CONNECT400

GA 400 TRANSIT INITIATIVE

Alternatives Analysis

DEFINITION OF ALTERNATIVES REPORT

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0 Executive Summary

The Metropolitan Atlanta Rapid Transit Authority (MARTA) has undertaken this study to identify potential and feasible transit alternatives in the Georgia State Route 400 (GA 400) corridor to address future travel demands.

The Definition of Alternatives Report defines the alternatives considered for evaluation for the GA 400 Corridor. It provides an assessment of the socioeconomic, land use, environmental and travel conditions that potentially support the case for a major transit investment in the study area. This document highlights the key information pertaining to known features, trends, opportunities and constraints that may warrant further analysis as the project advances through the study process. A Technical Appendix is included to provide details on the performance data collected and analyzed to support the findings summarized in this report.

The GA 400 Corridor Alternatives Analysis (AA) addresses the travel market generally extending north along GA 400 from I-285 to the Fulton – Forsyth County boundary, a distance of approximately 15 miles.

0.1 Purpose & Goals

The purpose of the project is to provide reliable, convenient, efficient, and sustainable transit service in the GA 400 corridor study area by:

- Providing high capacity transit (bus and/or rail) through the GA 400 corridor study area,
- mproving transit linkages and coverage to communities within the study area, and
- Enhancing mobility and accessibility to and within the study area by providing a more robust transit network that offers an alternative to automobile travel.

The goals and objectives of the GA 400 Corridor AA are:

1. Improve Mobility and Access
2. Support Land Use & Economic Development Planning
3. Provide Cost-Effective Transit Service
4. Minimize Environmental Impacts

0.2 Evaluation Process

Evaluation criteria and performance measures were used to evaluate how well the proposed alternatives would meet the project purpose and need, and associated goals and objectives. The measures are both quantitative and qualitative to allow for a comparison of the order-of-magnitude benefits and detriments of the proposed alternatives. In several cases, one performance measure correlates to multiple project objectives, and certain objectives have been defined by more than one performance measure. It is important to note that care has been taken to include measures that would be effective in demonstrating the relative differences between alternatives.

The following three levels of evaluation were used to define and screen alternatives to identify a Locally Preferred Alternative (LPA) for the GA 400 corridor:

Fatal Flaw Analysis – to identify Build Alternatives to advance into Screen 1

Screen 1_– to identify Build Alternatives to advance into Screen 2

Screen 2– to identify the LPA[1]

1 During the Screen 2 process, this goal was modified. The highest performing alternative will be determined in Screen 2, but in order to enter into NEPA Early Scoping per Map-21, an LPA will not be identified.

Rating System for Screen 1 and Screen 2

In the rating system for Screen 1 & 2, alternatives are compared to each other and rated accordingly. Each alternative is rated High (2), Medium (1), or Low (0) for each performance measure. The top performing alternative is given a score of High and the other alternatives are rated relative to the score as shown below.

0.3 Evaluation of Alternatives

0.3.1 Fatal Flaw Analysis

Rating	Deviation from Highest Performing	Scoring
High	0 to 10%	2
Medium	10 to 20%	1
Low	Greater Than 20%	0

A screening process was developed for the Fatal Flaw Analysis to assist project participants and decision-makers in identifying and refining alternatives that would address the overall purpose, goals and objectives established for the project. The Fatal Flaw Analysis included a three-step process that: (1) identified potential transit technologies; (2) paired the best transit technology types to nine potential alignments in the GA 400 and SR-9 corridors and (3) applied evaluation criteria to the Universe of Alternatives from the second step to determine a manageable number of alternatives to advance for further analysis.

Based on the results of the Fatal Flaw Analysis and recommendations from the Technical Advisory Committee (TAC), three transit technology types (bus rapid transit, light rail and heavy rail), and four alternatives were advanced for further evaluation in the Screen 1 phase: GA 400-1, GA 400-3, GA 400-6, and SR 9-2. A map of the Screen 1 alternatives is provided in Figure 0-1.

0.3.2 Screen 1 Alternatives & Results

Table 0-1 provides descriptions of the alternatives evaluated in Screen 1.

Screen 1 Results

Overall, alternatives GA400-1A LRT/BRT and GA400-1A HRT were the two highest rated alternatives in the Screen 1 analysis, followed by GA400-6, SR9-2, and GA400-3, respectively. Scoring for the each of the four project goals in Screen 1 is provided in Section 2.

- Alternatives SR9-2, GA400-1A LRT/BRT and GA400-3 best met Goal 1(improve mobility and access) because of the higher per-station population and employment served by those alternatives.
- Alternatives GA 400-1A LRT/BRT and GA 400-1A HRT best met Goal 2 (land use/development) because they were the most consistent with local and regional plans.
- SR9-2 and GA400-3 best met Goal 3 (providing cost-effective service) because they had the lowest annual operating and maintenance costs, and lowest capital construction costs (per mile).
- GA 400-1A (HRT/LRT/BRT) best met Goal 4 (minimize environmental impacts) because they impacted less natural resources, and they had far less impact to historic resources because the alignments would be entirely within the GA 400 right-of-way.

Table 0-1: Build Alternatives for Screen 1

Corridor	Alignment Name	Alignment Description	Technology
GA 400	GA 400 - 1	North Springs MARTA Station - GA 400 - Windward Parkway with the following design options between Mansell Road and Windward Parkway: • A – GA 400 • B – Mansell Road - North Point Parkway – Haynes Bridge Road - GA 400 • C –Mansell Road - North Point Parkway • D – New transit interchange at Encore Parkway	BRT LRT/SC HRT
	GA 400 - 3	North Springs MARTA Station - GA 400 - Holcomb Bridge Road - SR 9 - Mansell Road - North Point Parkway - Windward Parkway	BRT
	GA 400 - 6	North Springs MARTA Station - GA 400 - Holcomb Bridge Road - SR 9 - Windward Parkway	BRT
SR 9	SR 9 - 2	Dunwoody MARTA Station (potential tie into Revive 285) - Hammond Drive- SR 9 - Mansell Road - North Point Parkway - Windward Parkway	BRT

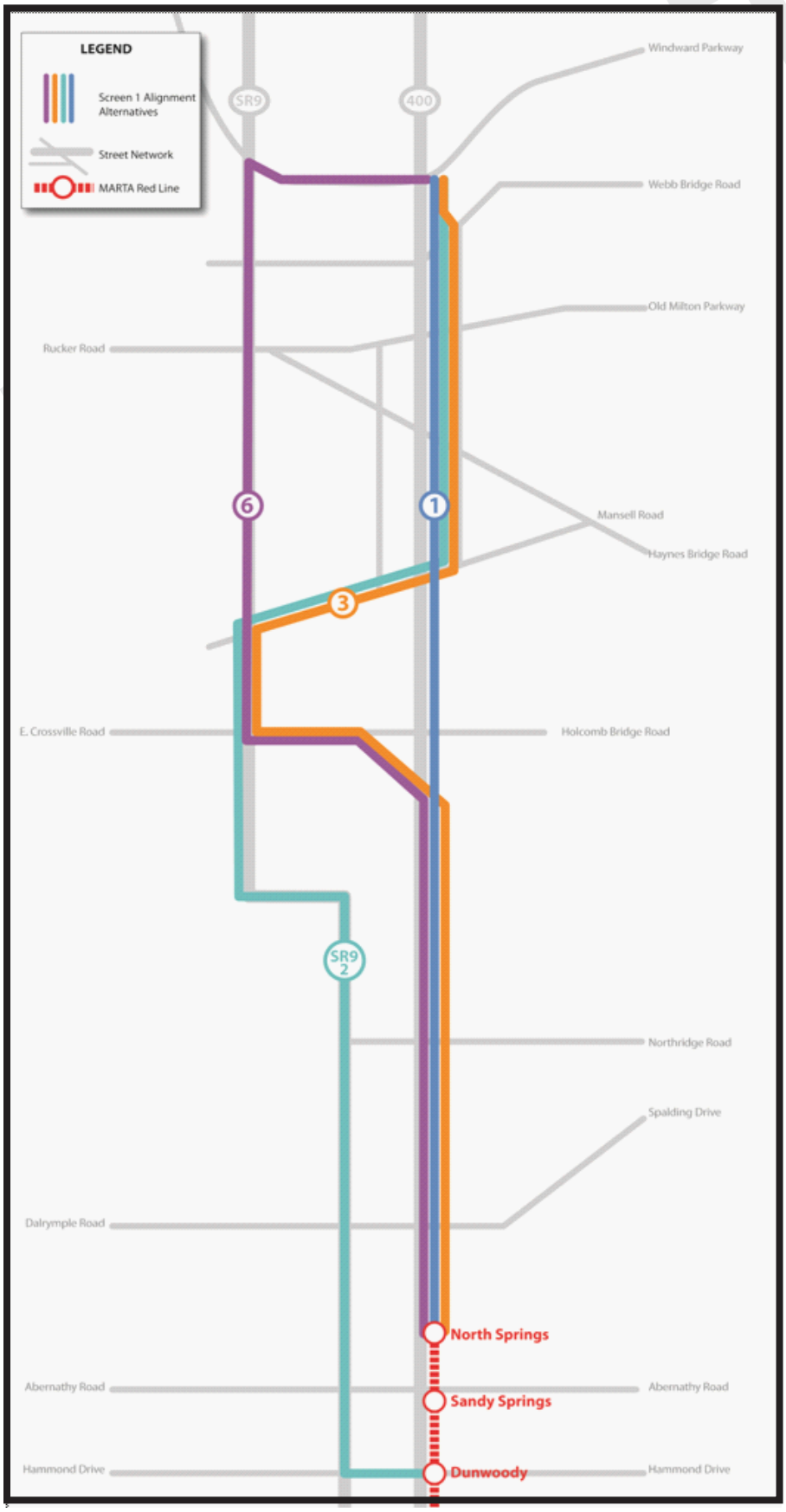

Figure 0-1: Screen 1 Alternatives

Advancement to Screen 2

GA 400-6 and SR9-2 were eliminated after Screen 1 because of engineering constraints and high potential to impact surrounding communities due to the length the alignments would traverse along State Route 9. GA 400-3 was eliminated because of the additional travel time added by detouring from Georgia 400 to run along Holcomb Bridge Road and Mansell Road, as well as the potential traffic impacts along those roads. Additionally, public input indicated that alternatives GA 400-3, GA400-6 and SR9-2 were the least appropriate alternatives for transit in the Georgia 400 corridor, while indicating a preference for GA 400-1A with heavy rail transit. Based on Screen 1 analysis and public input, GA 400-1A with all three transit mode types (HRT/LRT/BRT) were advanced to Screen 2 for further analysis.

0.3.3 Screen 2 Alternatives & Results

There is little or no difference in performance between the alternatives in many of the measures because the alignment for all three alternatives is identical. Particular emphasis was placed on the measures that show a significant difference between the alternatives - the 'distinguishing measures'. Many of the differences are related to the number of proposed stations, or differences in cost or ridership ratings between the three potential transit technologies (BRT, LRT, HRT).

A concept map of the Screen 2 alternatives is provided in Figure 0-2.

Screen 2 Results

GA 400-1 HRT was the best performing alternative in Screen 2, followed by

- GA 400-1 HRT best met Goal 1 (Improve Mobility & Access) because it provided significantly higher projected daily transit boardings, new transit riders, and reduction in annual corridor crashes. This alternative also would serve a higher projected population and employment base within the service area.
- GA 400-1A LRT best met Goal 2 (Support Land Use & Economic Development Planning). LRT performed highest because it includes Old Milton station, which has the highest amount of developable land within ¼ mile of the station.
- GA 400-1A BRT best met Goal 3 (Provide Cost-Effective Transit Service) because it had significantly lower operating and maintenance expenses, capital construction costs, and overall costs per projected transit trip.
- GA 400-1 HRT best met Goal 4 (Minimize Environmental Impacts) because it has the best potential to reduce vehicular miles traveled and air pollutants, and would have less overall impact to water resources and historic resources.

Overall, GA 400-1 HRT provides the highest ridership numbers, transit benefits and reductions in vehicular traffic of the three alternatives. All three alternatives are relatively equal in supporting local land use and economic development planning. GA 400-1 HRT presents the least environmental impact and most potential to reduce air pollutants.

Based on the Screen 2 results, the recommended transit alternative and alignment for the Georgia 400 corridor is GA 400-1 HRT.

Table 0-2: Screen 2 Alternatives

Alternative	Transit Type	Number of Stations	Proposed Stations
GA 400-1	Heavy Rail (HRT)	5	Northridge, Holcomb Bridge, Mansell, North Point, Windward
GA 400-1A	Light Rail (LRT), or Bus Rapid Transit (BRT)	6	Northridge, Holcomb Bridge, Mansell, North Point, Old Milton, Windward

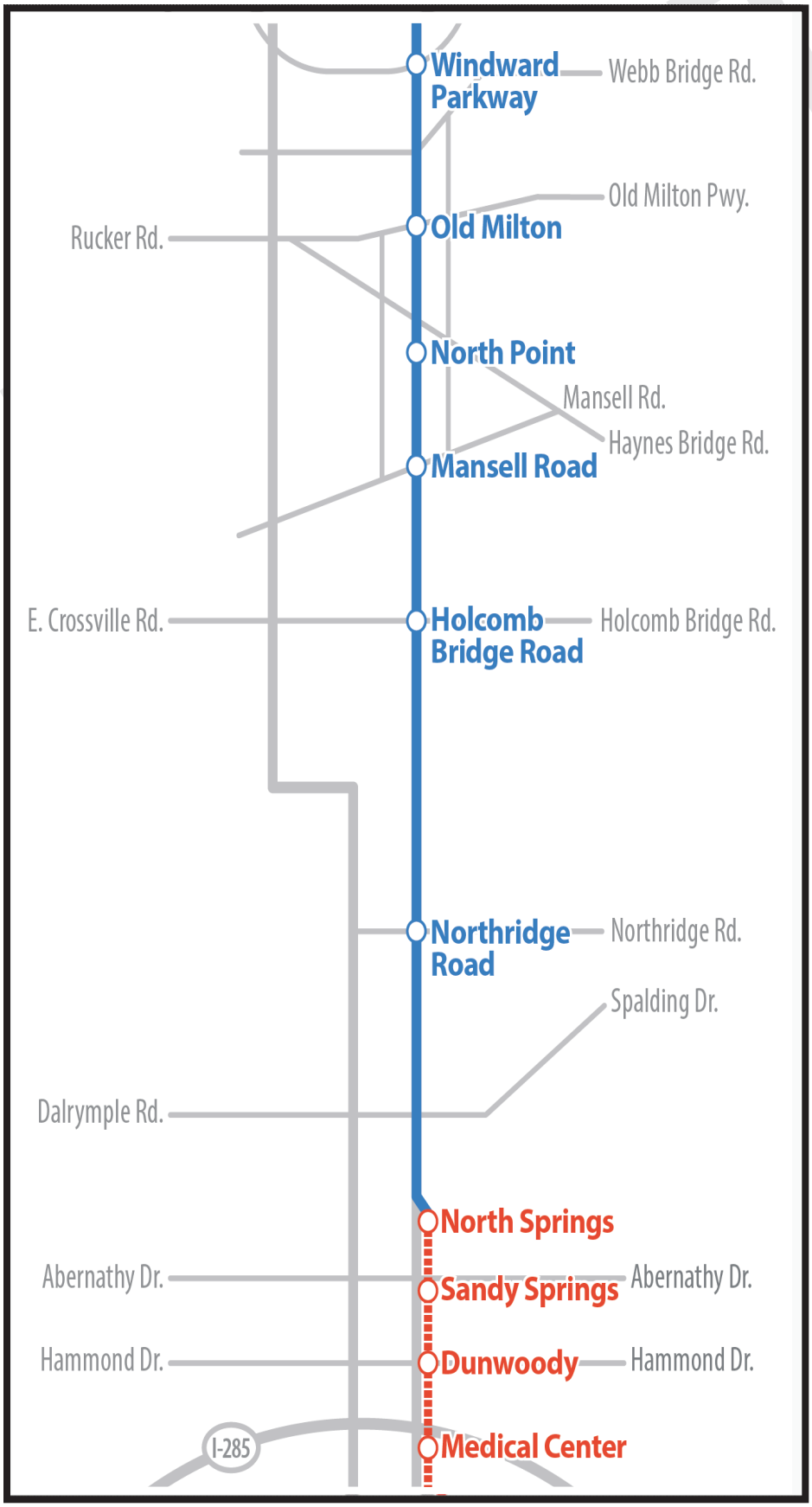

Figure 0-2: Screen 2 Alternatives

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1.0 Introduction

The Metropolitan Atlanta Rapid Transit Authority (MARTA) has undertaken the Georgia 400 Corridor Alternatives Analysis (AA) to identify potential and feasible transit alternatives in the Georgia State Route 400 (GA 400) corridor to address future travel demands. The GA 400 study area is characterized by low-density, scattered land use patterns that are automobile-oriented, a fragmented and discontinuous roadway network, and a lack of transportation options in the corridor. Further, a high proportion of trips utilize GA 400 and State Route 9 (SR 9) since they are the only available north-south routes. Likewise, a majority of the transit routes follow a similar north-south pattern, limiting mobility and accessibility for commuters that require east-west movement to, from and through the study area. Despite these travel limitations, the GA 400 Corridor is one of the largest and fastest growing major employment centers in the Atlanta region. To this end, the GA 400 Corridor AA is intended to identify improved travel options, enhanced transit services and access to jobs for the commuters and residents in the corridor.

The Definition of Alternatives Report defines the alternatives considered for evaluation for the Georgia 400 Corridor. It provides an assessment of the socioeconomic, land use, environmental and travel conditions that potentially support the case for a major transit investment in the study area. This document highlights the key information pertaining to known features, trends, opportunities and constraints that may warrant further analysis as the project advances through the study process. A Technical Appendix is provided to support the findings summarized in this report and detail the performance measures data which was collected and analyzed.

1.1 Study Area Definition

The GA 400 corridor is the transportation spine of northern Fulton County, one of the fastest growing sub-regions in the Atlanta area. The GA 400 Corridor AA addresses the travel market generally extending along GA 400 from I-285 to the Fulton – Forsyth County boundary, a distance of approximately 15 miles. The GA 400 corridor study area is home to many large employers. The southern portion of the corridor, Perimeter Center, one of the largest employment centers in the region. The study area, shown in Figure 1-1, centers on the GA 400 corridor and includes areas on both sides of the highway.

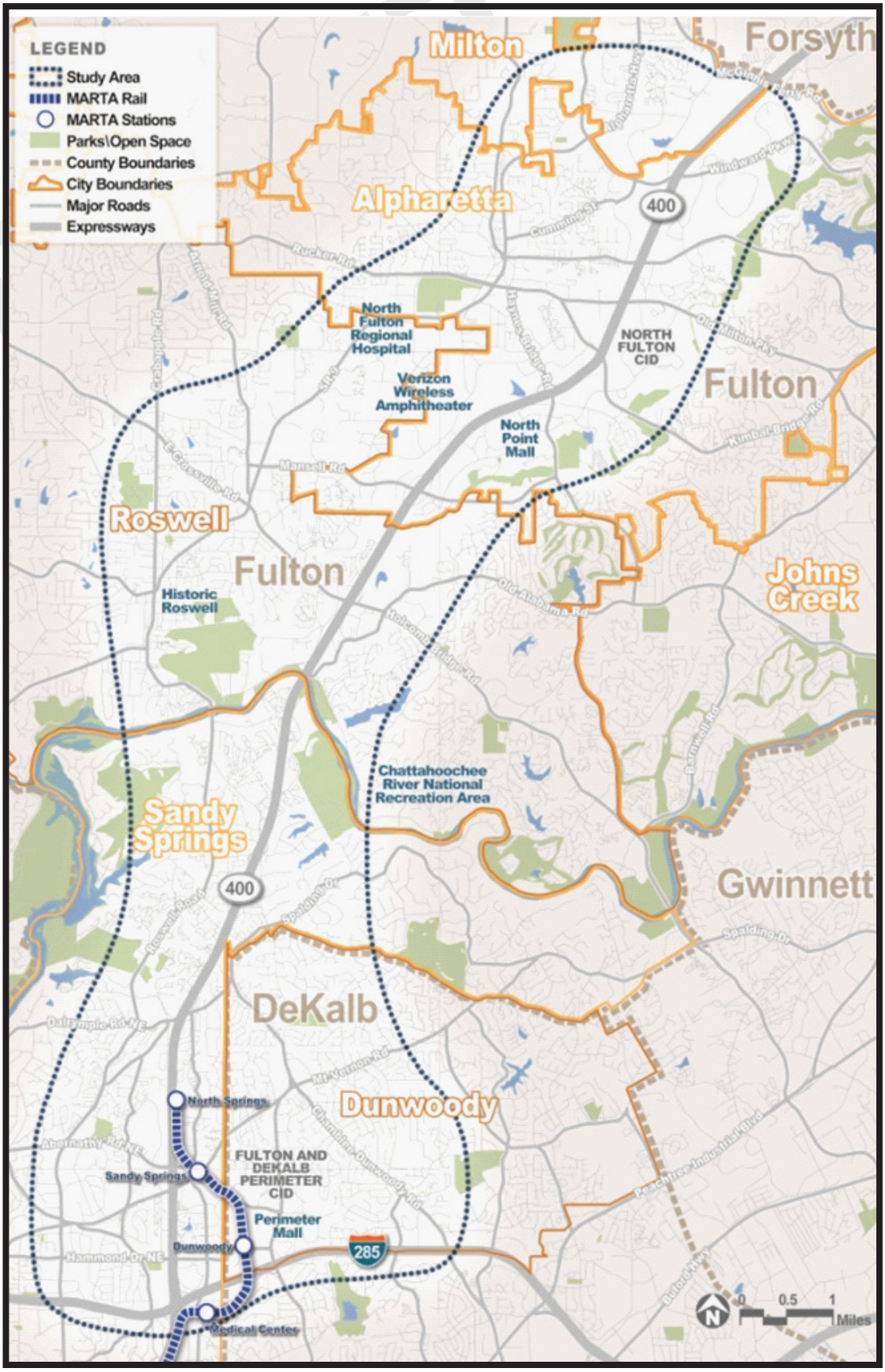
The entire study area lies within Fulton and DeKalb Counties and includes all or portions of the cities of Sandy Springs, Dunwoody, Roswell, Alpharetta, and Milton. Travel patterns in jurisdictions adjacent to the study area including the cities of Atlanta, Johns Creek, and Mountain Park, as well as Gwinnett, Forsyth and Cobb Counties will also be assessed. Major arterials with high volumes of traffic within the study area include portions of Interstate 285, GA 400, SR 9 or Roswell Road, Hammond Drive, Abernathy Road, Northridge Road, Holcomb Bridge Road, Mansell Road, Haynes Bridge Road, Old Milton Parkway, and Windward Parkway.

1.2 Purpose and Need

The purpose of the project is to provide reliable, convenient, efficient, and sustainable transit service in the GA 400 corridor study area by:

- Providing **high capacity transit** (bus and/or rail) through the GA 400 corridor study area,
- **Improving transit linkages** and coverage to communities within the study area, and
- **Enhancing mobility and accessibility** to and within the study area by providing a more robust transit network that offers an alternative to automobile travel.

Figure 1.1 1: GA 400 Corridor Study Areas



Through the assessment of travel conditions and public engagement in the corridor, the following themes emerged that reinforce the need for transportation improvements.

Travel demand -Increased travel demand and traffic congestion are expected to result from the growth in population, employment, and households. Specifically, increases in the elderly population, and an increased percentage of minority, low-income, and zero-car households will likely have a significant impact on the travel patterns.

Transit mobility - There is inadequate transit connectivity between northern Fulton, DeKalb, Gwinnett, and Cobb Counties. In particular, there is a lack of transit availability for east-west travel across GA 400 and north-south travel across the Chattahoochee River.

Transit travel times - Transit travel times are not competitive with auto travel times for trips within the study area or for trips with origins and destinations outside the study area.

Economic development - Traffic congestion caused by insufficient transportation system capacity affects both personal travel and the movement of goods, which constrains economic development opportunities.

Air quality - The continued growth of vehicular travel will negatively affect air quality in the study area and the region.

1.3 Project Goals and Objectives

The purpose and need outlined above provide the framework within which the goals and objectives were developed. The goals and objectives of the GA 400 Corridor AA are presented in Table 1.3-1.

1.4 Evaluation Criteria and Performance Measures

Evaluation criteria and performance measures were used to evaluate how well the proposed alternatives would meet the project purpose and need, and associated goals and objectives. The measures are both quantitative and qualitative to allow for a comparison of the order of magnitude of the benefits and detriments of the proposed alternatives. In certain cases, one performance measure correlates to multiple project objectives, and some objectives have been defined by more than one performance measure. It is important to note that care has been taken to include measures which would be effective in demonstrating the relative differences between alternatives. Table 1.4-1 shows the evaluation criteria and associated performance measures organized by the project goals and objectives they are intended to address.

1.5 Alternatives Identification Process

The following three levels of evaluation were used to define and screen alternatives to identify a Locally Preferred Alternative (LPA) for the GA 400 corridor:

Fatal Flaw Analysis – to identify Build Alternatives to advance into Screen 1

Screen 1 – to identify Build Alternatives to advance into Screen 2

Screen 2– to identify the LPA[1]

As presented in Figure 1.5-1, the three-step evaluation process is characterized by the application of an increasingly detailed and comprehensive set of performance measures to a decreasing number of alternatives. As the process progressed, more quantitative measures and fewer qualitative measures were applied.

1.5.1 Fatal Flaw Analysis

A screening process was developed for the Fatal Flaw Analysis to assist project participants and decision-makers in identifying and refining alternatives that would address the overall purpose, goals and objectives established for the project. The Fatal Flaw Analysis included a three-step process that identified potential transit technologies and geographic alternatives. Each step is outlined below:

Step 1: This step included a pre-screening of an array transit technologies, including standard bus, bus rapid transit (BRT), light rail transit/streetcar (LRT/SC), heavy rail transit (HRT), diesel multiple unit (DMU), and automated guideway transit (AGT) – which includes Maglev and monorail systems. Of these, BRT, LRT/SC, and HRT were identified as appropriate modes for the GA 400 Corridor based on factors such as system capacity, costs, constructability, and operability, as it relates to compatibility with existing infrastructure.

Step 2: BRT, LRT/SC, and HRT were paired with nine potential alignments. The potential alignments were identified based on travel patterns, connectivity to destinations, and stakeholder input. They generally follow the roadway in the GA 400 and SR 9 corridors. Twenty-two alternatives were subject to the Fatal Flaw Analysis with the HRT only considered for alignments along GA 400. Furthermore, eight east-west routes that would support and complement high capacity service on GA 400 and SR 9 were identified as part of a comprehensive approach to developing transit solutions in the study area. The east-west routes will be further refined in the later phases of project development.

1During the Screen 2 process, this goal was modified. The highest performing alternative will be determined in Screen 2, but in order to enter into NEPA Early Scoping per Map-21, an LPA will not be identified.

Table 1.3 1: Goals and Objectives

Goal 1: Improve Mobility and Access:	
Challenge	Objectives
• Levels of roadway congestion are forecast to increase along the corridor. • Transit mobility options are limited. • Transit travel times are not competitive with auto travel times in the corridor. • Travel demands are increasing	• Improve transit access and connectivity to employment, education, residential, and activity centers within the study area and the region
	• Increase transit ridership and capacity
	• Improve transit travel times and reliability for all trip purposes
	• Improve multimodal connections and access to the existing transit systems
Goal 2: Support Land Use and Economic Development Planning:	
Challenge	Objectives
• Economic development is constrained.	• Ensure consistency with land use plans of study area jurisdictions
	• Support planned and potential economic development
	• Provide opportunities for compact land development that supports transit ridership
Goal 3: Provide Cost-Effective Transit Service:	
Challenge	Objectives
• A funding shortfall slows the construction of transportation improvements.	• Maximize operating and cost-efficiency
	• Support planned and potential economic development
	• Provide a cost-effective transit system
Goal 4: Minimize Environmental Impacts:	
Challenge	Objectives
• Continued growth of vehicular traffic will negatively affect the study area's environment.	• Avoid, minimize, and mitigate impacts to cultural, historic, and environmentally sensitive areas
	• Avoid, minimize, and mitigate negative impacts on the surrounding community including park

Table 1.4 1: Project Goals and Objectives, Evaluation Criteria, and Performance Measures

Transportation Challenges	Evaluation Framework				
	Goals and Objectives	Evaluation Criteria	Performance Measures	Screen1	Screen 2
Goal 1: Improve Mobility and Access					
Levels od roadway congestion are forecasted to increase along the corridor. Transit Mobility options are limited. Transit travel times are not competitive with auto travel times in the corridor.. Travel Demands are increasing.	Increase north-south and east-west transportation capacity	Mobility	Total daily project transit boardings		X
			New transit riders		X
			Number of transfers per linked trip		X
	Increase trasit ridership		Total passengers miles		X
			Potential impacts tp roadway capacity	X	X
			Annual corridor crash reductions		X
	Improve transit travel times and reliability for all trip pruposes	Travel Times	Transit travel time savings		X
			Differences in transit and auto travel times between various origins and destinations in the study area		X
	Improve transit access and connectivity to employment, education, residential, and activity centers within the study area and the region	Accessibility and Connectivity	Projected population, household, and employment within a 10 minute walk and deive of stations	X	X
			Major trip generators/activity centers within a 10 minute walk and drive of stations	X	X
			Low-income, minority, elderly and zero-car populations/households within a 10 minute walk of stations	X	X
	Improve multimodal connections and access the existing transit systems		Interface with existing transit and future Concept 3 rapid transit service	X	X
			Maximize walking and bicycling accessibilty to stations		X
Goal 2: Support Land Use and Economic Development Planning					
Economic development is constrained by lack of transportation options. Existing land use and development is automobile- oriented and not conducive to alternative modes of travel.	Ensure consitency with land use plans of study area jurisdictions	Land Use and Development	Consistency with adopted local and regional plans	X	X
	Support planned and potential economic development		Acres of potentially impacted wetlands and waterbodies within 500 feet of alignments and 1/2 mile of stations		X
	Provide opportunities for compact land development that supports transit ridership	Potential for TOD	Projected population and employment densitieswithin 1/2 mile of stations	X	X
			Acres of transit-supportive future land uses and zoning with 1/2 mile of stations		X
			Acres of vacant or underutilized land within 1/2 mile of stations		X

Table 1.4 1: Project Goals and Objectives, Evaluation Criteria, and Performance Measures (Continued)

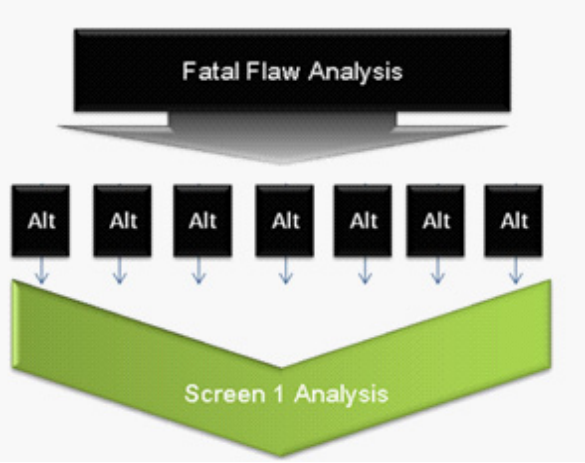
Transportation Challenges	Evaluation Framework				
	Goals and Objectives	Evaluation Criteria	Performance Measures	Screen1	Screen 2
Goal 3: Provide Cost-Effective Transit Service					
There is a funding shortfall to construct transportation improvements	Maximize operating and cost-efficiency	Costs	Annual Operations and Maintenance (O&M) Costs	X	X
	Match the transportation investment to the study area's level of travel demand		Construction Capital Costs	X	X
			Right of Way Cpsts		X
	Provide a cost-effective transit system	Cost Effectiveness	Cost Effectiveness Index (incremental costs divided by transportation system user benefit)		X
			Incremental cost per new rider		X
Goal 4: Minimize Environmental Imoacts					
Continued growth of vehicular travel will negatively affect the study area's environment	Avoid, minimize, and mitigate impact to cultural, historic, and environmentally sensitive areas	Environmental Quality	Acres of potentially impacted wetlands and waterbodies within 500 feet of alignments and 1/2 mile of stations	X	X
			Number of potentially impacted historic resources within 500 feet of alignments and 1/2 mile of stations	X	X
			Acres of noise sensitive land uses within 700 (HRT), 350 (LRT), or 200 (BRT) feet of alignments		X
			Number of contaminated and hazardous material sites within 1/4 mile of alignments		X
		Air Quality	Change in Vehicle Miles Traveled (VMT)		X
			Change in daily emissions of air quality pollutants (CO, NOx, PM2.5, PM10)		X
	Avoid, minimize, and mitigate negative impacts on the surrounding community including parks	Community Impact	Low-income, minority, elderly and zero-car populations/households within 500 feet of alignments		X
			Estimated community impacts/disruptions and number of displacements	X	X

Step 3: The initial alternatives developed in step 2 were evaluated using existing information, field reconnaissance, and aerial photography. The alternatives were subject to the following evaluation criteria: accessibility and connectivity, land use and development, costs, and community impact. The analysis was intended to reduce the Universe of Alternatives to a manageable number of Build Alternatives to be evaluated in the Screen 1 phase of the project.

Major findings from the Fatal Flaw Analysis:

- All modes would be appropriate for fixed guideway transit along the GA 400 corridor and should be further analyzed in Screen 1;
- The BRT option would be more appropriate for State Route 9 and other major arterials;
- All rail options on State Route 9 should be eliminated due to significant engineering constraints, major right-of-way impacts, disruptions to established communities, and other constructability issues.

Based on the results of the Fatal Flaw Analysis and recommendations from the TAC, six alternatives were advanced for further evaluation in the Screen 1 phase: GA 400-1, GA 400-3, GA 400-6, and SR 9-2



1.5.2 Screen 1 Evaluation

The alternatives advanced from the Fatal Flaw Analysis were evaluated in greater detail using information such as typical cross-sections, general station locations, and order of magnitude cost estimates. The alternatives were compared to each other in a single-step process of evaluating, scoring, and ranking the alternatives using a set of quantitative and qualitative performance measures (shown in Table 1.4-1) and the following evaluation criteria:

Mobility

Travel times

Accessibility and connectivity

Land use and development

Potential for transit-oriented development (TOD)

Cost

Environmental quality

Community impact

The results of the Screen 1 evaluation are described in Chapter 3.

1.5.3 Screen 2 Evaluation

Similar to the approach employed in Screen 1, a single-step process was used to evaluate, score, and rank the alternatives that were advanced for further analysis. The alternatives were compared to each other using a greater number of performance measures (shown in Table 1.4-1) and the following evaluation criteria:

Mobility

Travel times

Accessibility and connectivity

Land use and development

Potential for TOD

Cost

Cost-effectiveness

Environmental quality

Air quality

Community impact

The results of the Screen 2 evaluation are described in Chapter 4.

1.6 Technology Options for Build Alternatives

The following potential modes, which were evaluated in Screen 1 and 2, were identified for the Build Alternatives:

Figure 1.5-1: Three-Step Evaluation Process

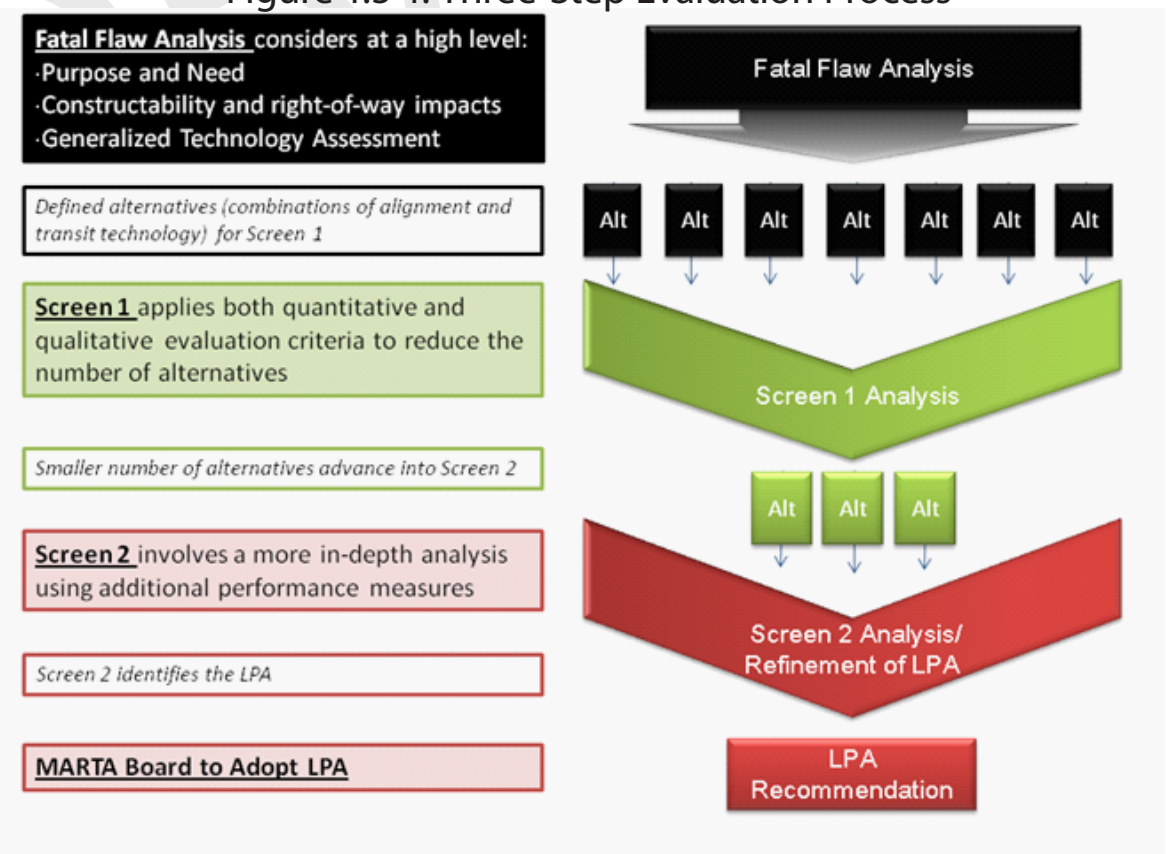


Table 1.6-1: Description of Transit Technologies Considered in Screens 1 and 2

	Description	Operating Area/ROW	Vehicle Size	Capacity
Bus Rapid Transit (BRT)	BRT is a form of rapid transit that uses a system of rubber-tired vehicles operating either on dedicated rights-of-way or in mixed traffic on ordinary streets.	Vehicles operate on roadways and do not require tracks or other guideway technology. Typically operate in 11-12' travel lanes.	Varies, but typical range between 40' to 60' long and 10' to 15' high.	Vehicle capacities range from approximately 60 to 120 passengers per vehicle, based on a combination of seated and standing passengers.
Light Rail Transit (LRT)	Streetcars (SC) and Light Rail consist of rail vehicles running on in-street track at-grade in either their own reserved right-of-way or mixed with automobile traffic. LRT/SC technology encompasses a range of vehicles with varying characteristics, from small "heritage" trolleys and modern streetcars to multiple-car street-running trains.	Vehicles run on standard-gauge track and typically receive power from an overhead electric wire. Typical systems require 12' to 14' right-of-way per track, but some systems with mixed traffic operate on lanes as narrow as 11'.	Individual streetcars typically 30' long. Light rail cars up to 100' long, 8' to 10' wide, and 8' to 12' feet high (not including connections to overhead wires).	Vehicle capacity can be up to 200 passengers (combination of seated passengers and standees), though streetcars are typically smaller. Vehicles can be linked to form multi-car trains.
Heavy Rail Transit (HRT)	HRT vehicles are designed to operate on an exclusive guideway at speeds up to 70 miles per hour. Operating speeds of an HRT system are in the range of 30 to 55 miles per hour.	Vehicles are electrically powered and usually rely on a power source adjacent to the tracks (an electrified "third rail"). They are designed for fare collection prior to boarding and most stations have fare collection barriers to separate paid passengers from those who have not yet paid.	Most HRT vehicles range from 45 to 85 feet long and are not articulated. HRT vehicles have steel wheels and high floors, but have level boarding because their stations have high level platforms	Between 85 and 200 passengers per vehicle (counting both seated and standing), with up to 2,000 or more passengers with a single operator. Some vehicles provide seating only for special needs riders, while others offer seating for the majority of riders.

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2.0 Screen 1 Alternatives

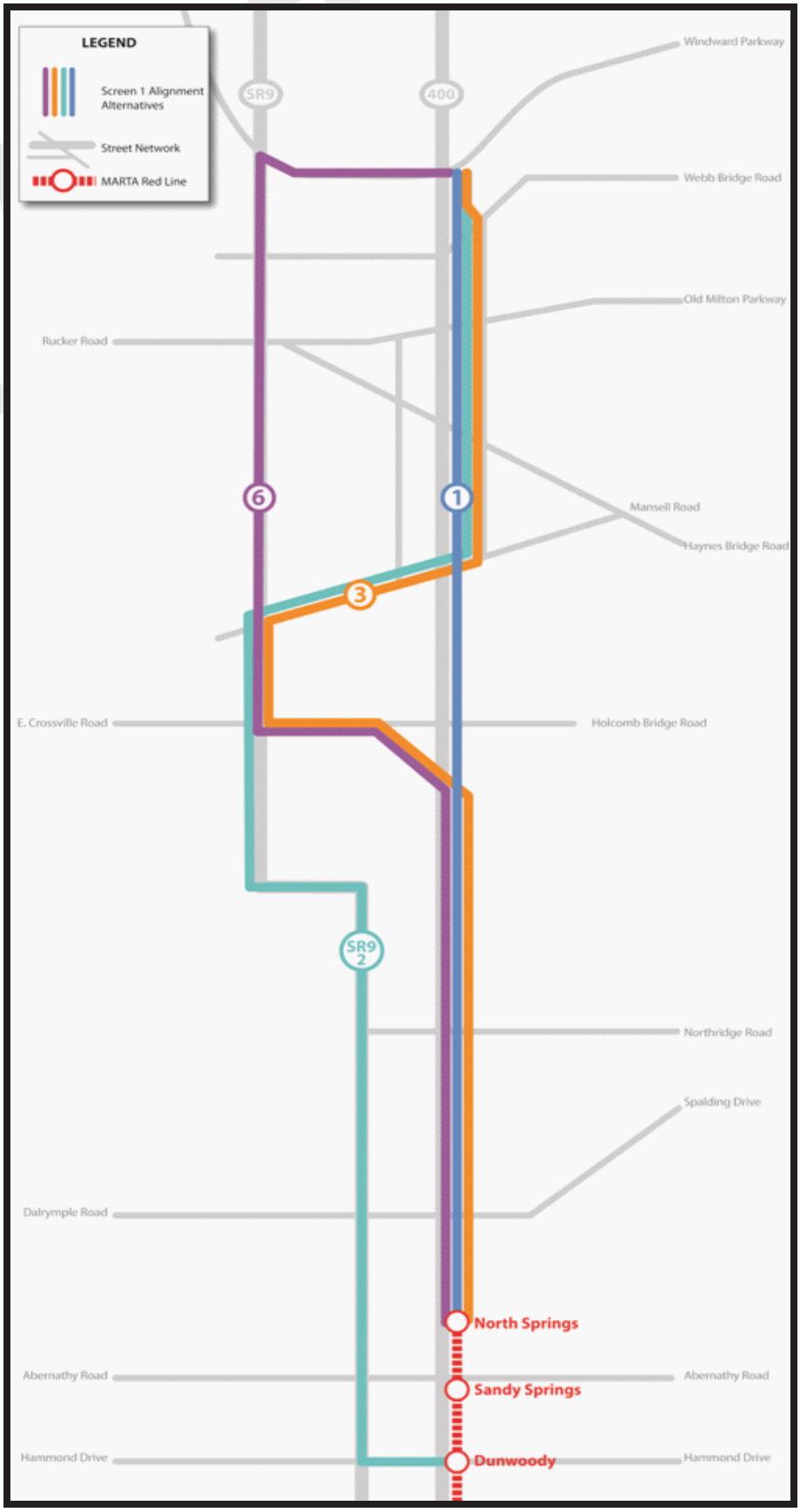
2.1 Screen 1 Alternatives

The Build Alternatives evaluated in Screen1 are listed below in Table 2.1-1. These alternatives were selected to advance to Screen 1 as a result of the Fatal Flaw analysis. A map of Screen 1 alternatives is provided on the following page (Figure 2.1-1).

Table 2.1-1: Alternatives for Screen 1

Corridor	Alignment Name	Alignment Description	Technology
GA 400	GA 400 - 1	North Springs MARTA Station - GA 400 - Windward Parkway with the following design options between Mansell Road and Windward Parkway: • A – GA 400 • B – Mansell Road - North Point Parkway – Haynes Bridge Road - GA 400 • C –Mansell Road - North Point Parkway • D – New transit interchange at Encore Parkway	BRT LRT/SC HRT
	GA 400 - 3	North Springs MARTA Station - GA 400 - Holcomb Bridge Road - SR 9 - Mansell Road - North Point Parkway - Windward Parkway	BRT
	GA 400 - 6	North Springs MARTA Station - GA 400 - Holcomb Bridge Road - SR 9 - Windward Parkway	BRT
SR 9	SR 9 - 2	Dunwoody MARTA Station (potential tie into Revive 285) - Hammond Drive- SR 9 - Mansell Road - North Point Parkway - Windward Parkway	BRT

Figure 2.1-1: Screen 1 Alternatives



2.2 Screen 1 Performance Measures, Evaluation, and Results

Each table in this section provides a summary of the results of each performance measure for Screen 1. The Definition of Alternatives Report Appendix provides details on the methodologies, data sources, and outcomes for each performance measure that inform the rating and scoring results.

In the rating system for Screen 1, alternatives are compared among each other and rated accordingly. Each alternative is rated High, Medium, or Low for each performance measure. The top performing alternative is given a score of High, and the other alternatives are rated relative to the high score, as shown below in Table 2.2-1.

Table 2.2-1: Screen 1 Rating System

Rating	Deviation from Highest Performing
High	0 to 10%
Medium	10 to 20%
Low	Greater Than 20%

Each table below provides a summary of the results of each performance measure for Screen 1. The methodology, data sources and evaluation for each performance measure is provided in the Definition of Alternatives Report Appendix.

2.2.1 GOAL 1: Improve Mobility & Access

The evaluation criteria identified under this category were developed to address travel conditions and limited mobility options within the corridor. Major roadways in the corridor are consistently congested with lengthy delays during peak periods and this is expected to worsen in the next 30 years. The Atlanta Regional Commission's Travel Demand Model (TDM) is used to perform analysis of alternatives in determining their potential benefits in ridership and travel times. The travel demand estimates are based on the future year 2040 Regional Transportation Plan (RTP) transportation system and the adopted Plan 2040 socio-economic forecasts for the Atlanta metropolitan area.

The performance measures under this category are intended to capture the effectiveness of the given alternative in allowing more people to travel in the corridor and in providing travel time savings during congested conditions. Furthermore, these measures were developed under the premise that transit works most effectively when it provides access to jobs and housing. Tables 2.2-2 and 2.2-3 display the results for Mobility and Accessibility & Connectivity, respectively.

The measure for mobility was impact to roadway capacity. The GA 400-1A alternatives scored higher because their alignments are within Georgia 400 right-of-way, whereas the other alternatives have alignment sections along surface roads that would impact roadway capacity by occupying existing travel lanes. The Accessibility and Connectivity measures assessed the per-station population and employment that would be served by each alternative, as well as transit-dependent populations (low-income, minority, senior populations and car-less households). Alternatives SR-9, GA 400-6, and GA 400-3 provided the most potential to provide transit to larger population and employment bases in their service areas because of their station locations. Overall, GA 400-1A (LRT/BRT), GA 400-6, and SR 9-2 alternatives best met Goal 1 – improve mobility and access.

2.2.2 GOAL 2: Support Land Use & Economic Development Planning

Station areas that provide access to high capacity transit have the opportunity to become destinations within the region provided that appropriate zoning and incentives exist to support new developments. As such, the analysis of land use and economic development potential is focused on station areas. This evaluation is a two-step process that involves an analysis at the station area level in which the results are aggregated and assigned to alternatives to determine their performance. A ½ mile radius of transit stations is used as the geographic unit of analysis.

All alternatives were relatively equal in terms of the land uses and zoning in place within ½ mile of the proposed station areas. The GA 400-1A alternatives were more consistent with regional transit plans because of their alignments, and highest potential to promote mixed-use and transit-oriented development (TOD). Therefore, the GA 400-1A alternatives best meet Goal 2. Table 2.2-4 displays the results of the Goal 2 measures.

2.2.3 GOAL 3: Provide Cost-Effective Transit Service

The performance measures under the costs and cost-effectiveness category are intended to ensure project costs are commensurate with measurable benefits and ensure financial feasibility. Table 2.2-5 displays the results.

The GA 400-3, GA 400-6 and SR 9-2 alternatives have the lowest estimated annual operating and maintenance (O&M) costs. GA 400-3 and SR 9-2 also had the lowest estimated per-mile capital construction costs; therefore, these two alternatives best meet Goal 3 in providing cost-effective transit service.

Table 2.2-2: Mobility

Alternative	Rating				
	GA400-1A HRT	GA400-1A LRT/ BRT	GA400-3	GA400-6	SR9-2
Number of Stations	4	6	7	7	11
Potential Impacts to Roadway Capacity	High	High	Low	Low	Low
Total - Mobility	**High**	**High**	**Low**	**Low**	**Low**

Table 2.2-3: Accessibility & Connectivity

Alternative	Rating				
	GA400-1A HRT	GA400-1A LRT/BRT	GA400-3	GA400-6	SR9-2
Number of Stations	4	6	7	7	11
Population within a 10-minute Drive of Stations	High	High	High	High	Med.
Households within a 10- minute Drive of Stations	High	High	High	High	Med.
Employment within a 10-minute Drive of Stations	High	Med.	Med.	Med.	Low
Population within a 10- minute Walk of Stations	Low	Med.	Med.	High	High
Households within a 10-minute Walk	Low	Med.	Med.	Med.	High
Employment within a 10-minute Walk of Stations	Med.	Med.	Med.	Med.	High
Major Trip Generators within a 10-minute Walk	Low	Low	Low	Low	High
Major Trip Generators with a 10-minute Drive	Low	High	High	High	High
Low-Income Population within a 10-minute Walk of Stations	Low	High	Med.	High	Low
Minority Population within a 10-minute Walk of Stations	Low	High	Med.	High	Med.
Senior Population within a 10-minute Walk of Stations	Low	Low	Low	Low	High
Zero-Car Households within a 10-minute Walk of Stations	Low	Low	Low	Low	High
Interface with Existing Transit & Future Concept 3 Transit	High	Med.	High	High	Med.
Total - Accessibility & Connectivity	**Low**	**Med**	**Low**	**High**	**High**
TOTAL GOAL 1 (Mobility + Access & Connectivity)	**Low**	**High**	**Low**	**High**	**High**

Table 2.2-4: Land Use & Development

Alternative	Rating				
	GA400-1A HRT	GA400-1A LRT/BRT	GA400-3	GA400-6	SR9-2
Number of Stations	4	6	7	7	11
Consistency with Adopted Local/Regional Plans	High	High*	Med.	Med.	Med.
Transit-supportive future land use and zoning within ½ mile of stations	**High**	**High**	**High**	**High**	**High**
Total Goal 2	**High**	**High**	**Low**	**Low**	**Low**

Table 2.2-5: Costs

Alternative	Rating				
	GA400-1A HRT	GA400-1A LRT/BRT	GA400-3	GA400-6	SR9-2
Number of Stations	4	6	7	7	11
Annual Operating and Maintenance Costs	Low	Low	High	High	High
Per Mile Construction Costs	**Low**	**Low**	**High**	**Med.**	**High**
Total Goal 3	**Low**	**Low**	**High**	**Low**	**High**

2.2.4 GOAL 4: Minimize Environmental Impacts

Potential transit investments should be implemented in a manner that minimizes effects to the natural and man-made environment. Potential negative impacts can include noise, displacement, physical barriers to traffic circulation and neighborhood severance. Consistent with the goals and objectives, care should be taken to ensure that potential impacts to the environment are avoided, minimized and mitigated. Furthermore, as a federally-designated non-attainment area, maintaining and/or improving air quality is an important issue in the Atlanta region. As such, the potential for transit projects to improve air quality directly relates to reduction of auto emissions.

Many of the environmental data used in this analysis are derived from the ARC GIS database or other widely accepted sources such as the U.S. Census Bureau, Georgia Department of Natural Resources or U.S. Fish and Wildlife Service. Specific data sources are cited in the Appendix under each performance measure. Tables 2.2-6 and 2.2-7 display the results for Environmental Quality and Community Impacts, respectively.

The GA-400 1A alternatives had the least impact to water resources because their alignments remain within the GA 400 right-of-way (some impacts result from station locations). For the same reasons, the GA 400-1A alternatives also had the least potential community impacts and displacements (see table 2.2-7). With HRT, the GA 400-1A alignment has the least impact to historic resources and districts because it has less transit stations, while the addition of two more stations in the LRT/BRT scenarios results in more impacts to historic resources. Overall, GA 400-1A HRT best minimizes environmental impacts (Goal 4).

Results

Table 2.2.-8 above shows the composite ratings of GA 400 Corridor transit alternatives for each of the four project goals and the overall cumulative score from the Screen 1 analysis.. Alternatives GA400-1A LRT/BRT and GA400-1A HRT were the two highest rated alternatives in the Screen 1 analysis, followed by GA400-6, SR9-2, and GA400-3, respectively. The Appendix provides detailed scoring results for each goal and measure.

- Alternatives SR9-2, GA400-1A LRT/BRT and GA400-3 best met Goal 1(improve mobility and access) because of the higher per-station population and employment projected to be served by those alternatives, including higher transit-dependent populations.
- Alternatives GA 400-1A LRT/BRT and GA 400-1A HRT best met Goal 2 (land use/development) because they were the most consistent with local and regional plans.
- SR9-2 and GA400-3 best met Goal 3 (providing cost-effective service) because they had the lowest annual operating and maintenance costs, and lowest capital construction costs (per mile).
- The GA 400-1A alternatives (HRT and LRT/BRT) showed the least impact to natural resources, and the least potential community disruptions and displacements. GA 400-1A best met Goal 4 (minimize environmental impacts) because it would also have the least impact to historic resources and historic districts.

Advancement to Screen 2

GA 400-6 and SR9-2 were eliminated because of engineering constraints and high potential to impact surrounding communities due to the length of the alignments along State Route 9. GA 400-3 was eliminated because of the additional travel time added by detouring from Georgia 400 to run along Holcomb Bridge Road and Mansell Road, as well as the potential traffic and community impacts along those roads. Additionally, public input indicated alternatives GA 400-3, GA400-6 and SR9-2 as the least appropriate alternatives for transit in the GA 400, while indicating a preference for GA 400-1A with heavy rail transit.

Based on Screen 1 analysis and public input, GA 400-1A with all three transit mode types (HRT/LRT/BRT) were advanced to Screen 2 for further analysis.

Table 2.2-6: Environmental Quality

Alternative	Rating				
	GA400-1A HRT	GA400-1A LRT/BRT	GA400-3	GA400-6	SR9-2
Number of Stations	4	6	7	7	11
Potentially Impacted Wetlands (acreage)	Low	Low	Low	High	Low
Potentially Impacted Open Water (acreage)	**High**	**High**	**Low**	**Low**	**Low**
Potentially Impacted Rivers/Streams (length)	**High**	**Low**	**Low**	**Med.**	**Low**
Historic Resources (count)	**High**	**Low**	**Low**	**Low**	**Low**
Historic Districts (acreage)	**High**	**High**	**Low**	**Low**	**Low**
Total – Environmental Quality	**High**	**Low**	**Low**	**Low**	**Low**

Table 2.2-7: Community Impact

Alternative	Rating				
	GA400-1A HRT	GA400-1A LRT/BRT	GA400-3	GA400-6	SR9-2
Number of Stations	4	6	7	7	11
Community Impacts	High	High	Med.	Low	Low
Potential Displacements	**High**	**High**	**Med.**	**Low**	**Low**
Total – Community Impact	**High**	**High**	**Low**	**Low**	**Low**
TOTAL GOAL 4 (Environmental Quality + Community Impact)	**High**	**Low**	**Low**	**Low**	**Low**

Table 2.2-8: Total Scores

Alternative	Rating				
	GA400-1A HRT	GA400-1A LRT/BRT	GA400-3	GA400-6	SR9-2
Number of Stations	4	6	7	7	11
Total Goal 1 (Improve Mobility & Access)	Low	High	Low	High	High
Total Goal 2 (Support Land Use & Econ. Develop.)	**High**	**High**	**Low**	**Low**	**Low**
Total Goal 3 (Provide Cost-Effective Service)	**Low**	**Low**	**High**	**Low**	**High**
Total Goal 4 (Minimize Environmental Impacts)	**High**	**Low**	**Low**	**Low**	**Low**
Cumulative Total	**High**	**High**	**Low**	**Med.**	**Med.**

3.0 Screen 2 Alternatives

3.1 Screen 2 Alternatives

GA 400-1 (HRT)

The GA 400-1 alternative uses Heavy Rail Transit technology. Five proposed stations are included in the analysis: Northridge Drive, Holcomb Bridge Road, Mansell Road, North Point Mall, and Windward Parkway.

GA 400-1A (LRT, BRT)

GA 400-1A has the same alignment as GA-400-1, but uses Bus Rapid Transit (BRT) or Light Rail Transit (LRT) technology. A total of six stations are included in the analysis – the five evaluated under GA-400-1, plus a proposed station at Old Milton Parkway. Old Milton was not included for HRT as the alternative is designed to provide a faster commuter option. All six stations are evaluated for this alternative regardless of transit type (BRT or LRT).

Table 3.1-1: Screen 2 Alternatives

Alternative	Transit Type	Number of Stations	Proposed Stations
GA 400-1	Heavy Rail (HRT)	5	Northridge, Holcomb Bridge, Mansell, North Point, Windward
GA 400-1A	**Light Rail (LRT), or Bus Rapid Transit (BRT)**	**6**	**Northridge, Holcomb Bridge, Mansell, North Point, Old Milton, Windward**

A map of Screen 2 alternatives is provided on the following page (Figure 3.1-1).

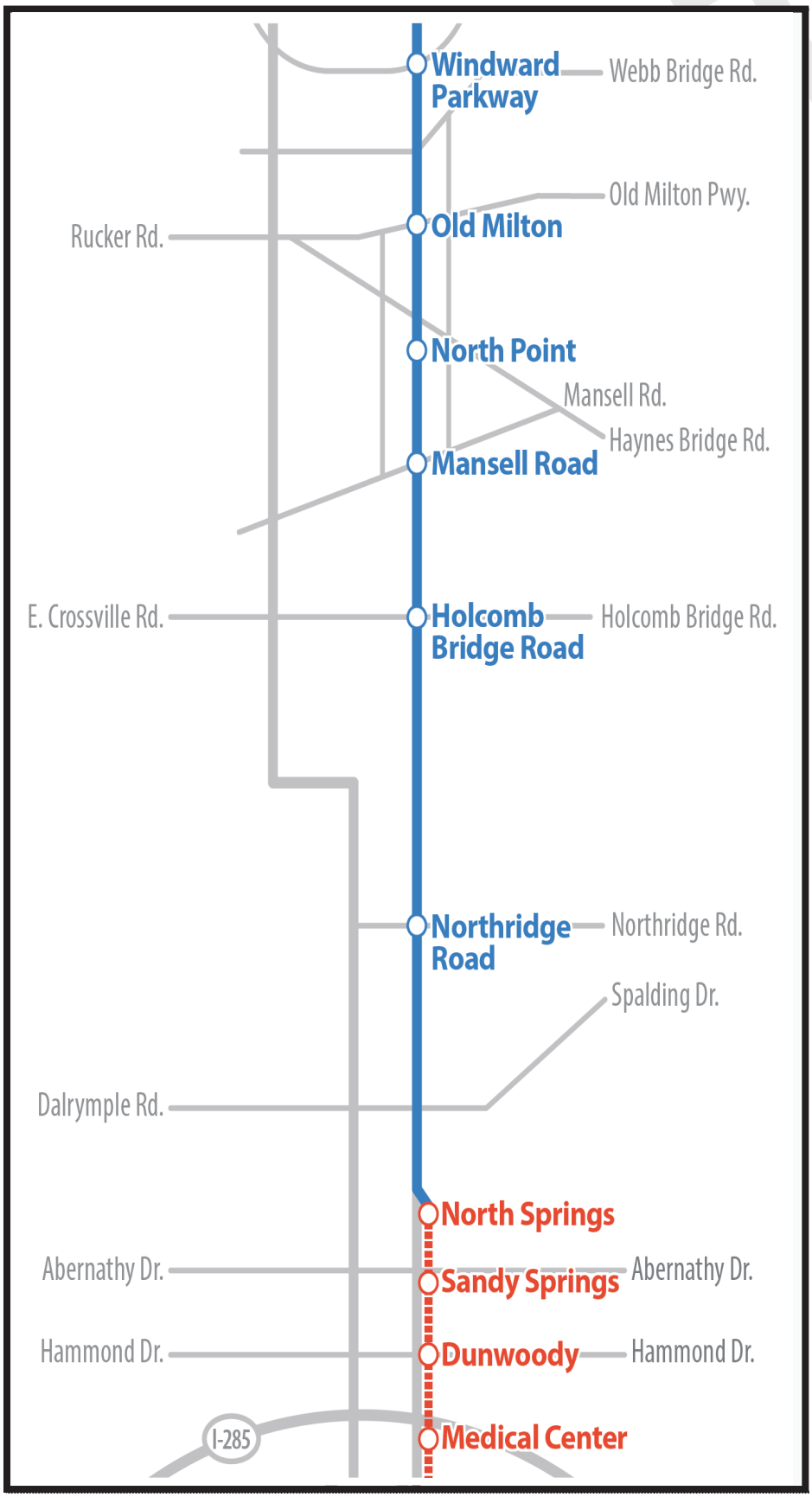


Figure 3.1-1: Screen 2 Alternatives

3.2 Screen 2 Performance Measures, Evaluation, and Results

Screen 2 Evaluation

Screen 2 includes all performance measures from Screen 1, along with additional measures. Screen 1 performance measures were re-evaluated and re-rated in the Screen 2 analysis to capture differences due to further refinements of the alignments, as well as the addition of Northridge station and removal of Pitts Road station. The Definition of Alternatives Report Appendix provides details on the methodologies, data sources, and outcomes for each performance measure that inform the rating and scoring results.

The rating system for Screen 2 is consistent with Screen 1- alternatives are rated High, Medium, or Low for each performance measure. As only three alternatives are evaluated, the top performing alternative is given the highest rating, and the other alternatives are rated relative to the high score as shown below.

Table 3.2-1 Screen 2 Rating System

Rating	Deviation from Highest Performing	Scoring
High	0 to 10%	2
Medium	10 to 20%	1
Low	Greater Than 20%	0

Distinguishing Performance Measures

As the alignment for all three alternatives is identical, there is little or no difference in performance between the alternatives for many of the measures. Particular emphasis is placed on the measures which show a significant difference between the alternatives. These differences are the result of the presence or absence of Old Milton station, or differences in cost or ridership ratings between the three potential transit technologies (BRT, LRT, HRT). Each section below first reports the distinguishing measures for each goal, then the performance measures for each goal.

3.2.1 GOAL 1: Improve Mobility & Access

The evaluation criteria identified under this category were developed to address travel conditions and limited mobility options within the corridor. The performance measures under this category are intended to capture effectiveness of the given alternative in allowing more people to travel in the corridor and in providing travel time savings during congested conditions. Furthermore, these measures were developed under the premise that transit works most effectively when it provides access to jobs and housing.

Distinguishing Factors. Table 3.2-2 below shows the ratings for Goal 1 performance measures where there was a significant enough difference between alternatives to rate differently. The GA400-1 HRT alternative is the highest performing alternative for the Goal 1 distinguishing measures, with the highest score in all Goal 1 measures. Heavy rail transit provides the greatest ridership in terms of boardings, new transit riders, and reduction in annual vehicular crash reductions.

The stations in the HRT alternative on average would serve a greater population and employment within a 10-minute drive, as well as serve a greater concentration of low-income residents within walking distance of transit stations. HRT also provided the best interface with existing transit because it would not require a mode transfer to connect with the existing MARTA rail system.

Table 3.2-2: Goal 1 Distinguishing Measures

Subsection	Measure	Rating (Score)		
		GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Mobility	Daily Projected Transit Boardings	High	Low	Low
	Transit Route Boardings	High	Med.	Med.
	New Transit Riders	High	Low	Low
	Annual Corridor Crash Reductions	High	Low	Low
Travel Times	Transit Travel Time Savings	High	Low	Low
	Travel Time Savings vs. Auto Travel (Origins/Destinations)	High	Low	Low
	Travel Time Savings vs. No-Build Transit (Origins/Destinations)	High	Low	Low
Accessibility & Connectivity	Projected Population/Households Within 10-minute Drive	High	Med.	Med.
	Projected Employment Within 10-minute Drive	High	Med.	Med.
	Population Below Poverty Level Within 10-minute Walk of Stations	High	Med.	Med.
	Interface with Existing Transit & Future Concept 3 Rapid Transit Services	High	Med.	Med.
	Total Distinguishing Measures, Goal 1	High	Low	Low

All measures: The following three tables provide all performance measures for Goal 1 (includes both distinguishing and non-distinguishing). Goal 1 is divided into three sub-categories: mobility measures (3.2-3), travel time measures (Table 3.2-4), and accessibility & connectivity measures (3.2-5). The definitions, methodology, data sources, and figures for all performance measures are reported in the Definition of Alternatives Appendix

Table 3.2-3: Mobility

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Daily Projected Transit Boardings	High	Low	Low
Transit Route Boardings	High	Med.	Med.
New Transit Riders	High	Low	Low
Transfers Per Linked Trip	High	High	High
Potential Impacts to Roadway Capacity	High	High	High
Annual Corridor Crash Reductions	High	Low	Low
Total – Mobility	**High**	**Low**	**Low**

Table 3.2-4: Travel Times

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Transit Travel Time Savings	High	Low	Low
Travel Time Savings vs. Auto Travel (Origins/Destinations)	High	Low	Low
Travel Time Savings vs. No-Build Transit (Origins/Destinations)	High	Low	Low
Total – Travel Times	**High**	**Low**	**Low**

Table 3.2-5: Accessibility & Connectivity

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Projected Population/Households Within 10-minute Walk	High	High	High
Projected Population/Households Within 10-minute Drive	High	Med.	Med.
Projected Employment Within 10-minute Walk	High	High	High
Projected Employment Within 10-minute Drive	High	Med.	Med.
Major Trip Generators Within 10-minute Walk	High	High	High
Major Trip Generators Within 10-minute Drive	High	High	High
Minority Population Within 10-minute Walk	High	High	High
Senior Population Within a 10-minute Walk	High	High	High
Population Below Poverty Level Within 10-minute Walk of Stations	High	Med.	Med.
Zero-Car Households Within a 10-minute Walk of Stations	High	High	High
Interface with Existing Transit & Future Concept 3 Rapid Transit Services	High	Med.	Med.
Maximization of Walking Accessibility	High	High	High
Maximization of Bicycling Accessibility	High	High	High
Total – Accessibility & Connectivity	**High**	**Med.**	**Med.**
TOTAL GOAL 1 (Mobility + Travel Times + Accessibility & Connectivity)	High	Low	Low

3.2.2 GOAL 2: Support Land Use & Economic Development Planning

The analysis of land use and economic development potential is focused on station areas. This evaluation is a two-step process that involves an analysis, first at the station area level, then the results are aggregated and assigned to alternatives to determine their performance. A ½ mile radius of transit stations is used as the geographic unit of analysis. The following sections will more clearly describe the process.

Distinguishing Factors. Table 3.2-6 shows the ratings for Goal 2 performance measures where there was a significant enough difference between alternatives to rate differently. The GA400-1A LRT alternative scored slightly higher overall in supporting local land use plans and potential for transit oriented development than the HRT and BRT alternatives. Light rail and heavy rail transit were more consistent with local and regional plans than bus rapid transit. The HRT alternative scored 'Medium' for TOD potential, while BRT and LRT scored 'High'. This was due to the high amount of vacant/ underutilized land and existing mixed-use zoning in the Old Milton Station area (Old Milton station is not included in the HRT alternative). Because LRT scored High in both categories while HRT and BRT each had a score of Medium, LRT had the highest overall score for Goal 2.

3.2.3 GOAL 3: Provide Cost-Effective Transit Service

The performance measures under the costs and cost-effectiveness category are intended to ensure project costs are commensurate with measurable benefits and ensure financial feasibility.

Distinguishing Factors. Table 3.2-9 shows the ratings for Goal 3 performance measures where there was a significant enough difference between alternatives to rate differently. The GA400-1A BRT alternative is the highest performing alternative for the Goal 3 cost performance measures.

The higher performance of the BRT alternative in the cost and cost-effectiveness measures is due to the much lower capital costs and annual operating and maintenance costs of bus rapid transit infrastructure compared to light or heavy rail systems. BRT scored High in all Goal 3 measures- Annual operating and maintenance costs, construction capital costs, cost-effectiveness, and incremental cost per rider [1] while HRT and LRT scored Low for all distinguishing measures.

3.2.4 GOAL 4: Minimize Environmental Impacts

Potential transit investments should be implemented in a manner that minimizes effects to natural and man-made environments. Potential negative impacts can include noise, displacement, physical barriers to traffic circulation and impacts to neighborhood boundaries. Consistent with the goals and objectives, care should be taken to ensure that potential impacts to the environment are avoided, minimized and mitigated. Furthermore, as a federally-designated non-attainment area, maintaining and/or improving air quality is an important issue in the Atlanta region. As such, the potential for transit projects to improve air quality directly relates to reduction of auto emissions.

Many of the environmental data used in this analysis are derived from the ARC GIS database or other widely accepted sources such as the U.S. Census Bureau, Georgia Department of Natural Resources or U.S. Fish and Wildlife Service. Specific data sources are cited under each performance measure. The methodologies, sources and evaluation results for each Goal 4 performance measure are explained in the applicable sections in the Appendix.

Distinguishing Factors. Table 3.2-12 shows the ratings for Goal 4 performance measures where there was a significant enough difference between alternatives to rate differently. The GA400-1 HRT alternative is the highest performing alternative for the Goal 1 performance ratings, with a high rating in seven of ten distinguishing measures.

The heavy rail alternative provides a less impact to water resources and historic resources than the other alternatives; and it has the least Category 3 vibration-sensitive locations (includes schools, churches and other institutional uses[2]) within ¼ mile of its proposed stations (because Old Milton station is not included). HRT is also projected to result in the greatest reduction in vehicle miles traveled; and therefore, also has the greatest potential reduction of air quality pollutant emissions.

1 Cost-effectiveness Index and Incremental cost per rider provide an annualized costs per trip. Further detail is provided in the Appendix, Section 3.3.

2 Definitions of Categories 1, 2 and 3 are given in the Appendix, Section 3.4.4

Table 3.2-6: Goal 2 Distinguishing Measures

Subsection	Measure	Rating (Score)		
		GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Land Use & Development	Consistency With Adopted Local/Regional Plans	High	High	Med
	Economic Incentives Within ½ Mile of Stations	High	Med	Med
Potential for TOD	Transit-Supportive Land Use & Zoning Within ½ Mile of Stations	Med.	High	High
	Acres of Vacant/Underutilized Land Within ½ Mile of Stations	Med	High	High
	Total Distinguishing Measures, Goal 2	Med.	High	Med.

All measures: The following three tables provide all performance measures for Goal 2 (includes both distinguishing and non-distinguishing). Goal 2 is divided into two sub-categories: land use and development (Table 3.2-7), and potential for transit-oriented development (Table 3.2-8). The methodology, data sources, and figures for all measures are reported in the Definition of Alternatives Appendix.

Table 3.2-7: Land Use & Development

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Consistency With Adopted Local/Regional Plans	High	High	Med.
Economic Incentives Within ½ Mile of Stations	High	Med.	Med.
Total – Land Use & Development	**High**	**Low**	**Low**

Table 3.2-8: Potential for Transit Oriented Development (TOD)

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Population/Households Density Within ½ Mile of Stations	High	High	High
Employment Density Within ½ Mile of Stations	High	High	High
Transit-Supportive Land Use & Zoning Within ½ Mile of Stations	Med.	High	High
Acres of Vacant/Underutilized Land Within ½ Mile of Stations	Med.	High	High
Total – Potential for TOD	Low	High	High
TOTAL GOAL 2 (Land Use/Development + Potential for TOD)	**High**	**High**	**High**

Table 3.2-9: Goal 3 Distinguishing Measures

Subsection	Measure	Rating (Score)		
		GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Costs	Annual Operating & Maintenance Costs	Low	Low	High
	Construction Capital Costs	Low	Low	High
Cost Effectiveness	Cost-Effectiveness Index	Low	Low	High
	Incremental Cost Per Rider	Low	Low	High
	Total Distinguishing Measures, Goal 3	**Low**	**Low**	**High**

All measures: The following two tables (3.2-10 to 3.2-11) provide all performance measures for Goal 3 (includes both distinguishing and non-distinguishing). Goal 3 is divided into two sub-categories: costs (Table 3.2-10), and cost-effectiveness (Table 3.2-11). The definitions, methodology, data sources, and figures for all measures are reported in the Definition of Alternatives Appendix.

Table 3.2-10: Costs

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Annual Operating & Maintenance Costs	Low	Low	High
Construction Capital Costs	Low	Low	High
Right-of-Way Costs	High	High	High
Total - Costs	**Low**	**Low**	**High**

Table 3.2-11: Cost Effectiveness

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Cost-Effectiveness Index	Low	Low	High
Incremental Cost Per Rider	Low	Low	High
Total – Cost Effectiveness	**Low**	**Low**	**High**
TOTAL GOAL 3 (Costs + Cost Effectiveness)	**Low**	**Low**	**High**

Table 3.2-12: Goal 4 Distinguishing Measures

Subsection	Measure	Rating (Score)		
		GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Environmental Quality	Potentially impacted open water	High	Med.	Med.
	Potentially impacted streams/rivers	High	Med.	Med.
	Potentially impacted stream buffers	High	Med.	Med.
	Potentially impacted historic districts	High	Low	Low
	Acres of Noise-Sensitive Land Uses (Residential)	Low	Low	High
	Acres of Noise-Sensitive Land Uses (Commercial)	Low	Low	High
	Acres of Noise-Sensitive Land Uses (Institutional)	Low	Low	High
	Vibration Sensitive locations – Category 3	High	Low	Low
Air Quality	Change in Vehicle Miles Traveled (VMT)	High	Low	Low
	Change in Daily Emissions of Air Quality Pollutants	High	Med.	Low
	Total Distinguishing Measures, Goal 4	High	Low	Low

All measures: The following three tables provide all performance measures for Goal 4 (includes both distinguishing and non-distinguishing). Goal 4 is divided into three sub-categories: environmental quality (Table 3.2-13), air quality (Table 3.2-14), and community impacts (Table 3.2-15). The methodology, data sources, and figures for all measures are reported in the Definition of Alternatives Appendix.

Table 3.2-13: Environmental Quality

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Potentially impacted wetlands	High	High	High
Potentially impacted open water	High	Med.	Med.
Potentially impacted streams/rivers	High	Med.	Med.
Potentially impacted stream buffers	High	Med.	Med.
Potentially impacted historic resources	High	High	High
Potentially impacted historic districts	High	Low	Low
Potentially impacted archaeological sites	High	High	High
Acres of Noise-Sensitive Land Uses (Residential)	Low	Low	High
Acres of Noise-Sensitive Land Uses (Commercial)	Low	Low	High
Acres of Noise-Sensitive Land Uses (Institutional)	Low	Low	High
Vibration Sensitive locations – Category 1	High	High	High
Vibration Sensitive locations – Category 2	High	High	High
Vibration Sensitive locations – Category 3	High	Low	Low
Hazardous material sites	High	High	High
Total – Environmental Quality	**High**	**Med.**	**High**

Table 3.2-14: Air Quality

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Change in Vehicle Miles Traveled (VMT)	High	Low	Low
Change in Daily Emissions of Air Quality Pollutants	High	Med.	Low
Total – Air Quality	**High**	**Low**	**Low**

Table 3.2-15: Community Impact

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Minority Population Within 500 ft. of Proposed Alignment	High	High	High
Senior Population Within 500 ft. of Proposed Alignment	High	High	High
Low Income Population Within 500 ft. of Proposed Alignment	High	High	High
Zero-Car Households Within 500 ft. of Proposed Alignment	High	High	High
Acres of Parks potentially impacted	High	High	High
Parkland Parcels potentially impacted	High	High	High
Neighborhood impacts	High	High	High
Total- Community Impact	**High**	**High**	**High**
TOTAL GOAL 4 (Environmental Quality + Air Quality + Community Impact)	**High**	**Low**	**Med.**

4.0 Recommended Technology and

Alternative GA400-1 with heavy rail transit (HRT) had the highest overall performance score, and was the highest performing alternative for two of the four goals. Table 4.0-1 displays the totals for each alternative.

Table 4.0-1: Total Scores

Measure	Rating (Score)		
	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Total Goal 1 (Improve Mobility & Access)	High	Low	Low
Total Goal 2 (Support Land Use/Econ. Development)	High	High	High
Total Goal 3 (Provide Cost-Effective Transit Service)	Low	Low	High
Total Goal 4 (Minimize Environmental Impacts)	**High**	**Low**	**Med.**
Cumulative Total Score	**High**	**Low**	**Medium**

Goal 1-Improve mobility and access: GA 400-1 HRT rated much higher than the other alternatives in providing new transit boardings and ridership, and providing the most benefit to transit users in travel time savings. GA400-1 HRT also rated slightly higher than LRT or BRT for serving transit-dependent populations within walking distance.

Goal 2 –Support land use and economic development planning: GA 400-1A with LRT performed slightly higher (difference of 1 point) than GA 400-1 and 1A BRT in terms of surrounding land uses, economic development, and consistency with local plans.

Goal 3 -Provide Cost-Effective Transit Service: GA 400-1A with BRT rated substantially higher than GA 400-1 and 1A LRT in costs and cost effectiveness because of the lower capital costs and operating and maintenance costs required for bus rapid transit.

Goal 4 –Minimize Environmental Impacts: GA 400-1 HRT rated highest in meeting this goal by presenting less of a potential impact to environmental and cultural resources, and because it would result in the highest reduction of vehicle miles traveled.

In the distinguishing measures (shown in Table 4.0-2 above), GA400-1 HRT received a 'High' rating in 20 of the 29 measures, whereas the GA 400-1A LRT only rated 'High' in 3 measures, and GA 400-1A BRT only in 9 measures. GA400-1A HRT was rated 'Low' in only 7 of the 29 measures, while GA 400-1A LRT and BRT received 16 and 10 'Low' scores, respectively.

4.1 Recommended Alternative

Overall, GA 400-1 HRT provides the highest ridership numbers, transit benefits and reductions in vehicular traffic of the three alternatives. All three alternatives are relatively equal in supporting local land use and economic development planning. GA 400-1 HRT presents the least environmental impact and most potential to reduce air pollutants.

Based on the Screen 2 results, the recommended alignment and transit for the Georgia 400 corridor is GA 400-1 with Heavy Rail Transit (HRT).

Table 4.0-2: Distinguishing Performance Measures by Alternative

	GA400-1 HRT	GA400-1A LRT	GA400-1A BRT
Number of 'High' ratings	20	3	9
Number of 'Medium' ratings	2	10	10
Number of 'Low' ratings	**7**	**16**	**10**

5.0 Next Steps

After completion of the Screen 2 analysis, the results of the Definition of Alternatives Report will be presented to the public and the Project Steering Committee for comments and feedback. Comments received from these groups will be used to define the evaluation results. The revised results then will serve as the basis for the Early Scoping, which an initial step in the National Environmental Protection Act (NEPA) process, and will help to identify a recommended preferred alternative.