

CHAPTER 6

COMMUNITY ANALYSIS



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Understanding the conditions in which a bike share system will operate in is essential for determining how feasible such a system can be for a given place. An existing conditions analysis helps identify physical, demographic, transportation, and infrastructure issues which may have an impact on how bike share is implemented in a community. Such an analysis also helps determine those areas of the community where bike share will likely thrive, and those where it might be less successful. For this purpose, the project team undertook a review of existing conditions and complemented it with a GIS-based heat mapping analysis which examined the city's topography, demographics, cultural characteristics, and points of interest.

The process included the analysis of several variables which have an effect on bike share demand, including:

- Physical conditions and topography;
- Population density and housing;
- Employment density;
- Colleges and student populations;
- Visitors and tourism; and
- Bicycling infrastructure.

A summary of existing conditions, challenges and opportunities for each of these variables is presented below. Each of these variables were then mapped and scored with weights based on bike share best practices. These scores were then compiled to develop a “heat map” showing the areas of the community most likely to use bike share.

PHYSICAL CONDITIONS AND TOPOGRAPHY

The City of Wilmington is the county seat of New Castle County in Delaware. It is situated where the Brandywine Creek flows into the Christina River, approximately 18 miles from Philadelphia, Pennsylvania. Wilmington is the largest city in the state with a population greater than 71,000,⁴⁷ and its metropolitan area (Philadelphia-Camden-Wilmington) is the 6th largest in the country with upwards of 6 million residents.⁴⁸

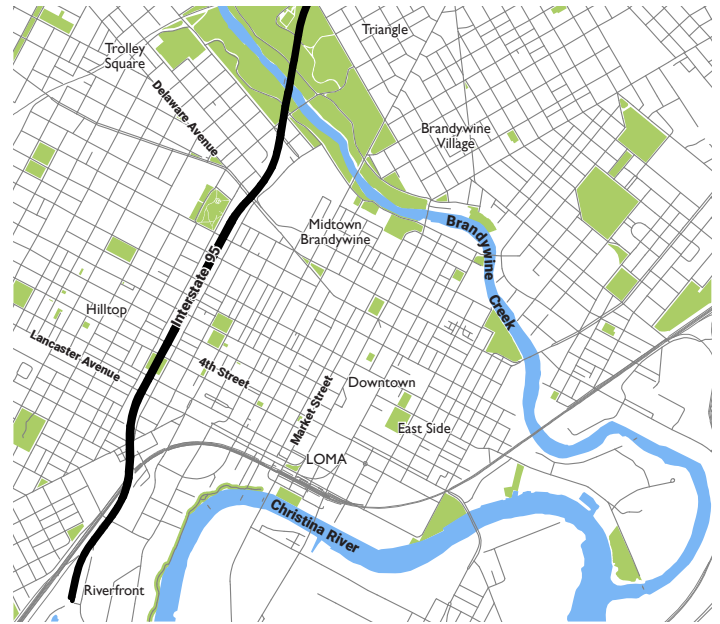


Figure 15: Wilmington Street Grid

The city covers 10.9 square miles and has two predominant street grids interrupted by railroads, highways, and natural features.⁴⁹ **Figure 15** illustrates the degree to which Brandywine Park and Creek, and to a lesser extent, Interstate 95, break up the continuity of the street grid.

The main street grid, perpendicular to the Delaware River, contains the city's downtown and residential neighborhoods like Mid-town Brandywine and Little Italy. The other street grid, east of Delaware Avenue and north of Market Street, is skewed approximately 35 degrees and includes the Brandywine Village and Triangle neighborhoods.

Wilmington has varied topography, with the area east of Market Street and along the Christina River generally flat and the area west of Market Street hilly.⁵⁰ The city's topography is illustrated in **Figure 16**. Wilmington is located in a temperate climate zone with four distinct seasons. The average high temperature exceeds 80 degrees from June to August and falls below 50 degrees from December through February. Wilmington sees about 19 inches of snow every year and 43 inches of total precipitation with the most coming in the summer months.⁵¹

47 <http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=CF>

48 <http://www.bea.gov/regional/bearfacts/pdf.cfm?fips=37980&areatype=MSA&geotype=4>

49 <http://quickfacts.census.gov/qfd/states/10/1077580.html>

50 <http://www.ci.wilmington.de.us/residents/cityhistory>

51 <http://www.usclimatedata.com/climate/wilmington/delaware/united-states/usde0055>

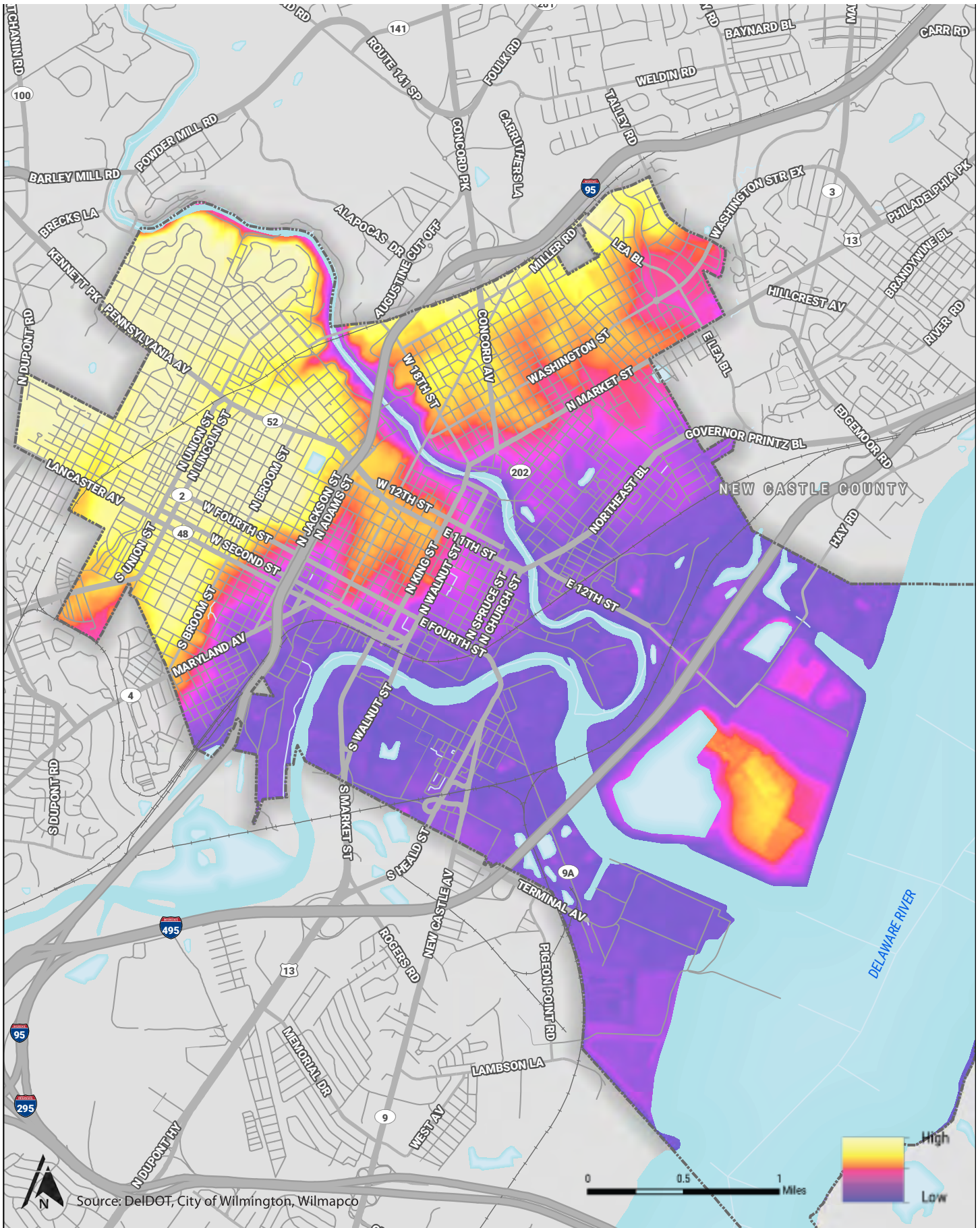


Figure 16: Wilmington Topography



Challenges

- The street grid is broken in places, concentrating traffic along certain corridors and reducing routing options for bicyclists.

Opportunities

- The consistent street grid allows bicyclists many routing options to get to local and regional destinations.
- The Riverfront neighborhood, site of significant development focus, is flat, encouraging bicycle trips.

POPULATION DENSITY AND HOUSING

The City of Wilmington has more than 71,000 residents and a population density of 6,497 persons per square mile. This density exceeds that of many American cities that have successful bike share systems, including Charlotte and Columbus, shown below.

Table 3 - Population Densities of Peer Cities⁵²

	Land Area (sq. mi.)	Population	Density (pop./sq. mi.)
Wilmington	10.9	71,292	6,540
Washington	61.05	658,893	10,792
Charlotte	297.68	809,958	2,721
Columbus	217.17	835,957	3,849

Figure 18 shows the distribution of population across the city. The highest densities can be found in the Upper East Side neighborhood east of Downtown, the Hilltop neighborhood west of Interstate 95, and the 9th Ward neighborhood. While these are the hot spots, the city is generally dense in part due to its row home neighborhood construction. The densities of these neighborhoods are promising because they are within an easily bikeable distance of the downtown job and retail centers. A bike share system could make it easier for these groups, including those in the Hilltop neighborhood who may live outside of walking distance of downtown, to access downtown’s jobs and other resources.

A further review of the 2013 American Community Survey indicates that:⁵³

⁵² Census Quick Facts. Charlotte, Columbus, Washington DC and Wilmington.

⁵³ US Census Bureau. 2009-2013 American Community Survey 5-Year

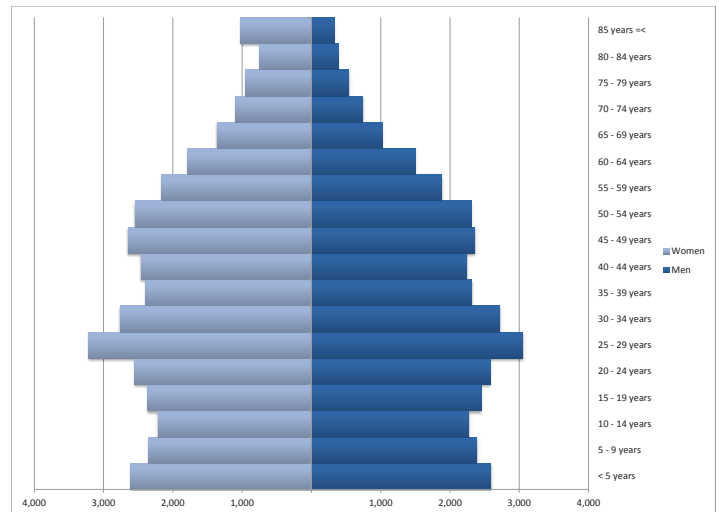


Figure 17: Population by Age and Sex

- The median age is 34 and a large proportion of the population (37.2 percent) is between 20 and 44 years old, as shown in **Figure 17**, but the population of those between the ages of 18 and 34 is forecasted to decline over the next five years by 4.2 percent.⁵⁴ This is not ideal because this cohort is one of those most likely to use bike share.
- The median household income is \$38,727, about 55 percent below the state’s median household income of \$59,878. However, a recent Strengths, Weaknesses, Opportunities, and Threats analysis by the City found that median income growth over the next five years was forecast to exceed the national average.⁵⁵
- Around one quarter (24.8 percent) of residents have a bachelor’s degree or higher, lower than the state’s 28.9 percent;
- The city’s demographic composition (**Figure 19**) shows approximately 29.3 percent of Wilmington residents are Caucasian, 55.5 percent are African-American, 12.7 percent identify as Hispanic or Latino, 1 percent are Asian, and 1.6 percent are of multiple races.
- One quarter of the households in Wilmington do not own a car.⁵⁶ In the areas immediately around

Estimates. DP05. Demographic and Housing Characteristics.

⁵⁴ <http://www.wilmingtonde.gov/docs/2122/SWOTpercent20Analysis.pdf> p.10

⁵⁵ <http://www.wilmingtonde.gov/docs/2122/SWOT&20Analysis.pdf> p.2

⁵⁶ <http://www.governing.com/gov-data/car-ownership-numbers-of-vehicles-by-city-map.html>

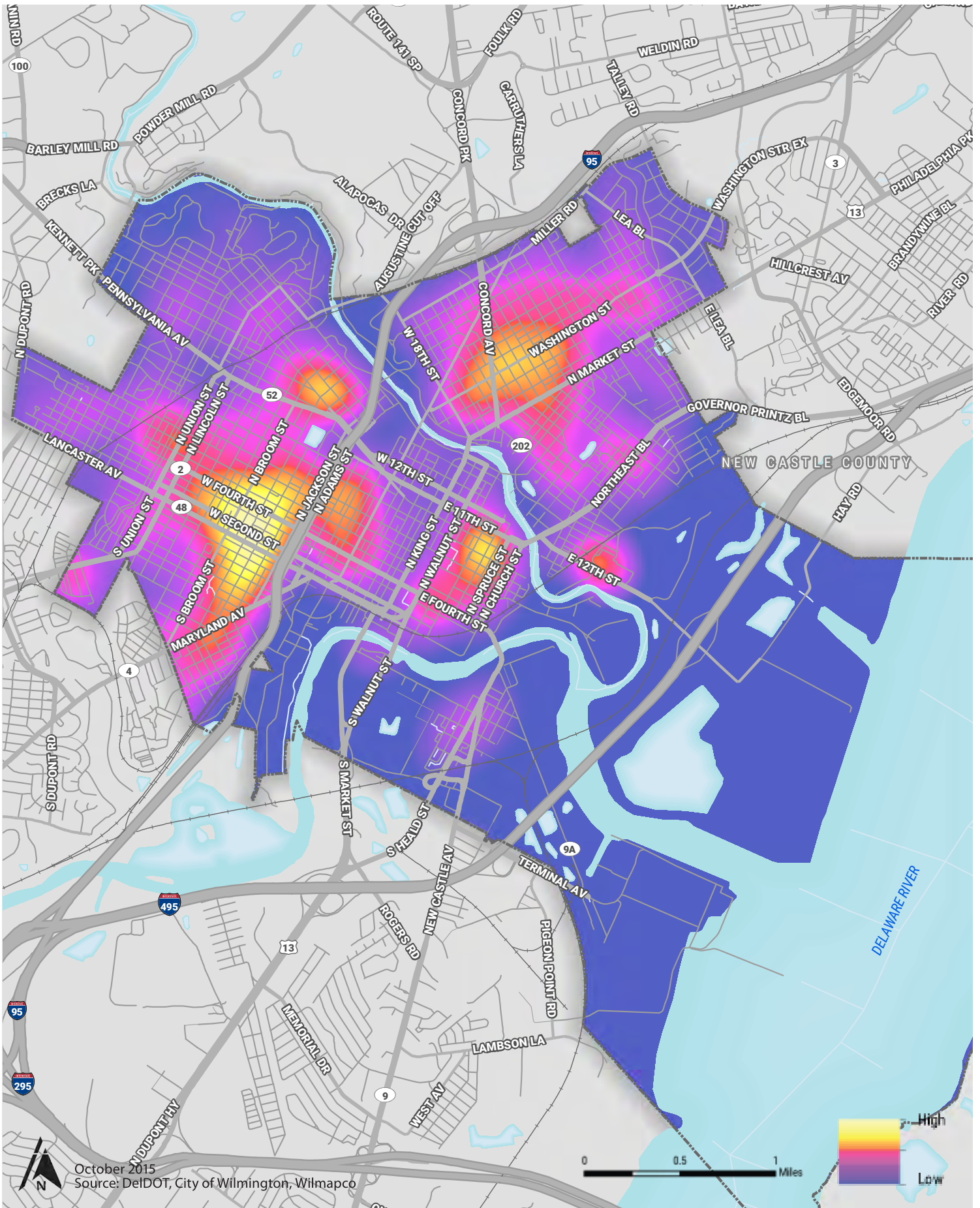


Figure 18: Population Density



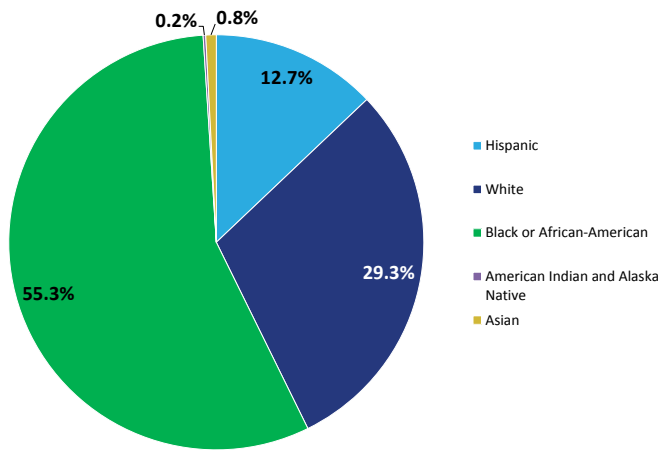


Figure 19: Demographic Composition

the downtown core, the percentage of households without cars is much higher, as shown in **Figure 20**. Residents of these areas may be more likely than others in Wilmington to benefit from access to a bike share program because of their current dependence on transit, walking and bicycling.

The demographic characteristics of Wilmington present both potential challenges and opportunities. Overall, Wilmington residents are on average young, low income, and minority populations. To date, such populations have not been a significant rider demographic for bike share systems, as surveys from existing bike share systems have indicated.⁵⁷ However, as bike share programs have continue to evolve, there have significant efforts around the nation to increase bike share ridership in low income and minority communities, that have had mixed success to date. Philadelphia for example, which is the closest comparison to Wilmington and has similar demographic breakdown, has launched the Indego system in 2015 with strong success by focusing on having at least 30 percent of station locations in areas of the city with a high concentration of low income and minority populations.

In Wilmington, minority communities are predominantly located east of Interstate 95, close to downtown. Due to their proximity to the region’s major job center, deploying bike share stations in these areas would be of great utility as these communities could use bike share as a great commuting option.

57 <http://www.capitalbikeshare.com/assets/pdf/cabi-2014surveyreport.pdf>

Challenges:

- The 18 to 34 year old population is forecast to decline in the coming years, the main bike share user’s age demographic. If the total number of likely potential bike share users declines in the city, the number of actual bike share users will likely go down as well.

Opportunities:

- High population centers are located within biking distance of downtown Wilmington’s jobs, even if many residents do not currently work in Wilmington.
- Bike share could be an opportunity to connect low-income and minority communities in close proximity to the central business district where many of the jobs and amenities are situated in the City.
- Around 25 percent of existing households in Wilmington don’t own a car. In areas around downtown, the percentage is much higher, upwards of 50 percent. These households are part of what could be called a “captive audience” for bike share which tends to move around the City by foot, bicycle, or transit. Bike share could provide people leaving in these areas another mobility option to carry out their daily tasks.

EMPLOYMENT DENSITY

The number and concentration of jobs are also vital indicators of bike share feasibility. Bike share can act as a first-mile, last-mile connection to transit and offer workers an easy way to get around during the day. Locating bike share stations in areas with high employment density is essential as these areas provide a higher concentration of potential riders which in turn may be beneficial for the program’s farebox recovery.⁵⁸

Data from the U.S. Census Longitudinal Employer-Household Dynamics program indicates that Wilmington’s employment density is overwhelmingly located in its downtown, centered on Market Street between East 14th Street to the north and West 3rd Street to the south, and extending to North Lombard Street to the east and North Jefferson Street to the west. This bodes well for bike share

58 http://www.pedbikeinfo.org/pdf/Programs_Promote_bikeshareintheus.pdf, page 15

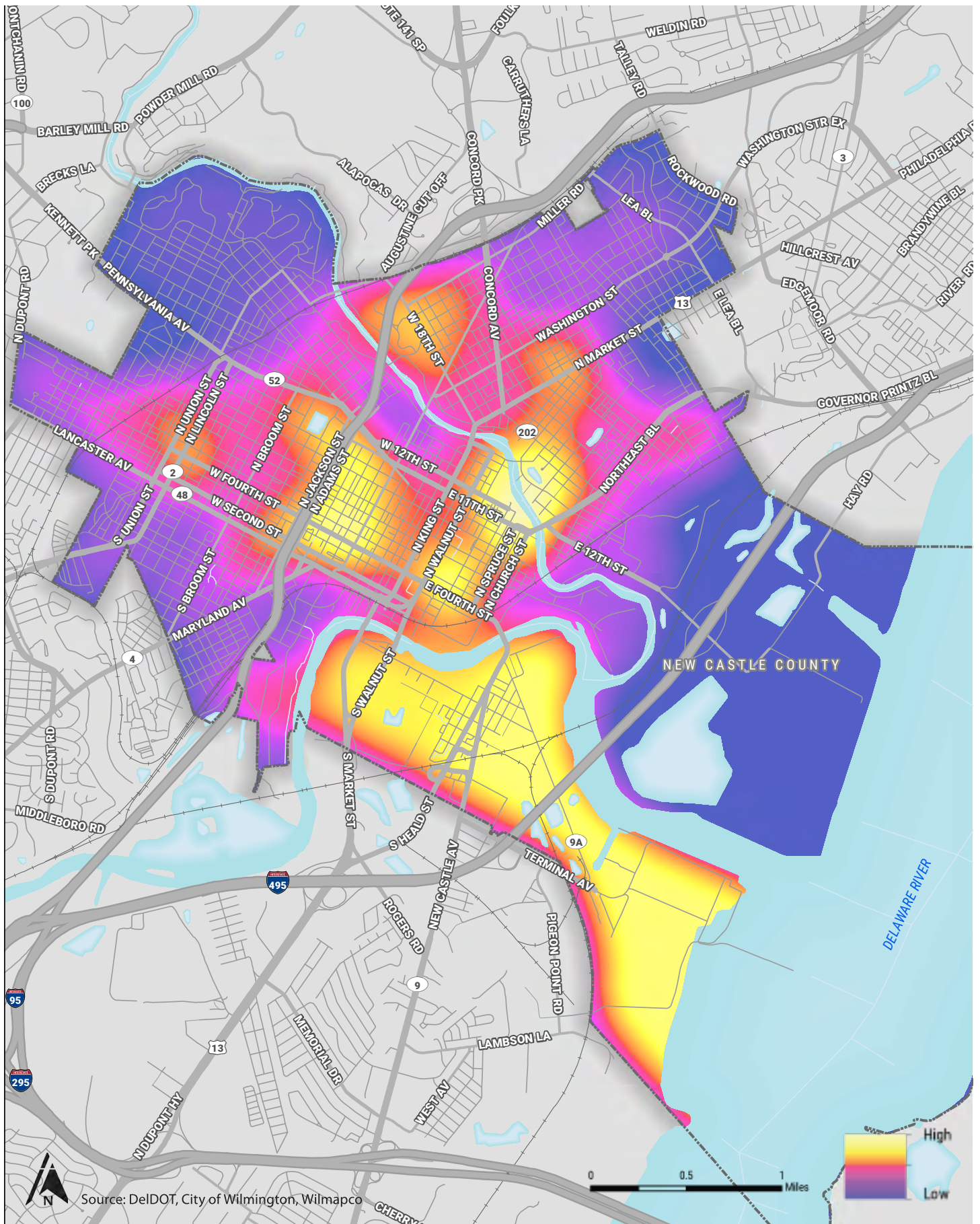


Figure 20: Concentration of Zero Car Households



in the downtown area, but the more limited employment in further afield parts of the city may limit the success of bike share in these areas **Figure 21** uses a probability density function created from employment density data to show the areas of the city with the highest density of employees.

A recent analysis found that people living outside the City hold 85 percent of City jobs, and that 24 percent of the City’s workforce lives out of state.⁵⁹ New Castle County, DE; Chester County, PA; and Delaware County, PA are the counties with the largest number of workers in Wilmington. With drive-alone commute mode shares of 79.6 percent, 81 percent, and 74.1 percent respectively, it is safe to assume that the vast majority of these out-of-town workers drive to the City.⁶⁰ Bike share could be used by these groups for running mid-day errands or riding from a parking lot/garage to their workplace. Conversely, 73 percent of City residents work outside city limits. For those residents who use transit to access their jobs, bike share could be a strong first-mile/last-mile tool to access transit for commuting purposes, and also help them access their neighborhoods and the rest of the city on the weekends and at night.⁶¹

Owing to Delaware’s unique business environment, many financial firms have a significant presence in Wilmington. Among those, Bank of America is the largest with 7,100 employees in the city as of 2014.⁶² The chemical and pharmaceutical industries also have a foothold in Wilmington, with E. I. Du Pont Nemours & Company employing 8,100 and AstraZeneca employing 4,500. While Dover holds the states capital, 13,000 state employees work in Wilmington, making it Wilmington’s largest employer Followed by Christiana Care Health Services with 10,400 employees.

The city’s 15 largest employers are listed in **Table 4**. Employees working for these companies represent great potential as users of a bike share system. Bike share could provide an immediate opportunity to connect employees to local destinations. A bike share membership could be

59 <http://www.wilmingtonde.gov/docs/2122/SWOT%20Analysis.pdf> p.26

60 http://factfinder.census.gov/bkkmk/table/1.0/en/ACS/13_5YR/B08301/0500000US10003

61 <http://www.wilmingtonde.gov/docs/2122/SWOT%20Analysis.pdf> p.26

62 http://www.ci.wilmington.de.us/docs/2200/CAFR_2014_Wilmington_DE.pdf p. 128

Table 4 – Wilmington Top-15 Largest Employers

Employer	Estimated Employees
State of Delaware	13,000
Christiana Care Health Services	10,400
E. I. Du Pont Nemours & Company	8,100
Bank of America	7,100
AstraZeneca, Inc.	4,500
Wal-Mart Stores, Inc.	4,700
University of Delaware	4,000
A. I. Dupont Institute	2,821
Christina School District	2,300
The Y of Delaware	2,300
Citibank Delaware	2,000
Red Clay School District	1,750
M&T Bank	1,700
Walgreen’s, Inc	1,700
Siemens	1,630

something that large employers include in their employee wellness and/or travel demand management programs. For example, many employers like Du Pont, Christiana Care, and Bank of America which are located on the north side of Downtown Wilmington may be able to benefit from the implementation of a bike share program. With the main commuter rail station at the southern end of Downtown, by the Riverfront, bike share would provide a convenient connection to easily cover the six-tenths of a mile distance.

Beyond their employees using the bike share system, these employers may be interested in sponsoring the bike share system to aid their sustainable image. In Salt Lake City for example, Kennecott Utah Copper and Rio Tinto, both mining companies, are major GREENbike sponsors even though their work locations do not have bike share access. Some Wilmington employers, like Barclay’s Bank and Citibank, already have experience sponsoring bike share systems in London and New York/Miami respectively.⁶³

Challenges:

- Although there is significant employment density in Downtown Wilmington, areas outside of the downtown core do not represent significant

63 <http://selecthealth.org/news/Pages/PressRelease.aspx?NewsID=44>

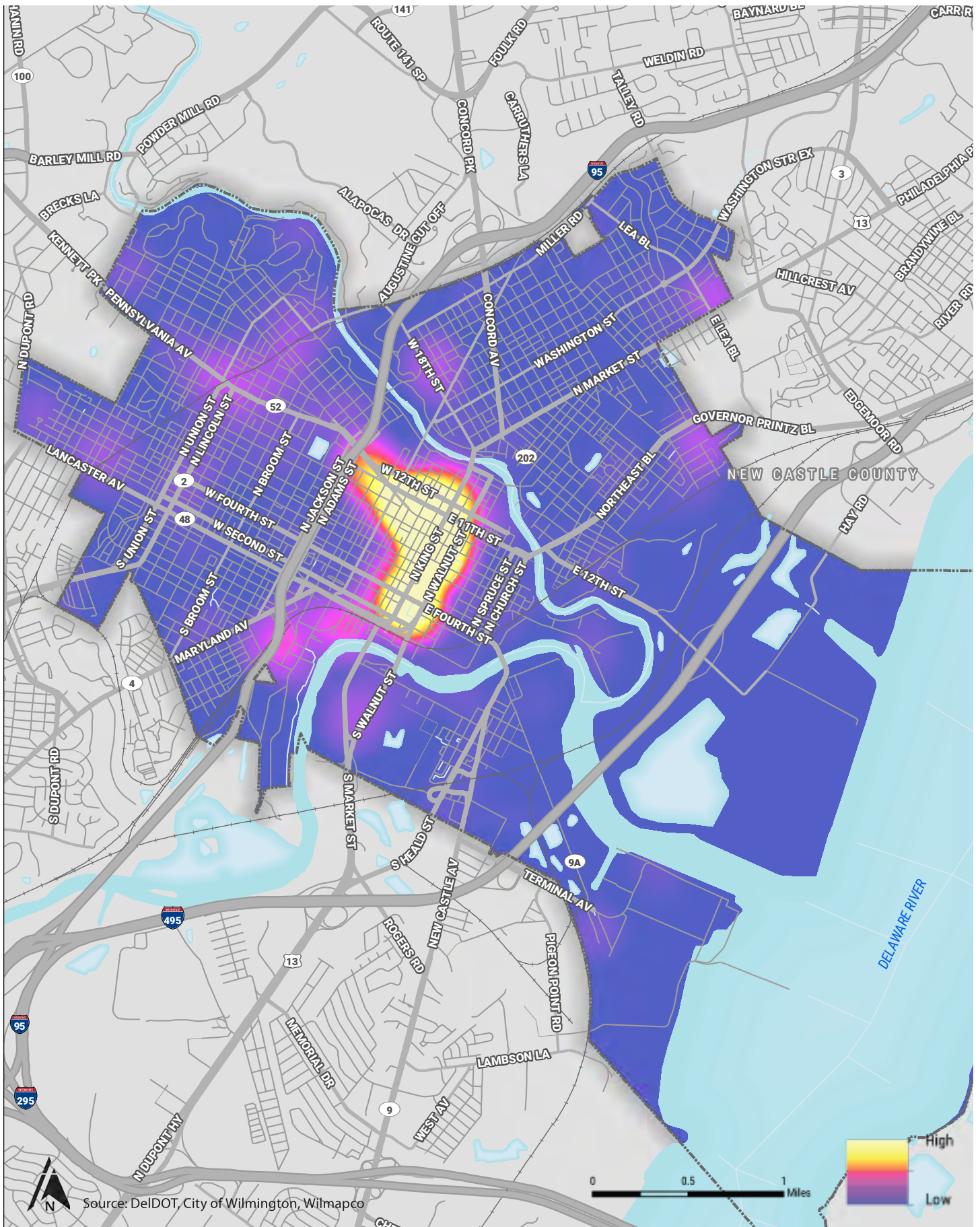


Figure 21: Employment Density



employment areas presenting a challenge for implementing bike share in those more outlying areas.

Opportunities:

- Ample public sector employment in Downtown Wilmington could provide opportunities for group membership. Other large employers, like those in the healthcare, financial, and chemical sectors could be interested in sponsorship or providing memberships to their employees as part of a wellness program or a transportation demand management program.
- Employment is highly concentrated in Downtown Wilmington, providing a critical mass necessary for bike share to be successful. A bike share system used by employees for commuting and mid-day travel purposes could be considered for this area.
- The great majority of jobs in the city are held by those who live outside city limits. Bike share is a strong opportunity to offer an option for running mid-day errands or riding from a parking garage/transit to their workplace.
- With so many residents working outside the city, bike share could be used to improve access to transit to suburban jobs and also to improve residents' connections to their neighborhoods.

COLLEGES AND STUDENT POPULATIONS

In determining if and where bike share is feasible in a city, the area around a college or university is generally a good location to consider for bike share implementation. As college students tend to take many daily short trips, and not own an automobile, bike share can be a natural mode of transportation. Additionally, colleges tend to have walkable, mixed-use development in the vicinity that caters to the student population. This land use pattern has proven to be very suitable for bike share in other communities.⁶⁴

There are three main schools of higher education within city limits, however none of them have significant residential student populations:

- The Delaware College of Art and Design is a small two-

64 http://www.pedbikeinfo.org/pdf/Programs_Promote_bikeshareintheus.pdf

year visual arts school with a 2013-2014 enrollment of 200 students and 27 full time employees located downtown at 600 Market Street.⁶⁵

- Delaware Technical Community College is the State of Delaware's only community college. The College's George Campus is located at 333 N. Shipley Street in downtown Wilmington. Together with the Stanton campus, the George campus enrolls 6,700 annually and has 189 faculty, and 262 full time staff.⁶⁶
- The University of Delaware's main campus is located south of Wilmington in the city of Newark, but the school has a satellite campus just outside of Wilmington, adjacent to the Wawaset neighborhood and a Downtown Center at 13 East 8th Street. Enrollment in the past year was 460.⁶⁷

In several cities, bike share stations have been located on university property. Site selection should be sensitive to areas with heavy pedestrian traffic and any locations where bicycling is not permitted. In addition, communication of on-campus bicycling rules can be emphasized when designing the bike share station signage.

Challenges:

- As not many students live in close proximity to their respective schools, bike share will not serve a significant number of Wilmington students in their residential life.

Opportunities:

- Bike share may serve as a last-mile transit solution for commuter students who do not live in the City or close to the university/college campus.

VISITORS AND TOURISM

Approximately two-thirds of user-generated revenues in peer cities come from tourists, visitors or other casual users.⁶⁸ Depending on the payment structure of the bike share system, these users can provide an important

65 http://www.dcad.edu/uploads/media/documents/consumer_info/FactBook_Final_Web_.pdf

66 <https://www.dtcc.edu/sites/default/files/fy15-heoa-fast-facts-sw.pdf>

67 <https://sites.udel.edu/ire/files/2015/04/15-enroll-227vq5u.pdf>

68 https://www.niceridemn.org/_asset/wcwbuh/NRMN_annual-report_2014_web.pdf



revenue stream for day-to-day operations as well as program expansion. Typically, tourists and visitors are less cost-sensitive and are willing to pay higher fees to keep bicycles out longer. For example for Salt Lake City's GREENbike program, in 2014 GREENbike's net revenue per trip for this group was \$4.01, compared to only \$1.20 for annual members.⁶⁹

Two million seven hundred thousand people visit New Castle County every year.⁷⁰ There are more than 5,000 hotel rooms available in the greater Wilmington region.⁷¹ There are a number of hotels along East 11th Street and also along King Street and in the Riverfront neighborhood.

Wilmington's largest attractions include:

- Delaware Center for the Contemporary Arts
- Delaware Children's Museum
- Delaware Theatre Company
- The Kalmar Nyckel
- Penn Cinema IMAX Riverfront
- Frawley Stadium
- Delaware Art Museum
- The Brandywine Zoo
- Delaware History Museum
- Delaware Symphony Orchestra
- Grand Opera House
- Old Swedes Historic Site
- The Playhouse at Rodney Square
- World Café Live at the Queen

All of the above locations are either in downtown Wilmington or easily accessible by bicycle. In addition to these attractions, the city hosts many annual festivals, including the Brandywine Festival of the Arts which draws 20,000 visitors annually,⁷² the Clifford Brown Jazz Festival which draws 30,000 attendees annually,⁷³ St. Anthony's Festival which draws 75,000 people annually,⁷⁴ and many others.

These attractions and annual events are great destinations

69 <https://configuringgreenbike.bcycle.com/docs/librariesprovider32/default-document-library/2014-annual-report.pdf?sfvrsn=2> 17

70 Delaware Tourism. <http://www.visitdelaware.com/>

71 <http://www.visitwilmingtonde.com/media/facts-sheet/>

72 <http://www.brandywinearts.com/about/>

73 [http://legis.delaware.gov/LIS/lis147.nsf/vwLegislation/HR+16/\\$file/legis.html?open](http://legis.delaware.gov/LIS/lis147.nsf/vwLegislation/HR+16/$file/legis.html?open)

74 <http://www.delawareonline.com/story/news/local/2014/06/08/st-anthonys-italian-fest-kicks-th-year/10209527/>

for visitors and residents alike to use bike share to access, especially given the parking constraints associated with popular street festivals and venues.

Business travelers could also be prolific bike share users. Bike share could be used to get between hotels and meeting spaces, the Chase Center on the Riverfront, restaurants, and entertainment venues. Conference and event planners could purchase bulk short-term memberships and include them in event registration packets for all attendees.

Figure 22 shows the areas with a preponderance of attractions, including the aforementioned venues, but also parks, community centers, and other local amenities.

Challenges:

- None observed

Opportunities:

- Many of the city's biggest attractions are located either downtown or close by. These venues can easily be accessed via bicycle from both residential areas and local hotels;
- Conventions and special events may increase usage and revenues, and can be tied with special membership deals or short-term passes to introduce people to the system.

TRANSPORTATION, INCLUDING TRANSIT, CAR SHARE, AND REGIONAL TRANSPORTATION

No matter how successful a bike share system is, it is usually not the sole mode of travel for city residents and visitors. In concert with walking, public transportation, carsharing, and other modes, bike share can help connect a city's origins and destinations. A city without access to these modes can struggle to support a bike share system. Fortunately, Wilmington offers a variety of transportation options, including private automobile, regular bus service, car share, and regional rail and bus service.

The existing road network is laid out in a grid pattern, disrupted by natural features like the Brandywine Creek and Christina River, and artificial ones like Interstate 95. While the street grid lends itself to biking, the city remains very automobile-oriented. According to the 2013 ACS 5-Year



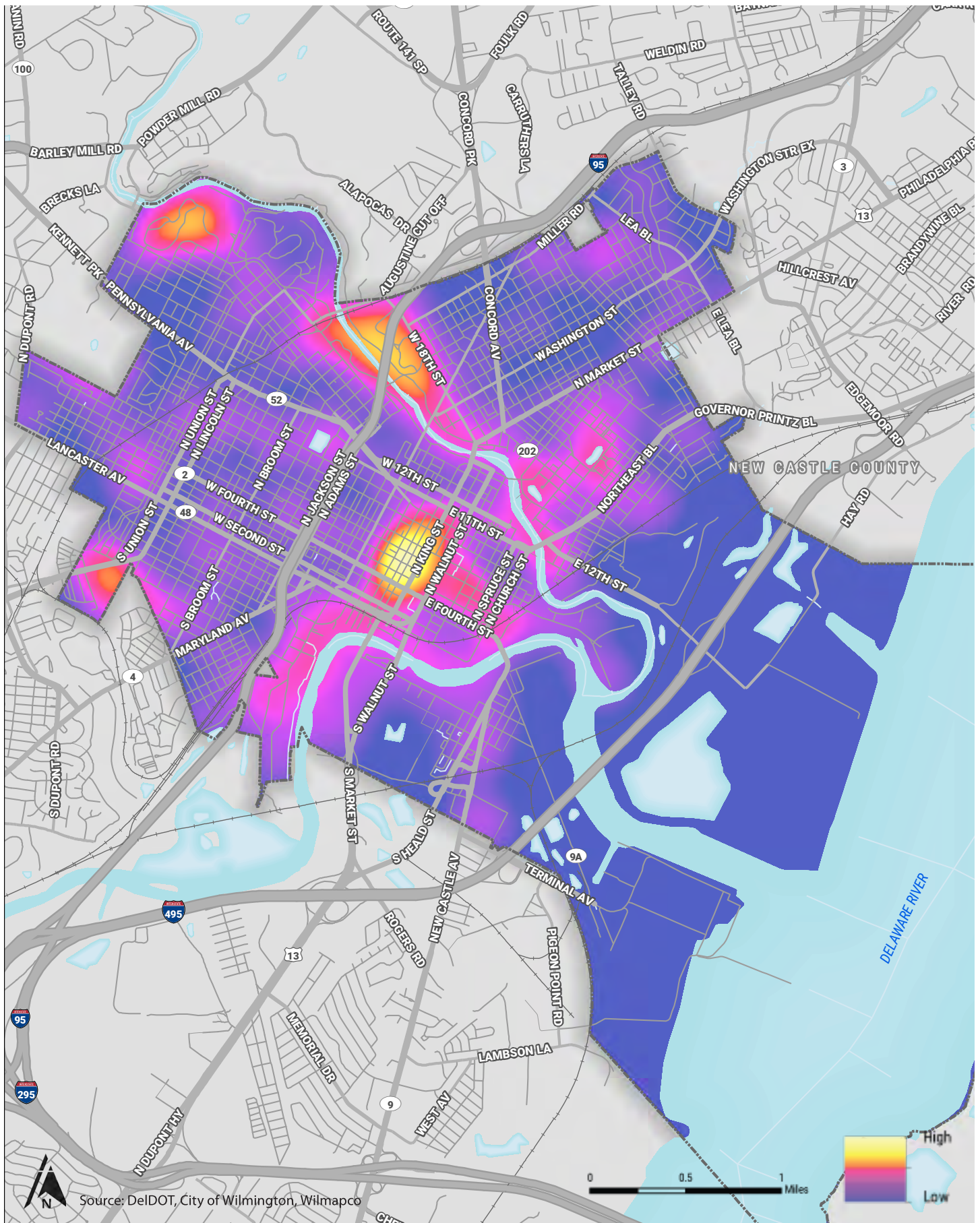


Figure 22: Regional Attractors Density



Estimates, 75.8 percent of city commuters drove to work compared to 12.8 percent using public transportation, 6.9 percent walking and less than one percent (0.5 percent) using bicycles to get to work.⁷⁵

The level of commuting by private automobile is high, and is likely related to employment and residential locations of most Wilmingtonians. Most city residents work outside the city and most workers in the City live outside it.⁷⁶

Transit service frequency and availability are other likely reasons why private automobile use is high. Wilmington's local transit service is called DART, and it is operated by the Delaware Transit Corporation. New Castle County has 44 fixed bus routes, and one-way fares cost \$1.75 per zone, with all of Wilmington being in one zone. Fares can be paid in cash or via pre-purchased DART card. Statewide, DART saw 10,601,325 trips in fiscal year 2012. The city's bus stop density can be seen in **Figure 23**. Greater Wilmington Bus Routes can be seen in **Figure 24**,⁷⁷ and downtown routes are shown in **Figure 25**.⁷⁸

Headways are generally 30 minutes, with some routes like the 1 Philadelphia Pike and the Wilmington Trolley being 20 minutes. Transportation experts note that the key to increasing transit use is to provide "frequent networks". The basic elements of a frequent network are that it runs all day and it runs every 15 minutes or better.⁷⁹ Today, Wilmington has no bus routes that qualify. Providing more frequent bus service may increase bus ridership and therefore present an opportunity for bike share, as a first-last-mile connection to DART riders.

Wilmington has regional train service through the Southeastern Pennsylvania Transportation Authority (SEPTA) and Amtrak. SEPTA offers service from Newark, Delaware through Wilmington to Philadelphia. Thirty four trains serve Wilmington every day. In fiscal year 2012, SEPTA service in Delaware saw 1,207,644 riders.⁸⁰ Amtrak services in Wilmington include:

75 http://factfinder.census.gov/faces/tableservices/jsf/pages/productview.xhtml?pid=ACS_13_5YR_S0801&prodType=table

76 <http://www.wilmingtonde.gov/docs/2122/SWOT%20Analysis.pdf> p.26

77 www.dartfirststate.com/information/maps/new/GreaterWilmington.pdf?082615

78 www.dartfirststate.com/information/maps/new/DowntownWilmington.pdf?082615

79 <http://www.humantransit.org/2010/08/basics-the-case-for-frequency-mapping.html>

80 <http://www.dartfirststate.com/home/about/fastfacts.shtml>

Long haul routes

- The Cardinal/Hoosier State from New York City to Chicago 4 times a week,
- the Carolinian/Piedmont from New York City to Charlotte daily,
- the Crescent from New York City to New Orleans daily,
- the Silver Service/Palmetto from New York City to Tampa/Miami daily
- the Vermonter from Washington, D.C. to St. Albans, Vermont daily.

Frequent routes

- The Northeast Regional multiple times a day from southern Virginia to Massachusetts
- the Acela Express multiple times a day from Washington, D.C. to Boston.

The monthly parking rate at the garage by the train station is one of the highest in the city at \$165,⁸¹ indicating a strong demand for parking by local commuters using regional and long-distance transit. Bike share may be able to replace some of these existing automobile trips by serving as a complement to transit, offering first-and last-mile connections to regional and long-distance trains.

The success of IndeGo in nearby Philadelphia offers the potential for regional integration, where people could take Indego to a transit station in Philadelphia and take bike share from the Wilmington train station to their destination when they arrive.

Challenges:

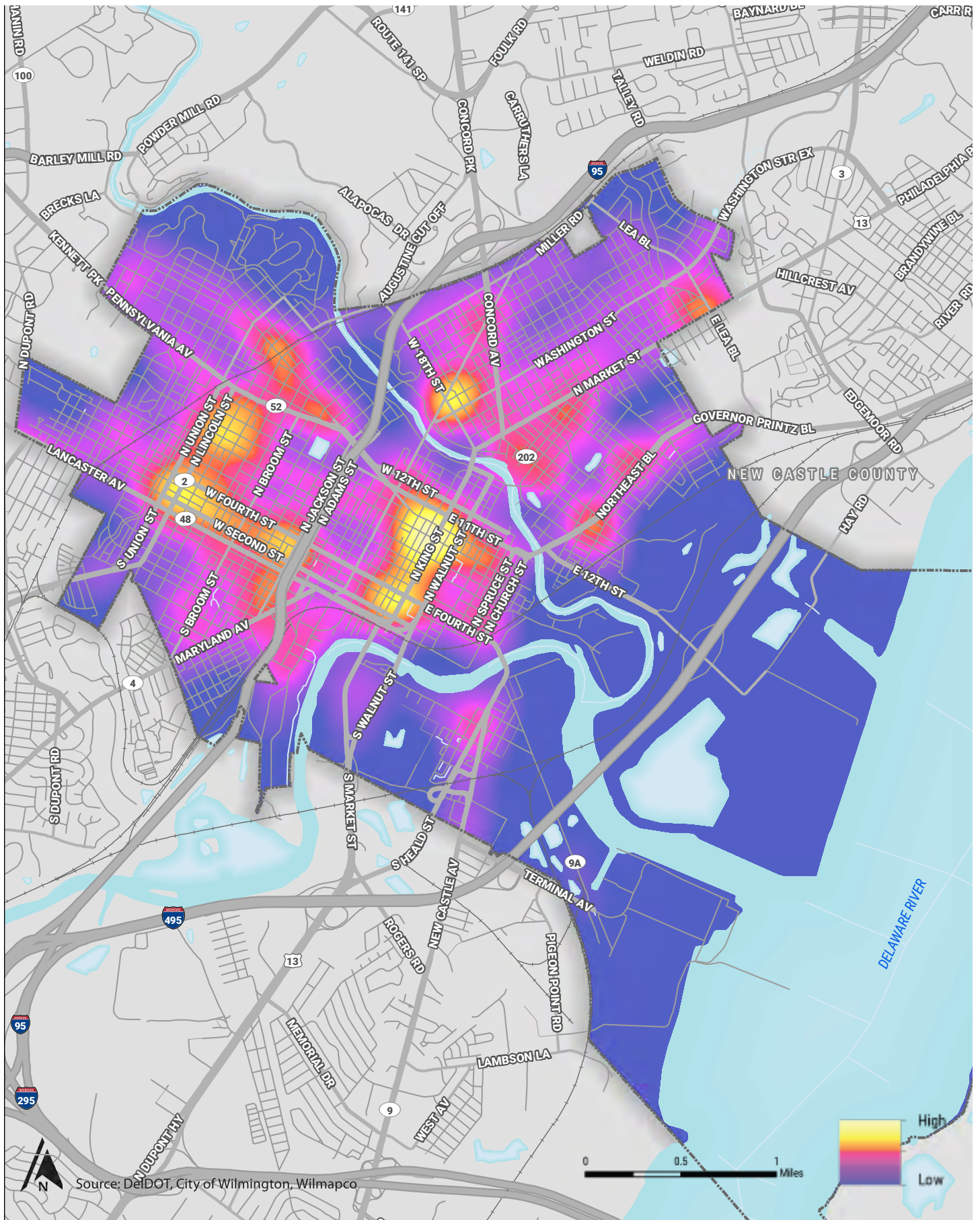
- A large majority of commute trips taken by City residents are in single occupancy motor vehicles.
- Public transit service is not a "frequent network", potentially depressing transit ridership and increasing single occupancy motor vehicle use.

Opportunities:

- Bike share offers a first- and last-mile connection to and from transit and in particular should be provided as an option at major transit stops.
- Strong and frequent Amtrak and SEPTA ridership by business commuters to local employers offer a large opportunity for bike share in Wilmington.

81 www.wilmingtonparking.com/train-station-garage/





Source: DelDOT, City of Wilmington, Wilmapco

Figure 23: Transit Density



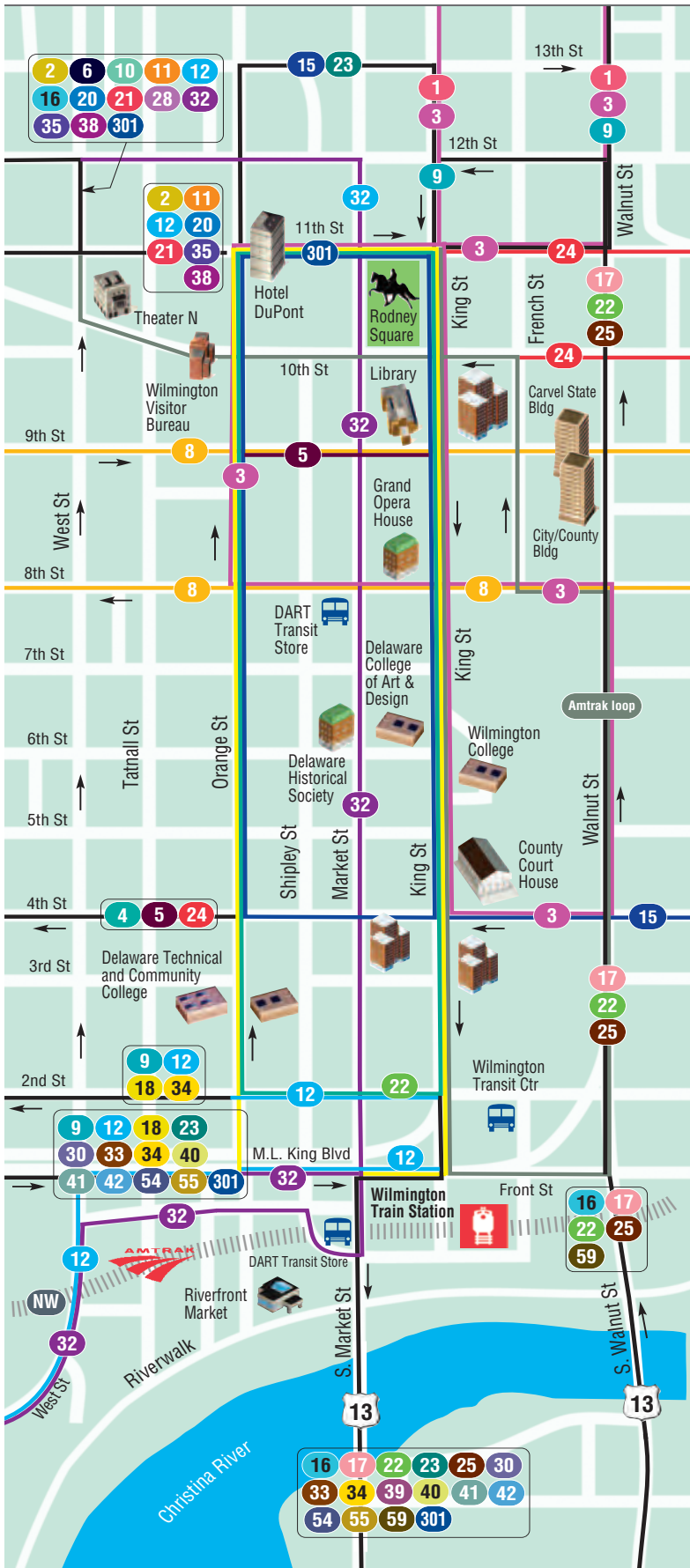
Routing is subject to change based on rerouting due to construction or other circumstances that can only be addressed by altering the route temporarily or permanently.

For assistance with trip planning, call **1.800.652.DART** or use the Google Trip Planner at DartFirstState.com

Greater Wilmington

Effective May 17, 2015

Figure 24: Greater Wilmington Transit Map



Downtown Wilmington and the Orange Street Loop Wilmington Amtrak Loop

Effective May 17, 2015

- **Orange Loop #1 Routes:**
1, 4, 5*, 15, 24 (*Turns on 9th Street)
 - **Orange Loop #2 Routes:**
9, 18, 30
 - **Orange Loop #3 Routes:**
23, 33, 34, 39, 40, 41, 42, 54, 55
 - **Wilmington Amtrak Loop Routes:**
2, 6, 10, 11, 12, 16, 20, 21, 28,
35, 38, 59, 301
- For detailed route information,
see individual pocket schedules.*

Routing is subject to change based on rerouting due to construction or other circumstances that can only be addressed by altering the route temporarily or permanently.

*For assistance with trip planning, call **1.800.652.DART** or use the Google Trip Planner at DartFirstState.com*



Figure 25: Downtown Wilmington Transit Map

BICYCLING INFRASTRUCTURE AND SAFETY

Bicycling is not a popular mode of travel in Wilmington. Though the State ranked number three in bicycle friendliness according to the League of American Bicyclists,⁸² bicycle mode share in the City among those 16 or older commuting to work is 0.5 percent.⁸³ **Figure 26** provides a heatmap with those areas of the city that have the highest bicycle mode share.

The City has no dedicated bicycle facilities except shared lane markings or “sharrows” found on Market Street downtown and existing trails along Brandywine Creek and the Christina River. Many neighborhoods have narrow streets which may be conducive to bicycling, but this will likely not entice the less-experienced and less-comfortable bicyclists to ride for recreation or transportation. A heat map noting the location of on-street bike facilities can be found in **Figure 27**, and a heat map of the City’s trail network can be found in **Figure 28**. While the city is working on expanding its bicycling infrastructure, it has to closely coordinate with the state of Delaware as it controls over 90 percent of roads, including all of Wilmington’s major roads.

While there has been little academic research regarding the link between the provision of bicycle facilities and bike share ridership, there is a significant volume of research that shows a positive relationship between the provision of facilities and private bicycling levels.^{84,85,86,87}

For example, a 2012 study found that cities that made a 10-percent increase in bike facilities saw a two- to three-percent increase in bicycle commuting compared to cities with no change. This relationship may be especially strong among minority and low income individuals. Fifty-nine percent of minorities⁸⁸ and 60 percent of low-income

82 <http://bikeleague.org/content/ranking>

83 US Census ACS 2013 5-Year Estimates “Means of Transportation to Work”

84 <http://www.pagnet.org/documents/2012LABfeedback.pdf>

85 City of Wilmington

86 Buehler, R. & Pucher J. (2012). *Cycling to Work in 90 Large American Cities; New Evidence on the Role of Bike Paths and Lanes.*

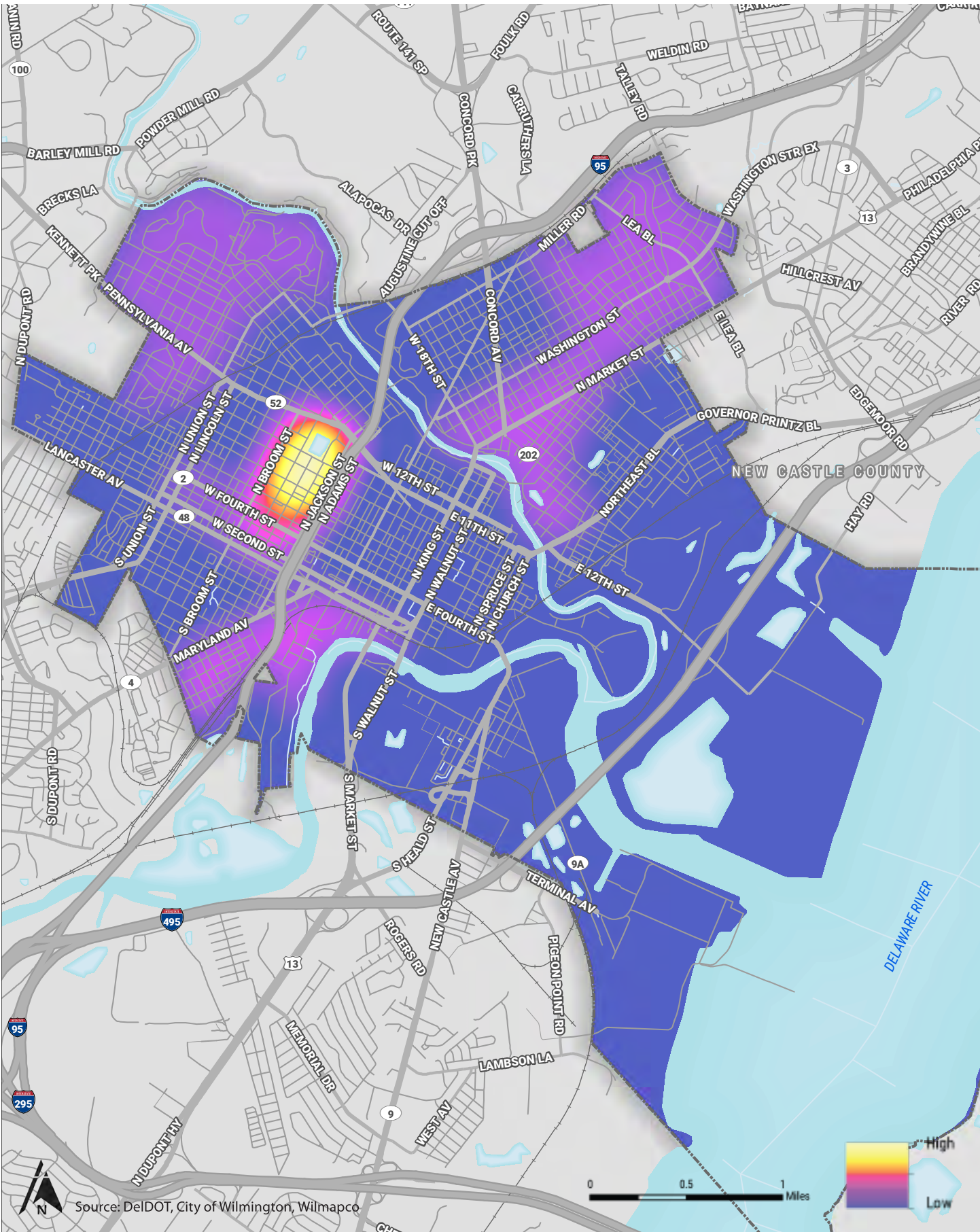
87 Dill, J. & Carr, T. (2003). *Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them.*

88 Minorities defined as Hispanics, African Americans, Asians, Native Americans, mixed, or other race.



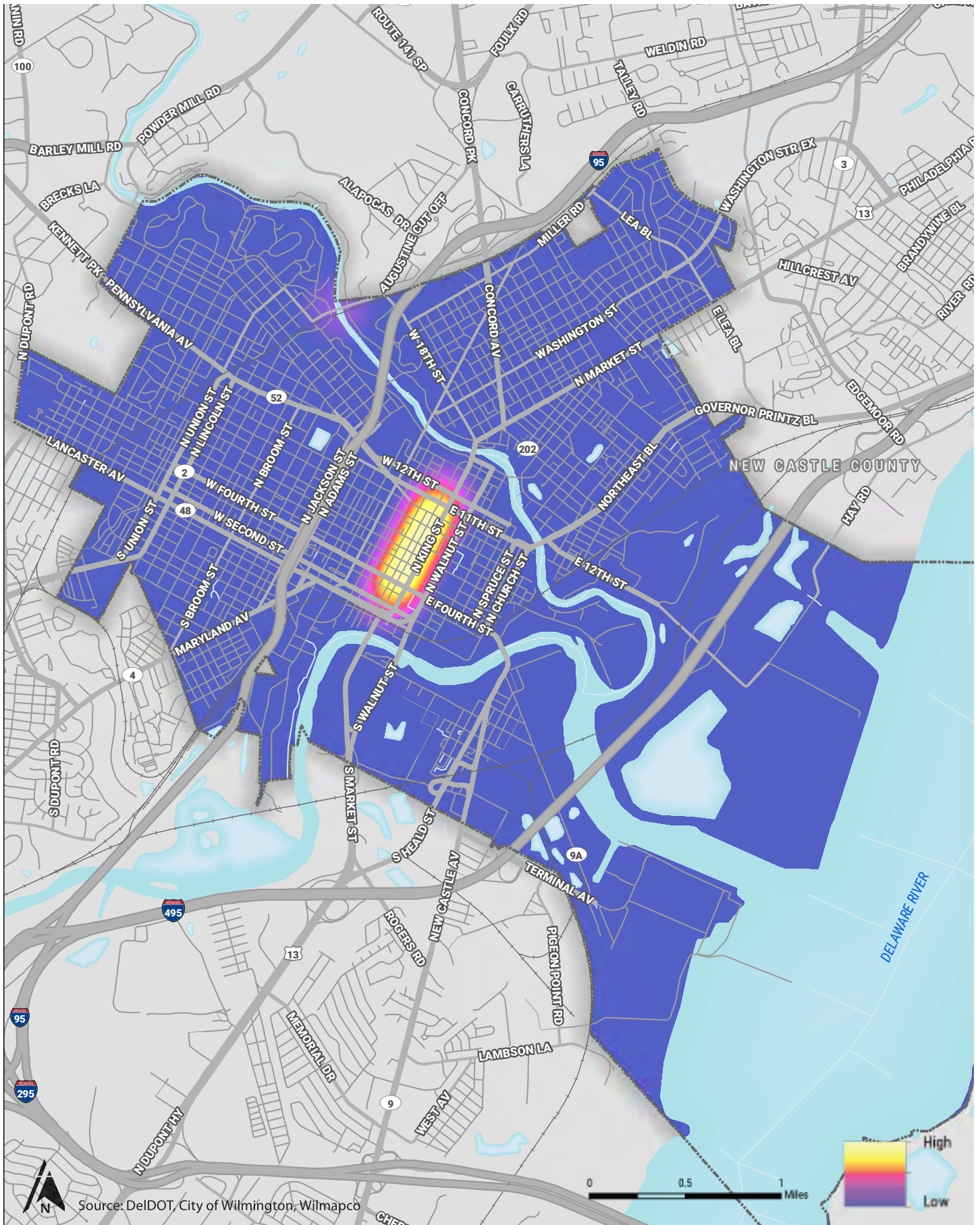
Figure 29: Boulder B-Cycle





Source: DelDOT, City of Wilmington, Wilmapco

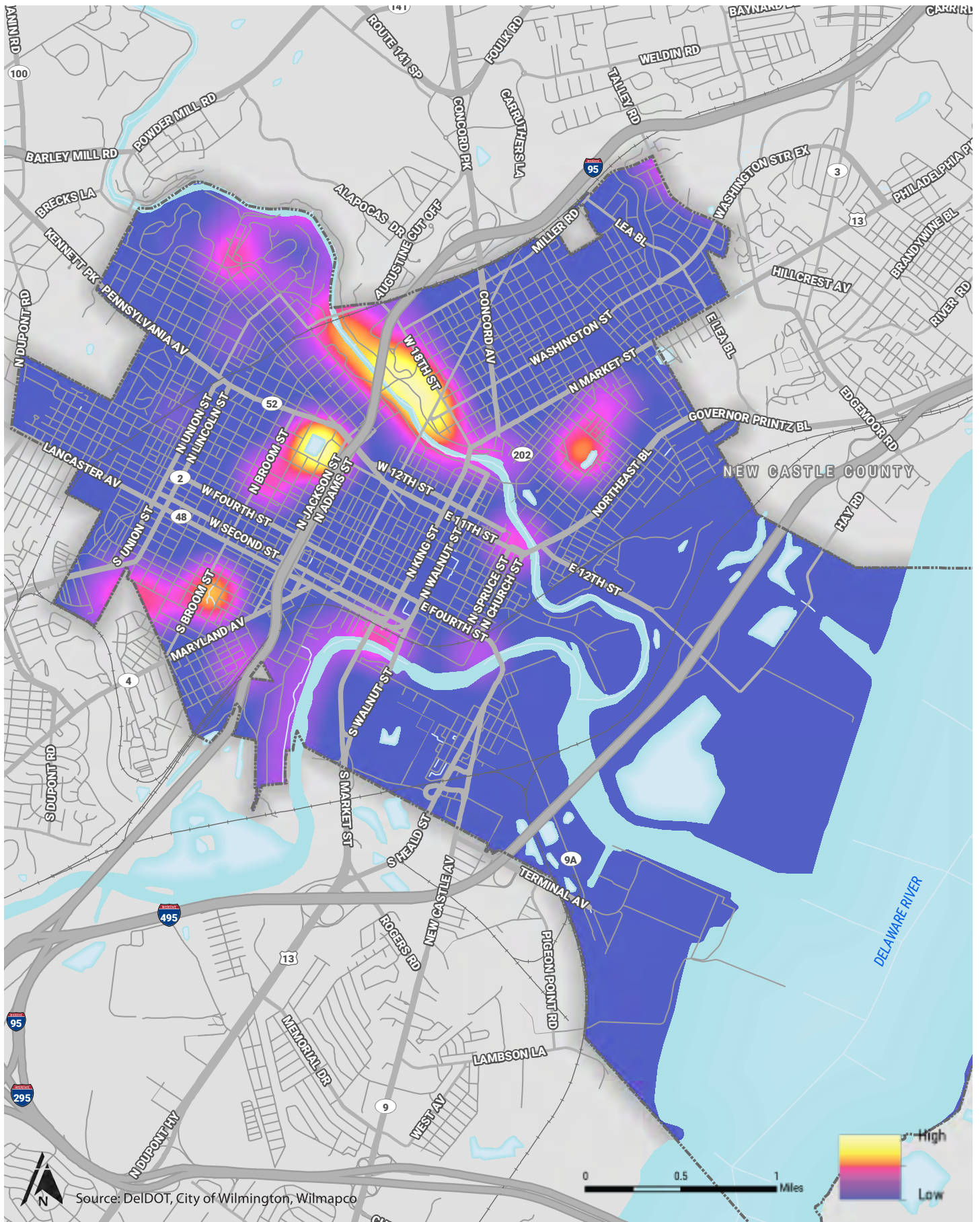
Figure 26: Bicycle Commute Mode Density



Source: DelDOT, City of Wilmington, Wilmapco

Figure 27: On-street Facilities Density





Source: DelDOT, City of Wilmington, Wilmapco

Figure 28: Existing Trails Density



people responding to a 2012 survey conducted by the League of American Bicyclists stated that the provision of more bicycle facilities would encourage them to ride more often.⁸⁹ In addition, in 2013, 56 percent Capital Bikeshare members responding to a general survey about their riding preferences stated that a lack of dedicated bicycle lanes or paths was a barrier to using Capital Bikeshare.⁹⁰

Conversations with stakeholders and the general public show that there is a perceived safety issue with cycling in Wilmington due to lack of infrastructure. In addition, increasing crime rates in the city have led to questions about personal safety related to using bike share outside of the downtown core.

Challenges:

- The lack of existing dedicated bicycle infrastructure may discourage novice or inexperienced bicyclists to use a bike share system confidently and safely.
- Lack of bicycling infrastructure and rising crime rates lead to potential cycling and personal safety issues related to bike share.
- As the State controls a large majority of roadways in the City, it will be important for the Wilmington officials to work closely with the State to place any stations in state owned/maintained right of way. This additional level of coordination, may present some level of difficulty in the implementation of a bike share program. Natural and artificial barriers, like rivers and highways, break up Wilmington's street grid. Funneling all modes into the same pinch points, leading to potential conflict between bicyclists and other road users.

Opportunities:

- Projects like the Wilmington-Newark Bikeway and the Wilmington-New Castle Greenway provide great opportunities to improve the safety and convenience of biking regionally, making people more likely to use a bicycle for transportation or recreation, increasing the pool of potential bike share users.

- While an extensive and connected existing bicycle network is preferred, a number of cities have been able to implement bike share programs while making a commitment to rapidly expand bicycle infrastructure in parallel. The city should build on the 2008 Wilmington Bicycle Plan to improve bicycling conditions citywide.⁹¹
- Though the city's current bicycle mode share is 0.5 percent, this represents a vast improvement over the 2012 American Community Survey,⁹² where it was 0.3 percent or the 2011 ACS,⁹³ where it was 0.08 percent.

89 http://bikeleague.org/sites/default/files/equity_report.pdf

90 <http://www.capitalbikeshare.com/assets/pdf/CABI-2013SurveyReport.pdf>

91 http://www.wilmapco.org/BikeWilmington/WilmingtonBicyclePlan2008_endorsed.pdf

92 US Census ACS 2012 5-Year Estimates "Means of Transportation to Work"

93 US Census ACS 2011 5-Year Estimates "Means of Transportation to Work"

