Regional Transit Framework Plan

Goals, Objectives and Performance Measures

Prepared for the Berkeley-Charleston-Dorchester Council of Governments

FINAL | March 29, 2018

Regional Transit Framework Plan

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Introduction

The Berkeley-Charleston-Dorchester (BCD) region is home to rich history, world-class beaches and attractions, multi-sector firms, military installations, a seaport, and national freight/passenger rail connections. Such attractions coupled with a growing job market have led to an influx of residents to the area, and more are expected to come in the future.

The purpose of the Regional Transit Framework Plan (RTFP) is to identify and prioritize a High-Capacity Transit (HCT) network that serves wide-ranging trip needs, connects the region, enhances the quality of life, and supports economic growth and development. The RTFP serves as a blueprint for future transit investment in the region through 2040 and will be consistent with recommendations from the Long-Range Transportation Plan (LRTP) that is currently being updated. The study will consider and evaluate existing transit needs as well as future considerations such as population/employment growth, land use, funding, local and regional policies and stakeholder needs. Understanding the purpose of the RTFP is fundamental to developing appropriate goals and objectives and subsequently performance measures.

Background

The Goals and Objectives presented here were developed after a thorough review of previous and current plans such as the OurRegion OurPlan (OROP), the Neck Master Plan, the i-26ALT, CARTA's Comprehensive Operational Analysis (COA) and the 2035 Long-Range Transportation Plan (LRTP). These documents serve as the foundation for developing the goals and objectives as well as the performance measures for the RTFP. The following are short summaries of these studies.

OurRegion OurPlan

OurRegion OurPlan (OROP) developed a framework for how to manage the rapid growth the region is experiencing and forecasted to continue over the next several decades. The growth is evident by the levels of congestion and the strain on the regional transportation network and housing market. The community has realized that investments need to be made to ensure advancements are implemented to make the existing transportation network more multi-modal and expand system throughput. OROP specifically identified a key strategy to develop the RTFP. The comprehensive regional transit network identified through the RTFP effort will allow connectivity between the urbanized areas in all three counties to serve the wide-ranging trip needs. **Figure 1**, included in **Appendix A**, shows the transit corridors identified in the OROP study.

Master Plan for the Neck Area of Charleston and North Charleston

The Master Plan for the Neck Area of Charleston and North Charleston (MPNACNC) developed a transportation and development planning framework to guide public and private development in a nearly 30 square mile area in the cities of Charleston and North Charleston. The NAMP identified four corridors in which to focus transit service investments, these are the Spine corridor, Dorchester Road corridor, I-26 corridor and the Freight Rail corridor. The plan recommended a phased and gradual implementation of a

variety of transit technologies such as enhanced bus service, BRT, light rail, and commuter rail. Each improvement sets the stage for additional investments. As transit demand is established a different technology would support the need. For example, enhanced bus service would lead to dedicated BRT and eventually to light rail. Lastly, the study recommended commuter rail in existing freight rail corridors to Summerville and/or Moncks Corner, and a combination of enhanced local and express bus service in the Dorchester Road and I-26 corridors. **Figure 2** in **Appendix A** shows the proposed corridors.

I-26ALT Study

The purpose of the I-26ALT Study was to improve transit service and enhance regional mobility along the 22-mile I-26 Corridor connecting Summerville, North Charleston, and downtown Charleston. The goals of the study were: improve mobility, accessibility, safety, and connectivity of the transit system and region; promote a cost effective and financially feasible transit alternative; support local land use objectives; plan for projected growth in an environmentally sustainable manner; respond to community needs and support; and support a diverse regional economy. The study effort identified a fixed guideway transit alternative for the corridor; **Figure 3** in **Appendix A** shows the recommended alignment and mode.

CARTA Comprehensive Operations Analysis

The Charleston Area Regional Transportation Authority (CARTA) Comprehensive Operational Analysis (COA) provided an in-depth analysis of the transit system. Using a detailed market, service, and operational analysis the COA identified strengths as well as opportunities for improvements in the short- and mid-term timeframes. The COA also outlined the resources needed to expand the system over a decade. **Figure 4**, included in **Appendix A**, shows the recommended local bus transit network.

Short-term recommendation goals revolve around reliable service, reinvestment in upgrading the system, and readying corridors for future investment. Short-term recommendations focus on improving the quality of service for current customers, ways to optimize the system (e.g. removing or modifying network inefficiencies), and setting aside revenues for capital reserves. The mid-term recommendations, a fiscally unconstrained needs assessment, revolve around high capacity transit corridors and a premium transit along the I-26 Corridor to grow the system over a decade.

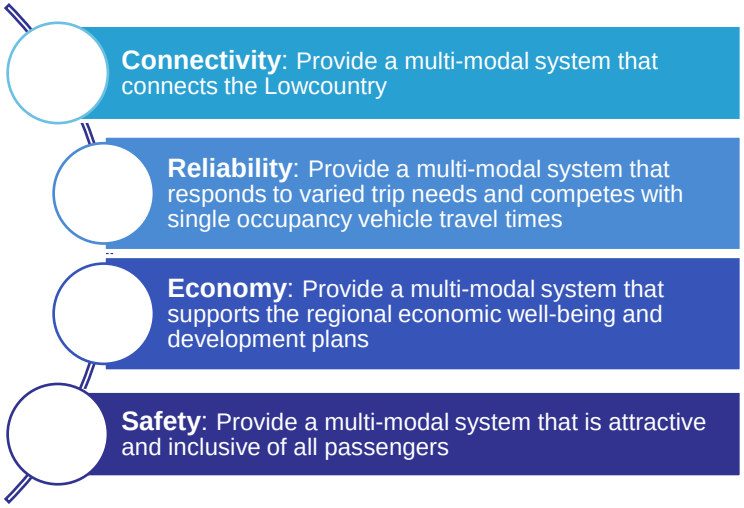
Long-Range Transportation Plan

A region's LRTP sets priorities for spending federal funds on transportation projects such as highways, roads, bridges, transit facilities and service, bicycle and pedestrian routes, and related enhancements. The LRTP is a guide for the development of a regional transportation system that meets the current and future mobility needs of area residents and visitors. A federally required document for all metropolitan areas, a LRTP must be updated at least once every five years to stay in compliance with federal regulations. The LRTP documents the region's vision and goals for the transportation system and guides the project prioritization and expenditure of federal transportation funding. Recommended strategies related to public transit in the BCDCOG's current LRTP, titled the 2035 LRTP, are service

enhancements; facilities, equipment, amenities and land use coordination; explore and develop new modes and technologies; and institutional and funding strategies for additional safety and marketing. The BCDCOG 2035 LRTP is currently in the process of being updated and once the RTFP is complete it will be incorporated into the LRTP. **Figure 6**, included in **Appendix A**, shows the existing and proposed transit network from the BCDCOG 2035 LRTP. Figure 7 shows the recommended transit corridors from the 2018 LRTP update.

Goals and Objectives

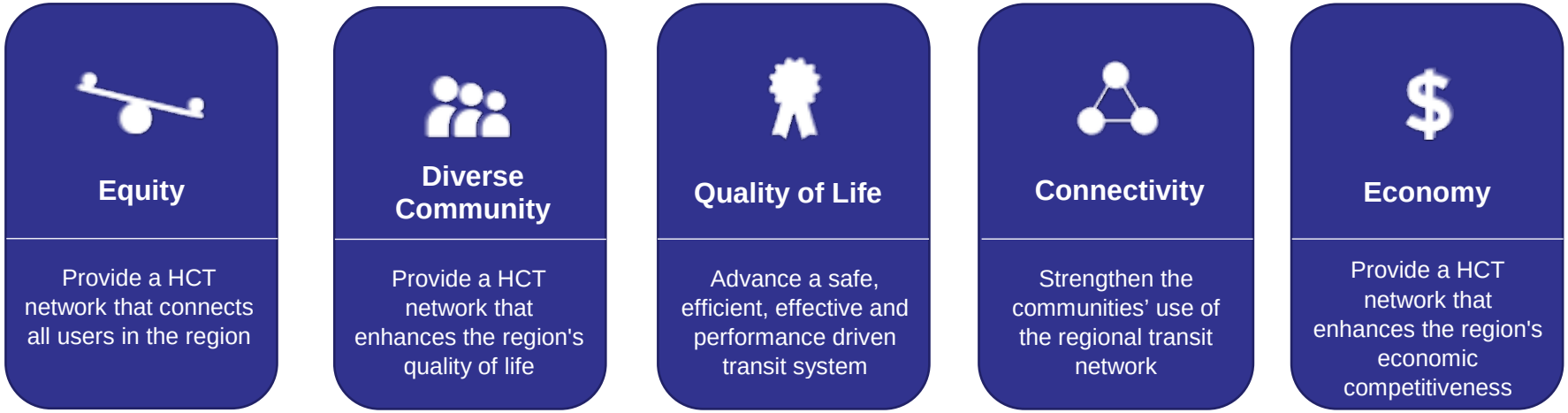
Four guiding principles were established to develop the RTFP's goals and objectives. The guiding principles were gleaned from an analysis of the overarching goals and objectives in the aforementioned studies. These principles are not separate elements, rather they are collaborative elements working together to meet the region's mobility needs. The guiding principles are as follows:



In addition to the guiding principles, the goals and objectives of the RTFP build on other previous and ongoing BCDCOG local and regional planning efforts, the Study Summary Matrix is included in **Appendix B**. The goals and objectives are also grounded based on a review of industry best practices, plans and studies that provide direction for performance based planning. In order to identify a performance driven HCT network, additional evaluation criteria, described further in this document, are proposed such as service and bus stop standards, performance measures and transit demand screening measures. These elements will support future study tasks and work together as follows:

The RTFP should be seen as a living document and should be updated as needed in order to ensure that the public is always engaged and the study is supported by the most recent data. The goals and objectives, which will help guide the screening of proposed HCT alignments, are summarized in **Figure 1**.

Figure 1: Goals and Objectives



- Increase quality transit options for transit dependent populations, choice riders and area visitors
- Deliver reliable and frequent HCT service
- Provide an equitable and affordable HCT network for all users

- Provide a transit network that serves multiple trip purposes
- Provide efficient connectivity to bicycle and pedestrian users
- Provide a transit network that connects to social and community resources
- Provide a transit network that connects to transit supportive land use and affordable housing

- Provide a seamless HCT network that improves regional connectivity
- Provide a competitive alternative to the automobile and that helps to reduce congestion
- Provide a performance-based system consistent with local, state and federal requirements

- Provide efficient connectivity to existing and future transit services
- Implement an intelligent transportation system that enhances the riders experience
- Coordinate with all jurisdictions to develop land use policies that support HCT

- Enhance connectivity to transit supportive districts
- Provide convenient and reliable access to regional employment areas
- Continue to develop partnerships that spur development that supports HCT
- Develop efficient and cost effective HCT corridors and modes

Evaluation Criteria

Evaluation criteria are vital to help identify and categorize regional transit corridors. The proposed criteria include service standards, performances measures and additional screening measures.

Service Standards

Service standards are the area where the customers' expectations and agency's possibilities meet; they serve as a baseline pledge to the customer and a reminder to the agency on the obligations to deliver that pledge. Standards are analyzed through performance measures to gauge how the system is functioning. They also serve as a planning tool for a consistent and reliable system for the customer. Service standards support the RTFP's goals and objectives because they provide a base level of service to identify a reliable network that connects the region and serves the various trips of all users.

Different types of transit services require different service standards and performance measures. For the purpose of this study the following service types are identified: Paratransit/Americans with Disability Act (ADA), circulator/shuttle, local bus, limited stop all day (BRT), and commuter express. Service standards such as level of frequency, span of day, and days of operation are recommended for each transit service type. Recommended standards are assigned to each service type based on anticipated demand, markets served (e.g. all day travel versus commuters), and industry practices. Recommended service standards by service type are noted in **Table 2**.

Table 1 | Recommended Service Standards by Service Type

Service Type	Min./ Base Headway or Daily Trips	Min. Span Week/ Sat/ Sun	Min. Operating Days
Paratransit (ADA)	NA	ADA service per FTA guidelines	
Shuttle/ Circulator	30 min	12hrs/10hrs/10hrs	Mon–Sun
Local Bus	30 min*	16hrs/14hrs/12hrs	Mon–Sun
Limited Stop All-Day (BRT)**	20 min	16hrs/14hrs/12hrs	Mon–Sun
Commuter Express	6 trips AM/ 6 trips PM	NA	Mon–Fri

**60 min early morning, late night service or as warranted per demand. **i-26 ALT Study recommendation.*

Recommended standards for bus stop spacing were also identified. Routes providing localized service make frequent stops while those with higher speeds have stops farther apart. **Table 3** describes recommended minimum stop spacing for the proposed service types. Note that in dense or sparse areas or corridors a variation to the standard may be warranted.

Table 2 | Recommended Minimum Stop Spacing

Service Type	Base
Paratransit (ADA)	NA
Shuttle/ Circulator	¼ mi.
Local Bus	¼ mi.
Limited Stop All-Day (BRT)	1 mi.
Commuter Express	2 maximum inbound stops

Performance Measures

Performance measures take the pulse of the current transit system and ensure that services are operating effectively and efficiently. Performance measures also help gauge the utilization of a future system. Measures include quantitative metrics that allow transit agencies to track progress towards established goals and objectives. A 2011 the National Cooperative Highway Research Program (NCHRP) study outlined several motivations for transit agencies to utilize performance measures, including: to comply with Federal or state mandates; to provide accountability to stakeholders; to assist with decision-making/prioritization processes; and, to help build or maintain credibility with the public.

While the list of possible performance measures is extensive, the specific measures a transit agency chooses to establish must be driven by its own unique goals and objectives and by the availability and reliability of data. Common transit performance measures that could be utilized in the BCDCOG region are noted in **Table 4**.

Table 3 | Draft Recommended Performance Measures

Draft Measures			
Total boardings	Operating cost per boarding	Subsidy per boarding	On-time performance
Average fare	Boardings per revenue hour	Boardings per revenue mile	Vehicle revenue hours
Vehicle revenue miles	Farebox recovery rate (%)	Operating cost per revenue mile	

While a quality performance measurement program is necessary to satisfy basic reporting requirements (e.g. National Transit Database reports, etc.), it is also vital in making the case for HCT investments. The FTA's Capital Investment Grant (CIG) program, the primary program for funding major transit capital investments, requires project sponsors to demonstrate how deficiencies in the performance of existing services (e.g. ridership exceeding vehicle capacity despite high-frequency service, on-time performance issues due to high volume boarding locations or traffic congestion, etc.) warrants the investment in a HCT solution. As such, any agency seeking to implement HCT options in their communities should establish robust transit performance measurement programs.

Additional Screening Measures

Beyond the performance of existing transit corridors additional screening criteria may be necessary to evaluate competitiveness of transit corridors of regional significance. **Table 5** includes potential screening criteria to help determine the competitiveness of other transit corridors. The screening measures matrix includes the overall project goals and how the measures tie back to those goals. Screening measures will consider existing and future conditions based on availability of data and applicability.

Table 4 | Screening Measures*

Equity	Diverse Community	Quality of Life	Connectivity	Economy	Screening Measures
x	x	x	x		Total population
		x		x	Total employment
x	x		x		% Households with zero vehicles
x	x		x		% of Low Income Households (<$25K)
		x		x	Household density
x	x	x	x		Corridor connections to bike facilities or lane miles
x	x	x	x		Number of civic destinations served
		x	x		Direct connections to committed HCT routes in LRTP
		x	x	x	Impact on AM and PM peak roadway congestion (average peak travel speed vs. posted speed)
x	x		x		Average daily weekday bus boardings
x	x		x		Average daily weekday bus boardings/hour
x	x		x		Average daily weekday bus boardings/mile
x	x	x	x	x	Average weekday span of service (Hours)
x	x				Cumulative peak weekday transit trips operated/hour
x	x				Cumulative base weekday transit trips operated/hour
x	x		x	x	Number of bus routes operating
		x	x		Roadway intersection density
x	x	x	x	x	Number of current and future/planned bus routes
		x		x	Total transit supportive jobs**
		x		x	Job Density
		x	x	x	Transit-Supportive Density (Jobs + Residents/Gross Acre)
	x		x	x	Daily Trips Generated and Attracted
			x	x	Traffic Analysis Zones inter- and intra- trip interchanges
x	x		x	x	Number of jobs accessible within 30 minutes

**One-mile buffer. ** Transit-supportive jobs: government, entertainment, and knowledge-based sectors*[1]

[1] http://reconnectingamerica.org/assets/Uploads/TransitandRegionalED2011.pdf

Appendix A

Figure 2 | The Vision's Plan Corridors

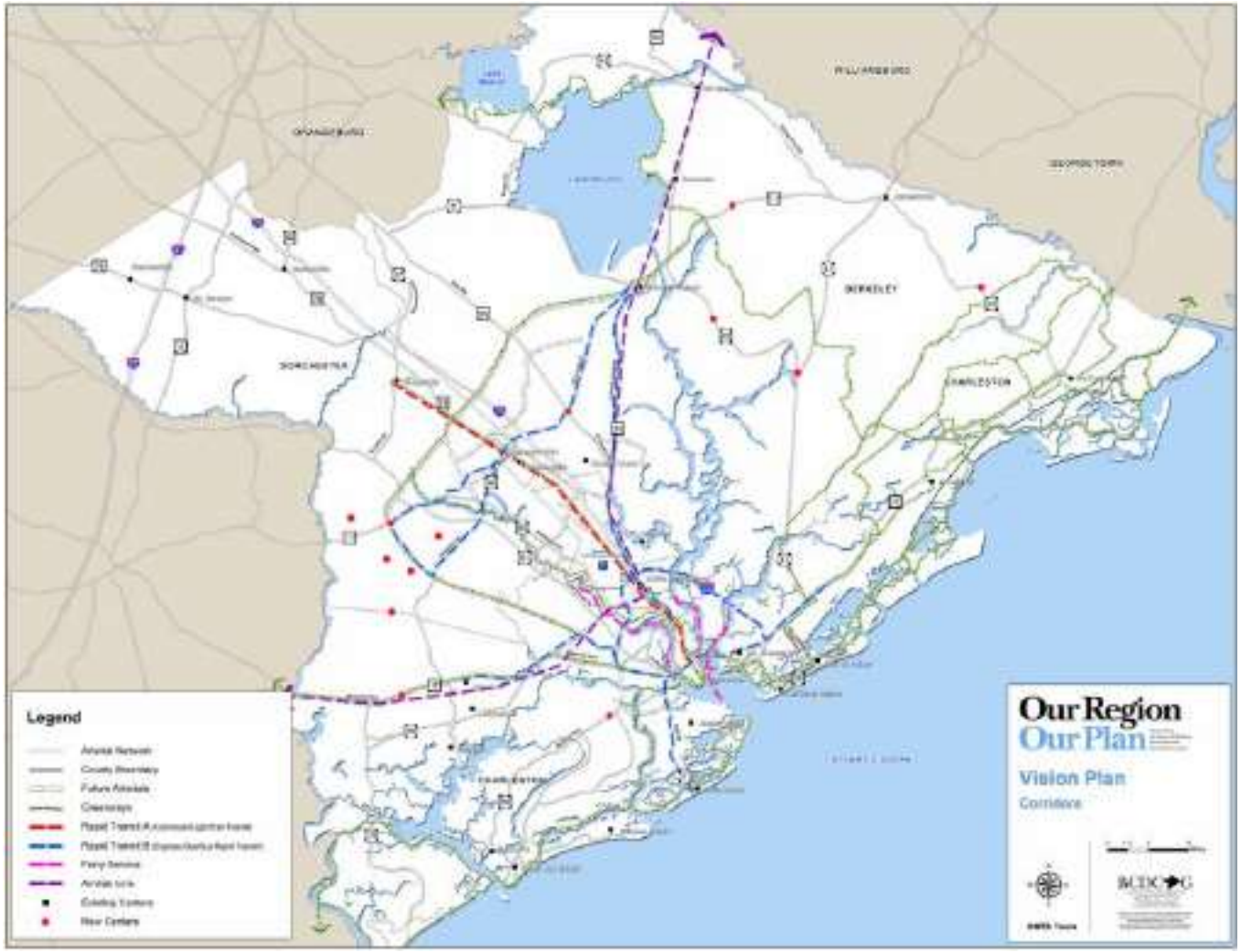


Figure 3 | A Master Plan for the Neck Area of Charleston and North Charleston

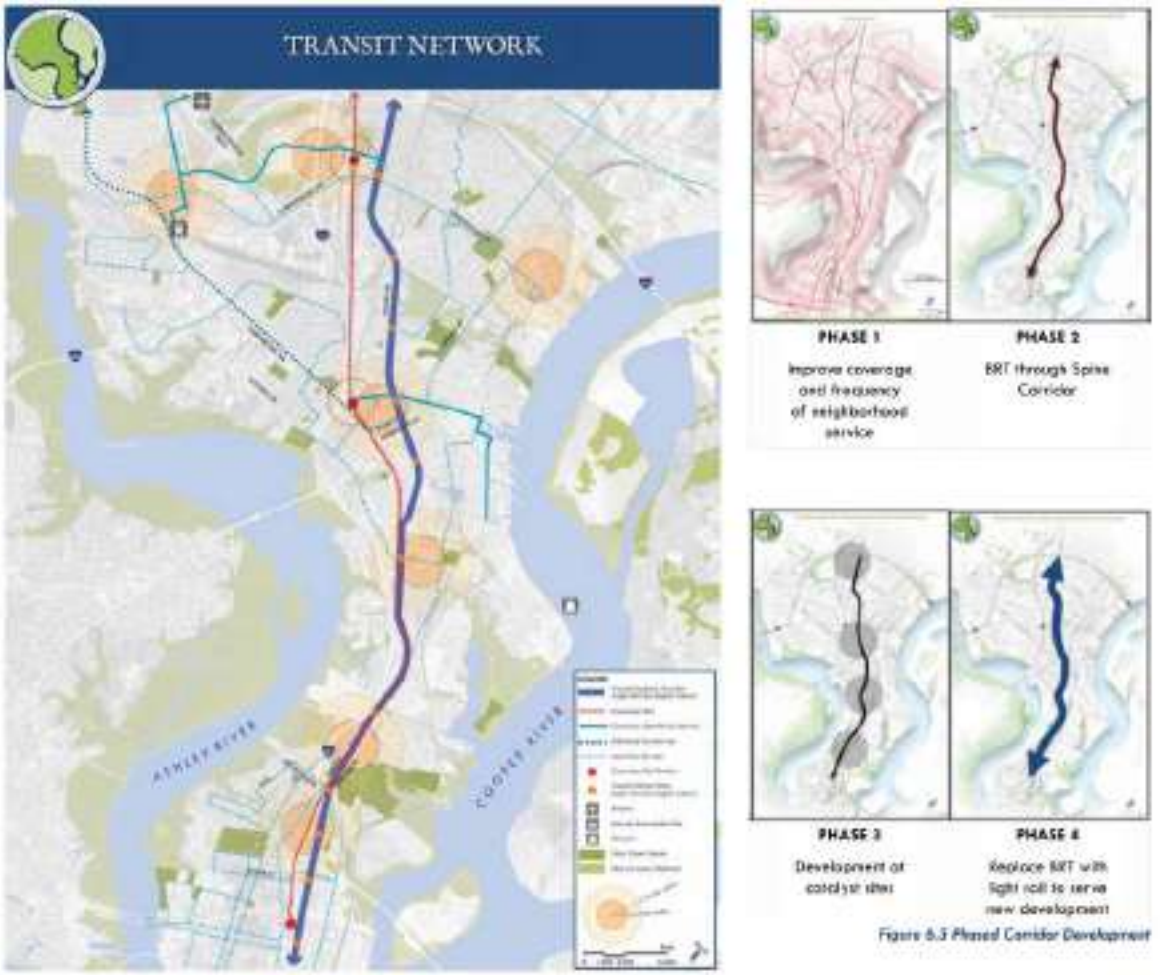


Figure 6.2 Planned Transit Network (See Appendix A pg. 214)

Figure 6.3 Phased Corridor Development

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Figure 4 | I-26ALT Recommended Alternative

Figure 5 | CARTA Comprehensive Operational Analysis

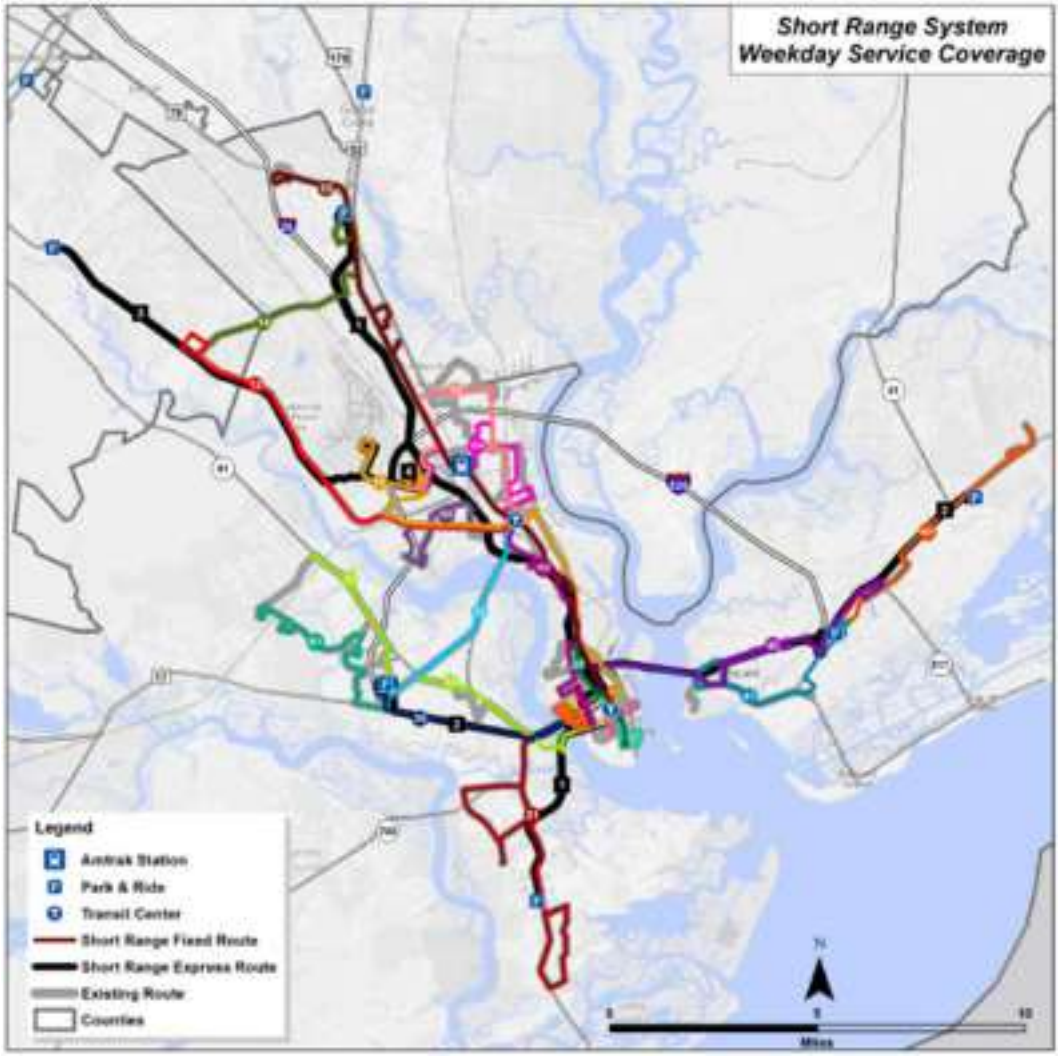

Figure 6 | 2008 LRTP Transit Services - Existing & Proposed

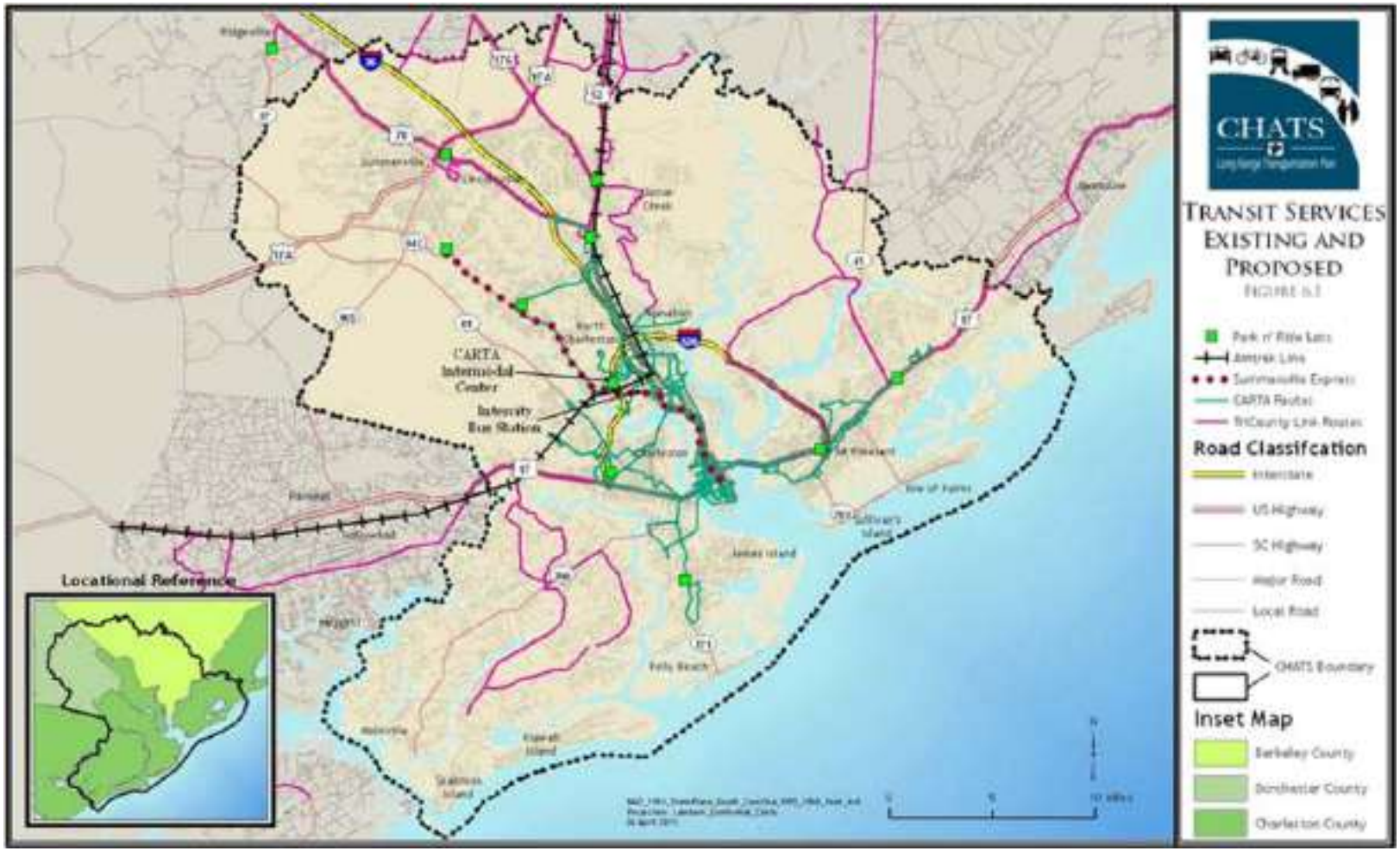

Figure 7 | LRTP Recommended Transit Vision Corridor Projects

Regional Transit Framework Plan

Appendix B

Table 5 | Study Summary Matrix

Study	Year	Major Findings / Recommendations
Charleston Area Transportation Study Long Range Transportation Plan	2008	The Charleston Area Transportation Study (CHATS) Long Range Transportation Plan (LRTP) established a vision for a future transportation system that provides mobility options and enhances the quality of life for all users. The LRTP included several transit recommendations including enhancing existing services, providing additional transit facilities and amenities, and introducing new modes and technologies. In particular, the plan recommended studying the potential implementation of fixed-guideway service to connect major activity centers and attractions in the region, preserving the existing freight rail corridor for potential commuter rail service, and examining critical corridors for BRT opportunities. The plan identified Rivers Avenue as a potential BRT corridor, citing the performance of CARTA's route 10 and the agency's plan to implement enhanced services in the corridor in the near future. The LRTP is currently being updated and is scheduled for completion in Summer 2018.
OurRegion OurPlan	2012	OurRegion OurPlan (OROP) is a comprehensive plan that provides a vision for future growth, development, and infrastructure improvements in the Berkeley-Charleston-Dorchester (BCD) region. The Plan utilized a scenario planning process and was developed through extensive public outreach efforts. The Plan includes a Mobility and Transportation Infrastructure element that calls for the development of a truly multi-modal system with a range of transit services and technologies. Specifically, the Plan states the need to "establish a comprehensive transit system that attracts new riders; connects major centers identified in the Plan; reduces congestion on major arterials; enhances affordability, protects the natural environment, provides for sustainability of the region and provides a viable alternative to personal automobile travel." OROP identified several indicators of success for this goal including: • Strategic planning for commuter/light rail between Charleston and Ridgeville • Strategic planning for express/BRT service between Charleston and Folly Beach, Ravenel, Mt. Pleasant, and Moncks Corner; along Interstate 526 between Mt Pleasant and Savannah Highway; and between Moncks Corner and East Edisto Finally, OROP also stressed that transportation facilities must be context-sensitive with the

Study	Year	Major Findings / Recommendations
		natural and constructed environment.
Partnership for Prosperity: A Master Plan for the Neck Area of Charleston and North Charleston	2013	The Neck Area Master Plan was a study that developed a transportation and development planning framework to guide public and private development in a nearly 30 square mile area in the cities of Charleston and North Charleston. The study identified four "transit emphasis corridors" in which to focus transit service investments. These include the Spine corridor, Dorchester Road corridor, I-26 corridor, and the Freight Rail corridor. The plan recommended implementing a variety of transit technologies (including enhanced bus service, BRT, light rail, and commuter rail) using a phased process. For example, the initial recommendation in the Spine corridor was identified as enhanced bus service, which would advance to BRT with dedicated lanes when development and conditions warranted, eventually converting to light rail once sufficient demand is established. The study also recommended implementing commuter rail in the existing freight rail corridors to Summerville and/or Moncks Corner, and a combination of enhanced bus and express bus service in the Dorchester Road and I-26 corridors.
Town of Mount Pleasant Comprehensive Plan	2014	The Town of Mount Pleasant Comprehensive Plan outlined a future vision for the Town and identified implementation strategies for making the vision a reality. One of the Plan's stated goals was to "promote alternative transportation options and increase connectivity to reduce traffic congestion and enhance quality of life.' This includes expanding and providing greater access to transit options such as fixed-route buses and water taxis, particularly for senior and disabled populations. The Plan also called for the integration of transit and land use through the development of design standards relating to the access and provision of transit in community nodes. More specifically, the Plan recommended that the Town should coordinate with CARTA to identify bus stop locations and then work with developers to ensure that they are built to the design standards set by CARTA. Finally, the Plan stated that a complete streets policy and design standards would be developed and adopted for all new transportation projects. The Comprehensive Plan is currently being updated and is scheduled for completion in 2018.
TriCounty Link Comprehensive Operational Analysis	2014	The TriCounty Link (TCL) Comprehensive Operational Analysis (COA) was conducted to analyze existing transit services and identify opportunities to reduce inefficiencies and

Study	Year	Major Findings / Recommendations
		optimize performance. The COA identified a number of near-term service changes to existing routes including: • Eliminate Route CS2 Dorchester, Dorchester Connector Shuttle/CS6 Shuttle, and D305 Monck Corner-Sangaree-Summerville-Lincolnville-Ladson-N. Charleston. • Routing modifications on Routes CS3 Dorchester-Santee-Cooper, C201 Edisto Island-Charleston, C203 McClellanville-Awendaw-Mt. Pleasant, and C204 Blue & Green. Additionally, the COA recommended implementing the following new routes: • Link to Employment: peak hour employment shuttle to replace CS2 serving SC Works and Jedburg/Hwy 78 areas • CS7 Ladson Area Shuttle: provides service to coast center and downtown Lincolnville • Summerville Connector: limited service (1 AM trip, 1 PM trip) • Naval Nuclear Power School Route: weekend only route with connections to CARTA service Finally, the COA also stressed the need to incorporate advanced technologies such as Automatic Vehicle Location (AVL) to improve the effectiveness of transit services for both operators (e.g. improved on-time performance) and passengers (e.g. real time information).
One Region	2016	One Region was strategic planning effort that evaluated the region's economic competitiveness and developed an action plan to achieve goals and address challenges. A joint effort by the Charleston Regional Development Alliance and the Charleston Metro Chamber of Commerce, the planning process was guided by an advisory group that consisted of leaders from public sector, private sector, nonprofit, and educational organizations. One of the Plan's core recommendations was to "invest in infrastructure that connects the region in a balanced and efficient manner." Furthermore it encouraged the region's business to incentivize employees who carpool, ride share, and use transit. Understanding that multimodal transportation networks are a vital component in a region's

Study	Year	Major Findings / Recommendations
		competitiveness, the Plan stressed the need for a more robust transit network.
I-26 Regional Fixed Guideway Transit Alternatives Analysis	2016	The I-26 Alternatives Analysis was a study that evaluated transit alternatives along the 22-mile I-26 corridor between Summerville and Charleston. Using a three-tiered screening process, the study evaluated a variety of transit modes and potential alignments before selecting BRT Alternative B-1 as the preferred alternative. The alignment for this alternative begins in Downtown Summerville and travels along Richardson Street, Cedar Street, Doty Street, and Main Street before turning southeast on US 78 to North Charleston. The alignment then merges onto US 52 and continues southbound on Rivers Avenue, Carter Avenue, and Meeting Street into Downtown Charleston to its terminus at Line Street. The study also identified 18 proposed station locations. An operating plan was also developed for the BRT service which featured 10-minute peak frequency, 20-minute base frequency and 30-minute early morning/late evening frequency. The capital cost for the preferred alternative was estimated at $359,061,298 (FY 2015 dollars), with annual operating costs estimated at $5,850,240.
Rethink Folly Road: A Complete Streets Study	2016	The Rethink Folly Road study identified a series of treatments to transform the 7.9-mile Folly Road corridor into a complete street that balances the needs of all travel modes and sets the standard for new development along the corridor. The study develops several scenarios/phases for improvements – Good (near-term), Better (mid-term), and Best (long-term). In addition to infrastructure improvements to facilitate and encourage safe bicycle and pedestrian activity, the study calls for several transit related improvements. In the near-term, the study calls for increased transit frequencies, implementing a planted median, additional amenities at bus stops, and installing shared-lane markings. Over the long-term, the study recommends converting the left most lane into a bus and bike only lane.
CARTA Comprehensive Operational Analysis	2016	The CARTA Comprehensive Operational Analysis (COA) was conducted to identify strategies to improve transit travel time and increase reliability, reduce inefficiencies, and optimize service along major transit corridors. The short-term recommendations included modifications to nearly every route, ranging from consolidation of stops to route extensions/reductions to frequency adjustments. The COA identified Route 10 (Rivers Avenue) as a candidate corridor for premium transit service in the future. The short-term recommendations for Route 10 included consolidating stops and increasing peak frequency

Study	Year	Major Findings / Recommendations
		to 20 minutes. The mid-term recommendations for Rivers Avenue include BRT service from Main & Richardson to Meeting & Line operating at 10-minute peak frequencies, 20-minute midday frequencies, and 30-minute early morning/late night frequencies. Route 10 would also be maintained but split into the following two routes: • 10A Rivers Avenue Local North: connecting Trident Health and CSU to the Rivers/McMillan BRT station at 30-minute frequencies. • 10B Rivers Avenue Local South: connecting Rivers/McMillan BRT station to the Downtown Charleston Visitors Center at 60-minute frequencies.
Plan West Ashley (2017)	2017	The Plan for West Ashely was established to guide continued growth in the community to ensure the development of livable, connected neighborhoods designed with environmental considerations in mind. The plan calls for remaking activity nodes along West Ashley's commercial corridors into mixed-use centers and mobility hubs. The plan identifies several near-term strategies for advancing multi-modal considerations including reducing speeds on arterial and residential streets to 35 mph and 20 mph respectively, installing crosswalks at all signalized intersections, and evaluating the potential implementation of dedicated High Occupancy Vehicle (HOV) and transit lanes on major corridors including Savannah Highway and Sam Rittenberg Boulevard. The plan also calls for increasing peak frequencies on CARTA express routes from 30 to 15 minutes and base frequencies on local routes from 60 to 30 minutes.