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2. ALTERNATIVES CONSIDERED

2.1 INTRODUCTION

This chapter describes the process by which GDOT identified, refined, and evaluated the proposed Build Alternatives and the No-Action Alternative (hereafter referred to as the No-Build Alternative) for the Project. Chapter 3, “Affected Environment and Consequences,” of this Tier 1 EIS evaluates the potential environmental impacts of each of the alternatives carried forward from this screening process.

This chapter also summarizes the detailed analyses included in the Alternatives Development Report (ADR). **Appendix B** presents the entire ADR. The ADR evaluated the universe of Corridor Alternatives, discussed the criteria used to assess each alternative, and detailed the potential service characteristics (train speed, train frequency, and station stops) for the screened Corridor Alternatives. This chapter summarizes these service characteristics and their associated ridership and revenue forecasts, and operating and maintenance costs. Capital cost estimates are based on high-level conceptual engineering that focuses on the general location of a given Corridor Alternative and the essential passenger rail infrastructure proposed to accommodate the service.

Because this chapter summarizes the ADR’s analysis, certain components discussed in the ADR are not discussed in this chapter, such as number of train sets, track infrastructure improvements, and maintenance facilities. GDOT developed the universe of Corridor Alternatives during scoping for the Project.¹ As referenced in Chapter 1 of this Tier 1 EIS, scoping is a key milestone of this EIS. The purpose of scoping is to provide an opportunity for participating agencies and members of the public to provide the lead agencies with expert advice and input on the Project. After FRA published the Notice of Intent (NOI) to prepare an Environmental Impact Statement for the Atlanta to Charlotte portion of the Southeast High Speed Rail (SEHSR) Corridor in the Federal Register on May 16, 2013, GDOT initiated scoping and prepared a draft-scoping document for public review and comment.² In addition to providing agencies and the public the opportunity to provide feedback, the scoping process allowed time to educate agencies and the public on the Project’s Purpose and Need and provide an overview of key activities to take place during this Tier 1 EIS.

As noted in Chapter 1, this Tier 1 EIS evaluates the potential impacts of implementing a high-speed passenger rail service that connects Atlanta and Charlotte. A candidate Corridor Alternative must address two goals to be a viable option for providing this service:

- ***Goal 1 – Develop a high-speed rail link between Atlanta and Charlotte that addresses intercity passenger transportation needs.***
- ***Goal 2 – Provide a cost-effective and efficient rail corridor.***

These two goals provide a framework for evaluating whether a Corridor Alternative provides a responsive service that meets future travel demand, and whether it is a sound transportation investment.

¹ The scoping process is described in more detail in the Alternatives Development Report (ADR).

² For the Federal Register Notice of Intent refer to: <https://www.fra.dot.gov/eLib/Details/L04634>.

Furthermore, the purpose of the Atlanta to Charlotte Passenger Rail Corridor Investment Plan, or the Project, is to improve intercity travel and mobility between Atlanta and Charlotte by expanding the region's transportation capacity and provide reliable mode choices through improvements in passenger rail services.

This corridor will also be an important component of the planned SEHSR Corridor, which proposes linkages to metropolitan areas along the East Coast in Georgia, South Carolina, North Carolina, Virginia, and Washington, D.C., as well as connections to points north along the Northeast Corridor (New York and Boston). Investment in passenger rail is an essential part of the region's multimodal transportation system and its ability to support population and economic growth throughout the SEHSR Corridor network.

The intention of intercity passenger rail is to provide an alternate transportation service that is competitive with other modes of travel in terms of travel time, convenience and safety. The proposed Atlanta to Charlotte intercity passenger rail service would satisfy the following needs:

- Provide Regional Linkage – Improve overall regional connectivity by providing an intercity passenger rail linkage between Atlanta and Charlotte and other proposed SEHSR locations, as well as enhance multimodal transportation connections;
- Improve Capacity – Supplement Interstate highways and commercial airports to provide increased corridor capacity to support passenger movement;
- Improve Travel Times – Decrease travel times between major urban centers compared to auto and total air travel times;
- Provide a Safe and Reliable Alternative Mode – Provide travelers with an alternate choice to automobile, bus, conventional rail and air travel that is safe, reliable and efficient;
- Enhance Energy Efficiency – Improve energy efficiency by reducing dependence on foreign oil and decreasing greenhouse gas emissions; and
- Promote Economic Development – Increase economic activity and employment opportunities via improved transportation connectivity resulting in a more productive and competitive economy with an expansion of the labor pool market along the corridor.

This Tier 1 EIS considers “Corridor Alternatives”, which GDOT defines as 600 feet wide, or 300 feet measured from centerline in each direction. The Tier 1 EIS generally utilizes a 600-foot wide “environmental screening area” to identify and evaluate impacts to environmental resources; however, the EIS can define environmental screening areas as narrow as 100 feet where constrained by known resources, such as in developed urban areas, or as wide as 1,000 feet, depending on the resource, as detailed in Chapter 3. This corridor will be further defined during a future Tier 2 EIS to a more precise width of 100 to 250 feet, which will represent the specific alignment required to construct the improvements proposed in this Project. **Exhibit 2-1** is an example illustration of the difference between a Corridor Alternative and an alignment.

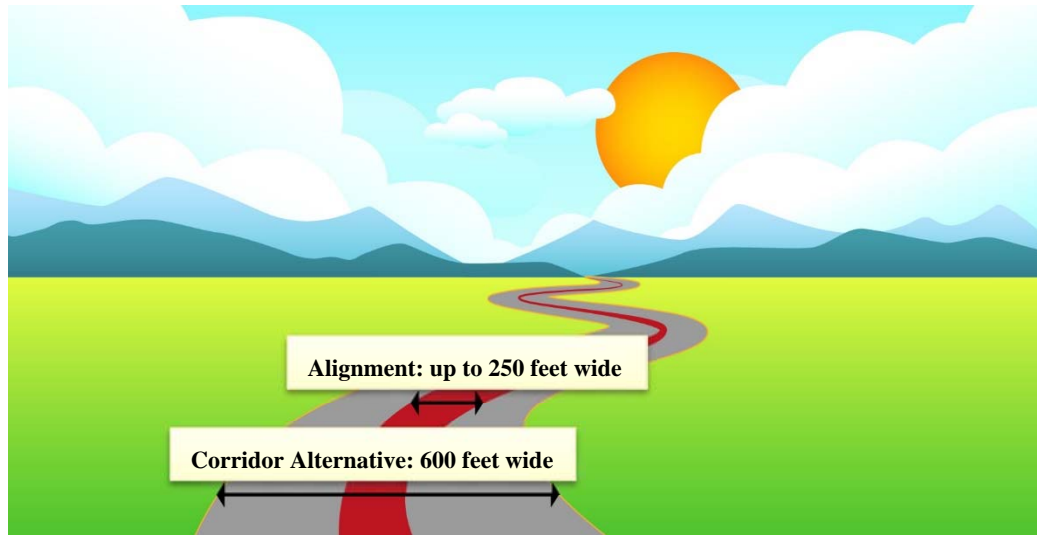
Exhibit 2-1: Corridor Alternative versus Alignment

Image Credit: HNTB

2.2 ALTERNATIVES DEVELOPMENT APPROACH

The screening and evaluation of Corridor Alternatives for the Project followed a three-phase process with increasingly detailed considerations in each phase. The three phases of analysis were:

- **Phase 1 – Screening:** GDOT started with six reasonable Corridor Alternatives identified by a 2008 Volpe Center study.³ GDOT used qualitative and quantitative measures to evaluate how well each Corridor Alternative meets the project goals and Purpose and Need Statement. Phase 1 concluded by advancing three of the six Corridor Alternatives for further analysis.
- **Phase 2 – Alternatives Analysis:** GDOT conducted more detailed operational and performance analysis of the three advancing Corridor Alternatives. Refinements were made to the corridor location and GDOT considered station opportunities where appropriate. Phase 2 also introduces the No-Build scenario, technology and speed considerations specific to each Corridor Alternative, and two options for approaching downtown Atlanta (the Atlanta Approach). This analysis is the focus of Chapter 2 and concludes with a summary of performance metrics comparing the three remaining Corridor Alternatives.
- **Phase 3 – Environmental Analysis:** GDOT evaluated potential environmental impacts of the three refined Corridor Alternatives from Phase 2 using high-level measures appropriate for Tier 1 environmental analysis. Phase 3 is detailed in Chapter 3 of this EIS.

³ The Volpe Center, 2008, “Evaluation of High Speed Rail Options in the Macon-Atlanta-Greenville-Charlotte Rail Corridor”, <http://www.dot.ga.gov/InvestSmart/Rail/Documents/Atl-Char/VolpeCenterFeasibilityStudy2008.pdf>

This three-phased approach summarizes the alternatives development process for the Tier 1 EIS, which will conclude with the selection of one preferred Corridor Alternative. Following the Tier 1 EIS, future Tier 2 studies will make decisions on the specific alignment (including the Atlanta Approach, which likely would be analyzed in a standalone NEPA document), station locations, train technology, additional service characteristics, and will conduct a more detailed environmental analysis of the preferred Corridor Alternative.

2.2.1 Phase 1: Corridor Alternatives Identification and Screening

The following sections describe the steps taken during Phase 1, including route identification, evaluation and screening, and public input.

2.2.1.1 Reasonable Corridor Alternative Identification

In the first phase of the screening process GDOT identified six reasonable Corridor Alternatives connecting Atlanta to Charlotte. In the Atlanta metro area, each of these corridors served the proposed Georgia Multi-Modal Passenger Terminal (MMPT), and terminated at Hartsfield-Jackson Atlanta International Airport (H-JAIA).⁴ In the Charlotte metro area, all six Corridor Alternatives terminated at the planned Charlotte Gateway Station located in the city center, “Uptown,” area of Charlotte. Three of the Corridor Alternatives would also serve the Charlotte-Douglas International Airport (CLT). Initial station areas are identified here in the Phase 1 screening, and then are revisited during the Phase 2 alternatives analysis as the three remaining Corridor Alternatives are further refined. Final station locations and alignment location will be determined during one or more future Tier 2 EIS.

A critical component for each Corridor Alternative is the manner in which it would transition into the Atlanta metropolitan area (hereafter referred to as the Atlanta Approach). During the Phase 1 screening, GDOT evaluated six Corridor Alternatives independent of their Atlanta Approach and instead focused on the extent between Atlanta and Charlotte. Due to the complexity of the developed urban environment and the existing freight railroad network in Atlanta, various approach options are discussed for each of the three Corridor Alternatives in **Section 2.2.2.2**. The selection of a preferred route into and through Atlanta is deferred to a future Tier 2 study.

During Phase 1, GDOT used high-level assumptions for operating speeds based on the types of train technology that could be used for each Corridor Alternative. During Phase 2, GDOT conducted a more detailed analysis based on the technology type, physical characteristics of each Corridor Alternative, and other service characteristics. For the purposes of the Phase 1 screening, GDOT assumed the following:

- Shared-use railroad corridors are evaluated with diesel trains operating at up to 79 mph on shared track and 110 mph on dedicated track;
- Interstate highway corridors are evaluated with diesel-electric technology capable of speeds as high as 125 mph; and

⁴ The proposed Georgia MMPT is one potential station location in downtown Atlanta, other opportunities may be explored during a Tier 2 analysis. The Georgia MMPT project is currently listed in the Atlanta MPO’s Long Range Transportation Plan (LRTP), indicating support from the region, however a local project sponsor with the ability to finance the project has yet to be identified at the time of this report.

- Greenfield corridors could be designed for electric trains capable of traveling up to 220 mph.

Again, these assumptions were revisited and refined during Phase 2 for each of the remaining three Corridor Alternatives, which is discussed in **Section 2.2.2.4**. A decision on train technology is deferred to a future Tier 2 study.

The six Corridor Alternatives, as envisioned during the Phase 1 screening portion of this Tier 1 EIS, are described in the following sections and are mapped in **Exhibit 2-2**.

ALTERNATIVE 1: SOUTHERN CRESCENT

The Southern Crescent Corridor Alternative is a 268-mile route that primarily follows the Norfolk Southern (NS) Piedmont Division right-of-way (ROW), which hosts the existing Amtrak *Crescent* long-distance service between Atlanta and Charlotte. This corridor shares the NS ROW, with freight and passenger trains operating together on shared tracks in certain sections of the corridor and on separate tracks in certain sections.⁵ This route serves three stations in North Carolina at Charlotte Gateway, CLT airport, and Gastonia; four stations in South Carolina in Spartanburg, Greer, Greenville, and Clemson; and six stations in Georgia in Toccoa, Gainesville, Suwanee, Doraville, downtown Atlanta (Georgia MMPT), and H-JAIA.

ALTERNATIVE 2: INTERSTATE 85

The I-85 Corridor Alternative is a 255-mile route located primarily within the interstate highway ROW on a dedicated high-speed passenger rail alignment following I-85 between Gastonia, NC and Suwanee, GA, then following a shared railroad ROW in the approaches to the Charlotte and Atlanta termini.⁶ This route serves three stations in North Carolina at Charlotte Gateway, CLT airport, and Gastonia; three stations in South Carolina in Spartanburg, Greenville, and Anderson; and four stations in Georgia in Suwanee, Doraville, downtown Atlanta (Georgia MMPT), and H-JAIA.

ALTERNATIVE 3: GREENFIELD

The Greenfield Corridor Alternative is a 274-mile route primarily on a new “greenfield” dedicated high-speed passenger rail alignment between CLT airport and Athens, GA, then following shared railroad ROW in the approaches to the Charlotte and Atlanta termini. This route serves three stations in North Carolina at Charlotte Gateway, CLT airport, and South Gastonia; two stations in South Carolina at GSP airport and Anderson; and five stations in Georgia in Athens, Suwanee, Doraville, downtown Atlanta (Georgia MMPT), and H-JAIA.

ALTERNATIVE 4: INTERSTATES 20 AND 77

The I-20 and I-77 Corridor Alternative is a 321-mile route located primarily within the interstate highway ROW following I-77 between Charlotte, NC and Columbia, SC and I-20 between Columbia, SC, Augusta, GA and Atlanta. Similar to the I-85 Corridor Alternative, this corridor consists of a dedicated high-speed passenger rail alignment in the interstate ROW, then follows a shared railroad ROW in the approaches to the Charlotte and Atlanta termini. This route serves one station in North Carolina at Charlotte Gateway; two

⁵ “Shared ROW” or “shared use” refers to ROW that is used by both freight and passenger service.

⁶ “Dedicated use” refers to new ROW dedicated solely for the purpose of providing passenger rail service. The addition of freight operations was not evaluated in this report. This does not necessarily preclude the operation of temporarily separated freight operations in that the engineering design standards used for the dedicated route alternative can support freight use where capacity is available. Heavy freight use will increase the maintenance costs associated with these tracks.

stations in South Carolina in Rock Hill and Columbia; and four stations in Georgia in Augusta, Covington, downtown Atlanta (Georgia MMPT), and H-JAIA.

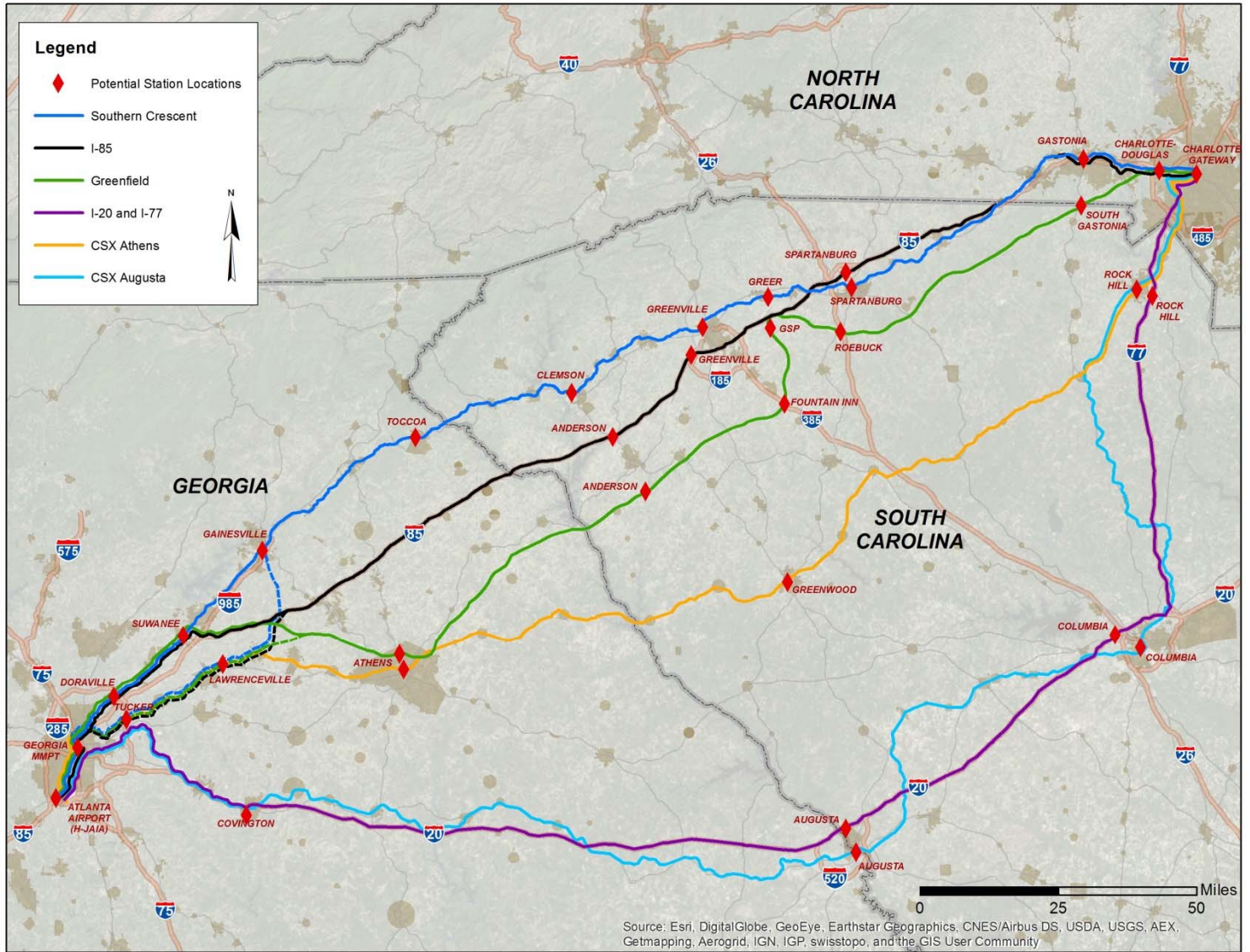
ALTERNATIVE 5: CSX AND NS VIA AUGUSTA (CSX AUGUSTA)

The CSX and NS via Augusta Corridor Alternative is a 373-mile route that follows the NS Charlotte-Columbia Subdivision ROW from Charlotte, NC to Columbia, SC, then the CSX Georgia Subdivision ROW from Columbia, SC to Atlanta, GA. This corridor shares the NS and CSX ROW, with freight and passenger trains operating together on shared tracks in certain sections of the corridor and on separate tracks in certain sections where the alignment supports it. This route serves one station in North Carolina at Charlotte Gateway; two stations in South Carolina in Rock Hill and Columbia; and four stations in Georgia in Augusta, Covington, downtown Atlanta (Georgia MMPT), and H-JAIA.

ALTERNATIVE 6: CSX AND NS VIA ATHENS (CSX ATHENS)

The CSX and NS via Athens Corridor Alternative is a 281-mile route that follows the NS Charlotte-Columbia Subdivision ROW from Charlotte, NC to Chester, SC, then the CSX Monroe and Abbeville Subdivisions to Athens and Atlanta, GA. This corridor shares the NS and CSX ROW with freight and passenger trains operating together on shared tracks in certain sections of the corridor and on separate tracks in certain sections where the alignment supports it. This route serves one station in North Carolina at Charlotte Gateway; two stations in South Carolina in Rock Hill and Greenwood; and five stations in Georgia in Athens, Lawrenceville, Tucker, downtown Atlanta (Georgia MMPT), and H-JAIA.

Exhibit 2-2: Phase 1 Screening – Identification of Six Reasonable Corridor Alternatives



Source: HNTB

2.2.1.2 Phase 1 Evaluation and Screening Criteria

After identifying six reasonable Corridor Alternatives, GDOT then screened the initial range of Corridor Alternatives. The evaluation used both quantitative and qualitative metrics to rate each Corridor Alternative, then assessed the performance of each Corridor Alternative against the others. Based on this screening process, the three top-performing Corridor Alternatives moved forward to the Phase 2 evaluation.

GDOT applied the following screening criteria to the six Corridor Alternatives in Phase 1:

- 1) **Purpose and Need:** A qualitative measure of how well each alternative meets the Purpose and Need including the primary goals and objectives of the Project. Corridor Alternatives best meeting the Project's goals and objectives of the stated Purpose and Need rank the highest.
- 2) **Corridor Length (miles):** A measure of potential improvement costs and indication of travel time. A longer corridor will require more miles of improvements and associated costs, all things being equal. A longer corridor will typically have a longer travel time and higher capital cost than a shorter corridor. Therefore, shorter Corridor Alternatives rank higher than longer Corridor Alternatives in this analysis.
- 3) **Corridor Travel Time (minutes):** An estimate of travel times from the Atlanta airport (H-JAIA) to Charlotte Gateway Station using Phase 1 screening-level assumptions for operating speed. Improved and competitive travel time, as compared to other travel modes, between Atlanta and Charlotte is an objective of the Purpose and Need, and is a measure of the relative mobility benefits of a corridor. For this criterion, the lower the travel time, the higher the ranking of a given Corridor Alternative.
- 4) **Geometry (Curves > 1 degree 30 minutes) and Limiting Speed:** A measure of track curvature that potentially limits train speeds. This analysis uses "1 degree 30 minutes" as the baseline curvature screening criteria to compare corridor geometry impacts⁷. This does not represent the maximum allowable curvature, but it typically limits a non-tilt train to about 90 mph and a tilt train to 110 mph. Thus, Corridor Alternatives with sharper curves negatively affect travel time; therefore, the higher number of curves with geometry greater than 1 degree 30 minutes lowers a Corridor Alternative's ranking.
- 5) **Population Served:** A measure of potential residential market access and ridership. A Corridor Alternative that serves a larger total market ranks higher than a corridor serving a smaller total market.
- 6) **Employment Served:** A measure of potential employment market access and ridership. Corridor Alternatives serving larger employment markets receive higher rankings.
- 7) **Regional and Intermodal Links:** A qualitative measure of how well each alternative provides connectivity to regional rail systems, airports, and multimodal terminals. This screening qualitatively evaluates rail connectivity and access to airports at H-JAIA, CLT and GSP, and the SEHSR Corridor at Charlotte Gateway Station. Corridor Alternatives that provide better connectivity receive higher rankings.

⁷ Degree of curvature is a commonly used measurement of horizontal curve along track. The larger the degree of curvature, the sharper the curve. More information on track geometry and limiting speeds can be found in the Alternatives Development Report, located in **Appendix B**.

2.2.1.3 Phase 1 Ratings and Results

Each of the Corridor Alternatives received a score and rating based on each of the criteria provided in **Section 2.2.1.2**.

Exhibit 2-3 outlines scoring and rating categories. The best performing Corridor Alternatives received 100 percent for a given criterion, which was 5.0 points. Each subsequent Corridor Alternative’s score was in proportion to the best performing alternative.

Exhibit 2-3: Phase 1 Screening - Scoring Criteria

| Performance Relative to the Best Performing Corridor Alternative | Score | Rating |
|---|--------------|---------------|
| Best performing corridor(s) (between 91 and 100%) | 4.1 - 5.0 | Best |
| Between 81 and 90% of the best performing corridor | 3.1 - 4.0 | Very Good |
| Between 71 and 80% of the best performing corridor | 2.1 - 3.0 | Good |
| Between 61 and 70% of the best performing corridor | 1.1 - 2.0 | Fair |
| 60% or less of the best performing corridor* | 0.0 - 1.0 | Poor |
| *Negative percentages receive a score of zero. | | |

Source: HNTB

2.2.1.4 Consistency with Purpose and Need

Each of the six Corridor Alternatives were qualitatively compared to the Purpose and Need statement as a measure of how well they meet each of the eight goals of the Atlanta to Charlotte PRCIP. The goals include:

- 1) **Provides regional linkages between Atlanta and Charlotte** – GDOT determined that all Corridor Alternatives met this criterion.
- 2) **Integrates with the SEHSR Corridor between Charlotte and Washington, D.C.** – To fully meet this goal, a Corridor Alternative has to provide both consistency with the 110 mph diesel technology employed by the SEHSR Corridor and also a direct connection to Charlotte Gateway Station. The three Corridor Alternatives that primarily share ROW and tracks with the freight railroads using diesel-electric technology and with a direct connection to the Gateway Station all meet both of these criteria, including the Southern Crescent, CSX and NS via Augusta and CSX and NS via Athens (Alternatives 1, 5 and 6). While providing a direct connection to the Charlotte Gateway Station, the full build out of the I-85, Greenfield, and I-20 and 77 Corridor Alternatives (Alternatives 2, 3 and 4) could utilize electrified equipment technology and require a transfer at Charlotte Gateway Station, and may only partially meet this criterion.
- 3) **Is consistent with a Federally designated high-speed rail (HSR) corridor** – Federal designation as a high-speed rail corridor by the USDOT Secretary shows that a corridor has been reviewed by USDOT and is eligible for certain types of Federal funding. It also is an indication that a corridor has substantial state support, given that states submit designation requests. Having a Federal designation, however, does not necessarily preclude a corridor without designation from receiving funding from

Federal programs. The Transportation Equity Act for the 21st Century (TEA-21) extended the SEHSR Corridor from Charlotte to Greenville and Atlanta.⁸ The Southern Crescent Corridor (Alternative 1) most directly reflects the route of the Federally-designated SEHSR Corridor. The I-85 (Alternative 2) and Greenfield (Alternative 3) Corridor Alternatives do not directly follow the route of the Federally-designated SEHSR Corridor; however, each serves similar cities along the corridor. The I-20 and I-77, CSX and NS via Augusta, and CSX and NS via Athens Corridor Alternatives do not meet this criterion.

- 4) **Promotes economic development** – All alternatives improve passenger rail service and increase accessibility to communities and jobs, as well as provide a degree of positive economic development. GDOT determined that all alternatives meet this criterion.
- 5) **Improves travel time over current passenger rail service** – Alternatives with travel times between Charlotte and Atlanta that were estimated to be better than current Amtrak services were scored as meeting this criterion. All Corridor Alternatives, with the exception of CSX and NS via Augusta (Alternative 5), meet this criterion.
- 6) **Supports multimodal hubs** – All alternatives provide access to both a downtown Atlanta station (Georgia MMPT) and Charlotte Gateway Station, which serve as local transit hubs with rail and bus connections to MARTA in Atlanta and CATS in Charlotte. GDOT determined that all alternatives meet this criterion.
- 7) **Improves/supplements highway and airport capacity** – All Corridor Alternatives were scored as supplementing highway capacity, given that new or improved rail service generates the majority of its riders from existing auto travelers. Those alternatives not serving all major airports along the corridor were scored as only partially meeting this criterion. The I-20 and I-77, CSX and NS via Augusta, and CSX and NS via Athens (Alternatives 4, 5 and 6) Corridor Alternatives do not meet this criterion.
- 8) **Improves air quality and emissions** – Because intercity passenger rail service has lower emissions per passenger mile than auto and air modes, all Corridor Alternatives were scored as meeting improved air quality and emission goals.

Appendix B contains the supporting data for each Corridor Alternative by criterion; however, for quick reference, **Exhibit 2-4** lists the highest-rated Corridor Alternatives by criterion. A Corridor Alternative could have rated the highest or lowest for any of the screening criteria, as GDOT analyzed each criterion independently. For example, the Southern Crescent Alternative rated the highest for multiple criteria, but it also rated lowest for two criteria, Corridor Geometry and Travel Time. A Corridor Alternative's cumulative score reflects how it scored across all criteria; therefore, a lower rating hurts its cumulative score.

⁸ <https://www.fra.dot.gov/Page/P0140> (accessed 12/7/17)

Exhibit 2-4: Phase 1 Screening – Highest Rated Corridor Alternative by Criterion

| Criterion | Highest Rated Corridor Alternatives |
|-----------------------------------|--|
| Consistency with Purpose and Need | I-85 and Greenfield |
| Shortest Mileage | I-85 and Greenfield |
| Travel Time | Greenfield |
| Corridor Geometry/Limiting Speed | I-20 and I-77 and Greenfield |
| Population Served | Southern Crescent, I-85, Greenfield, and I-20 and 77 |
| Employment Served | Southern Crescent and I-85 |
| Regional and Intermodal Linkages | Southern Crescent, I-85, and Greenfield |

Source: HNTB

The rating process summed the scores generated by each of the criterion to generate the cumulative score for a Corridor Alternative and weighted the criteria equally. **Exhibit 2-5** outlines the cumulative scores for each reasonable Corridor Alternative as well as the comparative performance for each alternative. The results indicate the Southern Crescent, I-85, and Greenfield performed well in comparison with the other reasonable Corridor Alternatives. The I-20 and I-77, CSX and NS via Augusta, and the CSX and NS via Athens Corridor Alternatives all performed far below the others. Refer to **Appendix B** for a detailed presentation of this information.

Exhibit 2-5: Phase 1 Screening – Cumulative Scores and Evaluation

| Alternative | Score | Performance Relative to Best Performing Alternative | Overall Performance Rating |
|------------------------|-------|---|----------------------------|
| Southern Crescent | 23.8 | 74% | Good |
| I-85 | 27.6 | 86% | Very Good |
| Greenfield | 32.1 | 100% | Best |
| I-20 and I-77 | 15.8 | 49% | Poor |
| CSX and NS via Augusta | 10.2 | 32% | Poor |
| CSX and NS via Athens | 14.6 | 45% | Poor |

Source: HNTB

Based on the cumulative score of the Phase 1 screening:

- The Greenfield Corridor Alternative rated as the “best”;
- The I-85 Corridor Alternative rated “very good” and was within 14 percent of the Greenfield; and
- The Southern Crescent Alternative rated “good” and was within 26 percent of the Greenfield.

Exhibit 2-5 illustrates a large difference between the Southern Crescent, I-85, and Greenfield Corridor Alternatives’ scores and the I-20 and I-77, CSX and NS via Augusta or Athens Corridor Alternatives’ scores.

I-20 and I-77, CSX via Augusta, and CSX via Athens scored “poor” and performed 60 percent worse than the Greenfield, noting that the CSX via Augusta Alternative scored the worst at 68 percent below the Greenfield. The I-20 and I-77 performed poorly on travel time and regional and intermodal linkages. CSX and NS via Augusta and CSX and NS via Athens performed poorly on travel time and geometry. CSX and NS via Augusta also performed poorly on corridor length (**Exhibit 2-6**).

2.2.1.5 Public Input

As part of the scoping process during June 2013, GDOT held public update open houses in Georgia, South Carolina, and North Carolina at which attendees provided comments on the Phase 1 evaluation (**Exhibit 2-6**). Participants provided comments regarding the alternatives selected to advance into Phase 2 (Refinement of Corridor Alternatives).

2.2.1.6 Phase 1 Screening Conclusion

Based on the Phase 1 screening technical results, supplemented by public input, GDOT deemed the Southern Crescent, I-85, and Greenfield Corridor Alternatives as feasible to advance to Phase 2. The I-20 and I-77, CSX and NS via Augusta or Athens Corridor Alternatives scored comparatively lower, and were screened out for the following criteria: Travel Time, Employment Served, and Regional and Intermodal Linkages. By letter dated October 14, 2015, GDOT requested FRA’s approval to dismiss the three lower-rated alternatives. In a letter dated October 21, 2015, FRA concurred. See **Appendix B** for copies of the pertinent correspondence.

Exhibit 2-6: Phase 1 Screening Results

| Initial Alternative | Purpose and Need | Route Length (miles) | Travel Time (hours, minutes) and Average Speed (mph) | Geometry (Number of curves greater than 1 degree, 30 minutes) | Population Served (population within 30 miles of stations) | Employment Served (employees within 15 miles of stations) | Regional and Intermodal Linkages | Overall Performance |
|--------------------------------------|------------------|----------------------|--|---|--|---|----------------------------------|---------------------|
| Southern Crescent | ● | ◐ | ○ | ○ | ● | ● | ● | ◐ |
| I-85 | ● | ● | ◐ | ◐ | ● | ● | ● | ◐ |
| Greenfield | ● | ● | ● | ● | ● | ◐ | ● | ● |
| I-20 and I-77 | ◐ | ◐ | ○ | ● | ● | ◐ | ○ | ○ |
| CSX Augusta / NS Columbia, Rock Hill | ◐ | ○ | ○ | ○ | ● | ◐ | ◐ | ○ |
| CSX Athens / NS Chester, Rock Hill | ◐ | ◐ | ○ | ○ | ◐ | ◐ | ◐ | ○ |

| Rating | Visual |
|-----------|--------|
| Best | ● |
| Very Good | ◐ |
| Good | ◑ |
| Fair | ◒ |
| Poor | ○ |

Source: HNTB

2.2.2 Phase 2: Refinement and Analysis of Corridor Alternatives

In Phase 2, GDOT evaluated potential service and operational characteristics of the three Corridor Alternatives that advanced from the Phase 1 screening. This Phase 2 alternatives analysis introduced some new considerations and refined some components of the three remaining Corridor Alternatives. New considerations introduced during Phase 2 include: multiple options for the Atlanta approach, schedules and stopping patterns based on practical operating speeds, and the inclusion of a No-Build Alternative. Areas of refinement consisted of: corridor location, station opportunities, train technology options, operating speeds by corridor, and travel time calculations.

Phase 2 concludes with a comparison of the three Corridor Alternatives’ potential service characteristics, including the following metrics: daily round trips, travel time, ridership, revenue, capital cost, operating and maintenance (O&M) cost, operating ratio, and benefit-cost ratio.

This section describes the No-Build, the three refined Corridor Alternatives, and the Phase 2 analysis approach and results. Following Phase 2, Phase 3 documents potential environmental impacts of the three Corridor Alternatives and the No-Build Alternative in Chapter 3 of this Tier 1 EIS.

2.2.2.1 No-Build Alternative

The Council on Environmental Quality (CEQ), which promulgates NEPA-implementing regulations, requires the inclusion of an alternative of “no action” along with the evaluation of all reasonable alternatives.⁹ This Tier 1 EIS compares the potential environmental effects of taking no action (the No-Build Alternative) with the effects of the three build alternatives. The NEPA process includes a detailed analysis of the No-Build Alternative to provide equal comparison to the build alternatives, and to help decision makers and the public understand the consequences of not implementing a build alternative. This also provides a baseline against which to measure the impacts of the build alternative.

Under the No-Build Alternative, the actions required to implement high-speed passenger rail service in the corridor would not take place. The No-Build Alternative consists of the existing physical rail infrastructure (i.e., tracks, bridges, signals, stations, maintenance, and layover facilities) and the existing passenger rail service, highway network and air services between Atlanta and Charlotte. It also includes:

- Committed improvements to the existing intercity passenger rail system;
- Existing and programmed improvements to the intercity highway, passenger rail, and aviation services indicated in each state’s transportation plan;
- Statewide transportation improvement programs (STIPs);
- MPO’s long range transportation plans (LRTPs); and
- Transportation improvement programs (TIPs), master plans, and other documents.

Committed improvements or projects are those that are reasonable and foreseeable; i.e. those programmed in the near term, specifically with a project phase programmed within the next six years. The following sections discuss the infrastructure included in the No-Build Alternatives for the transportation system in the states of Georgia, South Carolina, and North Carolina.

EXISTING PASSENGER RAIL SERVICE

Amtrak operates intercity passenger rail service either along or connecting to the Project. Along the corridor, Amtrak offers the daily *Crescent* long-distance train, which operates between New York and New Orleans, LA. This train operates in the early morning or late evening between Atlanta and Charlotte, which generally takes five and a half hours. Other than recent replacement of passenger cars utilized in the *Crescent* service, Amtrak does not have any plans to improve or modify the existing intercity passenger rail service between Atlanta and Charlotte.

At the north end of the Project corridor in Charlotte, Amtrak operates two train routes which are sponsored by the State of North Carolina. This service includes the daily *Carolinian*, which operates between Charlotte and New York via Raleigh and Richmond; and the three times daily *Piedmont*, which operates between

⁹ 40 CFR Part 1502 (Environmental Impact Statement), Section 14 (Alternatives including the proposed action)

Charlotte and Raleigh. In 2018, NCDOT completed a major capacity improvement on the Piedmont Corridor between Raleigh and Charlotte, which will provide the capacity to add two daily frequencies to the *Piedmont* service, providing a total of five daily North Carolina state-supported round-trip trains serving the corridor between Raleigh and Charlotte Gateway Station. These investments are described under the Committed Passenger Rail improvements, and North Carolina summary on the following pages. Amtrak’s and NCDOT’s combined investments in rail transportation will continue to establish passenger rail connectivity to the SEHSR corridor from cities within North Carolina, in particular providing for direct transfer to points south at Charlotte.

NON-RAIL TRANSPORTATION INFRASTRUCTURE

Each of the three states has its respective Interstate highways, state roads, and transit service. I-85 traverses all three states within the Project’s Study Area. At least one primary airport is located within each state:

- Hartsfield-Jackson Atlanta International Airport (H-JAIA) in Atlanta;
- GSP Airport, located between Spartanburg and Greenville, SC; and
- Charlotte-Douglas International Airport (CLT), Charlotte, NC.

Each of the three Corridor Alternatives advancing for analysis in this Tier 1 EIS include direct connections to each of the airports listed above, which will provide an additional multimodal trip generator to supplement the service proposed in the Atlanta to Charlotte PRCIP.

Chapter 1 of this Tier 1 EIS discusses non-rail transportation modes between Atlanta and Charlotte in terms of their respective travel time and travel frequency. See **Exhibit 1-8**.

PLANNED AND COMMITTED PASSENGER RAIL, HIGHWAY, AND AVIATION IMPROVEMENTS INCLUDED IN THE NO-BUILD ALTERNATIVE

The following sections describe future transportation system improvements within the Project’s Study Area that are in various phases of delivery and committed to by the state and local governments. The funded improvements are considered a part of the No-Build Alternative.

Service improvements intended to improve intercity rail passengers’ experience as well as highway and aviation projects represent the No-Build Alternative. However, these projects will occur independently, with or without implementation of the Project. A listing of these improvements in Georgia, South Carolina, and North Carolina is provided in **Exhibit 2-7**.

Exhibit 2-7: Planned and Committed Projects

| Project Name | County | Description |
|----------------------------------|-----------------------|--|
| GEORGIA | | |
| Amtrak Station Relocation | Fulton County | Relocate station from current location. |
| Georgia MMPT | Fulton County | Construct new multimodal hub in downtown Atlanta |
| I-85 Widening | Jackson County | Widen I-85 from SR 53 to US 129/SR 11 |
| I-85 Widening | Jackson/Barrow County | Widen I-85 from SR 211 to SR 53 |

| Project Name | County | Description |
|---|-------------------------|---|
| I-85 Widening | Gwinnett/Barrow County | Widen I-85 from Hamilton Rd to SR 211 |
| I-85 Managed Lanes | Gwinnett County | Extend managed lanes on I-85 from Old Peachtree Rd to Hamilton Mill Rd |
| I-85 Managed Lanes (2) | Gwinnett County | Expand current managed lane system on I-85 by adding a second lane in each direction between I-285 and Old Peachtree Road |
| I-285 East Managed Lanes | DeKalb County | Construct two new managed lanes on I-285 between I-85 and I-20 |
| I-20 East Managed Lanes | DeKalb County | Construct two new managed lanes on I-20 between I-285 and SR 124 |
| I-85 New Interchange @ Gravel Springs Rd | Gwinnett County | Construct new interchange at Gravel Springs Rd at I-85 |
| I-85 New Interchange @ McGinnis Ferry Rd | Gwinnett County | Construct new interchange on I-85 at McGinnis Ferry Rd |
| I-85 New Interchange @ SR 60 | Hall County | Construct new interchange on I-85 at SR 60 |
| I-985 New Interchange @ Martin Road | Hall County | Construct new interchange on I-985 at Martin Road, just north of SR 13 |
| I-20 @ Hwy 138 Interchange Improvements | Rockdale County | Interchange improvements at Hwy 138 |
| I-285/I-20 Interchange Improvements | DeKalb County | Construct capacity and operational improvements to general purpose interchange at I-285/I-20 in DeKalb (eastern wall) |
| I-285 @ I-20 Managed Lane Interchange | DeKalb County | Construct new managed lane ramps between managed lane systems on I-285 and I-20 |
| I-285 @ Bouldercrest Rd Interchange Improvements | DeKalb County | Construct interchange improvements at I-285 @ Bouldercrest Rd |
| I-75 Northbound Collector/Distributor Lanes | Clayton/Fulton Counties | Construct northbound collector/distributor lanes from Forest Pkwy to I-285 |
| SR 316 Grade Separation @ SR 11 | Barrow County | Corridor operational and capacity improvements along SR 316 (a major metro Atlanta arterial) |
| SR 316 Grade Separation @ SR 81 | Barrow County | Corridor operational and capacity improvements along SR 316 (a major metro Atlanta arterial) |
| SR 316 Grade Separation @ SR 53 | Barrow County | Corridor operational and capacity improvements along SR 316 (a major metro Atlanta arterial) |
| US 78/SR 10 Widening | McDuffie County | Widening of US 78/SR 10 from SR 43 to Smith Mill Rd |
| SR 17/SR 10 Widening | McDuffie/Wilkes County | Widening of SR 17/SR 10 from Smith Mill Rd to Washington Bypass |
| SR 10 Passing Lanes | Oglethorpe County | Construct passing lanes throughout Oglethorpe and Wilkes County |
| SR 72 Widening | Madison/Elbert County | Widen SR 72 from Comer to Broad River |
| US 129/SR 11 Widening | Jackson/Hall County | Widen US 129/SR 11 from SR 332 to SR 323 |
| US 129/Cleveland Hwy Widening | Hall County | Widen US 129/Cleveland Hwy from Limestone Pkwy to south of Nopone Rd |
| US 23/Buford Hwy Widening | Gwinnett/Hall County | Widening US 23/Buford Hwy from Sawnee Ave. to SR 347 |

| Project Name | County | Description |
|---|-------------------------------------|---|
| H-JAIA Inbound Roadway Improvements | Fulton/Clayton | Upgrades to H-JAIA's internal roadway network. |
| H-JAIA New Cargo Warehouse | Fulton/Clayton | The new Cargo C building will complete the existing South Cargo Facility complex. |
| H-JAIA Concourse C Midpoint Expansion | Fulton/Clayton | The project will expand and renovate a total of approximately 52,000 square feet of space. The project will include two new escalators for passengers to connect from the Plane Train system up to the concourse level. |
| <i>SOUTH CAROLINA</i> | | |
| I-85 Widening | Spartanburg County, Cherokee County | Widen I-85 from Gossett Rd (MM 80) to NC state line |
| I-26 Widening | Spartanburg County | I-26 from Us 176 (MM 15) to SC 296 (MM 22) |
| I-85 at SC 290 (MM 63) Interchange Improvement | Spartanburg County | Improve Interchange on I-85 at SC 290 (MM 63) (2 lane exit) |
| I-85 Widening | Cherokee County | Widen I-85 from SC 18 (MM 96) to near NC State Line (MM 106) |
| I-85 Widening from SC 153 (MM 40) to SC 85 (MM 69) | Spartanburg County | I-85 widening from SC 153 to SC 85 (MM 40 to MM 69) |
| I-85 Widening from SC 57 (MM 80) to SC 18 (MM 96) | Spartanburg County, Cherokee County | I-85 Widening SC 57 (MM 80) to SC 18 (MM 96) |
| I-85 Widening | Greenville County | Widen I-85 from US 25 (MM 43) to SC 129 (MM 67) |
| I-385 @ I-85 Interchange Redesign | Greenville County | Redesign interchange at I-385 (MM 36) and I-85 (MM 51) |
| I-385 Widening | Greenville County | Widen I-385 from West Georgia Rd (MM 29) to I-85 (MM 36) |
| I-85 Widening | Greenville County | I-85 Widening from SC 153 (MM 40) to SC 85 (MM 69) |
| I-85 over Rocky Creek Bridge | Greenville County | Replace the culvert over the Rocky Creek with a bridge. |
| I-85 over Seneca River | Anderson County | Bridge Replacement - I-85 NB & SB over Seneca River |
| I-85 over Three & Twenty Creek | Anderson County | Bridge Replacement I-85 NB & SB over Three & Twenty Creek |
| I-85 Corridor Improvements | Anderson County | I-85 Corridor Improvements from GA State Line to Exit 20 |
| I-77 Corridor Improvements | Chester, York Counties | I-77 Corridor Improvements from SC 9 (Exit 65) to US 21 (Exit 77) |

| Project Name | County | Description |
|--|---------------------------------------|--|
| I-20/I-26/I-77: Corridor Improvement | Lexington/Richland/Fairfield Counties | Corridor management plan (MM 34 TO MM 48) |
| I-20/I-26/I-126 - Corridor Improvements | Lexington/Richland Counties | Increase interstate capacity / mobility |
| I-26 @ US 1 (Augusta Rd) | Lexington County | Interchange improvements (HWY US21, MM119) |
| I-20 Widening | Lexington County | Interstate widening from US 378 to Longs Pond Rd (MM61 to MM 51) |
| I-20 & US 1 | Lexington County | Bridge Replacement |
| I-26 Widening | Lexington/Richland County | Interstate widening from US 176 to SC 202 (MM 85 to MM 101) |
| I-126 Bridge Replacement over SCL Railroad | Richland County | Bridge Replacement |
| I-26 (Near MM 96 to near MM 101) - S-58 (Koon Road) | Richland County | Bridge Replacement |
| I-26 (Near MM 96 to near MM 101) - S-80 (Shady Grove) | Richland County | Bridge Replacement |
| SC 277 NB over I-77 | Richland County | Bridge Replacement |
| I-77 (I-20 to Killian Road (Exit 22)) | Richland County | Widening I-77 NB/SB (I-20 and Exit 22 Killian Road); Rehab of SB lanes from Killian Rd to Blythewood Rd; Widening of 10 mainline bridges. |
| NORTH CAROLINA | | |
| Charlotte Gateway Station Project | Mecklenburg County | Construction of a new station in Uptown Charlotte that will provide seamless integration of various rapid transit modes. The City of Charlotte and NCDOT began construction on the railroad infrastructure for the new station in 2018, which will be completed in 2022. The City and NCDOT are also preparing engineering design for and pursuing funding to complete the station building by 2025. |
| NS Bulk Transfer Facility | Mecklenburg County | New intermodal facility for transfer of freight between truck and rail, located near I-485 within CLT airport property. |
| US 74 (Independence Blvd) | Mecklenburg County | Convert Bus Lanes to HOT Lanes. NC 27 to I-277. Laneage and jersey barriers are already in place. The scope of this project would include gantries, new striping and gates. |
| I-485 | Mecklenburg County | Construct one express toll lane in each direction within the existing median. I-77 to US 74. |
| I-85 Interchange at Cox Rd | Gaston County | Construct new interchange at Cox Rd @ I-85 |
| I-85 Widening | Gaston County | Widen I-85 to 8 lanes from US 321 to NC 273 |

| Project Name | County | Description |
|---|---------------------------------|---|
| Piedmont Improvement Program | Mecklenburg County | Corridor-wide railroad improvement program to increase capacity and expand intercity passenger rail service for up to five daily North Carolina state-supported round-trip corridor trains between Raleigh and Charlotte. |
| Harrisburg to Charlotte Railroad Improvements | Mecklenburg and Cabarrus County | This project involves constructing about 12 miles of second track and realigning curves along the North Carolina Railroad (NCRR) corridor in Mecklenburg and Cabarrus Counties. |
| Charlotte Rail and Locomotive Maintenance Facility | Mecklenburg County | This project involves constructing a new facility to service state-supported Piedmont and Carolinian trains during layovers in Charlotte. |
| South Land Acquisition | Mecklenburg County | Land acquisition at CLT airport for future airport expansion |
| CATS West Corridor Transit Study | Mecklenburg and Gaston County | CATS is conducting a planning study to evaluate transit alternatives between the existing LYNX Gold Line and the CLT airport, including consideration of light rail within the NS ROW. |

Sources: State DOTs' STIPs and MPOs' TIPs and LRTPs

GEORGIA PROJECTS SUMMARY¹⁰

Projects in Georgia fall into two categories: rail-related and non-rail. The two rail-related projects are both located in Fulton County (Atlanta). One is the planned Georgia MMPT in downtown Atlanta; the other is the Amtrak station relocation in midtown Atlanta. These two projects are included in the Atlanta MPO LRTP, which lists the region's funding priorities through the year 2040.

Most of the non-rail projects in Georgia are roadway projects that address regional and sub-regional travel. A majority of these roadway projects add capacity or operational improvements for major arterials and freeways. The most notable are the Interstate widening and managed lane projects, namely on I-85 northeast of Atlanta, approaching South Carolina.

Based on H-JAIA's construction report, there are three upcoming aviation projects scheduled for construction, comprising of upgrades to the internal road network, new storage facilities, and expansion of one of its concourses.¹¹

¹⁰ *GDOT*. <http://www.dot.ga.gov/InvestSmart/Pages/STIP.aspx> (accessed on 12/28/2017);
ARC. <http://atlantaregionsplan.org/regional-transportation-plan/> (accessed on 12/28/2017);
Gainesville-Hall MPO. <https://www.ghmpo.org/101/Documents> (accessed on 12/28/2017);
Athens MPO. <http://www.macorts.org/documents.html> (accessed on 12/28/2017);
Augusta MPO. <http://www.augustaga.gov/1312/Long-Range-Transportation-Plan> (accessed on 12/28/2017).

¹¹ *Hartsfield-Jackson Atlanta International Airport*. <http://next.atl.com> (accessed on 12/28/2017)

SOUTH CAROLINA PROJECTS SUMMARY ¹²

Rail projects in South Carolina are currently committed in lump-sum programming categories in support of rail crossing and railroad hazard elimination safety projects.¹³ Focusing on the condition and performance of the existing road and bridge network, South Carolina is bringing its system back into a state of good repair through statewide system improvement, bridge replacement, improving overall system travel time reliability at various bottlenecks, and addressing capacity along numerous interstate corridors. This includes upgrades to I-85, I-385, I-77, I-26, I-20, and various associated interchanges.

The GSP Airport Master Plan from December 2003 developed a phasing plan for its airport expansion; however, a timetable for construction projects has not been established.

NORTH CAROLINA PROJECTS SUMMARY ¹⁴

The most notable rail-related projects in North Carolina are the NCDOT Piedmont Improvement Program (PIP) and the construction of Charlotte Gateway Station. Through the PIP investments, NCDOT will have the capability to expand intercity passenger rail service up to five daily North Carolina state-supported round-trip corridor trains in Charlotte. Building on the PIP investments, the Charlotte Gateway Station project will relocate intercity passenger rail service to a new multimodal station in Uptown Charlotte. The Charlotte Gateway Station is the southern terminus for the corridor cleared under the Southeast High-Speed Tier 1 EIS. The improvements to intercity passenger rail facilities in North Carolina and Charlotte will offer direct connectivity to the Atlanta-Charlotte PRCIP in this Project.

NCDOT Piedmont Improvement Program:

In 2010 and 2011, FRA provided \$542 million from the High-Speed Intercity Passenger Rail (HSIPR) program to NCDOT for the Piedmont Improvement Program (PIP) to improve and expand the state-supported intercity passenger rail service between Raleigh, NC and Charlotte, NC. This program includes the construction of new or upgraded passenger stations and maintenance facilities, rehabilitation of intercity passenger rail equipment, construction of thirteen highway-rail grade separations, and installation of additional capacity on the North Carolina Railroad (NCR) corridor. This investment enables NCDOT to operate up to five daily North Carolina state-supported round-trip passenger trains between Raleigh and Charlotte, of which the fourth frequency began service in 2018. This program also includes the construction of an initial phase of a new Locomotive and Railcar Maintenance Facility (LRMF) in Charlotte for the servicing and maintenance of the state-supported passenger rail equipment. The LRMF is adjacent to Charlotte

¹² Greenville-Spartanburg International Airport. <https://www.gspairport.com/airport-planning-documents/> (accessed on 12/28/2017); South Carolina DOT. http://www.scdot.org/multimodal/pdf/SC_MTP_Rail_Plan_FINAL.pdf (accessed on 12/28/2017); South Carolina DOT STIP. <http://www.scdot.org/inside/planning-stip.aspx> (accessed on 2/18/19); Anderson MPO. <http://www.cityofandersonsc.com/anderson-area-transportation-study> (accessed on 12/28/2017); Greenville-Pickens Area Transportation Study. <http://www.gpats.org/plans/horizon2040> (accessed on 12/28/2017); Spartanburg Area Transportation Study. <http://spatsmpo.org/planning/> (accessed on 12/28/2017); Columbia Area Transportation Study. <https://centralmidlands.org/about/transportation-planning.html> (accessed on 12/28/2017).

¹³ SCDOT <http://www.scdot.org/inside/planning-stip.aspx> (accessed on 2/18/19);

¹⁴ Gaston-Cleveland-Lexington MPO. <http://gclmpo.org/plans-programs-and-studies/tip/> (accessed on 12/28/2017);

Charlotte MPO. <https://www.crtpo.org/plans-programs> (accessed on 12/28/2017);

NCDOT Rail Projects. <http://www.ncdot.gov/projects/projectsstudies/rail/projects.html> (accessed on 12/28/2017);

NCDOT STIP. <https://connect.ncdot.gov/projects/planning/Pages/default.aspx#0> (accessed on 12/28/2017)

Gateway Station at the north end of the Project corridor; however, there is limited capacity at the facility to provide full support for layover or servicing of the SEHSR Atlanta to Charlotte equipment.

Charlotte Gateway Station:

The City of Charlotte and NCDOT are sponsoring the development of the Charlotte Gateway Station project to serve as a comprehensive multimodal transportation facility in Uptown Charlotte. The station is envisioned to provide convenient, walkable access to Uptown Charlotte with direct connections to local and intercity bus, local and regional transit, and intercity and high-speed passenger rail. The Federal Transit Administration (FTA) completed an Environmental Assessment (EA) with a Finding of No Significant Impact (FONSI) for Charlotte Gateway Station in April 2009, which defined the multimodal transportation use and evaluated environmental impacts associated with the project. In 2015, the USDOT provided a \$250,000 grant from the Transportation Investment Generating Economic Recovery (TIGER) program to NCDOT and the City of Charlotte to prepare a Multimodal Station Area Plan (MSAP) to provide a final vision for the CGS as a multimodal hub and transit oriented district.¹⁵ Additionally, in 2017, the USDOT awarded a \$30 million grant to the City of Charlotte from the TIGER program to construct the railroad access components of CGS, including two dedicated station tracks with a passenger platform and ground level access to the multimodal facility. The MSAP envisions the development of CGS in phases corresponding to the incremental expansion in transportation services, including the future implementation of SEHSR service between Atlanta and Charlotte. The railroad access components are planned for completion in 2022. The City of Charlotte and NCDOT are also preparing engineering designs for the passenger amenities at the station, while the City is pursuing a partnership with a private developer to construct the larger multimodal transportation center, anticipated for completion by 2025. Upon completion of the Charlotte Gateway Station, the Amtrak and NCDOT passenger service is planned to relocate to Uptown Charlotte, providing a direct connection to the future SEHSR service between Atlanta and Charlotte.

Non-rail projects in North Carolina are primarily geared toward adding capacity and improving operations on the Interstate. The CLT airport, per its master plan, is currently acquiring additional land for its airport expansion plans, which it refers to it as the South Land Acquisition Area.¹⁶

2.2.2.2 Phase 2 - Refinement of Corridor Alternatives

In addition to the No Build Alternative, GDOT is evaluating the three Corridor Alternatives that scored the highest under the Phase 1 screening – the Southern Crescent, I-85, and Greenfield Corridor Alternatives.

A critical component for each Corridor Alternative is the manner in which it would transition into the Atlanta metropolitan area (hereafter referred to as the Atlanta Approach). Due to the density of the developed urban environment and the complex railroad network in Atlanta, the selection of a preferred route into Atlanta is deferred to a future Tier 2 EIS, but two options are considered in this Tier 1 EIS. Another critical component

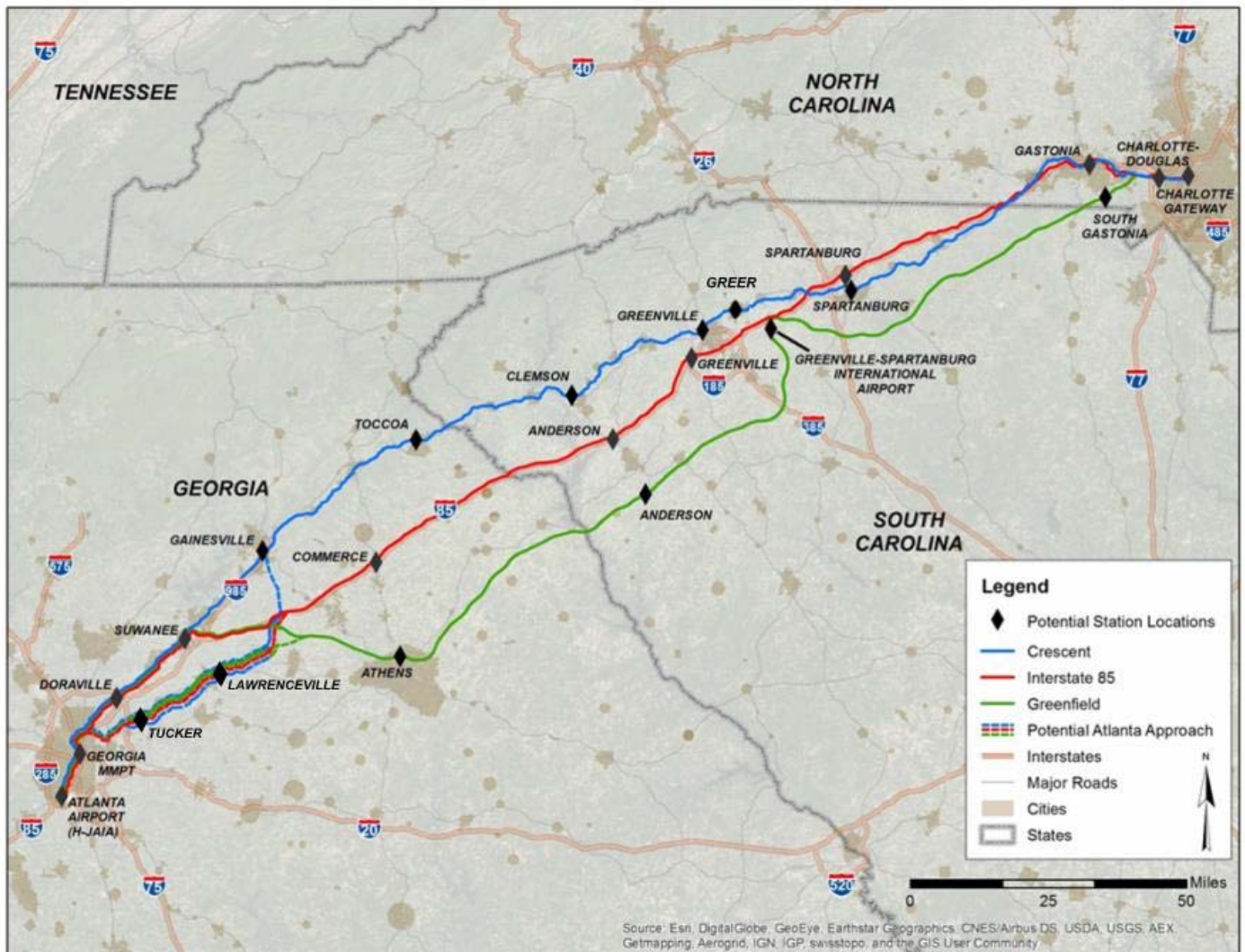
¹⁵ For the Final CGS MSAP Report: <http://charlottenc.gov/cats/transit-planning/charlotte-gateway-station/Documents/CGS%20MSAP%20-%20Final%20Report.pdf>.

¹⁶ Charlotte-Douglas International Airport. <http://www.cltairport.com/AboutCLT/Pages/LandAcquisition.aspx> (accessed 12/8/2017).

is the equipment technology options and associated operating speeds. A more detailed discussion is located in **Section 2.2.2.4**, but general assumptions for each Corridor Alternative are summarized here.

The following section provides descriptions of each Corridor Alternative, including refinements and new considerations introduced during the Phase 2 analysis. **Exhibit 2-8** illustrates these three Corridor Alternatives, including the refinements made to potential station locations as a result of Phase 2 analysis, further described in **Section 2.2.2.3**.

Exhibit 2-8: Phase 2 - Three Corridor Alternatives Advancing



Source: HNTB

CORRIDOR ALTERNATIVE 1: SOUTHERN CRESCENT

The location of the Southern Crescent Corridor Alternative remains as described in Phase 1 (**Section 2.2.1.1**), where the 268-mile route primarily follows the existing NS freight rail corridor that also hosts Amtrak's *Crescent* passenger rail service. GDOT assumes this Corridor Alternative would use diesel technology. Additional description of the corridor is provided below.

- 1) In North Carolina, this corridor follows the NS ROW for 41 miles on shared tracks operating at speeds up to 79 mph. The route begins at Charlotte Gateway Station, passes adjacent to the CLT airport and continues to Gastonia and Kings Mountain. This route serves three stations in North Carolina at Charlotte Gateway, CLT airport, and Gastonia.
- 2) In South Carolina, this corridor continues along the NS ROW for 122 miles on shared tracks. There is one 17-mile section where the alignment has the potential to support speeds up to 110 mph if a dedicated passenger track is constructed alongside the existing freight tracks. This route serves four stations in South Carolina: Spartanburg, Greer, Greenville, and Clemson.
- 3) In Georgia, this corridor continues along the NS ROW for 95 miles from the state line to Howell Junction in Atlanta where it transitions to a common NS and CSX route for 15 miles through downtown to a southern terminus at H-JAIA. Within Georgia, the route includes the potential for approximately 36 miles of higher speed track where the alignment can support speeds up to 110 mph, otherwise the speed is limited to 79 mph due to geographic and operational constraints. This route serves six stations in Georgia: Toccoa, Gainesville, Suwanee, Doraville, downtown Atlanta (Georgia MMPT), and H-JAIA.

This Tier 1 EIS also considers a potential alternate approach for the Southern Crescent Corridor from Gainesville, GA northeast of Atlanta to Howell Junction. This alternate approach diverges from the NS ROW near Gainesville, GA via a greenfield connection to near Auburn, GA, then follows the CSX Abbeville Subdivision to the CSX Atlanta Belt Line to rejoin with the NS ROW at Howell Junction. This route adds stations on the CSX approach in Lawrenceville and Tucker, GA to substitute stations on the NS approach in Suwanee and Doraville, GA.

CORRIDOR ALTERNATIVE 2: INTERSTATE 85

The I-85 Corridor Alternative remains as described in **Section 2.2.1.1**, where the 255-mile route generally follows I-85 between Atlanta and Charlotte. The exception is in the approaches into each terminus. GDOT assumes that dedicated passenger rail tracks would be constructed in the I-85 median or immediately adjacent to the interstate. GDOT also assumes that either diesel or electric technology could be employed for this Corridor Alternative. Additional description of the corridor is provided below.

- 1) In North Carolina, this corridor follows the NS ROW for 25 miles on dedicated passenger tracks from Charlotte Gateway Station to stations at the CLT airport and Gastonia, NC. Where following NS ROW, this corridor supports speeds up to 110 mph. At the interchange with State Highway 274, the corridor transitions to the I-85 ROW for approximately 15 miles to South Carolina. This route serves three stations in North Carolina at Charlotte Gateway, CLT airport, and Gastonia.

- 2) In South Carolina, this corridor continues along the I-85 ROW for approximately 105 miles serving three stations in Spartanburg, Greenville, and Anderson, SC. The construction of aerial viaducts may be required within the Greenville and Spartanburg metropolitan areas where the I-85 ROW is constrained. This corridor is capable of supporting speeds up to 125 mph with diesel technology or up to 180 mph with electric technology.¹⁷ However, top speeds may only be sustained for short segments due to corridor geometry, topography, and station stops.
- 3) In Georgia, this corridor continues along the I-85 ROW for approximately 65 miles to northeast of Suwanee, GA near the Hamilton Mill Road interchange, where the route transitions westward to the NS ROW via a 5-mile-long greenfield connector. From Suwanee, GA, the corridor follows the NS ROW for 25 miles to Howell Junction in Atlanta where it transitions to a common NS and CSX route for 15 miles through downtown to a southern terminus at H-JAIA. This route serves four stations in Georgia: Suwanee, Doraville, downtown Atlanta (Georgia MMPT), and H-JAIA. Within the shared ROW portion of this corridor, operating speeds are generally less than 80 mph with diesel technology and less than 110 mph with electric technology.

This Tier 1 EIS also considers a potential alternate approach for the I-85 Corridor from northeast of Atlanta to Howell Junction. This alternate approach diverges from the I-85 ROW near Braselton, GA via a greenfield connection to near Auburn, GA, then follows the CSX Abbeville Subdivision to the CSX Atlanta Belt Line to rejoin with the NS ROW at Howell Junction. This route adds stations on the CSX approach in Lawrenceville and Tucker, GA to substitute stations on the NS approach in Suwanee and Doraville, GA.

CORRIDOR ALTERNATIVE 3: GREENFIELD

The Greenfield Corridor Alternative remains as described in **Section 2.2.1.1**, where the 274-mile route generally follows a new dedicated alignment between the CLT airport and northeast Atlanta. GDOT assumes this Corridor Alternative could use either diesel or electric technology. Additional description of the corridor is provided below.

- 1) In North Carolina, this corridor follows the NS ROW for 10 miles on dedicated passenger tracks, operating between 80 and 110 mph, from Charlotte Gateway Station to the CLT airport station before transitioning to a new greenfield alignment just west of the Catawba River crossing. From the Catawba River, the greenfield alignment extends for approximately 15 miles passing southeast of Belmont, NC to a station at South Gastonia near the state line. This route serves three stations in North Carolina: Charlotte Gateway, CLT airport, and South Gastonia. Once on greenfield alignment, this corridor can sustain speeds up to 125 mph using diesel or 220 mph using electric technology.
- 2) In South Carolina, this corridor continues along a greenfield alignment for 65 miles passing east of Kings Mountain State Park to a route paralleling I-85, approximately 10 miles to the southeast, then diverging westward to a station near the GSP airport. From the GSP airport, this corridor returns eastward to a route

¹⁷ The maximum design speed for the I-85 Corridor Alternative is 220 mph; however, the maximum sustainable speed is 180 mph due to geographic constraints along the interstate ROW and acceleration capability of equipment operated in this service. Federal regulations require that all highway-rail crossings be grade-separated where train speeds exceed 125 mph. Requirements for operation through crossings at speeds above 110 mph are very rigorous; none have been authorized to date.

paralleling I-85, approximately 15 miles to the east, for 50 miles to the state line at the Savannah River with a station in Anderson, SC. This Corridor Alternative can support 125 mph (diesel) or 220 mph (electric) throughout most of South Carolina until reaching the first stop in Georgia.

- 3) In Georgia, this corridor continues along a greenfield alignment for 55 miles to a station in Athens, GA. From Athens, this corridor diverges westward along a greenfield alignment for 25 miles to join the route of the I-85 Corridor Alternative near Braselton, GA. From Braselton, this corridor continues along the I-85 ROW for approximately 9 miles to northeast of Suwanee, GA near the Hamilton Mill Road interchange, where the route transitions westward to the NS ROW via a 5-mile-long greenfield connector. From Suwanee, the corridor follows the NS ROW for 25 miles to Howell Junction in Atlanta where it transitions to a common NS and CSX route for 15 miles through downtown to a southern terminus at H-JAIA. This route serves five stations in Georgia in Athens, Suwanee, Doraville, downtown Atlanta (Georgia MMPT), and H-JAIA. Within the shared ROW of the Atlanta Approach, speeds are generally between 70 mph and 110 mph for both diesel and electric options.

This Tier 1 EIS also considers a potential alternate approach for the Greenfield Corridor from northeast of Atlanta to Howell Junction. This alternate approach diverges from the greenfield route near Auburn, GA, then follows the CSX Abbeville Subdivision to the CSX Atlanta Belt Line to rejoin with the NS ROW at Howell Junction. This route adds stations on the CSX approach in Lawrenceville and Tucker, GA to substitute stations on the NS approach in Suwanee and Doraville, GA.

ATLANTA APPROACH

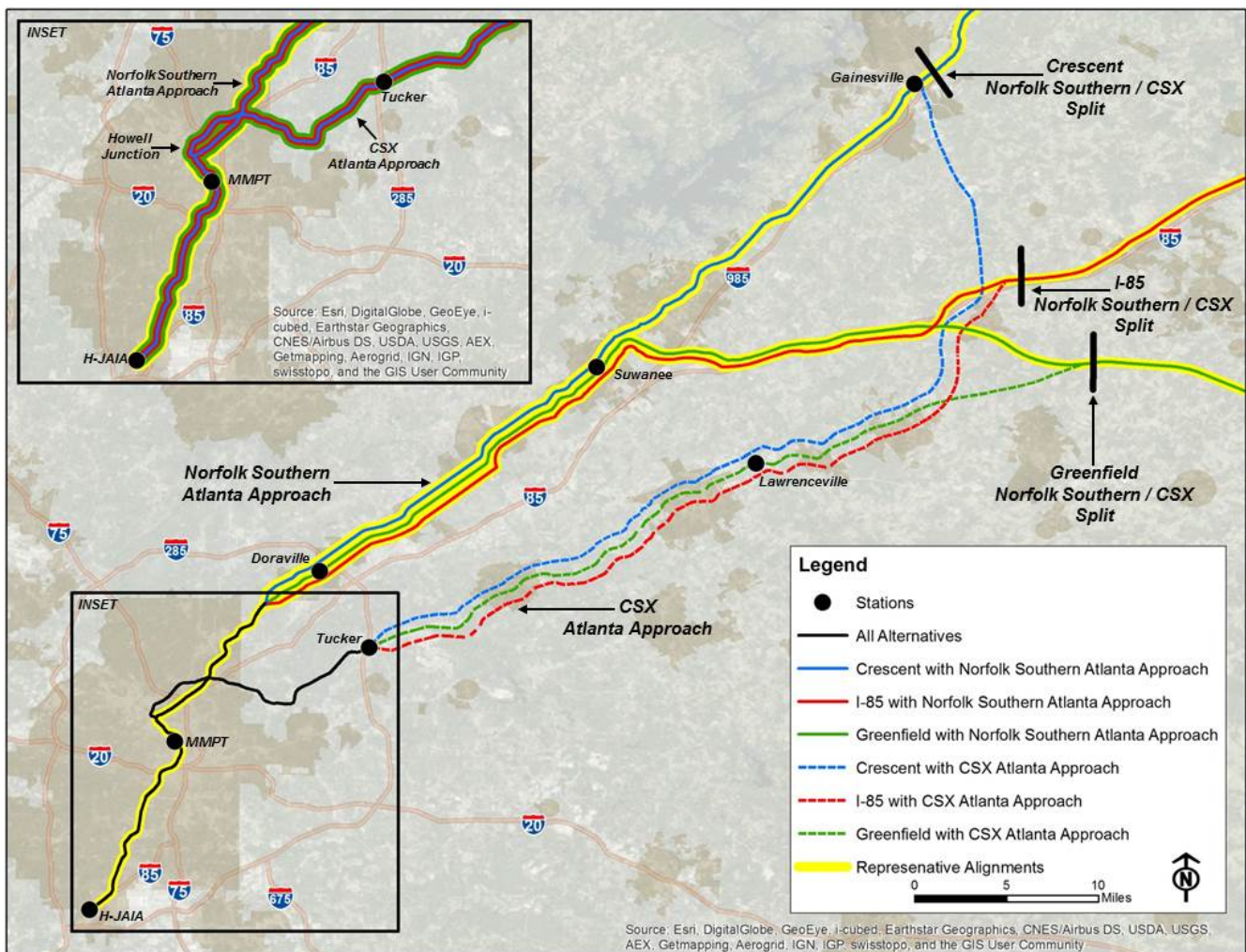
Multiple sub-Corridor Alternatives exist in the Atlanta area that could accommodate the approach of the three Corridor Alternatives from northeast of I-285 to Howell Junction north of downtown Atlanta, including the potential use of two freight railroad corridors. As illustrated in **Exhibit 2-9**, the three Corridor Alternatives could transition to either of two Atlanta Approaches: the Southern Crescent ROW (operated by NS) from northeast of Suwanee, GA, into Atlanta, or the CSX ROW, from northeast of Lawrenceville, GA, into Atlanta. Both approaches converge at Howell Junction, where all alternatives follow a common Class I railroad ROW along the NS/CSX corridor to access a station in downtown Atlanta (Georgia MMPT) and H-JAIA. GDOT assumes the Southern Crescent Corridor Alternative could use either approach; however, operating on shared tracks due to the modest level of service and limited operating speed. GDOT also assumes the I-85 and Greenfield Corridor Alternatives could use either approach; however, operating on dedicated tracks sharing the freight railroad ROW.

Due to the complex environment of the approaches to and through Atlanta and the nature of a tiered NEPA process, this Tier 1 EIS defers the selection of the preferred Atlanta Approach to a future Tier 2 EIS. Therefore, in Chapter 3 of this Tier 1 EIS, GDOT evaluated both the NS and CSX approaches for potential environmental impacts. For this corridor-level review, the operational analysis uses the NS approach as the representative common approach into Atlanta. The selection of NS's ROW as the common Atlanta Approach provides a consistent comparison of the operations of the three Corridor Alternatives within this Tier 1 EIS. The ADR in **Appendix B** provides data allowing for a preliminary comparison of the two Atlanta Approaches. In 2015, GDOT and FRA agreed upon this method for the Tier 1 EIS due to the minimal differences between ridership and revenue of the two Atlanta Approaches documented in the ADR. GDOT proposed this method in a letter

to FRA dated April 20, 2015 with references to sections of the ADR containing supporting data. FRA responded with a letter dated June 11, 2015 expressing agreement with GDOT's proposal. See **Appendix B** for copies of the pertinent correspondence.

In addition to the two potential Atlanta Approaches defined herein (NS and CSX), a future Tier 2 EIS could also identify additional feasible approaches or construction methods traversing the Atlanta area, such as use of public or private rights-of-way with at-grade, elevated (bridge or viaduct), or below-grade (tunnel) infrastructure, and could consider other intercity and commuter rail plans. FRA and GDOT will defer the definition and evaluation of any additional approaches along the aforementioned NS and CSX approaches to the Tier 2 analysis.

Exhibit 2-9: Atlanta Approach Options



Source: HNTB

This Tier 1 EIS evaluated the use of the common NS and CSX ROW from Howell Junction through downtown Atlanta to East Point, GA, then to a terminus on the west side of H-JAIA on the CSX Atlanta and West Point (A&WP) Subdivision; however, multiple alternate routes may also be available for consideration. The Atlanta Approach analysis deferred to a Tier 2 analysis will also include the refinement of the route from north of downtown Atlanta through to the southern terminus at H-JAIA.

For reference, FRA and GDOT completed a Tier 1 EIS with a ROD for the Atlanta to Chattanooga High Speed Ground Transportation Project in 2017¹⁸, which also includes service to a station in downtown Atlanta (Georgia MMPT) and at H-JAIA. The Atlanta-Chattanooga project evaluated a corridor following I-75 from north of Howell Junction through a tunnel under downtown Atlanta to a southern terminus on the east side of H-JAIA; however, the Tier 1 EIS for that project also referenced the potential use of the common NS and CSX ROW similar to that considered for the Atlanta-Charlotte service.

The development of a consolidated corridor to carry both services through downtown Atlanta to H-JAIA could provide many efficiencies to benefit each service. The cost for infrastructure and ROW acquisition required to construct a consolidated corridor with shared stations in downtown Atlanta (Georgia MMPT) and H-JAIA is likely much less than constructing two parallel systems. Interconnectivity for passengers in downtown Atlanta and at H-JAIA will also provide the opportunity for transfers between systems, which would generate higher ridership. FRA and GDOT recommend the consideration of a route through downtown Atlanta (Georgia MMPT) to H-JAIA that consolidates both the Atlanta-Charlotte and Atlanta-Chattanooga services during the Atlanta Approach analysis in the future Tier 2 EIS. The Tier 2 analysis may also consider other feasible proposals for connecting rail service into Atlanta.

2.2.2.3 Station Opportunities

During Phase 1 screening, GDOT identified initial cities, airports, and multi-modal hubs as station opportunities for each of the initial six Corridor Alternatives; these initial station opportunities were influenced by the Project's Purpose and Need as well as input from stakeholders and the public. During the Phase 2 analysis of the three refined Corridor Alternatives, which is summarized in this section and detailed in the ADR, GDOT analyzed ridership and travel-time impacts of stations, and used the results to make decisions where multiple options exist to serve an area. GDOT did not determine the precise station locations through this analysis, but identified generalized areas as potential station locations. A Tier 2 analysis will further refine these locations using specific service-related metrics and further environmental analysis of the preferred Corridor Alternative. GDOT will also utilize FRA's *Station Area Planning for High-Speed and Intercity Passenger Rail* (2011) to guide station decisions during the Tier 2 analysis.

The following describes station opportunities for each of the three Corridor Alternatives, which are affected by refined location and technology assumptions made during the Phase 2 analysis.

COMMON STATIONS

GDOT assumed the following station opportunities would be common throughout the three Corridor Alternatives, listed from north to south: the future Charlotte Gateway Station; the CLT airport; Doraville, an

¹⁸ For the Tier 1 Combined Final EIS and ROD: <http://www.dot.ga.gov/IS/Rail/AtlantatoChattanooga>

Atlanta suburb with MARTA service; the proposed Georgia MMPT in downtown Atlanta; and H-JAIA. These five locations are located along all three Corridor Alternatives and help meet the Purpose and Need by providing airport connectivity, transit access, and service between the downtowns of Atlanta and Charlotte. Due to the dispersed nature of Atlanta's population and development, Doraville provides an important access point along the NS Atlanta Approach for the northern and eastern suburbs and is situated near two major Interstates, I-285 and I-85, as well as MARTA rail. Should the CSX Atlanta Approach be advanced during the Tier 2 analysis, a station in Tucker would substitute for Doraville to provide access to I-285. The ultimate station locations will be refined in the Tier 2 analysis, particularly in the Atlanta and Charlotte Metro areas where routings are most subject to refinement.

SOUTHERN CRESCENT CORRIDOR

The existing Amtrak service stops along the Southern Crescent Corridor are considered logical station opportunities since this alternative follows the existing Amtrak alignment. From north to south, these stations, plus the aforementioned common stations, are as follows: Charlotte Gateway, CLT airport, Gastonia, Spartanburg, Greenville, Clemson, Toccoa, Gainesville, Suwanee, Doraville, downtown Atlanta (Georgia MMPT), and H-JAIA. Amtrak does not have an existing station in Suwanee, however GDOT identified it as an opportunity due to its proximity to the Southern Crescent Corridor, its population center, and its Interstate access. Additional suburban stations are beneficial for attracting ridership in the greater Atlanta area due to the dispersed nature of development. At 20 miles apart, stations at both Doraville and Suwanee could serve north and east metro Atlanta. Should the CSX Atlanta Approach be advanced during the Tier 2 analysis, stations in Lawrenceville and Tucker, GA would substitute for stations on the NS approach in Suwanee and Doraville, GA.

I-85 CORRIDOR

GDOT initially identified population centers near the I-85 corridor as station opportunities then reviewed ridership and travel time from the ADR, detailed in **Appendix B**, to optimize the number and location of stations. The following station opportunities exist for the I-85 Corridor: Charlotte Gateway, CLT airport, Gastonia, Spartanburg, Greenville, Anderson, Commerce, Suwanee, Doraville, downtown Atlanta (Georgia MMPT), and H-JAIA. The ADR informed GDOT that a GSP airport station between Greenville and Spartanburg would not capture sufficient additional ridership to balance the longer travel time. Stations serving the cities of Greenville and Spartanburg better serve the population and employment centers for this alternative. Should the CSX Atlanta Approach be advanced during the Tier 2 analysis, stations in Lawrenceville and Tucker, GA would substitute for stations on the NS approach in Suwanee and Doraville, GA.

GREENFIELD CORRIDOR

This corridor's high speed technology benefits from fewer station locations, which was factored into the operational analysis performed for the ADR. Station opportunities for the Greenfield Corridor include: Charlotte Gateway, CLT airport, South Gastonia, GSP airport, Anderson, Athens, Suwanee, Doraville,

downtown Atlanta (Georgia MMPT), and H-JAIA. As a result of the analysis detailed in **Appendix B**, GDOT found that Greenville and Spartanburg could be served by one station at the GSP airport in between the two cities. GDOT initially identified stations at Fountain Inn and Roebuck, then eliminated them at this stage due to their travel time impacts outweighing ridership benefits. In response to public comments and stakeholder agency feedback, GDOT added a station in the Athens vicinity, which analysis showed would add substantial ridership to the Greenfield Corridor. GDOT evaluated a downtown Athens station and a northern suburban Athens station. They generated very similar ridership, however GDOT estimates that the northern suburban location would be cheaper to construct and result in fewer impacts to existing development. A northern suburban location was also favored by stakeholders and the public. Should the CSX Atlanta Approach be advanced during the Tier 2 analysis, stations in Lawrenceville and Tucker, GA would substitute for stations on the NS approach in Suwanee and Doraville, GA.

ATLANTA APPROACH

The Atlanta Approach and exact station locations will be selected during a Tier 2 analysis, when the preferred Corridor Alternative and additional technology and service characteristics are known. As with the three Corridor Alternatives, potential opportunities for stations exist along the NS and CSX Atlanta Approaches. This Alternatives Analysis uses the NS Atlanta Approach as the representative route for comparing operating analyses of the three Corridor Alternatives, as described earlier in this chapter and detailed in **Appendix B**. As such, the preceding discussion addresses station opportunities at Doraville and Suwanee along the NS Atlanta Approach line. On the CSX approach, GDOT identified Lawrenceville and Tucker, two suburban town centers along the CSX line, as potential station opportunities.

Exhibit 2-10 displays station opportunities identified by this Tier 1 EIS along each of the three Corridor Alternatives and the two Atlanta Approaches.

Exhibit 2-10: Station Opportunities

| Southern Crescent (NS) | Southern Crescent (CSX) | I-85 (NS) | I-85 (CSX) | Greenfield (NS) | Greenfield (CSX) |
|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|---------------------------|
| H-JAIA | H-JAIA | H-JAIA | H-JAIA | H-JAIA | H-JAIA |
| Georgia MMPT | Georgia MMPT | Georgia MMPT | Georgia MMPT | Georgia MMPT | Georgia MMPT |
| Doraville, GA | Tucker, GA | Doraville, GA | Tucker, GA | Doraville, GA | Tucker, GA |
| Suwanee, GA | Lawrenceville, GA | Suwanee, GA | Lawrenceville, GA | Suwanee, GA | Lawrenceville, GA |
| Gainesville, GA | Gainesville, GA | Commerce, GA | Commerce, GA | Athens, GA | Athens, GA |
| Toccoa, GA | Toccoa, GA | Anderson, SC | Anderson, SC | Anderson, SC | Anderson, SC |
| Clemson, SC | Clemson, SC | Greenville, SC | Greenville, SC | GSP Airport | GSP Airport |
| Greenville, SC | Greenville, SC | Spartanburg, SC | Spartanburg, SC | South Gastonia, NC | South Gastonia, NC |
| Spartanburg, SC | Spartanburg, SC | Gastonia, NC | Gastonia, NC | CLT Airport | CLT Airport |
| Gastonia, NC | Gastonia, NC | CLT Airport | CLT Airport | Charlotte Gateway Station | Charlotte Gateway Station |
| CLT Airport | CLT Airport | Charlotte Gateway Station | Charlotte Gateway Station | | |
| Charlotte Gateway Station | Charlotte Gateway Station | | | | |

Source: HNTB

2.2.2.4 Rail Equipment Technology and Speed Options

This section identifies potential high-speed rail equipment technology options appropriate for each Corridor Alternative and subsequently estimates operating speeds, daily round-trip frequencies, and potential travel schedules associated with each technology option and Corridor Alternative.

The three Corridor Alternatives can generally be classified into two categories of operating speed: an anticipated maximum operating speed between 79 mph and 125 mph utilizing diesel-electric locomotive power, compared to an anticipated operating speed up to 220 mph on an electrified corridor. Therefore, each Corridor Alternative has been evaluated for two operating technologies in the ADR, summarized in the following section. In addition, the alternatives have unique corridor and operational attributes that impact the rail equipment technology options. Therefore, GDOT has evaluated the rail equipment that best suits each Corridor Alternative, which is described in this section and detailed in **Appendix B**.

Rail equipment is part of the overall system, and as such, the identification of system requirements of various equipment must be carefully integrated with the other elements of the railroad in order to achieve a safe, reliable, and cost effective solution. **Appendix B** provides substantial detail and analysis of potential operating plans and technology options.

Should this study process recommend a Corridor Alternative with electrified HSR technology, the Project could be developed incrementally, starting service with a lower (less expensive) technology and upgrading to the high-speed technologies as ridership and revenue increase throughout the life of the Project.

RAIL EQUIPMENT TECHNOLOGY OPTIONS

Train speed and rail equipment technology work in tandem. This Tier 1 EIS groups the technologies into two categories: diesel-powered and electric powered trainsets either paired with conventional (non-tilting) or tilting passenger coaches. Below is a brief description of each category along with illustrations. The speeds listed for each technology are top speeds, as opposed to average operating speeds, and are dependent on the geometry of the tracks.

- 1) **Diesel** - This Tier 1 EIS evaluated diesel powered trains paired with both conventional (non-tilting) and tilting technologies. Conventional trains travel at speeds ranging from 79 mph to 115 mph compared to trains with tilting cars that can travel at speeds up to 125 mph. Tilting cars allow trains to maintain speed on some curves that would otherwise limit travel speed. While the use of tilting cars does not significantly affect overall travel time, it is important to passenger comfort. An example of non-tilting passenger coaches is shown in **Exhibit 2-11** below.
- 2) **Electric** - Electric train technology utilizes electric power delivered directly to the trainset from a distribution system along the railroad system, typically via overhead catenary power lines. The electric power feeds “traction” motors either on a locomotive or in distributed motors integrated with the passenger coaches. This Tier 1 EIS evaluated electric train technology with tilting passenger coaches in alternatives with speeds above 125 mph up to 220 mph. A current example of an electric trainset with tilting passenger coaches is Amtrak’s Acela, which operates on the Northeast Corridor between Boston, MA and Washington, DC. The Acela is powered by electric locomotives with tilting passenger coaches and is capable of operating up to 160 mph. Another example of an electric trainset is the Deutsche Bahn Intercity-Express (ICE) high-speed train in Europe, which utilizes passenger coaches, without tilt, integrated with distributed electric motors capable of 200 mph operation. An example of this technology is shown in the **Exhibit 2-12** below.

Exhibit 2-11: Conventional Trainset: Diesel-Electric Locomotive with Non-Tilting Passenger Coaches



Image Credit: Amtrak

Exhibit 2-12: Electric High-Speed Trainset: Passenger Coaches with Distributed Power



Image Credit: Eurail

See **Appendix B** for a detailed discussion on the technologies and speed capabilities for each Corridor Alternative. Below is a summary of the technology assumptions made in this Tier 1 EIS for the purposes of analyzing and comparing each Corridor Alternative. Two options are evaluated for each.

1. Southern Crescent:
 - A. Diesel trains using shared tracks with freight traffic and conventional (non-tilt) cars.
 - B. Diesel trains using a combination of shared tracks and new dedicated passenger tracks in places where topography and geometry allow higher speeds if separated from freight traffic. This option includes tilting cars.
2. I-85:
 - A. Diesel trains on dedicated tracks with grade-separated roadway crossings mostly within Interstate ROW; within the Atlanta and Charlotte approach areas, tracks would follow shared freight rail ROW.
 - B. Electric trains on dedicated tracks with grade-separated roadway crossings; within the Atlanta and Charlotte approach areas, tracks would follow shared freight rail ROW.
3. Greenfield:
 - A. Diesel trains on dedicated tracks with grade-separated roadway crossings, mostly outside existing ROW; within the Atlanta and Charlotte approach areas, tracks would follow shared freight rail ROW.
 - B. Electric trains on dedicated tracks with grade-separated roadway crossings, mostly outside existing ROW; within the Atlanta and Charlotte approach areas, tracks would follow shared freight rail ROW.

TRAIN OPERATING SPEEDS AND TRAVEL TIME

The previous section identified two general types of technologies, diesel and electric, and associated top travel speeds. Operating speeds vary along a corridor and are a function of several factors beyond technology type, including: track infrastructure and geometry, corridor topography, the presence of at-grade roadway crossings, the use of dedicated or shared tracks (and associated freight volumes), and the number and location of station stops.¹⁹ In the future, a diesel option could be electrified to improve speed and level of service; however, top speeds would still be limited by track geometry, particularly curves. In addition, trains operating in NS or CSX right-of-way may need to comply with requirements set by the host railroad, which may impact operating speed.

GDOT calculated operating speed and travel time using TEMS LOCOMOTION Train Performance Calculator, a simulation model known as TPC. GDOT used TPC to estimate operating speeds at each mile point for each Corridor Alternative using known assumptions about geometry, technology, and infrastructure.

¹⁹ At locations with at-grade roadway crossings, FRA regulations restrict train speeds to 110 mph.

Below is a summary of the TPC results for each Corridor Alternative and technology option presented in the previous section.

1. Southern Crescent
 - A. For the diesel shared track option, trains are capable of a max speed of 79 mph at select locations along the corridor. Along most of the corridor, operating speeds are between 60 and 70 mph. Estimated trip time is 2 hours and 34 minutes.
 - B. For the diesel option using a combination of shared and dedicated tracks, trains are capable of operating between 79 and 110 mph along four stretches where new dedicated passenger tracks would be constructed, comprising of approximately 20 percent of the corridor. Along the remaining 80 percent of the corridor, operating speeds are generally between 70 and 79 mph. Estimated trip time is 4 hours and 35 minutes.
2. I-85
 - A. For the diesel option, a max speed of 125 mph may be possible at a few locations for short distances due to the grade and curvature of the interstate alignment. Along the rest of the corridor, speeds generally range between 80 and 110 mph, and less than 90 mph in the Atlanta and Charlotte approach areas. Estimated trip time is 2 hours and 50 minutes.
 - B. The electric option faces the same curve issues that limit speeds in the diesel option and, to a lesser degree, the same grade challenges. However, with electric technology, trains may reach up to 180 mph along a few short segments. Along most of the corridor, operating speeds are generally between 125 and 150 mph, with speeds less than 100 mph in the Atlanta and Charlotte approach areas. Estimated trip time is 2 hours and 42 minutes.
3. Greenfield
 - A. For the diesel option, trains are capable of traveling at a top speed of 125 mph for much of the corridor outside the Atlanta and Charlotte approach areas. Within the approach areas, operating speeds generally range between 70 and 110 mph. The reduced curvature and fewer number of station stops, relative to other Corridor Alternatives, allows trains to reach and sustain their maximum design speed. Estimated trip time is 2 hours and 44 minutes.
 - B. For the electric option, trains are capable of traveling at a top speed of 220 mph for most of the corridor outside the Atlanta and Charlotte approach areas. Within the approach areas, speeds generally range between 70 and 110 mph. As with the diesel option, the reduced curvature and fewer number of station stops allows trains to reach and sustain their maximum design speed. Estimated trip time is 2 hours and 6 minutes.

TRAIN TRAVEL FREQUENCIES

Train speed and technology determine train running times and establish train schedules. GDOT used speed and trip time results from the TPC simulator, described above, to calculate the number of daily round trips possible for each Corridor Alternative and technology option. Generally, a higher-speed corridor with a relatively shorter trip time and greater ridership can support more daily round-trip trains on the system.

Appendix B provides details from this analysis and **Exhibit 2-13** provides a summary. The ranges shown in **Exhibit 2-13** represent the two equipment technology options evaluated for each Corridor Alternative, described earlier in this section.

Exhibit 2-13: Summary of Operating Speed, Travel Time, and Frequencies

| Corridor Alternative | Top Operating Speed | Travel Time (hours:minutes) | Round Trips per Day |
|--------------------------|---------------------|-----------------------------|-----------------------|
| Southern Crescent | 79 to 110 mph | 4:35 to 5:34 | 4 |
| I-85 | 125 mph to 180 mph | 2:42 to 2:50 | 14 |
| Greenfield | 125 mph to 220 mph | 2:06 to 2:44 | 16 - 22 ²⁰ |

Source: HNTB

The number of round trips was based on multiple factors, such as travel time, station location, train length/capacity, and expected ridership (discussed in **Section 2.2.2.5**). Due to the faster operating speed and shorter run time, GDOT determined that the Greenfield would support the most round-trip frequencies among the Corridor Alternatives; therefore, it would generate the highest ridership. The number of round trips provided are preliminary and calculated for the purposes of comparing the alternatives. The schedules will be re-evaluated independent of this Tier 1 EIS within a future Tier 2 analysis for the Preferred Alternative. **Appendix B** includes details of the schedules developed for each Corridor Alternative.

POTENTIAL TRAVEL SCHEDULES

Based on the calculated train running times GDOT developed train timetables (schedules) to simulate service on the three Corridor Alternatives. The schedules included station stopping patterns for each alternative that reflect anticipated patterns of daily demand, and comprised of a combination of express and local services. The schedules were arranged to maximize the accommodation of riders going between both ends of the corridor as well as intermediate points. Reflecting a common industry practice, the schedules avoid departing an originating station before 6 AM or arriving after midnight; however, GDOT found it to be unavoidable to maintain frequencies at the fringes of the operating schedule. Detailed results are documented in **Appendix B**. The travel frequencies and train schedules are applied to the calculation of ridership and revenue forecasts, described in the following section.

2.2.2.5 Ridership and Revenue

This Tier 1 EIS includes forecasts for ridership and revenue for each of the Corridor Alternatives. Ridership and revenue (ticket sales) highly correlate, as the higher ridership numbers translate into higher revenues collected. Multiple factors affect ridership and revenue including destinations, travel time, schedule, and frequency. Another component that affects the competitiveness of a Corridor Alternative is the number and location of stations (see **Section 2.2.2.3**).

GDOT used nationally accepted demand forecasting tools to analyze ridership and revenue which addresses four distinct travel markets: intercity travel, intra-urban travel, airport diversion, and induced demand. More

²⁰ At 220 mph, the Greenfield Corridor Alternative ridership can support up to 22 round trips per day.

information concerning the demand forecasting methodology and results is provided in **Appendix B**. GDOT estimated projected revenue and ridership for each Corridor Alternative for the years 2025 and 2050. These two timeframes represent the incremental implementation of high-speed rail service, with 2025 representing a potential opening year for rail service and 2050 being the full build-out implementation of service year. Of the three corridors, GDOT estimates that the Greenfield will have the highest number of annual riders as well as the highest revenue; I-85 came in second, and the Southern Crescent third. Based on the ridership analysis, GDOT estimated the annual revenue generated by the system. Collectively, the forecasted annual revenue includes the farebox revenues and revenues from onboard services (food and beverage sales), which is referred to as “System Revenues.” Ranges shown in the table reflect the two equipment technology options analyzed for each Corridor Alternative, described in **Section 2.2.2.4**.

Exhibit 2-14 illustrates the anticipated ranges for ridership and revenue for both 2025 and 2050 forecast timeframes. Ranges shown in the table reflect the two equipment technology options analyzed for each Corridor Alternative, described in **Section 2.2.2.4**.

Exhibit 2-14 Ridership and Revenue Forecasts

| Corridor Alternative | 2025 | | 2050 | |
|--------------------------|-----------------------------|--|-----------------------------|------------------------------------|
| | Forecasted Annual Ridership | Forecasted Annual Revenue ²¹ (2012\$) | Forecasted Annual Ridership | Forecasted Annual Revenue (2012\$) |
| Southern Crescent | 0.81 M to 1.01M | \$37.0 M to \$48.2M | 0.94M to 1.18M | \$43.5M to \$56.9 M |
| I-85 | 4.65 M to 4.75M | \$305.6M to \$312.8M | 5.50M to 5.62M | \$369.0M to \$377.2M |
| Greenfield | 4.58 M to 5.37M | \$326.8M to \$397.0M | 5.38M to 6.30M | \$397.9M to \$475.8M |

Source: HNTB

Part of the ridership and revenue estimation, and ultimately the projected output, is the number of travelers diverting from air travel and choosing rail service instead. Airport choice diversion was only modeled for I-85 and the Greenfield Corridor Alternatives, as GDOT determined that the level of service provided by the Southern Crescent would not be sufficient to constitute a viable option for air travelers due to the longer travel time. Where airport choice diversion was modeled, GDOT assumed that passengers would have to purchase separate rail and air tickets. More information about modeling airport choice can be found in **Appendix B**.

The ridership and revenue analysis revealed three main trends:

- 1) Although the collective ridership for the Atlanta or Charlotte urban areas was the highest along the corridor, ridership at some individual stations within each urban area demonstrated lower ridership than stations in smaller communities along the corridor. This is due to a distribution of riders in the urban area among multiple stations. For example, the GSP airport station showed the greatest ridership potential along the Greenfield Corridor Alternative; however, this was due to only one station serving the Greenville-Spartanburg area compared to three each in the Charlotte and Atlanta urban areas.

²¹ Forecasted Annual Revenue includes ticket sales and on-board service (food and beverage sales), which are calculated on a passenger-mile basis for this Tier 1 EIS. Passenger-miles are calculated as the number of passengers multiplied by the miles traveled. Additional detail is documented in the ADR.

- 2) For the Southern Crescent Corridor Alternative, a strong intra-urban travel demand market serves the exurban Atlanta market in the Gainesville, Commerce, and Toccoa, GA, areas. The populations in these areas are more than 50 miles from the nearest international airport (either H-JAIA or GSP). A similar trend could be expected for exurban stations in the I-85 and Greenfield Corridor Alternatives.
- 3) The intercity travel trend among midpoint stations within the corridor is relatively high, but urban areas were primarily either the origin or destination for the vast majority of the forecasted trips.

2.2.2.6 Capital Costs

Costs for the Project fall into two categories: capital, and operations and maintenance (O&M). Capital represents the costs of building the Project, such as constructing track and bridges or trainsets. O&M represents costs associated with delivering and sustaining the service, such as train crews, fuel or electric power, or track maintenance. Collectively, the forecasted O&M costs are also referred to as “Operating Costs.”

To develop a consistent costing methodology, the capital cost estimates for each Corridor Alternative follow the FRA Standard Cost Categories (SCC) guidance for the development of all capital cost estimates, as shown in **Exhibit 2-115**.²² All cost estimates are in 2012 dollars, which reflects the base year of the data collected, and include a 30 percent contingency across all cost categories. See **Appendix B** for a detailed discussion of cost methodology and results for each Corridor Alternative.

Exhibit 2-115: FRA Standard Capital Cost Categories

| Standard Cost Categories | |
|--------------------------|--|
| 10 | Track Structures and Track |
| 20 | Stations, Terminals, Intermodal |
| 30 | Support Facilities: Yards, Shops, Administration Buildings |
| 40 | Sitework, ROW, Land, Existing Improvements |
| 50 | Communications and Signaling |
| 60 | Electric Traction |
| 70 | Vehicles |
| 80 | Professional Services |
| 90 | Unallocated Contingencies ²³ |
| 100 | Finance Charges |

Source: FRA

As shown in **Exhibit 2-16** below, the I-85 Corridor Alternative has the most expensive capital costs (ranging from \$13.3 billion to \$15.4 billion), primarily due to the modifications to the interstate to accommodate the

²² California High-Speed Train (Merced to Fresno) http://www.hsr.ca.gov/docs/programs/merced-fresno-eir/final_EIR_MerFres_TR_CapitalCost.pdf (accessed on 12/8/2017)

²³ Unallocated contingencies were not included in the cost estimates. These typically include more widespread uncertainties, such as schedule delays, changes in contracting, or other similar issues that are associated with individual construction activities.

Project. Since high-speed rail requires extensive curve improvements and protection from the adjacent roadway traffic, the I-85 Corridor Alternative includes reconstruction of highway medians and overpasses, and construction of an elevated rail viaduct in segments where there is no space available in the median for installation of tracks. The Greenfield is the second most expensive, with a range of \$6.2 billion to \$8.4 billion, primarily due to the construction of an entirely new transportation corridor. Lastly, the Southern Crescent was the least expensive, ranging \$2 billion to \$2.3 billion, primarily attributable to sharing an existing railroad corridor, and partial coordination with freight and passenger rail service. The cost ranges for the three Corridor Alternatives account for the various technologies applicable to each corridor (see **Appendix B**).

Exhibit 2-16: Capital Cost Estimates

| Corridor Alternative | Capital Cost (in 2012 dollars) |
|----------------------|--------------------------------|
| Southern Crescent | \$2.0 B to \$2.3 B |
| I-85 | \$13.3 B to \$15.4 B |
| Greenfield | \$6.2 B to \$8.4 B |

Source: HNTB

2.2.2.7 Operating and Maintenance Costs

This Tier 1 EIS includes forecasts for O&M costs for years 2025 and 2050. **Appendix B** provides O&M calculation methodology and unit costs. **Exhibit 2-17** summarizes cost categories for O&M and their drivers.

Exhibit 2-17: Operating Cost Categories and Primary Cost Drivers

| Drivers | Cost Categories |
|--|---|
| Train Miles <i>(number trains multiplied by the number of miles traveled)</i> | Equipment Maintenance Energy and Fuel Train and Engine Crews Onboard Service (OBS) Crews |
| Passenger Miles <i>(number of passengers multiplied by the number of miles traveled)</i> | Insurance Liability |
| Ridership and Revenue <i>(number of passengers and proceeds from ticket sales and on-board services)</i> | Sales and Marketing |
| Fixed Costs <i>(overhead and administrative costs that do not change with the amount of service provided)</i> | Service Administration Track and ROW maintenance Station Costs |

Source: HNTB

A summary of O&M costs for years 2025 and 2050 are shown in **Exhibit 2-18**. The range of values reflect the two equipment technology options evaluated for each Corridor Alternative. The Greenfield is the most expensive for O&M, ranging from \$164.2 million to \$197.8 million annually (in the year 2025), primarily

due to the impact of higher operating speeds on equipment and infrastructure as well as more frequent service. I-85 is the second highest in O&M costs, ranging \$146.8 million to \$150.9 million annually (year 2025), also due to higher operating speeds. The Southern Crescent is the least expensive for O&M costs, ranging \$58.1 million to \$60.7 million annually (year 2025), primarily due to the lower level of service and lower operating speeds.

Exhibit 2-18: Operating and Maintenance Annual Cost Estimates

| Corridor Alternative | O&M Cost (in 2012 dollars) ²⁴ | |
|--------------------------|--|------------------------|
| | 2025 | 2050 |
| Southern Crescent | \$58.1 M to \$60.7 M | \$63.2 M to \$66.1 M |
| I-85 | \$146.8 M to \$150.9 M | \$169.9 M to \$192.9 M |
| Greenfield | \$164.2 M to \$197.8 M | \$205.7 M to \$211.9 M |

Note: Growth in annual O&M cost over time reflects expenses related to growing ridership and greater maintenance needs as equipment and infrastructure ages.

Source: HNTB

2.2.2.8 Financial Analysis

The financial analysis represents a particular Corridor Alternative’s performance for the overall revenues, costs, and any surplus or deficits. Operating surpluses indicate that the service generates more system revenue than operating costs, and can be a positive indicator of financial stability, while operating deficits indicate the need for financial assistance (e.g., public subsidy). The comparison of System Revenues and Operating Costs does not include the capital costs required to construct the Project. An explanation of the revenues and costs that comprise the financial analysis follows:

- **System Revenues:** These include the fare box revenues and revenues from onboard services (food and beverage sales). This information is based on the ridership and revenue analysis discussed in 2.2.2.5 and detailed in **Appendix B**.
- **Operating Costs:** These are the O&M costs associated with operating passenger rail service such as fuel, equipment maintenance, ROW maintenance, and it includes onboard service costs. This information is based on the O&M analysis discussed in **Section 2.2.2.57** and detailed in **Appendix B**.

An operating surplus makes an important contribution to the overall business case for building the high-speed rail service or system. If there is an operating surplus, the system will not require a subsidy to operate or maintain, and the surplus can contribute toward repayment of the capital costs to construct the system. In addition, because the system is generating a positive cash flow, a Public-Private Partnership (P3) or other innovative financing method could be a means to operate the system, and possibly contribute toward the cost of its construction. Conversely, if there is an operating deficit, the system will require public funding to operate and maintain the system once built, and there will be no operating surplus to support repayment of the capital costs required to build the system. The requirement for a subsidy can reduce the economic performance of the system and offset some of the economic benefits. GDOT calculated the operating ratio for each Corridor Alternative by dividing the system revenues by the operating costs. Positive operating ratios (>1.0) indicate

²⁴ The range of values reflect the two technology options evaluated for each Corridor Alternative (described in Section 2.2.4), The first value listed is associated with the lower speed option.

an operating surplus, while negative ratios (<1.0) indicate an operating deficit. In the ADR, a Net Present Value (NPV) over the 30-year life of the system was calculated; NPV information is available in **Appendix B**.

Exhibit 2-19 displays the results of GDOT’s financial analysis. The range of values reflect the two technology options analyzed for each Corridor Alternative. In summary, the financial analysis projected the Greenfield corridor as having the largest annual operating surplus of the three Corridor Alternatives for the 2025 analysis year, ranging from \$162.6 million to \$199.2 million. I-85 would also have an annual operating surplus, ranging from \$154.7 million to \$166.1 million. The Southern Crescent would be the only one with an operating deficit, ranging between -\$12.5 million and -\$21.1 million. The positive operating surpluses calculated for the I-85 and Greenfield Corridor Alternatives indicate that projected ridership and revenues outweigh the higher operating costs discussed in the previous section.

Exhibit 2-19: Financial Analysis Summary²⁵

| Corridor Alternative | Annual Operating Surplus (or Deficit) ²⁶ | | Operating Ratio (over 30-year period) |
|--------------------------|---|-------------------------|---------------------------------------|
| | 2025 | 2050 | |
| Southern Crescent | (\$21.1 M) to (\$12.5 M) | (\$19.6 M) to (\$9.1 M) | 0.66 to 0.82 |
| I-85 | \$154.7 M to \$166.1 M | \$176.1 M to \$207.3 M | 2.05 to 2.30 |
| Greenfield | \$162.6 M to \$199.2 M | \$192.1 M to \$263.9 M | 2.08 to 2.32 |

Source: HNTB

Lastly, GDOT also calculated a benefit-to-cost ratio (B-C) to illustrate the Corridor Alternative that had the highest returns from a return on investment perspective. The B-C calculation was performed based on an interest rate of three percent, then an additional calculation was performed based on a seven percent interest rate for the purposes of providing a conservative estimate. A three percent interest rate reflects the cost of long-term government bonds. For this Tier 1 EIS, GDOT used the more conservative seven percent interest rate to define the value of the Project. **Appendix B** provides additional information about the financial analysis conducted for the three Corridor Alternatives.

The Greenfield had the highest B-C ratio among the three Corridor Alternatives, and was the only alternative to generate a positive benefit of 1.22. Although the I-85 and Greenfield Corridors generated similar operating costs and system revenues, the higher infrastructure cost of the I-85 Alternative reduced the B-C ratio to 0.60. The Southern Crescent Corridor Alternative produced the lowest B-C ratio of 0.44 because its ridership was unable to generate enough revenue to offset the Operating Costs.

²⁵ The range of values reflect the two technology options evaluated for each Corridor Alternative (described in Section 2.2.4), The first value listed is associated with the lower speed option.

²⁶ Operating Surplus (or deficit) is calculated by subtracting the O&M costs described in Section 2.2.2.7 from the revenues described in Section 2.2.2.5.

2.3 SUMMARY OF ALTERNATIVES ANALYSIS

GDOT initially screened six Corridor Alternatives and retained three, the Southern Crescent, I-85, and Greenfield, for further consideration because of their ability to best meet the Project's Purpose and Need. GDOT then identified potential equipment technologies, presented two Atlanta Approach options, calculated various service-related metrics, and performed a financial analysis of these three Corridor Alternatives.

Exhibit 2-20 provides a summary of results for each Corridor Alternative and their service characteristics. The ranges presented here reflect two technology options evaluated for each Corridor Alternative. The Southern Crescent was evaluated for two options using diesel technology, one following shared tracks and one with a combination of shared and dedicated passenger tracks. The I-85 Corridor Alternative was evaluated using a diesel and electric option, both following dedicated tracks. Likewise, the Greenfield Corridor Alternative was also evaluated for a diesel and electric option, both following dedicated tracks.

Exhibit 2-20: Summary of Alternatives Analysis

| Alternative | Top Operating Speed ²⁷ (MPH) | End to End Travel Time (hrs:min) | Frequency (daily round trips) | Capital Cost ²⁸ | 2050 Annual Ridership | 2050 Annual Revenue ²⁹ | 2050 Annual O&M Cost ³¹ | 2050 Operating Surplus (or Deficit) ³¹ | Operating Ratio (over 30-year period) | Benefit/Cost Ratio (7% Interest Rate) |
|--------------------------|---|----------------------------------|-------------------------------|----------------------------|-----------------------|-----------------------------------|------------------------------------|---|---------------------------------------|---------------------------------------|
| Southern Crescent | 79 to 110 | 4:35 - 5:34 | 4 | \$2.0 B to \$2.3 B | 0.94 M to 1.18 M | \$43.5 M to \$56.9 M | \$63.17 M to \$66.1 M | (\$19.6 M) to (\$9.1 M) | 0.66 to 0.82 | 0.44 to 0.52 |
| I-85 | 125 to 180 | 2:42 - 2:50 | 14 | \$13.3 B to \$15.4 B | 5.50 M to 5.62 M | \$369.0 M to \$377.2 M | \$192.9 M to \$169.9 M | \$176.1 M to \$207.3 M | 2.05 to 2.30 | 0.59 to --0.60 |
| Greenfield | 125 to 220 | 2:06 - 2:44 | 16 – 22 ³⁰ | \$6.2 B to \$8.4 B | 5.38 M to 6.30 M | \$397.9 M to \$475.8 M | \$205.7 M to \$211.9 M | \$192.1 M to \$263.9 M | 2.08 to 2.32 | 1.19 to 1.22 |

Source: HNTB

²⁷ As described in Section 2.2.2.4, operating speeds are a function of equipment technology, geometry, topography, and other corridor characteristics. Generally, top speeds are only sustained for portions of the trip, the extent of which varies by Corridor Alternative.

²⁸ Costs shown in 2012 dollars, reflecting the year of analysis

²⁹ Revenue includes tickets and on-board services

³⁰ With a sustained operating speed of 220 mph, the Greenfield Corridor Alternative can support up to 22 round trips per day.

2.4 TIER 2 ANALYSIS CONSIDERATIONS

As stated in **Section 2.2.2.2** of this Tier 1 EIS, some analysis will be deferred to the Tier 2 level. This includes station locations, interfaces with airports (H-JAIA, GSP, and CLT), project alignment, equipment technology, additional service details, and the approach into and through Atlanta. For instance, in the Atlanta-Chattanooga FEIS/ROD, the I-75/I-85 corridor was identified as a possible route through downtown Atlanta.³¹ Separate Tier 2 NEPA documentation could be pursued for the Atlanta Approach, which could also consider other intercity passenger rail corridors and planned commuter rail corridors in the Atlanta area. A Tier 2 analysis will also validate the assumptions made here regarding the approach into Charlotte to CLT and the terminal Charlotte-Gateway Station. Concerning equipment technology, a Tier 2 analysis may explore a phased approach that would initially use diesel technology with the option to electrify the corridor over time, as funding allows. Tier 2 EIS work could also explore phasing construction for the preferred alignment.

The “reliability” of the Project will also be explored during a Tier 2 analysis.³² The Southern Crescent, with its dependence on shared tracks and frequency of at-grade roadway crossings, may have reliability issues that are beyond the scope of a Tier 1 EIS.

³¹ <http://www.dot.ga.gov/IS/Rail/AtlantatoChattanooga>

³² *Reliability in this context refers to the operability of a corridor under non-everyday conditions such as inclement weather, changes in freight rail operations or roadway operations, and myriad issues stemming from human error.*