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CHATHAM COUNTY - SAVANNAH METROPOLITAN PLANNING COMMISSION mpc GEORGIA 1955

Technical Memorandum #4
Park and Ride Transit Service Plan

June 2014

PARK AND RIDE LOT STUDY

Submitted by:

CTG Connetics Transportation Group

In Association With:

moffatt & nichol

symbioscity
PEOPLE + PLACE + PLANET

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1. Introduction

The purpose of Technical Memorandum #4 is to present a potential transit service plan that serves the proposed park-and-ride lot facilities identified and recommended in Technical Memorandum #3. Prior analyses identified the following three major commuter travel sheds that could support park-and-ride facilities and services:

- The Northwest Corridor along SR 21
- The West Corridor along I-16 and US 80
- The South Corridor along I-95 and US 17

Within each of these corridors, several locations were identified as potential park-and-ride lot sites. Preferred locations within each of these corridors were determined through:

- A comprehensive site suitability evaluation process that scored each potential park-and-ride lot location;
- A travel market demand analysis that estimated potential home-to-work travel from park-and-ride catchment areas to various employment centers in the Savannah area; and
- Input from stakeholders that have been participating in this project.

Recommended locations advanced for further consideration are as follows.

Northwest Corridor

SR 21 South of Rincon is located on the boundary of Chatham and Effingham Counties. This site scored well on the site suitability analysis and had a high number of work trips in its catchment area. This site was also identified as a preferred location by project stakeholders. This area of SR 21 contains numerous opportunities for joint park-and-ride usage (e.g., Lowe's and a vacant grocery store's parking lot). There are other vacant parcels and commercial strip areas which could also be used for a lot. The City of Rincon also owns a parcel located off of SR 21 that is presently used for special events and is eventually planned as a park.

I-95 and SR 21 is an existing lot located in Chatham County that has a high site suitability score and a high number of work trips in its catchment area. It was also identified by the stakeholder committee as a preferred site. An advantage of this site is its close proximity to I-95, making it well suited for capturing trips from South Carolina. Expansion of the existing park-and-ride lot is recommended.

There are two other existing park-and-ride lots located in this corridor. It is recommended that the existing lot on SR 17 in Guyton continue to be a part of the regional park-and-ride lot system since the facility already exists. The existing lot at Effingham County Courthouse park-and-ride lot, however, is not recommended for continued park-and-ride usage. This is a shared use facility that does not have any parking spaces specifically designated for park-and-ride use. The courthouse parking lot is also fully utilized on court days. Therefore, it is recommended that this lot be removed from the regional park-and-ride lot system.

West Corridor

It is recommended that travel in this corridor be supported by the following two park-and-ride lot locations.

US 80 and Bloomingdale Road is a site located in Chatham County. This site scored reasonably high in the suitability analysis and had the second highest number of work trips in its catchment area of the five West Corridor sites that were evaluated. The stakeholder committee also identified this location as a preferred site, noting that it has the potential to capture trips from Effingham County coming in from SR 17. There are undeveloped parcels in the area that could be investigated for park-and-ride development. There are few commercial uses in the area that could be used for shared park-and-ride usage; however, there are some churches located in the area that could possibly be utilized.

I-16 and US 280/SR 30 is an existing park-and-ride lot located in Bryan County. It did not score as well as the US 80/Bloomingdale Road location in the suitability analysis. The stakeholder committee noted that this site seemed too far away from the corridor's commuter travel shed, which was verified in the travel market analysis. However, since the lot presently exists, and travel demand is expected to continue to grow in this corridor, it is recommended that it continue to be a part of the regional park-and-ride lot system.

South Corridor

It is recommended that travel in this corridor be supported by the following two park-and-ride lot locations.

US 17 in the vicinity of Wal-Mart in Chatham County achieved a high suitability score. This location also had the highest number of work trips in its catchment area of the seven South Corridor sites that were evaluated. It was the preferred location by stakeholders, noting that it is in a location that captures demand from both the SR 204 and US 17 corridors, and is located before peak period traffic congestion on SR 204 occurs. This area is also presently served by Chatham Area Transit. A potential lot along this US 17 segment could be secured as a joint-use location coupled with an existing commercial use, or located in presently vacant commercial establishments.

A second location is also recommended for this corridor, either ***at SR 144/US 17*** or ***SR 144/I-95*** in Bryan County. The SR 144/US 17 site scored better from a suitability standpoint. The SR 144/I-95 location, however, had a higher number of trips in its catchment area (second highest number of work trips in its catchment area of the seven sites that were evaluated for this corridor). There are potential shared use opportunities at the SR 144/US 17 location. New park-and-ride lot construction would likely be required at the SR 144/I-95 location.

There is an existing park-and-ride lot located in the South Corridor at I-95 and SR 204. This lot is relatively small in size and has limited expansion potential. Stakeholder committee members felt that usage of this lot would drop if an alternative park-and-ride facility were provided at US 17 in the vicinity of Wal-Mart. It is recommended that this park-and-ride lot remain a part of the regional park-and-ride

lot system, but eventually be removed should demand at this location diminish as other facilities open in this corridor.

Transit Service Assessment

The following sections of this Technical Memorandum present an assessment of potential transit services that could be implemented to support these recommended park-and-ride lot locations. Potential travel demand from each area is first reviewed, followed by potential transit service plans. This is followed by order-of-magnitude cost estimates for operating and maintaining regional transit services to/from these park-and-ride lot locations. It is important to note that the transit service plans presented in this Tech Memo represent a "full-build" scenario. Transit services do not necessarily need to begin at the same time as park-and-ride lot development. Service can be phased, with routes and service levels added as demand warrants. In addition to potential transit services, a comprehensive carpool and vanpool program can also be promoted. This particular Technical Memorandum addresses just the transit service component. An implementation strategy, to be addressed in this study's final report, will discuss the promotion of these ridesharing strategies.

2. Travel Market Analysis

This section presents a summary of travel market findings for the recommended park-and-ride lot locations. Prior work in this study identified estimated home-to-work travel from each candidate park-and-ride lot's travel shed. Findings from that analysis have been used to determine markets where transit service may be viable.

2.1 Methodology

Tech Memo #2 of this study identified the following ten major employment areas in the Greater Savannah area:

- Downtown Savannah
- Airport/Gulfstream/Crossroads area
- JCB Plant area
- Mitsubishi Plant area
- Oglethorpe Mall area
- Southside/Savannah Mall area
- Hunter Army Airfield
- Memorial/St. Joseph Hospitals area
- Port of Savannah
- Savannah State University area

Work-related travel demand was estimated for each candidate park-and-ride lot location to each of these major employment areas. The process used to develop these travel demand estimates was as follows.

1. Existing (2011) work-related travel was estimated by reviewing work locations of employees in the American Community Survey (ACS) and the Longitudinal Employer Household Dynamic (LEHD), both from the U.S. Census Bureau. This information was reviewed for all seven counties in the Greater Savannah area (Chatham, Bryan, Effingham, Liberty, Bulloch, Jasper, SC and Beaufort, SC).
2. The LEHD database does not include federal employees, thus people employed by the military (e.g., Hunter Army Airfield, Fort Stewart) are not included in LEHD totals. It also does not include sole proprietors. Thus, ACS totals were determined to be the best representation of home to work travel.
3. The LEHD data, however, provides the most detailed information of work locations of employees, with this data available at the census block level. Therefore, LEHD was utilized, but factored to ACS control totals. Hunter and Fort Stewart were able to provide information on home locations of their personnel. Thus, that information was first included in the home-to-work trip database before factoring to ACS control totals.
4. After developing the existing (2011) home-to-work trip matrix, future (2040) work-related travel was estimated based on population and employment projections from the MPC and county projections from the States of Georgia and South Carolina.

The process described above resulted in the following estimates of work-related travel:

- 2011 – 291,974 home-to-work trips
- 2040 – 376,457 home-to-work trips

This reflects a 29 percent growth in home-to-work travel.

2.2 Results

Technical Memorandum #3 presented travel market analysis findings for all candidate locations. For this particular Technical Memorandum, findings have been presented for just the recommended locations.

The regional home-to-work trip matrix described in the prior section was used to estimate travel from each park-and-ride lot site to each major employment area. A 10-mile diameter catchment area was drawn around each candidate site (skewed so that the site was not centered). A 10-mile catchment area was found to be the average in a recent transit on-board survey conducted in the Atlanta area of GRTA express route riders. Figures 2-1 through 2-3 identify assumed catchment areas for each of the proposed park-and-ride lots in the three corridors. The catchment area circles are purposely offset to reflect the likely direction park-and-ride users will travel to/from a park-and-ride facility. Users are less likely to travel out-of-direction from their work location when using a park-and-ride lot.

The 2011 and 2040 home-to-work trip tables were then used to determine demand. Table 2-1 presents the demand estimates from each proposed park-and-ride lot to the major employment destinations described earlier. It is important to keep in mind that park-and-ride lot usage is influenced by distance to the work location. As an example, there are a substantial number of trips from the Northwest Corridor's I-95/SR 21 park-and-ride lot catchment area to the Airport/Gulfstream/Crossroads area. However, the distance between the two is relatively short. Thus, park-and-ride lot usage of the I-95/SR 21 park-and-ride lot for trips to this area may not be that significant.

Major conclusions from this travel market analysis are as follows.

Northwest Corridor

- The Airport/Gulfstream/Crossroads area has the largest number of work trips coming from this corridor, followed by Downtown Savannah. The Airport/Gulfstream/Crossroads employment area is the closest employment area to the proposed Northwest Corridor park-and-ride lot locations, thus may not be as strong of market for transit services as Downtown Savannah.

West Corridor

- The Downtown Savannah area has the largest number of work trips coming from this corridor, followed by the Airport/Gulfstream/Crossroads employment area.

South Corridor

- The Downtown Savannah area has the largest number of work trips coming from this corridor, followed by the Southside/Savannah Mall area. The Southside/Savannah Mall area is the closest employment area to the South Corridor park-and-ride lot areas, thus may not be a strong market for transit services. Employment in this area is also dispersed over a large area. Hunter Army Airfield and the Hospitals area also appear to be relatively strong work trip markets from this corridor.

As noted above, Downtown Savannah is a strong commute destination for all three corridors, generally followed by the Airport/Gulfstream/Crossroads area. Additional factors that favor Downtown Savannah include roadway congestion and parking costs.

Figure 2-1
Northwest Corridor Recommended Park-and-Ride Lots and Potential Trip Capture Areas

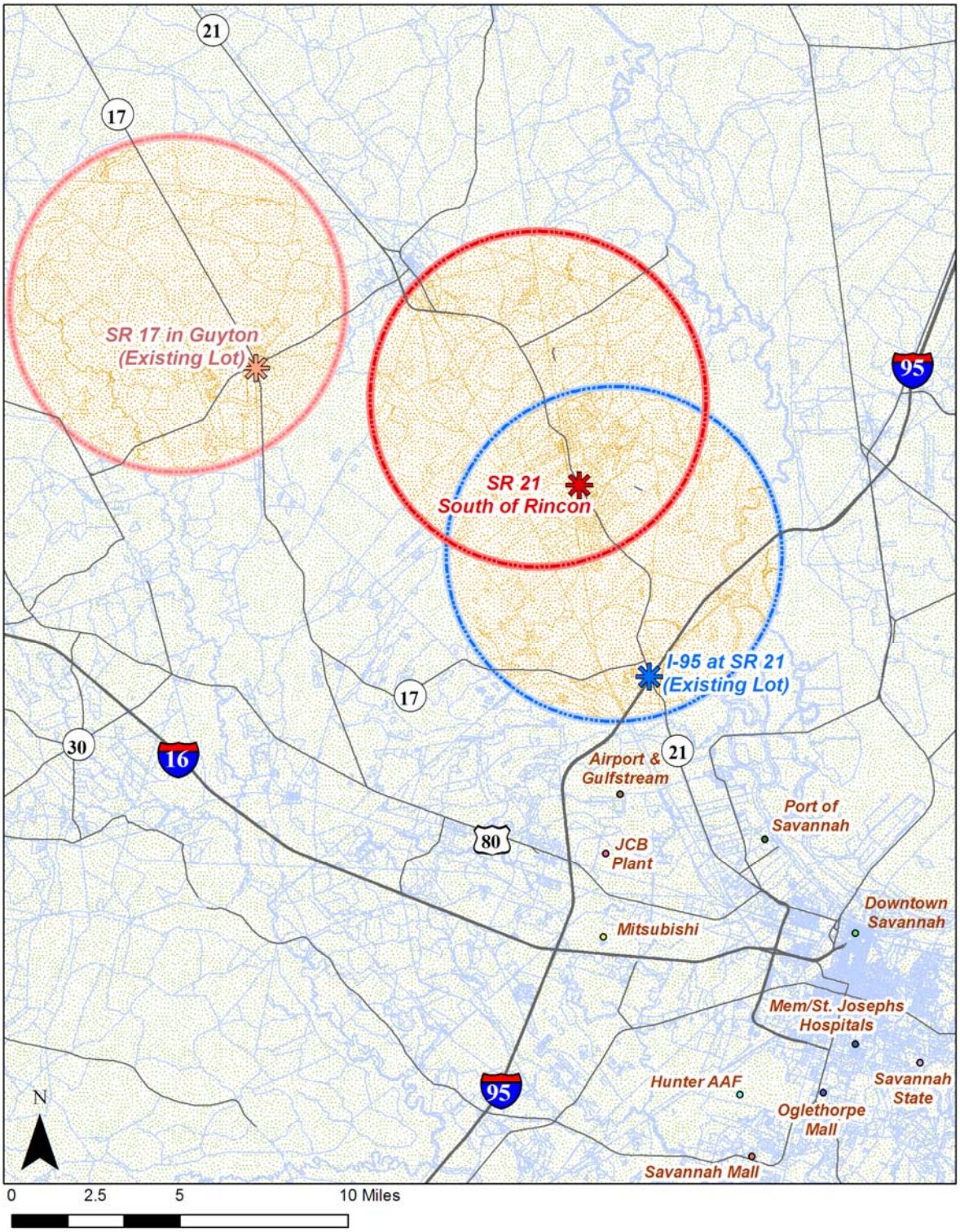

Figure 2-2
West Corridor Recommended Park-and-Ride Lots and Potential Trip Capture Areas

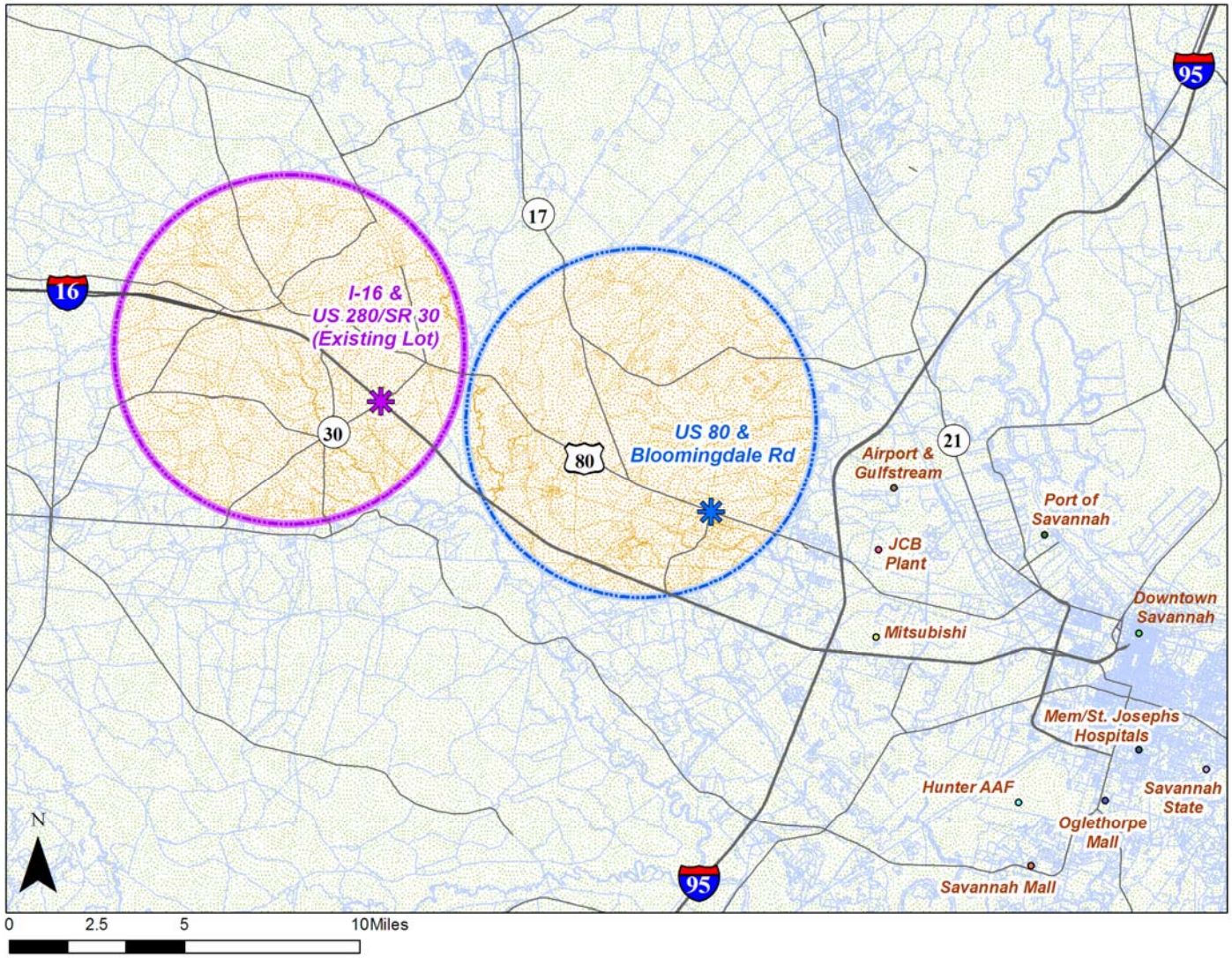

Figure 2-3
South Corridor Recommended Park-and-Ride Lots and Potential Trip Capture Areas

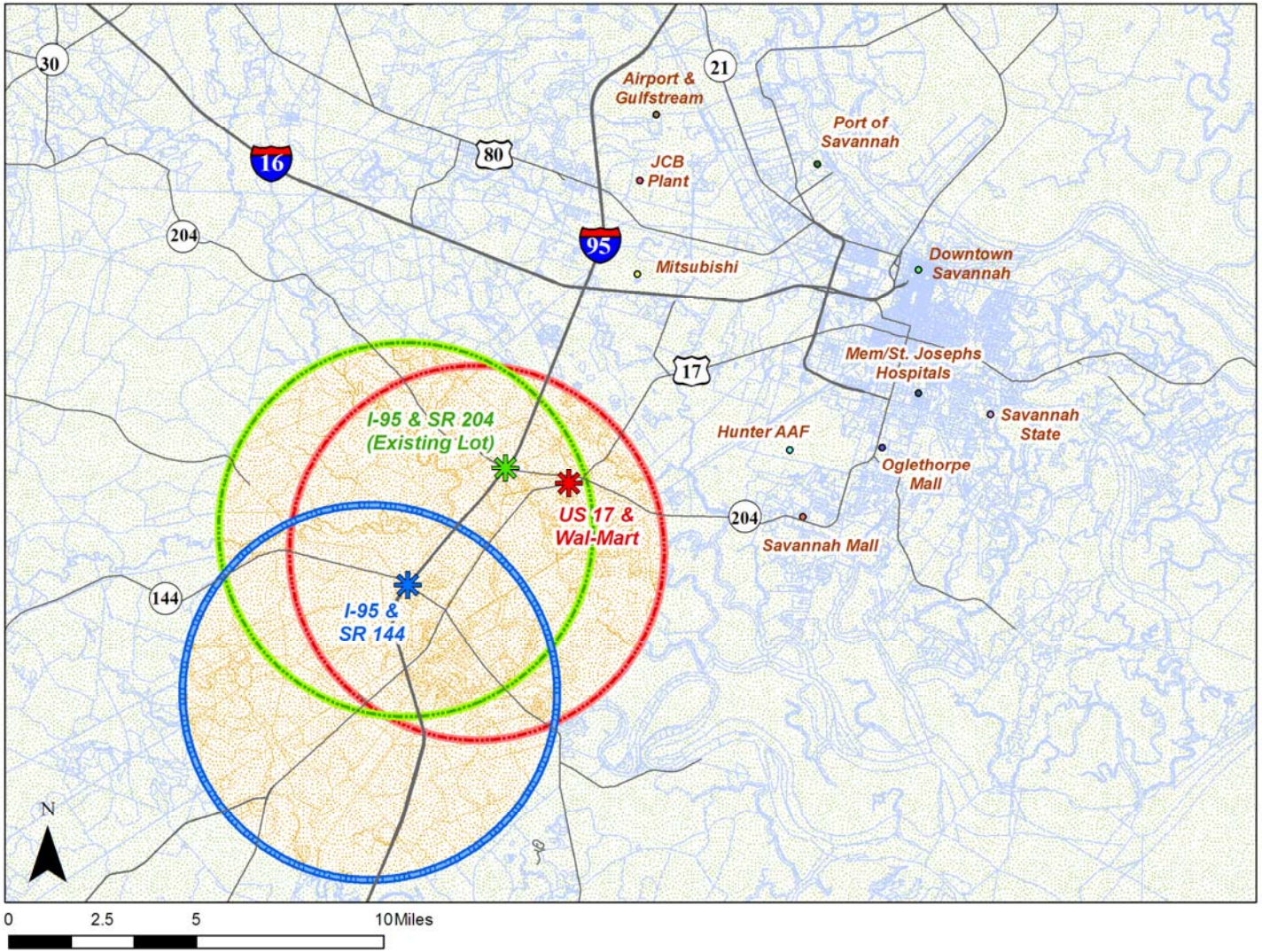

Table 2-1
Home-to-Work Trip Estimates for Proposed Park-and-Ride Lot Sites

Corridor	PNR Location Area	County Location	Characteristic	Trips from PNR Catchment Area to Work Trip Destination									
				Downtown Savannah	Airport, Gulfstream, Crossroads	Oglethorpe Mall Area	Hunter AAF	JCB Plant	Mem/ St. Joe Hospitals	Mitsubishi	Port of Savannah	Savannah State Univ. Area	Southside/ Savannah Mall Area
Northwest	SR 21 South of Rincon	Effingham	2011 Work Trips	838	1,473	455	450	83	497	14	555	16	391
			2040 Work Trips	1,108	1,960	599	597	110	673	18	738	20	515
	I-95 at SR 21 (Existing Lot)	Chatham	2011 Work Trips	1,847	2,023	780	760	141	886	14	742	62	667
			2040 Work Trips	2,502	2,743	1,053	1,031	192	1,210	19	1,002	84	901
	SR 17 in Guyton (Existing Lot)	Effingham	2011 Work Trips	380	633	232	253	53	173	9	309	6	181
			2040 Work Trips	505	820	305	336	70	229	12	406	7	236
West	US 80 & Bloomingdale Road	Chatham	2011 Work Trips	2,939	2,346	1,235	1,246	270	1,276	41	945	96	1,091
			2040 Work Trips	4,410	3,486	1,862	1,867	403	1,919	62	1,387	144	1,652
	I-16 & SR 30 (Existing Lot)	Bryan	2011 Work Trips	480	584	293	305	56	253	12	308	9	233
			2040 Work Trips	666	782	405	424	76	353	17	421	12	320
South	I-95 & SR 204 (Existing lot)	Chatham	2011 Work Trips	1,934	948	1,026	822	99	977	16	382	86	1,089
			2040 Work Trips	2,841	1,416	1,484	1,216	152	1,413	24	560	124	1,579
	US 17 & Vicinity of Wal-Mart	Chatham	2011 Work Trips	3,233	1,319	1,718	1,290	138	1,567	29	596	117	1,805
			2040 Work Trips	4,331	1,840	2,280	1,753	197	2,090	39	804	159	2,407
	I-95 & SR 144	Bryan	2011 Work Trips	2,050	1,008	1,124	934	110	1,047	18	437	93	1,224
			2040 Work Trips	2,995	1,491	1,610	1,363	166	1,504	26	632	132	1,749

3. Potential Transit Service Plans

The strongest markets for transit service appear to be Downtown Savannah and the Airport/Gulfstream/Crossroads area. There is potentially a market for express transit services from the South and West Corridors to Hunter Army Airfield. However, the distance from the South Corridor to Hunter may diminish transit ridership potential, and employment on the base is spread-out. There is also potentially a market for express transit services from the South and West Corridors to the Hospitals area. However, employment at the hospitals is 24/7. Thus, traditional peak period demand may be much less than other markets. At this time, it is recommended that carpool/vanpool options be prioritized for these employment destinations until such time that transit demand estimates are more favorable. With regards to other employment destinations, proposed park-and-ride lots will also undoubtedly be used for carpooling and vanpooling activities. From a likely cost-effectiveness standpoint, it is recommended that transit service initially be considered for just the Downtown Savannah and Airport/Gulfstream/Crossroads employment destinations.

3.1 Proposed Routing

For each corridor, it is proposed that there be one route to each destination (i.e., one route to Downtown Savannah and one route to the Airport/Gulfstream/Crossroads area). Each route would start from the farthest park-and-ride lot, make a mid-route stop at the closest park-and-ride lot, and then continue non-stop to the employment destination. Proposed routing is shown in Figures 3-1 through 3-3, and is described below.

Northwest Corridor

- *Downtown Route* – This route starts at the Rincon lot, makes a mid-route stop at the I-95/SR 21 lot, and then continues into Downtown Savannah non-stop via SR 21, SR 307 (Bourne Avenue) and SR 25. SR 25 eventually becomes Bay Street. This routing allows buses to pick-up and drop-off passengers mid-route at the Georgia Ports Authority Garden City Terminal without any significant impact to travel time or service statistics. Within downtown, proposed routing is Bay Street, East Broad Street, Broughton Street, MLK Jr. Blvd. and Oglethorpe Avenue to the CAT transit center. Transfers to the DOT (free Downtown Savannah shuttle) are possible at numerous locations in the downtown area for additional distribution of trips. Return routing in the p.m. peak is the reverse (i.e., start at the CAT transit center and travel through downtown via MLK Jr. Blvd., Broughton Street, East Broad Street, Bay Street to Port Wentworth, continuing on to the SR 21 corridor in Effingham County).
- *Airport/Gulfstream/Crossroads Route* – This route starts at the Rincon lot, makes a mid-route stop at the I-95/SR 21 lot, and continues to Gulfstream non-stop via SR 21 and Gulfstream Road. After stopping at the main Gulfstream facility, the route utilizes a recently constructed road that goes north to Innovation Drive, then to Crossroads Parkway. It is suggested that service beyond the Gulfstream main facility be route deviation service, where customers can request specific locations of drop-offs and pick-ups along Crossroads Parkway. Return routing in the p.m. peak is the reverse.

Note that no transit service is proposed to/from the existing Guyton park-and-ride lot. This facility is recommended for carpool/vanpool activities only.

West Corridor

- *Downtown Route* – This route starts at the US 280/I-16 lot and makes a mid-route stop at the US 80/Bloomingdale Road lot. The route continues into Downtown Savannah non-stop via US 80, I-95 and I-16. Buses travel through downtown via the Montgomery Street exit ramp from I-16 to Broughton Street, East Broad Street, Bay Street, MLK Jr. Blvd. and Oglethorpe Avenue to the CAT transit center.
- *Airport/Gulfstream/Crossroads Route* – This route starts at the US 280/I-16 lot and makes a mid-route stop at the US 80/Bloomingdale Road lot. The route continues to the main Gulfstream facility via Pooler Parkway, Airways Avenue and Gulfstream Road. After stopping at the main facility, the route continues on to serve destinations in the Crossroads Parkway corridor, following the same route pattern previously described.

South Corridor

- *Downtown Route* – This route starts at the I-95/SR 144 lot (or SR 144 and US 17, depending on the preferred location) and follows US 17, making a mid-route stop at a second lot in the vicinity of Walmart near US 17 and SR 204. The route continues into Downtown Savannah non-stop via SR 204, Veterans Parkway, I-516 and I-16. Buses travel through downtown via the same route pattern described for the West Corridor.
- *Airport/Gulfstream/Crossroads Route* – This route starts at the I-95/SR 144 lot (or SR 144 and US 17, depending on the preferred location) and follows US 17, making a mid-route stop at a second lot in the vicinity of Walmart near US 17 and SR 204. The route continues to the Gulfstream main facility via SR 204, I-95, Airways Avenue and Gulfstream Road. After stopping at the main facility, the route continues on to serve destinations in the Crossroads Parkway corridor, following the same route pattern previously described.

Note that no new service is proposed from the existing I-95/SR 204 park-and-ride lot. CAT presently provides three morning and three afternoon trips between this park-and-ride lot and the CAT Intermodal Transit Center (Route114X – Abercorn Express).

3.2 Proposed Service Plan

A key attribute to attracting ridership is providing the riders with a sufficient number of trip choices for traveling to and from their destinations. For purposes of this analysis, it is proposed that each route consists of three morning and three afternoon trips. Three trips is the recommended minimum number for each peak period to provide potential customers with the option of trip choices over an approximate 90-minute period.

Table 3-1 presents a potential schedule for transit service for each corridor to/from Downtown Savannah. Table 3-2 presents a potential schedule for transit service to/from the Airport/Gulfstream/Crossroads area. Two buses have been identified for each route. In the morning the first scheduled bus trip makes a non-revenue trip back to the park-and-ride lots to make the third scheduled inbound trip. Similarly, in the afternoon the first scheduled bus trip makes a non-revenue trip back to the destination to make the third scheduled outbound trip. Overall, twelve (12) buses are required to provide service to both Downtown Savannah and the Airport/Gulfstream/Crossroads area from all three corridors.

A key element to providing successful park-and-ride transit services is providing a guaranteed means of returning to the park-and-ride lot in the midday in the event of an emergency (e.g., to pick-up a sick

child from school). Included in the statistics is the assumption that one bus remains available for midday guaranteed ride home service for each destination.

Figure 3-1
Northwest Corridor Proposed Transit Routes

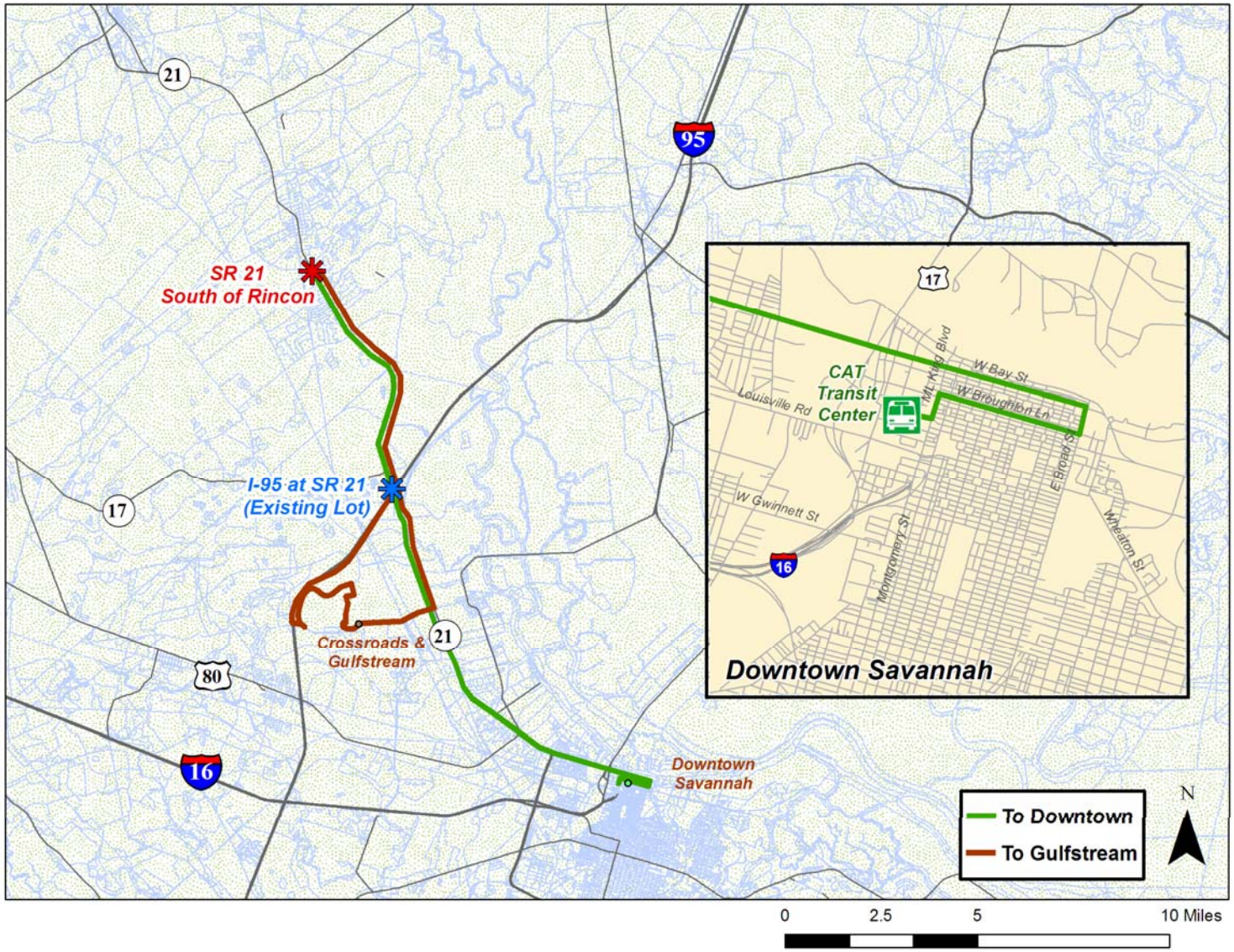

Figure 3-2
West Corridor Proposed Transit Routes

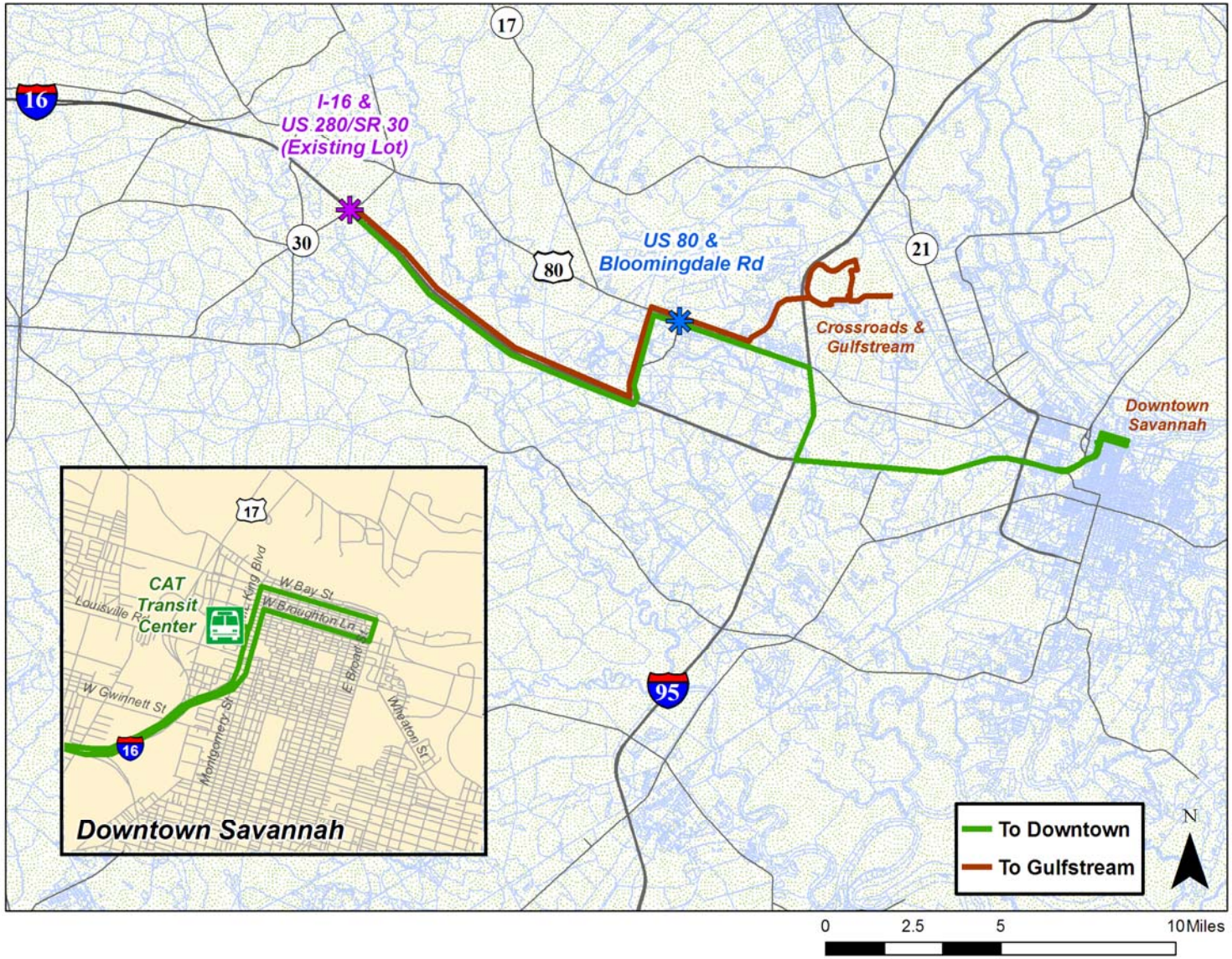

Figure 3-3
South Corridor Proposed Transit Routes

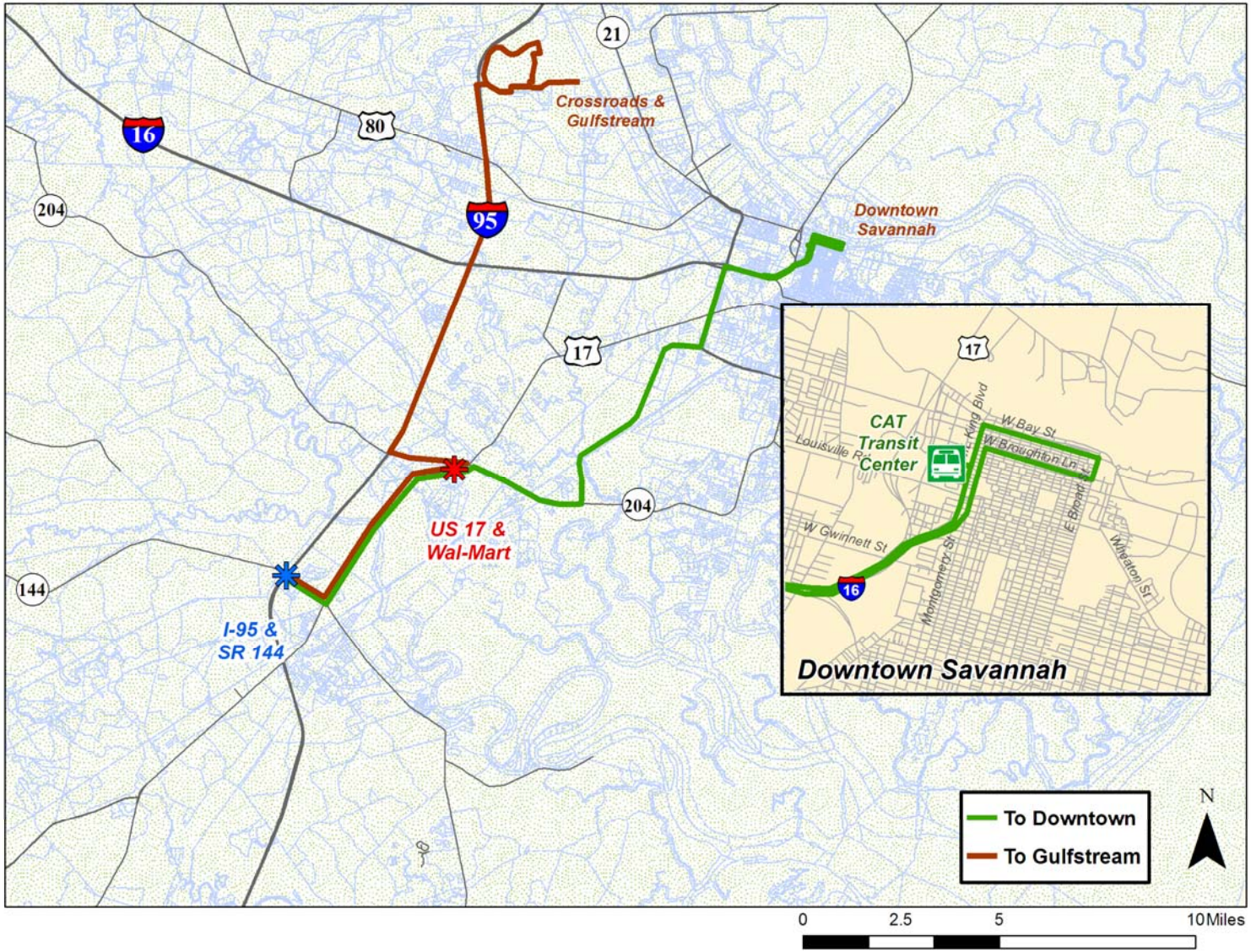

Table 3-1
Proposed Transit Service Plan
to/from Downtown Savannah

Corridor	AM Service Plan				PM Service Plan			
Northwest	***Bus***	***Rincon***	***SR 21/I-95***	***Downtown***	***Bus***	***Downtown***	***SR 21/I-95***	***Rincon***
	1	6:30 AM	6:40 AM	7:20 AM	1	4:30 PM	5:10 PM	5:20 PM
	2	7:00 AM	7:10 AM	7:50 AM	2	5:15 PM	5:55 PM	6:05 PM
	1	8:00 AM	8:10 AM	8:50 AM	1	6:00 PM	6:10 PM	6:50 PM
West	***Bus***	***US 280/I-16***	***Bloomingdale***	***Downtown***	***Bus***	***Downtown***	***Bloomingdale***	***US 280/I-16***
	1	6:25 AM	6:42 AM	7:20 AM	1	4:30 PM	5:08 PM	5:25 PM
	2	6:55 AM	7:12 AM	7:50 AM	2	5:15 PM	5:53 PM	6:10 PM
	1	8:05 AM	8:22 AM	9:00 AM	1	6:10 PM	6:48 PM	7:05 PM
South	***Bus***	***SR 144***	***Walmart***	***Downtown***	***Bus***	***Downtown***	***Walmart***	***SR 144***
	1	6:35 AM	6:45 AM	7:20 AM	1	4:30 PM	5:05 PM	5:15 PM
	2	7:05 AM	7:15 AM	7:50 AM	2	5:15 PM	5:52 PM	6:09 PM
	1	7:55 AM	8:05 AM	8:40 AM	1	5:50 PM	6:27 PM	6:44 PM

	Statistics	***Daily***	***Annual***
Summary of Service Requirements	**Peak Buses**	**6**	**n/a**
	Rev. Miles	**489**	**124,206**
	Rev. Hours	15.0	3,810
	Midday Hours	7.5	1,905
	Deadhead Hrs	8.5	2,159
	Total Hours	**31.0**	**7,874**

Note: Revenue-Miles and Revenue-Hours are the number of miles and hours that a bus is in service, avalable for passengers to board.

Table 3-2
Proposed Transit Service Plan
to/from Airport/Gulfstream/Crossroads Area

Corridor	AM Service Plan					PM Service Plan				
Northwest	***Bus***	***Rincon***	***SR 21/I-95***	***Gulfstream***	***Crossroads***	***Bus***	***Crossroads***	***Gulfstream***	***SR 21/I-95***	***Rincon***
	1	6:15 AM	6:25 AM	6:35 AM	6:50 AM	1	4:10 PM	4:25 PM	4:20 PM	4:35 PM
	2	6:45 AM	6:55 AM	7:05 AM	7:20 AM	2	4:40 PM	4:55 PM	4:50 PM	5:05 PM
	1	7:20 AM	7:30 AM	7:40 AM	7:55 AM	1	5:05 PM	5:20 PM	5:15 PM	5:30 PM
West	***Bus***	***US 280/I-16***	***Bloomingdale***	***Gulfstream***	***Crossroads***	***Bus***	***Downtown***	***Gulfstream***	***Bloomingdale***	***US 280/I-16***
	1	6:00 AM	6:17 AM	6:35 AM	6:50 AM	1	4:10 PM	4:25 PM	4:43 PM	5:00 PM
	2	6:30 AM	6:47 AM	7:05 AM	7:20 AM	2	4:40 PM	4:55 PM	5:13 PM	5:30 PM
	1	7:30 AM	7:47 AM	8:05 AM	8:20 AM	1	5:40 PM	5:55 PM	6:13 PM	6:30 PM
South	***Bus***	***SR 144***	***Walmart***	***Gulfstream***	***Crossroads***	***Bus***	***Downtown***	***Gulfstream***	***Walmart***	***SR 144***
	1	6:00 AM	6:10 AM	6:35 AM	6:50 AM	1	4:10 PM	4:25 PM	4:50 PM	5:00 PM
	2	6:30 AM	6:40 AM	7:05 AM	7:20 AM	2	4:40 PM	4:55 PM	5:20 PM	5:30 PM
	1	7:30 AM	7:40 AM	8:05 AM	8:20 AM	1	5:40 PM	5:55 PM	6:20 PM	6:30 PM

Summary of Service Requirements	***Statistics***	***Daily***	***Annual***
	Peak Buses	**6**	**n/a**
	Rev. Miles	**189**	**48,006**
	Rev. Hours	13.5	3,429
	Midday Hours	7.5	1,905
	Deadhead Hrs	8.3	2,096
	Total Hours	**29.25**	**7,430**

Note: Revenue-Miles and Revenue-Hours are the number of miles and hours that a bus is in service, avalable for passengers to board.

4.0 Potential Ridership and Costs

Key elements in determining the feasibility of transit service is the generation of ridership estimates, cost estimates and farebox revenues.

4.1 Potential Ridership

Order-of-magnitude ridership estimates were prepared by utilizing the travel demand estimates presented in Section 2.0 of this Tech Memo and applying typical express route mode share rates. An analysis of market share for GRTA Xpress routes in Atlanta indicates that typical home-to-work mode share rates are approximately 3 percent. The Atlanta commuter market, however, experiences higher levels of traffic congestion and higher parking costs than the Savannah market. Therefore, lower mode share rates were used for Savannah. Slightly higher mode share rates were used for the Downtown Savannah area because of the nature of this destination (i.e., paid parking, higher employment densities, higher levels of traffic congestion). Mode share rates also vary based on distance to/from the employment destination. The mode share rates utilized in this analysis are also consistent with mode shares generated by the CORE MPO travel demand model. Tables 4-1 and 4-2 present estimated home-to-work travel demand for each park-and-ride capture area (eliminating overlap when lots are within 10 miles of each other), a potential mode share rate and potential transit trips. A higher mode share rate was utilized for the corridor park-and-ride lots that are farther in distance from the employment destination. These figures are presented for the 2011 Base Year and for the 2040 Horizon Year. Mode share rates are estimates at this time, based on typical work trip transit mode share rates. Note that these are estimates of transit ridership only. This does not include the potential use of these lots by other commuters that carpool and vanpool.

The ridership estimates presented in Tables 4-1 and 4-2 result in an average of 15 to 28 passengers per bus trip for the downtown routes and an average of 6 to 12 passengers per bus trip for the Airport/Gulfstream/Crossroads routes in the base year (2011 trip totals). Thus, it is recommended that a large-sized bus be utilized for the downtown service (i.e., 29’ or more in length) and a small-sized bus (typically referred to as “cutaways”) be used for the Airport/Gulfstream/Crossroads routes (e.g., 22’).

Table 4-1
Ridership Estimates for Proposed Downtown Savannah Transit Routes

		2011 Base Year			2040 Horizon Year		
Corridor	**Park-and-Ride Lot Demand**	**Base Year Trips**	**Mode Share**	**Transit Trip Estimate**	**Horizon Year Trips**	**Mode Share**	**Transit Trip Estimate**
Northwest Corridor	I-95 at SR 21 (Existing Lot)	1,596	2.0%	30	2,174	2.0%	45
	SR 21 South of Rincon	512	2.5%	15	671	2.5%	15
	Total Round Trips	2,108		45	2,845		60
	Daily One-Way Boardings			***90***			***120***
West Corridor	US 80 & Bloomingdale Road	2,939	2.5%	75	4,410	2.5%	110
	I-16 & US 280/SR 30 (Existing Lot)	480	2.5%	10	666	2.5%	15
	Total Round Trips	3,419		85	5,077		125
	Daily One-Way Boardings			***170***			***250***
South Corridor	US 17 & Vicinity of Wal-Mart	2,830	2.0%	55	3,742	2.0%	75
	I-95 & SR 144	519	2.5%	15	744	2.5%	20
	Total Round Trips	3,349		70	4,485		95
	Daily One-Way Boardings			***140***			***190***
TOTAL DAILY TRANSIT TRIP ESTIMATE (Boardings)				**400**			**560**
TOTAL ANNUAL TRANSIT TRIP ESTIMATE (Boardings)				**101,600**			**142,240**

Table 4-2
Ridership Estimates for Proposed Airport/Gulfstream/Crossroads Routes

		2011 Base Year			2040 Horizon Year		
Corridor	**Park-and-Ride Lot Demand**	**Base Year Trips**	**Mode Share**	**Transit Trip Estimate**	**Horizon Year Trips**	**Mode Share**	**Transit Trip Estimate**
Northwest Corridor	I-95 at SR 21 (Existing Lot)	1,593	1.0%	15	2,174	1.0%	20
	SR 21 South of Rincon	919	1.5%	15	1,210	2.0%	25
	Total Round Trips	2,512		30	3,384		45
	Daily One-Way Boardings			***60***			***90***
West Corridor	US 80 & Bloomingdale Road	2,346	1.0%	25	3,486	1.0%	35
	I-16 & US 280/SR 30 (Existing Lot)	584	2.0%	10	782	2.0%	15
	Total Round Trips	2,930		35	4,268		50
	Daily One-Way Boardings			***70***			***100***
South Corridor	US 17 & Vicinity of Wal-Mart	1,063	1.5%	15	1,464	1.5%	20
	I-95 & SR 144	316	2.0%	5	451	2.0%	10
	Total Round Trips	1,379		20	1,915		30
	Daily One-Way Boardings			***40***			***60***
TOTAL DAILY TRANSIT TRIP ESTIMATE (Boardings)				**170**			**250**
TOTAL ANNUAL TRANSIT TRIP ESTIMATE (Boardings)				**43,180**			**63,500**

4.2 Potential Costs and Benefits

Costs for transit services are dependent on the service contracting arrangements. For this analysis, a contract service provider arrangement is assumed, where the sponsoring agency contracts with a private service provider to operate the service and maintain the buses. At this point, it is not known who the sponsoring public agency (or agencies) may be. A contract service provider arrangement is similar to CAT's operations prior to 2013 when CAT contracted with a service provider. The only costs incurred directly by CAT were fuel and administrative costs. To generate a cost estimate, CAT's 2012 expenses were utilized and converted to a cost per total bus-hour of service. Costs were broken down to direct agency costs and contract service provider costs. These costs were inflated to 2014 dollars based on the Bureau of Labor Statistics' Consumer Price Index (CPI).

CAT's O&M costs do not include buses, for those were purchased by the agency and then provided to the contract service provider to operate and maintain. For this analysis, it is assumed that the contract service provider's hourly rate will include the provision of buses (i.e., the sponsoring agency will not be purchasing buses, rather the contract service provider builds the cost for supplying buses into the hourly rate). As previously noted, a total of 12 buses are needed for the proposed service plan (six for each destination). Two spare buses are assumed for each service, resulting in a total of 16 buses.

Small buses are proposed for the Airport/Gulfstream/Crossroads routes. A unit cost of $90,000 is typical for buses of this size. These buses have a typical useful life of 4-5 years. Because these buses will be used only in peak periods, a five-year span of life has been assumed. Thus, if these buses were to be included in a service provider contract, the estimated annual cost is $18,000 per bus ($90,000 divided by five years).

Large (29' or greater) buses are assumed for the downtown routes. A unit cost of $350,000 is typical for diesel-powered buses of this size. These buses have a typical useful life of 12 years or 250,000 miles. Thus, if these buses were to be included in a service provider contract, the estimated annual cost is approximately $29,000 ($350,000 divided by 12 years).

Table 4-3 presents estimated costs for the provision of transit service per the operating plan described in Section 3.0 of this Tech Memo. This cost could be reduced by phasing implementation of transit service (e.g., do not start with transit service in all three corridors or to both destinations).

Table 4-3
Estimated Annual O&M Costs (2014 dollars)

Cost Item	Unit Cost	Unit Type	Units	Cost Estimate
Contract Operator O&M	$56.00	per Total Bus Hr.	15,304	$857,000
Fuel & Agency G&A =	$11.00	per Total Bus Hr.	15,304	$168,300
Small Bus Costs =	$18,000	per Bus	8	$144,000
Large Bus Costs =	$29,000	per Bus	8	$232,000
Total Annual O&M Cost Estimate				**$1,401,300**

Notes:
1. O&M - operating and maintenance costs.
2. G&A - general administrative costs
3. Small (cutaway) bus estimated to be $90,000 with a 5-year useful life
4. Larger (29' or more) diesel bus estimated to be $350,000 with a 12-year useful life
5. Costs are in 2014 dollars.

The costs for operating transit service average $9.68 per passenger trip, utilizing the Base Year ridership estimates previously presented. For comparison purposes, GRTA's Xpress bus service in Atlanta has an average cost of $9.65 per passenger trip (2012 costs inflated to 2014 dollars). The GRTA Xpress cost per passenger figure does not include the annualized cost of buses (GRTA provides buses to its contract service providers).

From a benefits standpoint, the 2040 ridership estimates presented in Tables 4-1 and 4-2 result in a reduced need of over 400 parking spaces for Downtown Savannah and the Airport/Gulfstream/Crossroads area. This is parking that would not be required of employers for businesses served by the proposed transit routes. It also does not include additional potential savings in parking requirements resulting from carpoolers.

For riders of the service, there is also a financial benefit. For riders destined to Downtown Savannah, fuel savings are estimated to range from $2.40 to $4.60 per one-way trip, with an average savings of $2.90 per one-way trip (i.e., $5.80 round trip). For riders destined to the Airport/Gulfstream/Crossroads area, fuel savings are estimated to range from $1.50 to $4.00 per one-way trip, with an average savings of $2.60 per one-way trip (i.e., $5.20 round trip). These calculations are based on the 2040 ridership projections presented in Tables 4-1 and 4-2, distances to and from each park-and-ride lot, an average 24 mpg fuel consumption rate and a fuel cost of $3.50 per gallon. In addition to fuel costs, riders destined to Downtown Savannah also realize a savings in parking costs. Monthly parking at the City's parking garages ranges from $30 to $80. Assuming an average rate of $50 per month, a downtown-destined rider could be saving over $8.00 in fuel and parking costs a day ($5.80 in round trip fuel costs and $2.25 in daily parking costs).

Finally, there are less quantifiable benefits associated with park-and-ride and transit usage. There are environmental benefits in the form of reduced traffic congestion and air pollution, and less usage of automobiles results in reduced auto maintenance costs for the auto owner. The AAA estimates auto maintenance costs average 5 cents for every mile driven.

4.3 Potential Farebox Revenues and Subsidy Requirements

In addition to ridership and costs, it is important to determine likely farebox revenues so the sponsoring agency (or agencies) has an understanding of potential service subsidy requirements.

For comparison purposes, express fares were reviewed in the Atlanta area. GRTA has a zoned fare system that ranges from $3.00 to $5.00 per one-way trip. Round trip and monthly pass discounts are available. Cobb Community Transit's (CCT's) single ride express fare is $5.00. Discounts are available for multi-ride and monthly pass tickets. CCT's local route cash fare is $2.50. Gwinnett County Transit's (GCT's) single ride express fares range from $3.75 to $5.00. Discounts are available for multi-ride and monthly pass tickets. GCT's local route cash fare is $2.50. CAT's current one-way fare in Savannah is $1.50 for both local and express routes[1]. Multi-ride and multi-day passes are available at a reduced rate.

For this analysis, a $2.50 cash fare has been assumed with multi-ride and monthly pass discounts that bring the net effective fare to $2.25 (10% lower than the cash fare). This fare assumption has been applied to each route's ridership estimates to determine potential farebox revenues. Annual O&M costs (including the lease of buses) have been calculated for each route. This provides the ability to calculate the subsidy required on a route-level basis. Tables 4-4 and 4-5 present these calculations for base year and horizon year forecasts. All cost figures in these tables are in 2014 dollars.

As shown in Table 4-4, Downtown Savannah service requires fewer subsidies than the Airport/Gulfstream/Crossroads service. The West and South Corridor services to Downtown Savannah perform better than the Northwest Corridor service because of anticipated higher ridership demand. By 2040, subsidy requirements for the Airport/Gulfstream/Crossroads service decrease significantly but still remain higher than the Downtown Savannah subsidy requirements.

[1] *Note: CAT is presently considering an increase for the Abercorn Express route to $2.00, effective October 1.*

Table 4-4
2011 Base Year Revenue and Subsidy Estimates

Service	Corridor	Daily Ridership	Annual Ridership	Total Bus-Hours	Fare Revenues	Annual O&M Cost	Farebox Recovery %	Subsidy Required	Subsidy/ 1-Way Trip
Downtown Routes	Northwest	90	22,860	2,625	$51,435	$223,900	23%	$172,465	$7.54
	West	170	43,180	2,887	$97,155	$241,400	40%	$144,245	$3.34
	South	140	35,560	2,362	$80,010	$206,300	39%	$126,290	$3.55
Downtown Totals		**400**	**101,600**	**7,874**	**$228,600**	**$671,600**	**34%**	**$443,000**	**$4.36**
Gulfstream/ Crossroads Routes	Northwest	60	15,240	1,926	$34,290	$206,400	17%	$172,110	$11.29
	West	70	17,780	2,752	$40,005	$261,700	15%	$221,695	$12.47
	South	40	10,160	2,752	$22,860	$261,700	9%	$238,840	$23.51
Gulfstream Totals		**170**	**43,180**	**7,430**	**$97,155**	**$729,800**	**13%**	**$632,645**	**$14.65**
FULL SYSTEM TOTALS			**144,780**	**15,304**	**$325,755**	**$1,401,400**	**23%**	**$1,075,645**	**$7.43**

Table 4-5
2040 Horizon Year Revenue and Subsidy Estimates

Service	Corridor	Daily Ridership	Annual Ridership	Total Bus-Hours	Fare Revenues	Annual O&M Cost	Farebox Recovery %	Subsidy Required	Subsidy/ 1-Way Trip
Downtown Routes	Northwest	120	30,480	2,625	$68,580	$223,900	31%	$155,320	$5.10
	West	250	63,500	2,887	$142,875	$241,400	59%	$98,525	$1.55
	South	190	48,260	2,362	$108,585	$206,300	53%	$97,715	$2.02
Downtown Totals		**560**	**142,240**	**7,874**	**$320,040**	**$671,600**	**48%**	**$351,560**	**$2.47**
Gulfstream/ Crossroads Routes	Northwest	90	22,860	1,926	$51,435	$206,400	25%	$154,965	$6.78
	West	100	25,400	2,752	$57,150	$261,700	22%	$204,550	$8.05
	South	60	15,240	2,752	$34,290	$261,700	13%	$227,410	$14.92
Gulfstream Totals		**250**	**63,500**	**7,430**	**$142,875**	**$729,800**	**20%**	**$586,925**	**$9.24**
FULL SYSTEM TOTALS			**205,740**	**15,304**	**$462,915**	**$1,401,400**	**33%**	**$938,485**	**$4.56**

NOTES:
1. Ridership Annualization Factor = 254
2. Fare per Passenger Trip = $2.25
3. Hours distributed to routes based on each route's 1-way trip revenue time. Midday hours are shared proportionally.
4. Costs for spare buses shared proportionally in O&M cost calculations

5.0 Transit Service Plan Conclusions

This Technical Memorandum has presented a potential transit service plan for the proposed park-and-ride lots in each corridor (Northwest, West and South Corridors). An analysis of home-to-work travel demand to major employment destinations indicates that the two most promising transit markets from the three corridors are Downtown Savannah and the Airport/Gulfstream/Crossroads area.

Routing has been defined for each corridor, with one route serving each destination from each corridor. Each route would make two park-and-ride stops, and then operate non-stop to the destination. Multiple stops are assumed in Downtown Savannah and the Airport/Gulfstream/Crossroads area to distribute trips. Route deviation service is proposed in the Crossroads area because of the dispersed employment centers. Each route is assumed to operate with three morning and three afternoon trips, requiring two buses on each route. Midday guaranteed ride home service is also proposed.

Ridership has been estimated for the proposed transit services. The Downtown Savannah ridership is estimated to be twice as high as the Airport/Gulfstream/Crossroads ridership. This is partially due to stronger travel demand to/from Downtown Savannah. It is also because Downtown Savannah is farther in distance from most of the park-and-ride lots where service is proposed (employees are more likely to use express route services as distances between home and the workplace increases). There are also higher densities, thus concentrations of employees in Downtown Savannah. Many employees must pay for downtown parking, an influencing factor for encouraging transit usage. Monthly parking at the City's parking garages is $30/month at the Liberty Street garage, and $80/month at the City's other four garages (Bryan Street, Robinson, State Street and Whitaker Street). There are also higher levels of traffic congestion in Downtown Savannah. Studies have shown that transit usage is heavily influenced by time (i.e., is the transit travel time competitive with the auto travel time) and cost (i.e., is the transit fare competitive with the cost of driving).

Annual operating and maintenance (O&M) costs were estimated by assuming a contract service operator provides the service and the buses. The sponsoring agency (or agencies) would supply fuel and administrative functions. It is not known who the sponsoring agency (or agencies) may be at this time.

Farebox revenues were estimated by assuming a $2.50 one-way trip cash fare, with multi-ride and monthly pass discounts that result in a net effective fare of $2.25. Subsidy requirements were calculated based on the ridership estimates, O&M cost estimates and farebox revenue estimates. The Downtown Savannah service was determined to have much lower subsidy requirements than the Airport/Gulfstream/Crossroads service. Subsidy requirements for the Downtown Savannah service with Base Year ridership numbers are estimated to be approximately $443,000 each year. Subsidy requirements for the Airport/Gulfstream/Crossroads service are estimated to be $633,000 each year.

Finally, it is important to note that transit service does not necessarily have to begin concurrent with the opening of corridor park-and-ride lots. Rideshare and vanpool programs/promotions can be an initial step in the encouragement of park-and-ride lot usage. Transit services can also be phased (e.g., begin with the Downtown Savannah service and then expand to the Airport/Gulfstream/Crossroads service, or begin service in a particular corridor and then expand to other corridors). Implementation strategies will be explored in a future task of this project.