

Tri-Rail Coastal Link Study

(formerly known as the South Florida East Coast Corridor Study)

Tri-Rail Coastal Link

Getting Southeast Florida To Work



Broward Metropolitan Planning Organization
Florida Department of Transportation
Miami-Dade Metropolitan Planning Organization
Palm Beach Metropolitan Planning Organization
Southeast Florida Transportation Council
South Florida Regional Planning Council
South Florida Regional Transportation Authority
Treasure Coast Regional Planning Council

Preliminary Project Development Report

April 2014

Appendix 4: Capital Cost Methodology and Results

FINAL

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Tri-Rail Coastal Link

Capital Cost Methodology and Results Report

Prepared for
Florida Department of Transportation

April 2014

Prepared by
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Acronyms and Abbreviations

AAF	All Aboard Florida	O&M	Operation & Maintenance
CADD	Computer Aided Design and Drafting	PA	Public Address
CCTV	Closed Circuit Television	PBA	Proposed Build Alternative
EA	Environmental Assessment	PTC	Positive Train Control
FDOT	Florida Department of Transportation	ROW	Right-of-Way
FEC	Florida East Coast Railway	SCC	Standard Cost Category
FECI	Florida East Coast Industries	SFECC	South Florida East Coast Corridor
FRA	Federal Railroad Administration	SFRC	South Florida Rail Corridor
FTA	Federal Transit Administration	SFRPC	South Florida Regional Planning Council
M	Million	SFRTA	South Florida Regional Transportation Authority
MGC	Miami Government Center	SLD	Straight Line Diagram
MIA	Miami International Airport	TCRPC	Treasure Coast Regional Planning Council
MIC	Miami Intermodal Center	TM	Track Mile
MP	Mile Post	VMS	Variable Message Sign
MPO	Metropolitan Planning Organization	WPB	West Palm Beach
NEPA	National Environmental Policy Act		



1.0 Executive Summary

This report provides a summary of the methodology and assumptions used to develop order-of-magnitude Capital Cost estimates for the Tri-Rail Coastal Link Build Alternatives. Formerly known as the South Florida East Coast Corridor (SFECC), the Tri-Rail Coastal Link project consists of new commuter service on the FEC Railway from Toney Penna Drive in Jupiter to Miami Government Center (approximately 82 miles). The project provides connecting service from existing Tri-Rail service to the Tri-Rail Coastal Link project. Planning-level order-of-magnitude Capital Cost estimates were developed for each of the Build Alternatives under evaluation to provide an estimated project cost to assist with planning in the Project Development phase. The client objective for the order-of-magnitude cost methodology was to minimize study effort while the alternatives were being evaluated and to allow for a quick turn-around time for cost estimate development after operations modeling results were available during alternatives development and refinement. These order-of-magnitude Capital Costs are not intended for programming funding commitments or determining final construction costs. Detailed cost estimates

will be developed during the next phase of study to confirm the project cost estimate is within the range of the order-of-magnitude Capital Cost estimate presented in this report.

During the next phase of study (Project Development), project refinements (including service plan changes, operations modeling assumptions, station locations and concept plan development) will need to be considered in the development of project cost estimates. These order-of-magnitude Capital Cost estimates are intended to provide a magnitude of the estimated project capital cost for preliminary financial planning and local government planning as well as provide an order-of-magnitude Capital Cost comparison for the project alternatives under evaluation.

As of April 2014, the build alternatives under evaluation include two operating plans including the PBA and A6C5 version 11.1 modeling scenarios referred to as Build Alternative Option A and Build Alternative Option B, respectively. The order-of-magnitude Capital Cost estimates for the build alternatives as of April 2014 are summarized in Table 1.1 and further detailed in the order-of-magnitude Capital Cost estimate provided in Appendix B.

Table 1.1 – Build Alternative Order-of-Magnitude Capital Costs

Build Alternative	Cost Estimate Total	Low Range (-5%)	High Range (+5%)
	Million Dollars		
Option A (aka PBA)	\$762M	\$724M	\$800M
Option B (aka A6C5)	\$812.7M	\$772M	\$853M

This executive summary provides an overview of the order-of-magnitude Capital Cost estimates. Reliance on this

information should be in consideration of the full context of this report.

2.0 General Information

2.1. Project Location

The project is located in Southeast Florida between Jupiter and Miami along the existing FEC Railway (see Figure 2.1).

2.2. Purpose of Estimate and General Scope

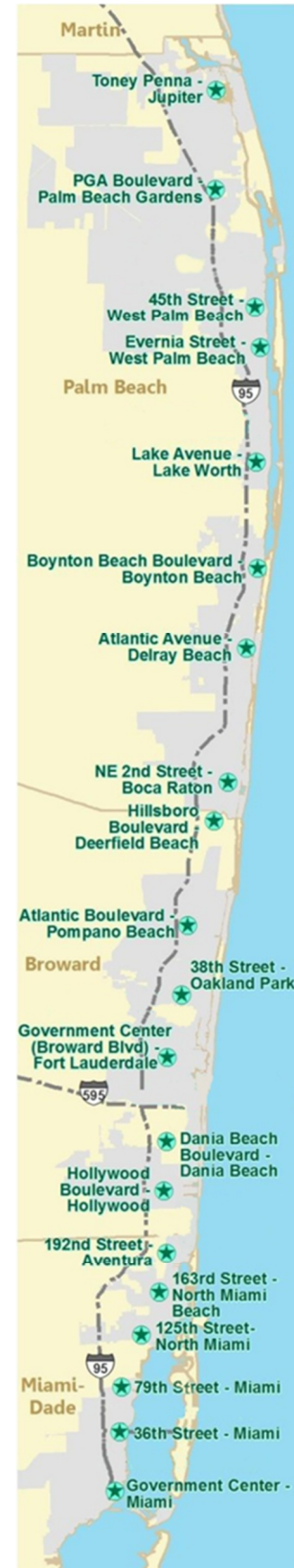
The purpose of this estimate is to provide the Florida Department of Transportation (FDOT) with order-of-magnitude Capital Cost estimates for the Tri-Rail Coastal Link Build Alternatives. This document describes the methodology for preparation of the order-of-magnitude Capital Cost estimates for the proposed service. In addition, it presents the summary of Capital Cost estimates using modified FTA Standard Cost Categories (SCCs) and cost elements.

The order-of-magnitude estimate uses the main SCC categories but not sub-categories. The traditional SCC format with detailed costs and quantities was not scoped for the planning phase at FDOT's request due to the number of alternatives and the short timeframe needed for cost estimate updates. Order-of-magnitude Capital Cost estimates are presented for this report and detailed cost estimates are scoped for the Project Development phase.

The primary objectives of this report are to:

- Identify the methods and processes used to develop the Capital Cost estimate;
- Identify the source documents and/or methodology used for pricing work;
- Identify risk elements;
- Describe unit price elements;
- Define estimating assumptions;

Figure 2.1 Project Location





- Define the approach and methodology with respect to FTA SCCs; and
- Present the results of the order-of-magnitude Capital Cost estimates for the build alternatives.

The order-of-magnitude Capital Cost estimates will be utilized by the Project Steering Committee comprised of representatives from FDOT, SFRTA, the three MPO's, SFRPC and TCRPC and local transit agencies to evaluate the alternative(s) that will be studied further in Project Development. Additionally, the order-of-magnitude Capital Cost estimates will assist in determining the financial feasibility of the project.

The estimating approach has been done in a manner that (1) provides the proper foundation for more detailed estimates as selected alternative(s) are further evaluated; and (2) provides the basis for subsequent conceptual design level estimates with additional guidelines for a more detailed Capital Cost estimate.

2.3. Capital Cost Estimate Methodology

The order-of-magnitude Capital Cost estimates have been prepared for guidance in project evaluation and implementation from the information available at the time of the estimate (April 2014). The order-of-magnitude Capital Cost estimates use a combination of historical unit costs and built costs. The final capital cost of the project will depend upon the final design development as well as the actual labor and material costs, competitive market conditions, implementation schedule and other variable factors. As a result, the final project Capital Costs will vary from the order-of-magnitude Capital Cost estimates presented herein. Because of this, project feasibility and funding needs

must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding

It should be cautioned to all readers that material prices can be volatile as a result of current fluctuating market conditions. No Operation and Maintenance (O&M) costs are included in this Capital Cost Methodology and Results Report.

2.3.1 Historical Bid-Based Method

Historical bid-based methods are commonly used to develop Engineer's Estimates, and are appropriate when design definition has advanced to the point where quantification of units of work is possible. These methods apply historical unit costs to counts or measures of work items to determine a total cost for the item or project. The unit cost data used is typically received in bid documents from prior projects and should be modified or adjusted to reflect current prices (inflated to current time) and project specific conditions such as geographic location, quantity of item needed, and the scheduled timing of the project. Techniques such as historical bid pricing, historical percentage, and cost based estimating are also used to determine unit prices.

2.3.2 Quantity Takeoffs

Quantity Takeoffs involve preparation of estimated quantities either by direct measurement and calculation of construction elements that are shown in preliminary concept drawings, sketches, electronically calculated for CADD files or established as an allowance quantity based on professional experience and judgment.

2.3.3 Contingency

Contingency, in the statistical sense, is the estimated percentage by which a



calculated value may differ from its true or final value and is typically included in an estimate as an allowance for the level of engineering design completion or to address imperfections in the estimating methods used at the various project development stages. Contingency is typically added to a particular item or group of items by the use of percentage multipliers. Contingency is generally greatest for the early stage of Project Development and decreases with advancement in the level of engineering design and pricing detail. During this planning phase for the Tri-Rail Coastal Link, the limited level of design information that is available requires the use of contingency allowances against specific construction or procurement cost categories. The percentage selected for a given cost category is generally based on level of definition of the scope of work involved and substantiated by professional judgment and experience relative to level of uncertainty and historical cost variability typically seen for work within a particular cost category. For the purposes of this order-of-magnitude Capital Cost estimate, all contingency assigned to the project is defined as unallocated to address overall project uncertainties and the general project unknowns. Unallocated contingencies will be estimated at thirty percent (30%) of the total construction costs.

Allocated contingency is typically based on known project unknowns. No allocated contingency has been added to the individual cost categories for the purposes of this estimate development. Unit prices presented have been adjusted as assumed applicable to include allocated contingency.

Detailed Capital Cost Estimates generated with quantity takeoffs will be prepared during Project Development to include all standard SCC sub-categories

with allocated contingencies (as applicable) and an expected reduction in the overall unallocated contingency.

3.0 Basis of Estimate

3.1. Basis and Source Documents

The estimate is based on the following sources and documents:

- SFECC Phase 2 Basis of Estimate Report (Gannett Fleming – March 2011)
- SFECC Phase 2 Alternative Analysis (Gannett Fleming – August 2010)
- SFECC Phase 2 Conceptual Transitway Structures Tech Memo (Gannett Fleming – August 2010)
- SFECC Phase 2 Preliminary Right-of-Way Cost Estimate Ranges (Glass Land Acquisition – January 2010)
- All Aboard Florida Environmental Assessment (February 2013); includes Service Plan
- Tri-Rail Coastal Link Station Refinement Report (DRAFT, March 2014)
- Tri-Rail Coastal Link Station Area Planning and Location Workbook (DRAFT July 2013)
- Tri-Rail Coastal Link Service Plans (January 2014)
- Tri-Rail Coastal Link Build Alternative Option A (PBA) Straight Line Diagram (February 2014)
- Tri-Rail Coastal Link Option B (A6C5v11.1) Straight Line Diagram (February 2014)

3.2. Capital Cost Workshop

A Capital Cost Workshop for the project was held on July 7, 2013 to present an overview of the March 2013 preliminary Phase 3 Capital Cost estimate analysis (documented in the Draft Order of Magnitude Capital Cost Estimate for Build Alternative and Segments dated



March 1, 2013 located in the project files), discuss the order-of-magnitude Capital Cost methodology, and review the Capital Cost risks and assumptions. Participants included FDOT, SFRTA, study team consultants (RS&H, CH2M HILL, and Hanson), and SFRTA consultants (Jacobs and PB). As a result of the Capital Cost Workshop, the order-of-magnitude Capital Cost was reviewed and agreed to as an acceptable methodology for the planning-level stage of project development. All acknowledged that further detail during Project Development, especially regarding right-of-way estimates, would facilitate the development of detailed Capital Cost estimates.

3.3. Key Assumptions

Current assumptions are based on source documents available as of January 2014. The estimate assumes that the work will be done on a competitive bid basis and the contractor will have a reasonable amount of time to complete the work. Additionally, the estimate assumes a reasonable project schedule, no overtime, constructed under a single contract, and no liquidated damages.

3.3.1 Existing and Planned Operations

The Build Alternatives for the Tri-Rail Coastal Link service were developed based on operations modeling of the existing and projected freight, proposed All Aboard Florida (AAF) intercity passenger service, proposed FEC Amtrak service and the planned Tri-Rail Coastal Link service plan. The AAF proposed service is documented in the Environmental Assessment (EA)/FONSI (February 2013). Based on the AAF documentation, the infrastructure for the AAF project would be double-track from Jupiter to Miami. The assumed base conditions are based on AAF coordination

between April 2013 and January 2014 and the provided AAF base infrastructure.

3.3.2 Operating Plan

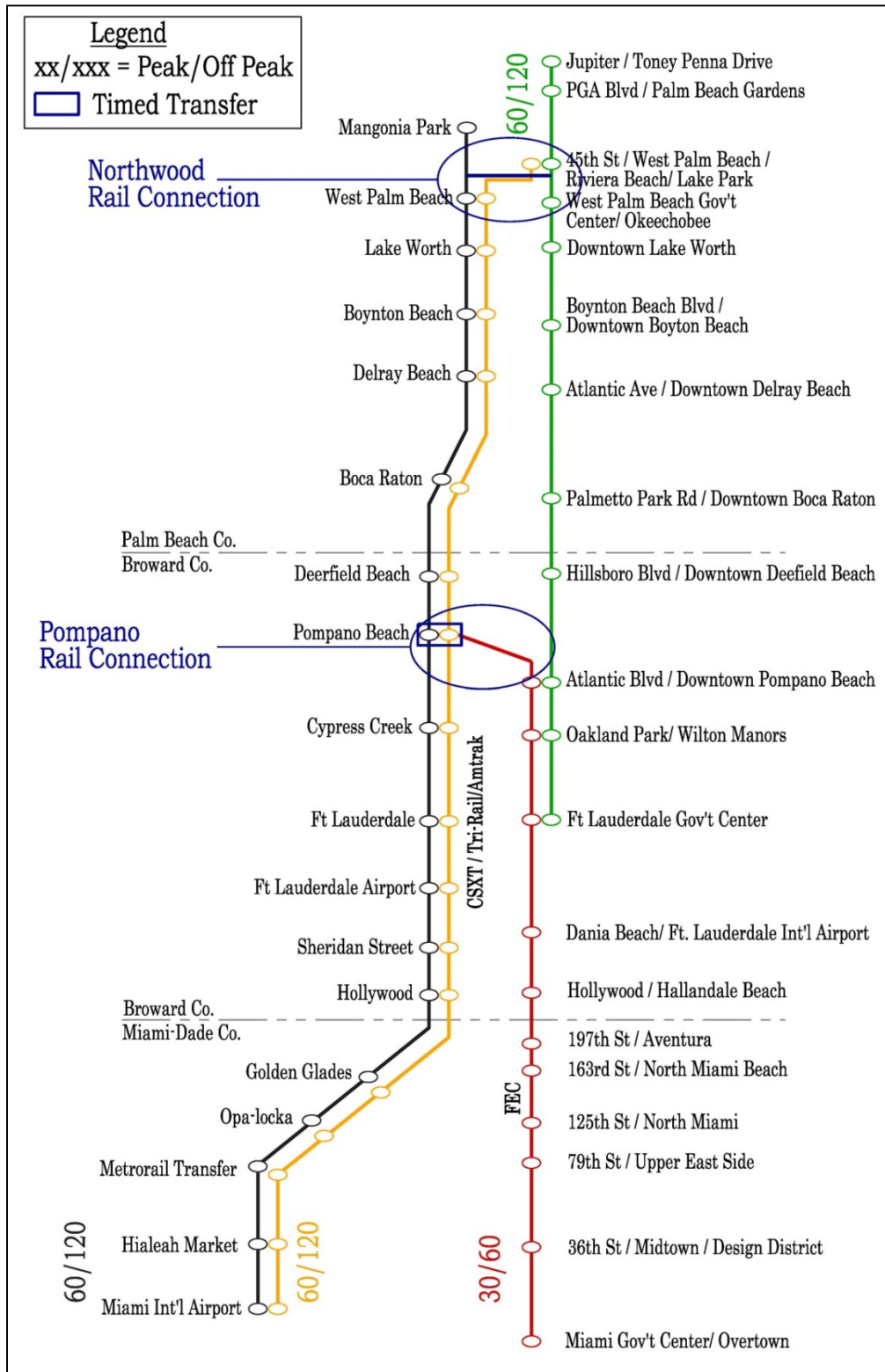
The operating plan options for the Tri-Rail Coastal Link project are a key assumption for the estimation of proposed infrastructure required in the Capital Cost estimate. As of January 2014, the operating plan options are based on ridership and operations modeling evaluations conducted during Phase 3 of the Tri-Rail Coastal Link Study. The operating plan for Build Alternative Option A and Build Alternative Option B are shown graphically in Figure 3.1 and Figure 3.2, respectively. A summary of the service plan assumptions are presented in Table 3.1.



Table 3.1 – Summary of Service Plan Assumptions

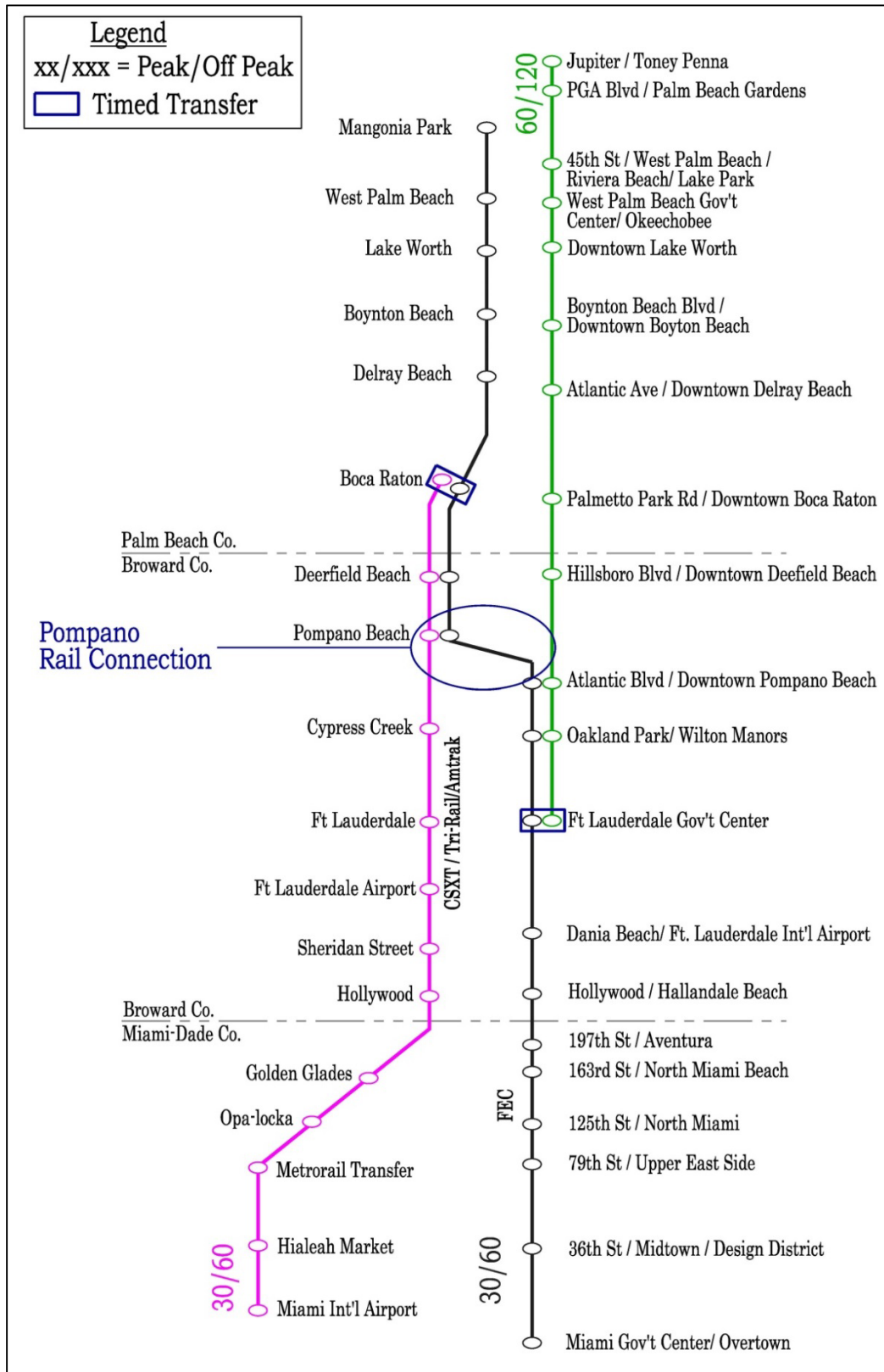
Scenarios	Option A	Option B
Description/Service Headways	- A 60/120 peak/off-peak service between Mangonia Park and Miami International Airport (MIA) along the existing Tri-Rail corridor. - A 60/120 peak/off-peak service between West Palm Beach and MIA. - A 30/60 peak/off-peak service between the existing Pompano Beach Tri-Rail station and Miami Government Center station on the FEC Railway. - A 60/120 peak/off-peak service between Jupiter (Toney Penna Drive) and Fort Lauderdale Government Center.	- A 30/60 peak/off-peak service between the Boca Raton Tri-Rail Station and MIA along the existing Tri-Rail corridor. - A 30/60 peak/off-peak service between the Mangonia Park Tri-Rail station and Miami Government Center station on the FEC Railway. This provides a combined 15/30 peak/off-peak service between the Boca Raton and Pompano Beach Tri-Rail stations. - A 60/120 peak/off-peak service between Jupiter (Toney Penna Drive) and Fort Lauderdale Government Center.
FEC Begin/End Milepost	FEC MP 284.1 to MP 4.9 (equivalent to MP 365.6)	Same as Option A
No. of Stations (Incremental)	20 proposed stations on FEC	Same as Option A
Timed Transfer	Pompano Beach Tri-Rail station	Boca Raton Tri-Rail station and the Fort Lauderdale Government Center FEC station

Figure 3.1: Build Alternative Option A



Source: AECOM (February 2014)

Figure 3.2: Build Alternative Option B



Source: AECOM (February 2014)



3.3.3 Existing and Assumed Base Infrastructure

The existing FEC corridor was formerly a double-track corridor. However, the existing condition is primarily single-track with a double-track siding from Lake Park to West Palm Beach and Wilton Manors to the Fort Lauderdale Airport. Additionally, existing industry sidings occur at intermediate points throughout the length of the project. For the purposes of this order-of-magnitude Capital Cost estimate, the base condition for the Tri-Rail Coastal Link project is assumed to be the existing FEC infrastructure as well as the infrastructure proposed for the AAF project. The AAF service is anticipated to be in operation by 2016 which will be the existing condition prior to implementation of the Tri-Rail Coastal Link project. The AAF base condition (i.e. the No-Build Alternative) is primarily restoring the historical double-track as shown on the Straight Line Diagrams (SLDs) provided in Appendix A.

based on the results of the operations modeling. The track infrastructure requirements for Build Alternatives Option A and Option B are illustrated graphically on the SLDs provided in Appendix A.

3.3.4 Infrastructure Requirements

As stated previously, the Build Alternatives for the Tri-Rail Coastal Link project were developed based on operations modeling of the existing and projected freight, proposed AAF intercity passenger service, proposed FEC Amtrak service and the planned Tri-Rail Coastal Link service plan. The Tri-Rail Coastal Link infrastructure requirements assume the AAF infrastructure exists prior to construction of the Tri-Rail Coastal Link project.

Based on these assumptions, the Tri-Rail Coastal Link track infrastructure requirements for each of the two Build Alternatives are summarized in Table 3.2. It should be noted that the infrastructure requirements include additional track infrastructure outside the project limits

Table 3.2 – Tri-Rail Coastal Link Track Infrastructure Requirements (February 2014)	
Option A	Option B
FEC New Track • Stub Track at Toney Penna Station MP 284.20 – 284.65 • Triple Track MP 288.40 – 290.77 • Stub Track at WPB 45th Street Station MP 296.50 – 296.95 • Triple Track MP 299.14 – 300.99 • Freight Siding MP 323.38 – 323.68 • Freight Siding MP 329.83 – 330.24 • Triple Track MP 332.47 – 341.04 • Quadruple Track MP 341.04 – 341.80 • Storage Track MP 341.05 – 341.16 • Triple Track MP 341.80 – 341.96 • Freight Siding MP 342.07 – 342.59 • Freight Siding MP 342.97 – 343.79 FEC New Crossovers • #24 at MP 284.65 • #24 at MP 286.46 • #24 at MP 299.16 • #24 at MP 300.96 • #24 at MP 332.53 • #24 at MP 334.16 • #24 at MP 334.24 • (2) #24 at MP 336.66 • (2) #24 at MP 337.45 • #24 at MP 339.44 • #24 at MP 339.66 • #24 at MP 341.40 • #24 at MP 341.76 • #24 at MP 341.84 • #24 at MP 341.92 • #24 at MP 358.71 SFRC New Track • Storage Track 1001.31 – 1001.57 • Double Track 1036.36 – 1036.95 SFRC New Crossovers • #20 at MP 1001.61 • #20 at MP 1003.00	New Track • All FEC New Track assumed in Option A except Stub Track at WPB 45th Street Station MP 296.50 – 296.95 • Triple Track MP 358.69 – 360.61 New Crossovers • All FEC New Crossovers assumed in Option A SFRC New Track • Triple Track MP 992.58 – 992.97 • Storage Track 992.74 – 993.17 • Storage Track 1001.31 – 1001.57 • Double Track 1036.36 – 1036.95 SFRC New Crossovers • #20 at MP 970.12 • #20 at MP 1003.13

Source: Stantec (January 2014)

Based on these modeled track infrastructure requirements, Table 3.3 summarizes the major order-of-magnitude

quantities for the Tri-Rail Coastal Link service for each of the Build Alternative scenario options.



Table 3.3 – Tri-Rail Coastal Link Capital Infrastructure Requirements and Service Characteristics (AAF assumed existing)

Infrastructure Requirements	Option A				Option B			
	Total	Palm Beach County	Broward County	Miami-Dade County	Total	Palm Beach County	Broward County	Miami-Dade County
Miles new double-track siding	0	0	0	0	0	0	0	0
Miles new third track siding	17.7	7.7	10.0	0	19.55	7.25	10.0	2.3
Miles new fourth track siding	0.7	0	0.7	0	0.7	0	0.7	0
Bridges expanded from 1 to 2 tracks	0	0	0	0	0	0	0	0
Bridges expanded from 2 to (3 or 4) tracks	4	0	4	0	6	0	4	2
Revenue Trains on Northwood Connection	√	√						
Double Track Pompano Connections to SFRC and FEC					√		√	
Reduced Service to Mangonia Park	√	√						
Access from MIC to Jupiter	√							
One Seat Ride from Mangonia Park to MGC					√			
Existing One Seat Ride from Mangonia Park to MIC (maintained)	√							
Improvements to Tri-Rail Boca Raton Station					√			√
Port Everglades Lead extension	√		√		√		√	



Table 3.3 – Tri-Rail Coastal Link Capital Infrastructure Requirements and Service Characteristics (AAF assumed existing) , cont.

Infrastructure Requirements	Option A				Option B			
	Total	Palm Beach County	Broward County	Miami-Dade County	Total	Palm Beach County	Broward County	Miami-Dade County
Little River Connection (access to Hialeah Yard)	√			√	√			√
MIC double track	√			√	√			√
New Tri-Rail Coastal Link Stations	17	7	5	5	17	7	5	5
New shared AAF/Tri-Rail Coastal Link Stations	3	1	1	1	3	1	1	1

Note: Data shown by County with miles of new track including trackwork on bridges as required. Estimate does not include trackwork at SFRC/FEC Connections (separate cost). Checkmarks indicate infrastructure element is included in alternative.

In addition to track infrastructure, all AAF improvements are assumed to be in place prior to implementation of the Tri-Rail Coastal Link service. The assumed AAF improvements were based on assumptions documented in the AAF Environmental Assessment and

supplemental information provided by AAF to AECOM in July 2013 to support the operations simulation evaluation. Table 3.4 summarizes the assumed AAF infrastructure improvements which formulate the base (or existing) condition for the Tri-Rail Coastal Link project.

Table 3.4 – AAF Infrastructure Improvements

Build Alternative Infrastructure Component	Base Infrastructure
Trackwork	
New Track Construction (Add 2 nd Mainline)	56.73 miles of new double track.
Rehab Existing Track	7.82 miles of siding rehabilitation - Hypoloxo, Villa Rica, Pompano, and Ojus.
New Switches	• New #24 universal crossovers MP351.2 and MP309.3 • New #10 universal crossover MP365.2 • New #24 crossovers MP289.8, MP319.5, MP321.5, MP330.5, MP332.3 • New #20 crossovers MP360.7



Table 3.4 – AAF Infrastructure Improvements , cont.

Build Alternative Infrastructure Component	Base Infrastructure
Bridges	
Rehab Existing Bridge Superstructure	Rehab 6 bridges • C15 Canal • Cypress Creek Canal • North Fork of Middle River • South Fork of Middle River • Oleta River • Royal Glades Canal
Add New Bridge structure	Five new bridges • Earman River Canal • C51 Canal • C16 Canal • Hillsboro Canal • Arch Creek Canal
Stations	
New AAF Stations	Three new stations. • Miami – Station building with elevated high level 1,000' x 80' center platform, 1,000' x 25' low level center service platform, and 1,000' x 25' high level side platform. • Ft. Lauderdale – Station building with high level 900' x 35' center platform. • West Palm Beach – Station building with high level 900' x 35' center platform.
Station Parking	Miami - new garage with 1,050 parking spaces; Ft. Lauderdale - 120 parking spaces; West Palm Beach - 215 parking spaces.
Support Facilities	Assumes existing Andrews Yard for Vehicle Maintenance.
Minor improvements – grade crossing	Upgrades at 134 of 183 existing highway and pedestrian crossings (West Palm Beach to Miami); does not include 4-quadrant gate infrastructure.
Systems	
Positive Train Control	Include upgrades to FEC corridor for passenger service
Signals	New track signal controls and upgrades as needed for passenger service
Right-of-Way	Assumes no acquisition required. Station parking/infrastructure within FEC ROW.
Vehicles	Each train set (up to 895 ft. long) consists of two locomotives, each 65 feet long. Single level, with level floor boarding from platforms. Seven passenger cars, each 85 feet long, with up to two additional passenger cars added.

Source: EA Scenario (Environmental Assessment, October 2012); AECOM Modeling assumptions, January 2014)



3.3.5 Right-of-Way

Right-of-Way (ROW) involves preparing estimated area quantities of impacted properties, either permanent full or partial takes and/or temporary easements, which result from potential construction, operation, and maintenance. ROW costs for projected impacts at stations, station parking areas, and track mainline were based on assumed permanent partial acquisition.

Conceptual track plans and concept plans are to be developed during Project Development and were not included in the scope of work for this order-of-magnitude Capital Cost estimate. To estimate the ROW impacts, typical sections were developed (refer to Appendix C) and the estimated ROW impact was calculated based on existing ROW lines (as indicated by property lines provided by the property appraiser databases within the study area). During Project Development, a ROW control survey will be required to confirm the available ROW in constrained locations.

ROW costs for projected impacts at each of the connections identified (Northwood, Pompano, and IRIS) were provided by FDOT based on assumed permanent partial acquisition at impacted parcels.

The estimated order-of-magnitude Capital Cost for this category was based on projected land use cost ranges provided in the SFECC Phase 2 Preliminary Right-of-Way Cost Estimate Ranges (Glass Land Acquisition – January 2010). This document summarizes the 2009 sales research using Southeast Florida Multiple Listing Service and CoStar databases to

determine the submarket areas along the study corridor and to establish the initial conceptual range of values per square foot for single family residential, condominium, multi-family, commercial, industrial, and vacant land within the submarket areas. The cost ranges presented all exclude severance damages, costs to cure, business damages, relocation, demolition, fees, and costs. To account for these items, the Tri-Rail Coastal Link order-of-magnitude Capital Costs include a 3.2 cost factor applied to all ROW impacts. This factor was provided by FDOT during Phase 2 of the study for the ROW costs.

3.3.6 Order-of-Magnitude Unit Costs

To develop an order-of-magnitude Capital Cost update, the major infrastructure improvements for the Build Alternatives and the AAF base condition were identified. These included trackwork (new or rehabilitated), bridges (new or rehabilitated), grade crossings, new stations, and estimated ROW impacts. For each of these areas, typical unit costs were developed to approximate each type of improvement. The unit costs were based on updated SFECC Phase 2 unit costs using a combination of historical transit project data, 2012 RS Means Cost Data, estimator judgment, and project knowledge of similar transit projects. The typical unit costs were reviewed against recent design and bid projects to validate the anticipated costs. Table 3.5 summarizes the order-of-magnitude unit costs developed for each type of improvement.



Table 3.5 – Unit Costs (by Infrastructure Improvement Type)

Title	Description	Unit	Unit Cost
SCC 10: Trackwork			
Add 3 rd Mainline / Add 4 th Mainline	New siding added; sitework and flagging protection included	Track Mile (TM)	\$2,757,000
SCC 10: Bridges			
Add new bridge structure	Assumes single track (200' x 18') E80 loaded bridge structure	Per New Bridge Structure	\$1,890,000
New moveable bridge structure over the New River	Assumes double track (150' x 33') bascule bridge structure, approach structures, street closure, and necessary track and special trackwork	Bascule Structure	\$33,861,750
SCC 20: Stations			
New Tri-Rail Coastal Link station (average cost of 20 stations)	Assumes average cost of 17 base Tri-Rail Coastal Link stations plus 3 shared AAF/Tri-Rail Coastal Link stations	Per Station	\$3,410,000
SCC 30: Support Facilities			
Light Maintenance Facility	Assumes track infrastructure and yard storage modifications	Allowance	\$24,000,000
SCC 40: Sitework and Roadway Grade Crossings			
Major improvements – grade crossing	Relocate existing gate warning and protection system and include 2 new gates; Includes roadway improvements, and concrete panels. Assumes a 4 quad gate for potential quiet zones (as warranted).	Per Crossing	\$425,000
Environmental Mitigation	Allowance for potential wetland or other environmental mitigation	Allowance	\$2,000,000
SCC 50: Systems			
Positive Train Control	Positive Train Control implemented (new Tri-Rail Coastal Link track only)	Track Mile (TM)	\$50,000
SCC 60: Right-of-Way			
Right-of-Way Impacts	Anticipated impact acreage due to trackwork, station platforms and station parking	Per acre (average value based on potential parking acquisition sites coordinated with municipalities)	\$4,000,000



3.3.7 Standard Cost Categories

To organize the order-of-magnitude Capital Cost estimate, a modified version of the top level FTA SCCs was developed. The following information describes detailed assumptions for how each SCC was modified and included in the order-of-magnitude Capital Cost estimate.

Cost Category 10: Track Structures and Track

The order-of-magnitude cost per mile for track structures and track is based on the anticipated track improvements (new track). The unit cost includes trackwork, assumed crossovers and turnouts based on a typical mile of track, and assumed guideway preparation required. The track quantities were based on the miles of required track as shown on the SLDs provided in Appendix A. The track quantities reflect approximate milepost locations based on planning level conceptual design

In locations where a third-track bridge structure is required, the new bridge structure was assumed to be a new single track bridge (18-foot wide and 200 foot average span) to operate parallel to the existing structures. A new double track bascule bridge is required at the New River Bridge in Fort Lauderdale. The cost estimate assumes a 150 foot bascule span and approach structure with MSE walls on both sides, street closure of SW 5th Street, roadway and signalization improvements at Himmarshee Street, and necessary track, special trackwork, and interlocking improvements.

Cost Category 20: Stations

Station costs were estimated using an average of the seventeen (17) base Tri-Rail Coastal Link station costs plus the incremental cost of three (3) shared AAF/Tri-Rail Coastal Link stations. Base Tri-Rail Coastal Link station costs are

based on minimum basic infrastructure including dual side platforms, canopies, signage, station communications, and fare collection. Station related communication costs are included within the Station Cost Category 20 independent of Systems Cost Category 50.

The 17 primary Tri-Rail Coastal Link stations reflected in the Build Alternatives are based on two at-grade 500 foot long by 25 foot wide platforms with full length canopy. The order-of-magnitude cost per station includes site preparation, platform, canopy, site furniture, lighting, ticket vending, signage, minimal landscape improvements, station communications equipment and associated fiber optic backbone. Additional stations are anticipated to be further evaluated during the Project Development phase to fully vet the final station locations.

Station parking supply is based on preliminary conceptual station site plans developed during station coordination meetings with local municipalities. The order-of-magnitude cost for station parking is based on an average cost per parking space and includes site preparation, pavement, pavement marking, curb, drainage, signage, lighting, minimal landscaping, and sidewalk connections from the parking area to station platform. ROW acquisition costs are itemized separately.

There are three shared AAF/Tri-Rail Coastal Link stations identified and infrastructure assumptions are based on preliminary architectural and engineering plan and section drawings provided by the AAF design team in June 2013. Platform width is expected to vary between shared AAF/Tri-Rail Coastal Link stations and it is assumed that no vertical access to the Tri-Rail Coastal Link station platforms will be provided by AAF. The potential future addition of vertical access to the



Tri-Rail Coastal Link platforms would require significant modifications to the assumed basic Tri-Rail Coastal Link station infrastructure.

Cost Category 30: Support Facilities

An allowance for Light Maintenance and Layover Support Facility costs has been included. Two light maintenance / layover facilities are assumed with a north facility in Palm Beach County and a south facility in Miami-Dade County (anticipated at the existing Hialeah Yard). SFRTA has reported funding in place for the north facility so a cost allowance remains for the south facility. Final site selections and costs will require further engineering and evaluation as part of the overall operations and simulation evaluations. Heavy maintenance is assumed at the existing Hialeah Yard. The proposed rail improvements (IRIS Northeast Connection) from the FEC Little River Connection to the Hialeah Yard to provide access to the maintenance facility and northern destinations is a separate proposed action under development and therefore, is not included in this cost estimate. The IRIS NE Connection is anticipated to be constructed by 2015.

Cost Category 40: Sitework and Roadway Grade Crossings

Sitework improvements including site clearing, subgrade preparation, excavation, erosion control, drainage, and assumptions for stormwater management and contaminated soil remediation was included in the calculation of the order-of-magnitude track mile costs.

Intersection improvements and restoration were included in the calculation of the order-of-magnitude grade crossing costs at locations impacted by the construction of new third track. Items included in the grade crossing improvement assumptions were pavement

removal, pavement replacement, subbase preparation, concrete crossing panels, an allowance for traffic control, and intersection improvements and restoration that would include traffic signal modifications, drainage, curb and gutter, sidewalk, signage, striping, median, and minimal landscape improvements. Grade crossing improvements would also include the addition of new gates and/or relocation of existing gates as required for the construction of new track.

Grade crossing improvements to full quad gates are assumed at locations where Tri-Rail Coastal Link third track is planned. Future diagnostic studies and the FRA safety assessment tool may present alternate improvements to achieve quiet zone compliance such as pedestrian gates, longer medians, traffic improvements at adjacent intersections, etc., but they have not been evaluated at this phase of the project.

An assumption for utility relocations and flagging protection are included in the cost estimate at locations where the new third track is planned. Anticipated utility conflicts and relocations will be identified during the Project Development.

An allowance is included for potential environmental mitigation. The majority of the work is anticipated to be performed within the existing railroad ROW, but an allowance is included for any potential wetland mitigation or to address any plant or species impacts.

Cost Category 50: Systems

Systems communications and wayside signaling equipment are included at the per mile cost to address the addition of system interlocking and signal related costs. Based on the operations modeling, one and a half interlockings per mile was assumed.



Costs for station communications including closed circuit television (CCTV), variable message signs (VMSs), node equipment, and public address (PA) electronics at stations are included in the station costs. Systems costs related to the corridor wide station communication fiber optic backbone is also included with station costs.

Positive Train Control (PTC) implementation for the corridor is assumed to exist as a result of the AAF project and existing Tri-Rail service and was calculated for new track only. The following assumptions were made related to providing a PTC overlay for new Tri-Rail Coastal Link track:

- Tri-Rail Coastal Link opening year is 2020 for assumption of estimate;
- Tri-Rail Coastal Link is an integrated system (between FEC and SFRC); consists of commuter rail, formerly designated SFECC;
- FEC freight, AAF and Tri-Rail Coastal Link would operate on FEC. Amtrak may eventually operate partially on FEC and partially on SFRC but that is a separate project/proposed action;
- SFRC would serve CSX freight, Tri-Rail, Amtrak and Tri-Rail Coastal Link;
- FEC Railway and South Florida Rail Corridor (Tri-Rail) are both PTC compliant prior to construction of Tri-Rail Coastal Link;
- FEC would convert their Automatic Train Control (ATC) system to be PTC compliant when they build their proposed AAF (high speed intercity passenger rail) from Orlando to Miami, prior to Tri-Rail Coastal Link;
- SFRTA would make the SFRC/Tri-Rail system PTC compliant per FRA requirements (by end of 2015 per prior FRA guidance) prior to Tri-Rail Coastal Link;

- Signal installation and system equipment is estimated separately;
- Capital Cost includes the incremental cost (per track mile) for PTC overlay on the additional track required by the Tri-Rail Coastal Link project assuming PTC and signal equipment is already in place; and
- PTC Cost estimate is shown for the additional track (per mile) assumed for the Tri-Rail Coastal Link service.

Cost Category 60: Right-of-Way

The ROW impacts for the track infrastructure and station platforms are based on an assumed typical section. The estimated ROW assumed for mainline pinch points, station platforms, and the parking areas were based on the preliminary mainline alignments and preliminary station site plan development conducted during Phase 3. Further evaluation of the constrained areas is required to ensure no additional ROW is needed. Costs for ROW acquisition include the FDOT approved 3.2 cost factor multiplier in the total ROW costs to address impacts to existing property, business, and relocation. Partial ROW acquisition was assumed at all impacted parcels. Additional overall project contingency costs were not applied to the ROW costs. Station parking supply and associated ROW is based on the preliminary site plans which will need to be revised during Project Development to consider parking demand and available surrounding parking supply.

Cost Category 70: Vehicles

It is assumed that each train consist includes 1 locomotive, 2 passenger coaches, and 1 passenger cab car. The Capital Cost estimate assumes the existing (and newly acquired) SFRTA fleet would accommodate most of the future Tri-Rail Coastal Link service. Additional rolling stock is based on



SFRTA coordination as of April 2014. The number of train consists and peak consists will be further evaluated as the operations plans and simulations are refined.

PTC implementation for the corridor is assumed to exist as a result of the AAF project and was calculated for new track only. The following vehicle related assumptions were made related to Tri-Rail Coastal Link and PTC upgrades:

- PTC compatible equipment is installed on the rolling stock (cabs and locomotives) and is interoperable on both railroads; vehicle modifications for PTC compliance is not part of the Tri-Rail Coastal Link project; and
- SFRTA would upgrade their locomotives/cab cars to PTC prior to Tri-Rail Coastal Link operations.

Cost Category 80: Professional and Other Services

Professional and Other Services percentages reflect the current engineer opinion of costs which total twenty-seven percent (27%) and includes preliminary engineering services, final design engineering, construction services, construction management, insurances, permits, and FEC force account work. A thirty percent (30%) contingency is also applied to all professional services.

Mobilization costs have also been included separately in Cost Category 80 at 7.5 percent.

Cost Category 90: Unallocated Contingency

Unallocated contingencies are estimated at thirty percent (30%) of the total construction costs. Detailed estimates prepared during the Project Development phase are expected to include all standard SCC sub-categories with allocated contingencies (as applicable) and the

overall contingency is expected to be reduced.

Cost Category 100: Finance Charges

Cost includes two percent (2.0%) of Total Construction Cost for Payment and Performance Bond Guarantees.

3.4. Risk Assessment

The order-of-magnitude Capital Cost estimate was prepared as a preliminary estimate to support agency coordination. The cost estimate did not involve the development of conceptual engineering plans and related quantities. In the next phase of study (Project Development), detailed cost estimates will need to be prepared to verify the anticipated capital cost. These detailed cost estimates will be based on conceptual engineering plans, site-specific analysis and corresponding quantities and involve environmental analysis to identify any environmental avoidance, minimization and mitigation measures.

During the future Project Development phase involving NEPA analyses, the Build Alternatives are anticipated to be refined based on FEC coordination, concept plan development, operations modeling refinements, and station site development allowing the Capital Cost estimate to be further refined. As a result, key areas of anticipated refinements include:

- Trackage – the trackage alignment and configuration will be verified.
- Turnout and crossover locations and type will be verified.
- Bridges – the anticipated bridge structures and bridge modifications required will be confirmed.
- Stations – final location and number of stations, parking requirements and associated ROW.
- Hialeah Yard – identification of modifications required.



- ROW – the layout of the track configuration will allow verification of ROW in constrained areas where additional sidings may be required.
- Contingency – potential reduction from thirty percent (30%) to twenty percent (20%).

Table 3.6 summarizes the key risk areas and associated assumptions identified for this planning level order-of-magnitude Capital Cost estimate. Risk areas are noted to indicate where changes in the project could result in major changes to the estimate.

Table 3.6: Summary of Risk Areas and Associated Assumptions

Item / Description	Key Risk / Assumption
General	
Order-of-Magnitude Estimate	Detailed cost estimates should be based on conceptual engineering plans. Site-specific analysis and corresponding quantities will need to be prepared in the Project Development phase to confirm the order-of-magnitude Capital Cost estimates.
Base Condition	The base condition was based on assumed AAF infrastructure as noted previously. Changes to the AAF project scope may result in increased Tri-Rail Coastal Link costs.
Range of Costs	The order-of-magnitude estimate provides a range of +/- 5% based on prior FDOT project coordination. The cost range is narrow for a typical planning phase but considering the project involves approximately twenty (20) miles of new siding track primarily within the existing ROW, the capital costs represent a typical range for a project of this magnitude. The major risk areas outlined in this report are intended to address the potential for change as well. Industry standard (AACE International) for this level of design is -30% to +50%.
Operation and Maintenance Costs	No O&M costs are included in this report.
Escalation	No escalation costs are included in this report. It is assumed the client financial model and financial planning team is reviewing different overall project development schedules along with financial scenarios.
Contractor/Subcontractor Markup	It is assumed that basic general contractor and subcontractor markup costs are included in the unit costs.
Sales Tax	Sales Tax costs are not included in this report.
Tax Exempt Status	It is currently unknown if the project will qualify as tax exempt. No taxes have been identified in this report.
Value Added Tax	It is assumed there will be no Value Added Tax applied in the State of Florida.



Table 3.6: Summary of Risk Areas and Associated Assumptions , cont.

Item / Description	Key Risk / Assumption
Bridges	
New River Bridge	Assumed existing at-grade double track bridge will support AAF operations based on operations modeling evaluations. Likely requires existing bridge to be locked down during AM/PM peaks. A new double track mid-level bascule bridge with viaduct is anticipated for Tri-Rail Coastal Link service. Assume construction of new double track bridge and viaduct can occur without ROW impact to existing property and businesses. Other alternatives investigated in Phase 2 include a high-level fixed bridge, tunnel, and a potential viaduct alternative requiring the costs to be revisited during Project Development.
New Bridge Structures	Based on coordination with FEC, the structural capacity of the existing bridges is assumed to support passenger and freight operations. New bridge structures are assumed to be completed by AAF for full double track construction from Jupiter to Miami. Changes to the AAF plan and/or assumed train schedules may result in the need for additional bridge widening. New bridge structures for construction of the Tri-Rail Coastal Link third track are able to be constructed within the existing FEC ROW and no additional ROW acquisition is assumed.
Grade Separated Bridges for Impacted Cross Street Operations	No grade separated bridges are assumed to be required due to impacted traffic operations at cross streets. The operations at grade crossings will need to be evaluated to confirm this assumption.
Stations	
Number of Stations	The number of stations assumed for primary implementation was based on technical evaluations (ridership and operations simulation) and extensive municipal and public outreach. While a few additional station alternatives may be evaluated during the subsequent NEPA phase, the cost estimate assumes 17 dedicated Tri-Rail Coastal Link stations and 3 shared AAF/Tri-Rail Coastal Link stations for primary implementation. Increasing the number of stations would result in cost increases.
Station Infrastructure Changes	The station costs are based on minimal infrastructure required to support passenger service and excludes ancillary station buildings. Modifications to these assumptions would result in cost increases. However, increased station amenities could be funded by local government or other funding partners.



Table 3.6: Summary of Risk Areas and Associated Assumptions , cont.

Item / Description	Key Risk / Assumption
Shared AAF/Tri-Rail Coastal Link Stations • Miami Government Center • Fort Lauderdale • West Palm Beach	Assumed infrastructure for the three shared AAF/Tri-Rail Coastal Link stations are based on preliminary plans and sections provided by the AAF design team as of February 2014.
Vertical Access From AAF Station Buildings	It is assumed that no vertical access will be included in the basic station platform costs and no vertical access connections would be established between AAF and Tri-Rail Coastal Link platforms. Tri-Rail Coastal Link platforms (with the possible exception of MGC) would require modification to accommodate the vertical access.
Overhead Pedestrian Crossing	It is assumed that no vertical access will be included in the basic station platform costs. There may be station locations that require an overhead pedestrian crossing be considered where limited at-grade roadway crossings are available for platform access, but no costs are being carried currently and would require further cost evaluation on an individual site-specific basis. Stations that may require further evaluation due to limited at-grade roadway crossings include Aventura and Palm Beach Gardens. Municipal interest for an overhead pedestrian crossing was also indicated at Lake Park, West Palm Beach 45th Street, Fort Lauderdale, and Hallandale Beach. Any overhead crossings would require FECI advance notification plus clearance and air rights coordination.
Station Parking	Preliminary planning level parking needs were assumed to support this order-of-magnitude estimate. A parking demand analysis will need to be conducted in the Project Development phase to verify the available parking availability within each station area and the parking spaces required to support initial service with consideration of the ultimate parking needs.
Sitework and Roadway	
Grade Crossings	Grade crossings for this project are limited to areas of new Tri-Rail Coastal Link third track and assume quad gates will be sufficient for quiet zone compliance. Future diagnostic studies and the FRA safety assessment tool may present alternate improvements to achieve quiet zone compliance such as pedestrian gates, longer medians, traffic improvements at adjacent intersections, etc., but these have not been evaluated at this phase of the project. Future development may present other required provisions for quiet zone compliance.



Table 3.6: Summary of Risk Areas and Associated Assumptions, cont.

Item / Description	Key Risk / Assumption
Sidewalk Connectivity	Assumed sidewalk connectivity for stations will be provided from adjacent grade crossing to station platform and also between proposed station parking and the platform. Additional sidewalk improvements are not included in the station or sitework costs. No new at-grade track crossings are included for pedestrians.
Utility Relocations	Minimal utility relocations are anticipated within the corridor (20% of new track construction). Significant utility relocations would increase cost and further utility investigation could result in an increased utility relocation expense.
Environmental Mitigation: Wetlands	Assumed most work will occur within the existing ROW, but minimal allowance is included to address potential environmental mitigation if applicable.
Environmental Mitigation: Sound Walls	Assume no Sound Walls or noise mitigation such as noise buffers will be required
Greenway	Assume no Greenway will be constructed
Corridor Fencing	Assume no safety/security perimeter corridor fencing installed
Material Sourcing	Assume no material sourcing has been performed.
Right-of-Way	
ROW Acquisition at Pinch Points	ROW impacts were based on current source data and available ROW information (property appraiser, FEC ROW maps, and aerials). Assume partial ROW takes at impacted parcels and not full parcel acquisition. Detailed ROW survey at constrained ROW locations will support verification of ROW impacts. Assumed FDOT and FEC owned parcels have no ROW acquisition cost.
ROW Acquisition at Station Parking Areas	Assumed partial ROW acquisition at impacted parcels. Parcel impacts are based on engineering judgment and station outreach/coordination on potential station site plans.
ROW Cost Factor	A ROW cost factor of 3.2 has been included for the order-of-magnitude costs to address parcel impacts to existing property, business, and potential relocation. This element is a highly variable figure and may need to be refined and further evaluated as the project develops. Site specific estimates to better refine ROW costs will need to be developed at a future date.



Table 3.6: Summary of Risk Areas and Associated Assumptions , cont.

Item / Description	Key Risk / Assumption
Vehicles	
Vehicle Maintenance	The existing SFRTA fleet contains newly acquired fleet (2013) and older vehicles. If SFRTA has sufficient vehicles to operate Tri-Rail Coastal Link, but overhaul costs for that equipment are required (to extend its useful life since a substantial part of the SFRTA car fleet will be over 30 years old by 2020) additional vehicle maintenance costs may need to be included in the project cost. Vehicle upgrades to the SFRTA fleet to make the equipment PTC compatible are also not included in this estimate. Any vehicle maintenance costs are assumed to be included in SFRTA's annual budget.

3.5. Exclusions

The following items are excluded from the scope of this effort:

- Heavy Maintenance Facility: SFRTA heavy maintenance will allow for servicing of Tri-Rail Coastal Link vehicles at Hialeah Yard or alternate site.
- Vehicle Maintenance (refer to Section 3.4)

3.6. Allowances

The order-of-magnitude Capital Cost estimate includes allowances/markups within the estimated costs for a light maintenance facility and environmental mitigation as stated previously.

3.7. Market Conditions

Market conditions can drastically affect the construction market across the country. This is based upon bids and comparisons with Engineer's Estimates. Bids can be very erratic with some jobs having a normal number of bidders, and others receiving numerous submittals. Despite the estimator's best practices and adjustments, bids are driven by current market conditions. The market adjustment factor is beyond the typical

contractor mark-ups, normal estimating contingency and normal escalation factors. The costs in this estimate reflect current local market conditions, but due to the conceptual nature and uncertain time frame in which these projects may be completed, no market factor has not been applied.

Typical market adjustment related factors would cover:

- Contractor work volume;
- Contractor's experience with the owner;
- Owner requirements and contracting methodology;
- Availability of management staff;
- Availability of crafts/trades;
- Volatile raw material markets;
- Fuel cost uncertainty;
- Availability of bonds and insurance; and
- Construction lending rates to commercial clients (contractors).

3.8. Escalation Costs

The order-of-magnitude Capital Cost estimate does not include escalation. It is assumed escalation is in the client's financial model and the financial planning team is reviewing different



overall project development schedules along with financial scenarios.

CH2M HILL typically uses information generated internally and from subscription services such as IHS Global, Engineering News Record, Marshall & Swift, and other sources. Work is categorized into specific types of construction and expected factors applied.

3.9. Cost Resources

The following is a list of the various cost resources used in the development of the order-of-magnitude Capital Cost estimate.

- 2012 RS Means
- Historical Data
- FDOT Historical Data
- Estimator Judgment

3.10. Estimate Validity

This estimate was prepared in April 2014 and is based on February 2014 SLDs and 2013 US dollars. As with all estimates it represents a snapshot in time of what is known about the project and is expected to occur. Changes in markets could have dramatic affects to this estimate. Therefore, this estimate should be viewed in that light and if there have been significant changes in the commodity markets; this estimate should be updated

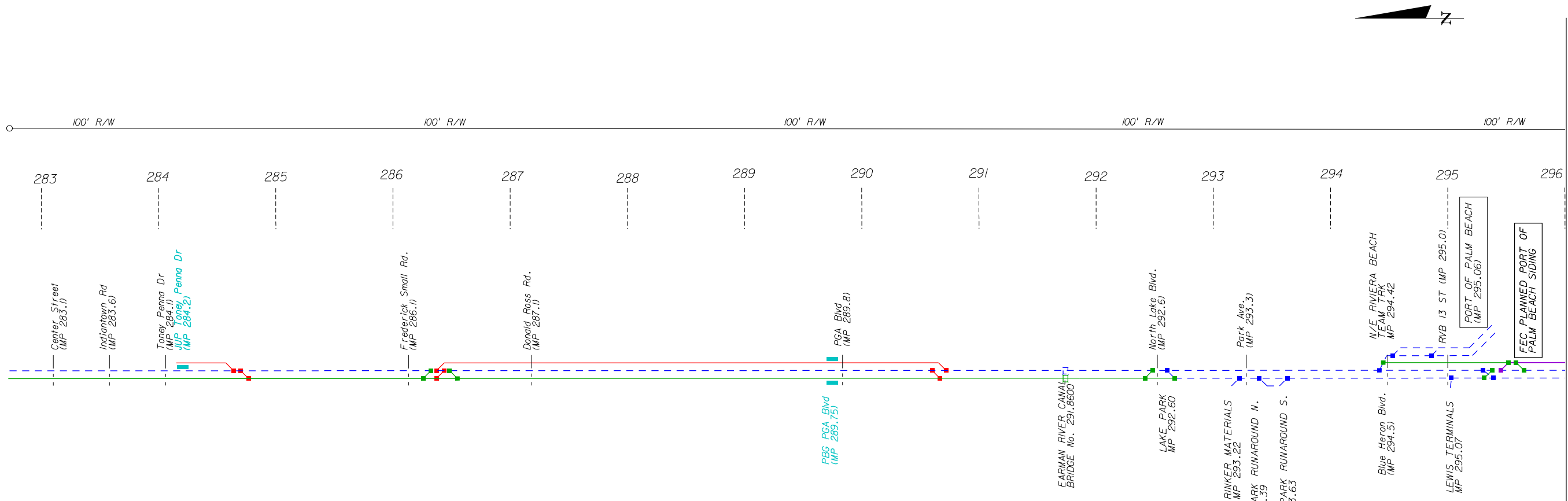
and reevaluated in the Project Development phase.

3.11. Disclaimer

The opinions of cost (estimates) shown, and any resulting conclusions on project financial or economic feasibility or funding requirements, have been prepared for guidance in project evaluation and implementation from the information available at the time the opinion was prepared. The final costs of the project and resulting feasibility will depend on actual labor and material costs, competitive market conditions, actual site conditions, final project scope, implementation schedule, continuity of personnel and engineering, and other variable factors. The recent increases or decreases in material pricing may have a significant impact which is not predictable and careful review or consideration must be used in evaluation of material prices. As a result, the final project costs will vary from the opinions of cost presented herein. Because of these factors, project feasibility, benefit/cost ratios, risks, and funding needs must be carefully reviewed prior to making specific financial decisions or establishing project budgets to help ensure proper project evaluation and adequate funding.



Appendix A: Straight Line Diagrams



JUPITER

MONET

MATCH LINE - MP 296

LEGEND

PROPOSED TRCL NEW TRACK

EXISTING FEC TRACK TO REMAIN

FEC PLANNED IMPROVEMENTS

PROPOSED CONNECTION TRACK

PROPOSED ALL ABOARD FLORIDA TRACK

EXISTING TRACK TO BE REMOVED

PROPOSED TRCL STATIONS (500' TYP.)

PROPOSED ALL ABOARD FLORIDA STATION

RIGHT-OF-WAY WIDTH

MAJOR ROADWAY CROSSINGS/OVERPASSES

EXISTING BRIDGE

PROPOSED TRCL BRIDGE

PROPOSED AAF BRIDGE

EXISTING TURNOUT

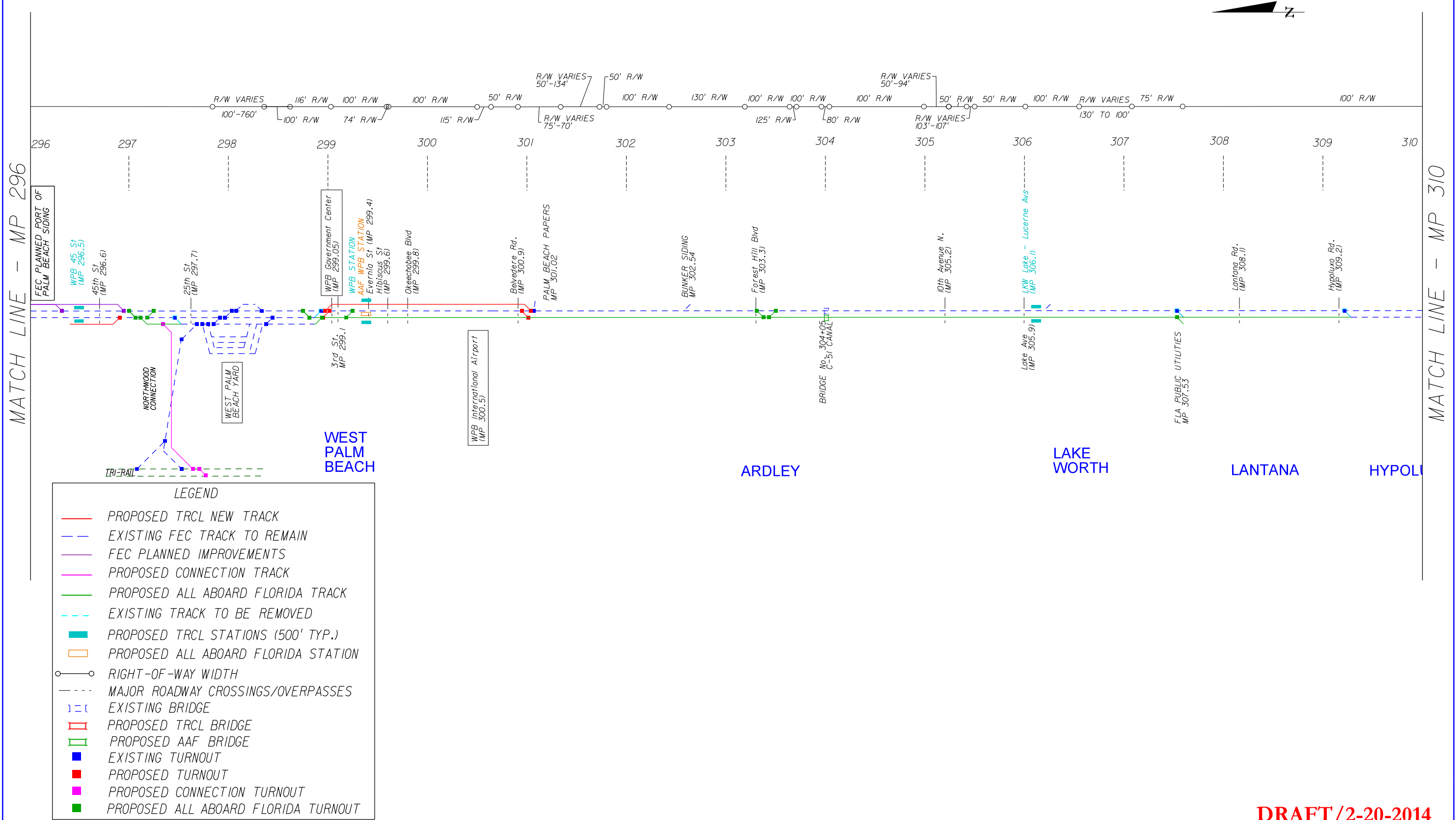
PROPOSED TURNOUT

PROPOSED CONNECTION TURNOUT

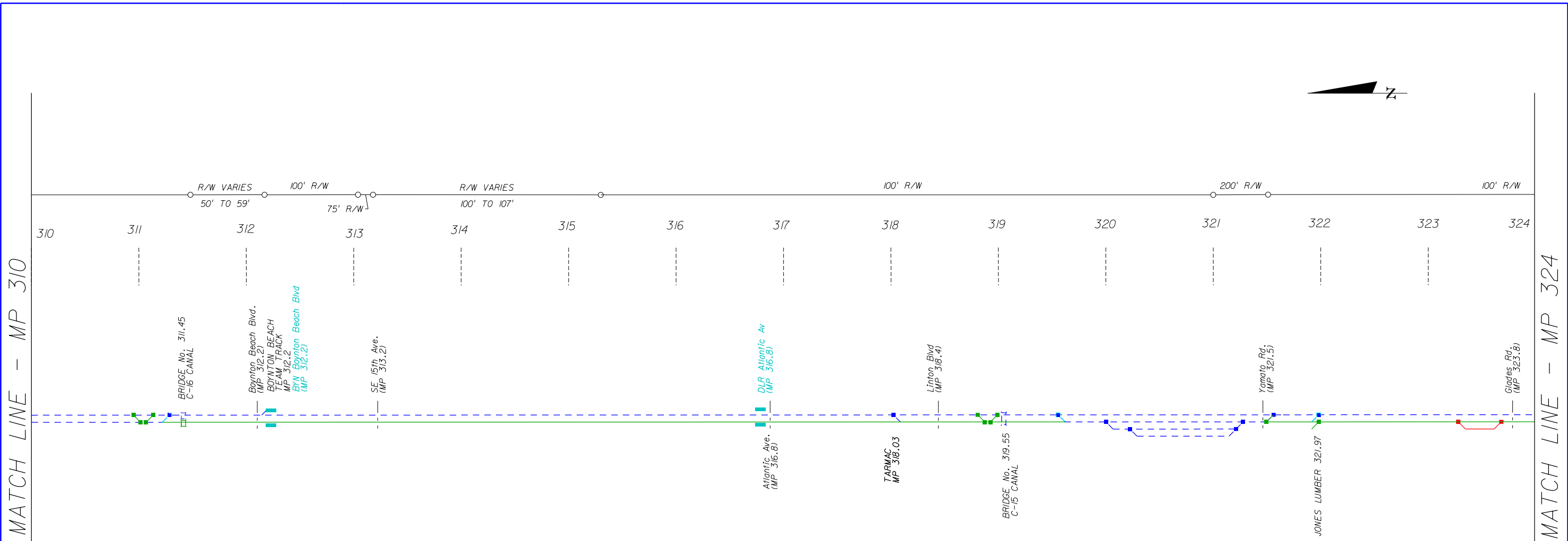
PROPOSED ALL ABOARD FLORIDA TURNOUT

DRAFT/2-20-2014

REVISIONS				Engineer of Record: Erin Trahan P.E. License No.: CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		TRI-RAIL COASTAL LINK		SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
						PALM BEACH	417031-1-22-01	SLD - BASE + TRCL PBA	SLD-1



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DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	SLD - BASE + TRCL PBA		SLD-2
						PALM BEACH	417031-1-22-01			



JXO

BOYNTON

DELRAY
BEACH

VILLA
RICA

LEGEND

PROPOSED TRCL NEW TRACK

EXISTING FEC TRACK TO REMAIN

FEC PLANNED IMPROVEMENTS

PROPOSED CONNECTION TRACK

PROPOSED ALL ABOARD FLORIDA TRACK

EXISTING TRACK TO BE REMOVED

PROPOSED TRCL STATIONS (500' TYP.)

PROPOSED ALL ABOARD FLORIDA STATION

RIGHT-OF-WAY WIDTH

MAJOR ROADWAY CROSSINGS/OVERPASSES

EXISTING BRIDGE

PROPOSED TRCL BRIDGE

PROPOSED AAF BRIDGE

EXISTING TURNOUT

PROPOSED TURNOUT

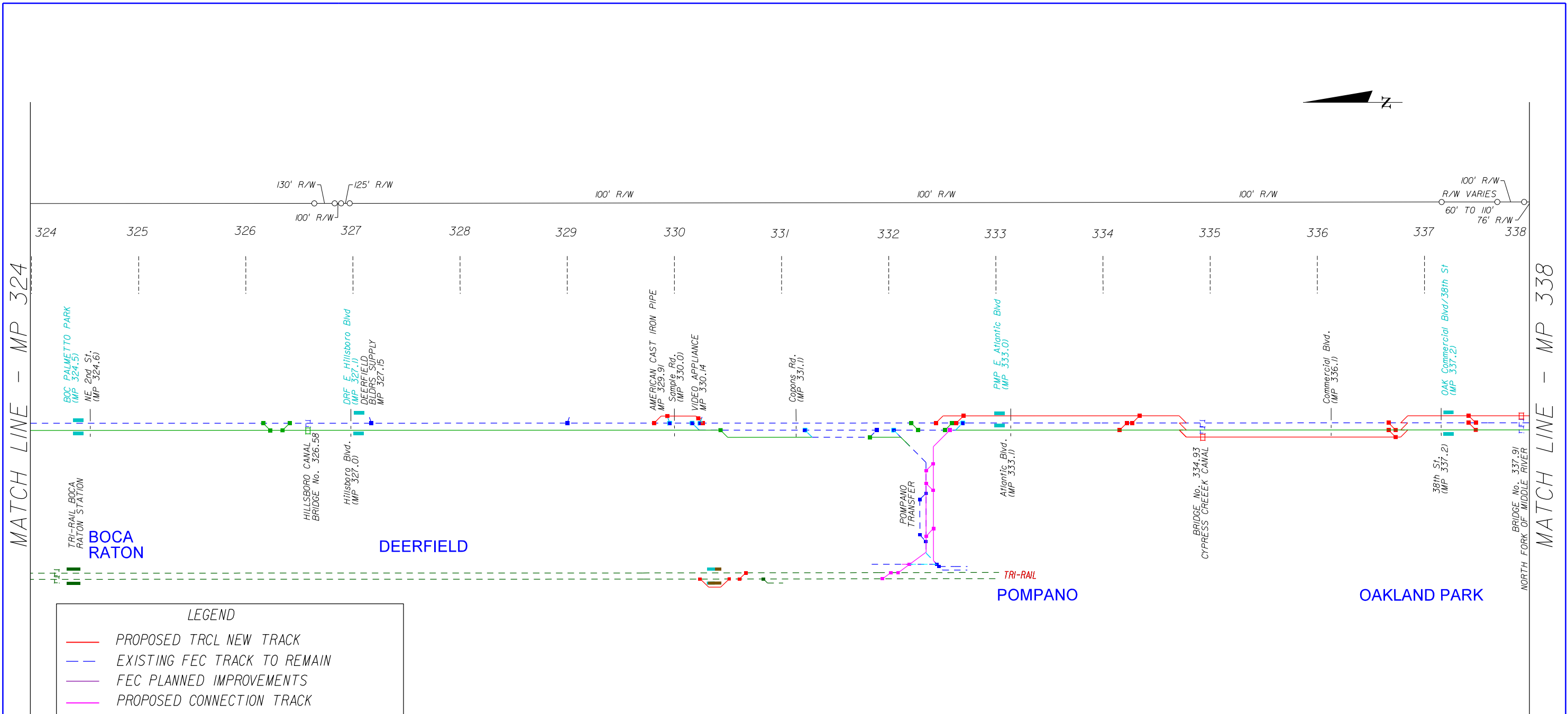
PROPOSED CONNECTION TURNOUT

PROPOSED ALL ABOARD FLORIDA TURNOUT

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R E V I S I O N S				Engineer of Record: Erin Trahan P.E. License No.: CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			TRI-RAIL COASTAL LINK	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
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SLD - BASE + TRCL PBA



LEGEND

PROPOSED TRCL NEW TRACK

EXISTING FEC TRACK TO REMAIN

FEC PLANNED IMPROVEMENTS

PROPOSED CONNECTION TRACK

PROPOSED ALL ABOARD FLORIDA TRACK

EXISTING TRACK TO BE REMOVED

PROPOSED TRCL STATIONS (500' TYP.)

PROPOSED ALL ABOARD FLORIDA STATION

RIGHT-OF-WAY WIDTH

MAJOR ROADWAY CROSSINGS/OVERPASSES

EXISTING BRIDGE

PROPOSED TRCL BRIDGE

PROPOSED AAF BRIDGE

EXISTING TURNOUT

PROPOSED TURNOUT

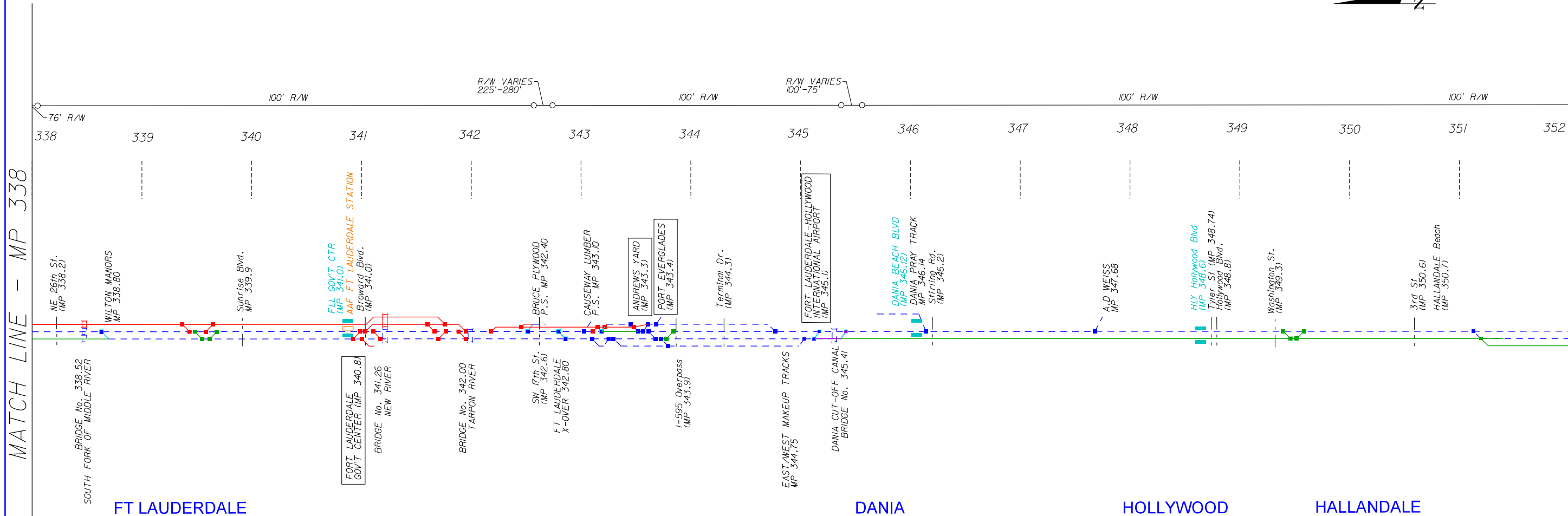
PROPOSED CONNECTION TURNOUT

PROPOSED ALL ABOARD FLORIDA TURNOUT

REVISIONS				Engineer of Record: Erin Trahan P.E. License No.: CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		TRI-RAIL COASTAL LINK SLD - BASE + TRCL PBA	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
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MATCH LINE - MP 338

MATCH LINE - MP 352



FT LAUDERDALE

DANIA

HOLLYWOOD

HALLANDALE

LEGEND

PROPOSED TRCL NEW TRACK

EXISTING FEC TRACK TO REMAIN

FEC PLANNED IMPROVEMENTS

PROPOSED CONNECTION TRACK

PROPOSED ALL ABOARD FLORIDA TRACK

EXISTING TRACK TO BE REMOVED

PROPOSED TRCL STATIONS (500' TYP.)

PROPOSED ALL ABOARD FLORIDA STATION

RIGHT-OF-WAY WIDTH

MAJOR ROADWAY CROSSINGS/OVERPASSES

EXISTING BRIDGE

PROPOSED TRCL BRIDGE

PROPOSED AAF BRIDGE

EXISTING TURNOUT

PROPOSED TURNOUT

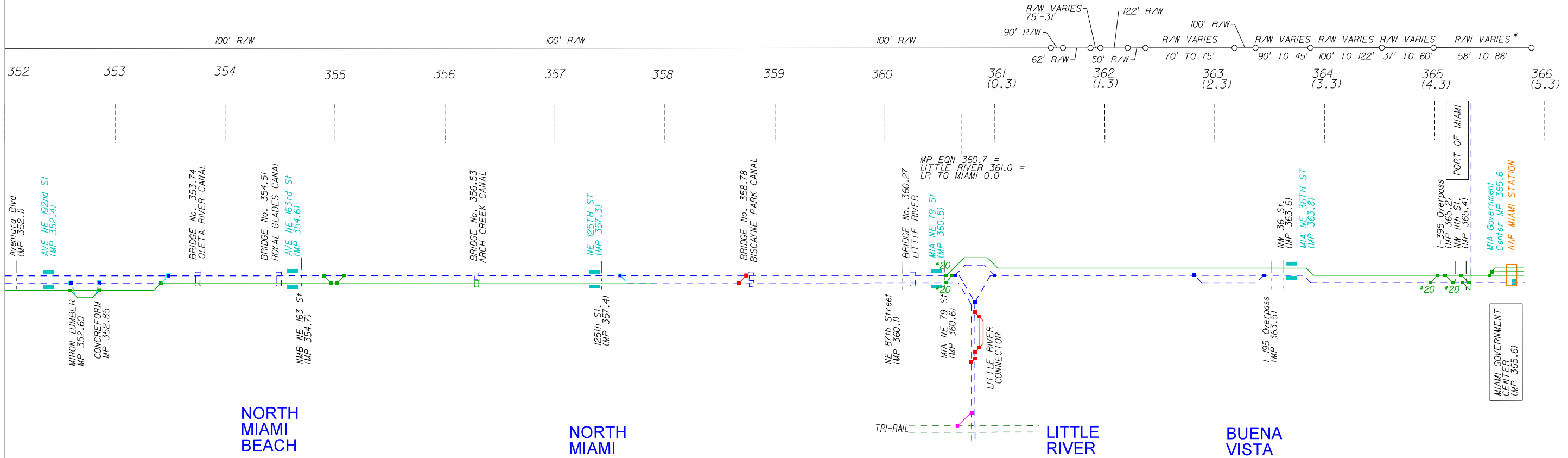
PROPOSED CONNECTION TURNOUT

PROPOSED ALL ABOARD FLORIDA TURNOUT

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MATCH LINE - MP 352



LEGEND

PROPOSED TRCL NEW TRACK

EXISTING FEC TRACK TO REMAIN

FEC PLANNED IMPROVEMENTS

PROPOSED CONNECTION TRACK

PROPOSED ALL ABOARD FLORIDA TRACK

EXISTING TRACK TO BE REMOVED

PROPOSED TRCL STATIONS (500' TYP.)

PROPOSED ALL ABOARD FLORIDA STATION

RIGHT-OF-WAY WIDTH

MAJOR ROADWAY CROSSINGS/OVERPASSES

EXISTING BRIDGE

PROPOSED TRCL BRIDGE

PROPOSED AAF BRIDGE

EXISTING TURNOUT

PROPOSED TURNOUT

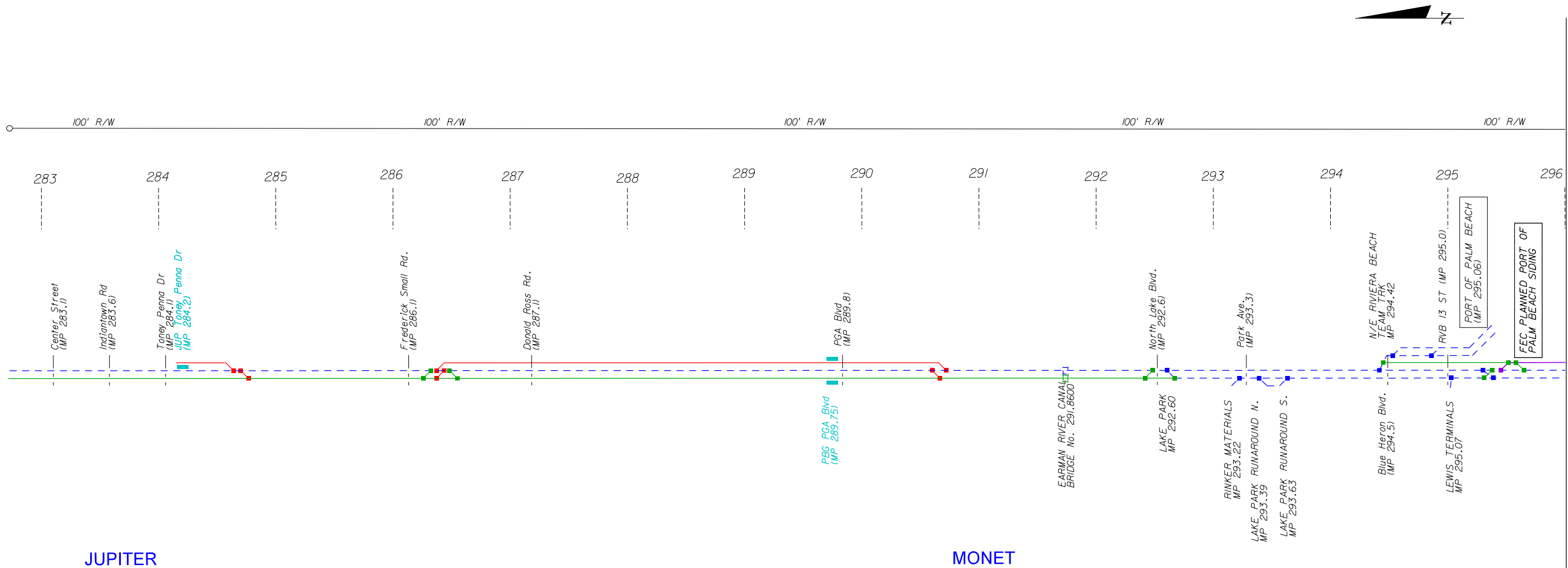
PROPOSED CONNECTION TURNOUT

PROPOSED ALL ABOARD FLORIDA TURNOUT

* ADJACENT FEC PROPERTY VARIES 115'-660' R/W

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REVISIONS				Engineer of Record: Erin Trahan P.E. License No.: CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		TRI-RAIL COASTAL LINK	SHEET NO. SLD-6
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY		
						MIAMI-DADE		



LEGEND

PROPOSED TRCL NEW TRACK

EXISTING FEC TRACK TO REMAIN

FEC PLANNED IMPROVEMENTS

PROPOSED CONNECTION TRACK

PROPOSED ALL ABOARD FLORIDA TRACK

EXISTING TRACK TO BE REMOVED

PROPOSED TRCL STATIONS (500' TYP.)

PROPOSED ALL ABOARD FLORIDA STATION

RIGHT-OF-WAY WIDTH

MAJOR ROADWAY CROSSINGS/OVERPASSES

EXISTING BRIDGE

PROPOSED TRCL BRIDGE

PROPOSED AAF BRIDGE

EXISTING TURNOUT

PROPOSED TURNOUT

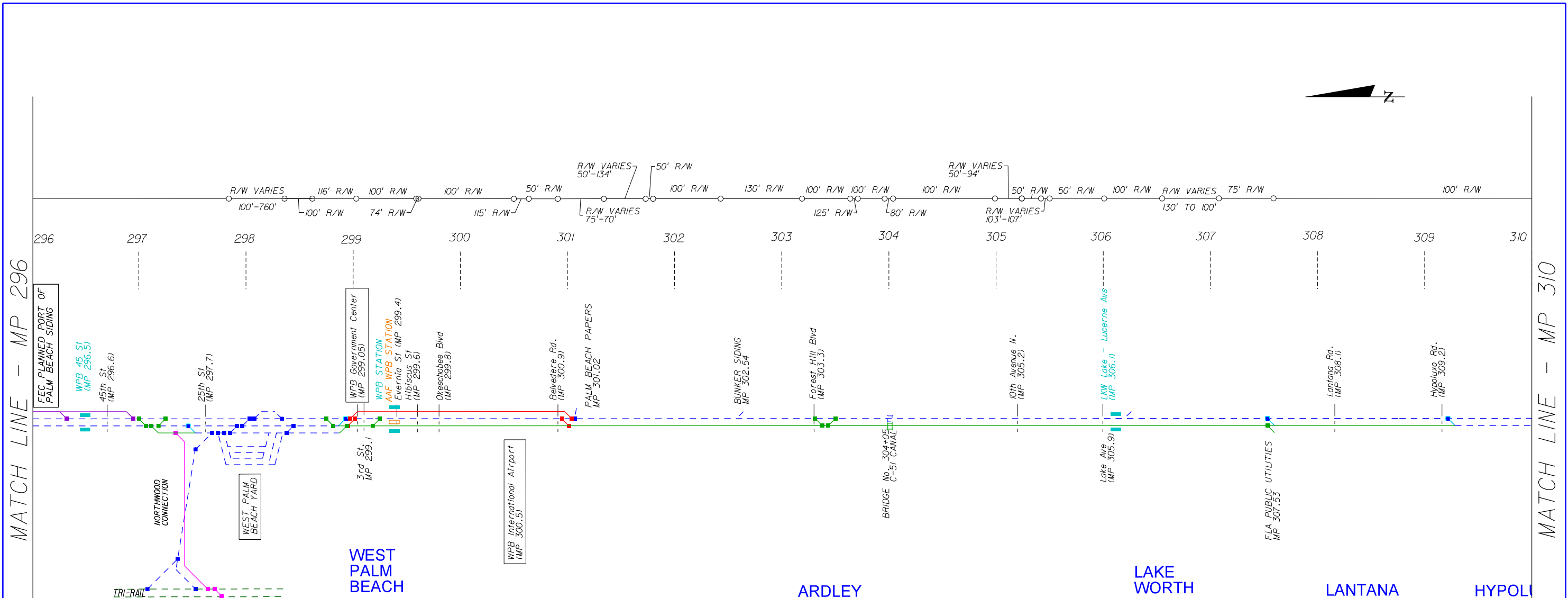
PROPOSED CONNECTION TURNOUT

PROPOSED ALL ABOARD FLORIDA TURNOUT

REVISIONS				CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		SOUTH FLORIDA EAST COAST CORRIDOR SLD - BASE + TRCL ALT A6C5	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
						MONTECALMO	417031-1-22-01	SLD-1

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DRAFT/1-23-2014



LEGEND

- PROPOSED TRCL NEW TRACK
- EXISTING FEC TRACK TO REMAIN
- FEC PLANNED IMPROVEMENTS
- PROPOSED CONNECTION TRACK
- PROPOSED ALL ABOARD FLORIDA TRACK
- EXISTING TRACK TO BE REMOVED
- PROPOSED TRCL STATIONS (500' TYP.)
- PROPOSED ALL ABOARD FLORIDA STATION
- RIGHT-OF-WAY WIDTH
- MAJOR ROADWAY CROSSINGS/OVERPASSES
- EXISTING BRIDGE
- PROPOSED TRCL BRIDGE
- PROPOSED AAF BRIDGE
- EXISTING TURNOUT
- PROPOSED TURNOUT
- PROPOSED CONNECTION TURNOUT
- PROPOSED ALL ABOARD FLORIDA TURNOUT

WEST PALM BEACH

ARDLEY

LAKE WORTH

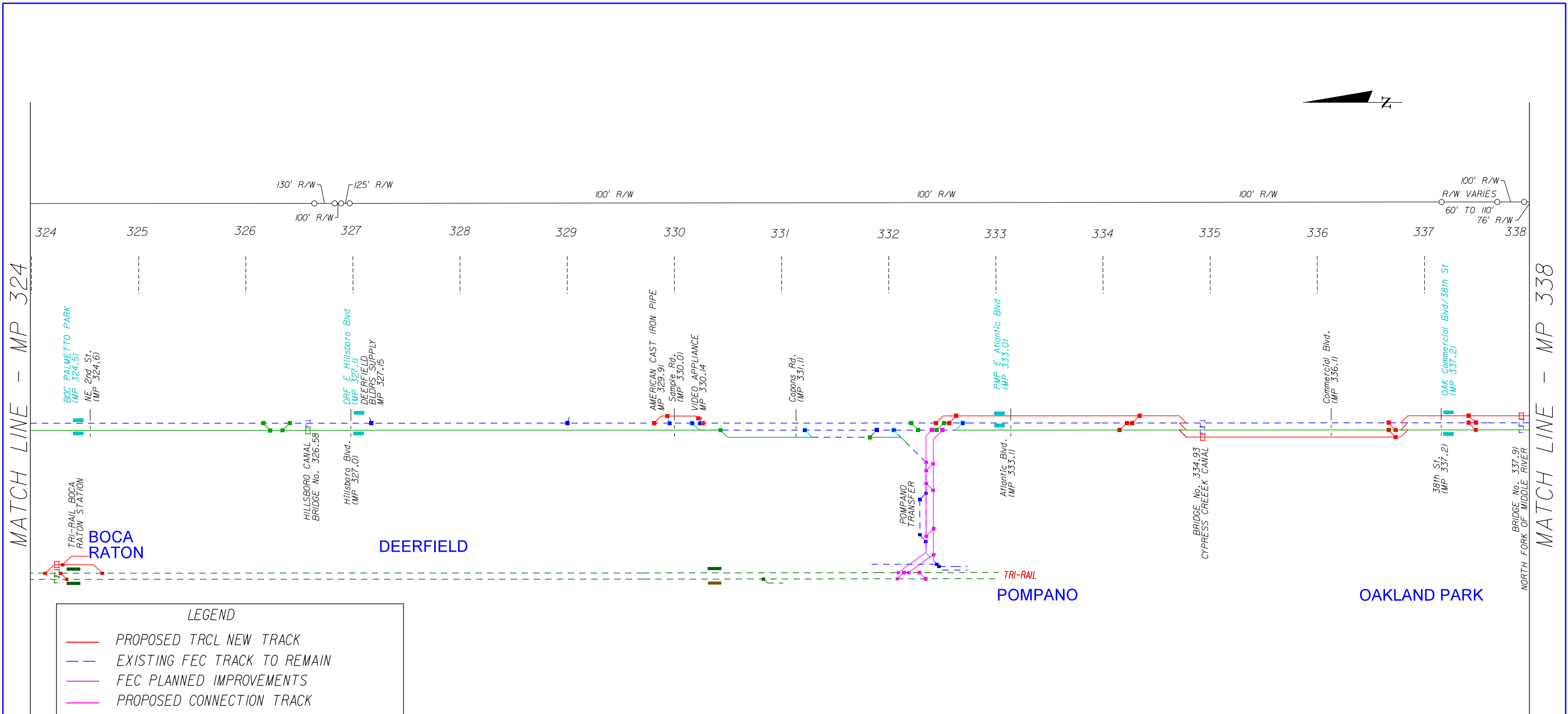
LANTANA

HYPOLUXO

REVISIONS				CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		SOUTH FLORIDA EAST COAST CORRIDOR SLD - BASE + TRCL ALT A6C5	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
						REMOVED	417031-1-22-01	SLD-2

DRAFT

DRAFT/1-23-2014



LEGEND

PROPOSED TRCL NEW TRACK

EXISTING FEC TRACK TO REMAIN

FEC PLANNED IMPROVEMENTS

PROPOSED CONNECTION TRACK

PROPOSED ALL ABOARD FLORIDA TRACK

EXISTING TRACK TO BE REMOVED

PROPOSED TRCL STATIONS (500' TYP.)

PROPOSED ALL ABOARD FLORIDA STATION

RIGHT-OF-WAY WIDTH

MAJOR ROADWAY CROSSINGS/OVERPASSES

EXISTING BRIDGE

PROPOSED TRCL BRIDGE

PROPOSED AAF BRIDGE

EXISTING TURNOUT

PROPOSED TURNOUT

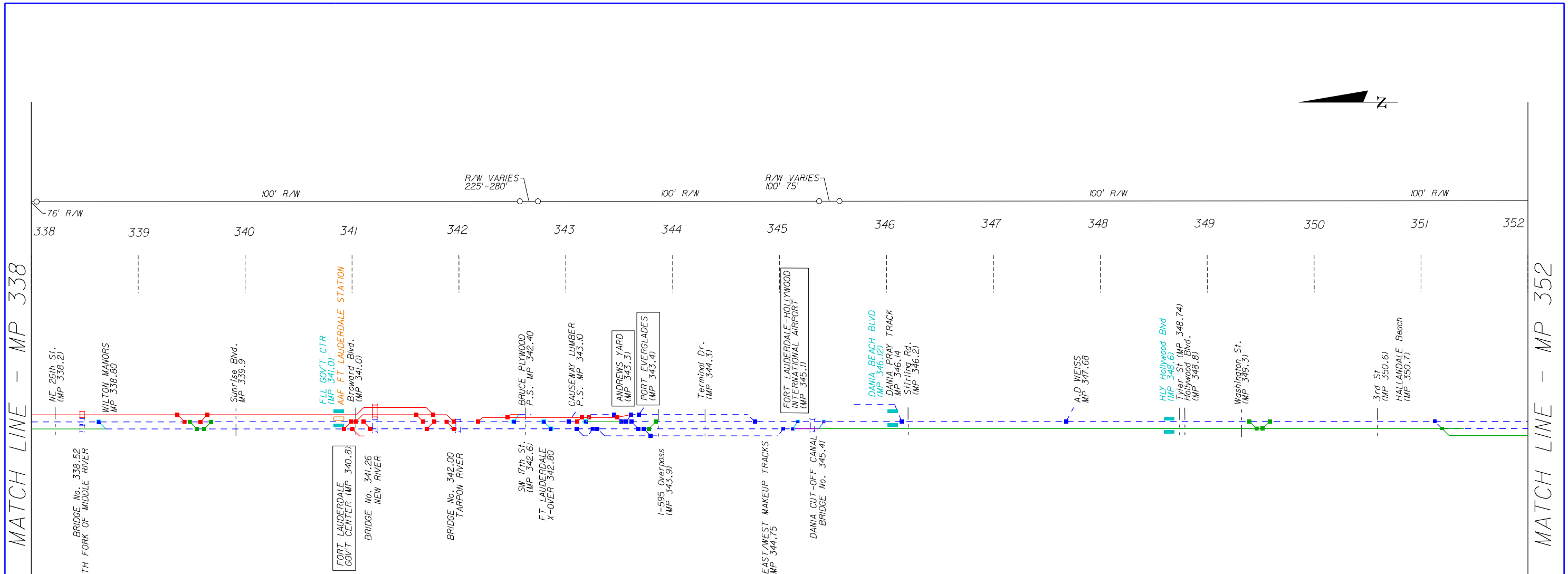
PROPOSED CONNECTION TURNOUT

PROPOSED ALL ABOARD FLORIDA TURNOUT

REVISIONS				CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		SOUTH FLORIDA EAST COAST CORRIDOR SLD - BASE + TRCL ALT A6C5	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID	
						DADE COUNTY	417031-1-22-01	SLD-4

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FT LAUDERDALE DANIA HOLLYWOOD HALLANDALE

LEGEND

PROPOSED TRCL NEW TRACK

EXISTING FEC TRACK TO REMAIN

FEC PLANNED IMPROVEMENTS

PROPOSED CONNECTION TRACK

PROPOSED ALL ABOARD FLORIDA TRACK

EXISTING TRACK TO BE REMOVED

PROPOSED TRCL STATIONS (500' TYP.)

PROPOSED ALL ABOARD FLORIDA STATION

RIGHT-OF-WAY WIDTH

MAJOR ROADWAY CROSSINGS/OVERPASSES

EXISTING BRIDGE

PROPOSED TRCL BRIDGE

PROPOSED AAF BRIDGE

EXISTING TURNOUT

PROPOSED TURNOUT

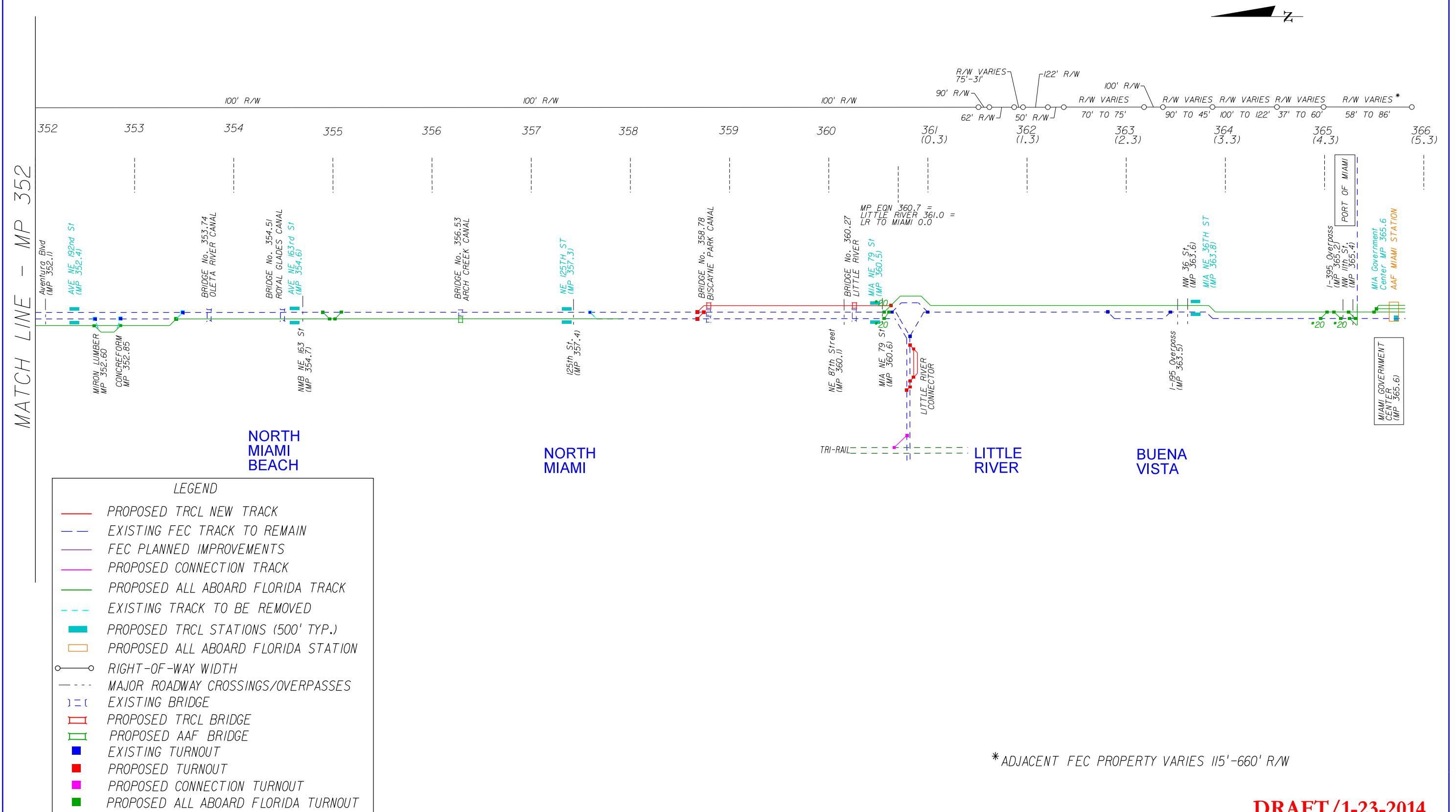
PROPOSED CONNECTION TURNOUT

PROPOSED ALL ABOARD FLORIDA TURNOUT

REVISIONS				CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA			SOUTH FLORIDA EAST COAST	SHEET NO.
DEPARTMENT OF TRANSPORTATION									
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		SLD - BASE + TRCL ALT A6C5
					DADE	417031-1-22-01			

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R E V I S I O N S				CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA			SOUTH FLORIDA EAST COAST		SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		DEPARTMENT OF TRANSPORTATION					
					ROAD NO.	COUNTY	FINANCIAL PROJECT ID			
					FLORIDA	417031-1-22-01		SLD-6		



Appendix B: Order-of-Magnitude Cost Estimate

TRCL PREFERRED BUILD ALTERNATIVE: JUPITER TO MGC				By County							
				West Palm Beach		Broward		Miami-Dade		Total	
FTA Standard Cost Category	Description	Unit	Costs (2013)	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
10 TRACK STRUCTURES & TRACK											
10.02	New Mainline										
10.02.02	Add 3rd Mainline (w/ Sitework)	Mile	\$ 2,757,000.00	7.71	\$ 21,251,875	10.00	\$ 27,570,000	-	\$ -	17.71	\$ 48,821,875
10.02.03	Add 4th Mainline (w/ Sitework)	Mile	\$ 2,757,000.00	-	\$ -	0.68	\$ 1,879,773	-	\$ -	0.68	\$ 1,879,773
10.04	Structures										
10.04.02	New 3rd Mainline Bridges	EA	\$ 1,890,000.00	-	\$ -	3.00	\$ 5,670,000	-	\$ -	3.00	\$ 5,670,000
10.04.03	New bridge over New River	EA	\$ 33,861,750.00	-	\$ -	1.00	\$ 33,861,750	-	\$ -	1.00	\$ 33,861,750
	Sub-total Track Structures & Track (A)				\$ 21,251,875		\$ 68,981,523		\$ -		\$ 90,233,398
20 STATIONS											
20.01	Stations										
20.01.01	New TRCL Station	EA	\$ 3,410,000.00	8.00	\$ 27,280,000	6.00	\$ 20,460,000	6.00	\$ 20,460,000	20.00	\$ 68,200,000
	Sub-total Stations, Terminals, Intermodal (B)				\$ 27,280,000		\$ 20,460,000		\$ 20,460,000		\$ 68,200,000
40 SITEWORK AND ROADWAY GRADE CROSSINGS											
40.01	Grade Crossings										
40.01.02	Grade Crossings for new third track	EA	\$ 425,000	20.00	\$ 8,500,000	32.00	\$ 13,600,000	-	\$ -	52.00	\$ 22,100,000
40.02	Utility Relocations										
40.02.01	Utility Relocation	MILE	\$ 212,000	7.71	\$ 1,634,167	10.68	\$ 2,264,545	-	\$ -	18.39	\$ 3,898,712
40.03	Flagging										
40.03.01	Flagging	MILE	\$ 25,000	7.71	\$ 192,708	10.68	\$ 267,045	-	\$ -	18.39	\$ 459,754
40.04	Environmental Mitigation										
40.04.01	Wetland impacts	Allow	\$ 2,000,000	0.33	\$ 666,667	0.33	\$ 666,667	0.33	\$ 666,667	1.00	\$ 2,000,000
	Sub-total Sitework, Utilities, Existing Improvements (C)				\$ 10,993,542		\$ 16,798,258		\$ 666,667		\$ 28,458,466
50 SYSTEMS											
50.01	Wayside signaling equipment										
50.01.01	Interlocking & Signals	MILE	\$ 1,125,000	7.71	\$ 8,671,875	10.68	\$ 12,017,045	-	\$ -	18.39	\$ 20,688,920
50.01.02	Positive Train Control	MILE	\$ 50,000	7.71	\$ 385,417	10.68	\$ 534,091	-	\$ -	18.39	\$ 919,508
	Sub-total Communications & Signaling (D)				\$ 9,057,292		\$ 12,551,136		\$ -		\$ 21,608,428
	Sub-total Construction Elements (A+B+C+D)				\$ 68,582,708		\$ 118,790,917		\$ 21,126,667		\$ 208,500,292
MOBILIZATION ON CONSTRUCTION ELEMENTS											
	Mobilization	6.0%			\$ 4,114,963		\$ 7,127,455		\$ 1,267,600		\$ 12,510,018
	Temporary Facilities	1.0%			\$ 685,827		\$ 1,187,909		\$ 211,267		\$ 2,085,003
	Site Clean-up	0.5%			\$ 342,914		\$ 593,955		\$ 105,633		\$ 1,042,501
	Sub-total Mobilization (E)		7.5%		\$ 5,143,703		\$ 8,909,319		\$ 1,584,500		\$ 15,637,522
PROFESSIONAL SERVICES ON CONSTRUCTION ELEMENTS											
	Preliminary Engineering Services	4.0%			\$ 2,743,308		\$ 4,751,637		\$ 845,067		\$ 8,340,012
	Final Design Engineering	7.0%			\$ 4,800,790		\$ 8,315,364		\$ 1,478,867		\$ 14,595,020
	Testing & Inspection	2.0%			\$ 1,371,654		\$ 2,375,818		\$ 422,533		\$ 4,170,006
	Construction Mgmt and Administration	6.0%			\$ 4,114,963		\$ 7,127,455		\$ 1,267,600		\$ 12,510,018
	Insurance and Insurance Certificates	3.0%			\$ 2,057,481		\$ 3,563,728		\$ 633,800		\$ 6,255,009
	Legal Fees & Permits	1.0%			\$ 685,827		\$ 1,187,909		\$ 211,267		\$ 2,085,003
	FEC Design Review Fees	1.0%			\$ 685,827		\$ 1,187,909		\$ 211,267		\$ 2,085,003
	FEC Construction Services	3.0%			\$ 2,057,481		\$ 3,563,728		\$ 633,800		\$ 6,255,009
	Sub-total Professional Services (F)		27.0%		\$ 18,517,331		\$ 32,073,548		\$ 5,704,200		\$ 56,295,079

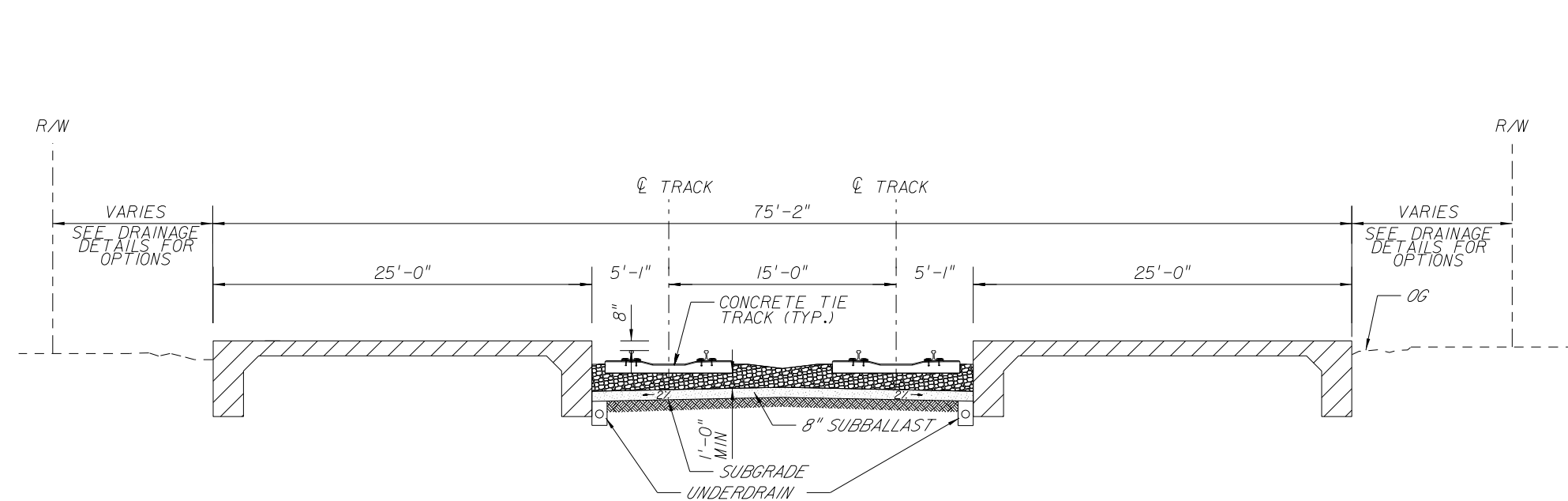
TRCL PREFERRED BUILD ALTERNATIVE: JUPITER TO MGC				By County							
				West Palm Beach		Broward		Miami-Dade		Total	
FTA Standard Cost Category	Description	Unit	Costs (2013)	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
	Professional Services Contingency		30.0%		\$ 5,555,199		\$ 9,622,064		\$ 1,711,260		\$ 16,888,524
	Sub-total Professional Services Contingency (G)		30.0%		\$ 5,555,199		\$ 9,622,064		\$ 1,711,260		\$ 16,888,524
CONTINGENCY ON CONSTRUCTION ELEMENTS											
	Design and Construction Contingency		30.0%		\$ 20,574,813		\$ 35,637,275		\$ 6,338,000		\$ 62,550,088
	Sub-total Contingency (H)				\$ 20,574,813		\$ 35,637,275		\$ 6,338,000		\$ 62,550,088
FINANCING											
	Payment and Performance Bond Guarantees		2.0%		\$ 1,371,654		\$ 2,375,818		\$ 422,533		\$ 4,170,006
	Sub-total Financing (I)				\$ 1,371,654		\$ 2,375,818		\$ 422,533		\$ 4,170,006
	Sub-total Construction Elements (A+B+C+D+E+F+G+H+I)				\$ 119,745,409		\$ 207,408,941		\$ 36,887,160		\$ 364,041,509
30 SUPPORT FACILITIES											
30.01	Light maintenance facility										
30.01.01	Layover Facility	ALLOW	\$ 24,000,000	0.33	\$ 8,000,000	0.33	\$ 8,000,000	0.33	\$ 8,000,000	1.00	\$ 24,000,000
30.02	FEC to SFRC Connections										
30.02.02	Pompano (includes additions to Tri-Rail Pompano Beach Sta)	LS	\$ 41,342,000								
	Infrastructure	LS	\$ 28,692,000	0.33	\$ 9,564,000	0.33	\$ 9,564,000	0.33	\$ 9,564,000	1.00	\$ 28,692,000
	Right of Way (does not include ROW needed at Pompano Beach Station)	LS	\$ 12,650,000	0.33	\$ 4,216,667	0.33	\$ 4,216,667	0.33	\$ 4,216,667	1.00	\$ 12,650,000
30.03	FEC/SFRTA Additional Construction										
30.03.01	Port Everglades Lead extension	LS	\$ 9,990,219	0.33	\$ 3,330,073	0.33	\$ 3,330,073	0.33	\$ 3,330,073	1.00	\$ 9,990,219
30.03.02	Outside Project Limits Crossovers	LS	\$ 1,920,600	0.33	\$ 640,200	0.33	\$ 640,200	0.33	\$ 640,200	1.00	\$ 1,920,600
30.03.03	Miami Airport Station	LS	\$ 3,158,514	0.33	\$ 1,052,838	0.33	\$ 1,052,838	0.33	\$ 1,052,838	1.00	\$ 3,158,514
	Sub-total Support Facilities: Yards, Shops, Admin. Bldgs (J)				\$ 26,803,778		\$ 26,803,778		\$ 26,803,778		\$ 80,411,333
60 RIGHT OF WAY											
	Right of Way										
	Mainline Impacts	AC	\$ 4,000,000.00	0.37	\$ 1,466,483	-	\$ -	-	\$ -	0.37	\$ 1,466,483
	Station Platform Impacts	AC	\$ 4,000,000.00	1.19	\$ 4,778,696	1.22	\$ 4,887,971	0.44	\$ 1,750,689	2.85	\$ 11,417,355
	Parking Impacts	AC	\$ 4,000,000.00	7.72	\$ 30,870,588	5.55	\$ 22,211,765	5.75	\$ 23,011,765	19.02	\$ 76,094,118
	cost factor		3.2		x 3.2		x 3.2		x 3.2		x 3.2
	Sub-total Right of Way (K)				\$ 118,770,455		\$ 86,719,153		\$ 79,239,851		\$ 284,729,459
70 VEHICLES											
70.01	VEHICLES										
70.01.01	Locomotive	EA	\$ 3,200,000		\$ -		\$ -		\$ -	-	\$ -
70.01.02	Cab Car	EA	\$ 2,500,000		\$ -		\$ -		\$ -	3.00	\$ 7,500,000
70.01.03	Coach	EA	\$ 2,000,000		\$ -		\$ -		\$ -	12.00	\$ 24,000,000
70.01.04	Spare Parts	LS	\$ 1,000,000		\$ -		\$ -		\$ -	1.00	\$ 1,000,000
70.01.05	Owner Inspection		1%		\$ -		\$ -		\$ -		\$ 315,000.00
	Sub-total Vehicles (L)				\$ -		\$ -		\$ -		\$ 32,815,000
2013 TOTAL COST (Sum A to L)					\$ 265,400,000		\$ 321,000,000		\$ 143,000,000		\$ 762,000,000
COST RANGE											
	Low		-5%		\$ 252,200,000		\$ 305,000,000		\$ 135,900,000		\$ 723,900,000
	High		5%		\$ 278,700,000		\$ 337,100,000		\$ 150,200,000		\$ 800,100,000

TRCL ALTERNATIVE A6C5: JUPITER TO MGC				By County							
				West Palm Beach		Broward		Miami-Dade		Total	
FTA Standard Cost Category	Description	Unit	Costs (2013)	Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
10 TRACK STRUCTURES & TRACK											
10.02	New Mainline										
10.02.02	Add 3rd Mainline (w/ Sitework)	Mile	\$ 2,757,000.00	7.25	\$ 19,998,693	10.00	\$ 27,570,000	2.29	\$ 6,318,125	19.55	\$ 53,886,818
10.02.03	Add 4th Mainline (w/ Sitework)	Mile	\$ 2,757,000.00	-	\$ -	0.68	\$ 1,879,773	-	\$ -	0.68	\$ 1,879,773
10.04	Structures										
10.04.02	New 3rd Mainline Bridges	EA	\$ 1,890,000.00	-	\$ -	3.00	\$ 5,670,000	2.00	\$ 3,780,000	5.00	\$ 9,450,000
10.04.03	New bridge over New River	EA	\$ 33,861,750.00	-	\$ -	1.00	\$ 33,861,750	-	\$ -	1.00	\$ 33,861,750
	Sub-total Track Structures & Track (A)				\$ 19,998,693		\$ 68,981,523		\$ 10,098,125		\$ 99,078,341
20 STATIONS											
20.01	Stations										
20.01.01	New TRCL Station	EA	\$ 3,410,000.00	8.00	\$ 27,280,000	6.00	\$ 20,460,000	6.00	\$ 20,460,000	20.00	\$ 68,200,000
	Sub-total Stations, Terminals, Intermodal (B)				\$ 27,280,000		\$ 20,460,000		\$ 20,460,000		\$ 68,200,000
40 SITEWORK AND ROADWAY GRADE CROSSINGS											
40.01	Grade Crossings										
40.01.02	Grade Crossings for new third track	EA	\$ 425,000	20.00	\$ 8,500,000	32.00	\$ 13,600,000	7.00	\$ 2,975,000	59.00	\$ 25,075,000
40.02	Utility Relocations										
40.02.01	Utility Relocation	MILE	\$ 212,000	7.25	\$ 1,537,803	10.68	\$ 2,264,545	2.29	\$ 485,833	20.23	\$ 4,288,182
40.03	Flagging										
40.03.01	Flagging	MILE	\$ 25,000	7.25	\$ 181,345	10.68	\$ 267,045	2.29	\$ 57,292	20.23	\$ 505,682
40.04	Environmental Mitigation										
40.04.01	Wetland impacts	Allow	\$ 2,000,000	0.33	\$ 666,667	0.33	\$ 666,667	0.33	\$ 666,667	1.00	\$ 2,000,000
	Sub-total Sitework, Utilities, Existing Improvements (C)				\$ 10,885,814		\$ 16,798,258		\$ 4,184,792		\$ 31,868,864
50 SYSTEMS											
50.01	Wayside signaling equipment										
50.01.01	Interlocking & Signals	MILE	\$ 1,125,000	7.25	\$ 8,160,511	10.68	\$ 12,017,045	2.29	\$ 2,578,125	20.23	\$ 22,755,682
50.01.02	Positive Train Control	MILE	\$ 50,000	7.25	\$ 362,689	10.68	\$ 534,091	2.29	\$ 114,583	20.23	\$ 1,011,364
	Sub-total Communications & Signaling (D)				\$ 8,523,201		\$ 12,551,136		\$ 2,692,708		\$ 23,767,045
	Sub-total Construction Elements (A+B+C+D)				\$ 66,687,708		\$ 118,790,917		\$ 37,435,625		\$ 222,914,250
MOBILIZATION ON CONSTRUCTION ELEMENTS											
	Mobilization	6.0%			\$ 4,001,263		\$ 7,127,455		\$ 2,246,138		\$ 13,374,855
	Temporary Facilities	1.0%			\$ 666,877		\$ 1,187,909		\$ 374,356		\$ 2,229,143
	Site Clean-up	0.5%			\$ 333,439		\$ 593,955		\$ 187,178		\$ 1,114,571
	Sub-total Mobilization (E)		7.5%		\$ 5,001,578		\$ 8,909,319		\$ 2,807,672		\$ 16,718,569
PROFESSIONAL SERVICES ON CONSTRUCTION ELEMENTS											
	Preliminary Engineering Services	4.0%			\$ 2,667,508		\$ 4,751,637		\$ 1,497,425		\$ 8,916,570
	Final Design Engineering	7.0%			\$ 4,668,140		\$ 8,315,364		\$ 2,620,494		\$ 15,603,998
	Testing & Inspection	2.0%			\$ 1,333,754		\$ 2,375,818		\$ 748,713		\$ 4,458,285
	Construction Mgmt and Administration	6.0%			\$ 4,001,263		\$ 7,127,455		\$ 2,246,138		\$ 13,374,855
	Insurance and Insurance Certificates	3.0%			\$ 2,000,631		\$ 3,563,728		\$ 1,123,069		\$ 6,687,428
	Legal Fees & Permits	1.0%			\$ 666,877		\$ 1,187,909		\$ 374,356		\$ 2,229,143
	FEC Design Review Fees	1.0%			\$ 666,877		\$ 1,187,909		\$ 374,356		\$ 2,229,143
	FEC Construction Services	3.0%			\$ 2,000,631		\$ 3,563,728		\$ 1,123,069		\$ 6,687,428
	Sub-total Professional Services (F)		27.0%		\$ 18,005,681		\$ 32,073,548		\$ 10,107,619		\$ 60,186,848
	Professional Services Contingency		30.0%		\$ 5,401,704		\$ 9,622,064		\$ 3,032,286		\$ 18,056,054

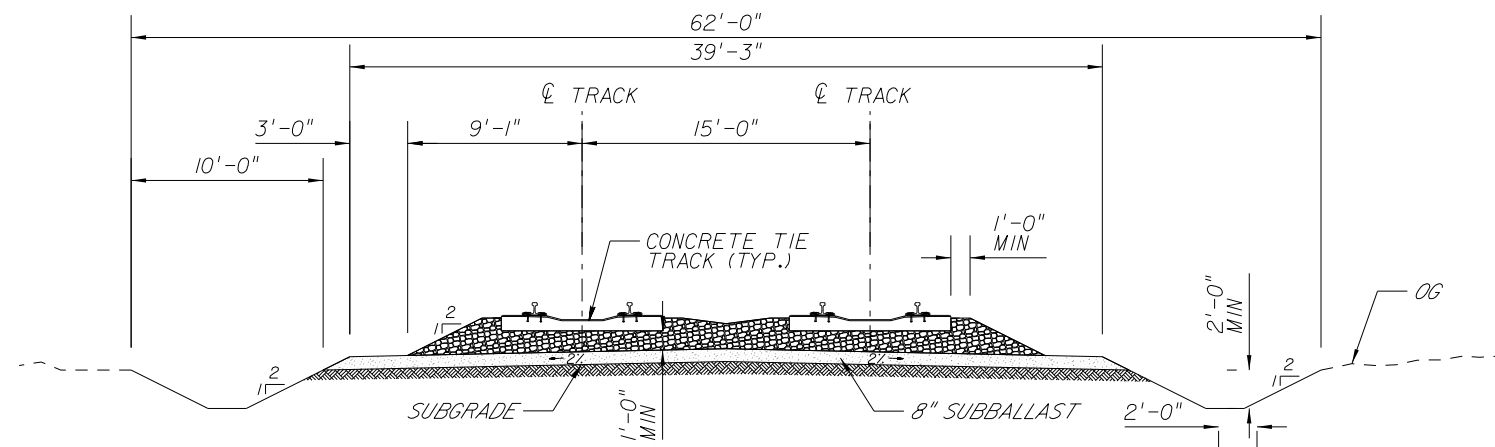
TRCL ALTERNATIVE A6C5: JUPITER TO MGC				By County							
FTA Standard Cost Category	Description	Unit	Costs (2013)	West Palm Beach		Broward		Miami-Dade		Total	
				Quantity	Amount	Quantity	Amount	Quantity	Amount	Quantity	Amount
	Sub-total Professional Services Contingency (G)		30.0%		\$ 5,401,704		\$ 9,622,064		\$ 3,032,286		\$ 18,056,054
CONTINGENCY ON CONSTRUCTION ELEMENTS											
	Design and Construction Contingency		30.0%		\$ 20,006,313		\$ 35,637,275		\$ 11,230,688		\$ 66,874,275
	Sub-total Contingency (H)				\$ 20,006,313		\$ 35,637,275		\$ 11,230,688		\$ 66,874,275
FINANCING											
	Payment and Performance Bond Guarantees		2.0%		\$ 1,333,754		\$ 2,375,818		\$ 748,713		\$ 4,458,285
	Sub-total Financing (I)				\$ 1,333,754		\$ 2,375,818		\$ 748,713		\$ 4,458,285
	Sub-total Construction Elements (A+B+C+D+E+F+G+H+I)				\$ 116,436,739		\$ 207,408,941		\$ 65,362,601		\$ 389,208,281
30 SUPPORT FACILITIES											
30.01	Light maintenance facility										
30.01.01	Layover Facility	ALLOW	\$ 24,000,000	0.33	\$ 8,000,000	0.33	\$ 8,000,000	0.33	\$ 8,000,000	1.00	\$ 24,000,000
30.02	FEC to SFRC Connections										
30.02.02	Pompano (Pompano Connection Only)	LS	\$ 29,173,000								
	Infrastructure	LS	\$ 16,523,000	0.33	\$ 5,507,667	0.33	\$ 5,507,667	0.33	\$ 5,507,667	1.00	\$ 16,523,000
	Right of Way	LS	\$ 12,650,000	0.33	\$ 4,216,667	0.33	\$ 4,216,667	0.33	\$ 4,216,667	1.00	\$ 12,650,000
30.02.02.A	Pompano Double Track NW and SE connections (no ROW included)	LS	\$ 7,392,564								
	Infrastructure	LS	\$ 7,392,564	0.33	\$ 2,464,188	0.33	\$ 2,464,188	0.33	\$ 2,464,188	1.00	\$ 7,392,564
30.03	FEC/SFRTA Additional Construction										
30.03.01	Port Everglades Lead extension	LS	\$ 9,990,219	0.33	\$ 3,330,073	0.33	\$ 3,330,073	0.33	\$ 3,330,073	1.00	\$ 9,990,219
30.03.02	Outside Project Limits Crossovers	LS	\$ 1,920,600	0.33	\$ 640,200	0.33	\$ 640,200	0.33	\$ 640,200	1.00	\$ 1,920,600
30.03.03	Miami Airport Station	LS	\$ 3,158,514	0.33	\$ 1,052,838	0.33	\$ 1,052,838	0.33	\$ 1,052,838	1.00	\$ 3,158,514
30.03.04	Boca Raton SFRTA Station	LS	\$ 8,616,510	0.33	\$ 2,872,170	0.33	\$ 2,872,170	0.33	\$ 2,872,170	1.00	\$ 8,616,510
	Sub-total Support Facilities: Yards, Shops, Admin. Bldgs (J)				\$ 28,083,802		\$ 28,083,802		\$ 28,083,802		\$ 84,251,407
60 RIGHT OF WAY											
	Right of Way										
	Mainline Impacts	AC	\$ 4,000,000.00	0.41	\$ 1,648,760	-	\$ -	-	\$ -	0.41	\$ 1,648,760
	Station Platform Impacts	AC	\$ 4,000,000.00	0.86	\$ 3,422,406	1.27	\$ 5,092,287	0.69	\$ 2,744,720	2.81	\$ 11,259,412
	Parking Impacts	AC	\$ 4,000,000.00	7.72	\$ 30,870,588	5.55	\$ 22,211,765	5.75	\$ 23,011,765	19.02	\$ 76,094,118
	cost factor		3.2		x 3.2		x 3.2		x 3.2		x 3.2
	Sub-total Right of Way (K)				\$ 115,013,614		\$ 87,372,964		\$ 82,420,751		\$ 284,807,329
70 VEHICLES											
70.01	VEHICLES										
70.01.01	Locomotive	EA	\$ 3,200,000		\$ -		\$ -		\$ -	2.00	\$ 6,400,000
70.01.02	Cab Car	EA	\$ 2,500,000		\$ -		\$ -		\$ -	5.00	\$ 12,500,000
70.01.03	Coach	EA	\$ 2,000,000		\$ -		\$ -		\$ -	17.00	\$ 34,000,000
70.01.04	Spare Parts	LS	\$ 1,000,000		\$ -		\$ -		\$ -	1.00	\$ 1,000,000
70.01.05	Owner Inspection		1%		\$ -		\$ -		\$ -		\$ 529,000.00
	Sub-total Vehicles (L)				\$ -		\$ -		\$ -		\$ 54,429,000
2013 TOTAL COST (Sum A to L)					\$ 259,500,000		\$ 322,900,000		\$ 175,900,000		\$ 812,700,000
COST RANGE											
	Low		-5%		\$ 246,600,000		\$ 306,800,000		\$ 167,200,000		\$ 772,100,000
	High		5%		\$ 272,500,000		\$ 339,100,000		\$ 184,700,000		\$ 853,400,000



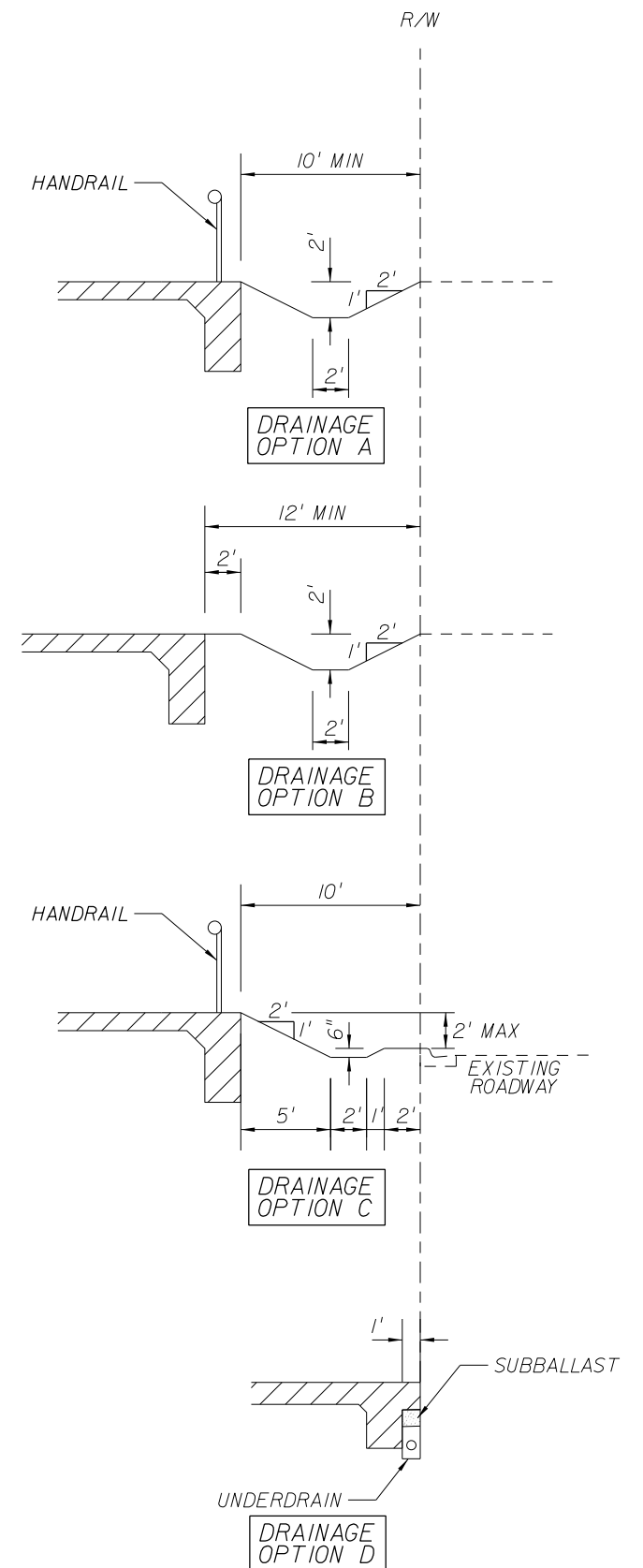
Appendix C: Typical Sections



TYPICAL SECTION 1 - TWO TRACK - TANGENT TRACK ON GRADE - SIDE PLATFORMS
SCALE: 1" = 10'

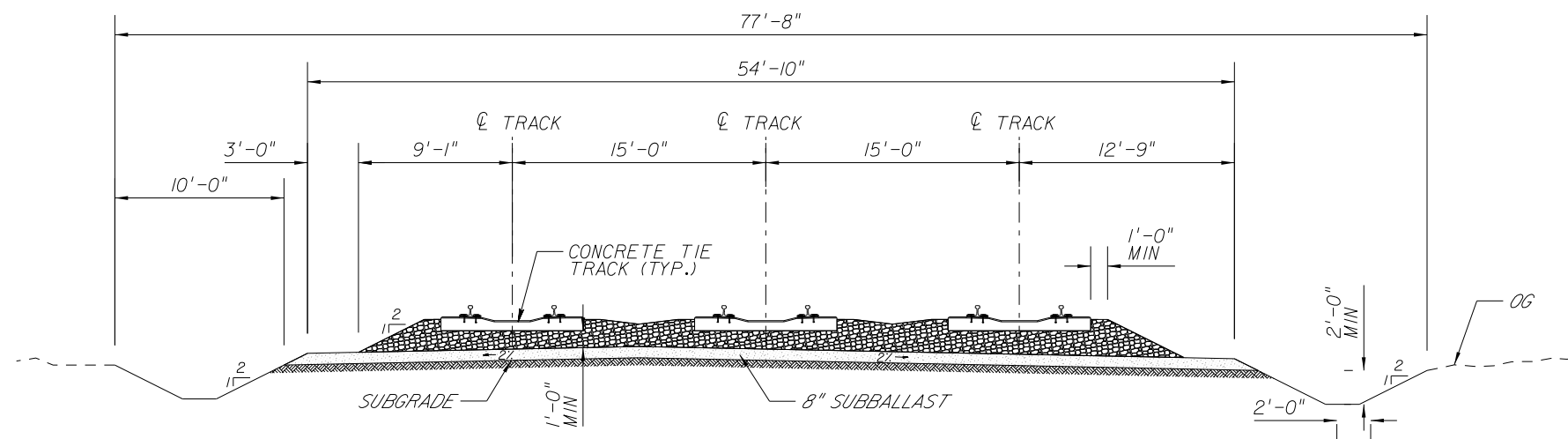


TYPICAL SECTION 2 - TWO TRACK - TANGENT TRACK ON GRADE
SCALE: 1" = 10'



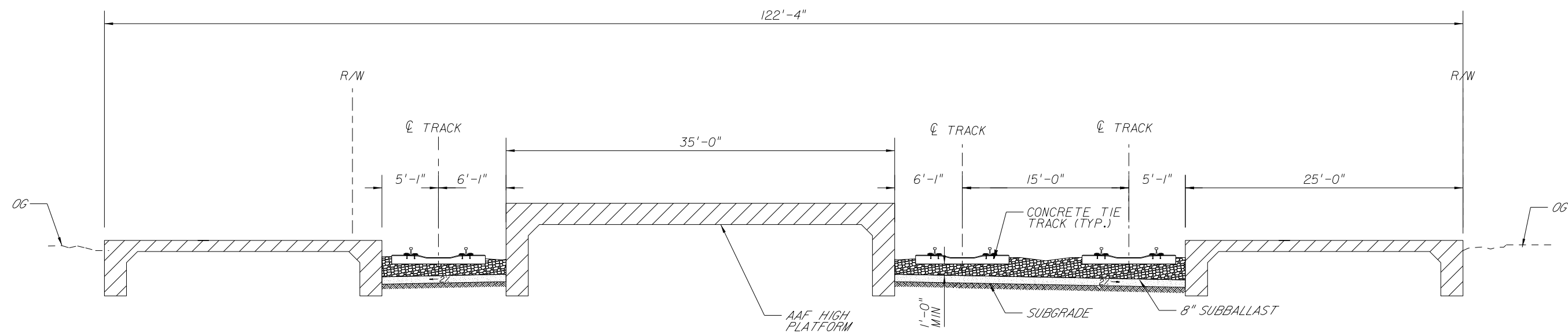
REVISIONS				CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION		SOUTH FLORIDA EAST COAST CORRIDOR TWO TRACK TYPICALS	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY		
							417031-1-22-01	

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TYPICAL SECTION 4 - THREE TRACK - TANGENT TRACK ON GRADE

SCALE: 1" = 10'

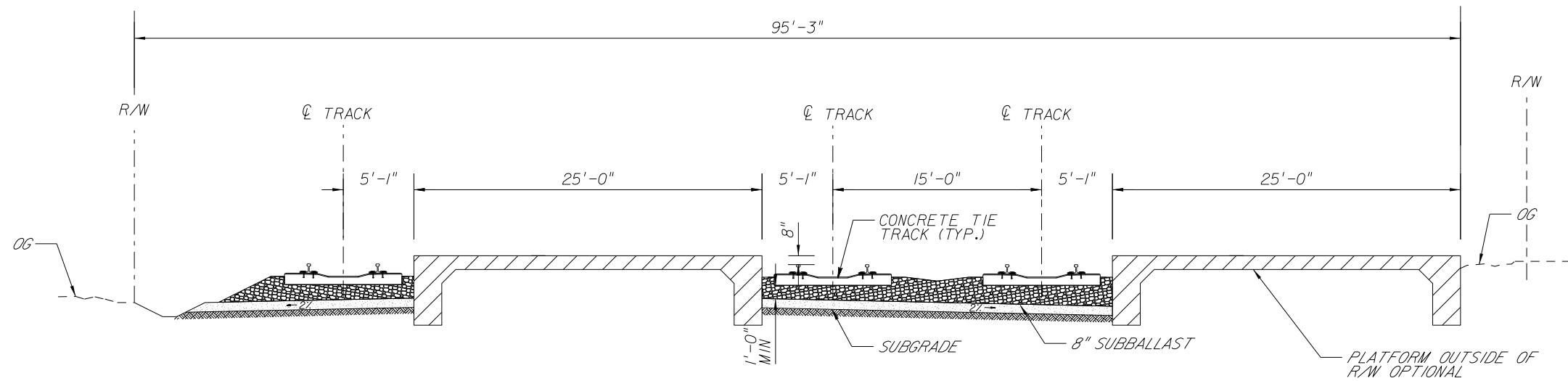


TYPICAL SECTION II - THREE TRACK - TANGENT TRACK ON GRADE - SIDE & CENTER PLATFORMS WITH AAF

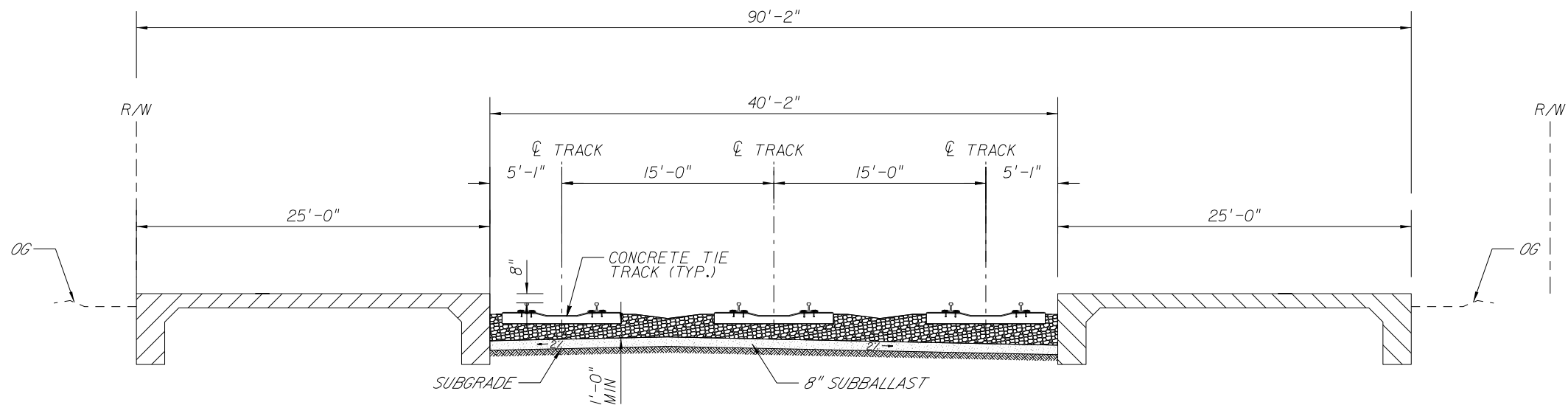
SCALE: 1" = 10'

REVISIONS				CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SOUTH FLORIDA EAST COAST CORRIDOR	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
							417031-1-22-01		

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TYPICAL SECTION 8 - THREE TRACK - TANGENT TRACK ON GRADE - SIDE & CENTER PLATFORMS
 SCALE: 1" = 10'



TYPICAL SECTION 9 - THREE TRACK - TANGENT TRACK ON GRADE - SIDE PLATFORMS
 SCALE: 1" = 10'

REVISIONS				CH2M HILL 225 E. ROBINSON STREET SUITE 505 ORLANDO, FL 32801-4321 CERTIFICATE OF AUTHORIZATION NO. 000072	STATE OF FLORIDA DEPARTMENT OF TRANSPORTATION			SOUTH FLORIDA EAST COAST CORRIDOR	SHEET NO.
DATE	DESCRIPTION	DATE	DESCRIPTION		ROAD NO.	COUNTY	FINANCIAL PROJECT ID		
							417031-1-22-01		

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