

# PREFERRED ALIGNMENT OPTIONS REPORT

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# Preferred Options Report

## 1. INTRODUCTION

### 1.1 Report Contents

The City of Tampa is conducting the InVision: Tampa Streetcar Feasibility Study (Streetcar Feasibility Study) to evaluate the potential modernization and extension of the Tampa Historic Streetcar system to better serve the mobility needs of residents, workers, visitors, and students in the Downtown Core, Ybor City, the Channel District, and surrounding urban neighborhoods. The planning effort is designed to advance mobility, livability, and economic development goals presented in the *InVision: Tampa Center City Plan* from 2015 and build on previous studies assessing transportation needs for the Center City.

This report identifies alignment options that best meet the defined Purpose and Need for enhanced transit serving downtown and surrounding urban districts, and have the greatest potential to provide cost-effective and efficient service. In subsequent stages of the project, the City will work with the community to further refine the preferred alignments, evaluate alternative vehicle technologies, assess community and environmental impacts, and define funding sources and implementation timetables.

The contents of this report build on material presented in the *Purpose & Need, Context, & Evaluation Plan* report and the *Definition & Evaluation of Alignment Options* report, both of which are available for review on the City of Tampa website at: [www.tampagov.net/streetcar](http://www.tampagov.net/streetcar).

### 1.2 Study Overview

The purpose of the Streetcar Feasibility Study is to define and evaluate the modernization options for the existing streetcar system and facilities, assess the potential for an extension of the system, and evaluate vehicle technology alternatives to improve ridership, operations, cost effectiveness, and overall quality of service. The City is conducting the study in partnership with other agencies including the Florida Department of Transportation (FDOT) and Hillsborough Area Regional Transit Authority (HART) and in coordination with other regional transit initiatives that are underway, such as the HART *Regional Transit Feasibility Plan*. The study will proceed under two distinct phases of work as described below.

#### PHASE 1: CONCEPT DEVELOPMENT AND FEASIBILITY ANALYSIS

The goal of Phase 1 is to define the project, identify alignment options, estimate preliminary capital and operating/maintenance costs, develop a preliminary financial plan, and to submit a request for entry into Project Development under the Federal Transit Administration (FTA) Small Starts program. Phase 1 includes a significant program of engagement to ensure residents and stakeholders have opportunities to participate in the process of defining and evaluating modernization and extension concepts. During Phase 1, the project's Purpose and Need will be developed and alignment options will be defined and evaluated using a set of measures that relate to the Purpose and Need and performance and potential impacts. Preliminary costs and ridership estimates will be established and an initial evaluation of impacts will be completed to support the selection of a preferred alignment option. It is anticipated that the proposed streetcar extension project would likely undergo the Small Starts review process for funding under the FTA Capital Investment Grant (CIG) program. The Phase 1 work program and engagement process is designed to define a highly competitive project that can satisfy the CIG project justification requirements.

## PHASE 2: PROJECT DEVELOPMENT

During Phase 2 of the study, the City will refine the definition of the preferred alignment option and prepare more detailed plans for extension and modernization. This effort will include:

- » an evaluation of alternative vehicle technologies;
- » development of guideway, station design, and modernization concepts;
- » preparation of updated ridership projections and capital and operating cost estimates;
- » completion of an environmental impact assessment and documentation; and
- » development of funding and financing plans.

Phase 2 activities will focus on the refinement of a preferred alignment option and preparation of documentation to support requests for funding from local, state, or federal sources, including FTA Small Starts funding under the Capital Investment Grant (CIG) program.

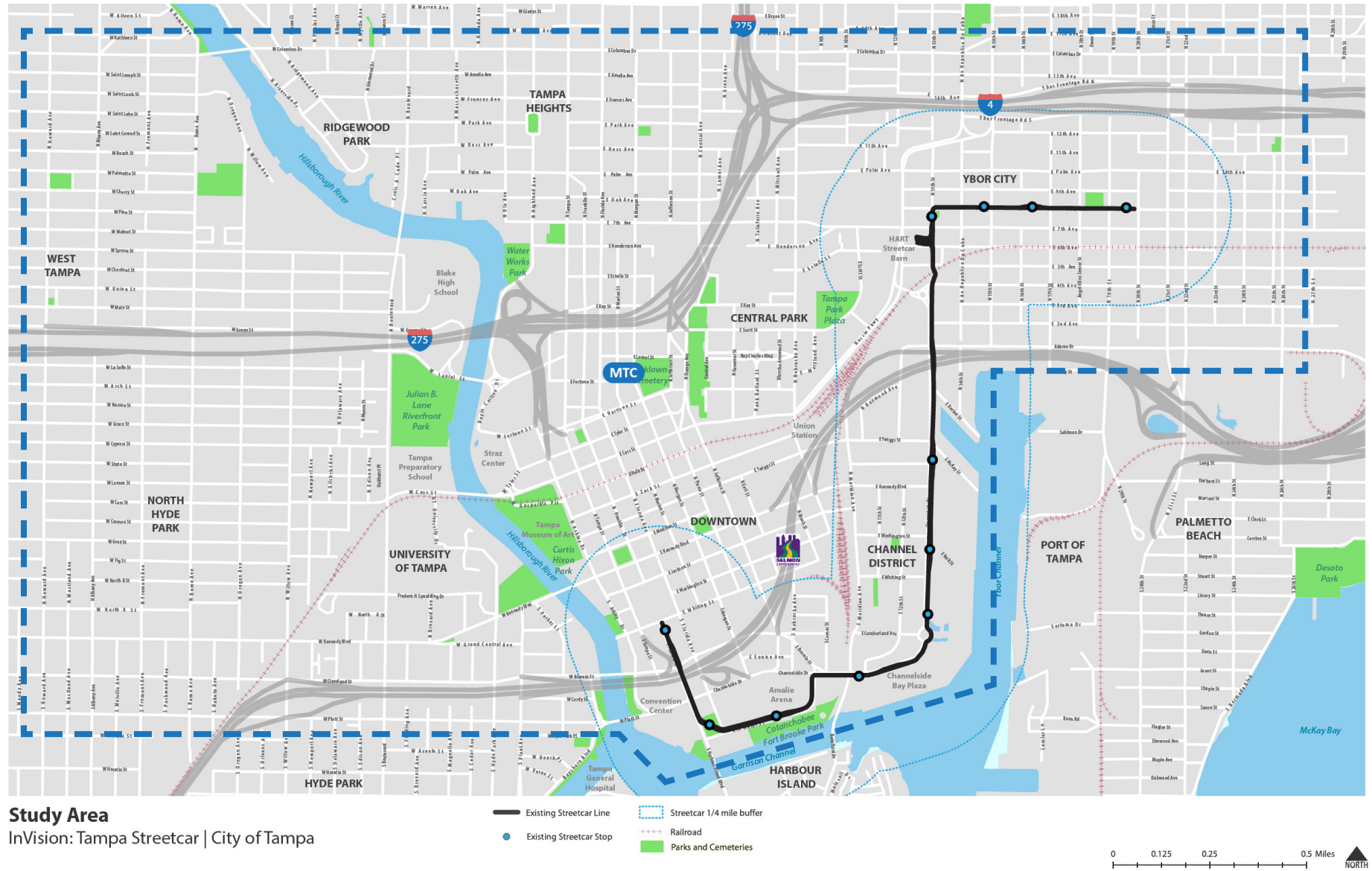
## 1.3 Study Area

The project study area is based on the area defined for the *InVision: Tampa Center City Plan* with the exception that it is focused more closely on the Downtown Core and the existing streetcar service area. As shown on Figure 1, the Streetcar Feasibility Study area measures approximately three-miles by two-miles centered on the Downtown Core with East Columbus Drive to the north; North 27<sup>th</sup> Street and Ybor Channel to the east; Platt Street, Garrison Channel, and Adamo Drive to the south; and South/North Howard Avenue to the west. This area spans the following urban districts and neighborhoods:

- » Tampa Heights;
- » Central Park/Encore!;
- » Ybor City;
- » Channel District;
- » Downtown Core/Central Business District;
- » University of Tampa/Grand Central;
- » North Hyde Park; and
- » West River.



Figure 1. InVision: Tampa Streetcar Feasibility Study Area



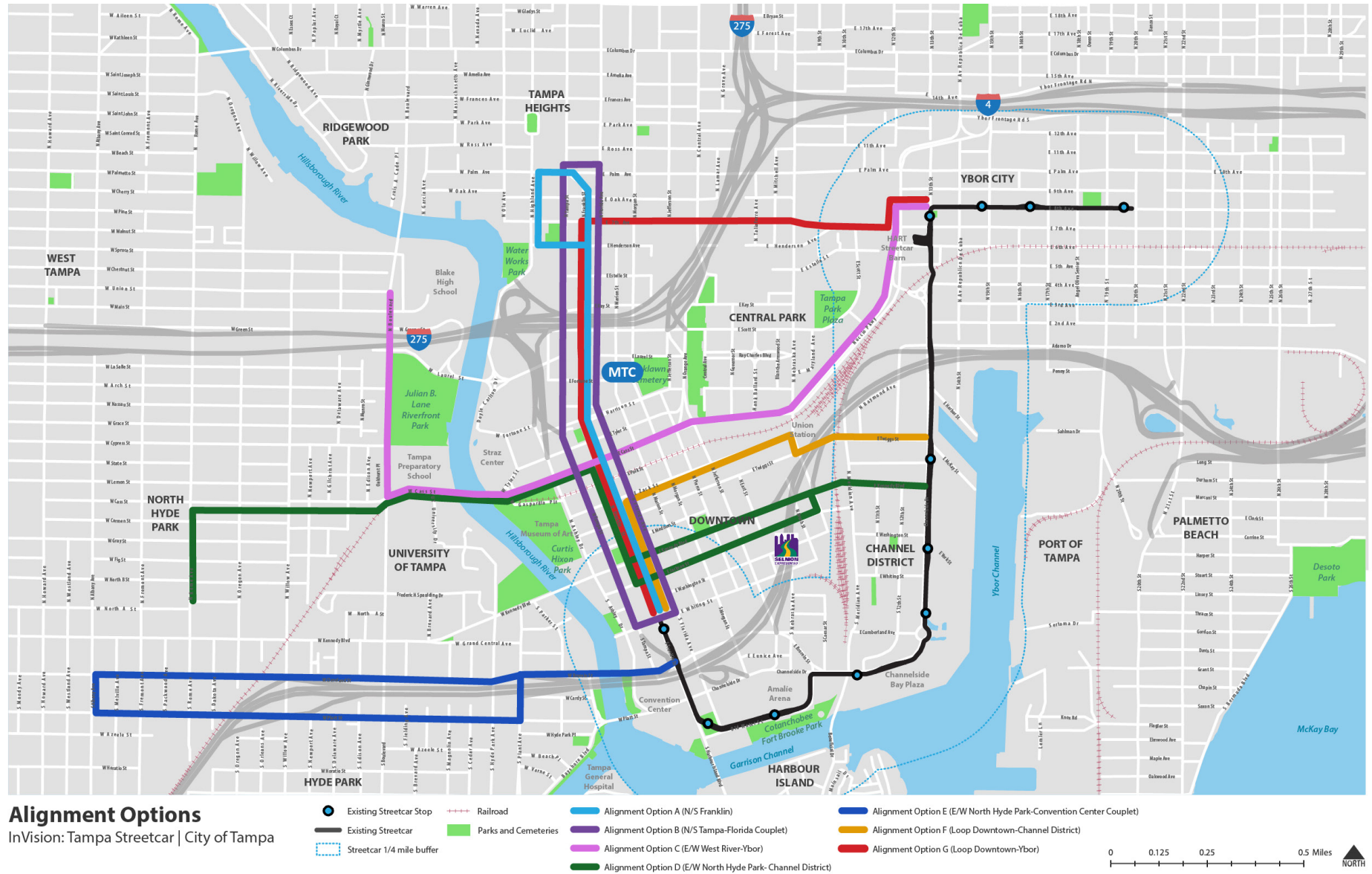
## 2. STREETCAR ALIGNMENT OPTIONS CONSIDERED

Seven alignment options were developed based on a review of previous studies, comments received during a series of engagement activities and stakeholder workshops, and feedback from an on-line survey and comment form. In spring 2017, the City held three public workshops to discuss project objectives, review corridor options, and define potential solutions. During the workshop in May 2017, the seven alignment options described below (and shown in Figure 2) were presented for initial public feedback, suggestions, and preferences.

- » **Alignment A: N/S Franklin Street** – A bi-directional, north/south alignment along Franklin Street in the Downtown Core with a short one-way loop along Palm Avenue, N. Highland Street, and Henderson Avenue in Tampa Heights.
- » **Alignment B: N/S Tampa Street-Florida Avenue Couplet** – A north/south, one-way couplet along Tampa Street and Florida Avenue through the Downtown Core to Palm Avenue in Tampa Heights.
- » **Alignment C: E/W West River-Ybor City** – An east/west, bi-directional/two-way alignment along Nuccio Parkway and E Cass Street connecting North Hyde Park and West River to the northern extent of the Downtown Core to Central Park and Ybor City.
- » **Alignment D: E/W North Hyde Park-Channel District** – An east/west, bi-directional alignment connecting the Channel District to the Downtown Core along Kennedy Boulevard and Jackson Street and the Downtown Core to North Hyde Park along West Cass Street crossing the Hillsborough River.
- » **Alignment E: E/W North Hyde Park-Convention Center Couplet** – An east/west couplet along Brorein Street (over the river), W. Cleveland Street, and W. Platt Street connecting the southern edge of the Downtown Core near the Convention Center to Grand Central and North Hyde Park along the Selmon Expressway.
- » **Alignment F: Loop Downtown-Channel District** – A north/south and east/west bi-directional alignment connecting the Downtown Core to the Channel District along North Franklin Street and East Zack Street to East Twiggs Street.
- » **Alignment G: Loop Downtown-Ybor City** – A north/south and east/west bi-directional alignment connecting the Downtown Core to Tampa Heights and Ybor City along North Franklin Street and East 7th Avenue.



Figure 2. Alignment Options



### 3. EVALUATION PROCESS & RESULTS

The evaluation methodology and measures described in the *Definition & Evaluation of Alignment Options* report served as the basis for a comparative assessment of the seven alignment options and provided the primary foundation for selecting the preferred alignment option. The evaluation methodology for rating the alignment options was based on five Purpose and Need categories and six Performance and Impact categories. The measures identified for each of the Purpose and Need categories are shown in Table 1 and the measures identified for each of the Performance and Impact categories are shown in Table 2.

Table 1. Purpose and Need Evaluation Categories and Measures

Category	Measure
Connect Downtown Districts	Serves Downtown core
	Serves emerging subdistricts
Serve Diverse Travel Markets	Serves the greatest population/employment within 1/4 mile (2020) - extension only
	Provides access for transit-dependent population within 1/4 mile
	Connects major destinations and parks within 1/4 mile
Improve First/ Last Mile Service	Provides connection to existing regional transit hubs (MTC)
	Provides connection existing regional and local transit services
	Provides connection to potential new regional transit hubs
Support Economic Development	Supports population/employment with 1/4 mile (2040) - extension only
	Provides access to developments that are under construction/ planned/proposed within 1/4 mile
	Serves areas with potential for transit-induced development
Expand Sustainable Transportation Options	Enhances connections to local mobility options

Table 2. Performance & Impact Evaluation Categories and Measures

Category	Measure
Population & Employment Served	Population/employment within 1/4 mile per track mile (2020)
	Population/employment within 1/4 mile per track mile (2024)
Capital & Operating Costs	Total capital cost (2017\$) - mid-range (extension & new vehicle cost only)
	Annual operations and maintenance (O&M) costs (2017\$) - extension only
Cost Effectiveness	Capital cost (2017\$) per track mile
	Annualized capital & O&M cost (2017\$) per rider (2020)
Constructability /Operational Constraints	Avoids CSX railroad crossings
	Avoids river crossings
	Avoids Esplanade crossing
	Minimizes or avoids other constraints that would affect streetcar operations
	Avoids or minimizes impacts to major utilities
Traffic & Parking Impacts	Minimizes or avoids increases in roadway congestion (2020 existing roadway capacity)
	Provides potential for dedicated guideway based on adjusted roadway capacity
	Avoids or minimizes reduction in on-street parking
	Avoids or minimizes potential for intersection failure
Community & Environmental Impacts	Serves Environmental Justice (EJ) populations with minimal impacts
	Minimizes impacts to business access
	Minimizes or avoids impacts to noise/vibration-sensitive uses
	Minimizes potential impacts to historic districts
	Avoids potential impacts to parklands or other Section 4(f) resources

For each of the evaluation measures shown in Tables 1 and 2, a rating from 1 to 5 (low to high) was assigned to describe how well each alignment option met a specific measure. An average rating of the evaluation measures was calculated for each category. The average rating for each evaluation category, including the five Purpose and Need categories and the six Performance and Impacts categories is provided in Table 3. This table also includes key information for each alignment, including track miles, capital costs, O&M costs, projected average weekday boardings (2020), and projected population/employment within ¼ mile of the alignment (2020). The complete evaluation matrix with details and ratings for each evaluation measure is provided as Appendix A of the *Definition & Evaluation of Alignment Options* report.

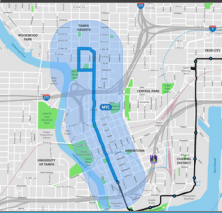
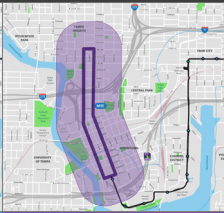
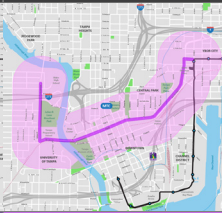
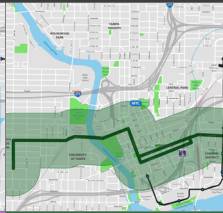
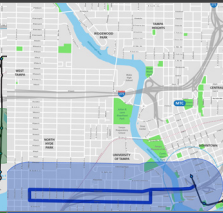
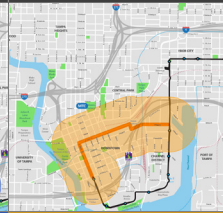
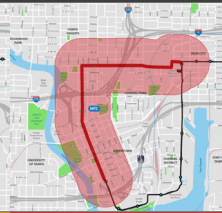
Overall, the two north-south alignments, Alignment Options A and B, perform the best. Both of these alignments perform above average in the Purpose and Need evaluation categories and are rated highly in the Performance and Impacts categories. Both of these options serve residents, employees, and special event venues in the Downtown Core, but do not serve as many of the surrounding emerging districts. These two alignments provide service to many existing and potential regional transit hubs, including the Marion Transit Center. Both alignments rate highly due to lower capital and operating costs than other alignments, but Alignment A rates higher in several areas as it requires a single CSX railroad crossing and has less impacts on local roadways and adjacent land uses due its path along Franklin Street instead of Tampa Street and Florida Avenue. Alignment B rates higher in other areas as it would not require a crossing of the Esplanade on Franklin Street and has a larger service area due to its alignment along two parallel roadways.

The three east-west alignment options do not rate highly overall. While Alignment C and Alignment D perform very well on many of the Purpose and Need categories because they would provide service to the existing and emerging districts with high concentrations of residents, employees and transit dependent populations, they do not perform well in the Performance and Impact categories. This is due to high capital and operating costs associated with river crossings and longer alignments, as well as higher potential impacts to major utilities. The lack of connection to the Downtown Core, other areas with high population and employment, and other existing and potential transit services results in low Purpose and Need ratings for

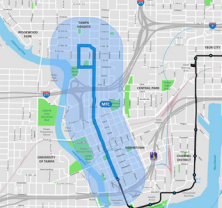
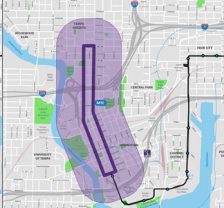
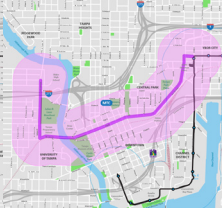
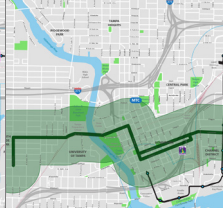
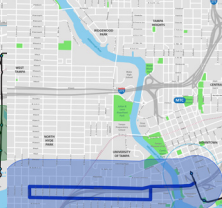
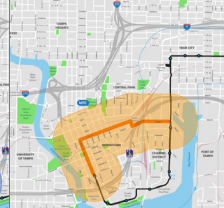
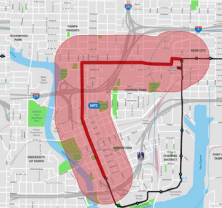

















































Alignment E. This alignment option also rates the lowest for Performance and Impact categories since the ridership potential would likely not support capital and operating expenses required and the river crossings and other operational constraints would limit the constructibility of this option.

The two loop options perform better than the east-west options, but not as well as the north-south options. Alignment G rates highly for Purpose and Need due to providing a connection between the Downtown Core, Tampa Heights, Central Park and Ybor City, existing and potential regional transit hubs, and multiple planned and potential redevelopment sites. Since Alignment F only provides connections to the Downtown Core and fewer subdistricts, it does not rate as highly in the Purpose and Need categories because fewer transit dependent populations are served and less connections would be provided to other existing and proposed transit services. However, Alignment F does rate highly in several Performance and Impact categories, due to its cost effectiveness, lack of CSX or river crossings, and limited operational constraints. While Alignment G best serves transit dependent areas, the overall population and employment per track mile served is lower because it serves a smaller area of Tampa Heights subdistrict and is a longer alignment. Overall, Alignment G rates lower on Performance and Impacts categories due to higher potentials of impact to historic districts and higher capital and O&M costs.

Table 3. Evaluation Summary Table

	North/South			East/West		Loop	
							
Evaluation Category	A N/S Franklin Street	B N/S Tampa Street-Florida Avenue Couplet	C E/W West River-Ybor City	D E/W North Hyde Park-Channel District	E E/W North Hyde Park-Convention Center Couplet	F Loop Downtown-Channel District	G Loop Downtown-Ybor City
<b>Alignment Information</b>							
Track Miles	2.67	2.60	4.66	4.94	3.27	2.46	4.12
Number of Vehicles	4	4	7	7	5	4	6
Capital Costs (\$2017)	\$94 million	\$97 million	\$174 million	\$180 million	\$124 million	\$91 million	\$138 million
Annual O&M Costs	\$3.6 million	\$3.6 million	\$6.2 million	\$6.2 million	\$4.4 million	\$3.6 million	\$5.3 million
Average Weekday Boardings (2020)	2,200	2,200	2,450	2,700	1,500	2,300	2,300
Population & Employment within 1/4 mile (2020)	20,600	24,100	29,900	31,200	15,100	20,400	22,000
<b>Purpose &amp; Need Considerations</b>							
Connect Downtown Districts	●	●	●	●	●	●	●
Serve Diverse Travel Markets	●	●	●	●	●	●	●
Improve First Mile/Last Mile Connections	●	●	●	●	●	●	●
Support Economic Development	●	●	●	●	●	●	●
Expand Sustainable Transportation Options	●	●	●	●	●	●	●



	North/South			East/West		Loop	
							
	A	B	C	D	E	F	G
	N/S Franklin Street	N/S Tampa Street-Florida Avenue Couplet	E/W West River-Ybor City	E/W North Hyde Park-Channel District	E/W North Hyde Park-Convention Center Couplet	Loop Downtown-Channel District	Loop Downtown-Ybor City
Evaluation Category							
Performance & Impact							
Population & Employment Served							
Capital & Operating Costs							
Cost Effectiveness							
Constructability/Operational Constraints							
Traffic & Parking Impacts							
Community & Environment Impacts							
OVERALL RATING							

See Appendix A of the Definition & Evaluation of Alignment Options report for the complete evaluation matrix.

**Rating Key:**



## 4. PREFERRED ALIGNMENT OPTION

Based on the results of the evaluation, the City has identified the north/south oriented Alignments A and B as the preferred alignment options. These alignments, extending enhanced transit service through the core of downtown, to the vicinity of Marion Transit Center, and north to Tampa Heights, along with modernization and enhanced service on the existing system, are recommended for advancement into Project Development for more detailed refinement and evaluation. During Project Development, the a final alignment will be developed which incorporated service along some combination of Tampa Street, Franklin Street, and Florida Avenue.

### 4.1 Modernization and Improved Service Quality

The project assumes enhanced transit service, whether provided by streetcar or another form of transit technology, will be provided along the extension and the existing historic streetcar alignment serving Ybor City, the Channel District, Water Street, and the Tampa Convention Center. The project assumes the full alignment—existing plus extension—will be designed to provide a “one seat” trip, maximize exclusive transit guideway operations, and offer high levels of service with full-day and evening operations with 15-minute headways. As a result, a paramount assumption is that the same vehicle technology will be operated on the existing system and the extension.

As identified in previous studies prepared by HART and depending on the final vehicle technology decision, modernization of the existing system may require reconfiguration of stations, changes in guideway alignment and additional double-tracking, upgrading of traction power distribution, and improvements to or replacement of the existing maintenance and service facility.

### 4.2 Phase 1 Preferred Extension Options

Both Alignments A and B provide an efficient, bi-directional connection north/south through the core of downtown on or parallel to the Franklin Street corridor. The alignment options connect directly to the existing line in the vicinity of the Fort Brook terminus of the existing system and extend to Palm Avenue in the Tampa Heights neighborhood. Both alignments provide the following benefits:

- » Serve rapidly developing areas in the core of downtown, the north end of downtown, and in Tampa Heights;
- » Provide access to Marion Transit Center (MTC) and the planned site of a regional intermodal center south of the downtown interchange;
- » Provide convenient connections to popular cultural destination including the Tampa Museum of Art, the Glazer Children’s Museum and the Straz Center; and
- » Improve access to major public amenities including the Riverwalk, Curtis Hixon Park, Waterworks Park, and the soon to be completed Julian B. Lane Park on the east side of the Laurel Street Bridge.

Alignment photos for the two preferred alignment options are shown in Figure 3 and Figure 4. The alignment maps are shown in Figure 5 and Figure 6. A summary of the alignment characteristics is provided in Table 4.



Table 4. Preferred Alignment Options Characteristics

Characteristics, Costs & Demographics	North/South	
	A N/S Franklin Street	B N/S Tampa Street- Florida Avenue Couplet
<b>Alignment Option Characteristics</b>		
Track Miles	2.67	2.60
Number of Vehicles	4	4
Number of Stations	8	8
CSX Crossing Required	Yes	Yes
I-275 Crossing Required	Yes	Yes
<b>Costs &amp; Projected Ridership</b>		
Capital Costs (\$2017)	\$94 million	\$97 million
Annual O&M Costs	\$3.6 million	\$3.6 million
Average Weekday Boardings (2020)	2,200	2,200
<b>Demographics (within 1/4 mile)</b>		
Population (2020)	5,150	5,770
Employment (2020)	15,489	18,310
Population & Employment (2020)	20,600	24,100
Population (2040)	10,675	12,464
Employment (2040)	21,791	25,864
Population & Employment (2040)	32,466	38,328

Figure 3. North Franklin Street at East Madison Street looking north



Photo taken June 26, 2017 (see location on Figure 5)

Figure 4. Florida Avenue at Madison looking north



Photo taken June 26, 2017 (see location on Figure 6)

Figure 5. Alignment A: N/S Franklin Street

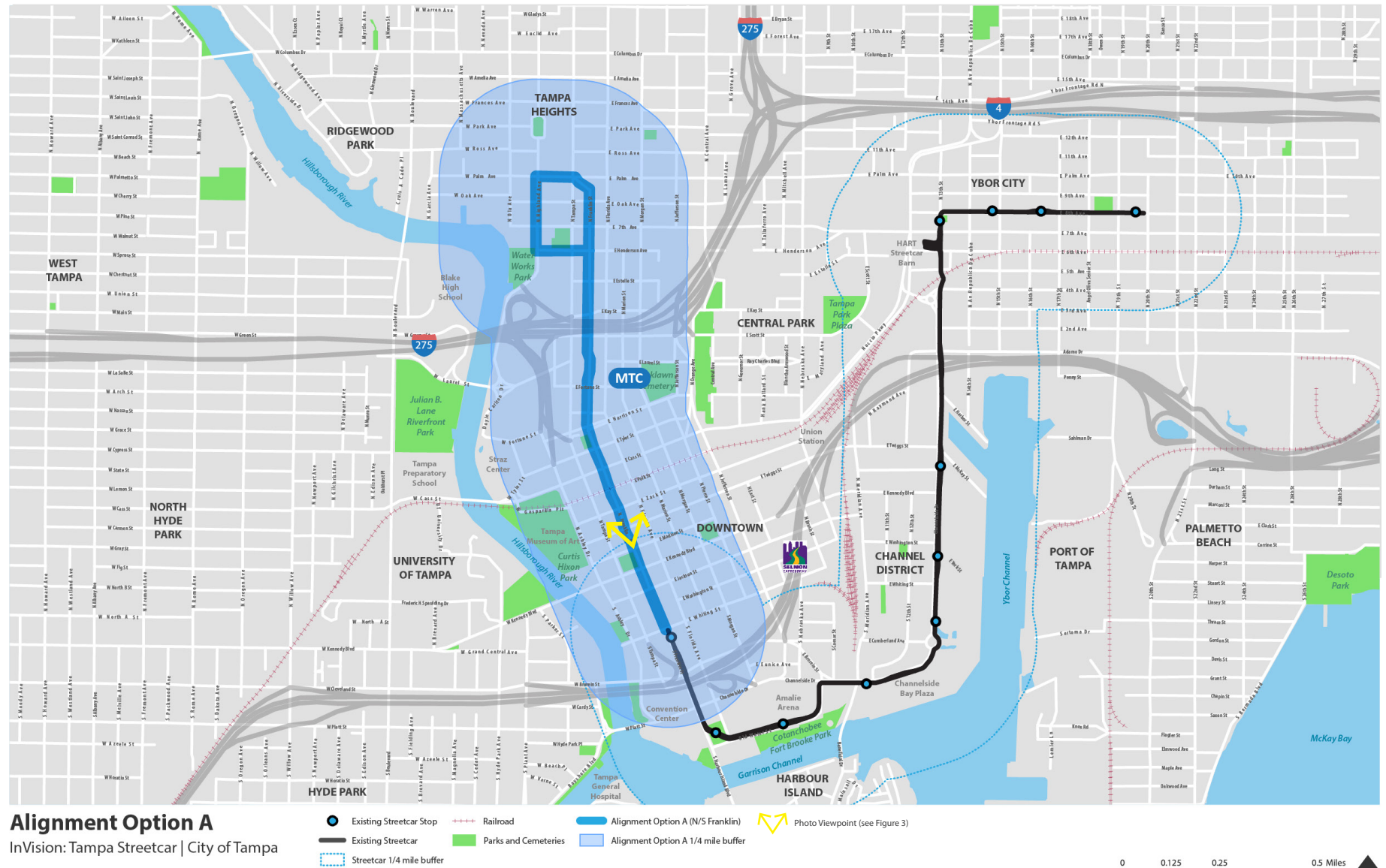
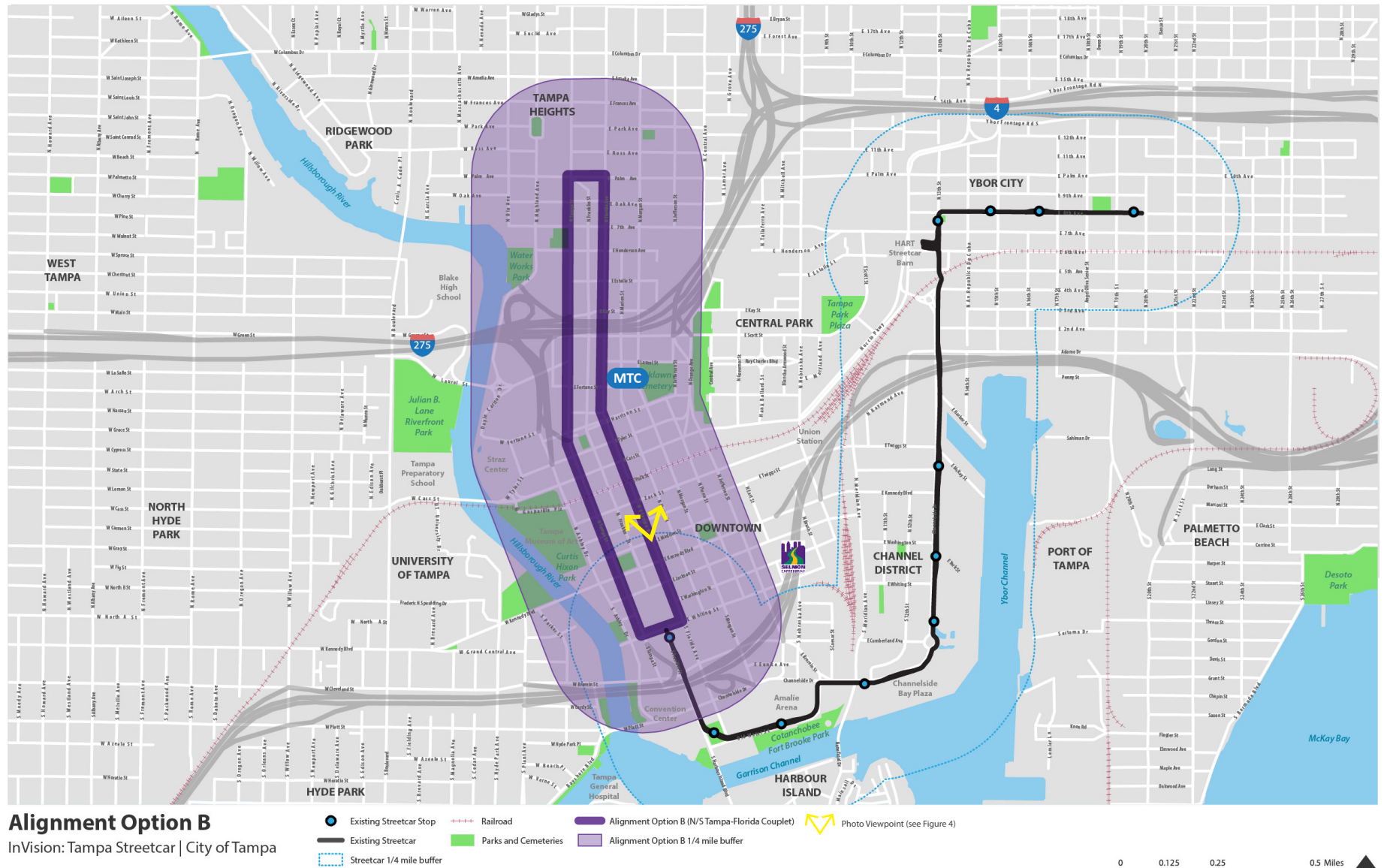




Figure 6. Alignment B: N/S Tampa Street-Florida Avenue Couplet



### 4.3 Potential Future Extensions

The provision of enhanced transit service along Alignments A and B, or a combination thereof, will provide a strong foundation for future extensions of the system. Future extensions could provide east-west connectivity with links back to the existing alignment (as shown in Figure 7), or could provide connections to communities to the west or southwest across the Hillsborough River or to the north to Seminole Heights. Depending on the outcome of future feasibility assessments, detailed planning and evaluation of extensions beyond Alignments A and B could be undertaken.

### 4.4 Integration with Transit and Mobility Network

Strategies to integrate new, enhanced transit service with the existing transit and mobility network will be defined during Phase 2 of the project. As described in the *Purpose & Need, Context, & Evaluation Plan* report, enhanced streetcar or another form of enhanced transit service has the potential to provide critical connections between existing mobility services and technologies, and greatly expand options for residents, workers, and visitors.

As a core mobility option, enhanced transit service along Alignments A and B, or a combination thereof, can be designed to bridge divides between Center City and close in districts and leverage the benefits of existing services, including local bus, express bus and regional rail service, on-demand and fixed route circulator services, and private offerings like bike share, car share, and water-borne transit. Phase 1 of the study included close coordination with the existing transit and mobility network, and these efforts to integrate the network will continue during the Project Development phase.

## 5. NEXT STEPS OF STUDY

### 5.1 Implementation Plan and Draft Funding Strategy

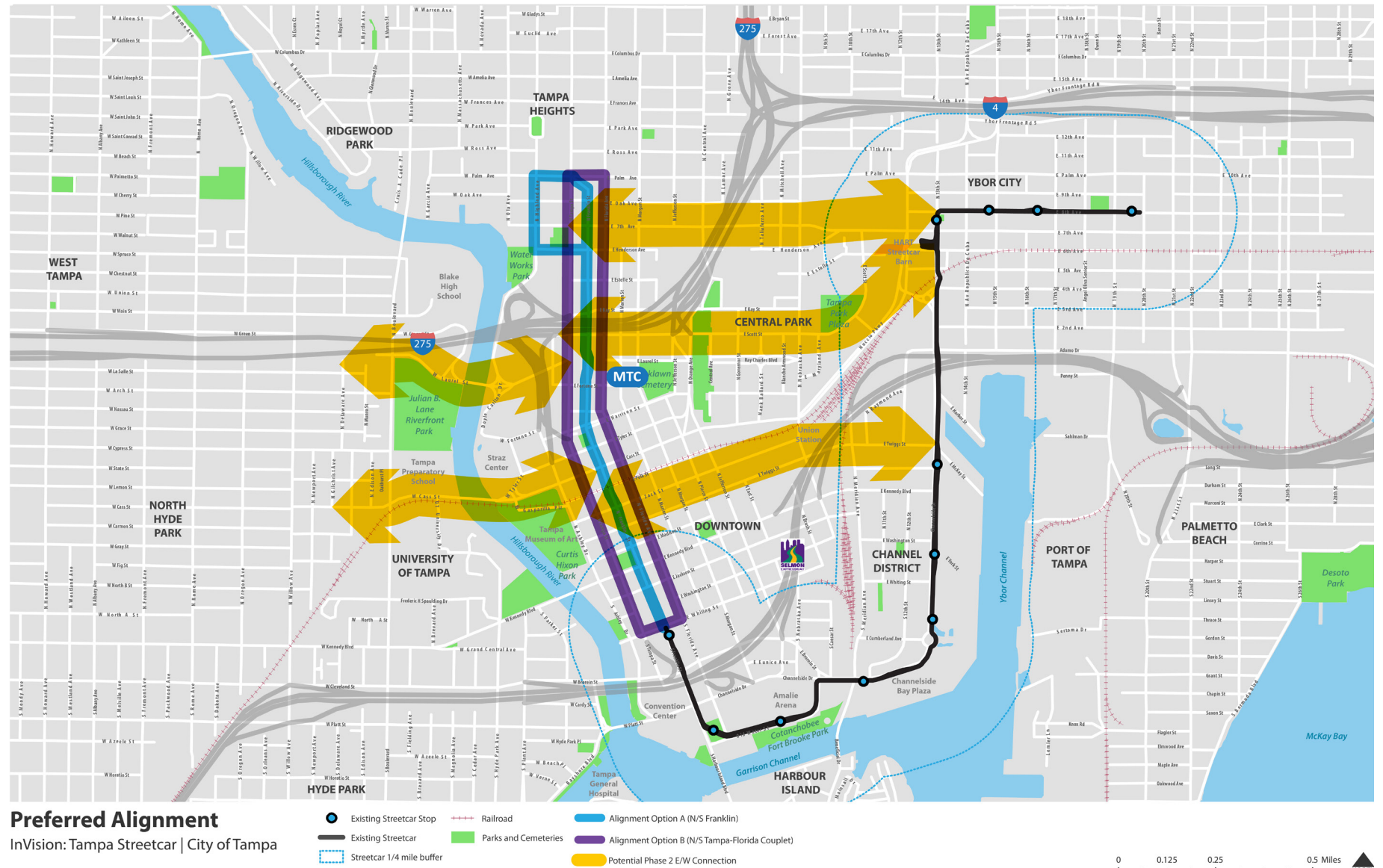
During Phase 2 of the project, the City will prepare an implementation plan and timeline for advancing each element of the proposed project, including the preferred alignment options, modernization, and improved service quality. The City also will outline a draft funding strategy for project development, design, construction, and operation of the system. Funding and financing strategies will be outlined for capital and ongoing operating and maintenance expenditures for proposed extensions as well as the existing system. The implementation plan and draft funding strategy will consider integration with other elements of the local and regional transit and mobility network, as well as with the findings of the *Regional Transit Feasibility Plan*.

### 5.2 FTA Small Starts

Assuming the implementation plan and funding strategy includes pursuit of FTA Small Starts funding from the Capital Investment Grant (CIG) program, the City will prepare the required Request Letter and supporting documentation for submittal to FTA for approval to formally enter the Small Starts Project Development phase. The Request Letter to FTA will document the planning process to date and identify the shortlist set alignment options under consideration for the proposed Project Development phase. The letter and supporting documentation will be consistent with the format and content in the most recent FTA guidelines and accepted national practices.

The FTA Small Starts Project Development process includes refinement of the preferred alignment option, preparation of updated capital and operating cost estimates, as well as updated estimates of ridership. An environmental review and formal decision is also completed during the FTA Small Starts Project Development phase. Assuming the project continues to advance, the City and stakeholders will work with FTA to pursue consideration for Small Starts funding recommendations and a potential grant agreement over the next few years. While there currently is some degree of uncertainty in the

Figure 7. Preferred Alignment Options with Potential Future East-West Lines



short-term and longer-term viability and sustainability of funding for new projects advancing in FTA's CIG program, the City and other proposed projects nationwide will continue to pursue some level of federal funding and to address FTA Small Starts requirements and procedures.

### 5.3 Project Development

The purpose of the Small Starts Project Development phase is to further define the preferred alternative for extensions and modernization based on information assembled during Phase 1 of the study, and to complete project development activities on the preferred alignment option. Activities include preparation of updated capital and operating cost estimates, completion of estimated ridership and benefits, documentation of an environmental review consistent with the National Environmental Policy Act (NEPA) and related regulations, and preparation of an updated and more complete funding and project delivery plan. The City and FDOT have secured funding and consultant support to complete the Project Development phase of this project. The City and consultant will ensure that technical work and procedures are consistent with relevant FTA, FDOT, regional and local laws, regulations, policies and best practices.

### 5.4 Mode and Technology Options

A major element of the Small Starts Project Development phase is to assess mode and technology options and select the preferred technology for operation along the existing alignment and preferred extension. As discussed earlier, the same vehicle technology will be operated on the existing system and any extensions. The City and FDOT will coordinate with FDOT, HART, and other stakeholders in consideration of a diverse, but practical set of mode and technology options. In addition, the decision on mode and technology will consider coordination with mode and technology options and any decisions made in the *Regional Transit Feasibility Plan*.

An initial list of options to be considered during the Project Development phase includes:

- » Continued use of the current TECO Historic Streetcar system vehicles, possibly including some level of rehabilitation and expansion of the fleet;
- » Introduction of new modern streetcar vehicle, similar to equipment recently introduced and operated in streetcar systems such as Portland, Seattle, Tucson, Kansas City, Cincinnati, Dallas, Detroit, etc.) Vehicles under consideration may include off-wire technology;
- » Some form of hybrid streetcar and light rail vehicle, as well as new bus and emerging technologies to address updated transit markets and operating environments; and,
- » Serious examination of emerging autonomous and connected vehicle technologies as well as coordination with shared mobility delivery systems.

### 5.5 Continued Public and Stakeholder Outreach

Stakeholder and public engagement activities will continue during Phase 2 of the study building on efforts undertaken during Phase 1. The project team will hold an additional series of large-scale public workshops at key milestones in the process, agency stakeholders will be engaged through a series of workshops, elected officials will be briefed, and team members will be available to provide updates and briefings to community, neighborhood, and business associations. Updates and progress reports will be posted on to the City's website and social media platforms as the study moves forward.