

An Analysis of South Jersey Light Rail

John J Reiser

Abstract

The newly opened RiverLine is the product of years of transportation study warped by political manipulation and poor planning. Extension of services on the RiverLine will improve its chance for success. A geographic information system (GIS) was used to project accessibility to two proposed extensions to the RiverLine. A light-rail mass transit service built on existing track would better serve the residents of Gloucester County than would a high-speed PATCO-style constructed on the median of Route 55.

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Introduction

South Jersey, despite its relatively small population and large size in comparison to North Jersey, is not without growing pains. Traffic in the Philadelphia metro region grows worse each day, as inflow migration and new construction continues in the suburban fringe. For Gloucester County residents, the average amount of time spent getting to work is 28 minutes, an increase of four minutes since 1990 (Menzie's A1). The New Jersey Department of Transportation has often been accused of failing to concern itself with the troubles of South Jersey, however the 1990s saw a change in this attitude, as NJ Transit restored a suspended rail line and increased services in the region. A 1989 transportation report by DVRPC, the regional planning agency for metropolitan Philadelphia, called for new commuter rail systems in Burlington and Gloucester Counties (Shaw B1). A scrapped plan for a high-speed line created in the 1950s was brought back to the table as a guide for future commuter rail. Based on this plan, a commuter rail line was proposed from Glassboro to Mount Holly via Camden. Senator Haines from Mount Laurel pushed to have the line run on a riverfront corridor, as opposed to the DRPA planned corridor. Controversy erupted when delays occurred and cost rose. The riverfront line, redubbed the RiverLine, began service on March 14th of 2004, almost a year behind schedule. When the line finally began service, songs of praise were sung for the line's ability to bring people into the small towns on the Delaware. The RiverLine is, by some measures, more of a small town revitalization tool than a traffic alleviator.

Praise of the RiverLine may or may not last. Adding more connections and carefully planning new development in the rail corridor will likely be contributors to the rail line's success. The excessive cost and multiple delays in constructing the line have diminished the likelihood of future rail options in South Jersey. If commuter rail is to be expanded in the region, extensive planning and analysis must first be complete, detailing the extent, costs, and markets served of any future line. This paper looks at recent commuter rail service, recounts the controversy over the RiverLine, and analyzes two potential rail services in Gloucester County. The analysis utilizes geographic information systems (GIS) to measure accessibility and connectivity on a restored commuter line and a new line constructed in the median of Route 55.

Much of the information on the history of the RiverLine and other regional rail systems came from the archives of local newspapers. The Philadelphia Inquirer contained a wealth of

articles on the construction and criticism of the RiverLine and detailed the restoration of the Atlantic City Line.

Information on performing accessibility analysis using GIS was found in Hasse and Lathrop, and in Upchurch. Measuring transit accessibility using small base units is a relatively new methodology, and as there were many articles on the importance of accessibility, few detailed the steps required to measure it.

History

Historically, commuter rail service in Southern New Jersey was essential to developing much of the region. Shore towns like Atlantic City and Beach Haven started as destinations accessible only by rail (Stansfield 76, Fernicola 1-2). The small towns of the interior depended on rail service not only as a means of travelling to the city or the shore, but also as the primary means of shipping goods to and from ports on the Delaware Bay and River. Many of the area's rail lines that exist today originate at the Jersey shore or near the Delaware Bay and converge on Camden. All but four of South Jersey's rail lines that are still in operation are used only for freight.



Currently, passenger rail service focuses on serving two markets: Camden-Philadelphia and to a lesser degree, the Jersey Shore. The Hi-Speedline, commonly referred to by the operating company's name, PATCO, runs on track from Lindenwold to Camden. PATCO began service to the New Jersey suburbs in 1969. The new RiverLine, which opened in March of 2004, runs from the waterfront in Camden to East Trenton. The RiverLine ends service at 10pm on most nights due to an agreement with freight operators, allowing freight traffic to run from 10 until 6am. PATCO does not share its line with freight traffic and typically ends service around 1:30am.

The RiverLine was born out of controversy and has been labeled a failure by many. These accusations may be premature, given that the line has been in operation for less than two months. PATCO, heralded by many as a remarkable success, shares in the history of the RiverLine. The Philadelphia Rapid Transit Company began service on the Bridge Line in 1936. The Bridge Line ran on the outside rail corridor on the Benjamin Franklin bridge and served Philadelphia and Camden with four stations at 8th Street and Franklin Square in Center City and at City Hall and Broadway in Camden. In the 1950s, the Delaware River Port Authority designed a new system to expand commuter service into Southern New Jersey. The plan called for a tunnel under the Delaware, with three branches into the region, one to Mount Holly, one to Woodbury Heights and the other to Lindenwold. Due to costs, this plan was scrapped in favor of extending the Bridge Line to Ashland and later to Lindenwold (Philadelphia Chapter).

The DRPA study calling for commuter service on the lines in Moorestown and Woodbury, acted as a starting point when, in the 1980s, NJ Transit looked into expanding its service in South Jersey. In 1989, NJ Transit started a new line from 30th Street Station in Philadelphia to Atlantic City with stops in between. Amtrak began operation of a "Gambler's Express" running from 30th Street to Atlantic City at the same time, on the same track. Both lines have had their share of controversy, and only one runs today.

Many people heralded the Gambler's Express as a step in the right direction. The track, which was out of service since 1982, originally began service in 1852. The rail line helped create Atlantic City by providing Philadelphians access to the shore in about one hour. Commuter use grew through the 1940s, and began to decline in the 1960s (Bowden B1). The restoration of express passenger service was seen as a boon to South Jersey residents and business, by providing Philadelphians easy access to the shore by means other than car. The problem with the line was that the expected populace never took the ride. Speed was one issue. Residents of Pennsauken protested the Gambler's Express line because they felt the train ran too fast through their residential neighborhoods. The town council attempted to enforce an ordinance limiting the speed of the line, which was overturned by a federal judge (Campbell, B12). Despite the advertised speed of 80 mph, the Express was often limited to a crawl by speed limits or grade crossing problems. Crossing the Delaware by means of the Delair Bridge, the Express lumbered along at 10 mph, the speed limit of the bridge (Bowden B1). Instead of a speedy 77 minutes, the Express took as long as four hours during one of its early runs (LeDuc A4). Initial estimates for the line projected 1.4 million riders by the end of its first year, a goal it fell short of by more than one million (Preston B1). Ridership numbers continued to fall until the Gambler's Express service ended in April of 1995.

The Atlantic City Line, which started in September of 1989, ran along the same line as the Gambler's Express. The line initially terminated at Lindenwold, allowing transfer to PATCO. Between Lindenwold and Atlantic City, the line provided daily service to Atco, Hammonton, Egg Harbor and Absecon. The Atlantic City line was seen as more of a commuter service than was Amtrak's Gambler's Express. The line was also wrought with troubles; on its inaugural run, the train collided with a car driven by Darlene Spirit of Sicklerville. The collision killed Spirit and her

four year old daughter. Spirit had a suspended license at the time and ignored the warning signals, passing other cars waiting at the crossing. Her death caused many residents of the rail corridor to protest the speed of the train. NJ Transit agreed to limit the speed of the line to 60 mph when passing through populated areas (Marder B2).

Despite the initial controversy, the Atlantic City line continued to grow. In 1991, Amtrak cut back service on the Gambler's Express, running only twice a day, as opposed to five times a day when the service started. At the time, NJ Transit was looking for a way to expand its service on the Atlantic City line. The line grew out to 30th Street Station in Philadelphia, filling the void left by the Amtrak cutbacks. Even though the line was a fiscal disappointment, losing \$8 million in 1992, NJ Transit decided to expand the service because it provided a much needed service to the South Jersey area (Burke S2). The Cherry Hill station, opened in 1994, is the most recent addition to the Atlantic City line.

The RiverLine grew out of the three-pronged rail network originally designed by DRPA. An April 26, 1993 Philadelphia Inquirer article discusses multiple plans for commuter rail devised and published by NJ Transit. The report includes plans for bus, high-speed train and light rail service along a corridor from Mount Holly to Glassboro. Each mode of transportation discussed is devised to alleviate traffic by linking Burlington and Gloucester Counties to PATCO in Camden (LeDuc S2). In the July 26, 1995 edition of the Philadelphia Inquirer, an editorial optimistically discusses expanding rail service to South Jersey by means of a "horseshoe curve of rail, from Glassboro through Camden City to Mount Holly." The article continues, concluding that the rail line will most likely increase property values and that those in favor of the line "should make themselves heard above the din of ill-informed critics." When the initial "horseshoe" corridor plans were released, Gloucester County Freeholders backed the plan. Moorestown, lying between Camden and Mount Holly, initially fought the plan. Bob Schwab, the general manager of PATCO, considered Moorestown's protest to be the same manner of quick-draw resistance Haddonfield experienced in relation to the Hi-Speedline (Olsen S3).

Gloucester County officials saw the "horseshoe" corridor as the perfect place to expand PATCO service. Camden City representatives argued against expanding PATCO, because linking the line to Gloucester County would require bypassing the Camden Waterfront, which depended

on mass transit alternatives as a means to promote redevelopment. Senator John Mattheussen of Gloucester County was in favor of the PATCO extension, citing that commuters would not be willing to change services in Camden, when PATCO trains are already full. Frank Russo of NJ Transit countered Mattheussen's suggestion with a light rail line from Camden to Glassboro, which would allow for further northern expansion. Mattheussen proposed a compromise; PATCO expands into Gloucester County, with a light rail spur to the Camden Waterfront (O'Neill B1).

In 1996, Conrail put the rail line between Camden and Trenton up for sale ("South Jersey" April 19). The NJ Transit Board of Directors voted in favor of using the Conrail line as the first half of a new commuter rail that will extend from Trenton to Glassboro. The Camden to Trenton leg of the light rail line was estimated to cost approximately \$300 million ("South Jersey" November). By the time the line is finished, it will have cost over \$1 billion.



The late Senator William Haines is primarily responsible for the light rail line's deviation from the "horseshoe" corridor. Haines saw the decaying US 130 corridor through Burlington

County as an area in dire need of revitalization. Using his political connections to Governor Whitman's administration, Haines and Frank Wilson, the transportation commissioner at the time, brought the riverfront plan before the NJ Transit Board of Directors in November of 1996. Wilson left NJ Transit one week after the vote to assume a position with DMJM, the engineering firm that designed the riverfront line (Pearsall). Haines ignored the planning process and pushed the riverfront corridor not as a means of eliminating traffic, but as a lifeline to the small cities along the Delaware experiencing economic decline.

Controversy surrounding the riverfront route seemed endless. A poll of 2,137 Palmyra residents found that 57 percent were against the riverfront line, which would run through the small town ("South Jersey" October). The line lacks a true destination; the line would not run late enough to serve the waterfront concertgoers, and the Trenton stops are one mile from the Capitol (Pearsall). The line is somewhat redundant; SEPTA, the Southeastern Pennsylvania Transit Authority, runs the R7, a commuter line from 30th Street Station to Trenton, on the opposite side of the river ("SEPTA"). One critic claims that the light rail line is a form of social engineering and that a mass transit line should be used to alleviate traffic, not bring traffic into declining towns ("Rail route"). An editorial in the April 26th, 2001 edition of the Courier-Post blasts the planning behind the rail line, "which was planned and executed with all of the open public dialogue and discussion of the Normandy Invasion." The editorial continues, noting that if the riverfront line fails, future mass transit plans that focus on alleviating traffic on congested roads will be harder to sell ("It's Tough").

When construction began on the riverfront line, the estimated cost was around \$300 million. The estimate grew to \$1 billion in April 2001 (Pearsall). During the construction, unforeseen delays and engineering blunders plagued the process. On April 5th, 2001, a railroad bridge under construction over the Rancocas Creek fell. As it was being hoisted into position, the top-heavy bridge tumbled into the creek (Pearsall 2). Protests in Palmyra and Riverside continued as construction and testing progress lumbered on. Piles of dirt from Florence Township were deposited in East Camden to act as a sound barrier. The dirt was found to contain heavy metals and PCBs, causing Camden to ask the state to conduct an environmental investigation into the potential hazards of the dirt mounds (Sullivan). When the end of construction grew near, the

RiverLine's debut was set for February 15th, 2004. The February date was already one year behind schedule when NJ Transit bumped the debut back one more month, to March 14th, in order to work out problems with crossing signal malfunctions (Moroz March).

Despite the troubles, as Inaugural Day drew near, many political figures stood by the new line. Senator Diane Allen and Burlington County Freeholder Vincent Farias rode the line to Burlington City as part of Inaugural Day festivities. Unlike the problems experienced with the Gambler's Express and the Atlantic City Line, the delays during the first day of operation on the RiverLine were due to standing room only crowds (Kummer A1). A 2003 study projected average ridership numbers for the line to be approximately 3,000 riders per day. As of April 2004, the line is averaging 1,500 riders per day (Kummer B1). Nonetheless, many residents of riverfront Burlington County are singing the praises of the RiverLine, as it has helped bring tourists and interest back into the small towns.

Potential for Expanding South Jersey Passenger Rail Service

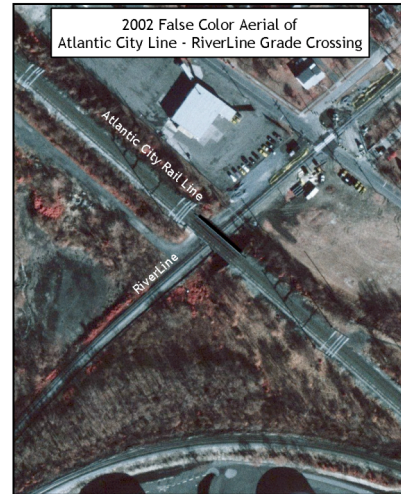
Regardless of the RiverLine's storied past, it has so far shown that alternative means of transportation may potentially benefit the towns and cities they serve. Dolly DeFreitas, a pastry shop worker in Riverton, plans to open a farmer's market near the town's rail stop in May (Kummer B1). Dan Fleischer, a 71 year old resident of Palmyra uses the train to run errands in Philadelphia. He notes that, "I know some people don't like the idea. But I think it gives a lot of people opportunity to travel" (B1). Considering that the rail line has been in service for little more than one month, a realistic evaluation of the success of the light rail line would require more time to show the true amount of riders. The measure of success is also in question; if the line helps revitalize the towns through which it passes, but fails to alleviate traffic in the area, is it a success?

To ensure the success of the RiverLine, and subsequently, South Jersey commuter rail in general, three options are under consideration. First, high density, walkable residential neighborhoods are proposed around the rail stops, a concept often labeled as transit oriented development (TOD) (Calthorpe 1993). Second, efficient connections need to be created to increase rail network connectivity. For example, the RiverLine would benefit from a connection to the Atlantic City line in Palmyra. Third, the commuter service must expand into areas with a high potential for use. A Gloucester County line would hopefully be a boon to commuters and alleviate traffic problems in Gloucester and Camden Counties by providing an alternative means of transportation around the I-295, NJ-42 and NJ-55 junction as well as providing a non-automobile option for a substantial number of county residents.

Dense residential neighborhoods with walkable access to the light rail line would create a symbiotic relationship between the town and the rail line. The fate of the rail line depends on daily riders who will use the line to get to and from work. Many of the riverfront towns in Burlington County have experienced economic decline and have viewed the new rail line as a blessing, hoping that the line will bring in new residents, day trippers and state funding ("Light Rail Line"). Riverside Township has been designated a "Transit Village" by the New Jersey Department of Transportation, making the township eligible for annual grants (NJDOT). Transit oriented development around the light rail stops would benefit rail users and the local economy, as pedestrians disembarking from the line will likely patronize small businesses within walking

distance of the station. These dense neighborhoods, designed around pedestrian travel, attempt to remove the need for travel by car by providing many services in close proximity to housing. Hopefully, shopping will then take place without the use of a car, in businesses operated by local proprietors.

The Atlantic City line crosses the RiverLine as it approaches the Delair Bridge in Palmyra. The bed of the RiverLine is about twenty feet below the Atlantic City line at this point, because the Atlantic City line is ascending the bridge. A two-story platform could be constructed, creating an interchange between the two systems. This would allow Burlington County residents from as far north as Burlington City to travel to Atlantic City in less than two hours. The interchange would also allow Atlantic County residents to



travel to Trenton in about three hours. An editorial in the May 21st, 2003 Courier-Post stated that adding the junction between the two lines, “makes sense.” The article continues, explaining that the \$10 million cost of constructing the interchange is justifiable, as it would “extend the reach of the line while offering a genuine destination to passengers.”

Continuing the line south to Glassboro would benefit not only the RiverLine by providing a link to an unserved residential population that is continuing to grow, but it would potentially restore interest in the small towns of Gloucester County. One of the criticisms often heard concerning the RiverLine is the line lacks strongly desirable destinations. Commuters using the RiverLine will likely require a transfer to a bus, PATCO, or NJ Transit’s Northeast Corridor line to reach their destination. The body of tourists expected to use the line must first utilize another mode of transportation before accessing the RiverLine, decreasing the likelihood that transfers to the line will be made. A southern extension would provide residents of Gloucester, Camden and Burlington Counties car-free access to Rowan University, the largest employer in Gloucester County. The line would also serve other nodes of employment such as Woodbury and Camden City.

The success of a future commuter rail system in South Jersey may depend on the expansion of service to the substantial number of potential riders in Gloucester County. Expansion will likely come in one of two forms; commuter service on the existing rail line, discussed in the DRPA study of the “horseshoe” corridor, or service via a new rail line constructed in the median of Route 55. There are unique benefits and potential drawbacks in how each line will



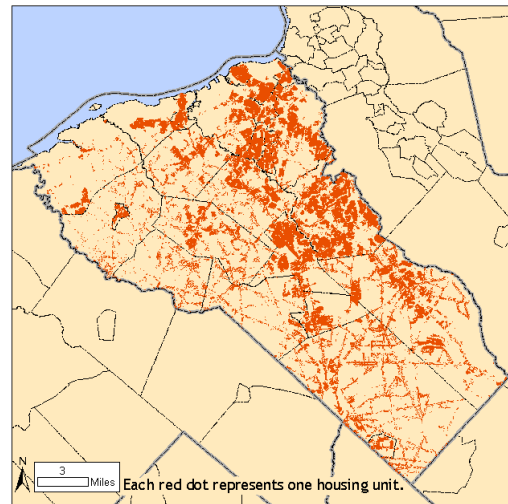
service Gloucester County residents. Restoring service on the existing line will be less expensive initially, compared to the Route 55 line. The existing line will be within walking distance for the residents of Westville, Woodbury, Woodbury Heights, Wenonah, Mantua, Sewell, Pitman and Glassboro. Like the RiverLine, initial “NIMBY” protests would occur. Construction of a rail line in the median of Route 55 will be costly and likely affect traffic. Acquiring a right-of-way to link the rail line from the northern terminus of Route 55 to a line in Camden will not be possible without some protest, as much of the area is already highly urbanized. Nonetheless, a line constructed on Route 55 would be able to provide high-speed access due to a lack of grade crossings.

GIS Methodology

In order for the accessibility of various rail station locations to be assessed, an accurate estimate of actual walking distance from any given household to a proposed rail station is needed. Before any distance function can be performed, two GIS datasets must be created. First, the location of every household in Gloucester County must be stored as points in the GIS. Second, true pedestrian distance from each household to the proposed stations will then be calculated.

Using ArcView, the author digitized the proposed stations. The station locations were placed on the road network at the nearest major road intersection. For the existing rail line, these intersections were determined by an illustration from the Gloucester County Times, seen at right. For the Route 55 option, the station points were placed at the northernmost 5 interchanges in the County.

The housing points were created by synthesizing a number of other datasets into one that best represents housing points utilizing an automated GIS housing location delineation method (Hasse and Lathrop 2003). The methodology began with a parcel layer of Gloucester County obtained from the County Planning Office. This layer was used in an intersection geoprocessing function with a land



use dataset to create a point layer that represents each housing point in the county. Before any analysis takes place, the parcel layer must be modified to increase the accuracy of the result. All right-of-ways needed to be removed from the dataset. Any sliver polygons, small polygons that are often the result of improper digitizing, must also be removed. Some sliver polygons are intentionally created in the parcel layer, due to the fact that some towns own sliver parcels such as gas line right-of-ways and drainage ditches. These parcels also needed to be removed due to the fact that they are inherently not part of a residential housing unit, and that the inclusion of said parcels would only inflate housing point estimates. In order to remove these sliver polygons from the dataset, they were selected on the value of their perimeter to area ratio. To accomplish this, it

was necessary to recalculate the area (in square feet and in acres) and perimeter of the parcel layer. A select-by-attributes statement of $[\text{Perimeter}]/[\text{Area}] > 0.3$ AND $[\text{Acres}] < 0.1$ selected all parcels that had the spatial attributes of sliver polygons. In testing this function, the perimeter to area ratio is not enough to accurately select the sliver polygons. Too often, small condominiums and other small parcel features are included in the selection. By selecting parcels contingent on the very small size and the ratio of perimeter to area, the likelihood of selecting residential units was diminished.

The land use layer was downloaded from the GIS Data page of the NJ Department of Environmental Protection website. The minimum mapping unit of the dataset is one acre. The dataset is based on color infrared orthophotography of New Jersey flown in 1995 and in some parts, 1997. The land use dataset is classified using a modified Anderson classification system. All land use polygons with a residential designation were exported as a separate layer by selecting those polygons with a SQL statement of $\text{“LU95”} < 1200$. “LU95” is the attribute field containing the Level 4 Anderson designations. All polygons in the county with an Anderson value less than 1200 contain only the areas deemed residential land use. The Grant F. Walton Center for Remote Sensing and Spatial Analysis (CRSSA) at Rutgers-New Brunswick created an “update” layer that consists of features where land use has changed in the time between 1995 and 2000. The CRSSA layer has an attribute field titled “LU9900” that contains Level 2 Anderson land use. All polygons within the county with an Anderson value of 11 are selected and exported as a polygon shapefile. An aside; in Anderson classification, a value of 11 and 1100 are the essentially the same, however the Level 2 value of 11 shows that there is residential land use, while the Level 4 values of 1110, 1120, 1130, and 1140 denote residential land use at various densities. The 1995 and the 2000 residential land use layers were merged, then dissolved, reducing the dataset to reflect areas of residential land use without density classification.

An intersection function is performed on the parcel layer and the land use layer. In the ArcView Geoprocessing Function Wizard, the parcel dataset is set as the input layer and the land use dataset is set as the overlay to the parcel dataset. The product of the intersection function is a polygon layer that is essentially the footprint for each housing unit in the county. In suburban areas, where much of the area is residential land use, many of the parcels will not change in size

from the original layer. In rural areas, where there is significant variation in land use and often, the parcels are of a much larger size, the resulting polygon is much smaller than the original parcel as the feature now represents where a rural house is likely to lie. For example, a home on 5 acres, set back 200 feet will have a large parcel. The intersection function returns only where a parcel and residential land use intersect, thus our footprint layer will have a feature that is close to the footprint of our rural home. Before points are created out of the footprint layer, sliver polygons must again be removed. The polygon boundaries of the land use layer do not conform to the parcel layer, as they were created from orthophotography. This overlap could inflate the number of housing points calculated.

In ArcView, an ArcObjects script from ESRI was used to calculate the Cartesian coordinates of the center points for each of the polygons in the footprint layer. These coordinates are stored in the attribute table of the footprint layer. The coordinates are exported as a separate table that is used to create a point shapefile. The housing point layer now consists of points where each house was located in 2000 in Gloucester County.

A point layer was created to store the location of the proposed light rail stations. Points were chosen where the railroad crossed the road network closest to the site of a proposed station or park and ride. Considering the somewhat vague description of the location of the proposed stops, measuring from the closest street intersection will not greatly affect the distance accessibility measurements.

A GPS generated road network was also obtained for Gloucester County. The road network was in Line Shapefile format with each feature representing the centerline of a paved roadway. The road network was converted into a raster grid with a cell size of 20 square feet. Cells on the road network were assigned a value of 1 and all other cells were assigned a value of NoData. A cost-distance analysis was performed on the road network, using the proposed light rail stops as the destinations. A cost-distance function weights distance against a source layer (the road network) and returns a layer with a “cost” value for each cell. The cost value in this analysis is distance; the road network cell value is one, meaning that all roads are equally accessible and the only cost to be weighed is distance. The resulting layer of the cost-distance function is a copy

of the road network, however each cell value is the distance in feet from the center of the cell, along the network, to the closest rail station.

An allocation of the cost-distance road network was then performed. The allocation function assigns the NoData cells the distance value of the closest cell on the road network. The filled cells have a distance value that does not include the distance of each cell from the road network. A straight-line distance function is performed on the road network and added to the allocation layer, resulting in a new surface that reflects actual distance. Every cell in this new surface has a value that is the sum of the straight-line distance to the road network and the distance along the road network to the closest rail station. A custom ArcObjects function was used to assign the value of the distance surface to the housing unit point layer (Rathert). This method was performed twice using the Gloucester County data: once to measure accessibility to the proposed light rail line and again to measure accessibility to the 5 northernmost Gloucester County interchanges on Route 55.

There will be some discrepancy between actual measurements and estimates generated by this method, nonetheless the estimates created are sufficient to demonstrate the number of residents with non-automobile means of accessing the rail line. This method relies on two assumptions concerning travel: that from the housing unit point, a person will travel the shortest route to the road network and that once on the road network, the person will not leave the network until the destination has been reached. Typical walking “shortcuts” across parks, parking lots and open green space are not taken into account.

When the estimated population is applied to distance values, the method also assumes that some error may be involved due to potential variation in the housing point count. Each cluster of housing points will vary in estimate population based on the population of the Census block in which the points fall and the possible over or under estimation of housing points in the Census block. Areas with excess housing points will have a lower estimate population value per point, however the underestimation applies only to housing points in the contiguous Census block. There is a greater likelihood of misrepresenting the population when using the estimate population in rural areas, where Census blocks are often relatively large in area.

The study also assumes that the southern most point serviced would be Rowan University. Route 55 and the existing rail line continue past Rowan into Cumberland County and rail service could be incorporated there as well. The Gloucester County Times map showing the “Southern Corridor” was the only detailed description of proposed station locations on the existing line. Thus, the stations on the Route 55 Line stop near Rowan University. Extending either line farther south without specifically knowing where stations are to be placed could negatively impact distance measurements by projecting service to areas where service may not be planned.

Results of Rail Line Study

The analysis of the proposed systems shows how each would theoretically provide service to the residents of Gloucester County. If restored, the existing rail line is better suited to serve as a light rail system, with many stops and a relatively slow speed. Conversely, a line constructed on Route 55 would only be usable as a high-speed line with few stops. Either form of commuter rail would benefit Gloucester County by providing service from suburbia to Camden and Philadelphia, however there are other implications in the construction and operation of either system that influences the feasibility of success.

Using the numbers calculated by the GIS, the difference between the lines is striking. There are 25 housing units within 1,500 feet of any of the rail stops on the Route 55 line, which represent 0.03% of the 98,372 units calculated for the County. 1,616 housing units are within the same distance from any of the planned rail stops on the existing rail line, representing 1.64% of the whole. By using the population values for each of those points, the number of people within walking distance can be inferred. The 25 housing units near Route 55 house approximately 34 people, while the 1,616 units near the existing line house an estimated 4,825 people, or 1.93% of Gloucester County's total population. In the range of one mile, there are 1,836 housing units near Route 55 stops, compared to 15,550 units within one mile of planned stations on the existing line. These housing units translate into 1.51% of the county's population within one mile of Route 55 and 18.27% of the county's population within one mile of the existing line. By restoring passenger service on the existing rail line, 45,636 people will have easy access to Camden, Philadelphia, the Jersey Shore and Trenton through the use of the rail network. Of those 45,000 people, the farthest walk would be 30 minutes and by bike, 10 minutes.

Housing Points

Distance to Route 55	Count	Percent Total
<= 1500	25	0.03%
1501 - 2640	130	0.13%
2641 - 5280	1681	1.71%
5281 - 15840	23404	23.79%
> 15840	73132	74.34%
All Points	98372	100.00%

Distance to Southern Corridor

<= 1500	1616	1.64%
1501 - 2640	4258	4.33%
2641 - 5280	9676	9.84%
5281 - 15840	27124	27.57%
> 15840	55698	56.62%
All Points	98372	100.00%

Population

Distance to Route 55	Count	Percent Total
<= 1500	34	0.01%
1501 - 2640	347	0.14%
2641 - 5280	3399	1.36%
5281 - 15840	61270	24.53%
> 15840	184748	73.96%
All Points	249798	100.00%

Distance to Southern Corridor

<= 1500	4825	1.93%
1501 - 2640	11507	4.61%
2641 - 5280	29304	11.73%
5281 - 15840	66550	26.64%
> 15840	137612	55.09%
All Points	249798	100.00%

Constructing a rail line on the median of Route 55 will require extensive preplanning, as the logistics of grading and constructing a rail line without closing the highway would be immense. The cost will also be a considerable factor. Preliminary estimates from 2003 put the cost in the “hundreds of millions” (Moroz April). The Route 55 Line would provide Gloucester County with a high-speed PATCO-style commuter line into Philadelphia, accessible by a few stations designed as “Park and Rides.” By nature, the Park and Ride lots will assume that users of the rail line will first drive to the station. This is a definite drawback, as it is likely that potential users of the Route 55 will likely continue on Route 55 to Philadelphia. It is counterintuitive to drive to a limited access freeway, to park and wait for a train that will likely require a transfer to PATCO or the RiverLine. Combined with a low population near the line, (26% of the population lives within three miles of the line, compared to 45% within three miles of the existing line) the Route 55 option will likely have low ridership.

A large share of Gloucester County’s population lives in the small towns along the existing rail line. Dense housing and “main street” commercial development presently exist in close proximity to the existing rail line. Cost of restoring passenger rail service along this line must be carefully considered, nonetheless it will likely be much lower than constructing the Route 55 line.

The nature of the line planned on the existing track will likely follow the form of the RiverLine. Gloucester County has a need for reliable mass transit via a passenger rail system.

Residents of Woodbury and Pitman could easily ride the train to Rowan University or to Philadelphia. If the service provides an efficient means of changing services in Camden, residents within walking distance of PATCO, the RiverLine, or SEPTA subways would be able to attend classes at Rowan University without using the dreaded I-295, NJ-42 interchange to commute to classes.

Another body of potential riders, Rowan University students would likely take the train into Camden and Philadelphia. The University offers “South Street” bus trips a few times during the academic year and many students currently use Route 55 to travel to Philadelphia. Traffic from the campus to Philadelphia is likely to increase if train service is extended through the county to the University. Students without cars (or those with cars without money for gasoline) would use the line as an inexpensive means of taking day trips. The line could also expect peaks on weekends, as a mass exodus of students leave Rowan for entertainment elsewhere.

The small towns of Gloucester County would benefit greatly from light rail line service. The traffic problems facing the northern end of the County would be alleviated by the reduction of traffic on local roadways. Park and Ride stations will serve residents of communities off the rail line. Although the light rail option would require slower travel times than that of a high-speed line, a high-speed line could be incorporated into the existing rail right-of-way, but at a considerable cost. If either a light rail or high-speed line is constructed on the existing line, it will be a greater public service than a rail line on Route 55, which would require private automobile transportation to access the line.

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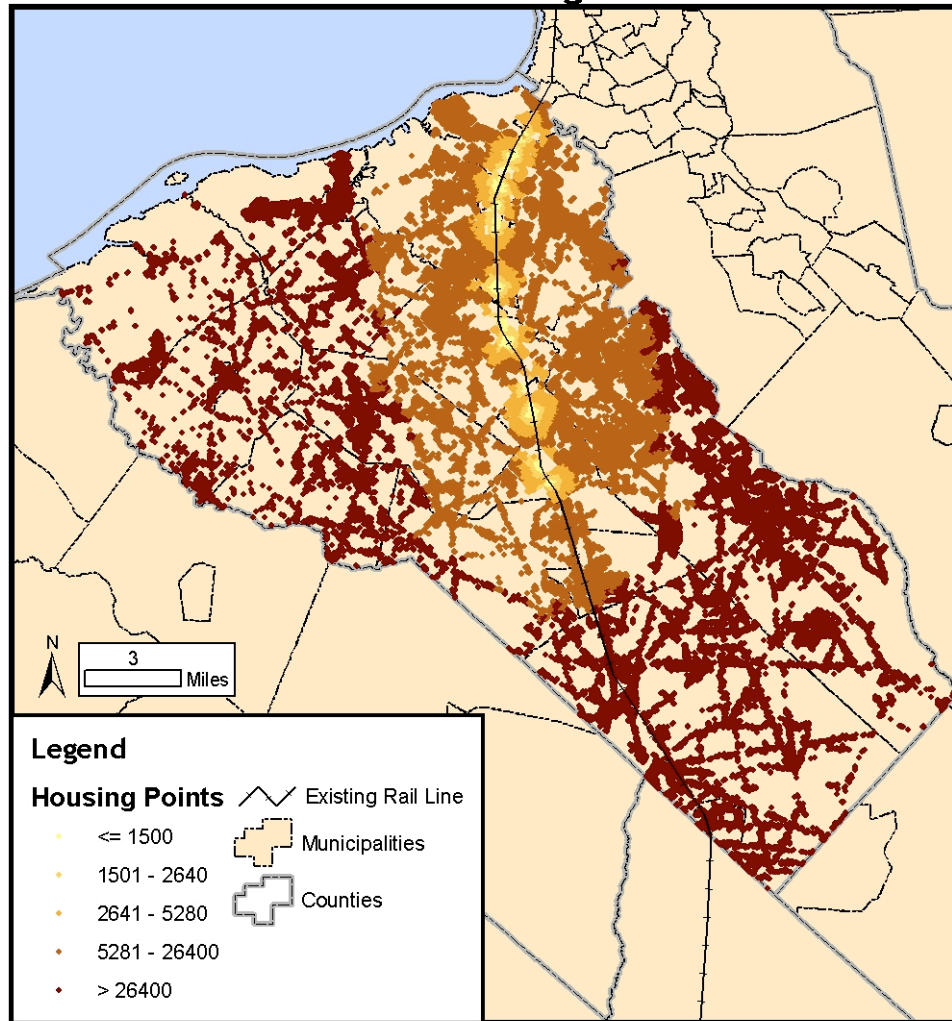
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Appendix A

Distance to Existing Rail Line



Count of housing points, classed by distance from existing rail line.

Distance to Existing Line

≤ 1500	1616	1.64%	5.97% of Gloucester County Homes within walkable distance
1501 - 2640	4258	4.33%	
2641 - 5280	9676	9.84%	15.81% of Gloucester County Homes within bicycle distance
5281 - 15840	27124	27.57%	43.38% of Gloucester County Homes within 3mi Road Distance
> 15840	55698	56.62%	
All Points	98372	100.00%	

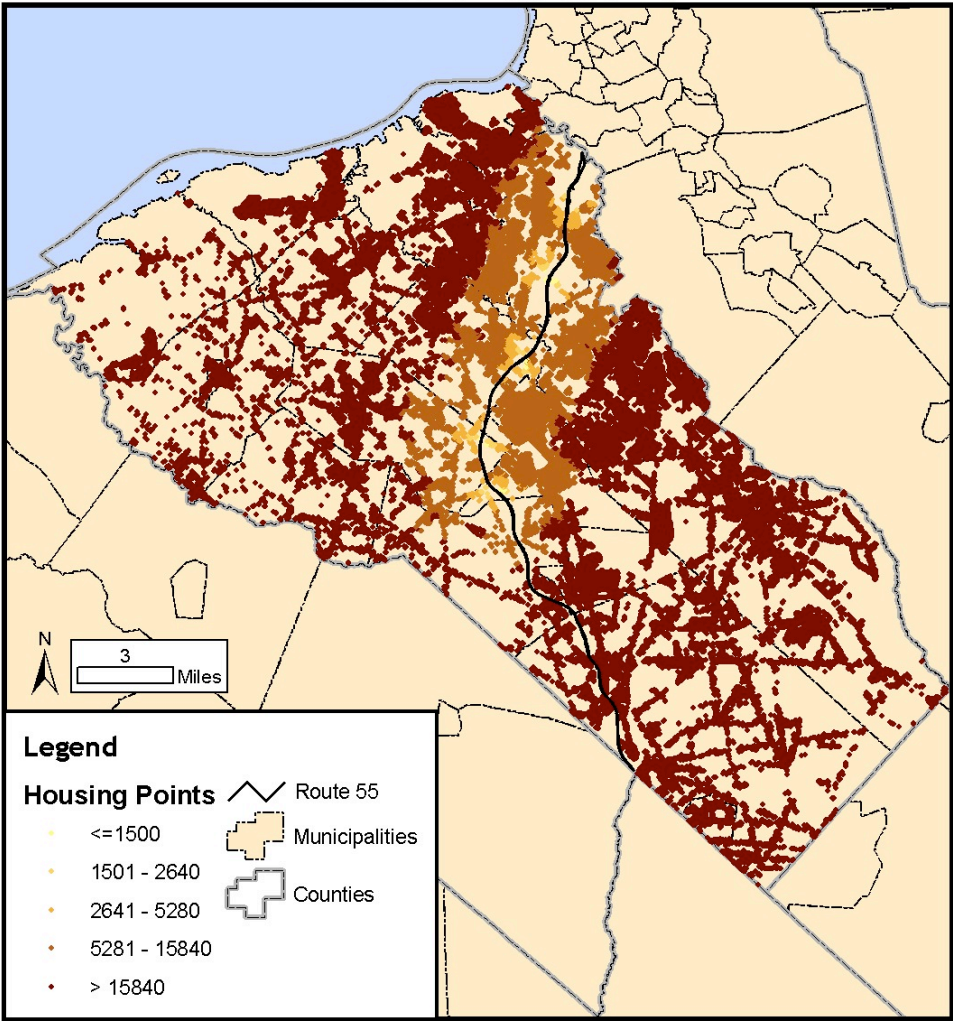
Population, interpreted from housing points and Census blocks, classed by distance from existing rail line.

Distance to Existing Line

<= 1500	4825	1.93%	6.54% of Gloucester County Residents within walkable distance
1501 - 2640	11507	4.61%	
2641 - 5280	29304	11.73%	18.27% of Gloucester County Residents within bicycle distance
5281 - 15840	66550	26.64%	44.91% of Gloucester County Residents within 3mi Road Distance
> 15840	137612	55.09%	
All Points	249798	100.00%	

Appendix B

Distance to Route 55



Count of housing points, classed by distance from Route 55.

Distance to Route 55	Count	Percent Total	
<= 1500	25	0.03%	0.16% of Gloucester County Homes within walkable distance
1501 - 2640	130	0.13%	
2641 - 5280	1681	1.71%	1.87% of Gloucester County Homes within bicycle distance
5281 - 15840	23404	23.79%	25.66% of Gloucester County Homes within 3mi Road Distance
> 15840	73132	74.34%	
All Points	98372	100.00%	

Population, interpreted from housing points and Census blocks, classed by distance from existing rail line.

Distance to Route 55	Count	Percent Total	
<= 1500	34	0.01%	0.15% of Gloucester County Residents within walkable distance
1501 - 2640	347	0.14%	
2641 - 5280	3399	1.36%	1.51% of Gloucester County Residents within bicycle distance
5281 - 15840	61270	24.53%	26.04% of Gloucester County Residents within 3mi Road Distance
> 15840	184748	73.96%	
All Points	249798	100.00%	