traffic movement in the peak direction. All turning movements would be coordinated with train movements and the system would require that an 8 to 12 second cycle be added to existing or new traffic signals at intersections crossed by the trains. The general operating characteristics for the Streetcar system are provided below.



Operating Characteristic	Description
Daily Operation	20.5 hours
Peak Period Service Frequency ⁽¹⁾	5 min (5:30 AM to 6:30 PM)
Off-peak Period Service Frequency	15 min (6:30 PM to 2:00 AM)
Train Consist ⁽²⁾	1 car AM peak, midday and PM peak
Station Dwell Time	20 seconds
Average Speed	15 to 18 miles per hour
Train Capacity ⁽³⁾	154 passengers (41 seated; 113 standing)

Notes:-

- (1) 10 minute headways on two loops in downtown Miami; combined headway of 5 minutes on Causeway Connector.
- (2) Stations are being designed to accommodate 2 car consist but, subject to verification of ridership demand, only one car platforms will be built initially.
- (3) 67' Streetcar length assumed.

4.5 Streetcar Facilities and Equipment

The vehicles can be of an “off-the-shelf” technology, similar to the one shown in the illustration above, and have the following characteristics: maximum design speed of 45 to 55 miles per hour; at least a partial low floor designed for level boarding from a low-level platform; articulated and capable of bi-directional operation as single units or as multiple units consisting of up to two vehicles; and, manually operated and powered by electricity drawn from an overhead catenary system along the entire length of the system.

Electrical substations for the vehicle propulsion system are located along the alignment. Substations are generally located approximately every mile along the alignment and require an area of about 20 feet by 40 feet. The required number and location of the substations will be determined during the PE/FEIS phase of the project. A substation will also be located at the Yard and Shop location. Operations would be governed by a block signal system or operator line-of-sight using a preemptive system to control traffic signals at some or all intersections.

4.5.1 Streetcar Maintenance Yard and Shop

Two potential maintenance yard and shop facility locations were identified during the DEIS process. The Yard and Shop design layout includes the following elements:

- Maintenance shop (approximately 48,500 SF) with three through service tracks;
- Separate train wash facility on track adjacent to the maintenance building;
- Bypass track to the storage yard;
- Employee and visitor parking;
- Double loop configuration with special trackwork to allow ease of movement between maintenance shop/wash track and storage yard;
- An electrical substation;
- Maintenance-of-way building and bulk material storage area; and,
- Storage ladder tracks for 21 vehicles plus provision for an additional 20 vehicles in the initial phase providing more than adequate capacity to accommodate eight Miami Streetcar Project fleet.

While not included in acreage requirements identified above, it may be expedient to take an option on, or acquire enough property to accommodate future lines.

The first potential Bay Link maintenance yard and shop facility evaluated is located east of the FEC rail near NE 17th Street. The site evaluated during the DEIS was located on approximately

12 acres to the east of Miami Avenue and north of 17th Street. This site has since been slated for urban renewal projects planned by the City of Miami.

The second potential yard and site (also evaluated during the DEIS) is located in the old Florida East Coast (FEC) Railroad container storage property (Buena Vista yard) west of the FEC rail corridor and just to the north of NW 29th Street and east of Miami Avenue. The site covers approximately 12 acres. No roadways would be affected by the layout. Miami Avenue would likely provide the ingress and egress for employees working at the facility and deliveries by trucks. Right-of-way for the yard lead and site access would be obtained through FEC property acquisition. This site is now being redeveloped as Midtown Miami.

A third yard and shop site, identified during the Phase 2 studies, is located in FEC property just to the west of I-95 between NW 17th Street and NW 20th Street. It has a site area of approximately 9 acres. Based on coordination during the Bay Link “form and fit” meetings which included representatives for the City of Miami Streetcar Project, it was determined that this site could be shared with the Miami Streetcar system. New lead tracks for a distance of about 5,000 feet would need to be constructed along NW 17th Street from the Miami Streetcar trackway on NE 2nd Avenue to the Yard and Shop site (Figure 10).

Several other potential sites are also still undergoing evaluation. The third yard and shop site option has been used for analysis and cost.

4.6 Options to Analyze During PE/FEIS

While the refined LPA provides a starting point for the PE/FEIS Phase of Project Development, the design and public outreach processes will continue in a well conceived and thoughtful way throughout the subsequent phases of development. Several issues have been identified specifically for further analysis in addition to the comments received from the DEIS Public Hearing. These options to review and evaluate during the PE/FEIS phase of development are:

- Shifting the Miami alignment to run along NW 1st Avenue (from the one-way pairs on Miami Ave. and NE 1st Ave.). The modification would extend the route along NE 9th Street (or perhaps also include a shift to NE 10th, 11th or 12th Street) and match back to the existing alignment at NE 3rd Street. Review of this option will require close coordination with the Miami Streetcar Project.
- The addition of another station on Biscayne Boulevard between NE 10th and 11th Streets.
- An alternative to the Beach Circulator alignment to continue north on Alton Road from a point at Lincoln Road across Dade Boulevard to 19th Street. The modified route would turn east on 19th Street and connect back again at Dade Boulevard. There would be a station on 19th Street between Alton Road and Dade Boulevard. This optional alignment would replace the West Avenue alignment; however, the bridge over the Dade Canal extending West Avenue to Dade Boulevard could still be built with the new option as a traffic mitigation measure.

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4.7 Statistical Comparison Of The Original LPA And Refined LPA

While the previously adopted LPA was not refined to a point where it could be costed as part of the AA/DEIS process, adjustments have been made to provide a comparative summary. Table 2 shows the statistical comparison between the originally adopted and refined LPAs.

Table 2. Statistical Comparison of the Adopted and Refined LPAs

Category	Adopted LPA	Refined LPA	Delta	Percent Change
Route Length (Miles)	10.4	18.04	7.6	73%
No. of Stations	25	42	17	68%
No. of Vehicles	16 LRT	21 Streetcars	N/A	N/A
Daily Ridership	15,483	20,075	4,592	30%
Annual Ridership	4.8 M	6.1 M	1.3	27%
Annual O&M Cost (Millions 2004 \$)	\$10.5	\$12.1	\$1.6	15%
Capital Cost (Millions 2004 \$)	\$429.7	\$482.7	\$53.3	12.3%

5.0 PROJECTED RIDERSHIP

5.1 Projected Daily Boardings by Alternative, Mode and Year

Travel demand model runs were conducted for the Bay Link project in August 2004. The travel demand model inputs include headways for all transit services that comprise the No-Build/Baseline and LPA alternatives. A description of the bus routes for the project area is shown in Figure 2 and tabulated in Appendix B. A comparison of the No-Build/Baseline and the LPA Alternative definitions are reflected in Table 3.

Table 3. Travel Demand Model Transit Network

BUS					
Line	Route Description	Alternative	Headway (min)		Itinerary
			Peak	Off-Peak	
214	Route EW1: MBCC-South Beach Circle	No-Build	15	15	Same as PTP
		TSM	15	15	Same as No-Build
		LPA	Deleted	Deleted	Not included
216	Route EW2: North Circulator	No-Build	15	15	Same as PTP
		TSM	15	15	Same as No-Build
		LPA	Deleted	Deleted	Not included
1	Route A: Miami-Beach to Omni	No-Build	15	20	Same as PTP
		TSM	15	20	Same as No-Build
		LPA	--	--	Turn Back at MBIF
5	Route C: Mount Sinai Hospital to Omni	No-Build	15	20	Same as PTP
		TSM	15	20	Same as No-Build
		LPA	--	--	Service deleted from 17 th Street to CBD
21	Route H: Sky Lake Mall to South Beach	No-Build	15	20	Same as PTP
		TSM	15	20	Same as No-Build
		LPA	--	--	Service deleted from 17 th Street to CBD
25	Route K: Diplomat to Omni	No-Build	30	60	
		TSM	30	60	Same as No-Build
		LPA	--	--	Service deleted from 17 th Street to CBD
26	Route K: Haulover to CBD	No-Build	30	30	
		TSM	30	30	Same as No-Build
		LPA	--	--	Service deleted from 17 th Street to CBD
43	Route S: CBD to Aventura Mall	No-Build	10	10	
		TSM	10	10	Same as No-Build
		LPA	--	--	Service deleted from 17 th Street to CBD
252	Route 51: Flagler MAX to Beach	No-Build	15	30	
		TSM	15	30	Same as No-Build
		LPA	--	--	Service deleted from CBD to South Beach
100	Kendall BRT	No-Build	20	30	
		TSM	20	30	Same as No-Build
		LPA	20	30	
103	Northeast BRT	No-Build	20	30	
		TSM	20	30	Same as No-Build
		LPA	20	30	

RAIL					
Line	Route Description	Alternative	Headway (min)		Itinerary
			Peak	Off-Peak	
101	Bay Link: Regional Loop via NE 1st Street	No-Build	--	--	N/A
		TSM	--	--	N/A
		LPA	10	20	
102	Bay Link: Regional Loop via SE 1st Street	No-Build	--	--	N/A
		TSM	--	--	N/A
		LPA	10	20	
103	Bay Link: South Beach Loop	No-Build	--	--	N/A
		TSM	--	--	N/A
		LPA	5	10	Beach Circulator
1	MetroRail Stage 1: Palmetto to Brickell	No-Build	6	12	
		TSM	6	12	
		LPA	9	20	
4	MetroRail Stage 2: Earlington Heights Extension	No-Build	6	12	
		TSM	6	12	
		LPA	9	20	Earlington Heights to MIC
5	MetroRail Stage 2: North Corridor Extension	No-Build	6	12	North Corridor Extension
		TSM	6	12	
		LPA	9	20	27 th Avenue to County line
7	Metrorail E-W: FIU to MIC	No-Build	3	6	FIU to MIC; East-west line
		TSM	3	6	
		LPA	3	12	Parallels SR 836
100	Tri-Rail: MIA to Broward Line	No-Build	27	60	MIA to Broward Cnty. Line
		TSM	27	60	
		LPA	27	60	
101	Tri-Rail: Broward Line to MIA	No-Build	40	60	Broward Cnty. Line to MIA
		TSM	40	60	
		LPA	40	60	
102	Tri-Rail: Broward Line to MIA	No-Build	24	--	Broward Cnty. Line to MIA
		TSM	24	--	
		LPA	24	--	
222	DPM: CW Inner Loop	No-Build	1.5	3.5	Inner loop
		TSM	1.5	3.5	
		LPA	1.5	3.5	
223	DPM: Omni Loop	No-Build	3	3.5	Omni loop
		TSM	3	3.5	
		LPA	3	3.5	
224	DPM: Brickell Loop	No-Build	4	4	Brickell loop
		TSM	4	4	
		LPA	4	4	
225	DPM: CW Inner Loop	No-Build	1.5	3.5	Inner loop
		TSM	1.5	3.5	
		LPA	1.5	3.5	

Notes:-

- (1) MBIF refers to the proposed Miami Beach Intermodal Facility at Washington Avenue and Lincoln Road.
- (2) Table is based on 8/31/04 model run; to be updated at completion of new model run.

5.2 Daily Station Boardings

The results of travel demand forecasting for the proposed PE/FEIS Alternatives for 2005, 2015 and the design year 2025 is presented in Table 4. These estimates are produced for average weekday and morning peak hour travel, as appropriate. It is important to note that the travel demand models do not address tourist and special event usage effectively and as a consequence, totals are conservative. During PE/FEIS a model for addressing tourist usage should be developed for FTA review and approval. Total transit ridership includes the total number of trips by bus or rail transit in Miami-Dade County. For any alternative, these include passengers who shift from one transit service to another in response to service changes, and passengers who shift from the automobile in response to transit service improvements.

Table 4. 2025 Projected Daily Boardings Summary by Mode

	Bay Link	Metrorail	Metromover	Bus	Tri-Rail	Total
2025-LPA	20,075	120,473	29,639	301,339	418	471,944
2025-TSM	N/A	116,426	23,967	327,591	409	468,393
2025-No Build	N/A	116,437	23,780	327,950	402	468,569
2015-LPA	18,648	104,350	27,089	271,414	337	421,838
2015-No Build	N/A	100,827	100,827	296,428	342	498,424
2005-LPA	17,107	93,542	24,643	254,776	271	390,339
2005-No Build	N/A	90,053	19,649	278,124	238	338,064

The Bay Link Streetcar LPA has a positive impact on Metrorail, Metromover and total system ridership. This increase is due to the higher quality, faster and more reliable service provided by the Streetcar. The MDT bus ridership declines as the more efficient Streetcars replace corridor bus service.

Average weekday boardings for each LPA line obtained from the travel demand model run is shown in Table 5.

Table 5. Summary of Total Daily Boardings

Causeway Connector; Clockwise Loop	7,031
Causeway Connector; Counterclockwise Loop	5,369
Beach Circulator	7,675
TOTAL	20,075

Based on the analyses conducted during the Bay Link study, the data indicates the following (tourist and special usage boardings not included):

- Approximately 20,075 daily riders on LPA; 6.2 million annually.
- Ridership on the Metrorail, Metromover and Tri-Rail systems would increase with the implementation of LPA.
- The ridership on the MDT bus system would decline reflecting the transfer to rail.
- Ridership by trip purpose would be 43% commuting, 38% non-work based trips; and 19% non-home based trips.

6.0 PROJECTED COSTS

6.1 Capital Costs Estimates

Capital costs are defined as the initial, one-time expenditures incurred in the implementation of a system until such time as it becomes fully operational and in revenue service. These costs include design, construction, systems procurement and installation, vehicles, right of way, and startup and testing. The estimated costs are based on the Conceptual Engineering Drawings, Design Criteria and Standards and operations plan for the system. Table 6 reflects the capital costs for the alternatives to be pursued in the PE/FEIS Phase of project development. The Year of Expenditure (YOE) dollars refers to the project opening year and reflects the costs based on a 2023 project implementation schedule.

Table 6. Capital Cost of Alternatives (Millions of 2004 and YOE \$'s)

Alternative	2004 \$'s	YOE \$'s
No-Build	N/A	N/A
Baseline	\$74.1	\$79.7
LPA (Build)	\$482.7	\$781.5

A breakdown of the estimated capital cost for the refined LPA in 2004 dollars is provided in Table 7. The capital cost estimate of the originally adopted LPA was \$429.7 million. This \$53.05 million increase in the estimated capital cost for the refined LPA is based on the following parameters:

- **Guideway:** The quantity of guideway in downtown increased from one loop of single track guideway to two loops of single track guideway. However, the unit cost for single track guideway has been reduced due to changes in the trackbed design from a full depth, two-pour concrete trackslab to a reduced, single-pour trackbed. The refined LPA includes modification to the Inter-Coastal Waterway Bridge and includes two new bridges over the Dade Canal.
- **Yard and Shop:** The major difference in the yard and shop cost is in the quantity of yard lead required to access the proposed site. Estimates for the previous yard lead were based on an existing railroad right-of-way while the yard lead for the refined LPA estimate is embedded street running.

**Table 7. Capital Cost Estimates for LPA
(Millions of 2004 Dollars)**

Description	Regional Line		Miami Beach	Maintenance	Vehicles	Total Amount
	Miami	Miami Beach	Circulator	Facility		
Length (RF):	41,500	27,100	26,650	5,070		95,250
Number of Stations:	19	15	11			45
Number of Vehicles:					21	21
1.0 Guideway Elements						
1.1 Guideway	\$40.41	\$30.97	\$8.60	\$1.91		\$81.89
1.2 Trackwork	\$20.80	\$16.02	\$12.34	\$4.47		\$53.63
2.0 Yards & Shops						
2.0 Yard & Shop				\$26.57		\$26.57
3.0 System Elements						
3.1 Train Control	\$8.53	\$6.77	\$3.86	\$0.44		\$19.61
3.2 Traction Power	\$11.18	\$7.46	\$6.77	\$1.63		\$27.04
3.3 Communications	\$7.28	\$5.36	\$3.94	\$0.40		\$16.98
3.4 Fare Collection	\$2.57	\$2.79	\$1.23	\$0.00		\$6.59
4.0 Passenger Stations						
4.0 Passenger Stations	\$21.15	\$11.34	\$3.48	\$0.00		\$35.97
5.0 Special Conditions						
5.1 Utility Modifications	\$5.80	\$3.76	\$3.96	\$0.75		\$14.28
5.2 Demolitions	\$0.52	\$0.31	\$0.36	\$0.07		\$1.25
5.3 Roadway Modifications	\$5.35	\$5.23	\$2.73	\$0.00		\$13.32
5.4 Environmental Mitigation	\$2.90	\$1.88	\$1.98	\$0.15		\$6.92
5.5 Landscaping	\$1.22	\$0.79	\$0.83	\$0.16		\$3.00
6.0 Vehicles						
6.0 Revenue Vehicles					\$43.22	\$43.22
Subtotal Construction Costs	\$127.72	\$92.68	\$50.09	\$36.54	\$43.22	\$350.26
7.0 Right-of-Way						
7.0 Right-of-Way	\$0.12	\$0.12	\$0.05	\$10.34		\$10.63
8.0 Soft Costs (Calculated on Construction Cost Only)						
8.1 Preliminary Engineering	\$5.11	\$3.71	\$2.00	\$1.46		\$12.28
8.2 Engineering Design	\$7.66	\$5.56	\$3.01	\$2.19		\$18.42
8.3 Construction Management	\$10.22	\$7.41	\$4.01	\$2.92		\$24.56
8.4 Project Management, Agency/PMC	\$5.11	\$3.71	\$2.00	\$1.46	\$1.73	\$14.01
8.5 Change Order Contingency	\$8.94	\$6.49	\$3.51	\$2.56	\$3.03	\$24.52
8.6 Project Insurance	\$6.39	\$4.63	\$2.50	\$1.83	\$2.16	\$17.51
8.7 Training/Start-Up/Testing	\$3.83	\$2.78	\$1.50	\$1.10	\$1.30	\$10.51
Subtotal Soft Costs	\$47.26	\$34.29	\$18.53	\$13.52	\$8.21	\$121.82
Grand Total (\$2004)	\$175.11	\$127.09	\$68.67	\$60.41	\$51.43	\$482.71

- **Trackwork:** Due to the different trackbed design, some of the cost that was previously accounted for under the guideway cost category has been transferred to the trackwork cost category. A small quantity of ballasted trackwork was included in the DEIS estimate, while the refined LPA estimate is either embedded or direction fixation only.
- **System Elements:** Train Control - while the quantity of guideway has increased, this was offset by the fact that the previous estimate assumed block system train control over the entire system while the refined LPA estimate assumes line-of-sight control on the Downtown and Miami Beach segments with block system train control only on the causeway segment. Differences in Traction Power and Communications are primarily due to increased quantity of guideway
- **Fare Collection:** Quantity of fare collection/vending equipment per platform was reduced from an average of 2 per platform to 1 per platform. Estimate assumes that 2 stations in Downtown and 10 stations on Miami Beach have 2 pieces of collection/vending equipment per platform.
- **Passenger Stations:** The original LPA estimate had 25 stations, however, 6 of these stations were side platform stations (2 platforms per station) which results in a total of 31 platforms. The refined LPA estimate has a total of 45 stations (either single side platforms or single center platform). The exceptions are the Watson and Terminal Island stations, which are elevated side and center platform stations, respectively. This results in a total of 46 platforms for a difference of 15 platforms. The major differences are that the previous estimate assumed 200 ft long platforms while the current estimate uses 160 ft long platforms on the regional system and 80 ft. platforms on the Miami Beach circulator.
- **Vehicles:** Differences in vehicles are due to increase in quantity and reduction in unit cost from LRT vehicle to Streetcar vehicle type.
- **Special Conditions:** Differences are primarily due to reduced allowance cost for utility impacts that result from the shallower trackway slab. Differences in Demolition costs are primarily due to addition of an allowance for miscellaneous demolition that might occur along the guideway. Differences in Roadway Modifications and Landscaping are primarily due to increased quantity of guideway.
- **Right-of-Way:** Differences are primarily due to increase in allowance unit cost for purchase of land.
- **Soft Costs:** Soft costs are calculated as percentage mark-ups to the estimated construction cost and therefore reflect changes in those cost categories.

6.2 Operating and Maintenance Costs Estimates

The transit modes affected by the alternatives include bus, heavy rail, commuter rail, and the automated people mover. The Metrobus, Metrorail and Metromover cost models have been validated using recent MDT bus and rail operating statistics and the resulting O&M cost estimates as compared to actual expenditures. The Tri-Rail cost is based on SPRTA's O&M cost model updated in 2004. Revenue forecasts have been derived from the applicable fare structure and the forecasts of ridership for each alternative. Table 8 summarizes the total O&M cost estimates by alternative for each applicable transit mode.

**Table 8. Annual System O&M Costs By Alternative and Mode
(Millions of 2004 \$s)**

Alternative	Bus Costs	Metrorail	Metromover	Tri-Rail	Bay Link	Total
No-Build	\$299.83	\$195.77	\$14.84	\$4.71	N/A	\$515.14
TSM	\$299.88	\$195.77	\$14.84	\$4.71	N/A	\$515.20
LPA	\$286.84	\$195.85	\$14.94	\$4.71	\$12.10	\$514.43

6.3 Cost Effectiveness

6.3.1 Farebox Recovery

The farebox recovery ratio (the annual O&M costs divided by the collected revenue from passengers) directly affects the amount of money the county must pay to subsidize transit operations. Based on the *2003 National Transit Database Report*, the farebox recovery for all MDT modes is around 14.5 percent. The current farebox recovery for Tri-Rail is 22 percent. As shown in Table 9, the calculated farebox recovery ratio for the refined LPA alternatives is estimated at 34.6 percent in 2025.

Table 9. 2025 System Farebox Recovery

Alternative	System wide Daily Riders	Annual Riders (000)	Annual Fare Revenue (\$000)	Annual O&M Costs (\$000)	Farebox Recovery (%)
No-Build	468,167	143,259	90,566	\$515,142	17.6
TSM	467,984	143,203	110,316	\$515,197	21.4
LPA	471,526	144,287	177,994	\$514,433	34.6

6.3.2 Other Measures of Effectiveness

Based on the modeling efforts for the project, Bay Link is expected to carry approximately 20,075 riders a day (over 6,100,000 annually) and result in a travel time savings of almost 6.7 minutes per passenger mile. Bay Link is projected to attract approximately 1,860,000 more linked trips per year with both Metrorail and Metromover ridership increasing; 1.1 million and 1.5 million for Metrorail and the Metromover respectively. Total annual system O&M costs realizes savings with a decrease of \$708,360. The incremental cost per hour in transportation user benefits in 2025 is \$13.00. A summary of the user benefits for the refined LPA are summarized below.

User Benefits Per Passenger Mile (minutes)	6.65
O&M Costs Per Passenger Mile (\$/Mile)	(0.014)
Incremental Cost Per Hour – Year of Expenditure (\$/Hours)	\$13.05
Incremental Cost Per Incremental Passenger (\$/New Rider)	\$17.14

By 2025 over 67,000 people and 132,000 jobs will be within an easy walk of the 42 stations; which equates to a population density of over 16,500 persons per square mile and an employment density of over 33,000 jobs per square mile. A population of over 51,000 persons in Miami Beach equates to 58 percent of the corridor's projected population; while a total of 101,276 employees in the City of Miami equates to 77 percent of the corridor's projected employment.

7.0 FINANCIAL PRO-FORMA AND PRIMARY SOURCES OF FUNDS

7.1 Financial Pro-Forma

The financial pro-forma supporting the 2025 LRTP (2004 Update) is currently being reviewed and updated by the MPO, MDT and FDOT to reflect the expected funding from all sources including the local tax generated by passage of the People's Transportation Plan's half-cent surtax. The process entails the identification and ranking of needed transportation improvements and financial resources. An updated LRTP and financial pro-forma are expected to be adopted late this year by the MPO.

7.2 Primary Source of Funds

The Pro-Forma assumptions regarding the general sources of funding are shown in Table 10. A detailed financial plan will be prepared and submitted with the PE/FEIS application and New Starts Report.

Table 10. Pro-Forma Assumptions

Source	Capital Cost	O&M Cost
Federal (5309)	50%	N/A
State (FDOT)	25%	N/A
Local (PTP)	25%	35% Farebox; 65% PTP

7.2.1 Federal Discretionary Funding

FTA uses a highly structured ranking process to prioritize requests for discretionary New Start assistance. At this time, the ability to credibly demonstrate a minimum of 50 percent non-discretionary New Start funding should be considered a threshold criterion. The non-discretionary funds may be derived from federal or non-federal sources, but must not result in total federal funding that exceeds 80 percent of Project costs. In addition to a local revenue commitment, some form of grant anticipation financing may be required to match Congressional appropriations under a Full Funding Grant Agreement (FFGA) with actual construction outlays. Additionally, the financial plan must demonstrate the capacity to fund cost overruns and delays in discretionary appropriations from sources other than Section 5309 New Starts earmarks.

7.2.2 Florida Department of Transportation Funding

The source of State funds could be flexible funding under the federal highway program, State public transportation grants (PTO), or other sources allocated by the MPO. However, it is assumed that FDOT will provide a match of 25 percent for the Bay Link system.

Given the constraints of FDOT's work program development process, it is also necessary to consider financing mechanisms that could "bridge" funds allocated in out-years of the 2025 Long Range Transportation Plan to address construction requirements.

7.2.3 Local Funding

Miami-Dade County's one-half cent sales tax generates approximately \$170 million per year (2004 \$) for transportation initiatives. Proceeds from the measure would be used to double the current bus fleet and build several major fixed guideway systems, including the Earlington Heights Extension of Metrorail, the North Corridor Extension of Metrorail, the East-West Corridor and the Bay Link Project. In addition, the revenues will provide a dedicated revenue source for meeting ongoing capital replacement and operating needs of the core transit network.

Depending upon core system requirements and the sequencing of future fixed guideway investments, the revenues allocated for Bay Link from a one-half cent sales tax are more than adequate to meet the \$16.4 million (inflated dollars) in average annual funding needed for the LPA from local capital sources.

8.0 IMPLEMENTATION PLAN

The AA/DEIS analysis process for Bay Link was conducted in accordance with the FTA planning and project development principles and guidelines. This process was initiated with system planning and continues through AA/DEIS, PE/FEIS, final design, and then construction, project start-up and revenue operations. This section provides an understanding of the FTA process and development of the LPA in accordance with the schedule supportive of the priority established in the MPO's LRTP.

8.1 Project Development Process

The AA/DEIS phase of the project was completed with the adoption of the LPA by the MPO Board. Phase 2 of the current scope of services was focused on completing the refinement of the LPA and generating the PE application letter to FTA, along with supporting documentation and requesting authority to advance the Bay Link Project into the PE/DEIS phase of project development, thus concluding the project planning phases. The next phase of the project is the completion of PE/FEIS and the NEPA required documentation necessary to secure a Record of Decision. The public involvement program will continue throughout the project development process.

During the PE/FEIS phase, the design and location of the alignment, stations, and support facilities of the LPA will be further evaluated, taking into consideration all of the alignment and station location design issues identified for additional study. Engineering plans and specifications will be prepared for all project facilities and equipment to an approximate overall 30 percent level of design and establishing the scope, budget and schedule baselines to serve

as the basis of final design. The operating plan for the streetcar system and support bus services will also be refined. Based on the revised engineering and operating plans, more precise estimates of capital and O&M costs will be developed to a level of detail suitable for the negotiation and execution of a Full Funding Grant Approval (FFGA) with the FTA. The financial plan will be refined based on the revised costs, and letters of commitment will be obtained from all local funding sources.

The NEPA documentation process will be completed in parallel with PE. All comments received on the DEIS have been addressed and those requiring further analysis will be carried into the PE/FEIS phase. The FEIS document will be updated based on the comments received on the DEIS and to reflect more current and detailed information provided through the engineering process. Avoidance or mitigation measures for adverse impacts will also be developed. The FEIS document will then be prepared and submitted to FTA. Upon completion of review of the FEIS by FTA, a draft ROD will be prepared and the FEIS submitted to the US Environmental Protection Agency (EPA). FTA may then authorize funding for final design and project construction in the form of a FFGA.

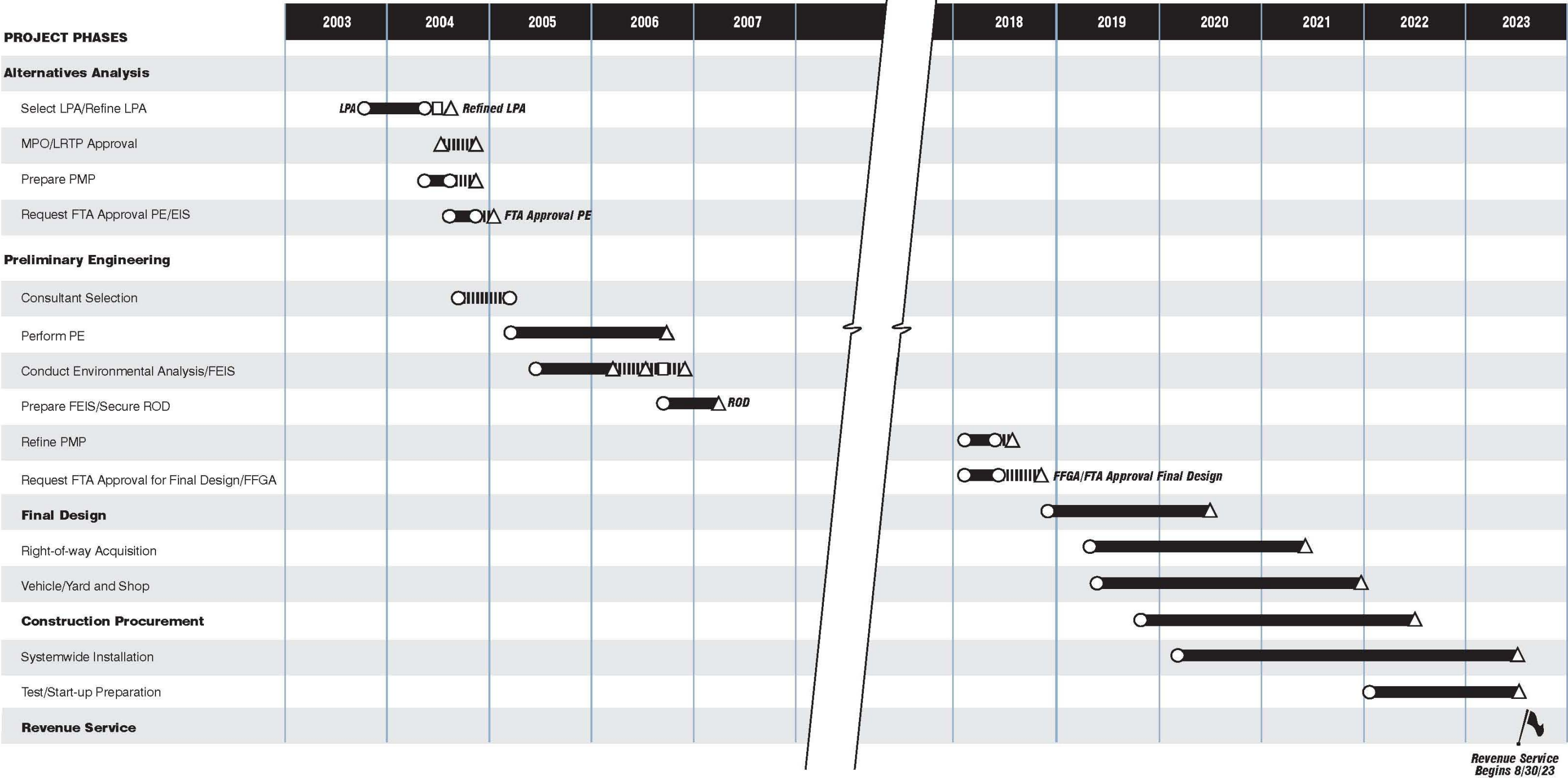
The final design phase of project development involves the preparation of final construction drawings, project specifications, construction management plans, and bid documents. Local agencies may also proceed with right-of-way acquisition. The process culminates in the construction phase of the process with the physical construction, procurement of vehicles, and pre-service testing of the system before revenue operations begin.

8.2 Project Schedule

The project schedule for implementation of the Bay Link Project is shown in Figure 11. The schedule is consistent with the project need reflected in the LRTP and TIP. Current plans support completion of the Bay Link Project in 2023. The Bay Link Project and the Miami Streetcar Project must be carefully coordinated due to the potential use of shared trackage, stations and the yard and shop facility. As a consequence, it may be necessary to develop the Bay Link Project in phases using a combination of local and federal funds. Parts of the project such as the initial Miami loop and the Miami Beach Circulator could be built initially using local funds and the project completed with federal assistance. The Bay Link Implementation schedule is also subject to refinement based on the completion and adoption of the updated LRTP and its supporting financial plan.

Due to the intense interest in accelerating the development of the Bay Link Project and to provide the MPO with maximum flexibility in implementing the LRTP, an analysis has been prepared to access the earliest practical date for the completion of the Bay Link Project. In full compliance with the FTA's development process, the Bay Link Project could be placed in service in 2012 if the capital funds were available. The schedule for 2012 is reflected in Figure 12.

Figure 11. General Implementation Schedule



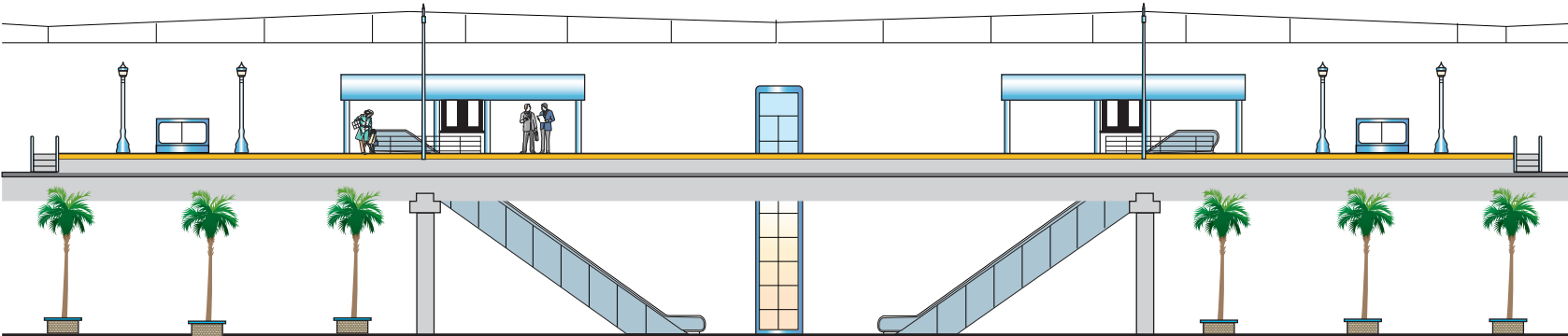
- Activity
- Public Hearing
- ☆ Advertise
- △ NTP
- 🚧 Begin Revenue Service

Figure 12. Accelerated Implementation Schedule (2012)

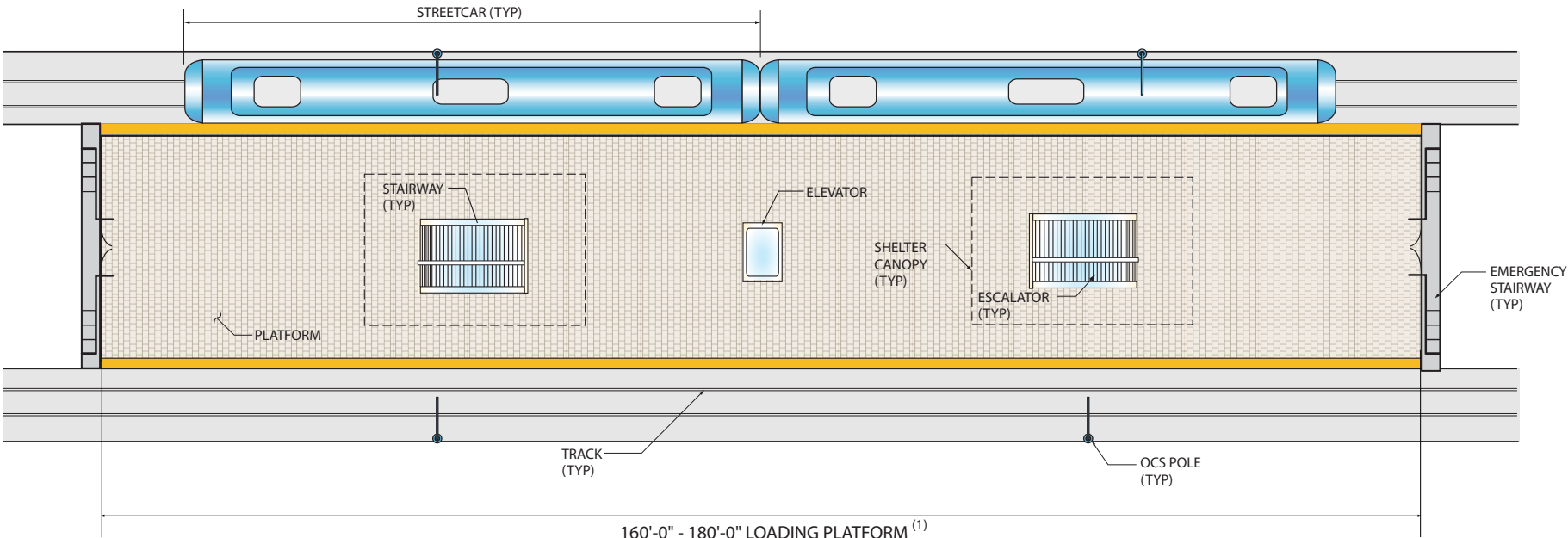


APPENDIX A

Prototypical Station Types

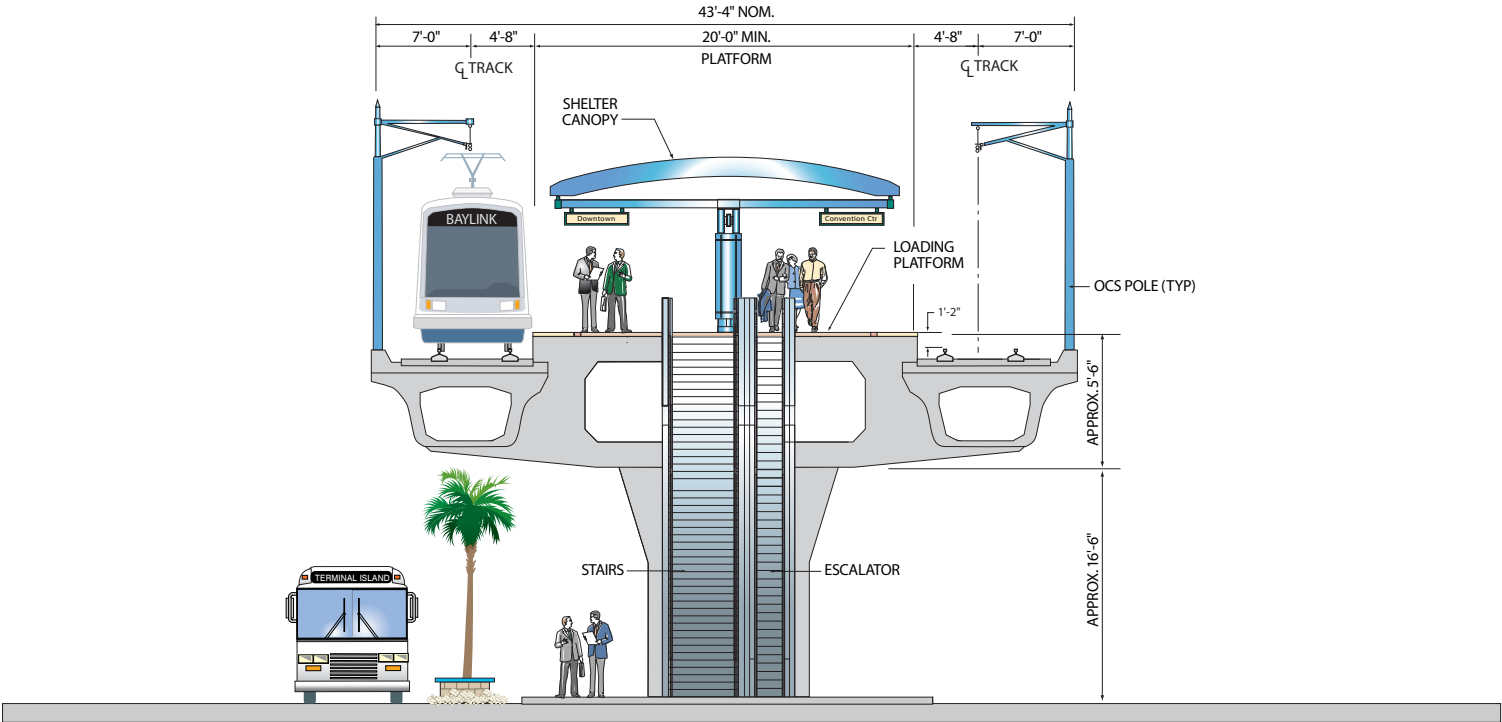


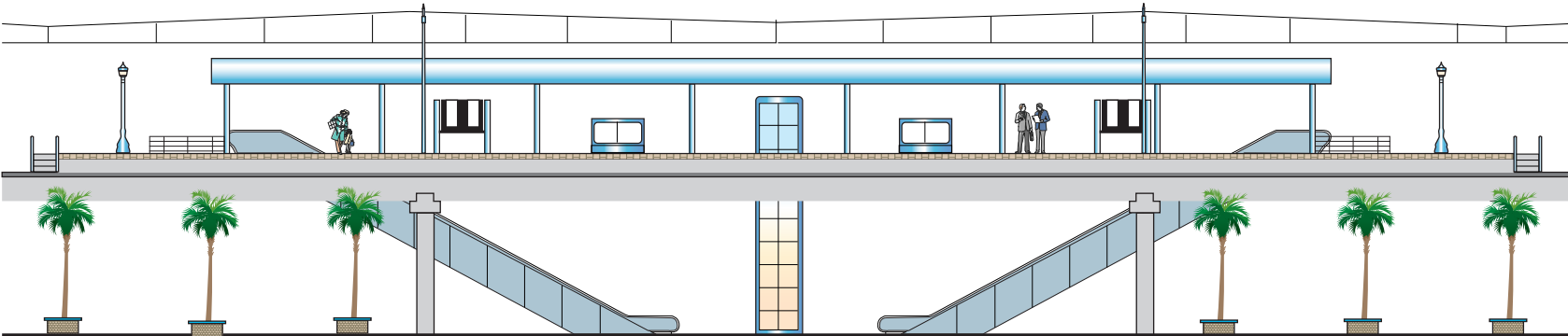
ELEVATION
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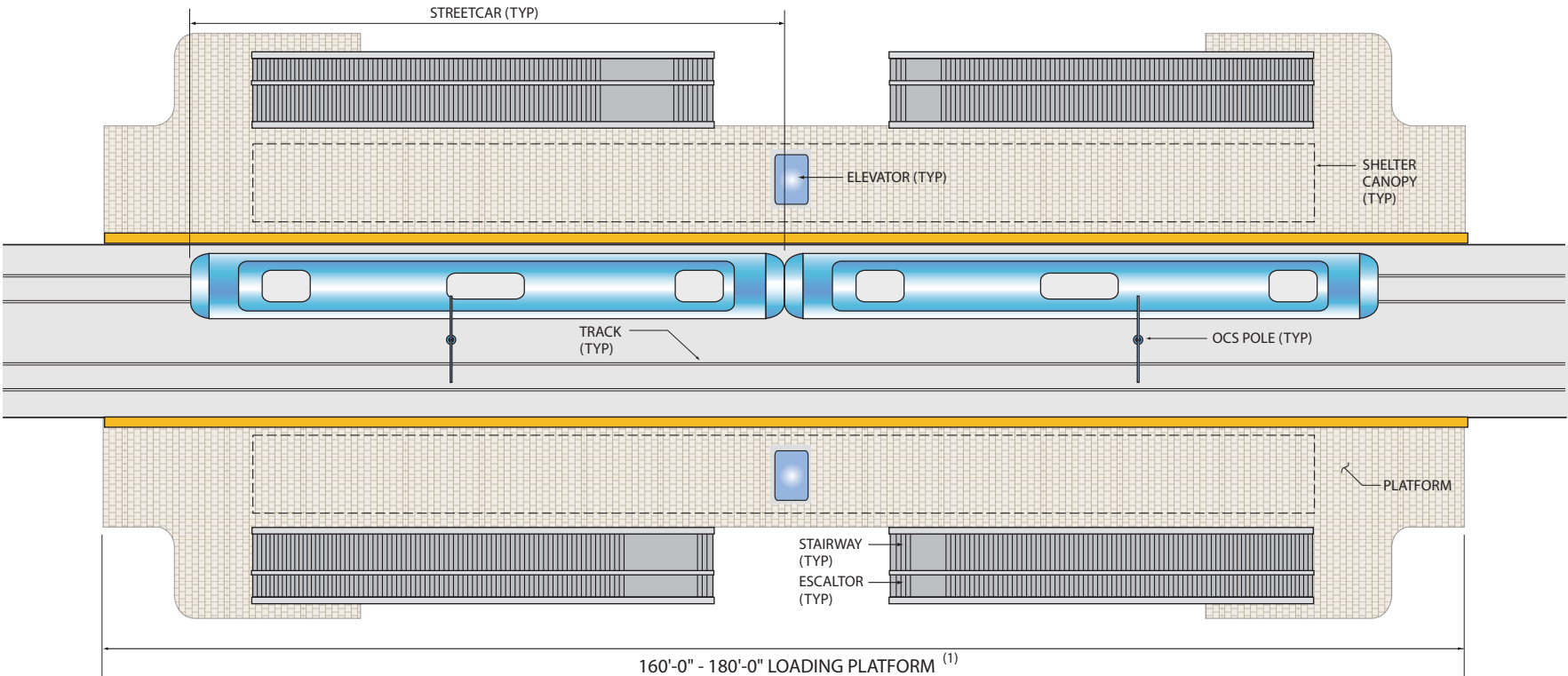
PLAN
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(1) Due to high retrofit cost, will build for 2-car trains to address potential future needs.



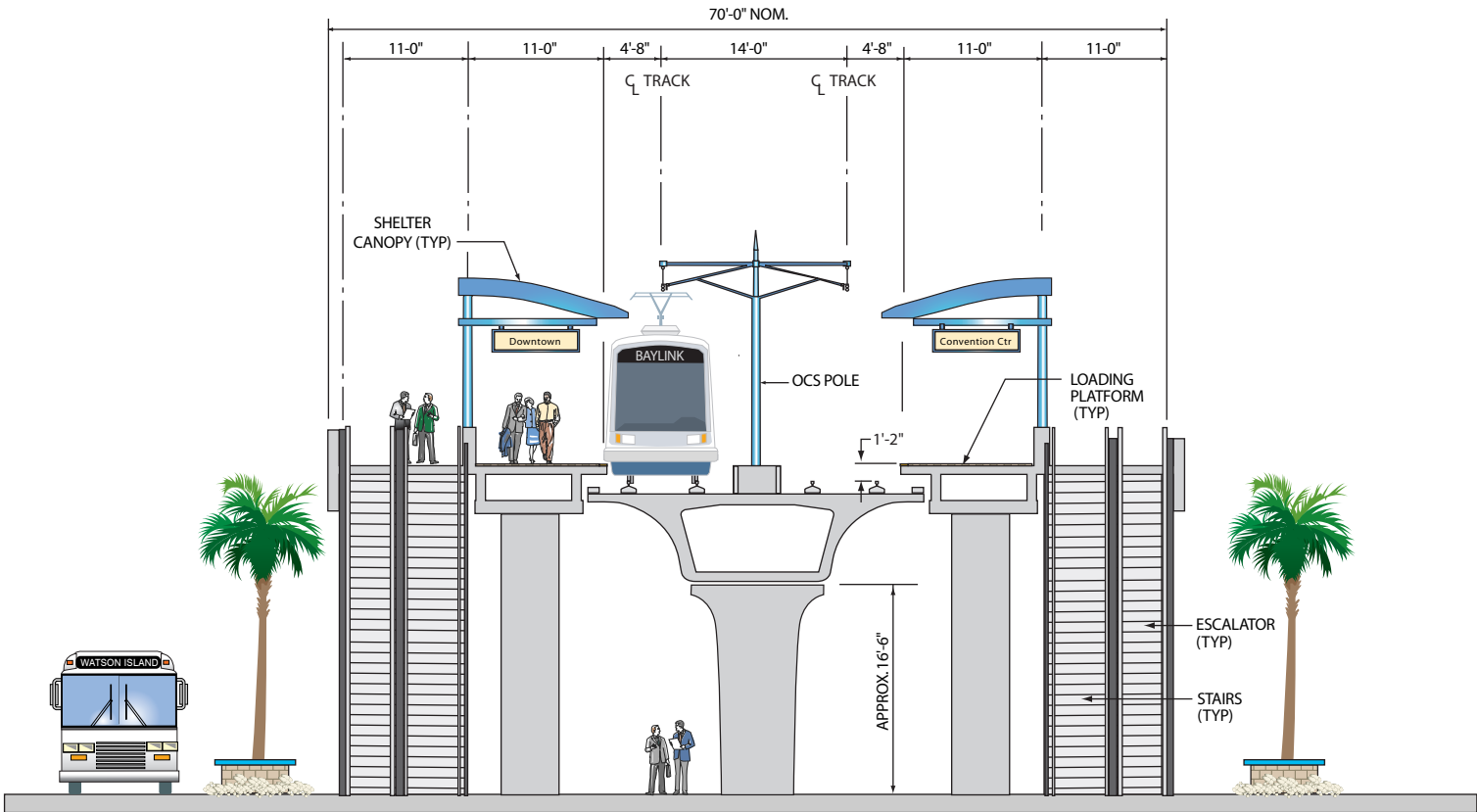


ELEVATION
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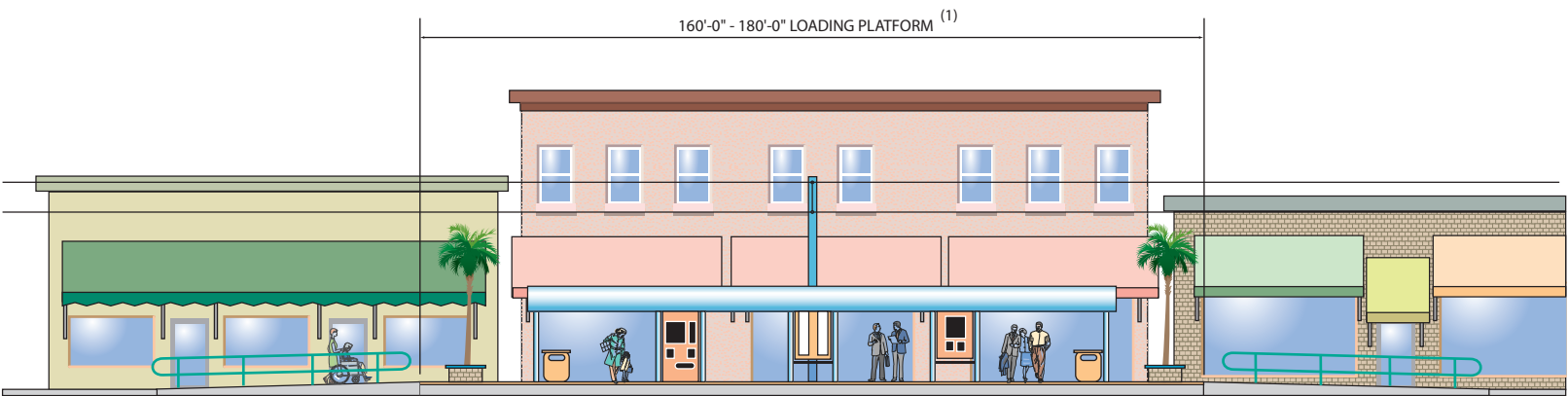


PLAN
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(1) Due to high retrofit cost, will build for 2-car trains to address potential future needs.

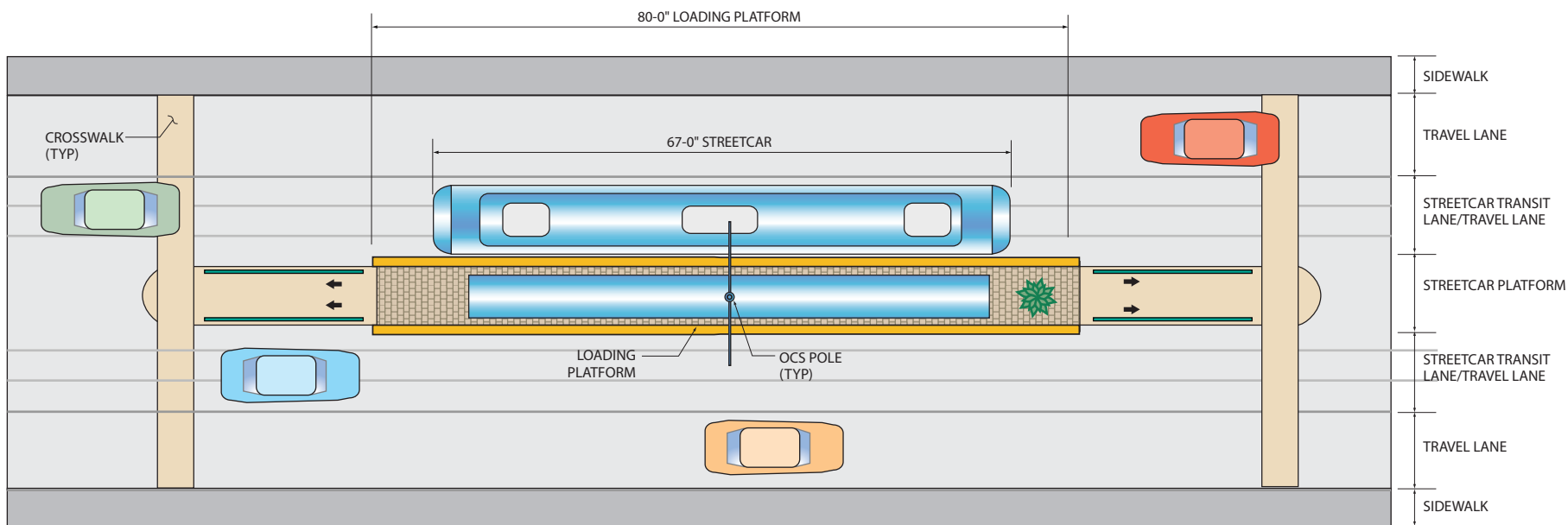


SECTION
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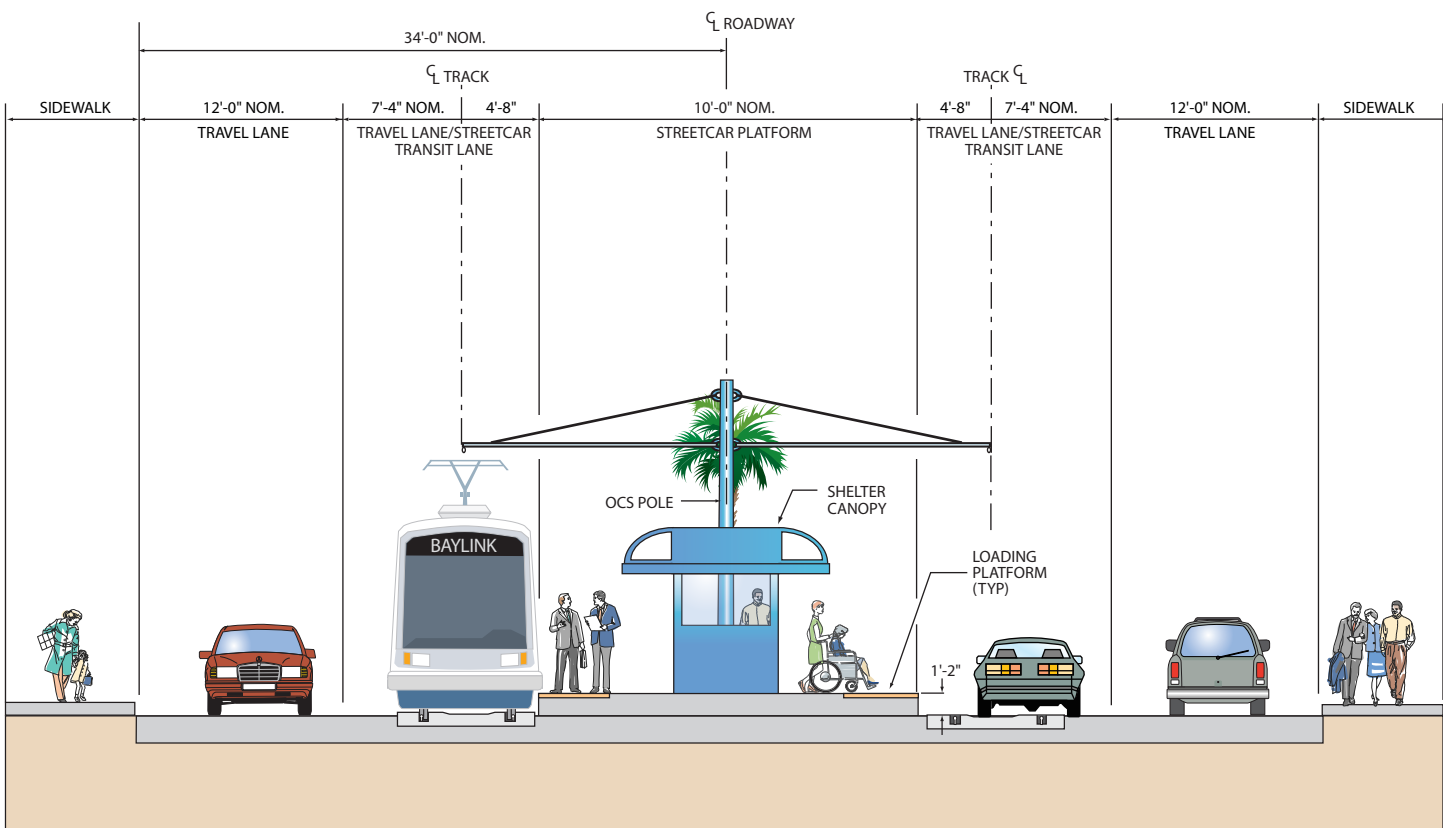


ELEVATION
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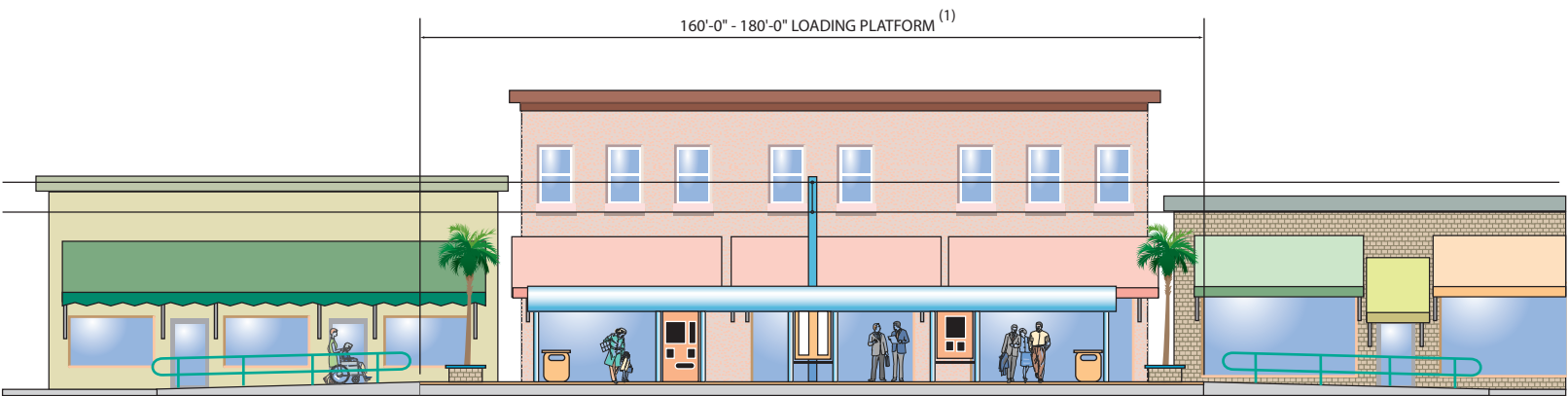
(1) Will design as 2-car tram platforms; depending on demand, will initially build for 1-car trams.



PLAN
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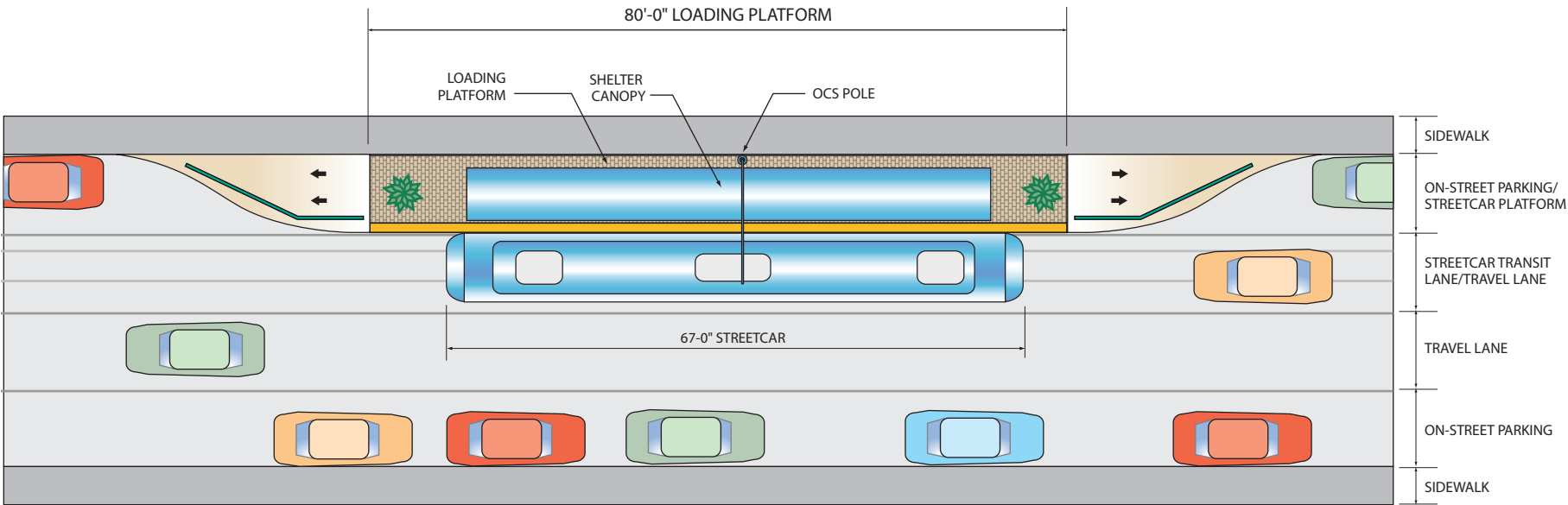


SECTION
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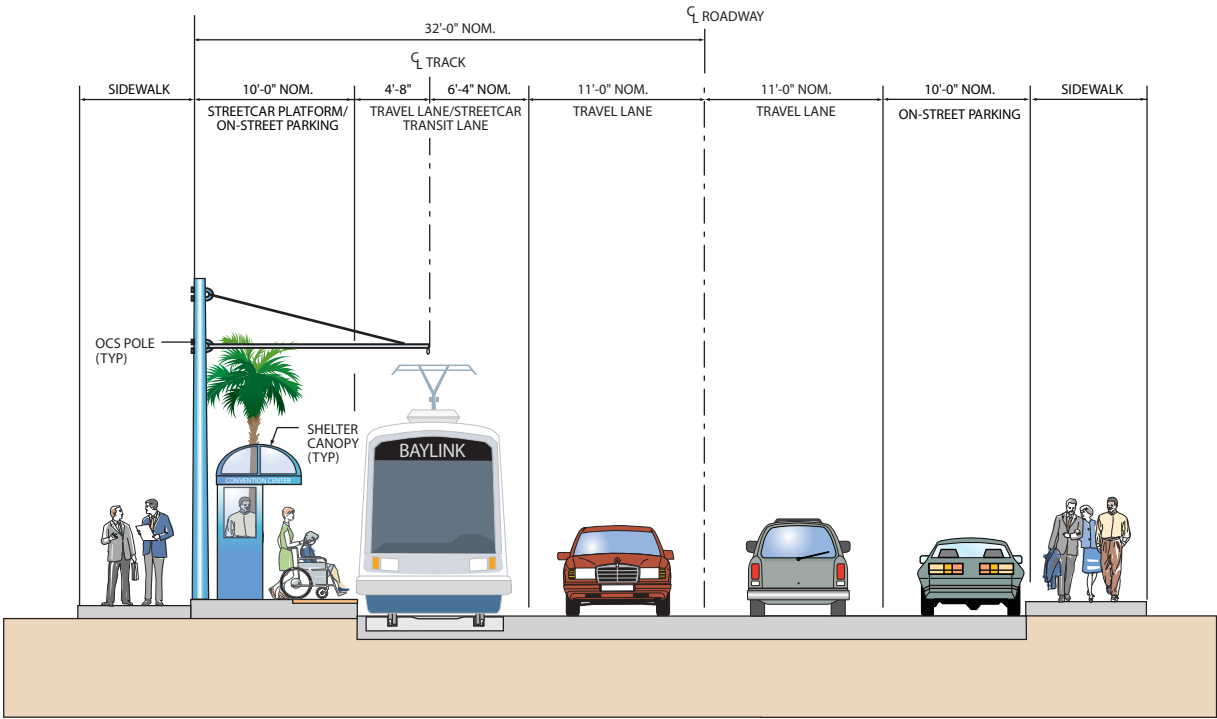


ELEVATION
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(1) Will design as 2-car tram platforms; depending on demand, will initially build for 1-car trams.



MID-BLOCK PLAN
NTS



SECTION
NTS

APPENDIX B

No-Build Bus Route Descriptions

NO-BUILD BUS ROUTES DESCRIPTIONS

Route #	Frequency		Connects (Route Description)
	Peak (min)	Off Peak (min)	
2	20	20	163rd St. Mall to downtown bus terminal
3	15	15	Aventura to downtown bus terminal
6	60	60	South Bayshore Sr. to downtown Metromover
7	30	30	Sweetwater to Overtown Station
8	30	30	FIU to Government Center Station
9	24	40	Aventura to downtown bus terminal
10	30	40	North Miami Beach to downtown bus terminal
11	10	15	FIU to Government Center station
16	20	20	North Miami Beach to downtown bus terminal
21	30	30	Opa-locka to downtown bus terminal
24	30	30	SW 137th Ave. to Government Center Station
32	15	30	St. Thomas University to Omni bus terminal
36	20	60	Koger Office Park to Omni bus terminal
48	30	30	South Miami to Mercy Hospital to Omni International Mall
77	20	30	Golden Glades to downtown bus terminal
95X	5	30	Golden Glades to downtown Miami
A	15	20	Lincoln Road to Omni bus terminal
B	15	30	Key Biscayne to Government Center station
C	15	20	Mt. Sinai Hospital to downtown bus terminal
H	15	20	Bal Harbor to South Beach
J	15	30	NW 36th St. to MIA to Miami Beach
K	20	30	Omni bus terminal to Haulover marina to Diplomat Mall (Broward County)
L	20	24	Hialeah Metrorail Station to Collins Ave. to Meridian Ave.
M	15	30	Civic Center Station to Omni bus terminal to Mt. Sinai Hospital
R	30	30	Mt. Sinai Hospital to South Beach
S	10	10	Aventura to Miami Beach to downtown bus terminal
T	20	30	Haulover Marina to downtown bus terminal
W	20	20	South Beach to Miami Beach Convention Center
Biscayne Max	15	15	Downtown Miami to Omni Metromover Station to Aventura Mall
Flagler Max	15	30	Flagler St. to Government Center Station to Convention Center
Seaport Connection	40	40	Downtown Miami (Government Center) to Seaport Terminal
Electrowave	5-10	5-10	Loop service within South Beach along Washington Avenue.