NEW HORIZONS IN MOBILITY

MIDDLESEX COUNTY

TRANSPORTATION PLAN ELEMENT

OF THE COUNTY COMPREHENSIVE MASTER PLAN

Funding Support by:

NJTPA
NORTH JERSEY TRANSPORTATION PLANNING AUTHORITY

September 2013

COUNTY OF MIDDLESEX

NEW HORIZONS IN MOBILITY

MIDDLESEX COUNTY

TRANSPORTATION PLAN ELEMENT

OF THE COUNTY COMPREHENSIVE MASTER PLAN

Adopted by:
Middlesex County Planning Board
September 10, 2013

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In Memory of
JOHN J. HOGAN
Chairman,
Middlesex County Transportation Coordinating Committee (TCC)

This Plan is dedicated to the Memory of John Joseph Hogan the late Chairman of the Middlesex County TCC and also Chairman of the Transportation Plan Update Steering Committee which played a key role in the development and completion of this Plan Element of the County Comprehensive Master Plan.

We acknowledge and deeply appreciate John Hogan's long time service to the TCC since its inception in 1976 and his strong dedication and commitment to improving transportation and the quality of life in Middlesex County.

****

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Table of Contents

EXECUTIVE SUMMARY 1

Goals of the Plan 1
Steering Advisory/Technical Committee Participation and Public Outreach 2
Demographic Trends 3
System Performance and Needs 4
Conclusion 5

CHAPTER ONE: GOALS, POLICIES, AND PRIORITIES 7

1.1 Introduction 7
1.2 Goals 8
1.3 Policies and Federal Emphasis Areas 11
1.4 Local Priorities 12
1.5 Major Accomplishments from the Prior Transportation Plan 19
1.6 Proposals to Advance Goals, Policies and Priorities 22

CHAPTER TWO: DEMOGRAPHIC AND ECONOMIC PROFILE 37

2.1 General Characteristics 40
2.1.1 Total Population 40
2.1.2 Population Growth Trends 45
2.1.3 Age of Population 46
2.2 Households 51
2.2.1 Total Number of Households 51
2.2.2 Average Household Size 51
2.2.3 Household Density 52
2.3 Housing Stock 56
2.3.1 Type of Housing Unit 56
2.3.2 Vehicle Availability 61
2.4 Social Characteristics 66
2.4.1 Educational Attainment 66
2.4.2 Language 67
2.5 Economic Characteristics 70
2.5.1 Household Income 70
2.5.2 Labor Force 74
2.5.3 Occupations 76
2.5.4 Poverty Rates 77

CHAPTER THREE: WORK COMMUTE TRAVEL BEHAVIOR AND EMPLOYMENT CHARACTERISTICS 81

3.1 Commute Shed Analysis (CSA) 83
3.2 Labor Shed Analysis (LSA) 94
3.3 Journey to Work 102
3.3.1 Means of Transportation to Work (Resident Labor Force) 102
3.3.2 Average Travel Time 114
3.3.3 Journey to Work Trends 116
3.3.4 Means of Transportation to Middlesex County as a Workplace 119

3.4 Employment Characteristics 120
3.4.1 Resident Labor Force 120
3.4.2 Workers Employed in Middlesex County 122
3.4.3 Goods Movement Industries 124

CHAPTER FOUR: EXISTING TRANSPORTATION RESOURCES 129

4.1 Roadway Network 129
4.2 Functional Classification System 130
4.3 Public Transportation System 130
4.3.1 Middlesex County 2013 Transit Guide 130
4.3.2 Passenger Rail 131
4.3.3 Bus System 132
4.4 Benefits and Characteristics of Public Transportation 135
4.5 Bicycle and Pedestrian Facilities 137
4.5.1 Major Bicycle and Pedestrian Projects and Initiatives 140
4.5.2 Metropark Station Area -- public input on bicycling and pedestrian proposals 144
4.6 Freight Facilities 145
4.7 Ferry, Airports, and Heliport Accommodations 149

CHAPTER FIVE: SYSTEM PERFORMANCE & PROBLEM AREAS 151

5.1 Vehicle Miles Traveled (VMT) 151
5.2 NJDOT Congestion Management System 155
5.3 Safety in Transportation 158
5.3.1 National and State Trends 158
5.3.2 Middlesex County Crash Analysis 159
5.3.3 Countermeasures to Safety Problems 167
5.4 Transit System Deficiencies 178
5.4.1 NJ Transit's Transit Score 178

CHAPTER SIX: LAND USE AND TRANSPORTATION 181

6.1 Background 181
6.1.1 Historic Patterns 181
6.1.2 Models of Development 183
6.2 Transit Villages in New Jersey 184
6.3 Today's County 185

CHAPTER SEVEN: NORTH JERSEY TRANSPORTATION DEMAND FORECASTING MODEL 187

7.1 Purpose/Overview 187
7.2 Baseline Forecast–Demographic and Employment Forecast Model (DEFM) 188
7.2.1 County-level Forecasts 189
7.2.2 Allocating County-level Forecasts to the Municipalities and Traffic Analysis Zones 190
7.3 Municipal Growth Trend-Based Allocation 191
7.4 Comparison of DEFM Forecast to Municipal Trend Projections 193
7.5 NJRTM-E Results 197

CHAPTER EIGHT: ONGOING TRANSPORTATION IMPROVEMENT STRATEGIES 201

8.1 Public Participation in Transportation Planning 201

8.2 Transportation Demand Management 204
8.2.1 Staggered or Flexible Working Hours 204
8.2.2 Promoting Employer-Operated Shuttle Vans 205
8.2.3 Ridesharing Initiatives 205
8.2.4 Extending and Improving Local and Regional Transit 206
8.2.5 Parking Management and Park & Ride Facilities 206
8.2.6 Promoting Transportation Centers Where Feasible 208
8.2.7 Integrated Corridor Management (ICM) 208
8.2.8 Home-based Telecommuting programs 208
8.2.9 Safe Routes to School program 209
8.2.10 Middlesex County Transportation Information Facility 210
8.2.11 Marketing, Education and Awareness of Public Transportation 210
8.2.12 Promotion of Bicycle Stations 211
8.2.13 Promotion of Non-motorized Travel 212
8.2.14 Miscellaneous 212
8.3 Maintaining Mobility for the Elderly 213
8.4 Middlesex County Comprehensive Traffic Safety Web Site 215
8.5 Complete Streets Policies 215
8.6 American Disabilities Act Requirements 217
8.7 Mitigating Climate Change Impacts and Green Transportation Alternatives 219
8.8 Improvements through Intelligent Transportation Systems Technology 223
8.9 Implementation of Strategies 225

CHAPTER NINE: FEDERAL TRANSPORTATION FUNDING 227

9.1 Capital Investment Strategy 227
9.2 List of Federally-Funded and New Jersey Turnpike Authority Projects, FY 2012 230

CHAPTER TEN: FUNDING ALTERNATIVES FOR TRANSPORTATION INFRASTRUCTURE AND SERVICES 235

State 235
Federal 235
County of Middlesex 235

CONCLUSION 237

PLAN ADOPTION AND ENDORSEMENTS 239

Middlesex County Planning Board 239
Middlesex County Transportation Coordinating Committee 241

Index of Tables

TABLE 1—1: MUNICIPAL MASTER PLAN RECOMMENDATIONS SUMMARY TABLE 18
TABLE 2—1: MIDDLESEX COUNTY MUNICIPALITIES BY COUNTY SUBREGION 38
TABLE 2—2: POPULATION SUMMARY: SUBREGIONS, COUNTY AND STATE (2010) 40
TABLE 2—3: POPULATION DENSITY: SUBREGIONS, COUNTY AND STATE (2010) 40
TABLE 2—4 : MEDIAN AGE: SUBREGIONS, COUNTY, AND STATE (2010) 46
TABLE 2—5: HOUSEHOLDS AND HOUSEHOLD TYPES SUBREGIONS AND MIDDLESEX COUNTY (2010) 51
TABLE 2—6 : AVERAGE HOUSEHOLD SIZE OF OCCUPIED HOUSING UNITS BY TENURE SUBREGIONS, COUNTY, AND STATE (2010) 51
TABLE 2—7: HOUSEHOLD DENSITY SUBREGIONS, COUNTY AND STATE (2010) 52
TABLE 2—8: NUMBER OF HOUSING UNITS BY RESIDENTIAL STRUCTURE TYPE BY SUBREGION AND MIDDLESEX COUNTY (2006-2010) 56
TABLE 2—9: PERCENT OF HOUSING UNITS BY RESIDENTIAL STRUCTURE TYPE BY SUBREGION AND MIDDLESEX COUNTY (2006-2010) 56
TABLE 2—10: NUMBER OF VEHICLES AVAILABLE PER OCCUPIED HOUSING UNIT: SUBREGIONS, COUNTY & STATE 61
TABLE 2—11: LANGUAGE SPOKEN AT HOME, MIDDLESEX COUNTY (2006-2010) 68
TABLE 2—12: LANGUAGE SPOKEN AT HOME BY ABILITY TO SPEAK ENGLISH, MIDDLESEX COUNTY (2006-2010) 69
TABLE 2—13: MEDIAN HOUSEHOLD INCOME, NEW JERSEY, MIDDLESEX COUNTY AND MUNICIPALITIES (2006-2010) 70
TABLE 2—14: TOTAL LABOR FORCE (2006-2010) 74
TABLE 3—1: JOURNEY TO WORK, MIDDLESEX COUNTY RESIDENTS (1990, 2000, AND 2006-2010) 117
TABLE 3—2: JOURNEY TO WORK TRENDS OF MIDDLESEX COUNTY RESIDENTS (1990 TO 2006-2010) 117
TABLE 3—3: TOP 5 INDUSTRIES OF THE LABOR FORCE LIVING IN SUBREGIONS AND COUNTY (2010) 121
TABLE 3—4: TOP 5 INDUSTRIES BY SUBREGIONS AND COUNTY, RANKED BY NUMBER OF PRIMARY JOBS IN WORKPLACE GEOGRAPHY (2010) 123
TABLE 5—1: MIDDLESEX COUNTY ROAD MILEAGE BY NJCMS PRIORITY RATING CATEGORIES 156
TABLE 7—1: MIDDLESEX COUNTY CONTROL TOTALS: FORECASTED HOUSEHOLDS, POPULATION AND EMPLOYMENT, 2015 TO 2040 189
TABLE 7—2: FUTURE HOUSEHOLDS BY COUNTY SUBREGION AND MUNICIPALITY: YEAR 2040 NJTPA FORECAST VS. MUNICIPAL TREND-BASED ALLOCATION 194
TABLE 7—3: FUTURE TOTAL POPULATION BY COUNTY SUBREGION AND MUNICIPALITY: YEAR 2040 NJTPA FORECAST VS. MUNICIPAL TREND-BASED ALLOCATION 195
TABLE 7—4: FUTURE TOTAL EMPLOYMENT BY COUNTY SUBREGION AND MUNICIPALITY: YEAR 2040 NJTPA FORECAST VS. MUNICIPAL TREND-BASED ALLOCATION 196
TABLE 7—5: NJRTM-E AVERAGE WEEKDAY INDICATORS FOR SCENARIOS MIDDLESEX COUNTY TOTAL 198
TABLE 7—6: NJRTM-E AVERAGE WEEKDAY INDICATORS FOR SCENARIOS EAST SUBREGION 198
TABLE 7—7: NJRTM-E AVERAGE WEEKDAY INDICATORS FOR SCENARIOS CENTRAL SUBREGION 199
TABLE 7—8: NJRTM-E AVERAGE WEEKDAY INDICATORS FOR SCENARIOS SOUTH SUBREGION 199

Table of Figures

FIGURE 1—1: STEERING COMMITTEE MEMBERS QUESTIONNAIRE RESPONSES TO THE TOP 5 MOST CRITICAL TRANSPORTATION ISSUES THAT SHOULD BE ADDRESSED DURING THE NEXT 5 YEARS....14
FIGURE 1—2: STEERING COMMITTEE MEMBERS QUESTIONNAIRE RESPONSES TO THE TOP 3 TRAFFIC CONGESTION AREAS IN MIDDLESEX COUNTY....15
FIGURE 1—3: STEERING COMMITTEE MEMBERS QUESTIONNAIRE RESPONSES TO THE 3 WORST TRAFFIC SAFETY HAZARDS IN MIDDLESEX COUNTY....16
FIGURE 2—1 : TOTAL POPULATION GROWTH SUBREGIONS AND COUNTY (1930 TO 2040)....45
FIGURE 2—2 : AGE COHORTS FOR SUBREGIONS AND COUNTY (2010)....46
FIGURE 2—3: NUMBER AND PERCENT OF HOUSING UNITS BY RESIDENTIAL STRUCTURE, MIDDLESEX COUNTY (2006-2010)....57
FIGURE 2—4: OCCUPIED HOUSING UNITS BY NUMBER OF VEHICLES AVAILABLE: SUBREGIONS, COUNTY & STATE (2006-2010)....61
FIGURE 2—5: EDUCATIONAL ATTAINMENT (2006-2010)....66
FIGURE 2—6: COMPARATIVE UNEMPLOYMENT TRENDS, 2005 TO 2011....74
FIGURE 2—7: OCCUPATIONS OF MIDDLESEX COUNTY RESIDENTS (2006-2010)....76
FIGURE 2—8: POVERTY RATES FOR PEOPLE IN MIDDLESEX COUNTY AND NEW JERSEY (2006-2010)....77
FIGURE 2—9: POVERTY RATES FOR FAMILIES IN MIDDLESEX COUNTY AND NEW JERSEY (2006-2010)....79
FIGURE 3—1: TOP 20 WORKPLACE DESTINATIONS OF MIDDLESEX COUNTY RESIDENTS, BY MUNICIPALITY (2010)....87
FIGURE 3—2: TOP 10 COUNTIES WHERE MIDDLESEX COUNTY RESIDENTS WORKED (2010)....87
FIGURE 3—3: TOP 20 WORKPLACE DESTINATIONS OF EAST SUBREGION RESIDENTS, BY MUNICIPALITY (2010)....88
FIGURE 3—4: TOP 10 COUNTIES WHERE EAST SUBREGION AREA RESIDENTS WORKED (2010)....88
FIGURE 3—5: TOP 20 WORKPLACE DESTINATIONS OF CENTRAL SUBREGION RESIDENTS, BY MUNICIPALITY (2010)....89
FIGURE 3—6: TOP 10 COUNTIES WHERE CENTRAL SUBREGION AREA RESIDENTS WORKED (2010)....89
FIGURE 3—7: TOP 20 WORKPLACE DESTINATIONS OF SOUTH SUBREGION RESIDENTS, BY MUNICIPALITY (2010)....90
FIGURE 3—8: TOP 10 COUNTIES WHERE SOUTHERN SUBREGION AREA RESIDENTS WORKED (2010)....90
FIGURE 3—9: TOP 20 MUNICIPALITIES OF RESIDENCE OF THE MIDDLESEX COUNTY WORKFORCE (2010)....98
FIGURE 3—10: TOP 10 COUNTIES OF RESIDENCE OF THE MIDDLESEX COUNTY WORKFORCE (2010)....98
FIGURE 3—11: TOP 20 MUNICIPALITIES OF RESIDENCE OF THE EAST SUBREGION WORKFORCE (2010)....99
FIGURE 3—12: TOP 10 COUNTIES OF RESIDENCE OF THE EAST SUBREGION WORKFORCE (2010)....99
FIGURE 3—13: TOP 20 MUNICIPALITIES OF RESIDENCE OF THE CENTRAL SUBREGION WORKFORCE (2010)....100
FIGURE 3—14: TOP 10 COUNTIES OF RESIDENCE OF THE CENTRAL SUBREGION WORKFORCE (2010)....100
FIGURE 3—15: TOP 20 MUNICIPALITIES OF RESIDENCE OF THE SOUTH SUBREGION WORKFORCE (2010)....101
FIGURE 3—16: TOP 10 COUNTIES OF RESIDENCE OF THE SOUTH SUBREGION WORKFORCE (2010)....101
FIGURE 3—17: MIDDLESEX COUNTY COMMUTERS' MEANS OF TRANSPORTATION TO WORK (2006-2010)....103
FIGURE 3—18: MIDDLESEX COUNTY COMMUTERS' MEANS OF TRANSPORTATION TO OUT-OF-STATE EMPLOYMENT LOCATIONS (2006-2010)....103
FIGURE 3—19: BUS VS. RAIL RIDERSHIP IN THE MIDDLESEX COUNTY (2006-2010)....104

FIGURE 3—20: PERCENTAGE OF STUDY AREA RESIDENTS TAKING PUBLIC TRANSIT TO WORK, MIDDLESEX COUNTY, SUBREGIONS AND NEW JERSEY (2006-2010).....104
FIGURE 3—21: AVERAGE TRAVEL TIME TO WORK BY MEANS OF TRANSPORTATION (2006-2010).....114
FIGURE 3—22: MEANS OF TRANSPORTATION TO WORK, MIDDLESEX COUNTY (1990, 2000, AND 2006-2010).....116
FIGURE 3—23: COMPARATIVE AVERAGE TRAVEL TIMES TO WORK (1990, 2000 AND 2006-2010).....118
FIGURE 3—24: MEANS OF TRANSPORTATION TO MIDDLESEX COUNTY AS A WORKPLACE (2006-2010).....119
FIGURE 3—25: INDUSTRIES OF MIDDLESEX COUNTY RESIDENTS (2010).....120
FIGURE 3—26: PRIMARY JOBS IN MIDDLESEX COUNTY, BY INDUSTRY (2010).....122
FIGURE 5—1: TOTAL DAILY VEHICLE MILES TRAVELED MIDDLESEX COUNTY (2000 TO 2010).....152
FIGURE 5—2: TOTAL ANNUAL VEHICLE MILES TRAVELED PER CAPITA MIDDLESEX COUNTY (2000 TO 2010).....152
FIGURE 5—3: DAILY VEHICLE MILES TRAVELED ON INTERSTATES AND FREEWAYS MIDDLESEX COUNTY (2000 TO 2010).....153
FIGURE 5—4: DAILY VEHICLE MILES TRAVELED ON ARTERIALS AND COLLECTORS MIDDLESEX COUNTY (2000 TO 2010).....153
FIGURE 5—5: DAILY VEHICLE MILES TRAVELED ON LOCAL ROADS MIDDLESEX COUNTY (2000 TO 2010).....154
FIGURE 5—6: DAILY PER CAPITA VEHICLE MILES TRAVELED ON LOCAL ROADS MIDDLESEX COUNTY (2000 TO 2010).....154
FIGURE 5—7: STATEWIDE TRENDS IN MOTOR VEHICLE CRASH FATALITIES, 1992 TO 2011.....158
FIGURE 5—8: TRANSIT SCORE FORMULA AND SCORE CATEGORIES OF THE DVRPC PROTOCOL.....178
FIGURE 9—1: FEDERAL TRANSPORTATION FUNDS PROGRAMMED FOR MIDDLESEX COUNTY BY CAPITAL INVESTMENT CATEGORY, FY2012-2015.....230

Table of Map Figures

Map 2-1: Map of Subregions in Middlesex County....39
Map 2-2: Total Population and Population Density: East Subregion by Block Group (2006-2010)....42
Map 2-3: Total Population and Population Density Central Subregion by Block Group (2006-2010)....43
Map 2-4: Total Population and Population Density South Subregion by Block Group (2006-2010)....44
Map 2-5: Population Age 65 and Over: East Subregion by Block Group (2006-2010)....48
Map 2-6: Population Age 65 and Over Central Subregion by Block Group (2006-2010)....49
Map 2-7: Population Age 65 and Over South Subregion by Block Group (2006-2010)....50
Map 2-8: Total Households and Household Density East Subregion by Block Group (2006-2010)....53
Map 2-9: Total Households and Household Density Central Subregion by Block Group (2006-2010)....54
Map 2-10: Total Households and Household Density South Subregion by Block Group (2006-2010)....55
Map 2-11: Multifamily Housing Units and Percent of Total East Subregion by Block Group (2006-2010)....58
Map 2-12: Multifamily Housing Units Central Subregion by Block Group (2006-2010)....59
Map 2-13: Multifamily Housing Units South Subregion by Block Group (2006-2010)....60
Map 2-14: Occupied Housing Units with no Vehicle Available East Subregion by Block Group (2006-2010)....62
Map 2-15: Occupied Housing Units with no Vehicle Available Central Subregion by Block Group (2006-2010)....63
Map 2-16: Occupied Housing Units with no Vehicle Available South Subregion by Block Group (2006-2010)....64
Map 2-17: Vehicles per Occupied Housing Unit Middlesex County by Census Tract (2006-2010)....65
Map 2-18: Median Household Income East Subregion by Block Group (2006-2010)....71
Map 2-19: Median Household Income Central Subregion by Block Group (2006-2010)....72
Map 2-20: Median Household Income South Subregion by Block Group (2006-2010)....73
Map 2-21: Total Labor Force & Labor Force Density: Middlesex County by Census Tract (2006-2010)....75
Map 2-22: Population Living Below Poverty Level Middlesex County by Census Tract (2006-2010)....78
Map 2-23: Households with an Income below Poverty Level Middlesex County by Census Tract (2006-2010)....80
Map 3-1: Where Residents in the East Subregion Commute to Work (2010)....83
Map 3-2: Where Residents in the Central Subregion Commute to Work (2010)....84
Map 3-3: Where Residents in the South Subregion Commute to Work (2010)....85
Map 3-4: Where Residents of the East Subregion Worked, by Census Tract....91
Map 3-5: Where Residents of the Central Subregion Worked, by Census Tract....92
Map 3-6: Where Residents of the South Subregion Worked, by Census Tract....93
Map 3-7: Where Workers in the East Subregion Live (2010)....94

MAP 3-8: WHERE WORKERS IN THE CENTRAL SUBREGION LIVE (2010) 95
MAP 3-9: WHERE WORKERS IN THE SOUTH SUBREGION LIVE (2010) 96
MAP 3-10: JOURNEY TO WORK BY MUNICIPALITY (2006-2010) 105
MAP 3-11: EAST SUBREGION RESIDENTS USING PUBLIC TRANSPORTATION TO WORK BY BLOCK GROUP (2006-2010) 107
MAP 3-12: CENTRAL SUBREGION RESIDENTS USING PUBLIC TRANSPORTATION TO WORK BY BLOCK GROUP (2006-2010) 108
MAP 3-13: SOUTH SUBREGION RESIDENTS USING PUBLIC TRANSPORTATION TO WORK BY BLOCK GROUP (2006-2010) 109
MAP 3-14: EAST REGION COMMUTING TO WORK BY WALKING AND BIKING BY BLOCK GROUP (2006-2010) 111
MAP 3-15: CENTRAL REGION COMMUTING TO WORK BY WALKING AND BIKING BY BLOCK GROUP (2006-2010) 112
MAP 3-16: SOUTH REGION COMMUTING TO WORK BY WALKING AND BIKING BY BLOCK GROUP (2006-2010) 113
MAP 3-17: AVERAGE TRAVEL TIME TO WORK BY CENSUS TRACT (2006-2010) 115
MAP 3-18: EAST SUBREGION EMPLOYMENT CENTERS (2010) 125
MAP 3-19: CENTRAL SUBREGION EMPLOYMENT CENTERS (2010) 126
MAP 3-20: SOUTH SUBREGION EMPLOYMENT CENTERS (2010) 127
MAP 5-1: CONGESTION MANAGEMENT SYSTEM PRIORITY RATINGS, 2009 DATA 157
MAP 5-2: CRASH HOT SPOTS, 150 OR MORE CRASHES PER LOCATION (2009-2011) 161
MAP 5-3: CRASH CORRIDORS, MORE THAN 500 CRASHES PER 2 MILES (2009-2011) 162
MAP 5-4: PEDESTRIAN CRASH HOT SPOTS, 5 OR MORE CRASHES PER LOCATION (2009-2011) 163
MAP 5-5: PEDESTRIAN CRASH CORRIDORS, MORE THAN 9 CRASHES PER 2 MILES (2009-2011) 164
MAP 5-6: BICYCLE CRASH HOT SPOTS, 3 OR MORE CRASHES PER LOCATION (2009-2011) 165
MAP 5-7: BICYCLE CRASH CORRIDORS, 6 OR MORE CRASHES PER 5 MILES (2009-2011) 166
MAP 5-8: MIDDLESEX COUNTY 2005 TRANSIT SCORES BY TRAFFIC ANALYSIS ZONE 179
MAP 5-9: MIDDLESEX COUNTY 2035 TRANSIT SCORES BY TRAFFIC ANALYSIS ZONE 180

Appendices

(Bound under a separate cover)

Appendix A	Questionnaire on Concerns and Priorities and Summary of Steering Committee Member Responses
Appendix B	Municipal Summaries
Appendix C	New Jersey Department of Transportation Functional Classification Map of Middlesex County
Appendix D	Middlesex County Transit Guide

Executive Summary

Middlesex County's strategic location in the State and the Region approximately midway between New York and Philadelphia and the Boston – Washington Corridor makes it a prestigious and very desirable location for business, industry, education, and an attractive place to live. It accommodates such transportation facilities including the New Jersey Turnpike, the Garden State Parkway, Interstate 287 / Route 440, US Routes 1, 9, and 130, and State Routes 18, 27, 34 and 35, and rail services along the Northeast Corridor/Amtrak Line, the North Jersey Coast Line, and the Raritan Valley Line. Interstate, regional and local bus services are also provided within and through the County by NJ Transit, Amtrak, Suburban Transit/Coach USA, Academy Bus Company, the Middlesex County Area Transit System and other providers. Middlesex County's New Horizons in Mobility Transportation Plan is intended to guide transportation planning in the County and promote policies for advancing projects and programs that promote a balanced transportation system that accommodates all users. The Plan, New Horizons in Mobility, will address current conditions, emerging issues, and actions needed to achieve and maintain a sound and responsive transportation system, and one that will help balance the needs of adequate mobility, safety and economic needs for the various population groups in Middlesex County. The Transportation Plan presents ten goals that serve as guideposts for developing proposals of the plan with projects, programs and initiatives that lead to solutions that are comprehensive, continuing and coordinated.

Goals of the Plan

1. ***Improve mobility and reduce traffic congestion***
2. ***Promote traffic safety***
3. ***Promote public transportation and intermodal improvements***
4. ***Maintain a State of Good Repair***
5. ***Promote an adequate and safe bicycle and pedestrian system that supports both mobility and recreation***
6. ***Promote integration of transportation and land use***
7. ***Support freight transportation improvements***
8. ***Protect the environment and address energy conservation and climate change impacts on transportation***

9. ***Improve economic vitality, access to jobs and business appeal***

10. ***Promote public and private sector partnerships on transportation projects and programs***

These goals are also consistent with the goals of Plan 2035, the North Jersey Transportation Planning Authority's current Regional Transportation Plan. These goals are intended to encourage policies and actions that will help create attractive communities in the County that are well connected, provide safe and convenient services, minimize traffic delays, accommodate the movement of goods efficiently and economically, offer user friendly transportation sensitive to the needs of automobile and non-auto users, and improve on the overall quality of life. To promote business investment, economic opportunities, and expanded intermodal transportation projects the Plan encourages collaboration with appropriate local, State and regional agencies including the Port Authority of New York and New Jersey to advance potential ferry transportation projects for East sub region and coastal areas of the County. The Plan supports exploring expanded and new ferry routes as alternative means of reducing traffic congestion and meeting future needs of passengers, trade and economic growth of the region.

Steering Advisory/Technical Committee Participation and Public Outreach

A steering / technical advisory level committee was formed in the early stage of the project to assist in the development and contents of the Plan Update and to get input from a broad range of agencies and groups at the County, State, regional and private sector level that affect transportation in the County or that have an active interest in various aspects of transportation. Such agencies / groups with representatives on the Plan Update Technical Advisory Committee included the Middlesex County Transportation Coordinating Committee; County Office of Engineering; Office of Parks and Recreation; Middlesex County Area Transit (MCAT); County Department of Business Development and Education; County TMA, Keep Middlesex Moving TMA; County Improvement Authority; County Regional Chamber of Commerce; North Jersey Transportation Planning Authority; NJ Department of Transportation, NJ Transit, New Jersey Turnpike Authority; Rutgers University Transit Operations and School of Planning and Public Policy; the East Coast Greenway Alliance; the New Jersey Motor Truck Association; and the National Transit Institute.

In the initial stages of the Plan development the Steering / Technical Advisory Committee played an important role in identifying priorities for the Plan. The Committee was given a questionnaire to assess major concerns and priorities to be identified in the Plan. These included

traffic congestion, safety, rail and bus transit, special transportation needs of the elderly and disabled, bicycle and pedestrian facilities, transportation management, commuting options, and transportation of freight. Major transportation issues identified through this public outreach process included improving transit service access and/or a need for expansion; adequacy and safety of pedestrian and bicycling accommodations; maintenance of a transportation system in a state of good repair; integration of transportation and land use; upgrading the weight limit on freight rail facilities to 286,000 lb; reduction of traffic congestion; and traffic safety improvements. Throughout the Plan development process the County Transportation Coordinating Committee also played an important role in providing public input into the Plan. At the public hearing stage of the Plan, municipalities in the County and the general public were provided opportunity for comment at the public hearing and during the subsequent 20 day period of the hearing.

A comprehensive inventory of municipal transportation / circulation plans was also undertaken early in the Plan development process to provide an understanding of municipal priorities on transportation as identified in local plans and programs. The detailed listing of the individual municipal master plan recommendations is included as Appendix B – Municipal Summaries.

Demographic Trends

Demographic trends in population, employment, job access, and vehicle miles traveled continue to support the need for reducing congestion and investing in alternative transportation modes that serve the needs of all users. It is not sufficient to focus only on one or two major transportation modes when other means of travel or transportation management strategies can provide viable alternatives or connections to various local and regional destinations.

Hence, it is important to explore and expand on additional options to help achieve the goals of the Plan. These include:

- intermodal transportation facilities that are user friendly;
- safe, secure and attractive system of highways and transit facilities;
- bicycle and pedestrian accommodations for transportation as well as for recreation purposes, including the expansion of greenway projects and corridors;
- countywide applications of complete streets design;

- closer coordination with private sector employers to promote and engage in more transportation demand management strategies including home based telecommuting and flex time options where feasible;
- new technologies to enhance intelligent transportation systems;
- greater attention to climate change impacts and strategies to help mitigate these impacts on transportation infrastructure; and
- reducing greenhouse gas emissions generated from transportation sources.

System Performance and Needs

According to a US News and World Report article from May 2007, the amount of hours that Americans spent in traffic increased fivefold over a 20 year period starting from the early 1980's. During this period the amount of free-flowing traffic decreased by less than half. This On America's worst commutes noted in this article Middlesex County ranked 24th out of 50 counties in the nation with the highest average travel time to work. Middlesex County tied Manhattan (New York County, NY) with a mean travel time of 31.1 minutes. Factors contributing to high levels of traffic delays include population increases, and deficiencies in highway capacities, transit facilities, and accommodations for alternative transportation modes and travel demand strategies. Past trends point to the continuing need to know how to best mitigate congestion and seek strategies and measures that will minimize its presence even with the significant growth in population and other traffic generating activities that we can expect.

The Plan proposes that transportation needs and deficiencies be addressed with a combination of improvements to infrastructure, conventional and demand responsive transit operations and demand management strategies that may be appropriate for a particular area. Such improvements may be funded from existing federal, State or County capital transportation programs, or developed as new proposals and advanced through the appropriate project or program development process. Such improvements should address as many of the following Plan goals as possible:

- Reduce traffic congestion/improve traffic flow on arterial roads
- Promote safety for motorists, pedestrians and bicyclists
- Promote public transportation improvements to system capacity, safety, security
- Promote user friendly connected and integrated intermodal system

- Provide an expanded and safer bicycle and pedestrian system and network that supports mobility and recreation
- Promote "Complete Streets" design that accommodate all transportation users
- Promote demand management and trip reduction strategies at public and private sector facilities and agencies
- Support stronger coordination and integration of land use plans with transportation needs and system improvement
- Provide better integration of freight transportation needs within our transportation system and explore new freight options and operational efficiencies
- Address climate change impacts on the transportation infrastructure and encourage actions and strategies that will help to reduce these impacts
- Promote technological improvements that will enhance transportation system capacity, reliability, customer service, safety and security
- Promote partnerships on transportation improvements and strategies between the public and the private sectors

Conclusion

In recognition of the complexities in meeting tomorrow's different transportation needs for the population of Middlesex County, the Transportation Plan calls for a multifaceted approach to solving the transportation problems discussed in the Plan. Areas of priority supported by the Plan include improving overall mobility, reducing congestion in the movement of traffic through the road network in the County, and achieving a safer transportation system that can serve as a model for other areas in the region and the country. Actions that will help attain this include infrastructure improvements that address capacity, operational and safety improvements on the supply side of the equation and travel management and land use strategies on the demand side. Both are needed to arrive at a balanced transportation system able to address the growing demand that will be placed upon it in the years ahead to meet the needs of those who do not drive such as the young, the elderly and disabled, along with the needs of drivers. In the mix of potential improvements consideration needs to be given to the advancement of various strategies and proposals including: new highway capacity; safety enhancements on all components of transportation; intelligent transportation measures; transit, bicycle, pedestrian, goods movement; and ferry options including the expansion of trade routes and

import/export goods industry. Where possible the delivery process of needed improvements needs to be expedited by the utilization of “fix it first policies” and streamlining of the overall transportation implementation process, The Plan places much emphasis on significantly reducing traffic accidents and related fatalities, injuries and economic losses to individuals and to society. In addition to engineering and enforcement measures, of great importance in promoting safety while driving is also the need to create among drivers, pedestrians and cyclists the attitude of patience, courteous driving habits, and the practice of allowing extra time for arriving at a destination. Education of safe driving practices can apply to both the young and the older population. Transportation improvement measures also need to be sensitive to the issue of climate change, its impact on transportation infrastructure, how we can best mitigate or adapt to climatic impacts; and the issue of sustainability involving our ability to create and maintain conditions that allow us to coexist in harmony with our natural environment while meeting the transportation needs of present and future generations.

Chapter One: Goals, Policies, and Priorities

1.1 Introduction

Middlesex County is often referred to as the crossroads of New Jersey because of its strategic location between the New York to Washington corridor and its regionally important routes with the New Jersey Turnpike (I-95), the Garden State Parkway, I-287-NJ Route 440, NJ Route 18, and US Routes 1, 9 and 130. It also houses transit service in the form of rail with service from Amtrak and NJ TRANSIT on the Northeast Corridor Line, and other NJ TRANSIT operations on the North Jersey Coast Line and Raritan Valley Line, and through various regional bus lines. The county's 25 municipalities on 310 square miles at the heart of the State are situated about halfway between New York and Philadelphia with relative easy access to Newark, Trenton and New Jersey shore points.

The County's central location and diverse land use including revitalized cities, suburban environment and scenic countryside continues to attract residential, employment and development opportunities for many people far and wide. The County is also home to some of the best medical and higher educational facilities in the State hosting the main campuses of Rutgers the State University of New Jersey. The County's location and its regional and local multimodal transportation facilities also make it attractive for business appeal and economic growth. However, characteristics that have made Middlesex County a popular place to live and work have also placed a growing demand on its transportation system to accommodate the travel needs of its residents, workers and visitors.

The update of the Middlesex County Transportation Plan will address transportation options that facilitate multimodal mobility in support of sustainable land use planning efforts in areas along the major highway and transit corridors throughout the County. It will do this by promoting the development/expansion of transit connections and transit centers with transit facilities, amenities and infrastructure that is user friendly and provides a safe and secure environment at all times of day. The Plan will promote bicycling stations and accommodations of bicycles on trains and local/commuter buses, and improvement of routes that can serve as linkages from major residential areas to transit centers along these corridors to encourage and facilitate safer and easier pedestrian/bike access. The Plan will also address the need for parking structures at major park and ride transit facilities that provides various parking incentives for people who carpool, bicycle, walk or use low polluting vehicles. These strategies will also help to address the mobility demands resulting from the recommendations of municipal land use plans at these corridors and elsewhere in the County, especially for land use plans

relating to high density and mixed use development. With regard to roadway improvements and safety, the Plan will promote the adoption and application of the new NJDOT Complete Streets Design to improve the shared use of public roadways in the County including the overall walking and bicycling environment.

The Plan will also promote the public input that has been gathered through the County's Transportation Coordinating Committee, meetings with local officials and public outreach workshops.

1.2 Goals

The goals of the Plan provide the essence and direction in the type of actions, strategies and investments that the Plan supports to improve the County's transportation system and make it more responsive to present and future needs.

1. Improve mobility and reduce traffic congestion

Efforts to reduce traffic congestion must consider options that include capacity, operational, transportation demand management strategies, and options that involve the use of alternative modes of travel. This goal emphasizes achieving adequate system capacity, performing "Fix It First" repairs to structurally deficient bridges and obsolescent roadways, use of demand management strategies where possible and expansion of alternative modes of travel for greater efficiency in peak period travel.

2. Promote traffic safety

Safety improvements on our transportation system must be comprehensive and address the needs of all users including drivers, passengers, pedestrians and bicyclists. With the numerous number of at grade railroad crossings along arterial, collector and local roads comprehensive safety programs must deal also with the interaction of motor vehicles with trains as well as pedestrians and bicyclists. These programs must examine measures relating to the 3 E's which include education, engineering and enforcement, all of which can play important roles in achieving a safer transportation system. Where appropriate and as interim measures during which

3. Promote public transportation and intermodal improvements

Making our public transit system as attractive as possible to the general public is key to improving transit ridership on buses and trains. This goal seeks to achieve a more attractive transit system with bus and transit services that are reliable, comfortable and convenient, provide a sense of

security for passengers and which operate in a coordinated, integrated and seamless manner. This includes the creation of linkages from one mode to another, expansion of transportation centers where feasible, expansion of paratransit/demand responsive services and their integration to fixed route transit services, and expansion of intermodal transportation by working with the Port Authority of New York and New Jersey to explore opportunities and constraints for ferry transportation sites including regional port expansion projects for East sub region and coastal areas. This could help reduce traffic congestion, attract new business investment in the County and capitalize on expanded trade routes that may be developed

4. Maintain a State of Good Repair

This goal focuses on safety and reliability for our aging infrastructure on both highway and transit facilities with applicable asset management and condition monitoring best practices so that roads, bridges and transit facilities remain safe for public use, become more resilient to heavy demands and severe climatic impacts, enhance commercial vitality, and keep our infrastructure operating with minimal interruptions.

5. Provide an adequate and safe bicycle and pedestrian system that supports mobility and recreation

This goal supports improvements that help make bicycling and walking viable and attractive activities for both mobility and recreational purposes. It envisions expanded bicycling and pedestrian activities that are well integrated and welcomed within the roadway and system wide transit facilities so that they serve as useful transportation linkages, enhance the public health and well being, and help make Middlesex County one of the most bicycle and pedestrian friendly places in the State and region.

6. Promote integration of transportation and land use

It is essential that both transportation and land use considerations be applied simultaneously. Mobility needs of various land use facilities should be met as efficiently and economically as possible by multimodal and alternative forms of transportation providing access to a wide range of destinations, densities and trip generating activities that support public transit services

7. Support freight transportation improvements

Provide better integration of freight transportation accommodations and infrastructure upgrades for rail and truck facilities and explore new freight options and operational efficiencies that help reduce traffic congestion and promote economic competitiveness.

8. Protect the environment and address energy conservation and climate change impacts on transportation

Address climate change impacts by making our transportation infrastructure more adaptable and resilient to extreme climate impacts and by putting in place actions and strategies that help reduce greenhouse gas emissions and improve the desirability and use of efficient modes of transportation.

9. Support economic vitality, access to jobs and business appeal

Encourage multimodal access to jobs and to local and regional employment and business centers by means that are affordable, convenient and attractive; encouraging centers of residential developments to support and participate in improving access and accommodations such as by new or expanded shuttle linkages to nearby train and major bus facilities; and increase the business attractiveness of Middlesex County areas through a transportation system that meets the needs of business activities. Explore advancement of transportation improvements through economic development programs such as TIGER grants, USEDA infrastructure grants, Transit Village, Transit Oriented Development grants, and public - Private Funding Partnerships.

10. Promote public and private sector partnerships on transportation projects and programs

Encourage partnerships among municipal, county, state and federal levels of government and between public and private sector entities that can provide support and funding contributions towards transportation improvement projects and strategies that are in the public interest.

1.3 Policies and Federal Emphasis Areas

In accordance with federal and regional transportation planning requirements the Middlesex County Transportation Plan Element is consistent with goals of the North Jersey Transportation Planning Authority (NJTPA) and federal emphasis areas and planning factors that have been basic aspects of federal surface transportation regulations. These include:

- Increasing the accessibility and mobility of all people
- Increasing the level of safety and security of the transportation system for motorists and non motorized users including pedestrians and bicyclists
- Promoting the integration and connectivity of the transportation system across and between modes for people and freight
- Protecting and enhancing the environment, promoting energy conservation, improving the overall quality of life
- Increasing the level of mobility for freight
- Promoting efficiency in the transportation system management and operations
- Supporting economic vitality
- Emphasizing the preservation of the existing transportation system

The Transportation Plan also helps to advance regional goals of the NJTPA, Plan 2035, Regional Transportation Plan for Northern New Jersey and the Regional Plan for Sustainable Development (RPSD). These goals protect and improve the human environment; promote accessible and affordable transportation; provide more transportation choices; promote economic activity and competiveness; enhance intermodal coordination, efficiency and connectivity; promote safety, reliability, and state of good repair; enhance unique characteristics of communities and neighborhoods; and support the coordination of the transportation system with surrounding land use. The Plan also supports the vision and strategies of the New Jersey Long Range Transportation Plan for NJDOT and NJ Transit.

1.4 Local Priorities

1. Transportation Plan Steering Committee Questionnaire

To assess the level of importance given to various transportation issues and concerns by the members of the Steering Committee a questionnaire was devised to begin to assess concerns and priorities on such matters involving traffic congestion, safety, rail and bus transit, special transportation needs of the elderly and disabled, bicycle and pedestrian facilities, transportation management and commuting options, and matters of freight. See Appendix A: Questionnaire on Concerns and Priorities and Summary of Steering Committee Member Responses.

The most critical transportation issues identified by the Committee included improving transit service access and/or a need for expansion; adequacy and safety of pedestrian and bicycling accommodations; maintenance of a transportation system in a state of good repair; integration of transportation and land use; and a tie on traffic congestion and traffic safety concerns. See Figure 1—1 on page 14.

The worst traffic congestion or hot spot areas were seen as the Route 1 Corridor; Route 18/ NJ Turnpike/ Route 1 convergence area; and the Route 18 Corridor itself. See Figure 1—2 on page 15. The worst traffic safety hazards were identified as insufficient bicycling and pedestrian accommodations; peak period traffic movements in the area of the Route 18/ NJ Turnpike Exit 9/ Route 1; and Route 1 Corridor; safety problems generated from congestion, and problems of driver behavior. See Figure 1—3 on page 16.

With regard to transit access, most respondents indicated a willingness to walk up to a ½ mile to get to bus stop or train station from their home and back for a work trip. A slightly smaller number of respondents indicated that they would be willing to walk the same distance to get to a bus stop or train station and back for a non work trip.

Major impediments to bicycling along most Middlesex County roads were attributed to lack of continuous bike lanes, concern over driver behavior, lack of bike facilities, congestion and poor roadway condition or design. Major impediments to walking were attributed to lack of continuous sidewalks, poor condition of sidewalk/roadway design or lighting, and lack of overall pedestrian environment and accommodations.

There was most agreement on the importance of the following actions for improving transit use to and from work: maintaining reliable service, ease of transferring and making on time

connections, frequency of service, knowledge of transit services and places that are served, security within and around transit facilities, and visibility of clarity and adequacy of information displayed at bus and rail facilities, proximity of bus stop or train station to place of residence, and comfort and cleanliness within and around transit facilities.

Factors affecting one's decision to carpool were seen predominantly as: guaranteed emergency ride home, the convenience of not having to drive, comfort level with the people in the carpool, and having the length of the work trip greater than 10 miles.

Most important factors affecting one's decision to bicycle to work were seen as: availability of an off road bicycle path, availability of bicycle lanes on route, feeling secure along the route, availability of secure and preferably sheltered bike racks, ability to ride bike in daylight hours, having to ride a distance of within 3 miles, and the availability of a well lighted route.

Similarly, the most key factors seen as most important in affecting one's decision to walk to work included: availability of sidewalks, having a safe and secure route from home to work, availability of adequate marked and lighted crosswalks, feeling secure along the route that is well lighted and in good condition, and having to walk a distance within a half mile.

Figure 1—1: Steering Committee Members Questionnaire Responses to the Top 5 Most Critical Transportation Issues that Should Be Addressed During the Next 5 Years

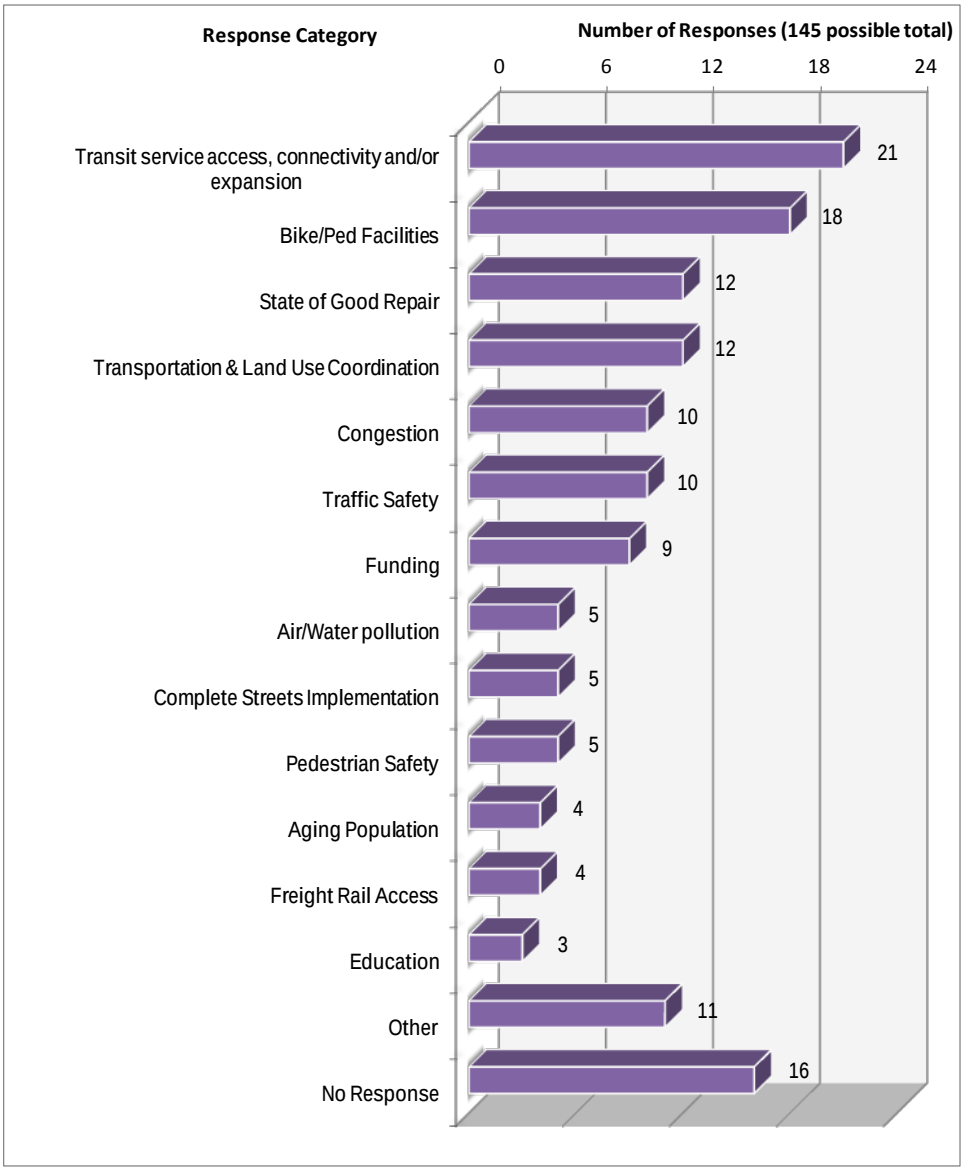


Figure 1—2: Steering Committee Members Questionnaire Responses to the Top 3 Traffic Congestion Areas in Middlesex County

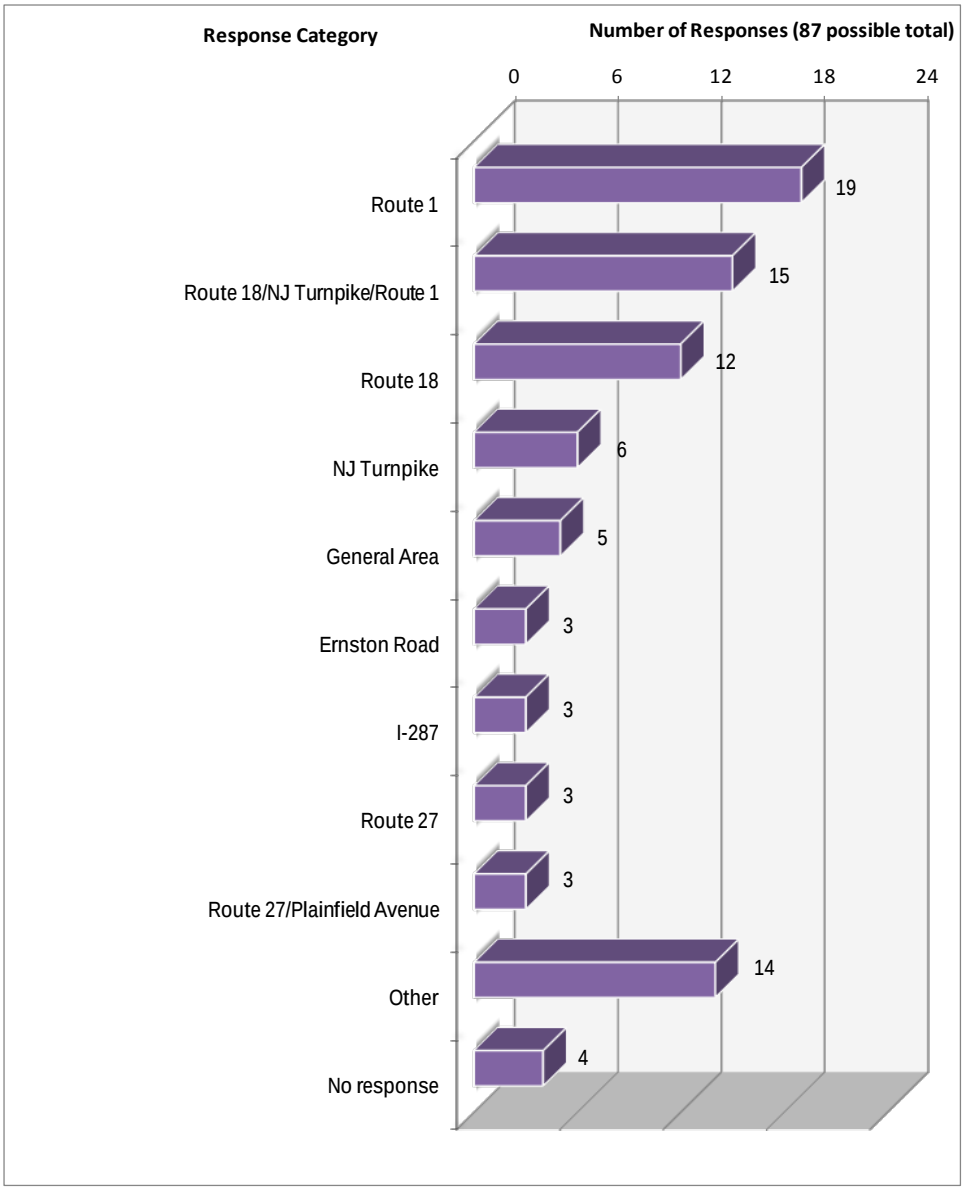
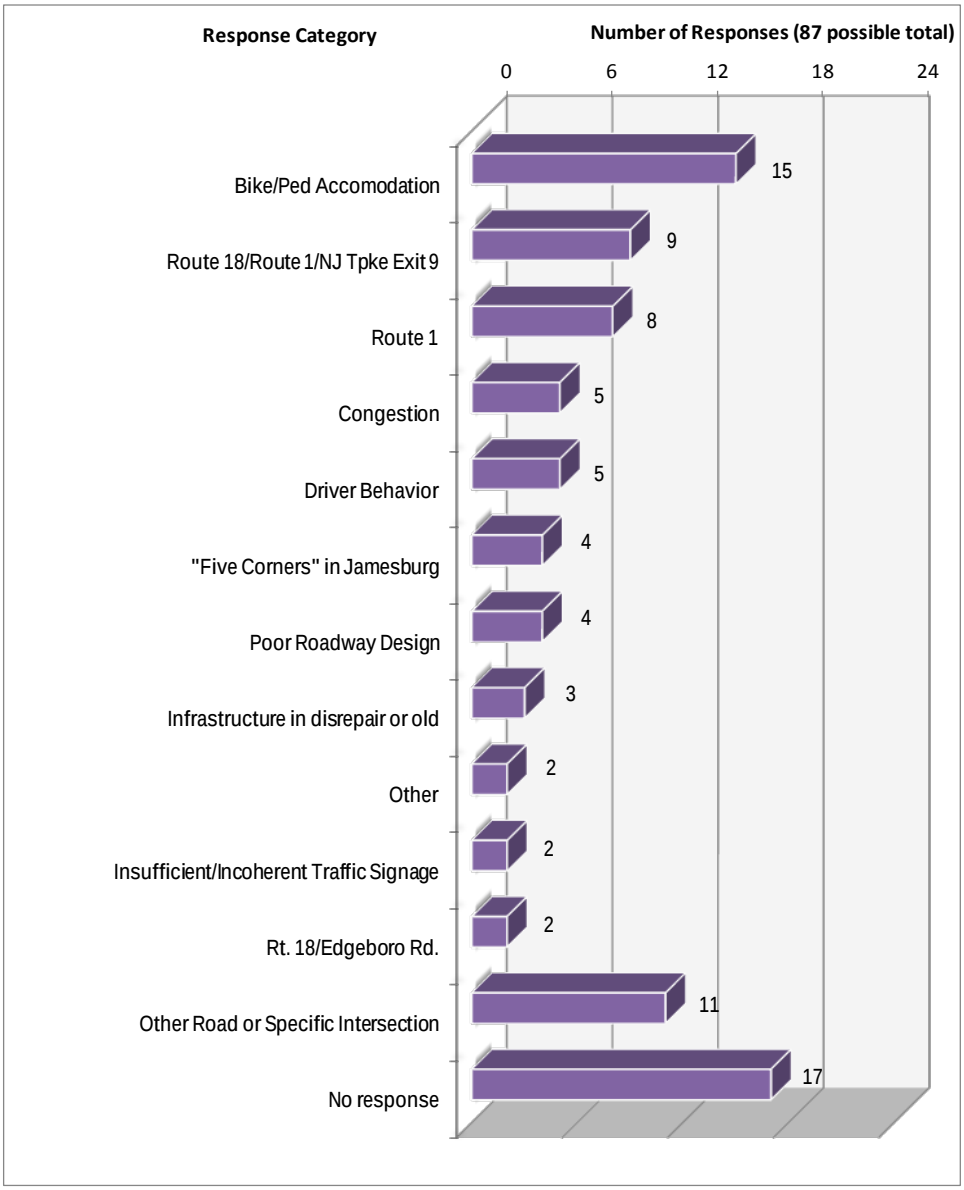


Figure 1—3: Steering Committee Members Questionnaire Responses to the 3 Worst Traffic Safety Hazards in Middlesex County



2. Municipal Master Plan Review

Local input on the type of transportation improvements proposed and recommended in the most recent municipal master plans on file with Middlesex County is illustrated in the following Table 1—1 showing the number and percentages of categories and sub elements within these categories of improvements involving intersections, roadways, bike/pedestrian facilities, parking railroad crossings, ferry/water taxis, freight rail, busways and transit. The detailed listing of the individual municipal master plan recommendations that are numerically summarized by count in Table 1—1 is included as Appendix B – Municipal Summaries.

Table 1—1: Municipal Master Plan Recommendations Summary Table

Master Plan Recommendation Category by Recommendation Type	Count	Percent
Intersection	**235**	**42.96%**
Expansion	2	0.37%
New Construction	15	2.74%
Pedestrian	10	1.83%
Realignment	17	3.11%
Reconfiguration	52	9.51%
Study Required	46	8.41%
Traffic Control	93	17.00%
Roadway	**185**	**33.82%**
Expansion	45	8.23%
New Construction	66	12.07%
Pedestrian	7	1.28%
Realignment	21	3.84%
Reconfiguration	27	4.94%
Repair/Replace	1	0.18%
Study Required	12	2.19%
Traffic Control	5	0.91%
Miscellaneous	1	0.18%
Bike/Ped Facilities	**99**	**18.10%**
Expansion	10	1.83%
Multi-user	1	0.18%
New Construction	19	3.47%
Pedestrian	65	11.88%
Reconfiguration	2	0.37%
Study Required	2	0.37%
Parking	**12**	**2.19%**
New Construction	4	0.73%
Reconfiguration	2	0.37%
Study Required	4	0.73%
Traffic Control	1	0.18%
Miscellaneous	1	0.18%
Railroad crossings	**6**	**1.10%**
New Construction	2	0.37%
Realignment	1	0.18%
Reconfiguration	2	0.37%
Study Required	1	0.18%
Ferry/Water Taxi service	**4**	**0.73%**
New Construction	2	0.37%
Study Required	2	0.37%
Freight Rail network	**2**	**0.37%**
New Construction	2	0.37%
Miscellaneous	**2**	**0.37%**
Multi-user	2	0.37%
Transit Station	**1**	**0.18%**
Expansion	1	0.18%
Busway	**1**	**0.18%**
New Construction	1	0.18%
Grand Total	**547**	**100.00%**

Source: municipal master plans on file

1.5 Major Accomplishments from the Prior Transportation Plan

Over the 14 years since the prior Plan was adopted a wide range of transportation improvement projects relating to roads, bridges, transit and bicycling and pedestrian facilities have accomplished. Such major projects include:

- Route 1 Widening, I-287 to Union County, Edison, and Woodbridge
- Route 1 Bridge over Millstone River, Replacement, Plainsboro
- Route 1 and 130 Grade Separated Interchange, North Brunswick
- Route 9 Edison Bridge, Reconstruction and widening, Sayreville, and Woodbridge
- Route 18 Bridge Replacement over South River, Conrail and Main Street, East Brunswick, and Old Bridge
- Route 18 widening from Route 27 to Paulus Blvd., New Brunswick
- Route 18 Extension Section 2A from River Road to Davidson Ave., Piscataway
- Route 18 Extension Section 3A from Davidson Ave to I-287, Piscataway
- Route 27 Bridge Replacement over Reading Railroad (CSX), Metuchen
- Route 28 Bridge Replacement over Green Brook from Middlesex Borough to Bound Brook, Somerset County
- Route 35 Victory Bridge, Replacement, Sayreville, Perth Amboy
- Route 35 Victory Circle, Reconstruction of Sayreville
- Route 35 Bridge over Cheesequake Creek, Old Bridge, Sayreville
- Garden State Parkway Widening, Sayreville, Woodbridge
- New Jersey Turnpike Widening Exit 8A to Exit 9 South Brunswick, East Brunswick, Milltown, New Brunswick
- New Jersey Turnpike Exit 12 Enhancements, Carteret
- NJ Turnpike Exit 8A Ramp to Cranbury Road (CR 535), South Brunswick
- CR 514, Main Street and Woodbridge Center Drive (CR 646) Grade Separated Interchange, Woodbridge
- CR 514, Woodbridge Avenue (CR 514) and Raritan Center Parkway Grade Separation, Edison

- CR 535, Washington Road New Transportation Enhancement Program, Sidewalks from vicinity of Johnson Lane to vicinity of Main Street, Sayreville
- CR 615, Bordentown Avenue Bridge Replacement, over South River
- CR 617, Ryders Lane Widening from Tices Lane to Dunhams Corner Road East Brunswick
- CR 617 Ryders Lane Bridge Replacement over Saw Mill Brook, East Brunswick, Milltown
- CR 643, Peter J. Sica Industrial Highway/Middlesex Ave/Prologis Way from Roosevelt Avenue to Port Reading Avenue, Carteret, Woodbridge (road is county jurisdiction in Woodbridge only)
- CR 647, New Brunswick Avenue Bikeway from Stelton Road to West 7th Street, Piscataway
- CR 657,Evergreen Road, Widening and Northeast Corridor Bridge Replacement, Edison
- CR 673, Ernston Road (CR 673) and Bordentown Avenue (CR 615) intersection, Widening and Operations improvements, Old Bridge, Sayreville
- CR 684, Lower Main Street Relocation and New Bridge over North Jersey Coast Line, South Amboy
- CR 685, Old Trenton Road / South Main (CR535)Street Intersection Reconstruction and Widening, Cranbury
- CR 692, Cedar Lane Bikeway, Highland Park
- Middlesex Greenway and New Greenway Bridge over Route 1, Metuchen, Edison, Woodbridge
- New Brunswick Bikeway from George Street and Bishop Place to College Avenue and Lafayette Street,, Development of Federal Aid Project through Feasibility, Scoping, Final Design and Construction Stage.
- Suttons Lane Bikeway, from Metlars Lane to Kilmer Road, Piscataway
- Middlesex County Area Transit, Creation of Seven Bus Shuttle Routes, Countywide
- New BrunsQuick Shuttle, 5th and 6th Ward to Train Station
- NJ Transit 655, Creation of New Bus Route from Plainsboro to Princeton
- NJ Transit 800 Routes–Acquisition of State of the Art New Nabi Buses for NJ Local Routes in Middlesex County
- Metropark Train Station Improvements and Upgrades, Woodbridge

- New Brunswick Station, Gateway Project Access from Somerset Street to South Bound Platform and Station
- South Amboy New Train Station and New High Level Platforms

1.6 Proposals to Advance Goals, Policies and Priorities

In order to advance the intent of these goals, the Plan identifies various proposals, programs and strategies for short term, mid-term or long-term implementation which have emerged during the Plan development process. These are consistent with County priorities and with other State, regional and local plans and programs including the NJTPA Regional Transportation Plan for Northern New Jersey – Plan 2035, the Together North Jersey Consortium goals for sustainable development, the New Jersey Long Range Transportation Plan for NJDOT and NJ Transit, the New Jersey State Strategic Plan, the Central Jersey Transportation Forum, the Raritan Valley Rail Coalition, the Route 1 Regional Growth Strategy Study, Keep Middlesex Moving and with plans of other local partners. The following proposed projects and initiatives have been compiled from recommendations from previous plans and capital programs of Middlesex County transportation improvements. These include the NJTPA Transportation Improvement Program (TIP), the Capital Transportation State Aid Program (CTP), and Middlesex County's own Capital Improvement Program which contain detailed information on the funding, scheduling and phasing of programmed projects. Project proposals in the Plan are also derived from past NJTPA sponsored studies, recommendations that have been made through the Middlesex County Transportation Coordinating Committee, and valid proposals that have been advanced through the public participation and outreach that has occurred as a key part of the development of this Plan. The identification of projects in the TIP and other Programs also serves to show conformance of these projects to the Plan.

In order to simply point out and give emphasis of the range of proposals that have emerged from the Plan development process, the identification of these proposals have been placed in the front part of the Plan document. Some of these proposals and strategies may also relate to other sections of this Plan and are further discussed in that particular section.

The following projects contain a wide range of proposed improvements to address roadway capacity needs, transit operations, service expansions, bicycling and pedestrian accommodations, and trip reduction strategies, and thus serve to illustrate the types of improvements that are promoted in this Plan. It is not the intent of this Plan to limit the number of potential projects and strategies or programs that can be applied to address and implement the goals of this Plan to only these projects.

1. Improve mobility and reduce traffic congestion

Advance and implement capital improvement projects that enhance capacity, improve traffic flow and reduce congestion. Examples of these improvements include:

- US Route 1 improvements capacity and operational improvements from Aaron Road, to Forrestal Road, North Brunswick, South Brunswick, and Plainsboro.
  - Short term improvements and long-term grade separations at Route 1 and Finnegan's Lane, Commerce Blvd., and Cozzens Lane/Adams Lane in North Brunswick.
  - Route 1 and Ridge Road, operations and drainage improvements, South Brunswick.
  - Route 1 and Raymond Road drainage improvements, South Brunswick.
  - Route 1 Major Road / Sand Hills Road operational improvements, South Brunswick.
  - Widening of Route 1 through South Brunswick.
- US Route 1 / Plainfield Avenue Capacity and Operational Improvements, Edison.
- US Route 9/35, Main Street Interchange Improvements, Sayreville, South Amboy.
- Route 18/Edgeboro Road Intersection Improvements.
- Route 18/Edgeboro Road long term grade separation, East Brunswick.
- Route 18, Route 1 to NJ Turnpike operational and safety improvements, East Brunswick, New Brunswick.
- Route 18/Route 1 interchange improvements, New Brunswick.
- Route 18/CR 516/CR527 Interchange Improvements, Old Bridge.
- Route 27 / Wood Avenue intersection improvement, Edison.
- Route 27 / Plainfield Avenue Capacity and Operational Improvements, Edison.
- Route 32 and CR 535 Grade Separation, South Brunswick.
- Route 35 widening, drainage and safety improvements, Old Bridge.
- Route 440 – High Street Connector for access to Perth Amboy waterfront redevelopment area, Perth Amboy.
- I-287 and River Road (CR 622) Interchange Improvements, Piscataway.
- I-287 and Interchange 10 Improvements, Piscataway, Franklin.
- I-287 and South Washington Ave Interchange Improvements, Piscataway.

- I-287 / Route 27 Interchange Improvements, Edison – Metuchen.
- I-287 New Southbound Ramp at National Road and Mack Road, Edison.
- Garden State Parkway Interchange 125 Improvements, Sayreville.
- New Jersey Turnpike widening Exit 9 to 8A, South Brunswick, East Brunswick.
- Main Street Bypass Sayreville.
- Northeast Corridor / Evergreen Road, widening of Evergreen Road underpass Edison.
- Northeast Corridor and Conrail underpasses widening at Parsonage Road between Route 27 and Oakwood Avenue, Edison.
- Old New Brunswick Road Bridge widening over I-287, Piscataway.
- Plainfield Avenue widening Kilmer Avenue to Ethel Road, Edison.
- Raritan Center Industrial Highway, Extension of Riverside Drive - Parkway Place Extension (CR656) from Raritan Center Parkway to Mill Road (CR 667) Edison..
- Raritan River additional Crossing between I-287 and Landing Lane, explore long term potential to accommodate traffic growth and reduce congestion between Somerset and Middlesex Counties.
- Route 522 Realignment Extension from Route 130 to NJ Turnpike, South Brunswick.
- Signal coordination/improvements along major arterials such as Routes 1, 18, 27, 35, and 130, countywide.

2. *Promote safety for motorists, pedestrians and bicyclists*

Examples of improvements that will enhance safety include:

- US Route 9-Bordentown Avenue- Kenneth Avenue Safety and Operational Improvements, Sayreville.
- Route 18 and Edgeboro Road, East Brunswick, Pedestrian crosswalks and access improvements and bus shelter/waiting accommodations at bus stops on Route 18.
- Route 18, Naricon Place to US Route 9, pedestrian and bicycling enhancements, East Brunswick, Old Bridge.
- Route 27 and Easton Avenue, reduce potential conflicts between high volumes of pedestrians crossing Route 27 to and from train station and vehicular traffic, New Brunswick.

- Route 34 – Amboy Avenue- Morristown Road, Old Bridge, Intersection Safety and Operational Improvements.
- Route 35 and Smith Street (CR 611), Perth Amboy
  - Route 35 is a wide street for pedestrians to cross. Enhanced highly visible crosswalks are needed as well as pedestrian countdown signal heads.
- Advance complete streets design policies to include safe and adequate accommodations for users, including bicyclists, pedestrians, transit riders and the mobility-impaired on roadway improvements throughout the County.
- George Street near Buccleugh Park and the Route 18 Trench entrance/exit, New Brunswick
  - Need marked crosswalk and signs alerting motorists of pedestrian crossing.
- Restrict and discourage pedestrian illegal crossings of major arterial highways such as Routes 1, 9, 18, 35, 130 at uncontrolled locations, Countywide
- Improve structurally deficient and functionally obsolete bridges throughout the County.
- Edison Train Station surrounding area, improve pedestrian accommodations including Plainfield Avenue – Stelton Road (CR 529) approaches
  - Kilmer Road, Central Avenue The railing and support wall approaching the underpass Replace deteriorated railings and support walls at railroad underpass;
  - Install sidewalk from the Metroplex complex to the railroad underpass
- Enhance transit security measures at all train and bus facilities to improve sense of personal comfort and safety among transit users.
- Improve safety conditions of physical structures at all train stations such as platforms, stairwells and seek compliance with ADA standards.
- Landing Lane and Johnson Drive signage for pedestrian crossings generated by nearby Rutgers Stadium and other activities, Piscataway.
- Livingston Avenue, in New Brunswick
  - Livingston Avenue and New Street intersection, New Brunswick. Consider improvements including traffic countdown timers and more effective controls for turning vehicles to avoid potential conflicts with pedestrians in view of heavy pedestrian traffic generated by such facilities as the nearby Bloustein School of

Planning and Public Policy, the Heldrich Work Force Development Center, the New Brunswick Public Library, and the Middlesex County Planning Board offices.

- Livingston Avenue Corridor in New Brunswick (CR 691), improve safety conditions along corridor with complete streets design principles for better accommodation of pedestrians, bicyclists and school age children.

- River Road near Rutgers Stadium, Piscataway
  - Mid block crosswalk for pedestrian crossings during Stadium events.
- Smith Street (CR 611) – State Street (CR 656) - New Brunswick Avenue (CR 616) Five Corner Intersection, Perth Amboy.
  - Turning movements are often confusing for motorists and pedestrians.
  - Enhanced crosswalks needed.
  - Several bus routes (#s 813, 815, 817, 62,116) serve this area attracting high pedestrian traffic.
- Woodbridge Avenue and Duclos Lane (CR676), Highland Park- Edison,
  - Traffic signal, crosswalk enhancements, signage and sight distance improvements.
- Woodbridge Avenue and Gurley Road, Edison.
  - Crosswalk enhancements, signage and sight distance improvements.
- Support Federal and State programs that promote further study and development of technology for the enhancement of vehicles with the option of self-driving technology autopilot functions. This, along with related infrastructure improvements on certain freeways and other appropriate principal arterials could make roads safer and less congested. A number of carmakers have been working on autonomous vehicle technology for years and it is expected that commercial vehicles could feature "autopilot" functions within the next decade. Self driving vehicles have been tested in California roadways and it is noted that those that have been tested with more than 300,000 miles of self driving have not had any accidents.

3. *Promote public transportation and intermodal improvements*

Examples of these improvements include:

- Carteret Ferry Service Terminal.

- Ferry/marine vessels crossing improvements to facilitate present and future marine crossings of the North Jersey Coast Line bridge structure at Raritan Bay between Perth Amboy and South Amboy.
- Greater New Brunswick Area BRT service.
- Route 1 Corridor BRT and proposed NJTransit Route 653 bus route between New Brunswick and Princessville, Mercer County serving New Brunswick, North Brunswick, South Brunswick and Plainsboro in Middlesex County.
- South Amboy Intermodal Center TIP project elements relating to improved access to rail, bus and proposed ferry facility.
- South Amboy Ferry Service implementation.
- Study proposals for ferry and/or waterborne transportation services at points to be determined along the Raritan River for potential transportation and/or recreations purposes.
- Provide park and ride facilities in strategic locations, as in the US-9 Corridor, including location such as the NJ TRANSIT proposed park and ride near Route 9 & Spring Valley Road, Old Bridge.
- North Brunswick Transit Village Short Term Bus service improvements.
- North Brunswick Transit Village New Train Station on Northeast Corridor.
- Northeast Corridor Train Turnaround Facility south of new North Brunswick Train Station to serve NJ TRANSIT Trains and provide cost savings for rail operations on the Northeast Corridor.
- Perth Amboy High Level Platforms.
- Piscataway Transit Village, advance proposal for transit village along Route 529 Corridor near Edison Train Station.
- Support Amtrak Gateway Program and Next Generation High Speed Rail Service between New York City and Washington DC.
- Expand Amtrak service in New Brunswick, the County Seat and a major urban center.
- New/expanded local and regional transit services to proposed Sayreville Point Development

- Coordinate transit services, facilitating transfers among transit providers, and creating intercepts.
- Coordinate schedules for different bus routes of same and different carriers to improve travel time.
- Expand accessible community transportation services to meet daily living needs of persons without access to automobiles.
- Expand paratransit and fixed route bus service to growing areas of the County. Extend lines to cover gaps in service.
- Invest in newer and state of the art equipment.
- Expand communication / marketing and outreach to major employers, welfare programs, students, seniors, and others to inform them of available transit services.
- Invest in infrastructure improvements, including bus shelter installation at more locations, bus stop signage with user-friendly bus route information and markings, priority traffic signals, and bus pull-offs, thereby enhancing both attractiveness and safety for users.
- Enhance the existing NJ TRANSIT "Mybus" system schedule information to real time operations information and expand its application to all bus routes and providers in the County.
- Develop a one stop transit information source covering all transit operations in the County
- Promote Safe Routes to Transit
- Advance Robert Wood Johnson Hospital Parking Facility with provisions to accommodate vehicle and bike parking for access to train and nearby regional and local bus facilities.
- Improve travel options for the aging population, senior citizens and people with disabilities and low income groups.
- Explore all viable linkages from one mode to another.
- Support expansion of transportation centers where feasible
- Promote expansion of paratransit/demand responsive services and their connection and integration to fixed route transit services.
- Route 18 Corridor traffic, bicycle –pedestrian access and to transit and related bus shelters and transit amenities.

- Route 18 Corridor Express Bus Service from Old Bridge to New Brunswick and New Park and Ride Facility in vicinity of Route 18 and Route 9 in Old Bridge.
- Improved bus connections between Route 9 Corridor buses and NJT 818 Bus in vicinity of Route 9 and Ticetown Road, Old Bridge.
- Promote complete streets design policies to include safe accommodations and bus stop access improvements for transit riders and the mobility-impaired on roadway improvements throughout the County.
- Expand county and municipal shuttle routes providing weekend and evening service.
- Expand the use of the County website to promote all community transit provider services through website links to other websites.
- Include on Google Transit Private Carrier operations and MCAT shuttle services in Middlesex County to promote more integrated use of these services with NJ Transit.
- Identify potential for County operation/coordination of municipal community transportation services (Similar to Woodbridge, Sayreville, Old Bridge services).
- Expand vehicle-to-vehicle transfers for Access Link passengers going to common site destinations.
- Expand pilot program for purchase of NJ TRANSIT bus and rail tickets for distribution to MCAT customers who can use transit.
- Develop travel training program for senior citizens and disabled residents to promote use of transit by traditional community transit customers.
- Expand program of identifying MCAT and municipal shuttles that serve NJ TRANSIT bus stops by developing uniform and highly visible route number/name information on bus stop signs and bus shelters.
- Expand the acquisition and installation of bus shelters with user friendly bus route information at legally designated bus stops throughout the County to enhance comfort and convenience of transit users.
- Work with key agency recipients of transportation services to identify the potential for agency and/or customer co-payments to provide funding for expanded transportation services.

- Expand the pilot on-bus advertising program by making referrals to the County advertising broker and exploring higher revenue forms of advertising media (e.g., bus wraps).
- Identify foundation and private sector funding for community transit and potential public/private partnerships.
- Expand out-of County transportation for MCAT services, particularly addressing destinations within 5 miles of the Middlesex border with contiguous counties.
- Expand availability of group ride (charter) transportation services on weekends and evenings.
- Develop effective schedule coordination between community shuttles operated by the County and municipalities.
- Expand evening and weekend service beyond the special (charter) trips and community shuttle pilot efforts.
- Work towards an integrated fare structure between the County and NJ TRANSIT to encourage passenger transfer activity between community transit and traditional rail and bus transit systems.
- Encourage new employer transportation services addressing unmet off-peak needs.
- Expand senior municipal transportation services to persons with disabilities.
- Address non-English language barriers to obtaining community transportation services beyond bi-lingual customer reservations.
- Improve the coordination of vehicle trips between Access Link and MCAT to address areas outside Access Link ¾ mile band around fixed route system.
- Develop and apply improved technology tools such as improved routing/scheduling, GPS and billing software to move toward a more integrated dispatching, billing and reporting system involving a broader set of community transportation providers.
- Expand bus shuttle connections between underserved major residential areas with train stations and major bus corridors.
- Consider potential heliport facilities and access linkages at appropriate locations to be developed in coordination with affected municipalities and public input.
- Promote TMA goals for transportation demand management strategies and promote use of TMA ridesharing (Ride Match) software where possible.

4. Maintain a state of good repair

Examples of initiatives to advance this goal include:

- Periodic inspections of highway and bridge infrastructure for assessing structural deficiencies, obsolescence related repairs, needed upgrades and new improvements
- Use of long lasting and high quality pavement material more resilient to winter conditions and to salting and plowing than conventional asphalt requiring more frequent maintenance and repairs
- Use of state of the art porous pavement material on large surface parking facilities and along sections of roadways prone to flooding
- Apply quick fix solutions as interim measures for problem areas to avoid interruption of service while long term solutions are being implemented
- Maintain adequate redundancy on transit infrastructure and bus and rail rolling stock to prepare for unanticipated events and breakdowns

5. Promote an adequate and safe bicycle and pedestrian system that supports mobility and recreation

Examples of these improvements and initiatives include:

- Advance East Coast Greenway Short Term and Long Term Proposed Facilities including ECG off street routes, Woodbridge, Edison, Highland Park, and New Brunswick.
- Provide Middlesex Greenway Proposed Extensions to South Plainfield, Perth Amboy and Raritan Center, Edison.
- Develop Middlesex Greenway extension to Roosevelt Park along Amtrak easement from Pierson Avenue to Northeast Corridor near Roosevelt Park, Edison.
- Provide bicycle paths along Rahway River and Arthur Kill waterfronts.
- Implementation of Route 1 Bicycle and Pedestrian Corridor Case Study NJDOT Report Recommendations, Woodbridge, Edison, New Brunswick. It is proposed that this include an alternative bikeway facility primarily on Route 1 South that would replace the former US Route 1 “Power Trail” proposal along the PSE&G power lines on Route 1 North; and that it provide bicycle access to Woodbridge Center Mall, nearby residential facilities, Menlo Park Mall and Roosevelt Park.

- Improve the Route 18 Bikeway section know as the "Trench or Route 18-Raritan River Trail" from Route 27 to John Lynch Bridge connection to Route 18 Bikeway in Piscataway.
- Upon completion of Route 18 Extension to I-287 in Piscataway designate the Route 18 Corridor Bikeway/multipurpose facility from I-287 vicinity in Piscataway to Route 18 at Paulus Boulevard, New Brunswick; and provide signs for motorists to use caution in the presence of pedestrians and bicyclists along Route 18 between Route 27 and Paulus Boulevard. Provide a designated bikeway connection from the D& R Canal Towpath terminal point at Landing Lane to the New Brunswick Bikeway terminal point at College Avenue and Lafayette near Buccleugh Park and to the Johnson Park Bikeway in Piscataway.
- Provide a bikeway along the River Road Corridor from Hoes Lane to Bound Brook Train Station.
- Improve bikeway / sidewalks along River Road from Hoes Lane to Route 27, Piscataway, and Highland Park.
- Rutgers University Cook/Douglass Campus Bikeway Extension to Ryders Lane in North Brunswick and future southerly bikeway extension to area institutions including DeVry and Silverline, and northerly extension to Rutgers Village in New Brunswick and East Brunswick Transportation Center.
- Advance Veterans Field Pedestrian Walkway / Bike Path, South River.
- Implement recommendations of the Route 18 Pedestrian Crossing Study to Enhance Safety and Public Transit Use completed by the Middlesex County Department of Planning in September, 2005 as a NJTPA sponsored Subregional Planning Study.
- Implement recommendations of the Route One Corridor Bicycle & Pedestrian Case Study for Middlesex and Mercer Counties, prepared for NJDOT in December, 1997.
- Provide new and/or expanded safe and secure/protected bike parking or bike station facilities at all train stations, major bus terminals, and activity centers. Rail stations include Metropark, Metuchen, Edison, New Brunswick, Jersey Avenue, Dunellen, Avenel, Woodbridge, Perth Amboy, and South Amboy. Major bus facilities include:
  - Route 9 – Ernston Road Park and Ride, Old Bridge
  - East Brunswick Transportation Center
  - NJ Turnpike Exit 9 Park and Ride, New Brunswick

- Address common urban area problems hindering pedestrian mobility based on various walk able community workshops:
  - Faded crosswalks, poorly designated crosswalks, and narrow stop bars at intersections create poor visibility and confusion to where drivers should stop. These should be replaced with high visibility ladder style markings.
  - Lack of continuous sidewalks on one or both sides of a street or urban highway.
  - Broken sidewalk along significant long stretches on sidewalks along major routes. Residential property owners often do not have the financial means for needed sidewalk replacements/repairs.
  - Encroachment of trees and vegetation into pedestrian space.
  - Poor and unattractive lighting especially along side streets leading to activity areas.
  - Poor or nonexistent way finding signage and signage for transit facilities.
  - Unaligned curb ramps with crosswalks.
  - Lack of pedestrian walk signals and countdown timers at wide intersections especially at street crossings of more than two lanes of traffic.
  - Excess lane widths which may contribute to speeding problems. Poor sight distance at intersections that cause vehicles to pull into crosswalk area to view cross street traffic.
  - Promote and encourage Middlesex County municipalities to adopt and advance "Complete Streets" design that accommodates bicyclists and pedestrians.

6. *Promote integration of transportation and land use*

- Support development that allows higher densities, mixed uses, is near transit facilities, includes plans for providing new or expanded transit services, and provides accommodations for pedestrians and bicyclists.
- Encourage existing apartment developments to provide shuttle services to nearby train stations and/or major bus terminals/stations.
- Support Transit Oriented Developments and improvements at Transit Villages and other activity centers.

- Support multimodal transportation improvements and transit service expansions near all proposed major developments such as the North Brunswick Transit Village and the Point at Sayreville.
- Utilize the Middlesex County Site Plan and Subdivision resolution recommendations for installing appropriate pedestrian, bicycling, and transit accommodations at new development proposals subject to County review.

7. *Support freight transportation improvements*

Provide better integration of freight transportation needs within our transportation system and explore new freight options and operational efficiencies. The Plan supports improvements that will benefit the movements of freight by rail and truck movements to nearby and interstate destinations, and benefit shippers and consumers. Examples of these improvements include:

- Invest on freight access improvements to areas of the County with rail and truck access in place and in conformance to surrounding land uses such as Raritan Center and NJ Turnpike Exit 8A
- Support improvements on rail freight lines that upgrade substandard rails to the national 286,000 weight standard
- Provide appropriate signage and trailblazers to encourage truck drivers to use existing truck routes and routings that involve use of principal arterial roads and avoid residential areas where possible.
- Improve truck connection routes to regional and local ports
- Advance major road improvements that can improve the flow of truck traffic and/or access to nearby truck destination points
  - Advance Route 18-Edgeboro Road- grade separation
  - Route 1 corridor improvements and widening from Aaron Road to Forrestal in North Brunswick, South Brunswick and Plainsboro
  - the Main Street Bypass in Sayreville
  - the Route 32 alignment and connector road improvements from the New Jersey Turnpike Exit 8A to US Route 130

8. Protect the environment and address energy conservation and climate change impacts on transportation

Address climate change impacts on the transportation infrastructure and encourage actions and strategies that will help to reduce these impacts. Examples of these improvements include:

- Encourage programs, incentives and strategies to reduce vehicle miles traveled (VMT) to reduce Greenhouse Gas (GHG).
- Improve design standards to make roadways and other transportation infrastructure more adaptive to flooding and impacts from climate change
- Encourage use of alternate fuel vehicles, utilization of cleaner fuels and conversion of fleet vehicles to electric, hybrid and compressed natural gas to reduce pollution and as a fossil fuel energy conservation measure
- Develop a network of charging stations to support the growing number of electric vehicles and plug in hybrids as a means to encourage consumer use of electric vehicles to reduce greenhouse and gas emissions and improve air quality.
- Include risk assessments into the project selection and design process to account for mitigation against extreme weather conditions.
- Promote incentives for low polluting – energy efficient vehicles and transportation options.

9. Improve economic vitality, access to jobs and business appeal

- Support Federal and State programs that promote further study and development of technology for the enhancement of vehicles with the option of self-driving technology autopilot functions. This, along with related infrastructure improvements on certain freeways and other appropriate principal arterials could make roads safer and less congested. A number of carmakers have been working on autonomous vehicle technology for years and it is expected that commercial vehicles could feature “autopilot” functions within the next decade. Self driving vehicles have been tested in California roadways and it is noted that those that have been tested with more than 300,000 miles of self driving have not had any accidents.
- Explore with the Port Authority of New York and New Jersey and affected municipalities the feasibility of intermodal ferry operations and expansion of marine freight facilities for

Middlesex County coastal areas as ways of attracting new business investment, jobs and other economic / trade opportunities in Middlesex County.

10. Promote public and private sector partnerships on transportation projects and program

- Promote partnerships on transportation improvements and funding participation on projects that benefit the public interest. Encourage partnerships with private sector entities in funding of transportation improvement projects that are in the public interest. An example of transportation related improvements secured through public – private sector cooperation includes approximately 45 linear miles of new sidewalks and almost 32 linear miles curbing from private developers between 2002 and 2012. The Middlesex County Office of Planning secured these improvements as part of the land development review process on developments affecting County roads or drainage facilities.
- Encourage existing apartment developments to provide shuttle services to nearby train stations and/or major bus terminals/stations.

Some of the proposed capital improvements have been delayed for years due to lack of funding. The development / expansion of a stable funding source for transportation may be a way of addressing funding shortfalls for needed projects.

Chapter Two: Demographic and Economic Profile

Modern society is highly dependent on the regional, national and global transportation networks. While it is possible to understand such networks as stand-alone systems, given its wide-ranging impact on nearly every member of society, it must also be understood through how people interact with it. This relationship can be understood through demographic data, including factors such as population density, age, disabilities, automobile ownership, and income. In concert with statistical and engineering data, this information can help determine where possible changes in transportation may be appropriate.

The series of demographic data tables and graphs presented in this section of the report are primarily tabulated from the 2006-2010 American Community Survey (ACS) 5-Year Estimates and the 2010 Census, which were the most current data sources available at the municipal-level geography when this section was being prepared. The 2006-2010 ACS 5-year Estimates represent the average characteristics of an area over the 5-year time period, based on statistical sampling data collected between January 2006 and December 2010. Future references in this report to the 2006-2010 ACS data will simply state, "during 2006-2010." Data from the 2010 U.S. Census represents a physical counting of the population, based on mailed-in questionnaires, as well as in-person interviews conducted by census-takers. Future references in this report to the 2010 U.S. Census data will simply state, "during 2010" or "in 2010".

A full series of municipal demographic "QuickFacts" is included with data specific to each of the 25 municipalities of Middlesex County and can be found in Appendix B – Municipal Summaries. The Municipal Summaries offers a comprehensive selection of key statistics from a variety of datasets including the decennial U.S. Census of Population, the American Community Survey, the U.S. Economic Census and a few others.

The following table specifies the sub-regional groupings by Municipality, which are used throughout this document. The following table is depicted in map form on the following page

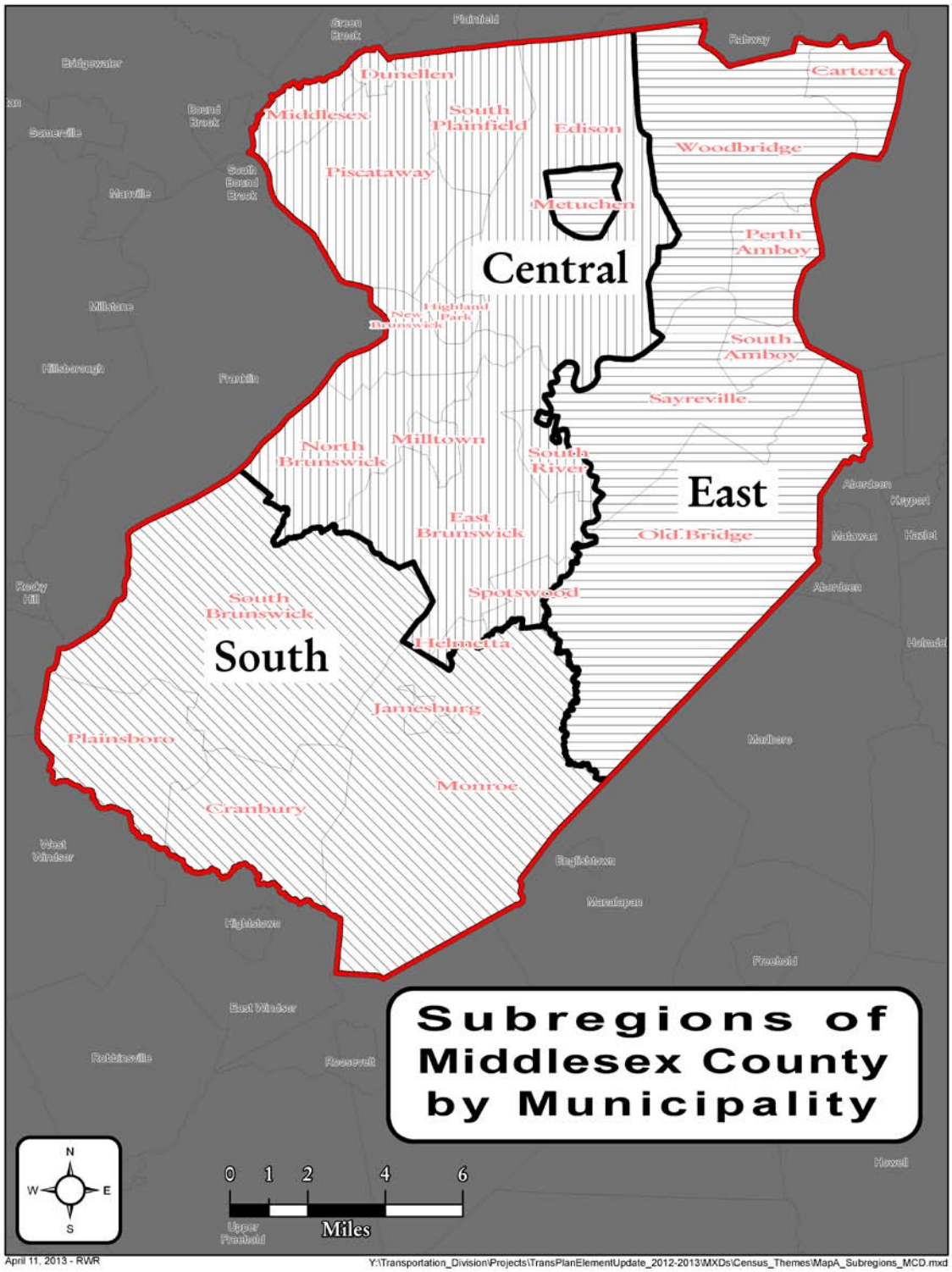
Table 2—1: Middlesex County Municipalities by County Subregion

County Subregion	Municipality
East	Carteret Borough
	Metuchen Borough (see Note 1)
	Old Bridge Township
	Perth Amboy City
	Sayreville Borough
	South Amboy City
	Woodbridge Township
Central	Dunellen Borough
	East Brunswick Township
	Edison Township (see Note 2)
	Helmetta Borough
	Highland Park Borough
	Middlesex Borough
	Milltown Borough
	New Brunswick City
	North Brunswick Township
	Piscataway Township
	South Plainfield Borough
	South River Borough
	Spotswood Borough
South	Cranbury Township
	Jamesburg Borough
	Monroe Township
	Plainsboro Township
	South Brunswick Township

Note 1: Metuchen, despite being surrounded by Edison Township of the Central Subregion, is included in the East Subregion to be consistent with the existing formal organizational structure of the Middlesex County T.C.C. and to maintain the ability to directly compare data presented in the last comprehensive master plan of the 1970s, which utilized this sub regional organization

Note 2: All tabular summations by subregion include all of Edison as situated entirely in the Central Subregion; however, for display on the thematic maps, the U.S. Census tract that is split by the municipal boundary with Woodbridge Township which runs through Raritan Center is displayed within the view extent of the East Subregion. This is for cartographic display purposes only.

Map 2-1: Map of Subregions in Middlesex County



2.1 General Characteristics

2.1.1 Total Population

In 2010, the total population of Middlesex County was 809,858 (303,527 residents in the east; 380,576 in the central; 125,755 in the south). The east subregion accounted for approximately 37% of Middlesex County's total population, the central subregion for 47%, and the south subregion for 16%. Middlesex County accounted for approximately 9.2% of New Jersey's total population. Twenty-three percent of the county's population was under 18 years of age and 12% was 65 years and older. Both of these figures are within two percentage points of the statewide figures.

Table 2—2: Population Summary: subregions, county and state (2010)

Geography	Total Population	Under 18		18 and Over		65 and Over	
		Quantity	%	Quantity	%	Quantity	%
East	303,527	70,841	23.3%	232,686	76.7%	35,733	11.8%
Central	391,011	86,980	22.2%	304,031	77.8%	43,171	11.0%
South	115,320	27,636	24.0%	87,684	76.0%	20,558	17.8%
Middlesex County	809,858	185,457	22.9%	624,401	77.1%	99,462	12.3%
New Jersey	8,791,894	2,065,214	23.5%	6,726,680	76.5%	1,185,993	13.5%

Source: 2010 U.S. Census

Middlesex County had an overall population density of 2,621.6 persons per square mile, which is significantly higher than the statewide density of 1,195.5 persons per square mile. There was significant variation within the county, however, as the south subregion was comparable to the statewide figure, while the east and central subregions greatly exceeded that of the county and the state. These figures provide important context for transportation planning, as large portions of the county exceed the average density in the nation's most densely populated state.

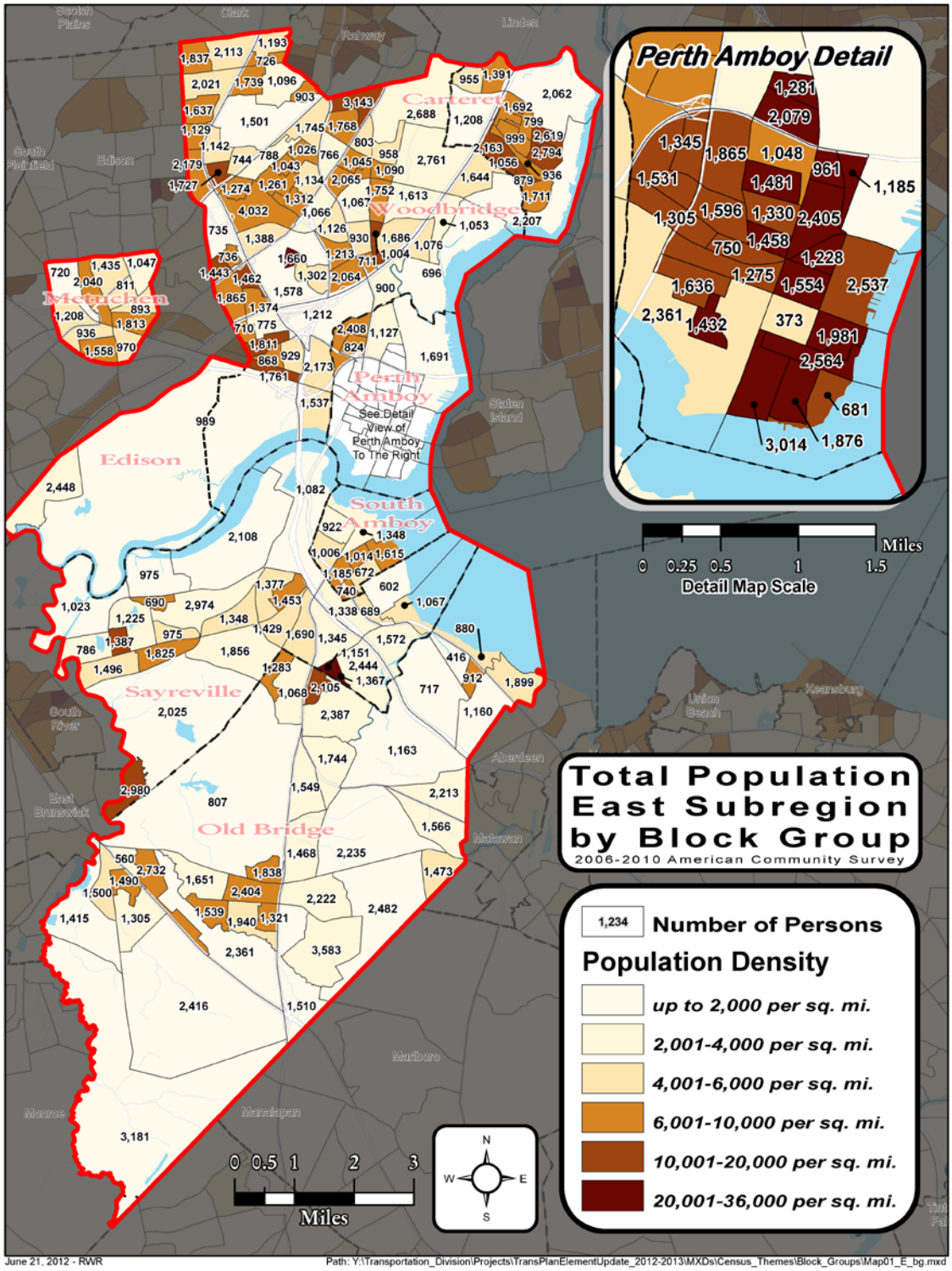
Table 2—3: Population Density: subregions, county and state (2010)

Geography	Population Density (persons per sq. mi.)
East	3,352
Central	3,560
South	1,063
Middlesex County	2,622
New Jersey	1,195

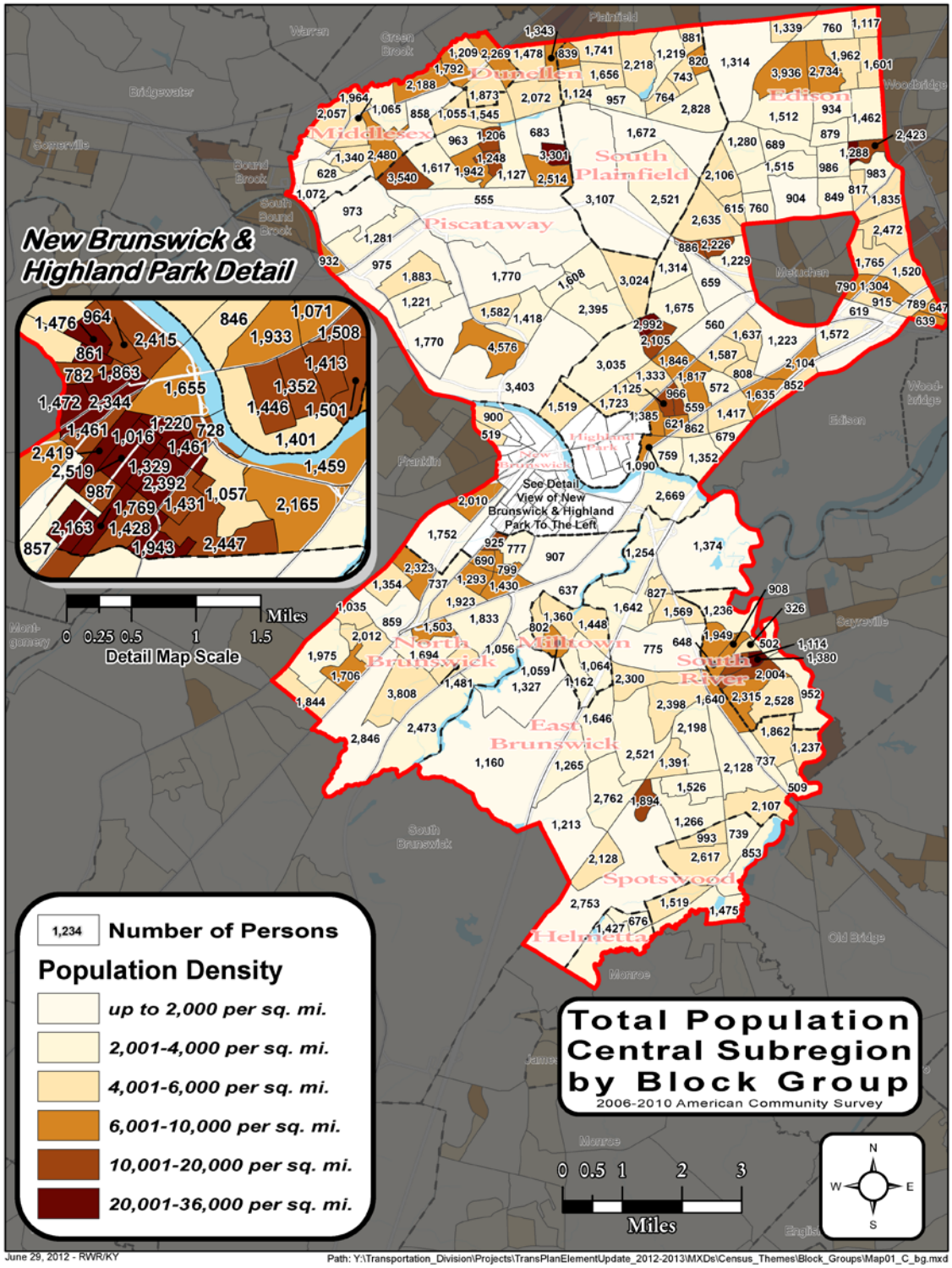
Source: 2010 U.S. Census

The following maps illustrate total population and population density by block group. In all of the maps below any block group classified higher than the second category, greater than 4,000 people per square mile, illustrates areas within Middlesex County that have population density that are more than three times higher than the State average of 1,195 per square mile.

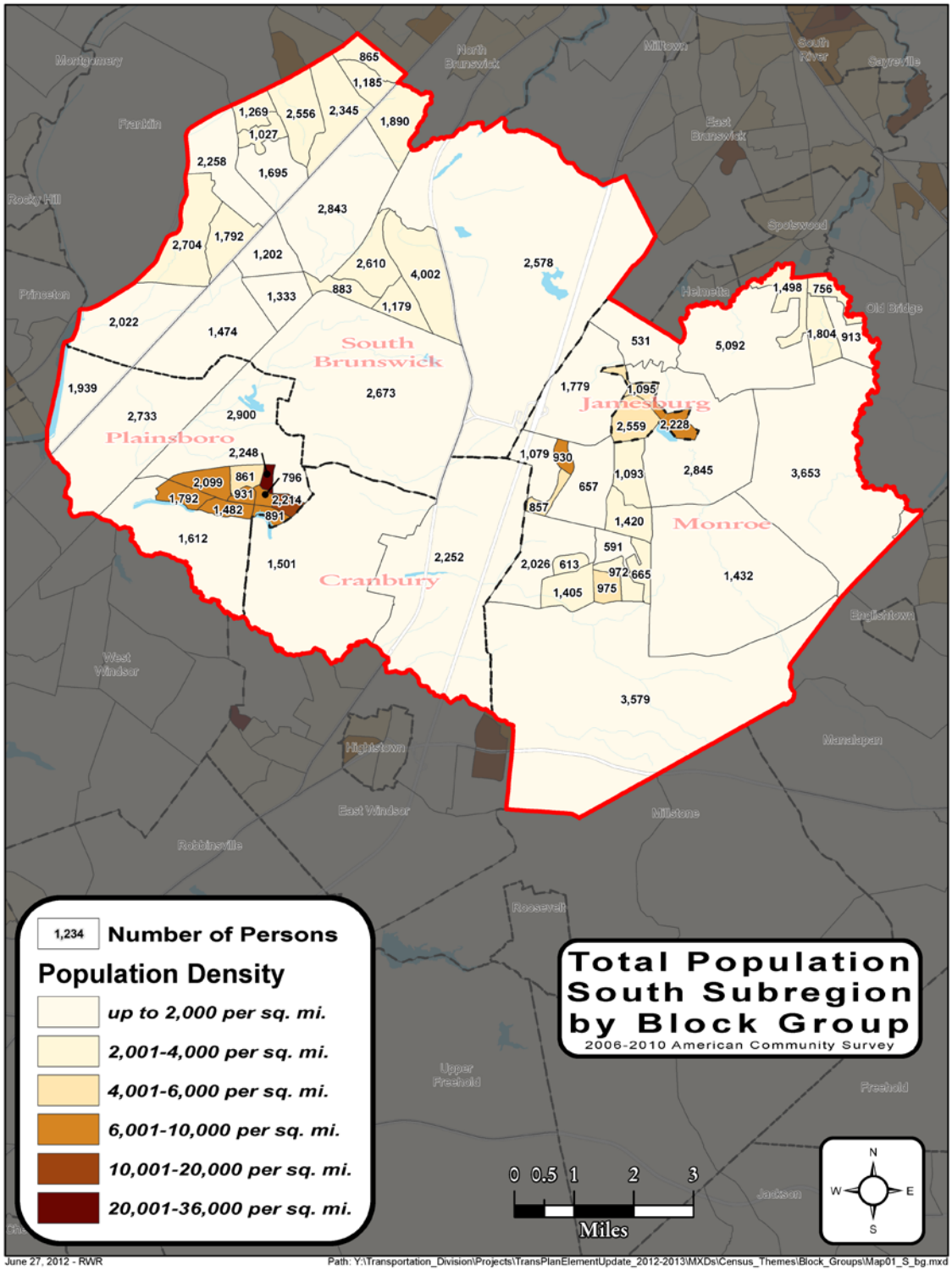
Map 2-2: Total Population and Population Density:
East Subregion by Block Group (2006-2010)



Map 2-3: Total Population and Population Density
Central Subregion by Block Group (2006-2010)



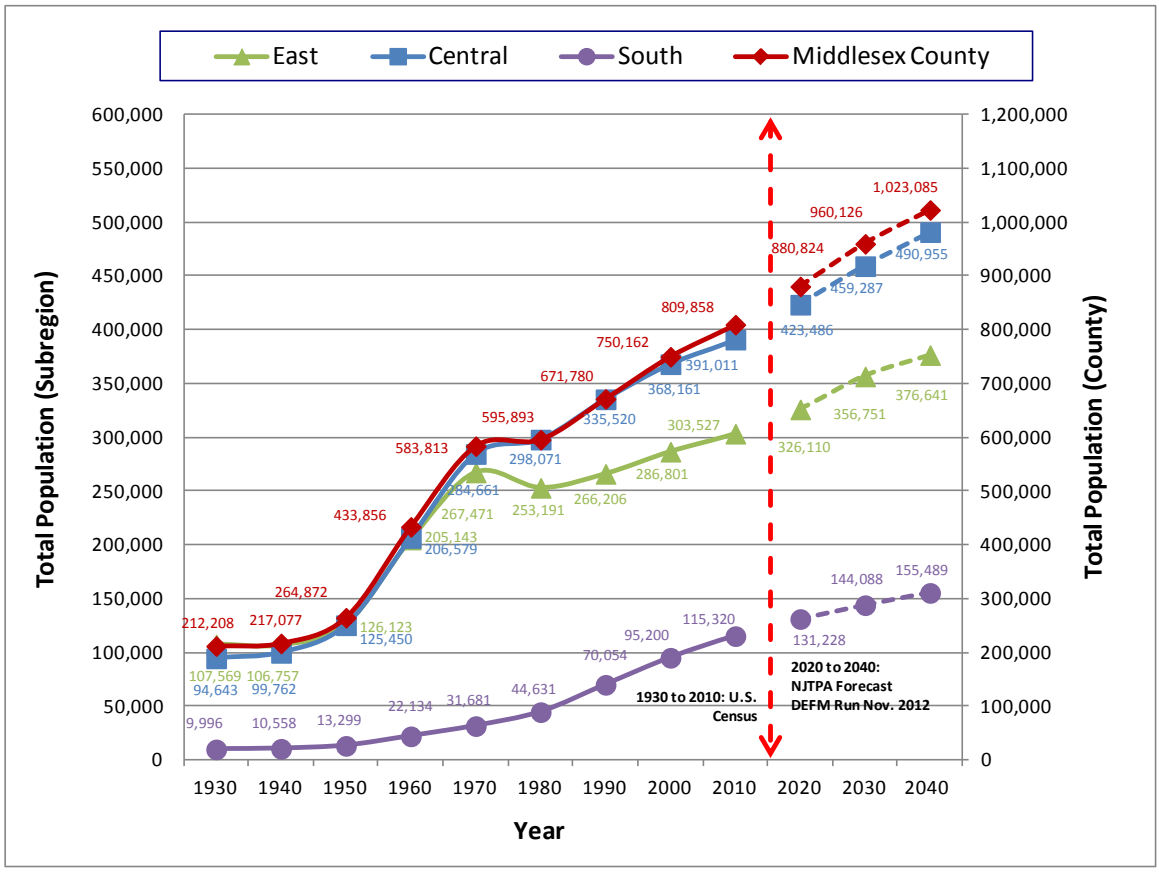
Map 2-4: Total Population and Population Density
South Subregion by Block Group (2006-2010)



2.1.2 Population Growth Trends

According to historic data from the US Census, Middlesex County's population more than doubled between 1950 and 1980. Since 1980, the historic and projected population growth rates have remained relatively constant for all three subregions, as well as the county. Based on North Jersey Transportation Planning Authority (NJTPA) population forecasts to 2040, the county is expected to continue growing in population by roughly 7,000 persons per year, with total forecasted population expected to slightly exceed 1 million people.

Figure 2—1 : Total Population Growth Subregions and County (1930 to 2040)



Sources: as noted in chart

2.1.3 Age of Population

During 2010, the median ages for the east and central subregions, 37.7 and 35.1 respectively, were less than the state's median age of 39.0, and while the central subregion's was less than Middlesex County's median age of 37.2. The south region, with a median age of 41.8, was higher than both the state and county.

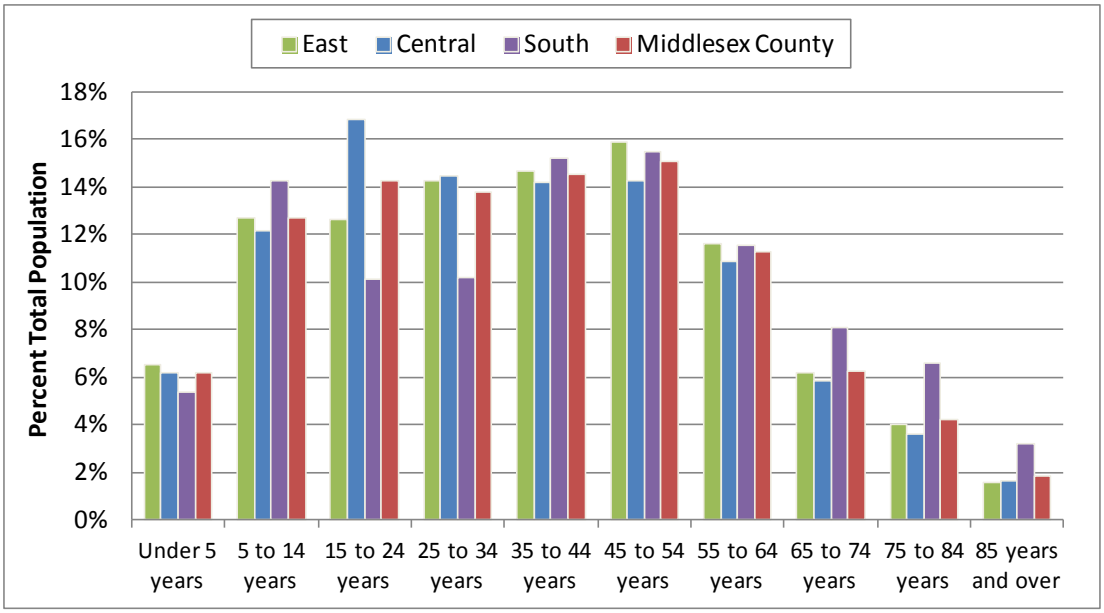
Table 2—4 : Median Age: subregions, county, and state (2010)

Geography	Median Age
East	37.7
Central	35.1
South	41.8
Middlesex County	37.2
New Jersey	39.0

Source: 2010 U.S. Census

Middlesex County has mainly an adult population, with 77.1% of its residents reported as being 18 years of age and older; slightly less than one-third of the population between the ages of 35 and 54; and, 12.3% of the population was 65 years and over.

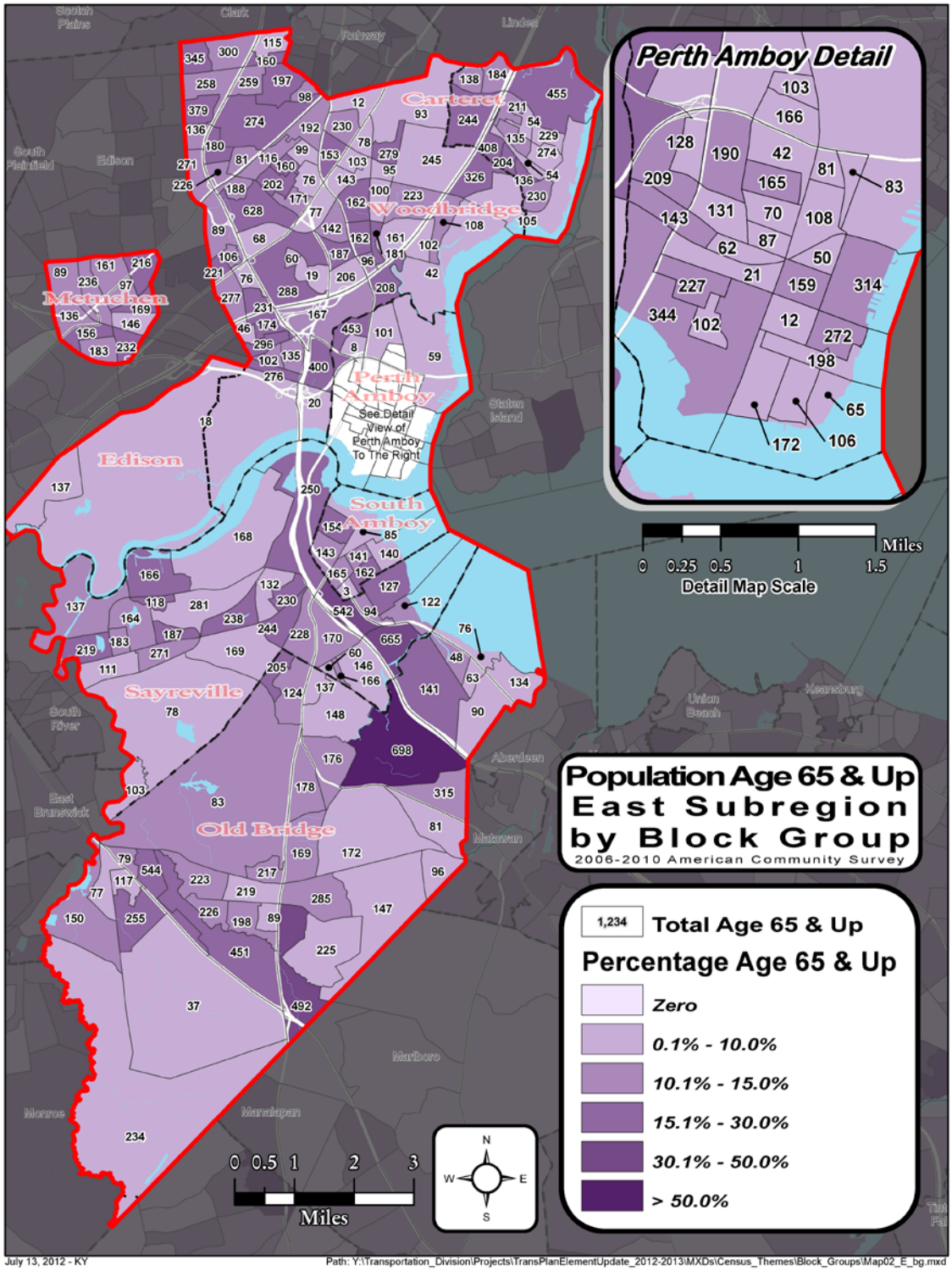
Figure 2—2 : Age cohorts for subregions and county (2010)



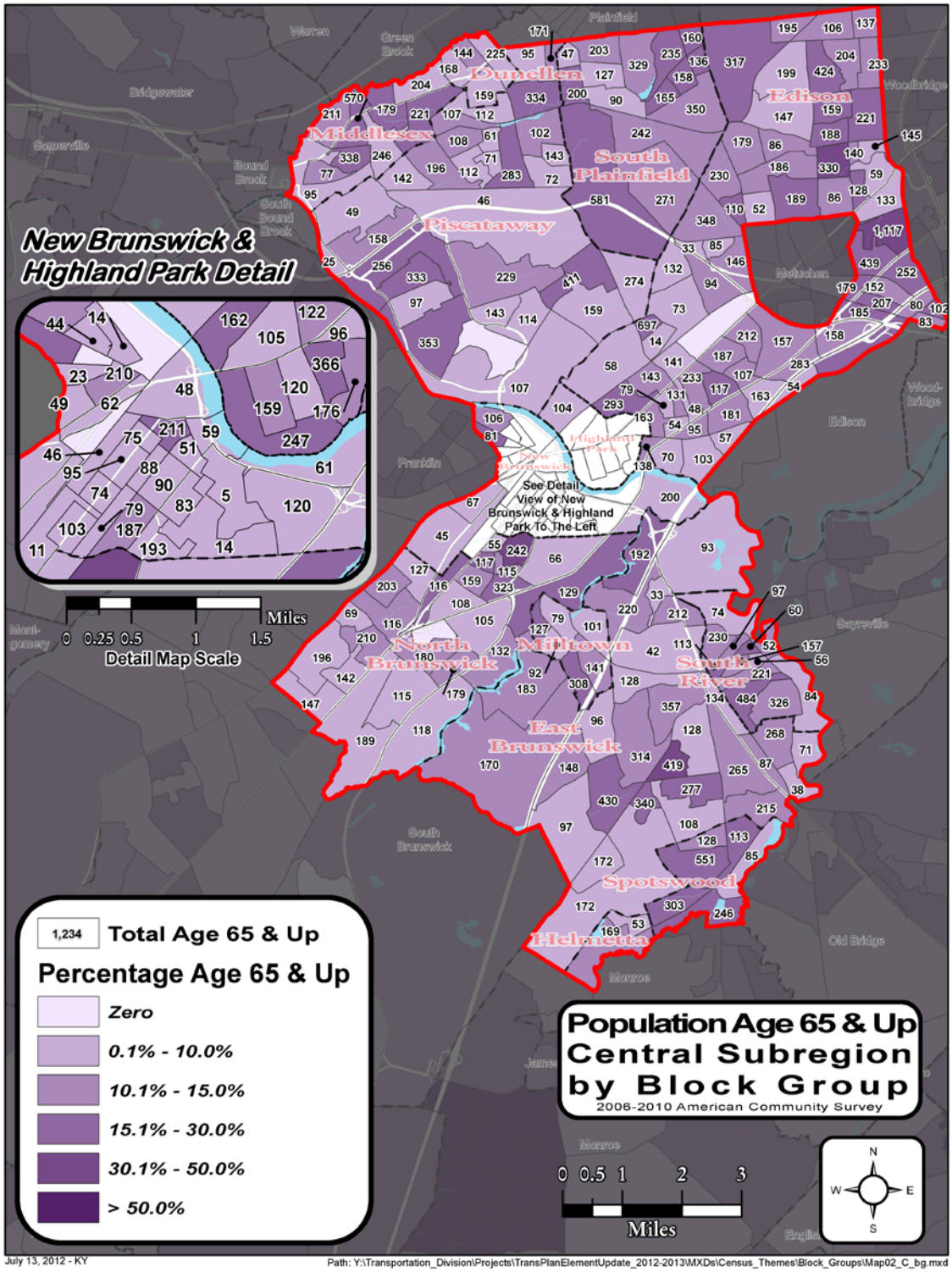
Source: 2010 U.S. Census

The following maps illustrate the concentrations of population 65 years old and over by block group within each of the County's subregions. As these maps depict, the largest concentration of population of 65 years old and older is primarily in the South Subregion within Monroe Township. Monroe has many retiree communities and according to American Community Survey data more than 51% owner occupied householder and more than 77%% of renter occupied householder were 65 years old or over in Monroe.

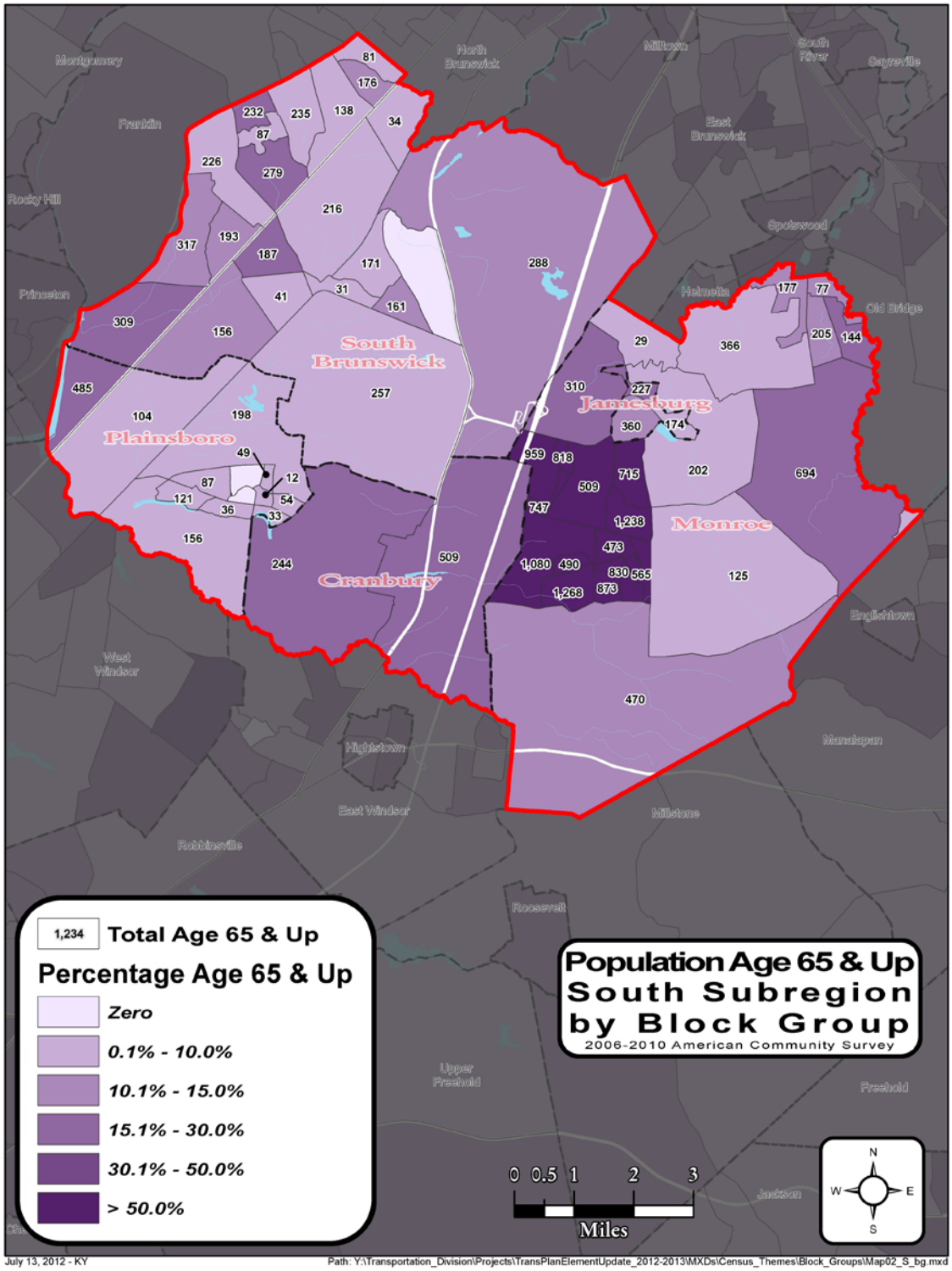
Map 2-5: Population Age 65 and Over:
East Subregion by Block Group (2006-2010)



Map 2-6: Population Age 65 and Over
Central Subregion by Block Group (2006-2010)



Map 2-7: Population Age 65 and Over
South Subregion by Block Group (2006-2010)



2.2 Households

2.2.1 Total Number of Households

In 2010, Census data shows that of the 281,186 households in Middlesex County, 34.4% had children under 18 years of age, compared to 34.5 in the east region, 34.6% in the central and 33.6% in the south. Family households comprised 72.2% of the total households in the county, which was lower than the percentage for the east region, but higher than those of the central and south regions.

Table 2—5: Households and Household Types subregions and Middlesex County (2010)

Households	East		Central		South		Middlesex County	
	Quantity	%	Quantity	%	Quantity	%	Quantity	%
Total Households	105,653	100.0%	131,073	100.0%	44,460	100.0%	281,186	100.0%
Non-Family Households	28,025	26.5%	36,762	28.0%	13,445	30.2%	78,232	27.8%
Family Households	77,628	73.5%	94,311	72.0%	31,015	69.8%	202,954	72.2%
With Own Children Under 18	36,474	34.5%	45,077	34.4%	15,135	34.0%	96,686	34.4%

Source: 2010 U.S. Census

2.2.2 Average Household Size

During the 2010 Census, the average household size in Middlesex County was 2.80 persons per household, which closely paralleled the average household sizes for the east and central subregions (2.83 and 2.85, respectively), and exceeded the average for the south region (2.56). The south region was lower than the statewide average of 2.68 persons per household.

Table 2—6 : Average Household Size of Occupied Housing Units by Tenure subregions, county, and state (2010)

Geography	All Occupied Housing Units	Owner-Occupied	Renter-Occupied
East	2.83	2.94	2.64
Central	2.84	2.93	2.69
South	2.57	2.68	2.18
Middlesex County	2.80	2.89	2.61
New Jersey	2.68	2.79	2.47

Source: 2010 U.S. Census

2.2.3 Household Density

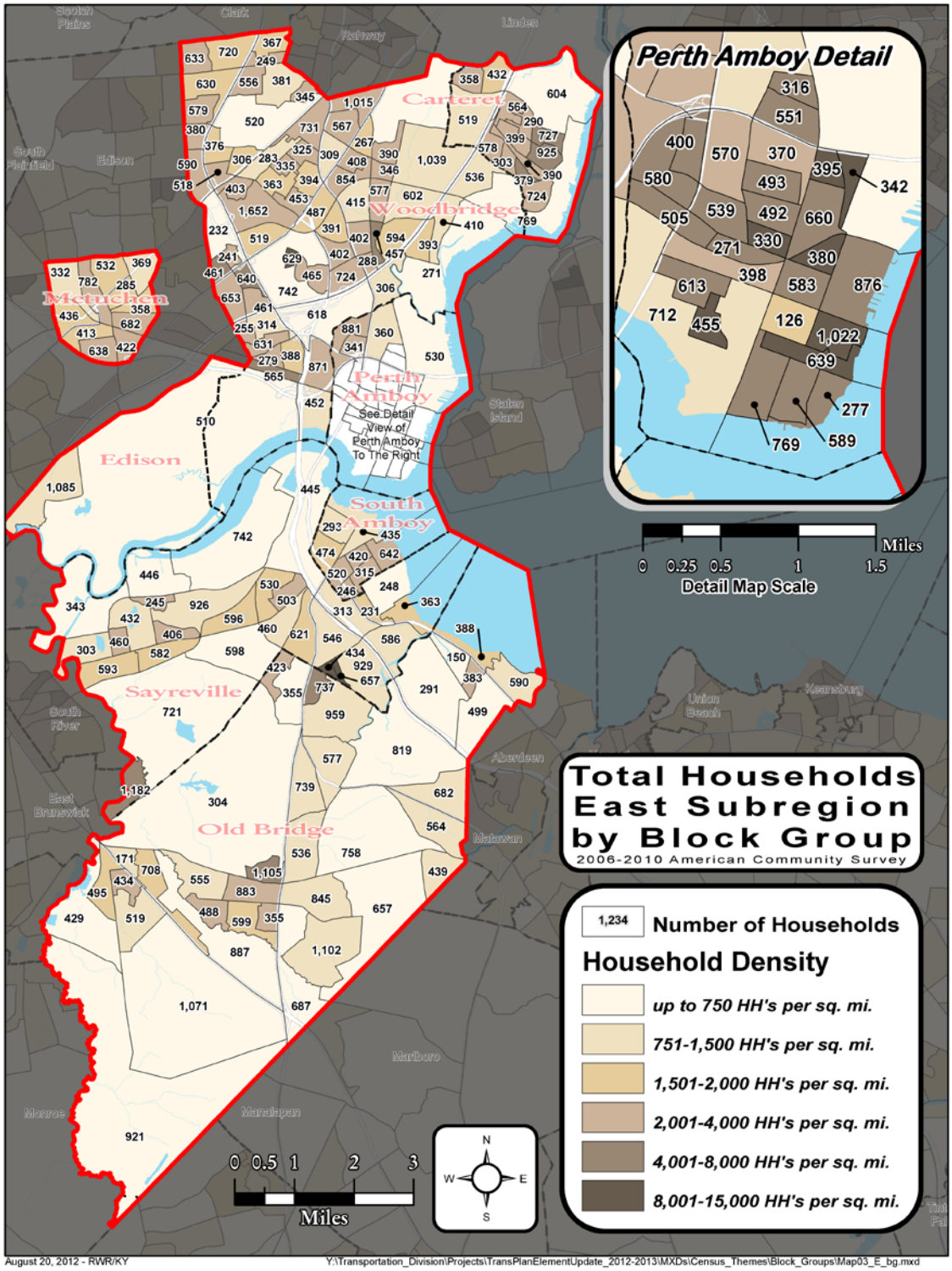
During 2010, the east and central subregions exhibited a household density of over 1,150 households per square mile — nearly triple the state average of 437.1 households per square mile. The south region had a household density of 434.2 households per square mile, slightly less than the state average. Combined, the three regions yield a county-wide household density of 910.2 households per square mile. However, the differing densities indicate the divergent development patterns between east, central and south.

Table 2—7: Household Density subregions, county and state (2010)

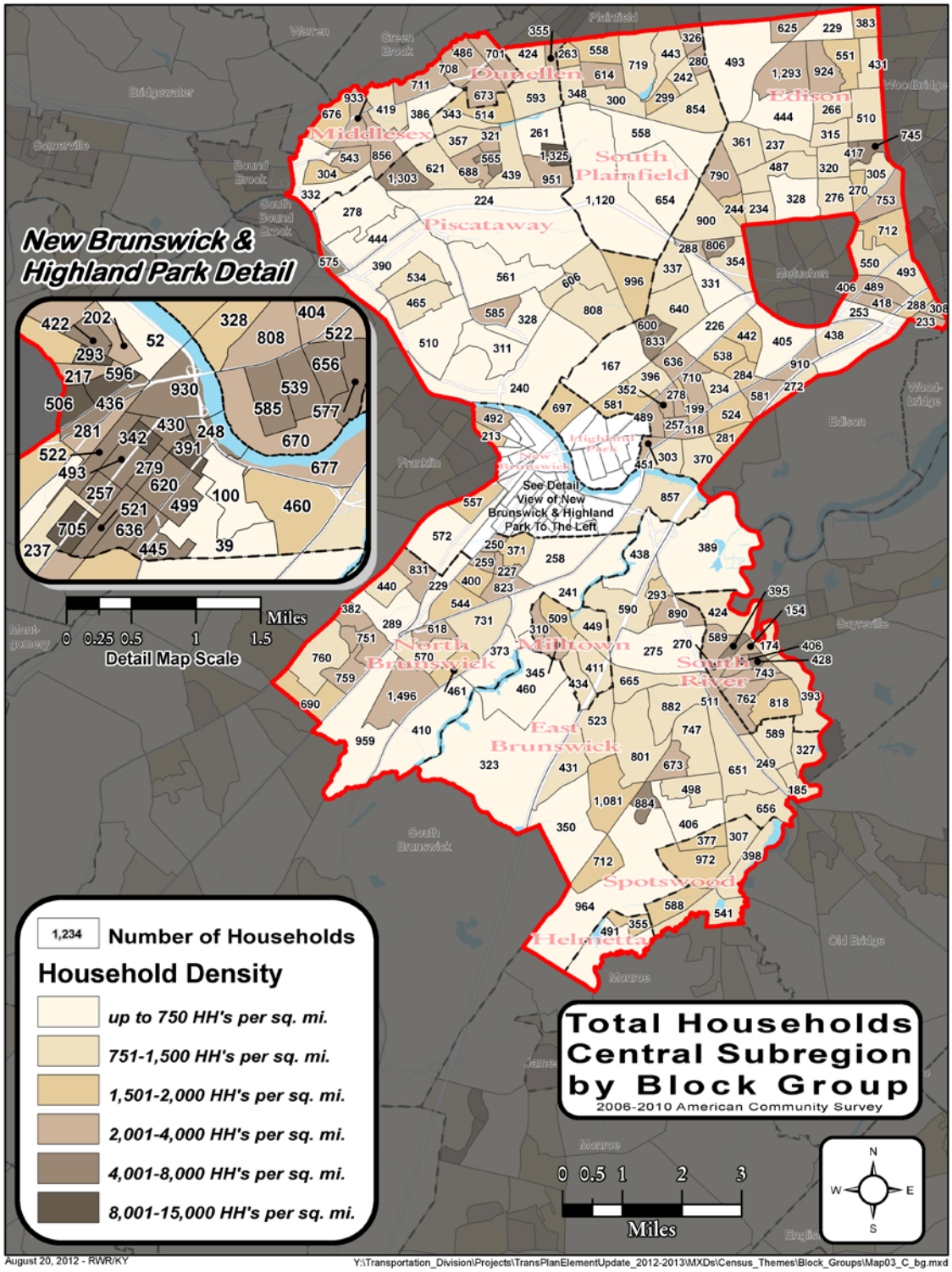
Geography	Household Density (households per sq. mi.)
East	1,166.8
Central	1,193.4
South	409.7
Middlesex County	910.2
New Jersey	437.1

Source: 2010 U.S. Census

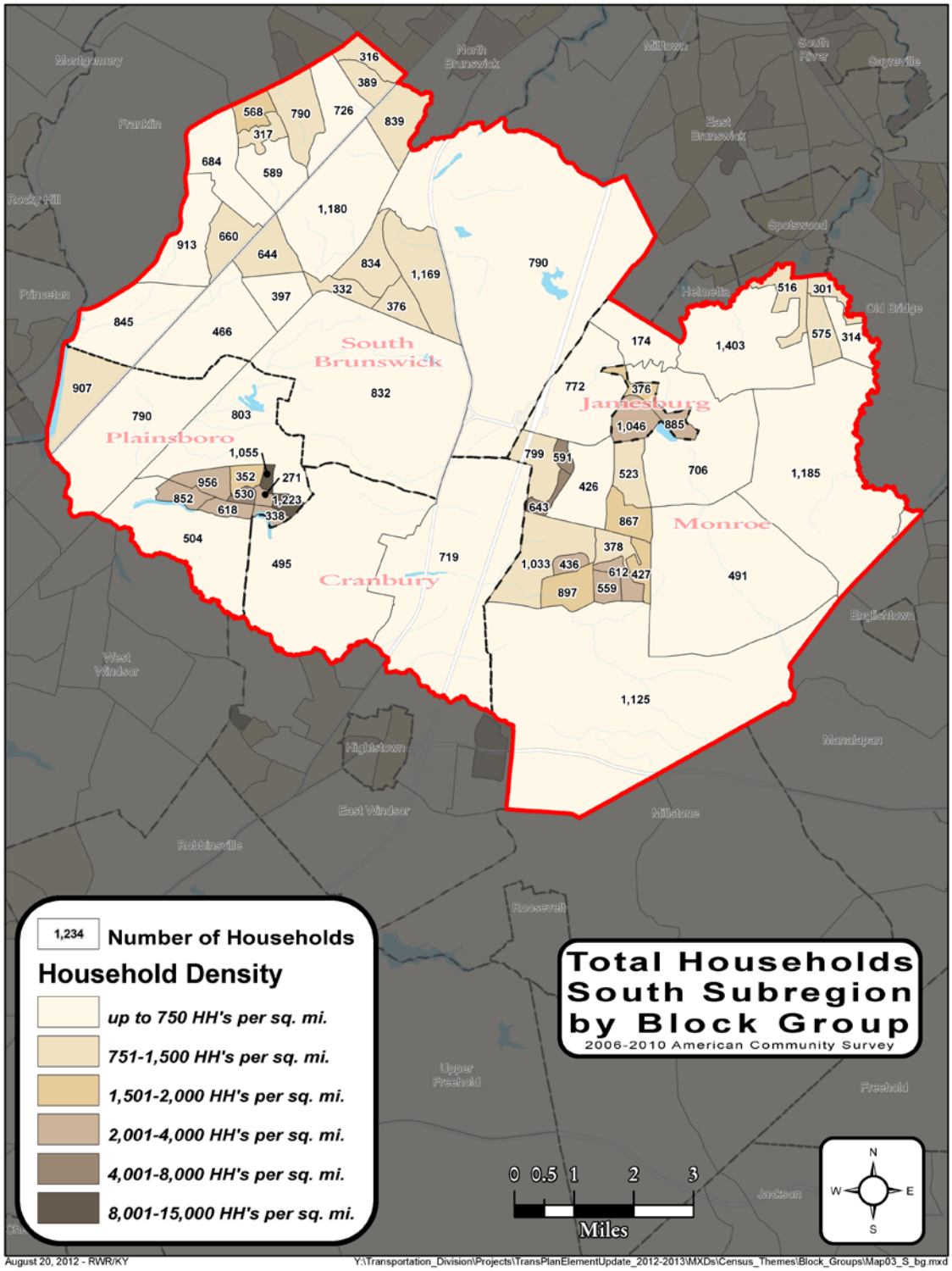
Map 2-8: Total Households and Household Density
East Subregion by Block Group (2006-2010)



Map 2-9: Total Households and Household Density
Central Subregion by Block Group (2006-2010)



Map 2-10: Total Households and Household Density
South Subregion by Block Group (2006-2010)



2.3 Housing Stock

2.3.1 Type of Housing Unit

During 2006-2010, single-family dwellings (detached and attached) comprised 53% of the total housing stock Middlesex County. Multi-family dwellings accounted for 27.1% and two-family dwellings were 7.4% of the total housing stock. Single-family housing units (detached and attached combined) accounted for 63% of the housing stock of the East subregion, 64% of the Central and 71% of the South. Multi-family housing units accounted for 27% of the housing stock of the East subregion, 28% of the Central, and 24% of the South. The South subregion had a significantly larger number of single family units and smaller number of two-family and multi-family dwellings.

Table 2—8: Number of Housing Units by Residential Structure Type by Subregion and Middlesex County (2006-2010)

Number of Housing Units	East	Central	South	Middlesex County
Total Housing Units	111,810	134,664	46,021	292,495
Single-Family, detached	60,932	71,049	23,032	155,013
Single-Family, attached	9,552	15,004	9,824	34,380
Two-Family	10,486	9,665	1,385	21,536
Multi-family	29,902	37,997	11,239	79,138
Mobile home, trailer, or other	938	949	541	2,428

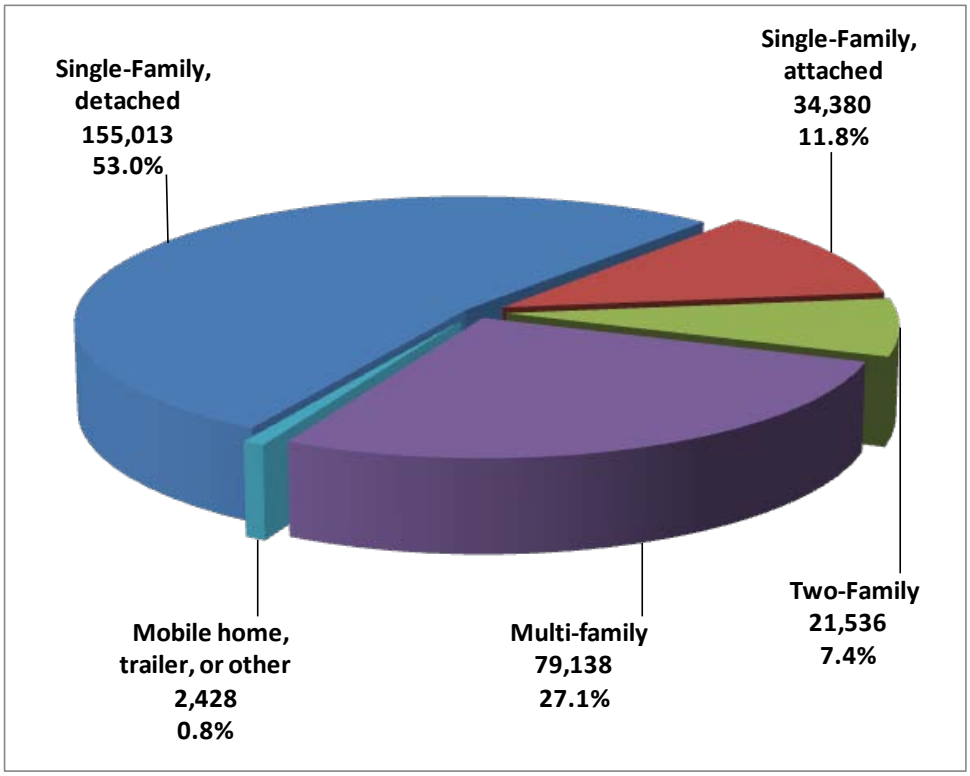
Source: U.S. Census, 2006-2010 American Community Survey Estimates

Table 2—9: Percent of Housing Units by Residential Structure Type by Subregion and Middlesex County (2006-2010)

Percent of Housing Units	East	Central	South	Middlesex County
Single-Family, detached	54.5%	52.8%	50.0%	53.0%
Single-Family, attached	8.5%	11.1%	21.3%	11.8%
Two-Family	9.4%	7.2%	3.0%	7.4%
Multi-family	26.7%	28.2%	24.4%	27.1%
Mobile home, trailer, or other	0.8%	0.7%	1.2%	0.8%

Source: U.S. Census, 2006-2010 American Community Survey Estimates

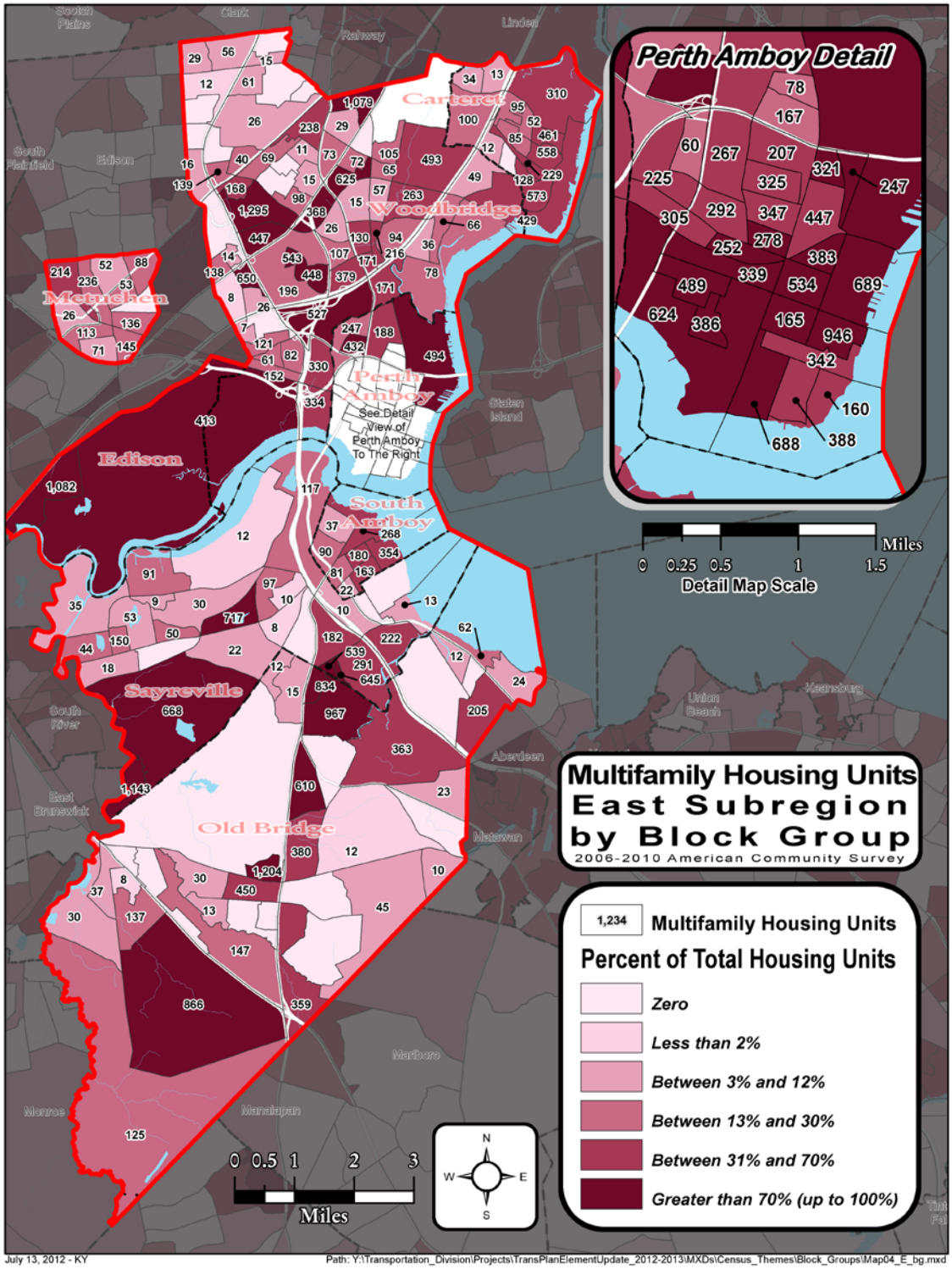
Figure 2—3: Number and Percent of Housing Units by Residential Structure, Middlesex County (2006-2010)



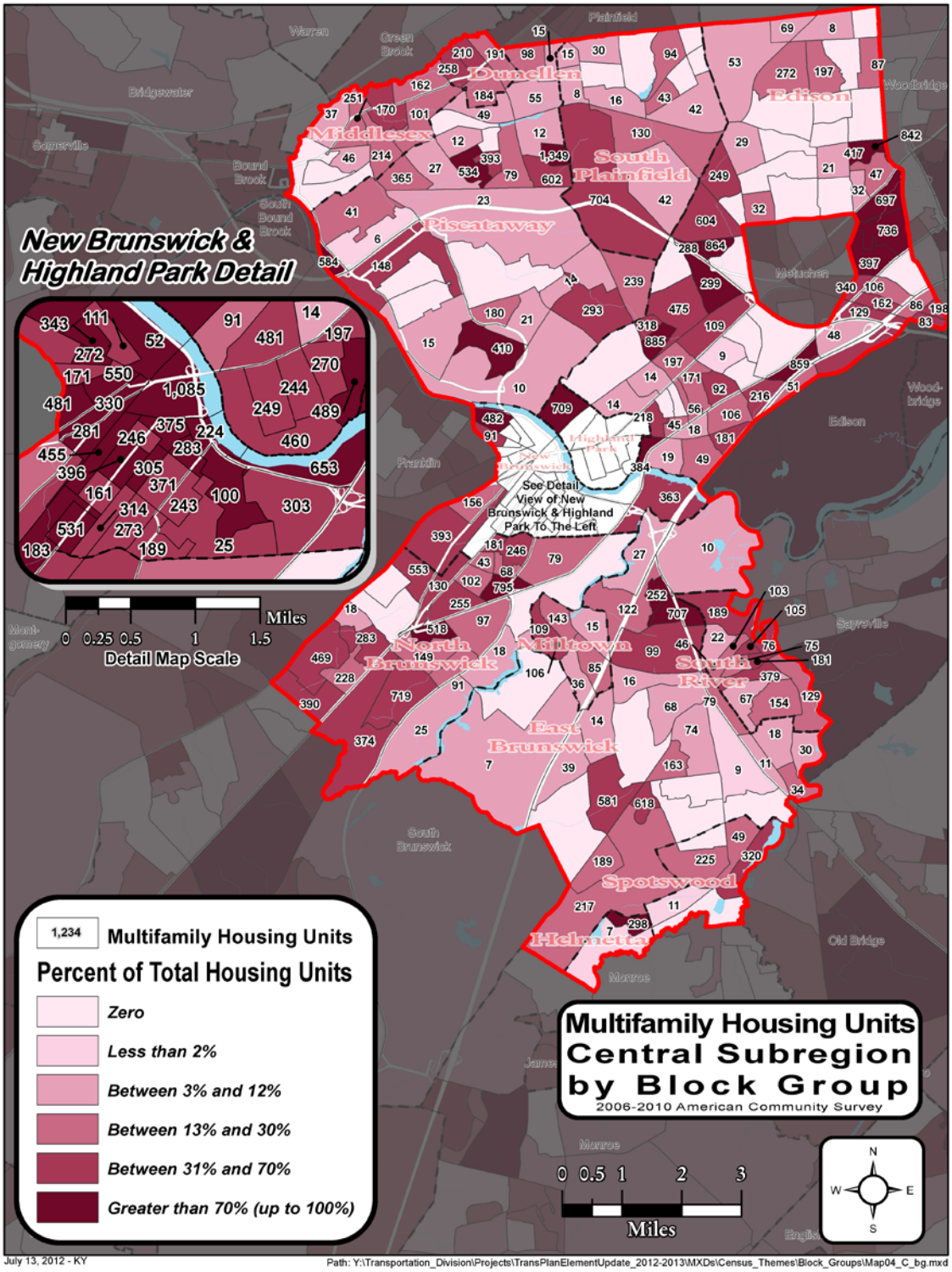
Source: U.S. Census, 2006-2010 American Community Survey

The following maps illustrate that multi-family housing was much more prevalent in the Central and East Subregions than in the South Subregion.

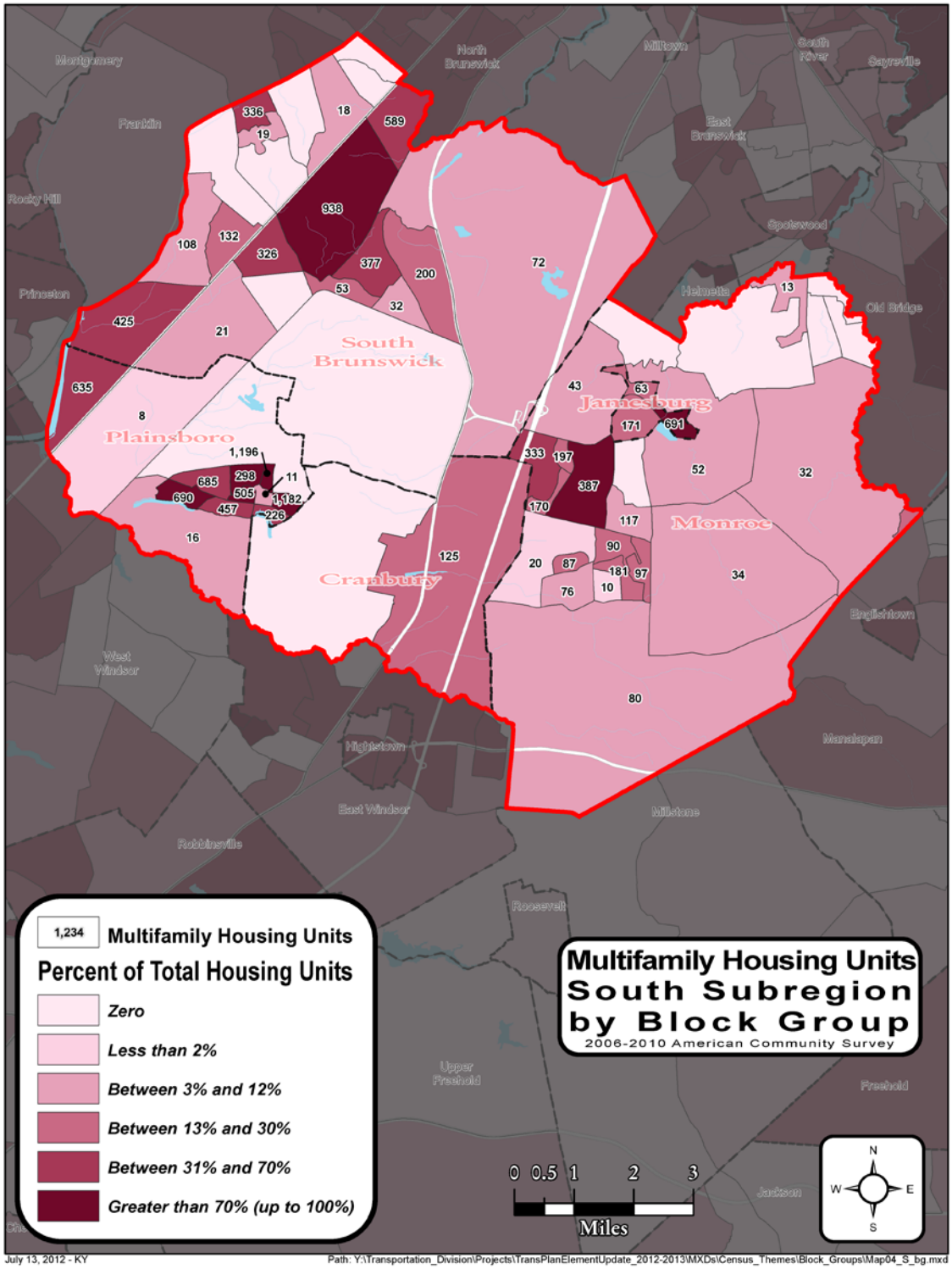
Map 2-11: Multifamily Housing Units and Percent of Total East Subregion by Block Group (2006-2010)



Map 2-12: Multifamily Housing Units
Central Subregion by Block Group (2006-2010)



Map 2-13: Multifamily Housing Units
South Subregion by Block Group (2006-2010)



2.3.2 Vehicle Availability

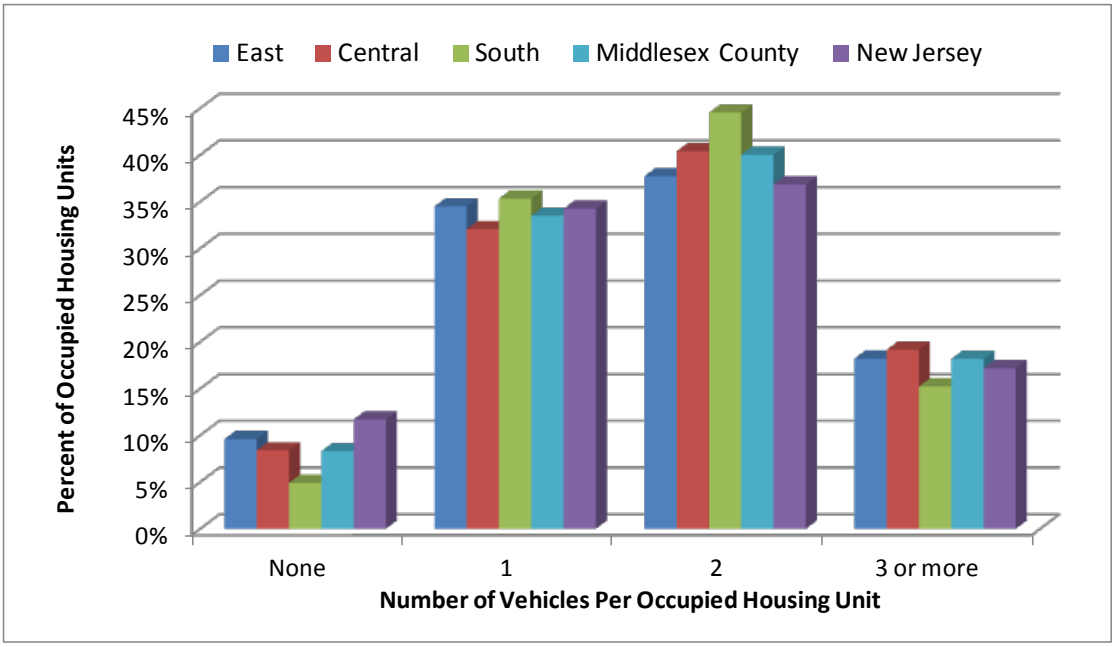
During 2006-2010, there was a slightly higher rate of vehicles per housing unit in the Central subregion than in the other subregions, county or the state. All of the subregions and the County had a higher rate of vehicles available per housing unit than the State.

Table 2—10: Number of Vehicles Available per Occupied Housing Unit: Subregions, County & State

Geography	Number of Vehicles per Occupied Housing Unit
East	1.72
Central	1.78
South	1.77
Middlesex County	1.75
New Jersey	1.66

Source: U.S. Census, 2006-2010 American Community Survey Estimates

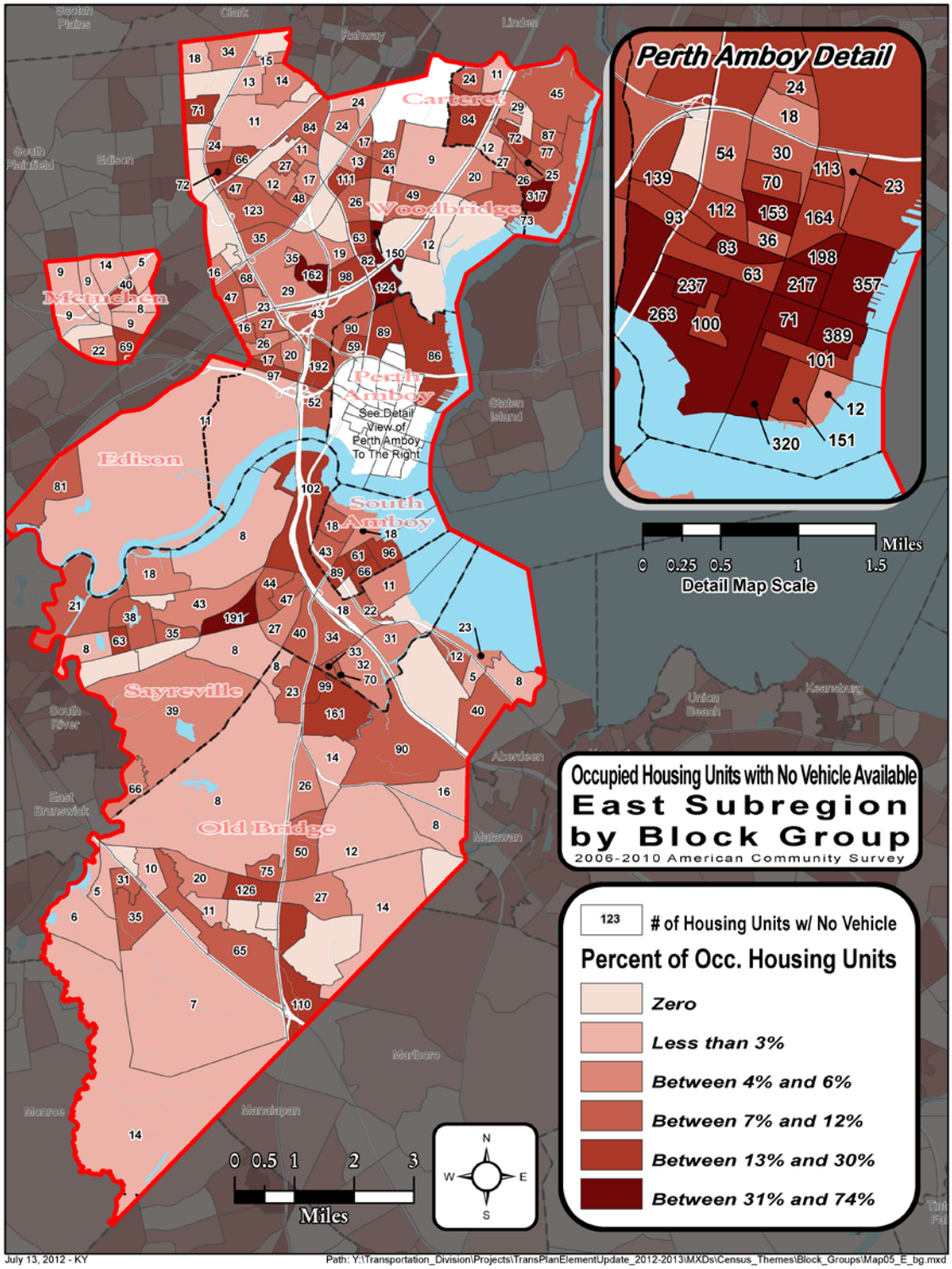
Figure 2—4: Occupied Housing Units by Number of Vehicles Available: Subregions, County & State (2006-2010)



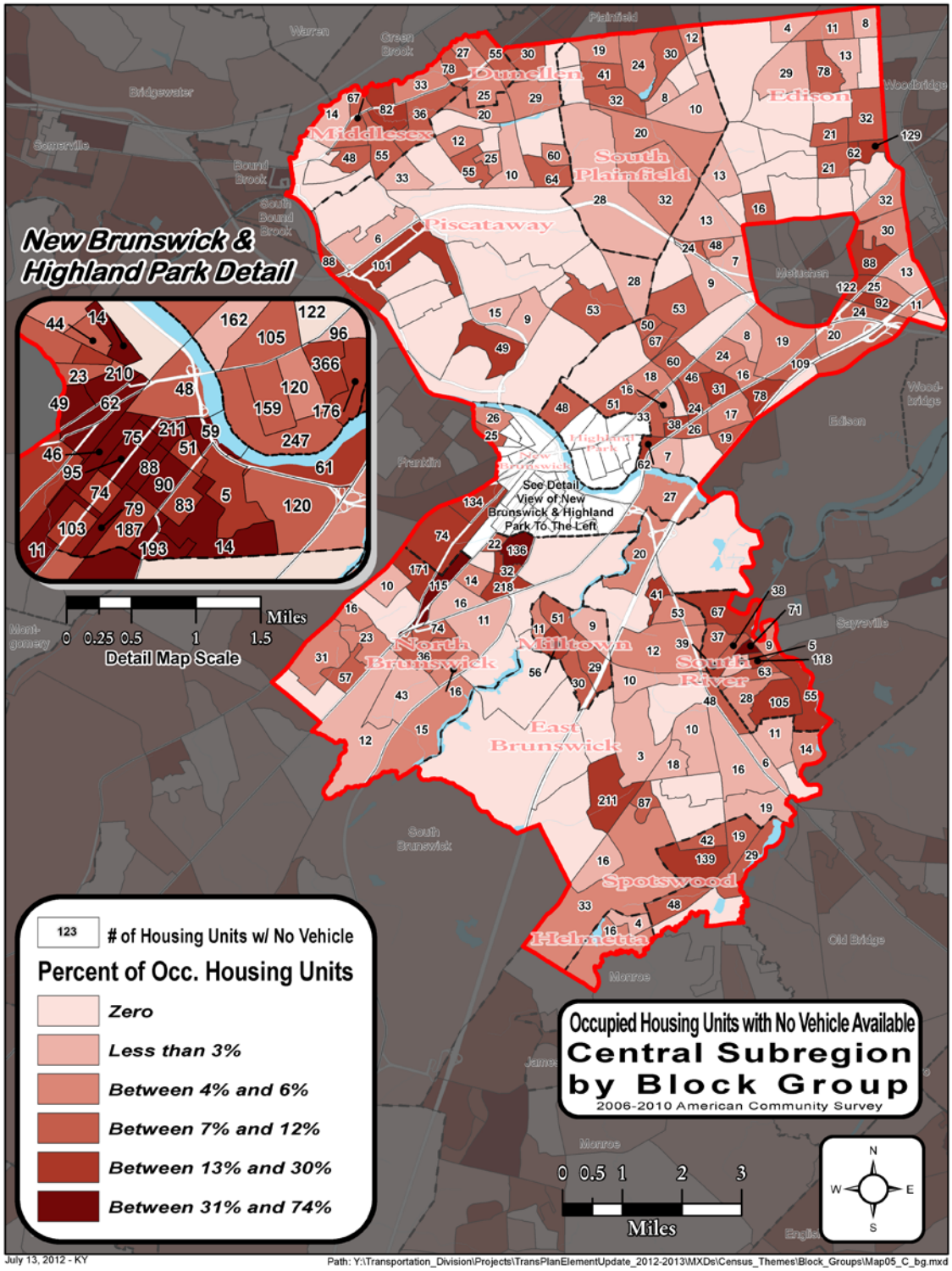
Source: U.S. Census, 2006-2010 American Community Survey Estimates

During 2006-2010, approximately 23,000 housing units out of a total occupied housing stock of almost 277,400 units in the County had no vehicle available. Over 8% of all occupied housing within the County had no vehicle available. The darker colors on the following maps highlight block groups in the county that had higher incidence of housing units with no vehicle available. The areas that had higher incidence of no vehicle available were more widespread in New Brunswick and Perth Amboy.

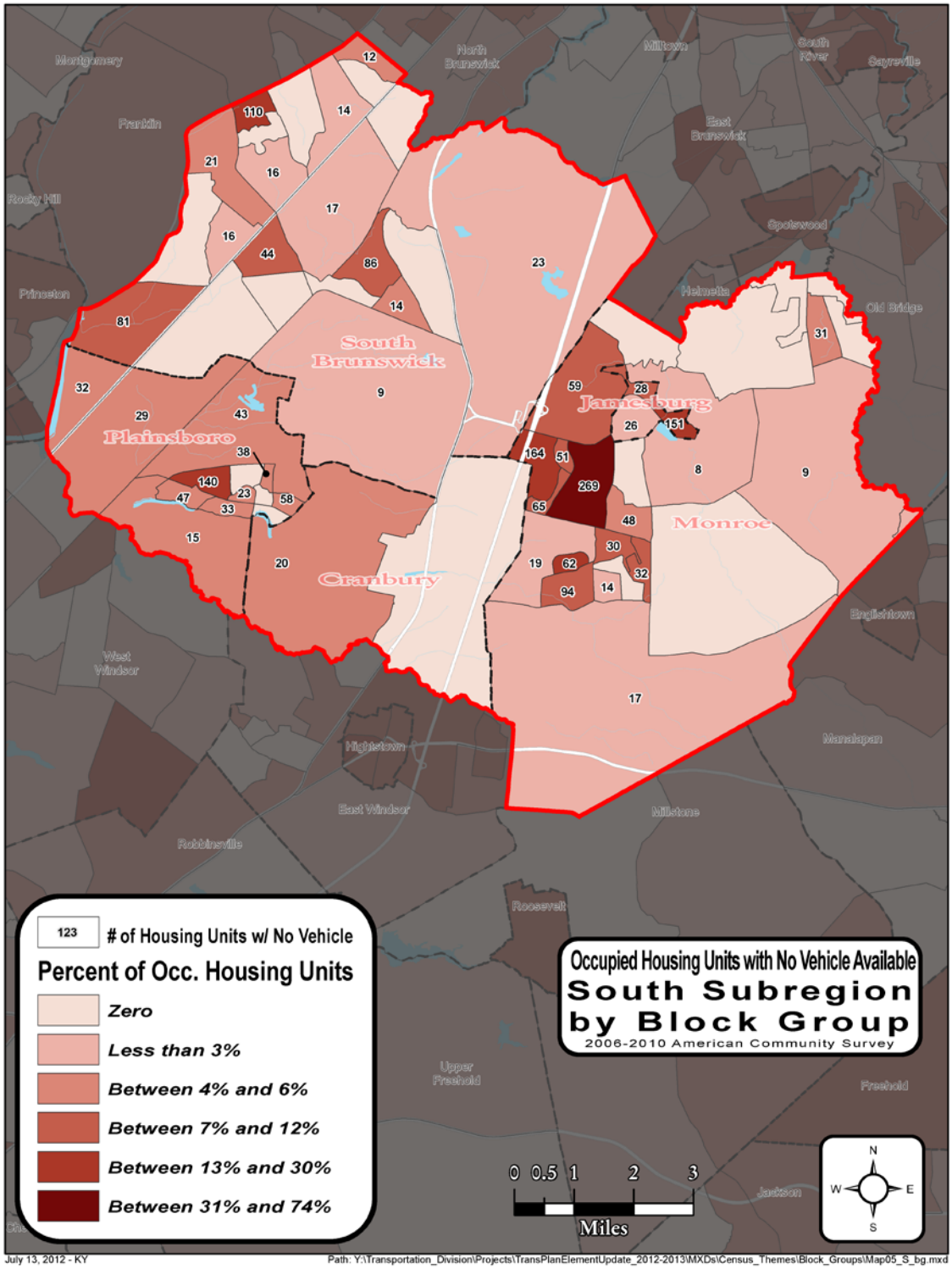
Map 2-14: Occupied Housing Units with no Vehicle Available
East Subregion by Block Group (2006-2010)



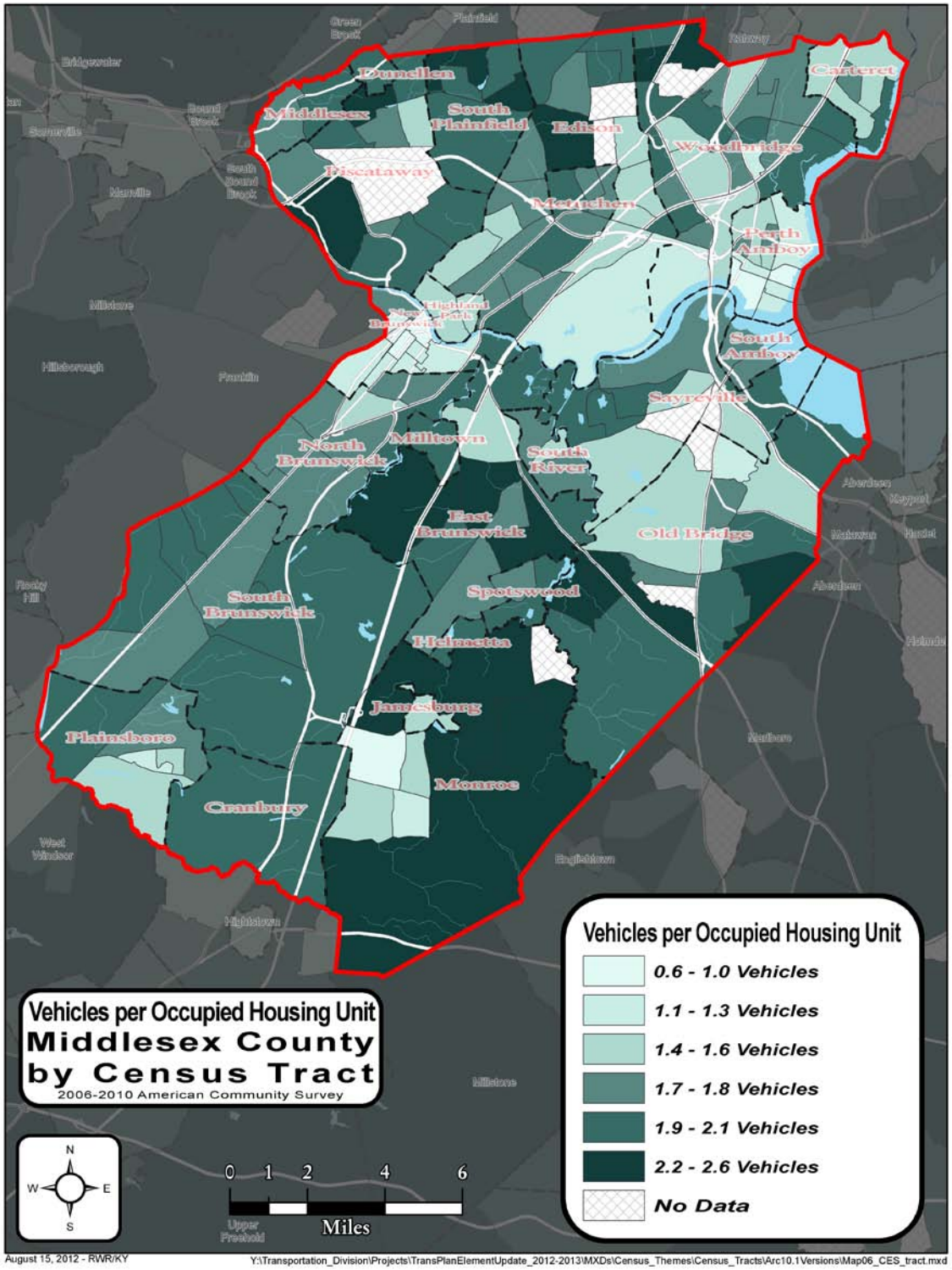
Map 2-15: Occupied Housing Units with no Vehicle Available
Central Subregion by Block Group (2006-2010)



Map 2-16: Occupied Housing Units with no Vehicle Available
South Subregion by Block Group (2006-2010)



Map 2-17: Vehicles per Occupied Housing Unit
Middlesex County by Census Tract (2006-2010)

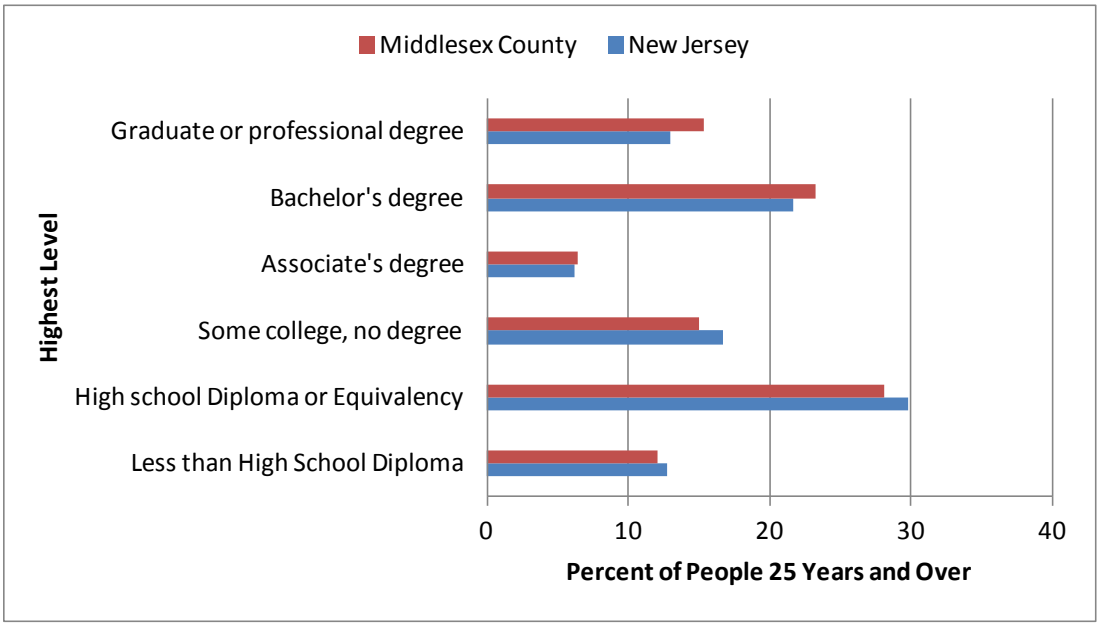


2.4 Social Characteristics

2.4.1 Educational Attainment

During 2006-2010, the U.S. Census estimated that 39% of residents 25 years and older in the County had achieved a Bachelor's degree or higher. This was slightly higher than the 35% for State. Conversely, about 28% of the people 25 years and older in the County had attained a high school diploma or equivalent as the highest level of education, which is less than the same figures reported at the state levels of 30%.

Figure 2—5: Educational Attainment (2006-2010)



Source: U.S. Census, 2006-2010 American Community Survey Estimates

2.4.2 Language

Among people at least five years old living in Middlesex County during 2006-2010, roughly 40% (over 295,000 people) spoke a language other than English at home. While there is a significant share of people who spoke a foreign language at home, there was also a single dominant foreign language spoken. Households with Spanish or Spanish Creole as the language spoken at home accounted for almost 37% of the total non-English speaking households. Gujarati and Chinese were also in the top three languages spoken at home by households in Middlesex County with 8.1% and 8.0% of the households speaking a language other than English, respectively.

Slightly more than 37,500 people in the County, or about 5% of the total population five years and over, reportedly spoke English "not well". Approximately 14,000 people did not speak English at all. The following two tables provide further details regarding language spoken at home and the ability to speak English.

Table 2—11: Language Spoken at Home, Middlesex County (2006-2010)

Language Spoken at Home, Middlesex County	Quantity	Percent
Total Population 5 years and over	748,180	100%
Speak only English	452,977	60.5%
Speak Language other than English:	295,203	39.5%
Spanish or Spanish Creole	108,846	14.5%
French (incl. Patois, Cajun)	2,151	0.3%
French Creole	1,026	0.1%
Italian	5,262	0.7%
Portuguese or Portuguese Creole	7,250	1.0%
German	1,971	0.3%
Yiddish	298	0.0%
Other West Germanic languages	333	0.0%
Scandinavian languages	242	0.0%
Greek	1,646	0.2%
Russian	7,170	1.0%
Polish	8,001	1.1%
Serbo Croatian	537	0.1%
Other Slavic languages	2,922	0.4%
Armenian	144	0.0%
Persian	718	0.1%
Gujarati	23,985	3.2%
Hindi	18,809	2.5%
Urdu	6,645	0.9%
Other Indic languages	16,688	2.2%
Other Indo European languages	1,958	0.3%
Chinese	23,708	3.2%
Japanese	983	0.1%
Korean	4,897	0.7%
Thai	200	0.0%
Vietnamese	2,428	0.3%
Other Asian languages	20,002	2.7%
Tagalog	11,209	1.5%
Other Pacific Island languages	820	0.1%
Other Native North American languages	70	0.0%
Hungarian	1,537	0.2%
Arabic	7,281	1.0%
Hebrew	1,664	0.2%
African languages	3,544	0.5%
Other and unspecified languages	258	0.0%

Source: U.S. Census, 2006-2010 American Community Survey Estimates

Table 2—12: Language Spoken at Home by Ability to Speak English, Middlesex County (2006-2010)

Language Spoken at Home by Ability to Speak English, Middlesex County	Quantity	Percent
Total Population 5 years and over:	748,180	100%
Speak only English	452,977	60.5%
Speak Spanish:	108,846	14.5%
Speak Spanish: - Speak English "very well"	56,639	7.6%
Speak Spanish: - Speak English "well"	22,025	2.9%
Speak Spanish: - Speak English "not well"	20,950	2.8%
Speak Spanish: - Speak English "not at all"	9,232	1.2%
Speak other Indo-European languages:	107,756	14.4%
Speak other Indo-European languages: - Speak English "very well"	71,820	9.6%
Speak other Indo-European languages: - Speak English "well"	22,822	3.1%
Speak other Indo-European languages: - Speak English "not well"	10,093	1.3%
Speak other Indo-European languages: - Speak English "not at all"	3,021	0.4%
Speak Asian and Pacific Island languages:	64,247	8.6%
Speak Asian and Pacific Island languages: - Speak English "very well"	40,096	5.4%
Speak Asian and Pacific Island languages: - Speak English "well"	16,695	2.2%
Speak Asian and Pacific Island languages: - Speak English "not well"	5,733	0.8%
Speak Asian and Pacific Island languages: - Speak English "not at all"	1,723	0.2%
Speak other languages:	14,354	1.9%
Speak other languages: - Speak English "very well"	10,018	1.3%
Speak other languages: - Speak English "well"	3,119	0.4%
Speak other languages: - Speak English "not well"	1,080	0.1%
Speak other languages: - Speak English "not at all"	137	0.0%

Source: U.S. Census, 2006-2010 American Community Survey Estimates

2.5 Economic Characteristics

2.5.1 Household Income

The median household income for Middlesex County during 2006-2010 was $77,615, which was just above the New Jersey median of $69,811 for the same period. It was 11% greater than the state's median income, exceeding it by nearly $7,800. Out of the 25 municipalities within the county, 15 had median household incomes higher than the County and 10 municipalities below the county median. Median household incomes of the municipalities of Middlesex County were mostly higher than the statewide median household income, with 19 municipalities higher than the statewide median and only 6 below the statewide median.

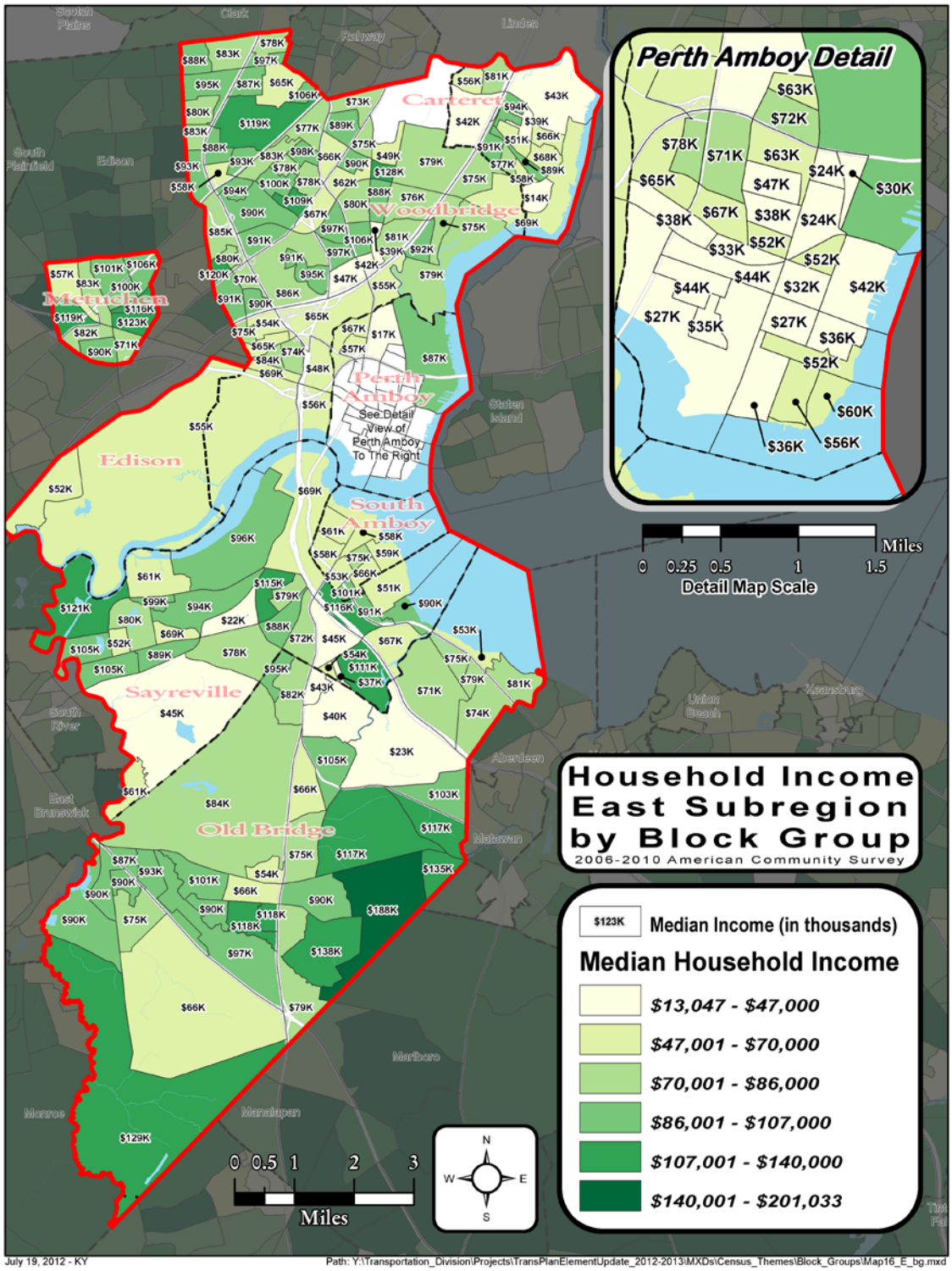
Table 2—13: Median Household Income, New Jersey, Middlesex County and Municipalities (2006-2010)

Geography	Median household Income (dollars)	County Subregion
New Jersey	$69,811	not applicable
Middlesex County	$77,615	not applicable
Carteret	$58,614	East
Cranbury	$131,667	South
Dunellen	$74,375	Central
East Brunswick	$100,655	Central
Edison	$86,725	Central
Helmetta	$80,690	Central
Highland Park	$78,821	Central
Jamesburg	$52,169	South
Metuchen	$94,410	East
Middlesex	$80,338	Central
Milltown	$89,457	Central
Monroe	$74,202	South
New Brunswick	$44,543	Central
North Brunswick	$78,469	Central
Old Bridge	$82,640	East
Perth Amboy	$47,696	East
Piscataway	$88,428	Central
Plainsboro	$86,986	South
Sayreville	$71,808	East
South Amboy	$61,566	East
South Brunswick	$100,950	South
South Plainfield	$92,263	Central
South River	$62,284	Central
Spotswood	$70,360	Central
Woodbridge	$79,277	East

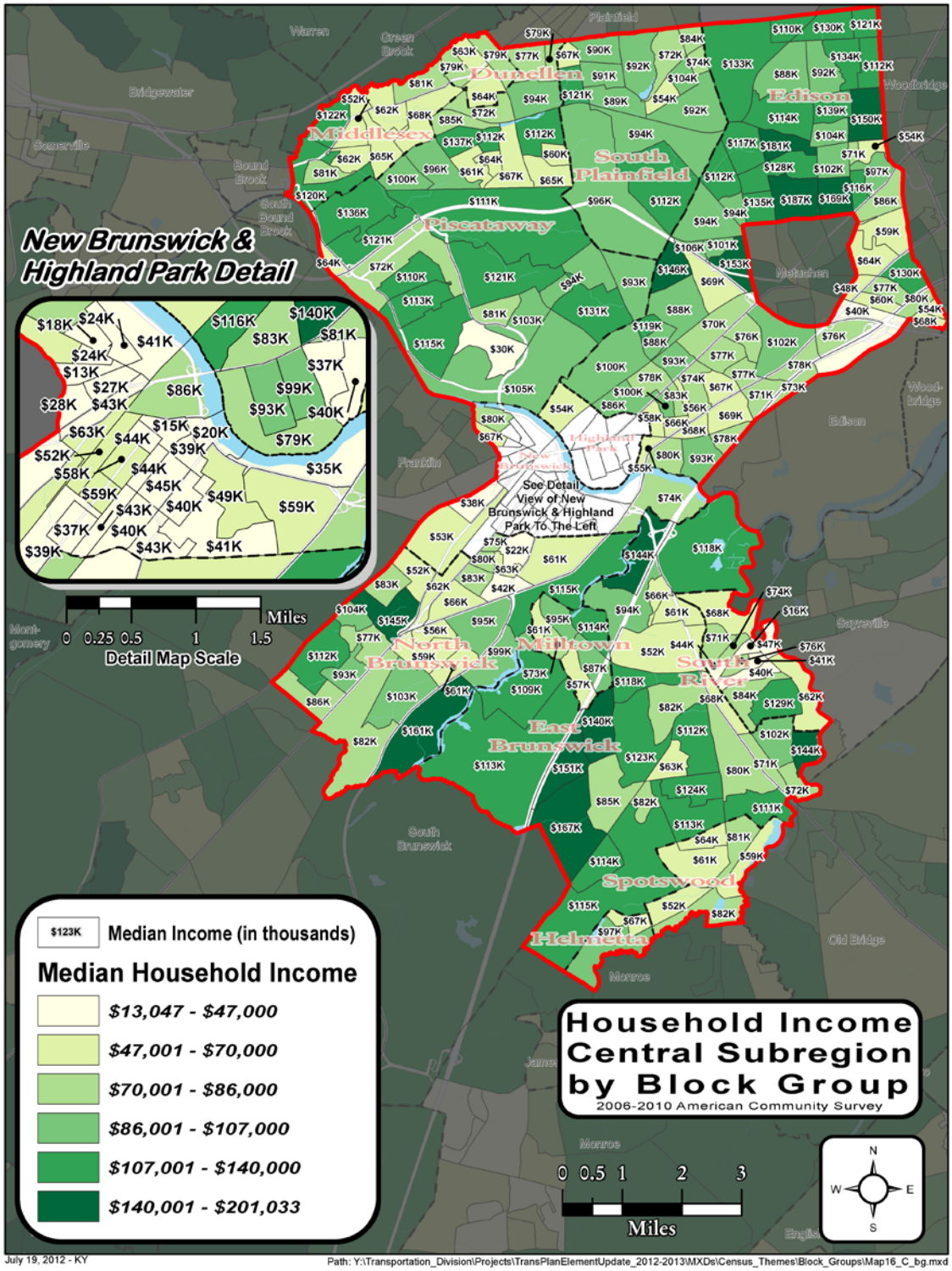
Source: U.S. Census, 2006-2010 American Community Survey Estimates

The following maps illustrate median household income by block group within each of the subregions of Middlesex County during 2006-2010.

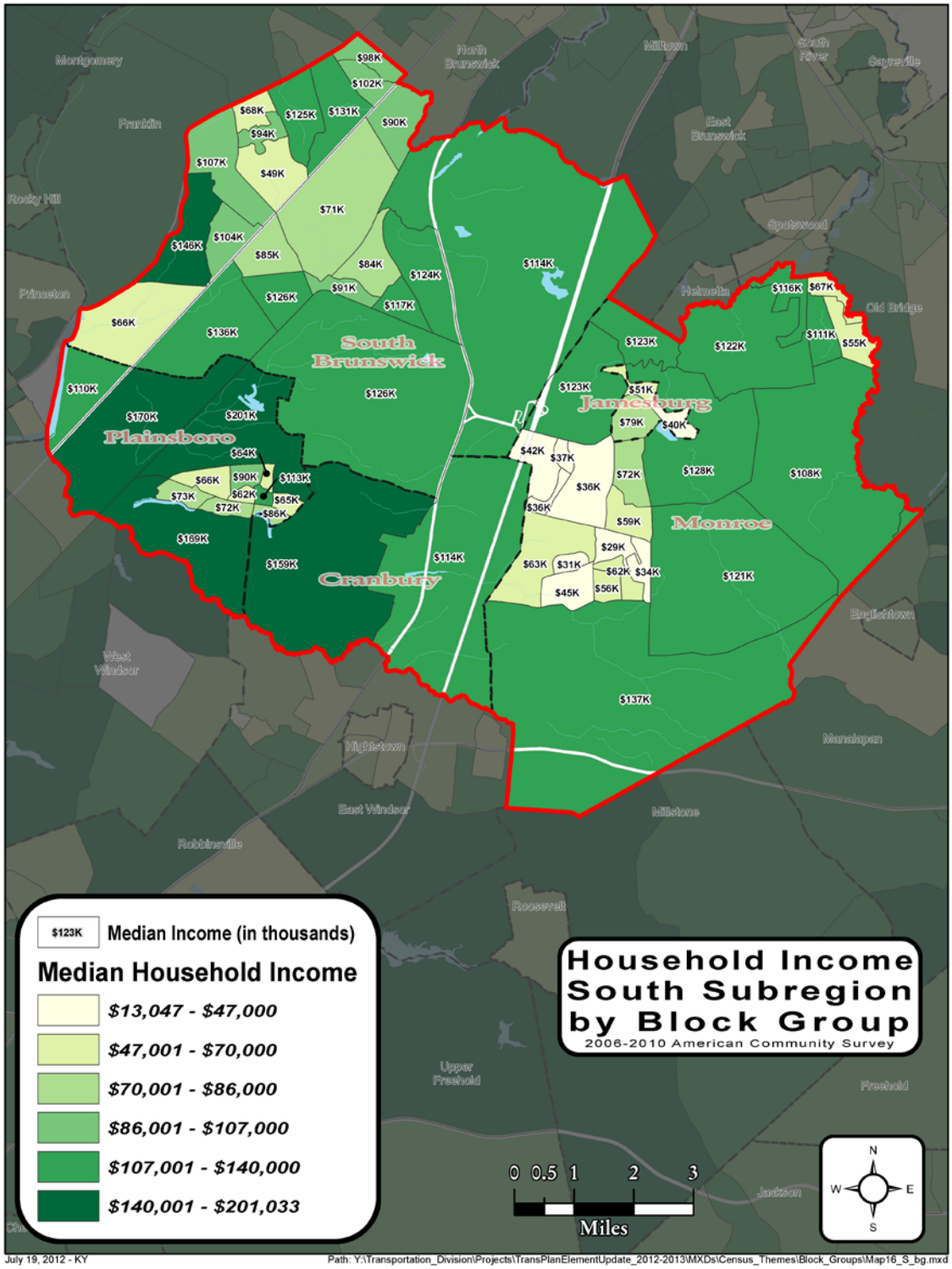
Map 2-18: Median Household Income
East Subregion by Block Group (2006-2010)



Map 2-19: Median Household Income
Central Subregion by Block Group (2006-2010)



Map 2-20: Median Household Income
South Subregion by Block Group (2006-2010)



2.5.2 Labor Force

During 2006-2010, the total labor force in Middlesex County was over 426,000 people. The unemployment rate of 7.1% in the County was better than the state rate of 7.8%. With unemployment at 7.7%, the Central Subregion was on par with state unemployment, while both the South and East subregions were below State levels with 5.8% and 6.9 % respectively.

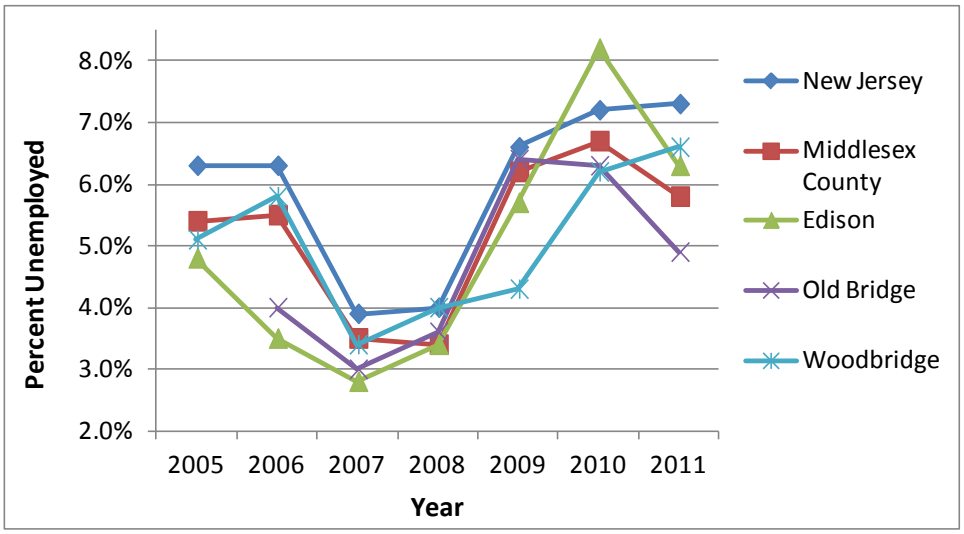
Table 2—14: Total Labor Force (2006-2010)

Employment Status	East	Central	South	Middlesex County	New Jersey
Population 16 years and over	238,027	310,240	88,215	636,482	6,893,087
In labor force	159,784	210,157	56,474	426,415	4,596,702
Civilian labor force	159,749	209,984	56,412	426,145	4,587,250
Employed	148,691	193,889	53,122	395,702	4,230,560
Unemployed	11,058	16,095	3,290	30,443	356,690
Armed Forces	35	173	62	270	9,452
Not in labor force	78,243	100,083	31,741	210,067	2,296,385
Percent Unemployed	6.9%	7.7%	5.8%	7.1%	7.8%

Source: U.S. Census, 2006-2010 American Community Survey Estimates

During the individual years between 2006 and 2010, there was a economic boom followed by a recession that caused widespread shifts in unemployment that are not represented in the 2006-2010 ACS five-year average estimates presented above. Figure 2—6 illustrates the turbulent nature of unemployment rates of New Jersey, Middlesex County and certain towns within Middlesex County from 2005 to 2011. This graph better illustrates the trends in unemployment rates.

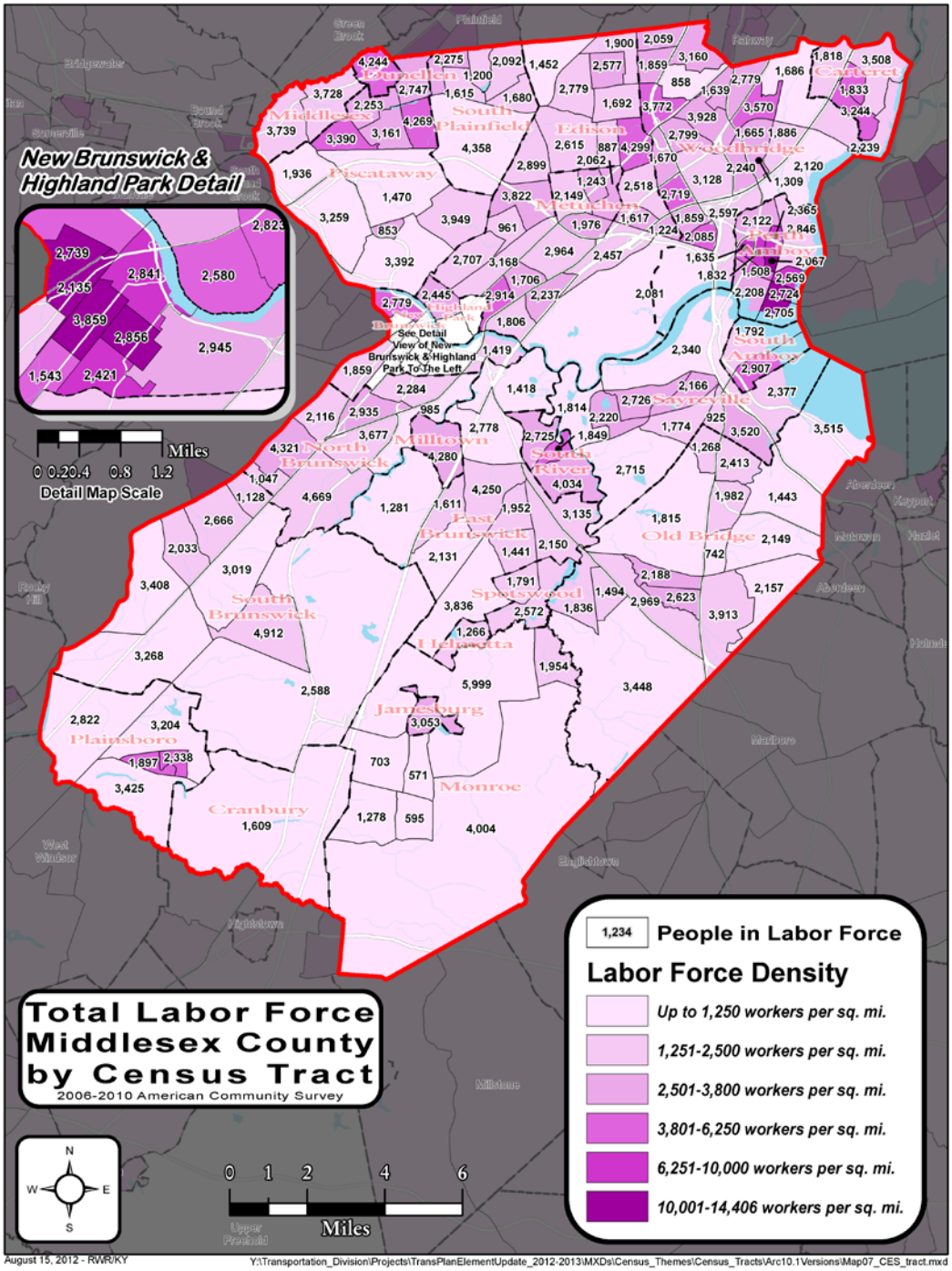
Figure 2—6: Comparative Unemployment Trends, 2005 to 2011



Source: U.S. Census, 2006-2010 American Community Survey Estimates; unemployment rates are not available for any other municipalities in Middlesex County because the number of sample cases is too small or the population is less than the population threshold; this is why there is no data for Old Bridge at year 2005

The following map illustrates where the labor force is most densely concentrated within the County. These areas coincide with the most densely populated areas.

Map 2-21: Total Labor Force & Labor Force Density: Middlesex County by Census Tract (2006-2010)

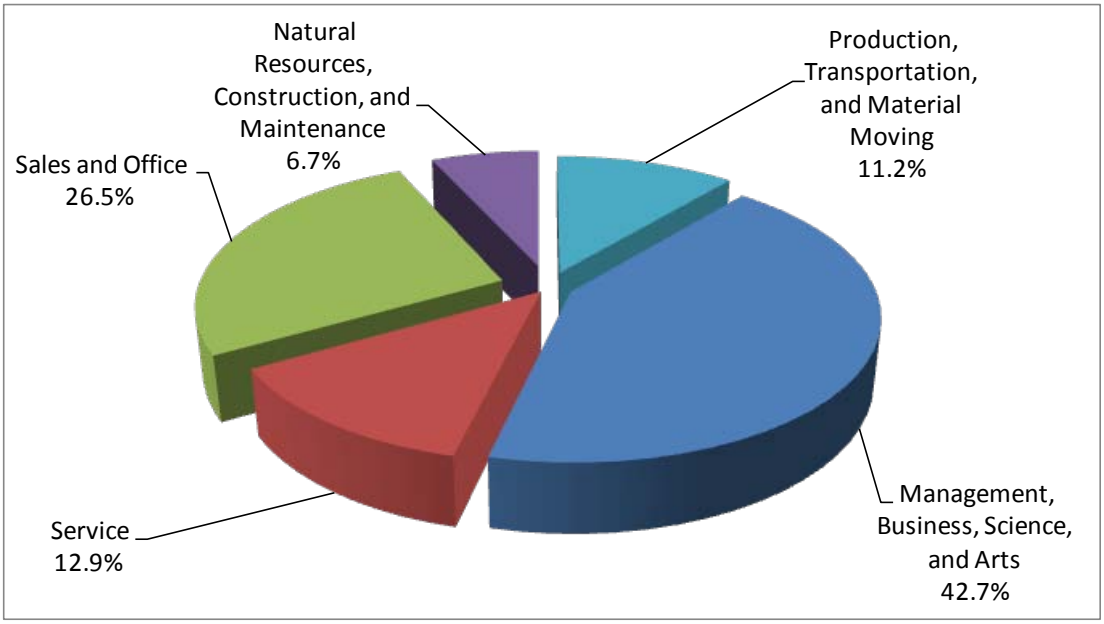


2.5.3 Occupations

During 2006-2010, most of the employed labor force of Middlesex County worked in the occupation category of "Management, Business, Science and Arts". The two largest occupation categories "Management, Business, Science and Arts" and "Sales and Office", combined, accounted for almost 70% of the total working population in Middlesex County with more than 270,000 people employed in these two occupation categories.

Figure 2—7: Occupations of Middlesex County Residents (2006-2010)

Total Employed Population 16 years and over: 395,702



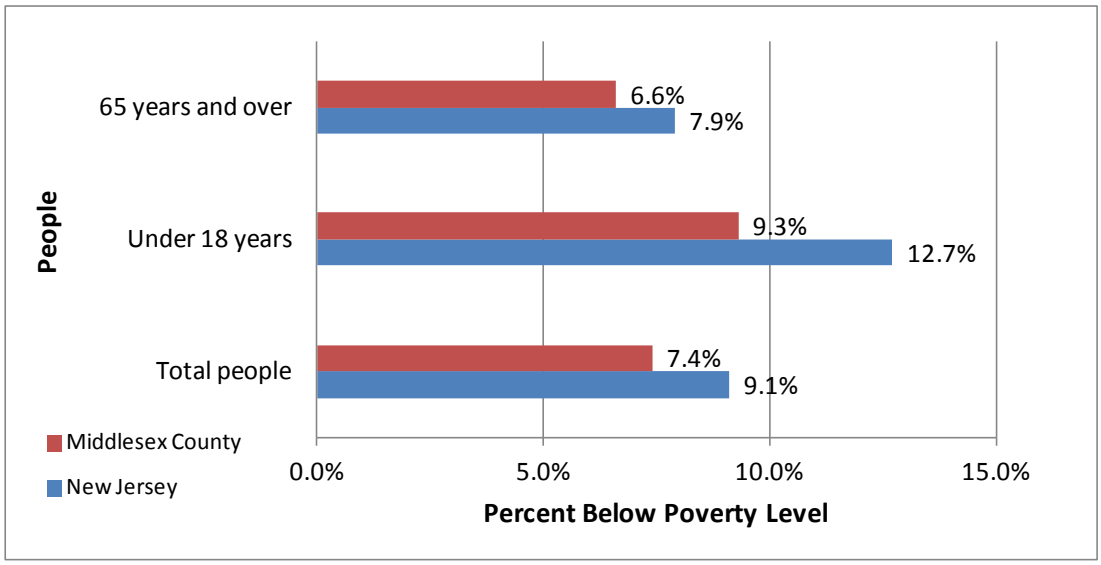
Source: U.S. Census, 2006-2010 American Community Survey Estimates

2.5.4 Poverty Rates

1. *Total Population Living Below Poverty Level*

During 2006-2010, the poverty rate for the population living in Middlesex County was 7.4%, which was lower than state rate of 9.1%. Over 9% of people under the age of 18 were below the poverty level. In Middlesex County more than 6% of seniors (65+) were reported as living below the poverty level. New Brunswick had the highest incidence of total people living below the poverty level at almost 26% of the total population.

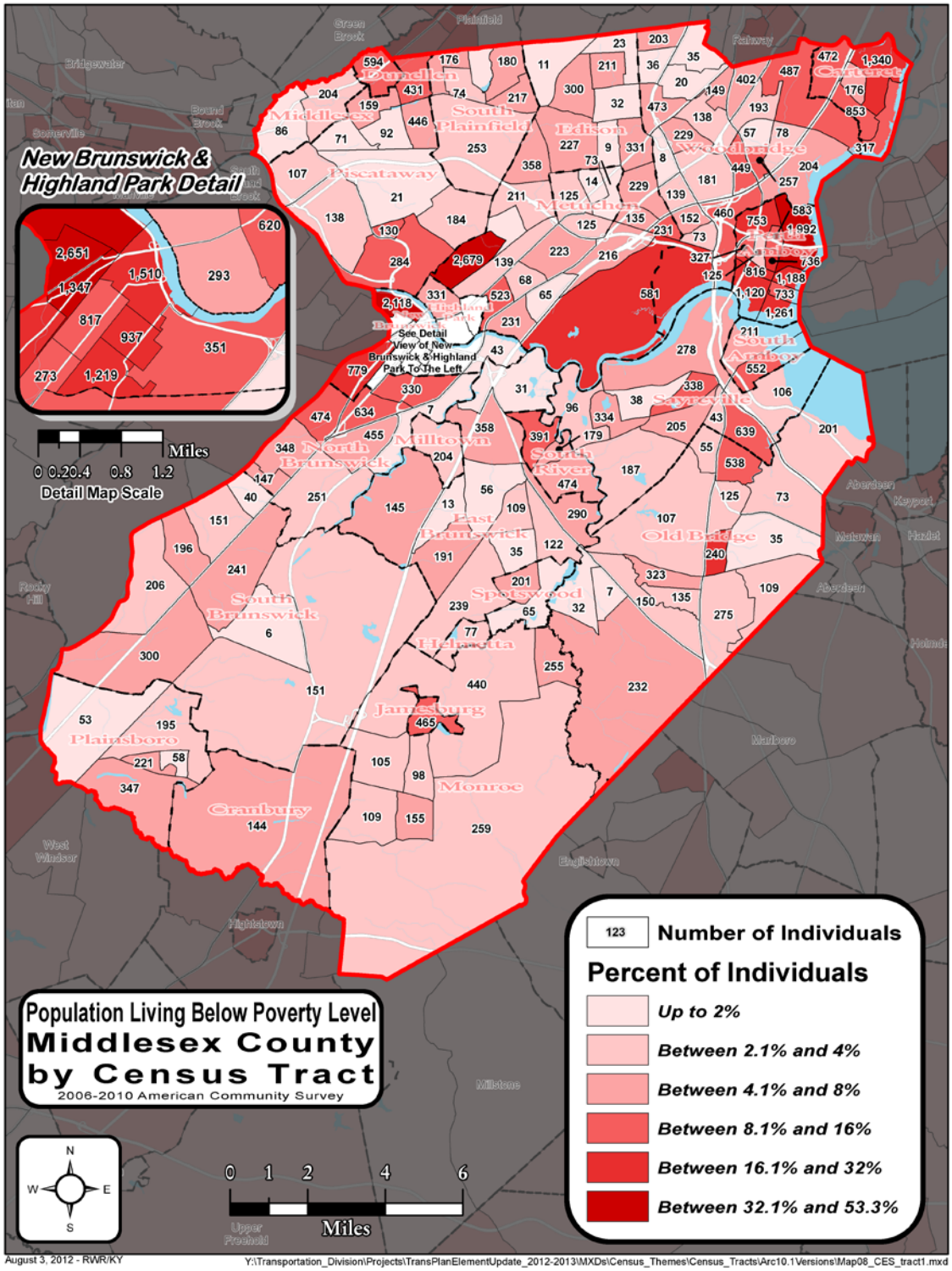
Figure 2—8: Poverty Rates for People in Middlesex County and New Jersey (2006-2010)



Source: U.S. Census, 2006-2010 American Community Survey Estimates

The following map highlights the areas of Middlesex County where the highest incidence of individuals living below poverty level occurred. The map also illustrates that a significant portion of Middlesex County exhibited poverty rates that were lower than both county and state. However, in some areas, rates for individuals living below poverty level were higher than 16% and as high as 53%, substantially higher than the county and state poverty rates.

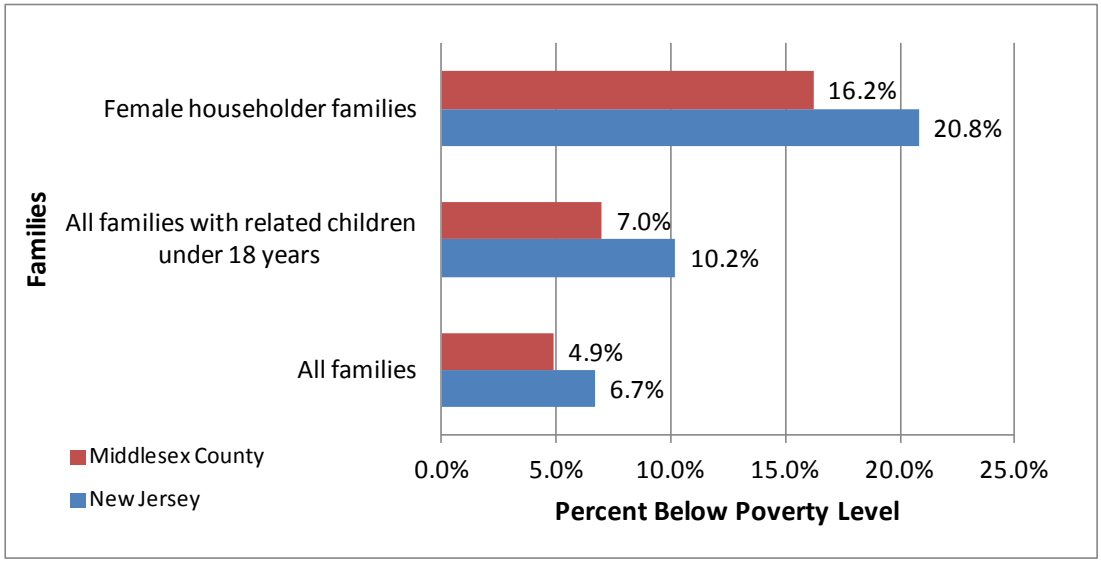
Map 2-22: Population Living Below Poverty Level
Middlesex County by Census Tract (2006-2010)



2. Family Households with an Income Below Poverty Level

The family poverty rates for Middlesex County were less than 5%, which was lower than the poverty rate for all families in New Jersey (6.7%). Among families with a female householder and no husband present, the County's poverty rate (16.2%) was also less than the statewide poverty rate (20.8%).

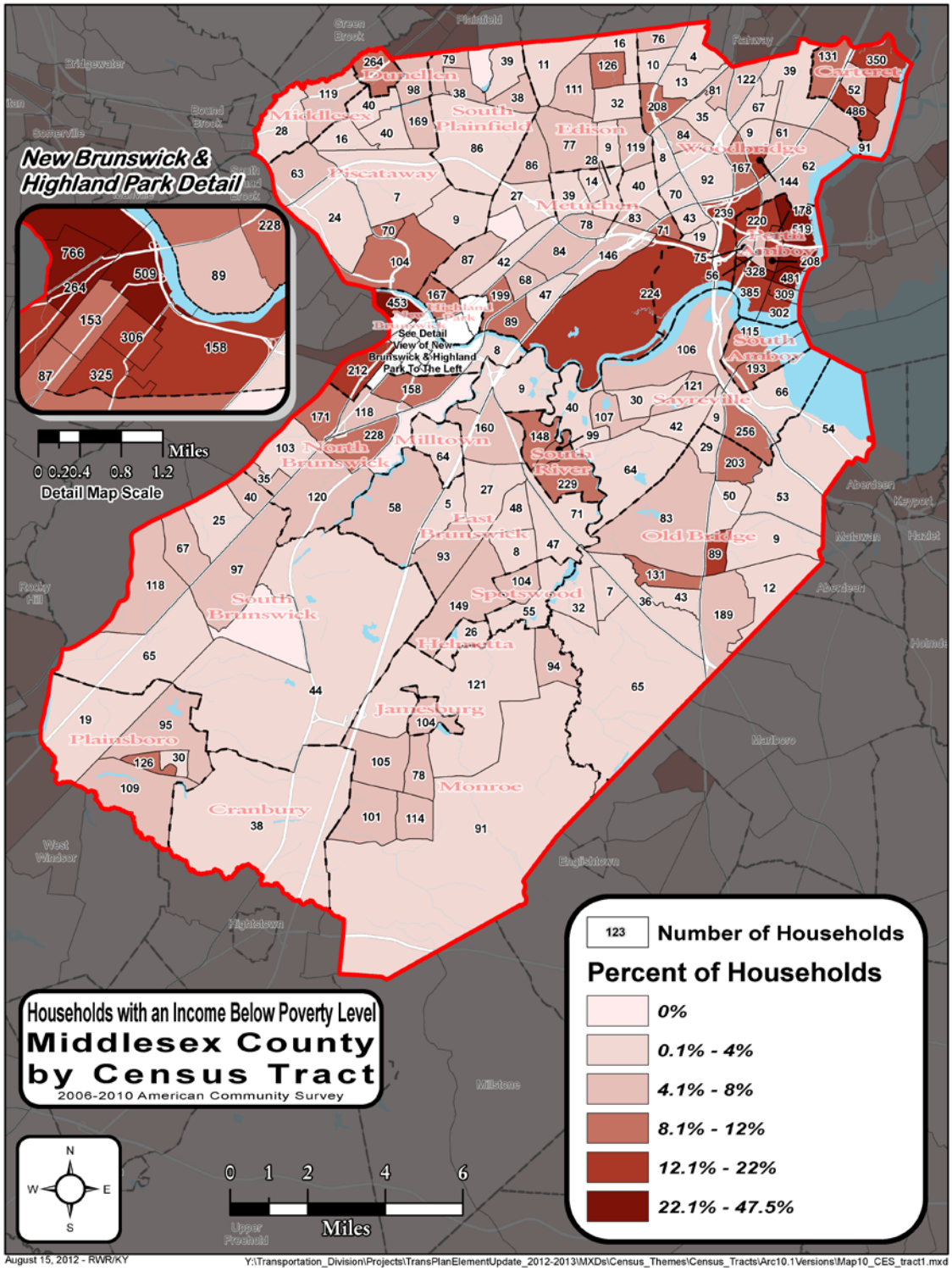
Figure 2—9: Poverty Rates for Families in Middlesex County and New Jersey (2006-2010)



Source: U.S. Census, 2006-2010 American Community Survey Estimates

The following map of households with an income below poverty level (Map 2-23) closely resembles the map of population living below poverty level (Map 2-22). Similar to the poverty rates of individuals within the county, the rates of households with an income below poverty level in many areas of the county are lower than the overall rate of the county and the state; however, there are areas that experience poverty rates that greatly exceeded the county and state rates.

Map 2-23: Households with an Income below Poverty Level
Middlesex County by Census Tract (2006-2010)



Chapter Three: Work Commute Travel Behavior and Employment Characteristics

This section of the report uses work commute travel behavior data to identify patterns that help provide insight for potential public transportation enhancements throughout Middlesex County. First, this section looks at the origins and destinations of workers who live in the County and juxtaposes them with origins and destinations of workers commuting to jobs within the County. The next section focuses on mode share for the journey to work, juxtaposing how workers commute to and from employment centers within the County. It then observes how the mode share estimates have changed over time among three different datasets. The final section of this chapter analyzes employment characteristics for workers employed in the County and for the resident labor force. This section describes primary industries in which people living and working in the Study area are employed.

This chapter draws upon a combination of data sources, including 2006-2010 American Community Survey (ACS) 5-year estimates, the 2010 Census, and Longitudinal Employer-Household Dynamics (LEHD), all of which are data from the Census Bureau. The ACS five-year estimates average characteristics 2006-2010 survey-period. The LEHD data, unlike ACS five-year average estimates, represents state labor data for jobs covered under the respective state's unemployment insurance system. The state assigns place of employment information and the Census Bureau assigns place of residence. The 2010 LEHD data[1] that was queried for this report analyzed primary jobs, which are defined as the job that provides the most earnings for each worker. In essence, this "one job per worker" analysis shows the number of employed people in the labor force and the corresponding primary commute patterns of the employed labor force. One important consideration regarding the use of this data is that LEHD may represent only the primary address of the employer, which may not capture the actual origin or destination of each and every work trip (e.g. employees in satellite offices or workers at a construction site).

[1] All data downloaded from the LEHD OnTheMap Origin-Destination Database for year 2010 represents employment at the beginning of the second quarter of 2010.

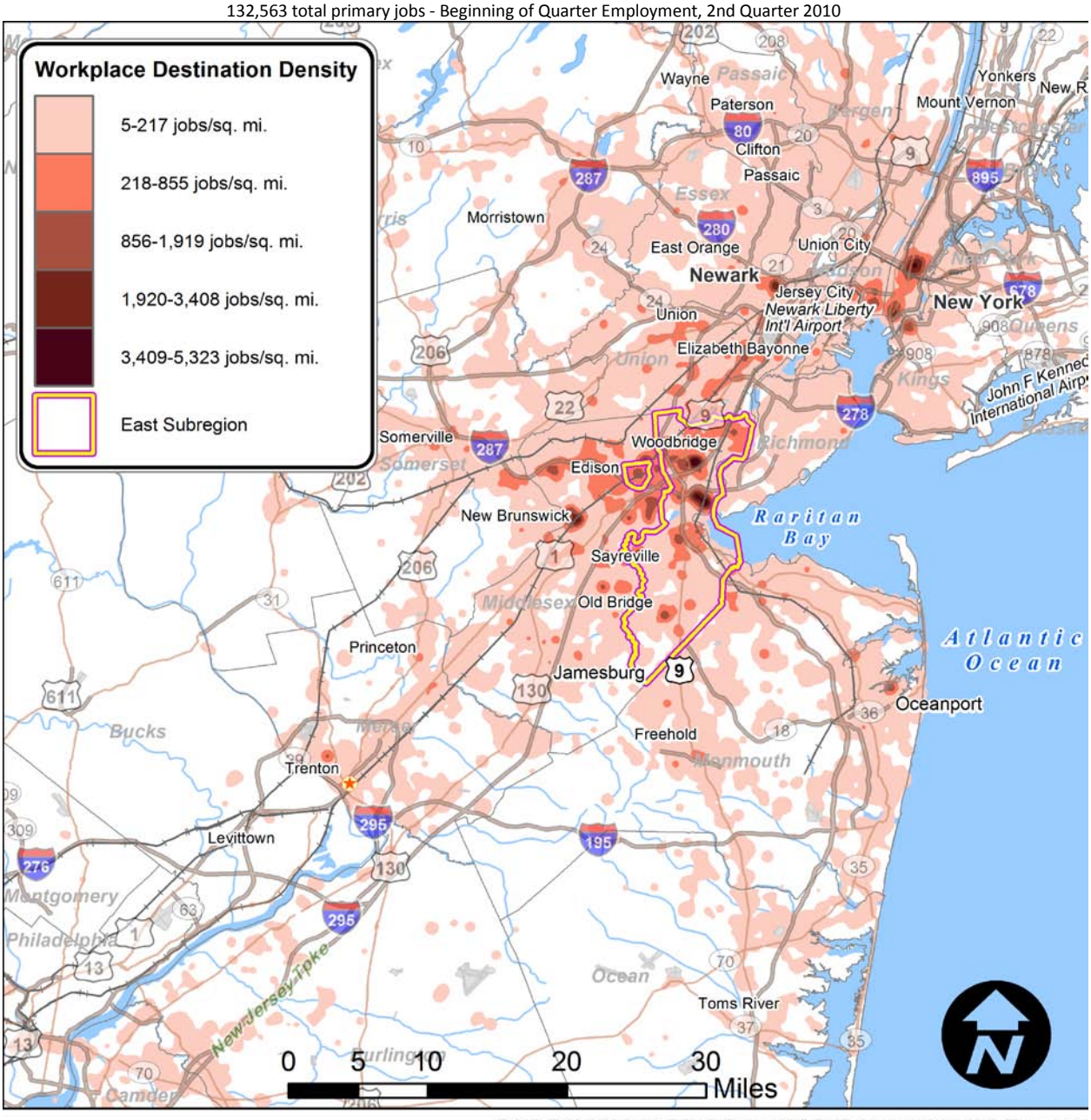
The inherent limitation with each of these datasets is that the travel behavior data is confined to the limited scope of commute trips. Essentially, they point to travel between a person's place of residence and their place of work, which captures only an approximately 16% share of all trips in Middlesex County, according to the most recent 2010/2011 Regional Household Travel Survey (RHTS) jointly conducted by NJTPA and NYMTC. Other trip purpose categories, such as "other home-based trips" (e.g., shopping and social/recreation trips) and "other non-home/non-work trips", account for much larger shares of the total trips, 53% and 21%, respectively.

3.1 Commute Shed Analysis (CSA)

A Commute Shed Analysis (CSA) illustrates where workers who live in a particular study area are employed. As of 2010, there were 348,481 total primary jobs held by Middlesex County residents. The following maps graphically depict the relative land area density (jobs per square mile) of the employment locations where residents were commuting to by subregion in 2010.

Map 3-1: Where Residents in the East Subregion Commute to Work (2010)

132,563 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010

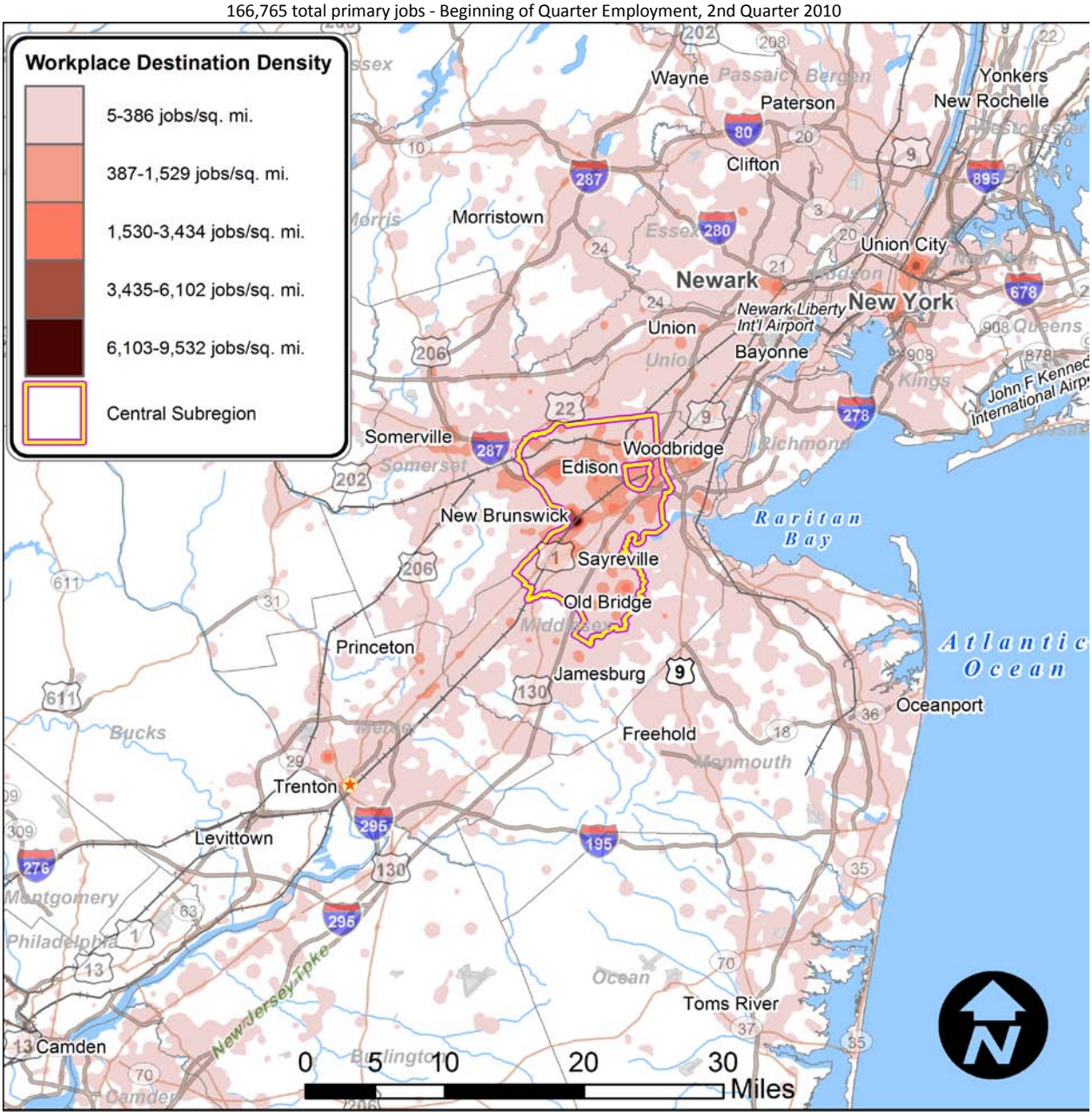


T:\SSP_FY2012-2013_NewTrPln\OnTheMap\MXD\EAST_Commute_Shed_2010_Thermal.mxd

Source: US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

Map 3-2: Where Residents in the Central Subregion Commute to Work (2010)

166,765 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010

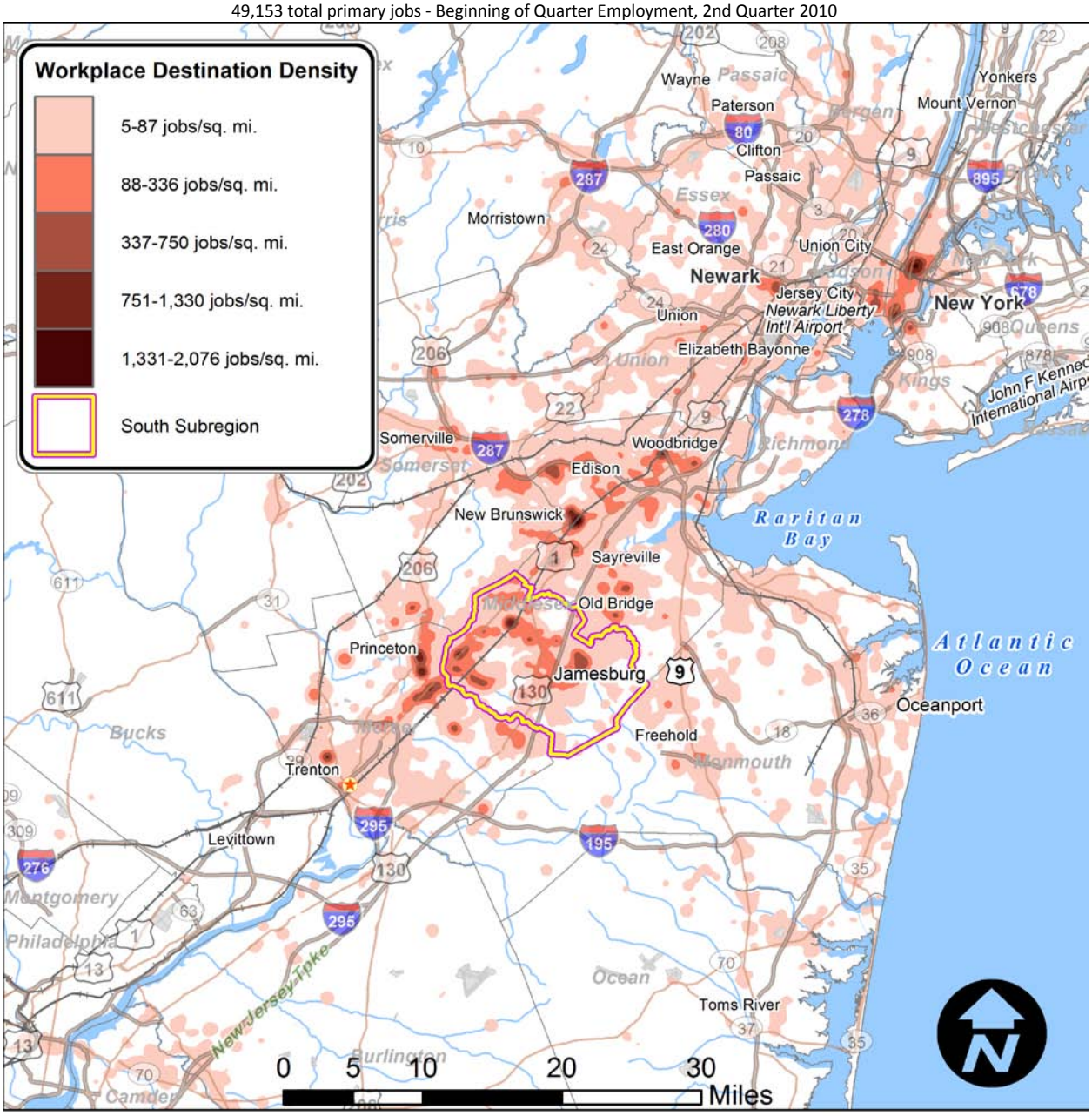


T:\SSP_FY2012-2013_NewTrPln\OnTheMap\MXD\CENTRAL_Commute_Shed_2010_Thermal.mxd

Source: US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

Map 3-3: Where Residents in the South Subregion Commute to Work (2010)

49,153 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



T:\SSP_FY2012-2013_NewTrPln\OnTheMap\MXD\SOUTH_Commute_Shed_2010_Thermal.mxd

Source: US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

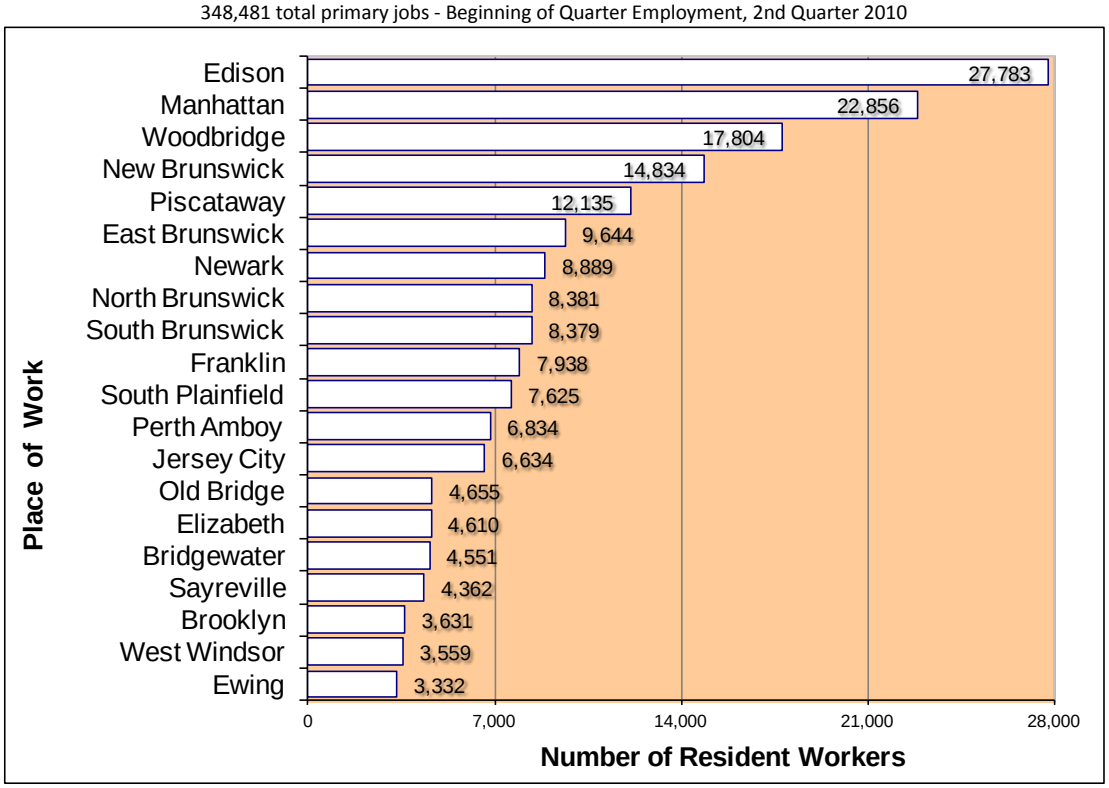
The top 20 primary workplace destinations of employed persons living in the County (by municipality as shown in Figure 3—1) accounted for 58.6% of the total primary jobs. Edison was the top municipal workplace destination for residents of Middlesex County, at 8.0%. Manhattan was second with 6.6%, and Woodbridge was third with 5.1% of the employed labor force. Other popular workplace destinations included Jersey City, NJ, Newark, NJ, and Brooklyn, NY, all of which are at least 15 miles by car. Points north of Middlesex County aggregated together, including Manhattan, accounted for more than 42% of the total workplace destinations. Altogether 41.7% percent of primary workplace destinations were actually within the municipalities of Middlesex County. New Brunswick, Piscataway and East Brunswick were also popular workplace destinations.

Of the total 348,481 primary jobs that Middlesex County residents held during the second quarter of 2010, the top ten counties, ranked in Figure 3—2, accounted for 89% of the primary workplace destinations. More than 58% of the primary jobs held by County residents were located outside of Middlesex County.

Similar patterns of workplace destinations were evident in the three county subregions. In all three subregions (Central, East and South), Edison and Manhattan were consistently two of the top three workplace destinations. New Brunswick, Woodbridge and South Brunswick were included as the other municipalities in the top three destinations for the subregions, respectively. In a similar manner, all three subregions of Middlesex County have Middlesex County as the top county of workplace destination.

Figure 3—1: Top 20 Workplace Destinations of Middlesex County Residents, by Municipality (2010)

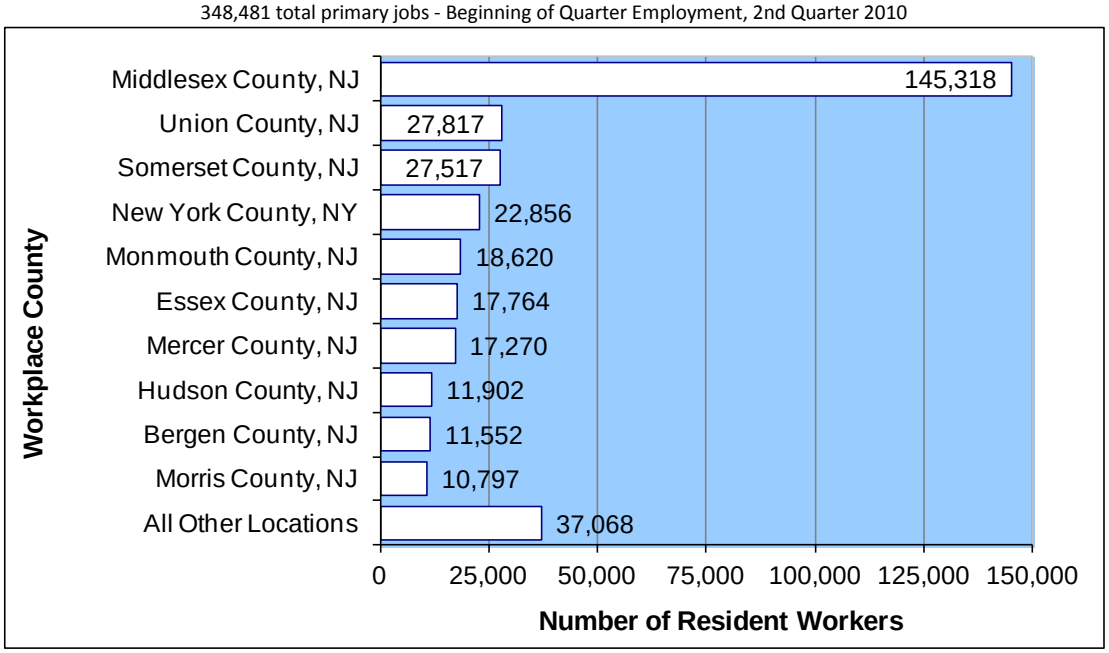
348,481 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



Source: US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

Figure 3—2: Top 10 Counties where Middlesex County Residents Worked (2010)

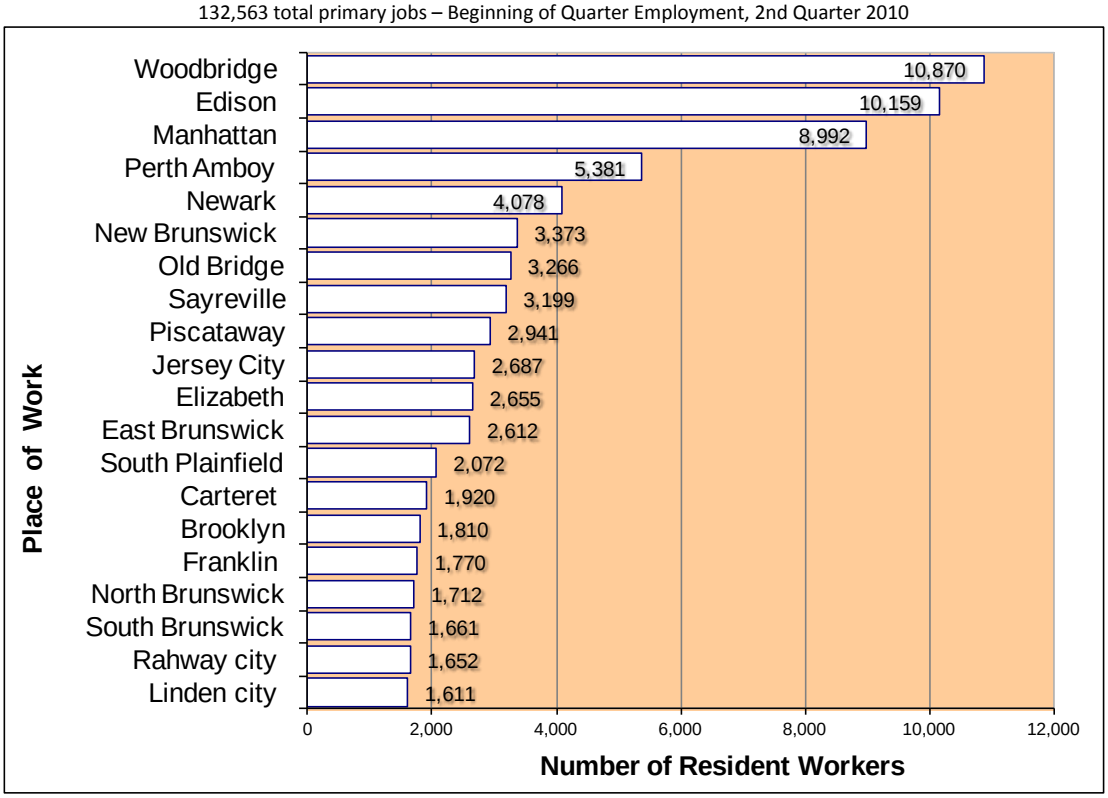
348,481 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



Source: US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

Figure 3—3: Top 20 Workplace Destinations of East Subregion Residents, by Municipality (2010)

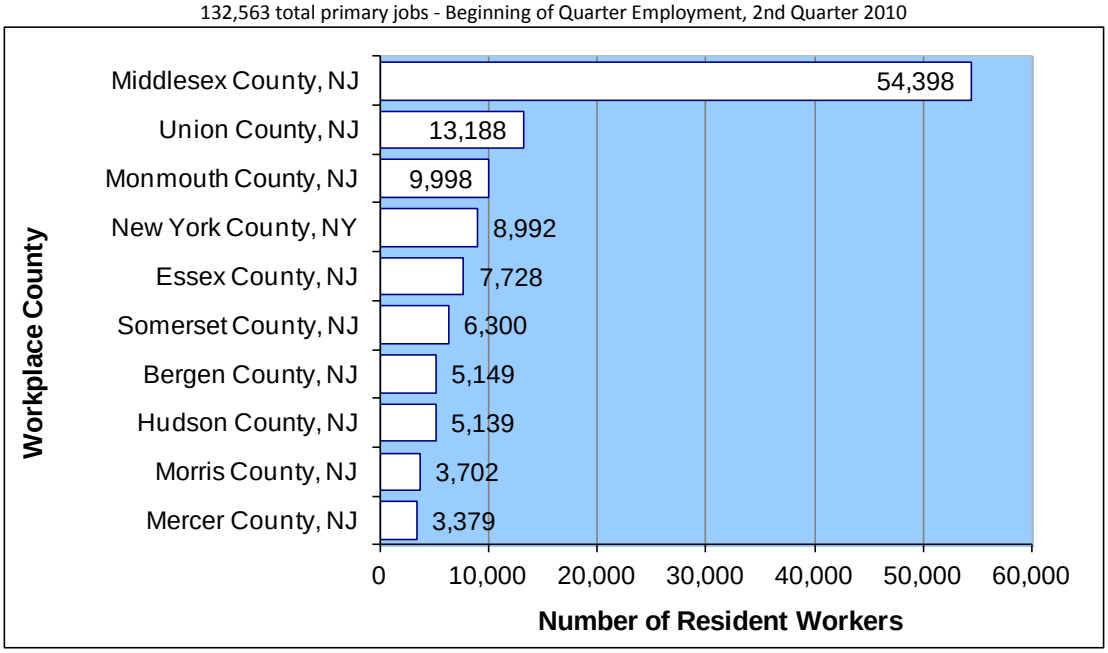
132,563 total primary jobs – Beginning of Quarter Employment, 2nd Quarter 2010



Source: US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

Figure 3—4: Top 10 Counties where East Subregion Area Residents Worked (2010)

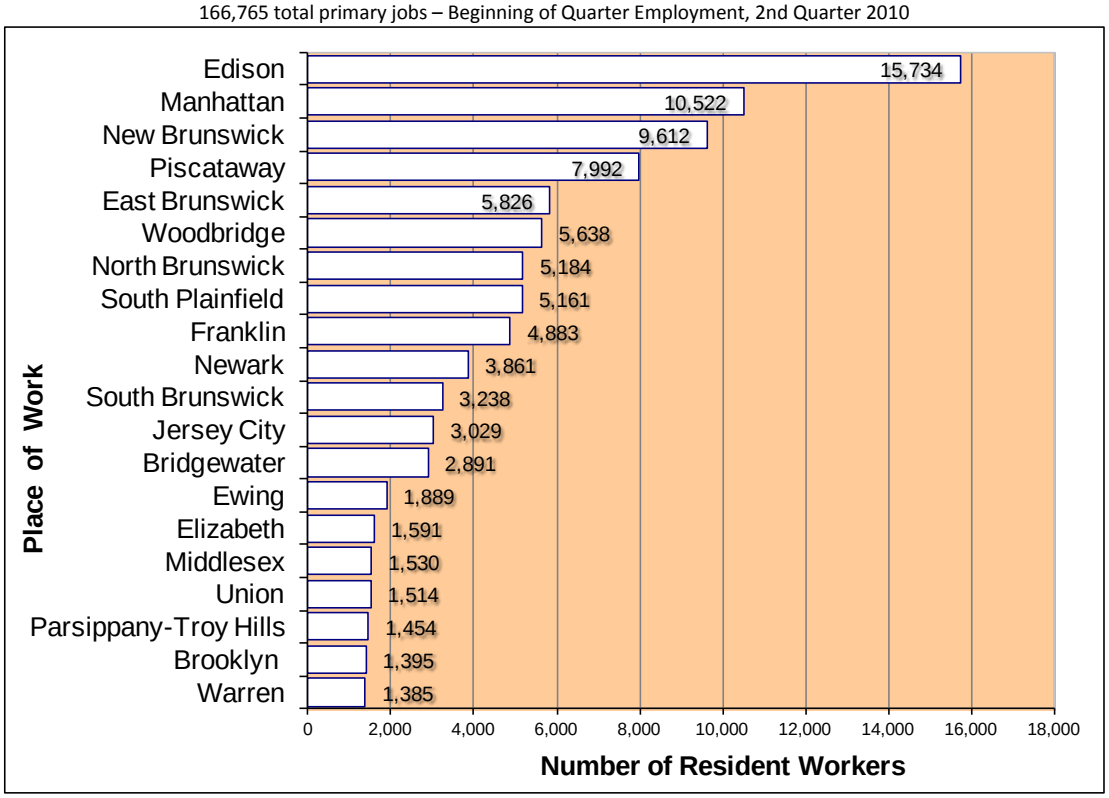
132,563 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



Source: US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

Figure 3—5: Top 20 Workplace Destinations of Central Subregion Residents, by Municipality (2010)

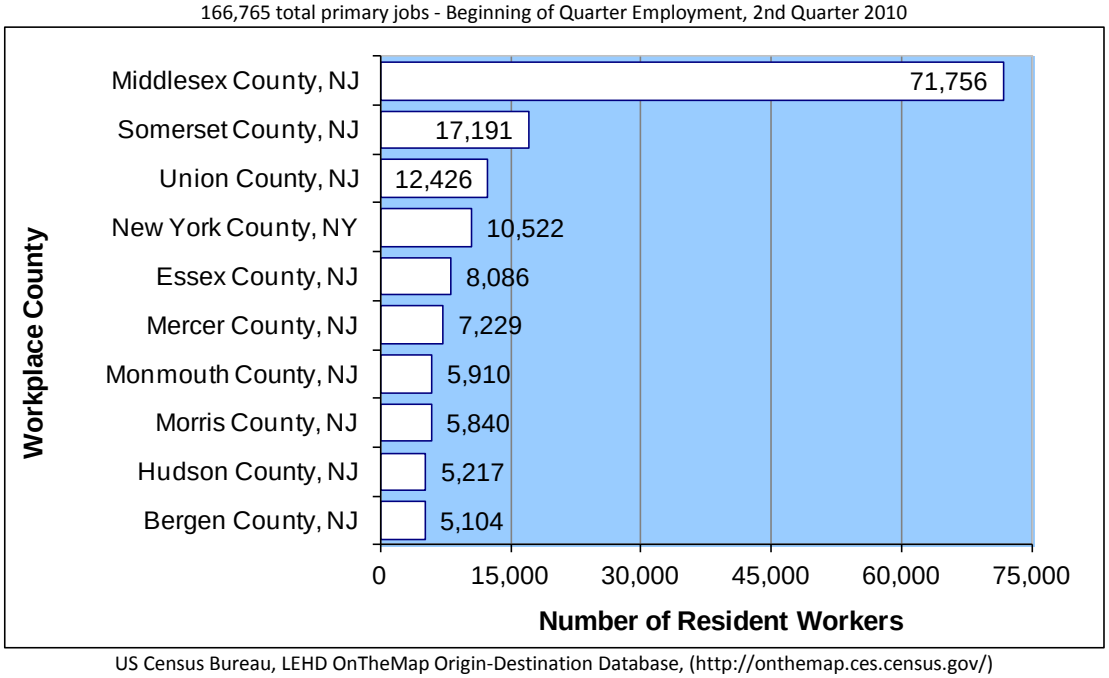
166,765 total primary jobs – Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

Figure 3—6: Top 10 Counties where Central Subregion Area Residents Worked (2010)

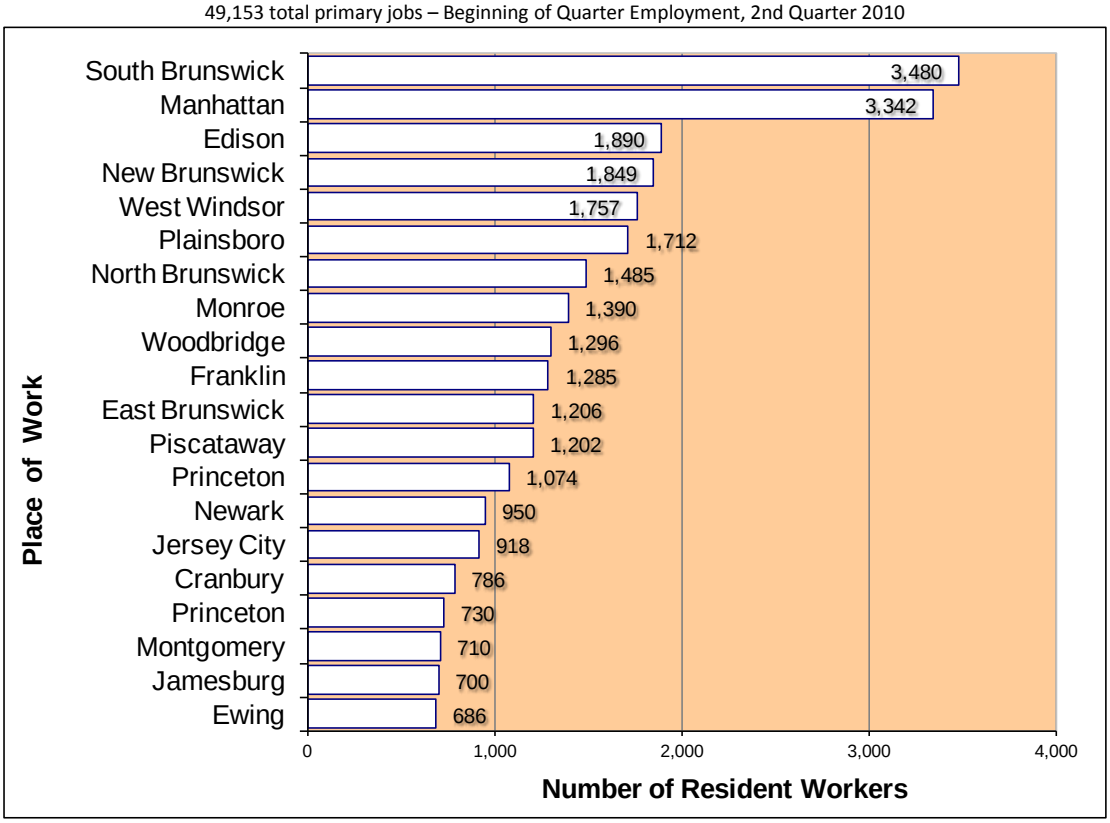
166,765 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

Figure 3—7: Top 20 Workplace Destinations of South Subregion Residents, by Municipality (2010)

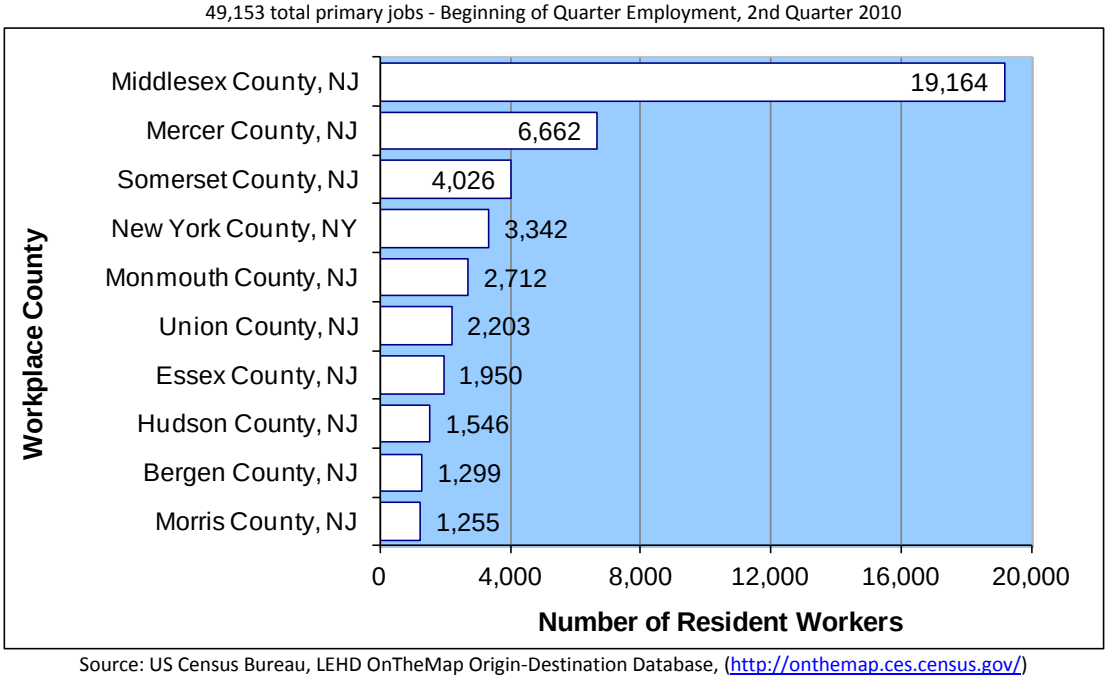
49,153 total primary jobs – Beginning of Quarter Employment, 2nd Quarter 2010



Source: US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

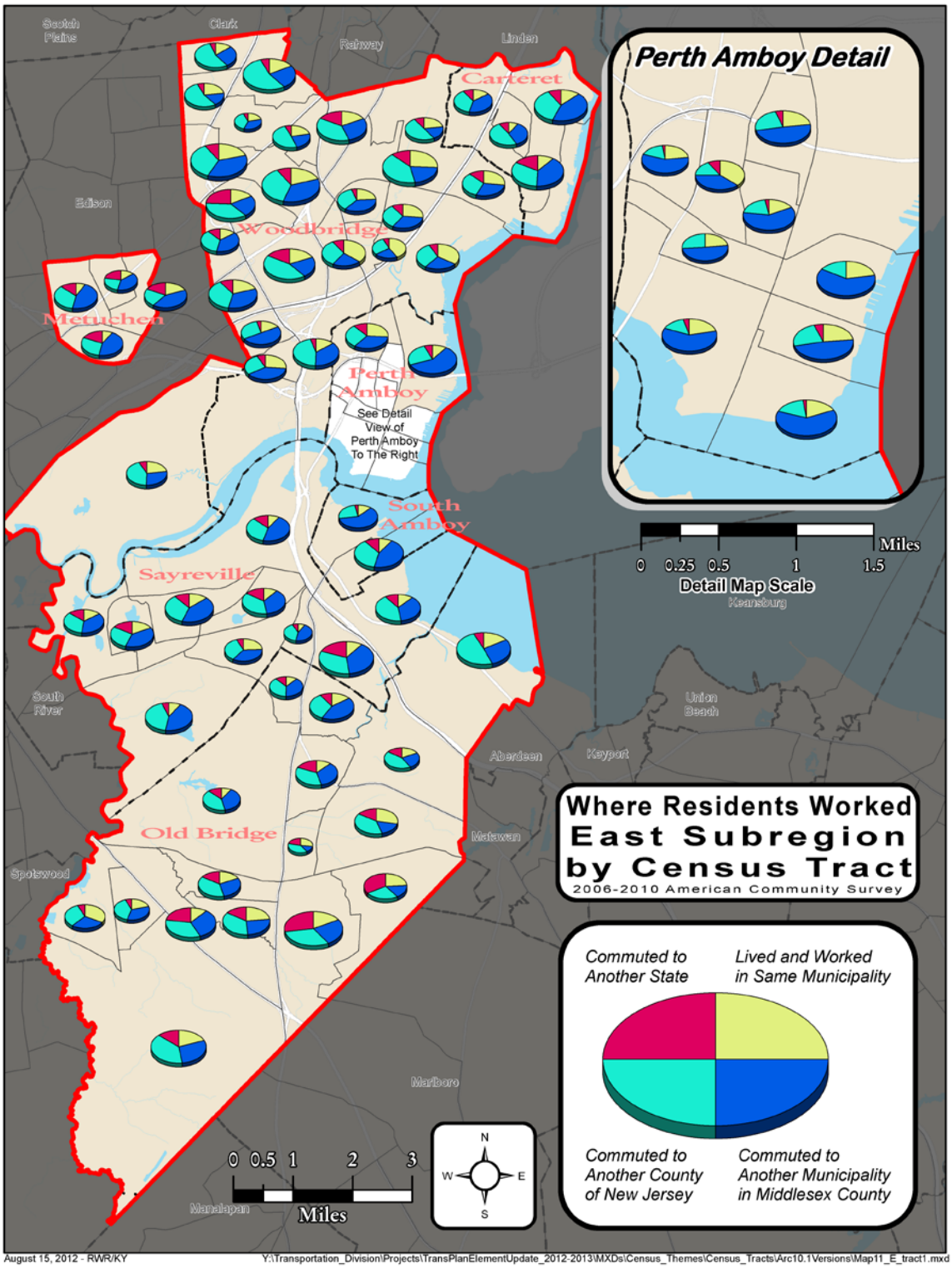
Figure 3—8: Top 10 Counties where Southern Subregion Area Residents Worked (2010)

49,153 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010

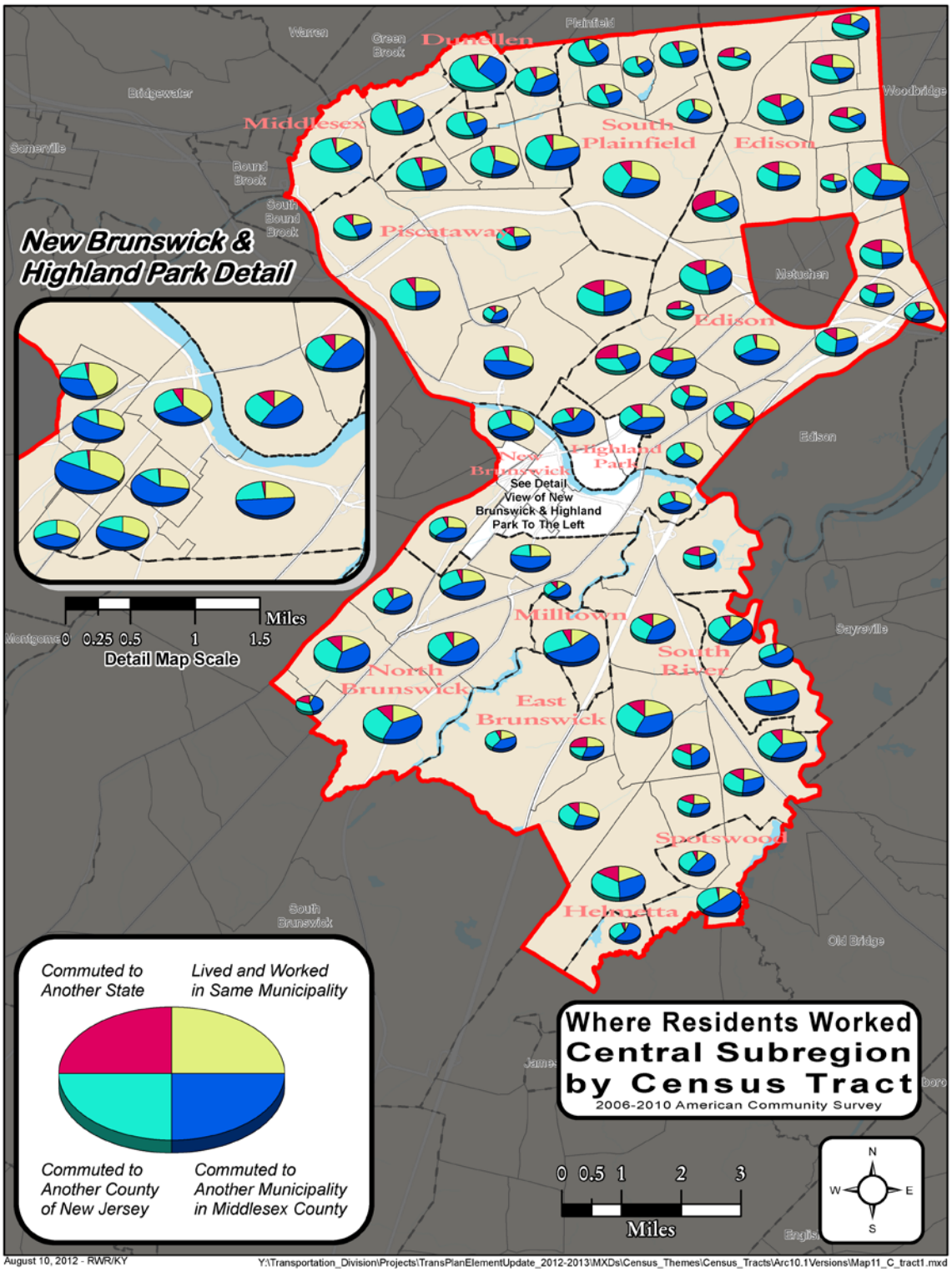


Source: US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov/)

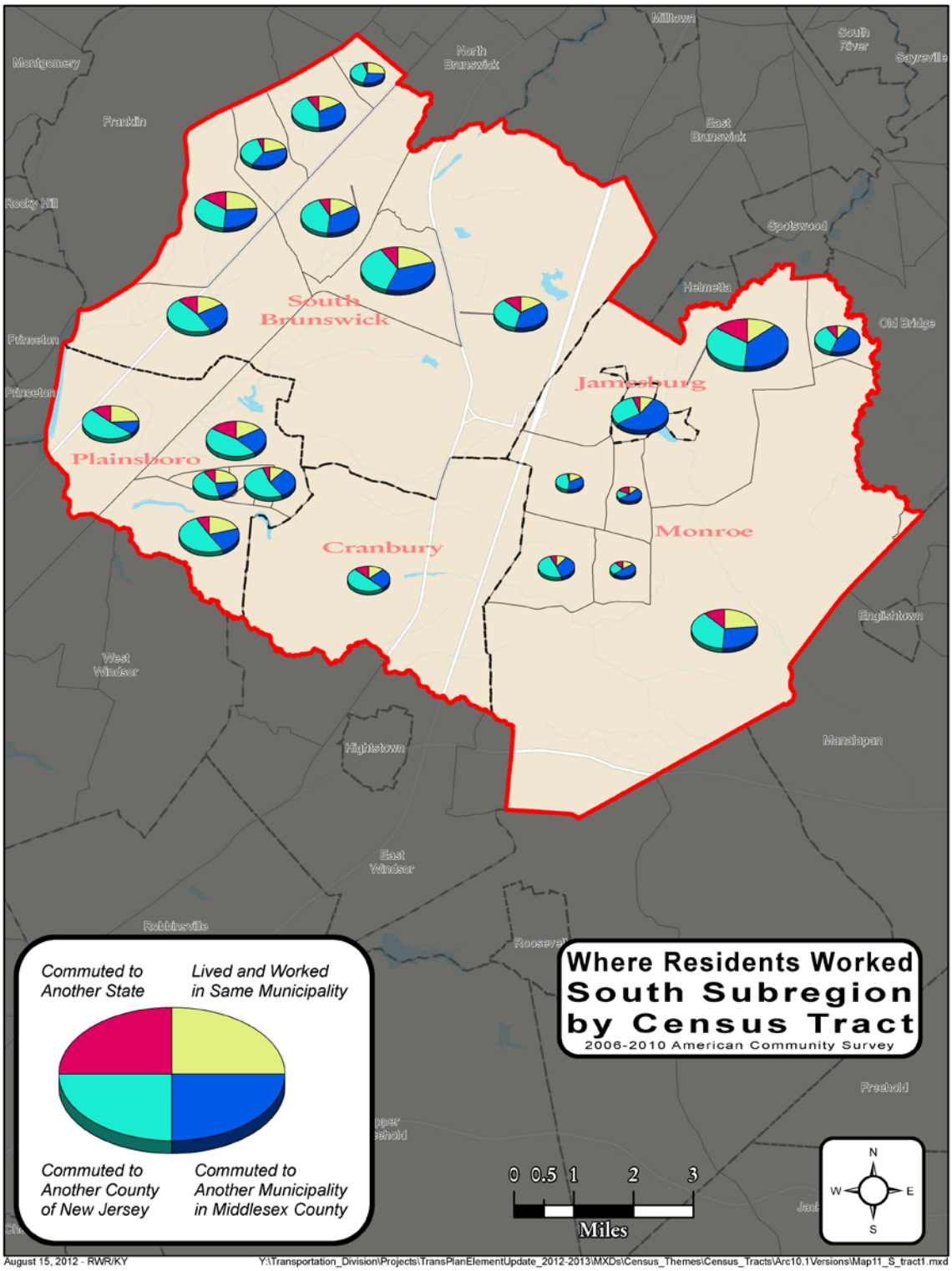
Map 3-4: Where Residents of the East Subregion Worked, by Census Tract



Map 3-5: Where Residents of the Central Subregion Worked, by Census Tract



Map 3-6: Where Residents of the South Subregion Worked, by Census Tract

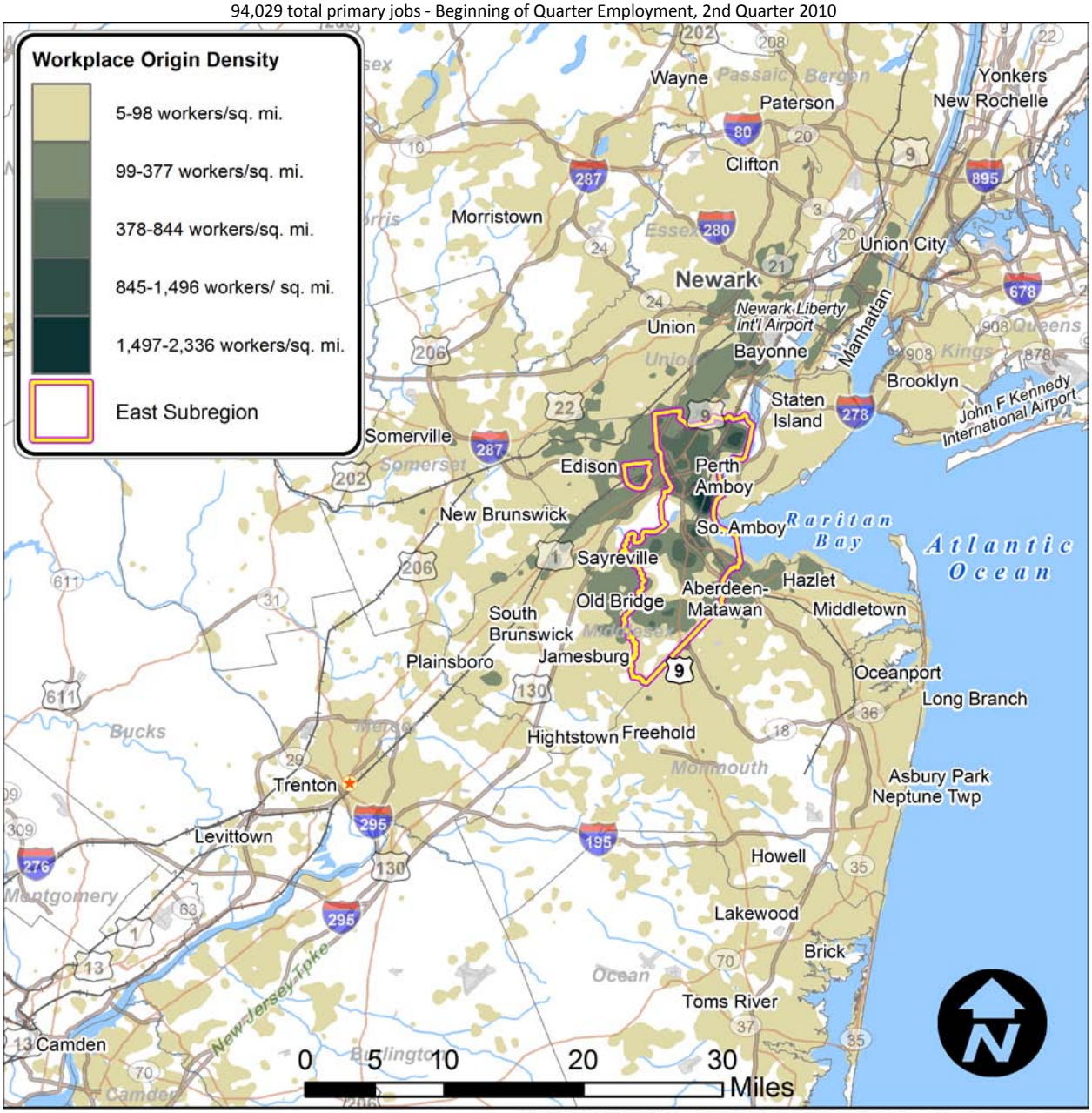


3.2 Labor Shed Analysis (LSA)

A Labor Shed Analysis (LSA) shows the place of residence of the workforce employed in a given area. As the maps below illustrates, during 2010 most of the workforce employed in the County were people who were living in or near the County itself.

Map 3-7: Where Workers in the East Subregion Live (2010)

94,029 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



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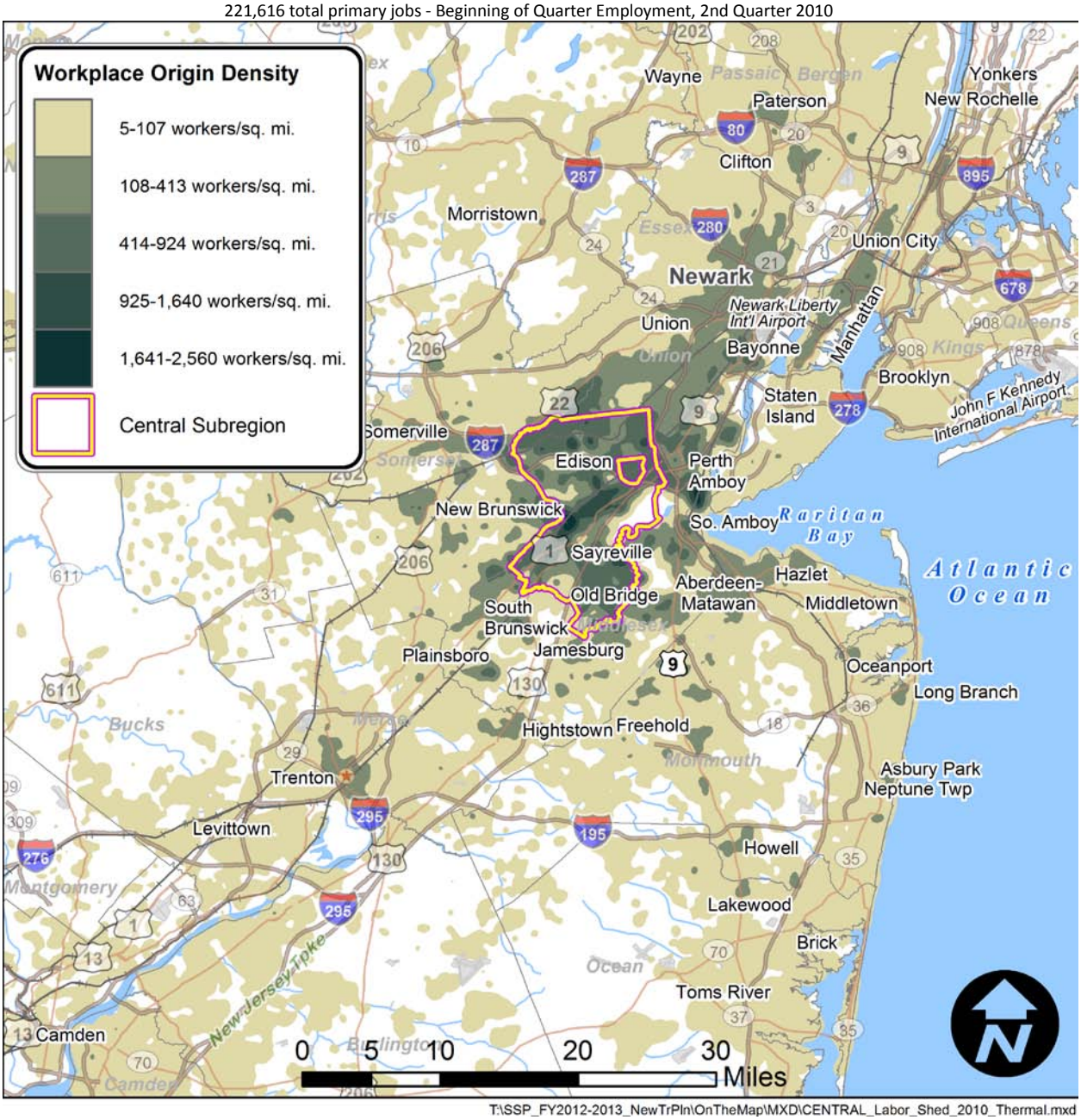
US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Map 3-8: Where Workers in the Central Subregion Live (2010)

221,616 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



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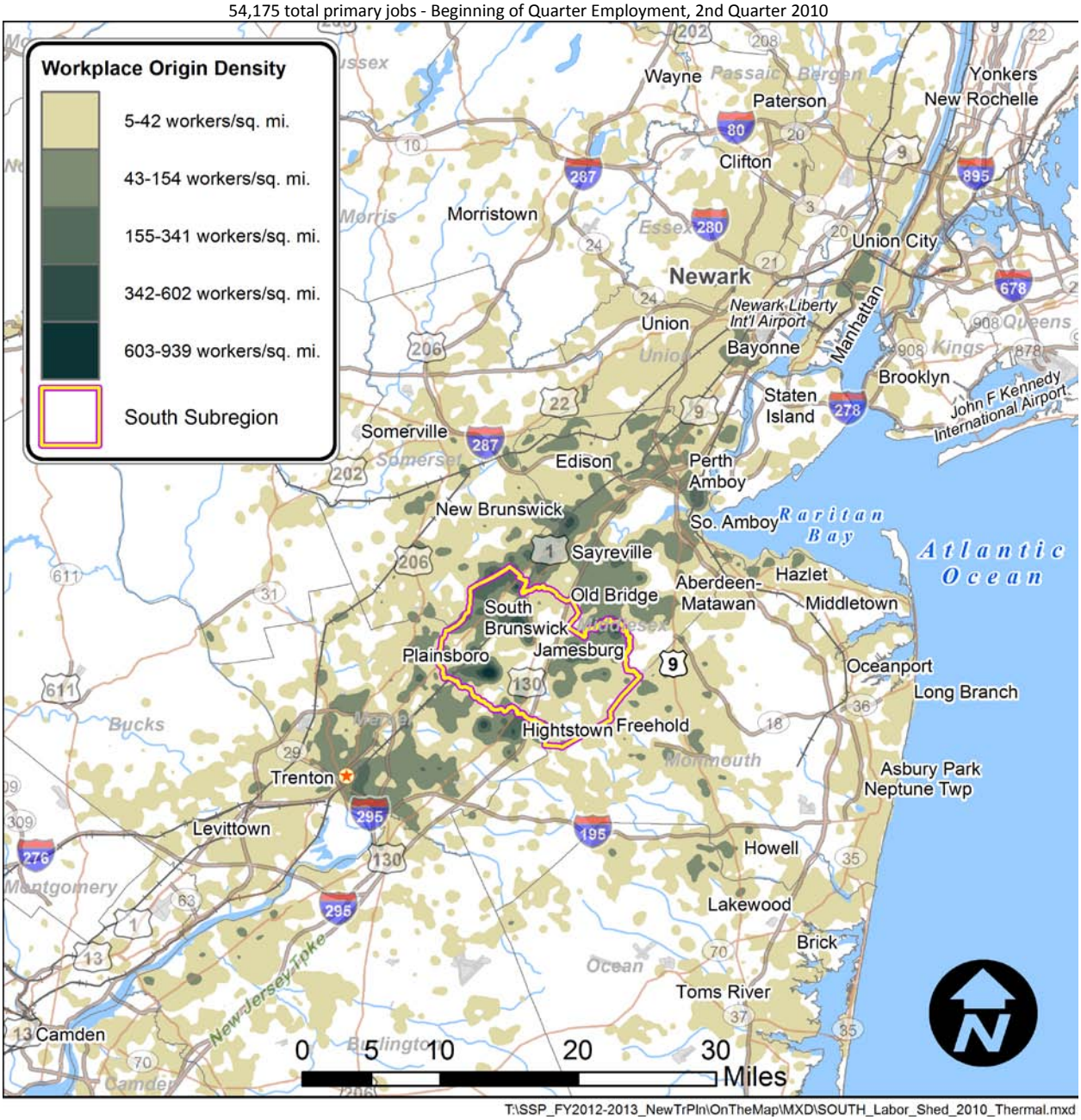
US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Map 3-9: Where Workers in the South Subregion Live (2010)

54,175 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



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US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

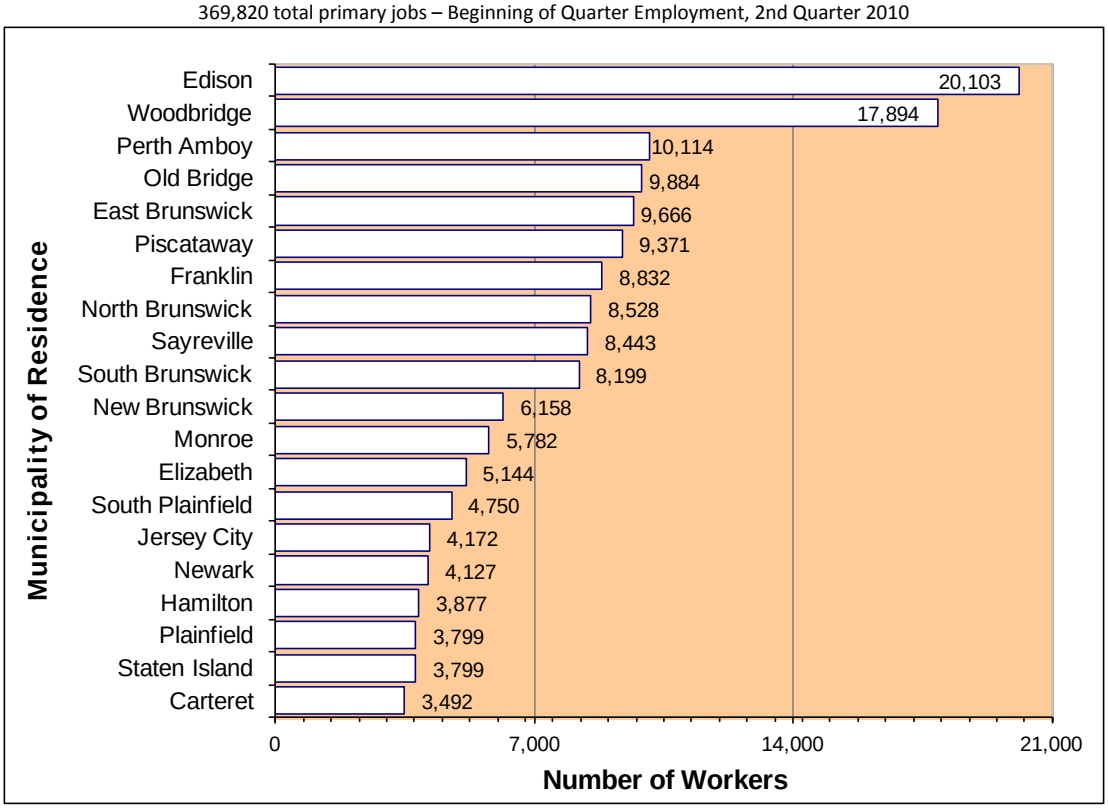
Middlesex County employed 369,820 people in primary jobs at the beginning of the second quarter of 2010. While most people living in the County commuted to destinations outside of it, 39.3% of the people that worked in the County also lived there. The second largest share of County's workforce (25.7%) came from points north. The top 20 municipalities of residency (Figure 3—9) accounted for 42% of those workers. One New York City boroughs (Staten Island) also appear on the top 20 list.

Eighty-two percent of the workers lived in one of the 10 counties listed in the graph below. More than half of the workforce lived outside of Middlesex County. Over 15% of the County's workforce came from Monmouth and Somerset Counties. In addition, a large number of workers in the County lived in the northern New Jersey region of Bergen, Essex and Hudson Counties.

However, when residency patterns were analyzed in the three subregions, there was quite a bit of contrast. There was no consistency with the top three, but there was a consistent pattern that at least two of the three top municipalities were contained within the subregion.

Figure 3—9: Top 20 Municipalities of Residence of the Middlesex County Workforce (2010)

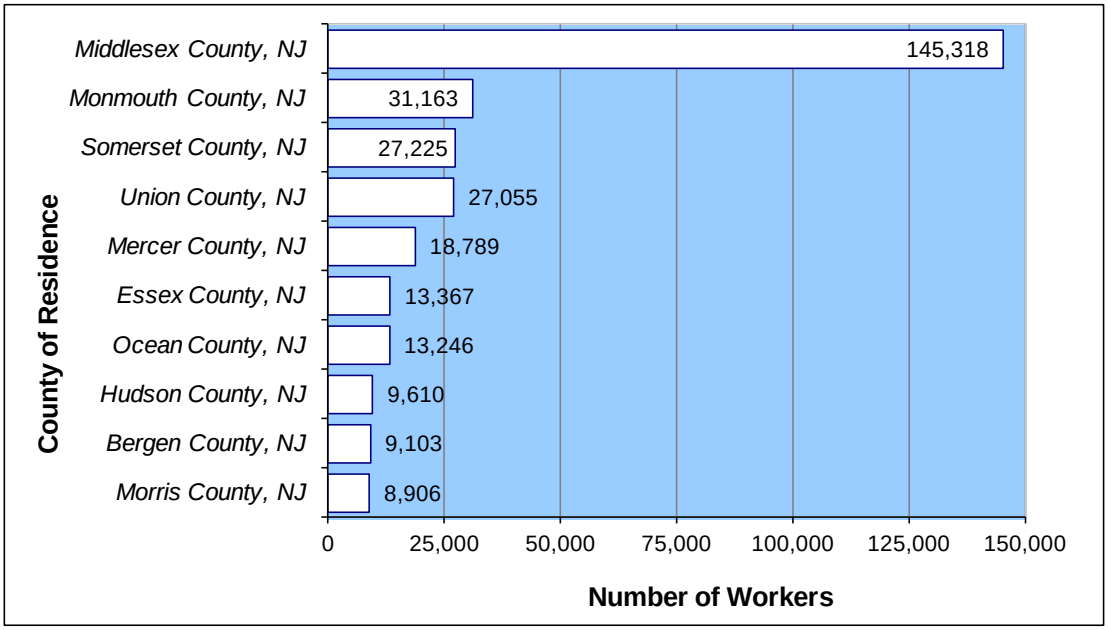
369,820 total primary jobs – Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Figure 3—10: Top 10 Counties of Residence of the Middlesex County Workforce (2010)

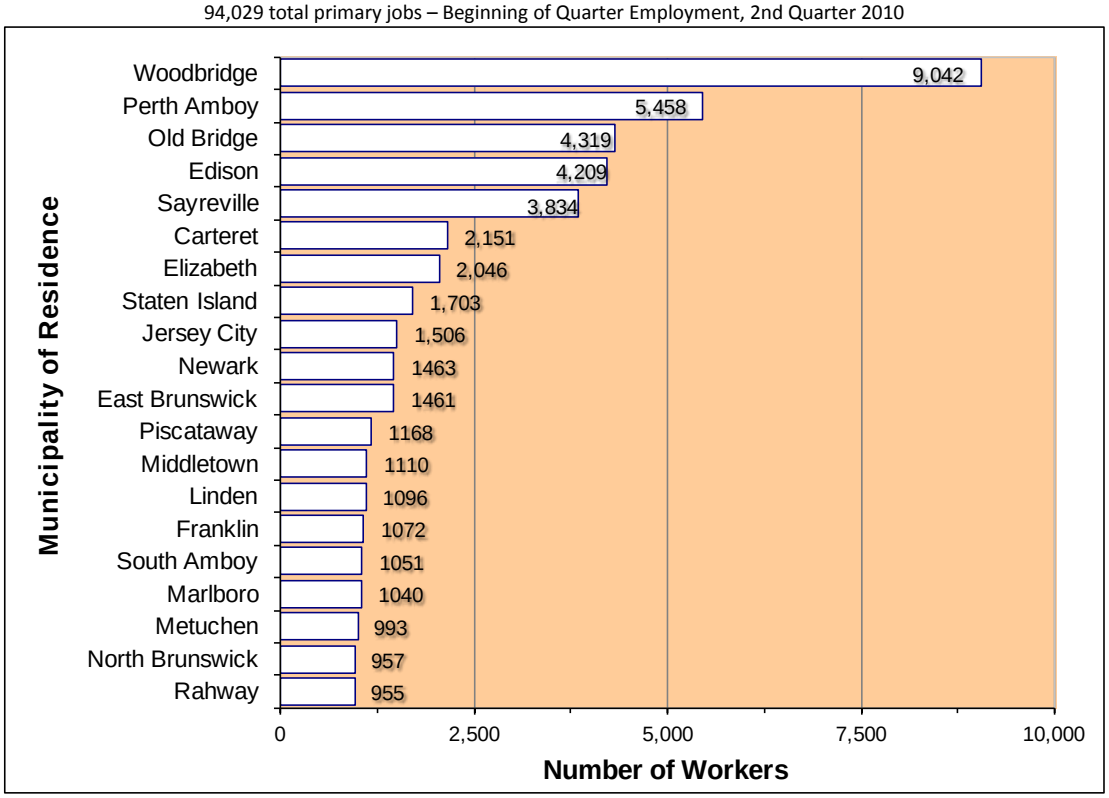
369,820 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Figure 3—11: Top 20 Municipalities of Residence of the East Subregion Workforce (2010)

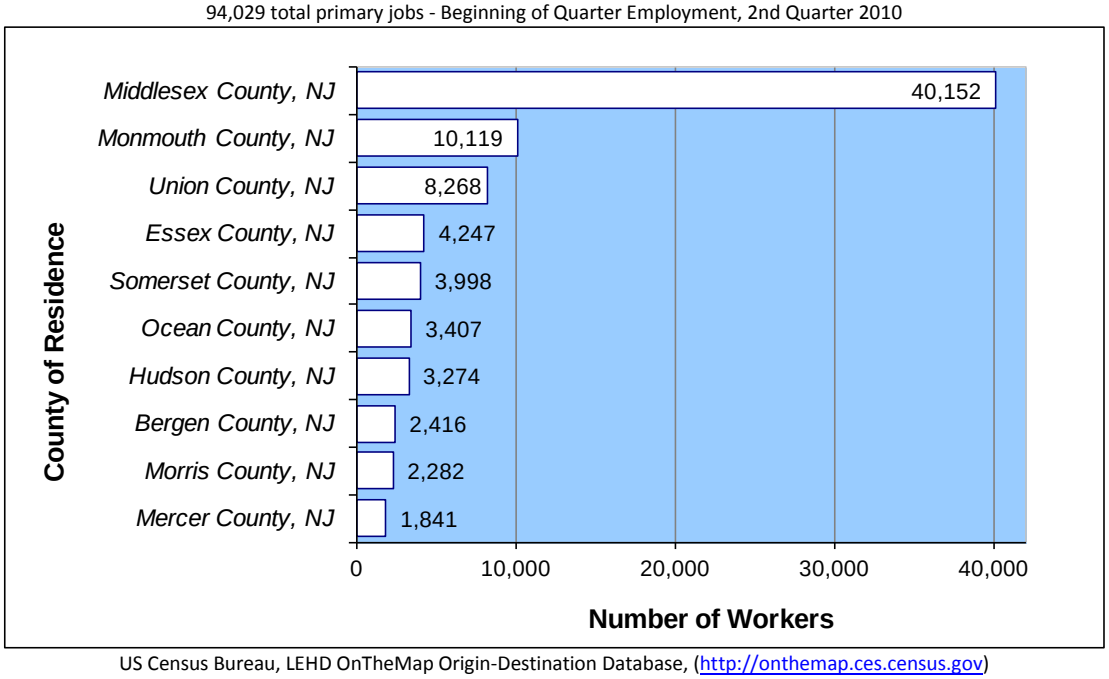
94,029 total primary jobs – Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Figure 3—12: Top 10 Counties of Residence of the East Subregion Workforce (2010)

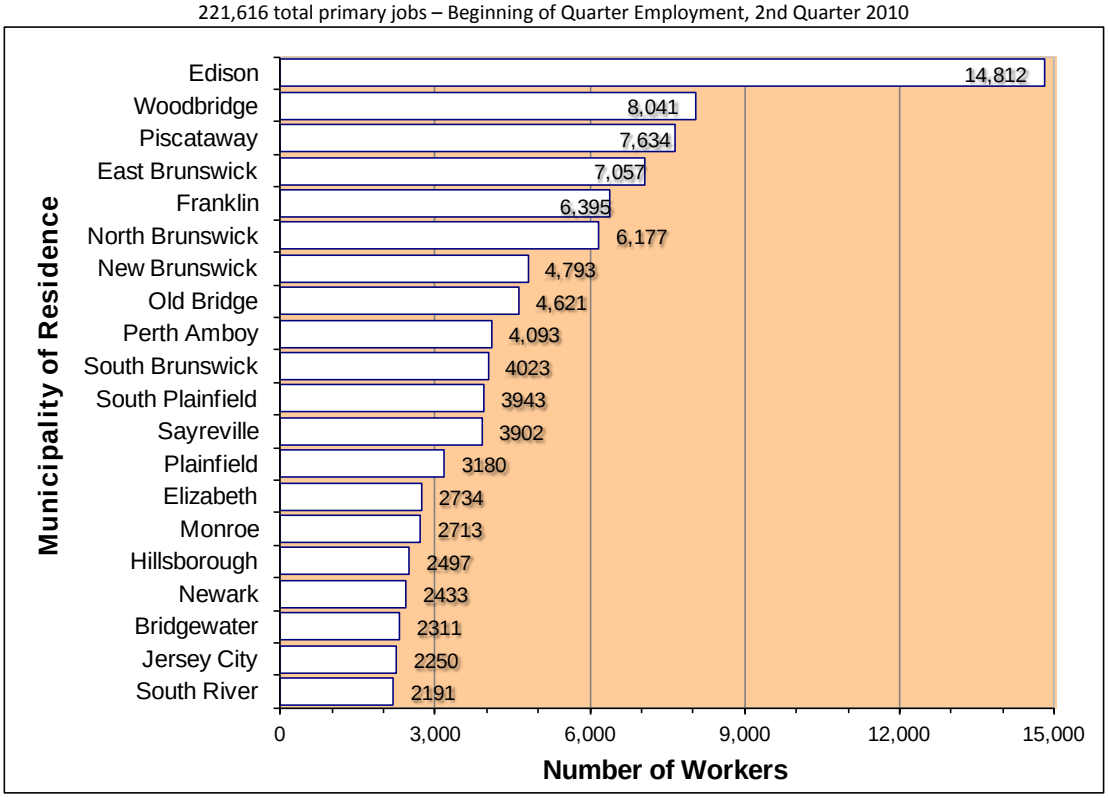
94,029 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Figure 3—13: Top 20 Municipalities of Residence of the Central Subregion Workforce (2010)

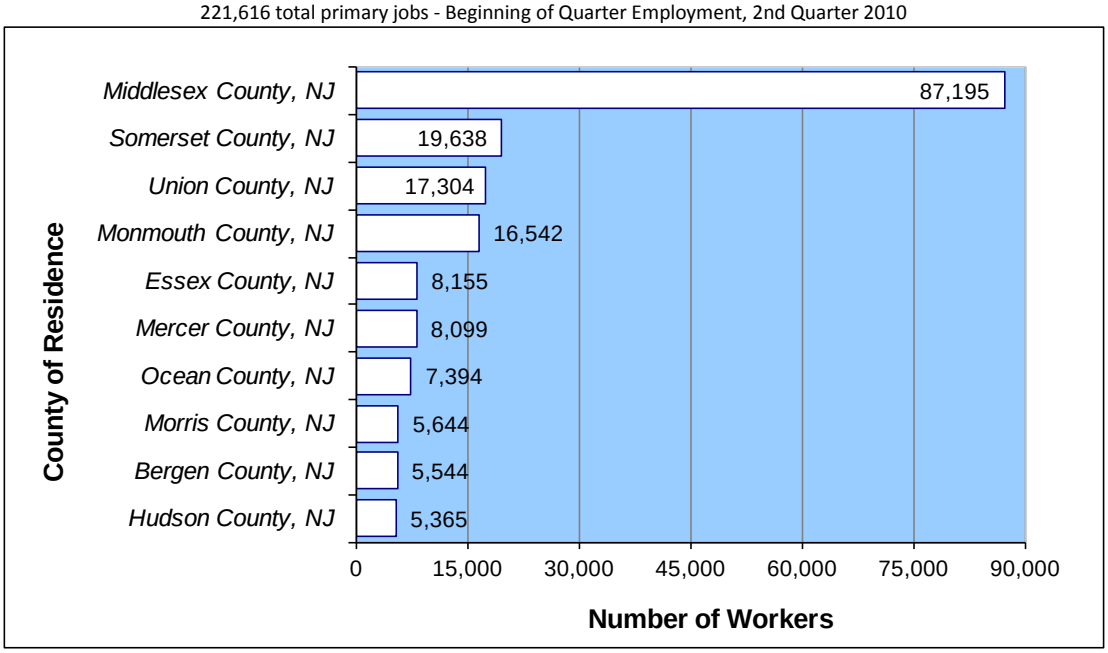
221,616 total primary jobs – Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Figure 3—14: Top 10 Counties of Residence of the Central Subregion Workforce (2010)

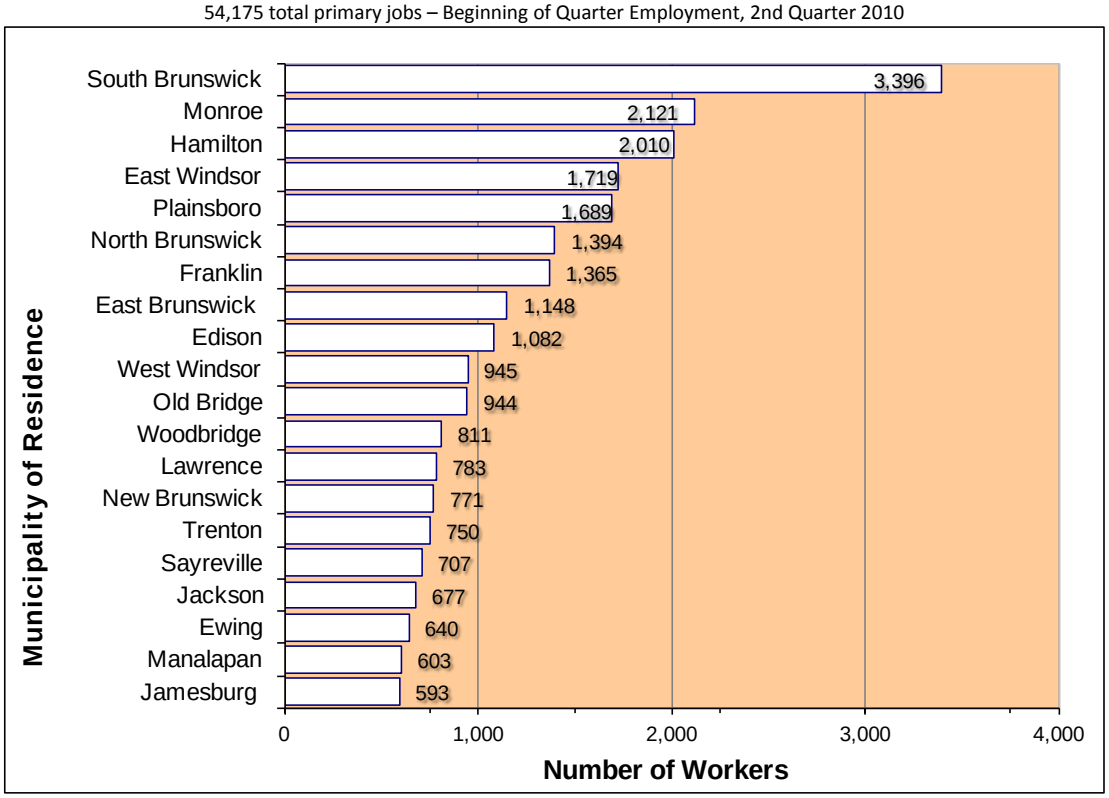
221,616 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Figure 3—15: Top 20 Municipalities of Residence of the South Subregion Workforce (2010)

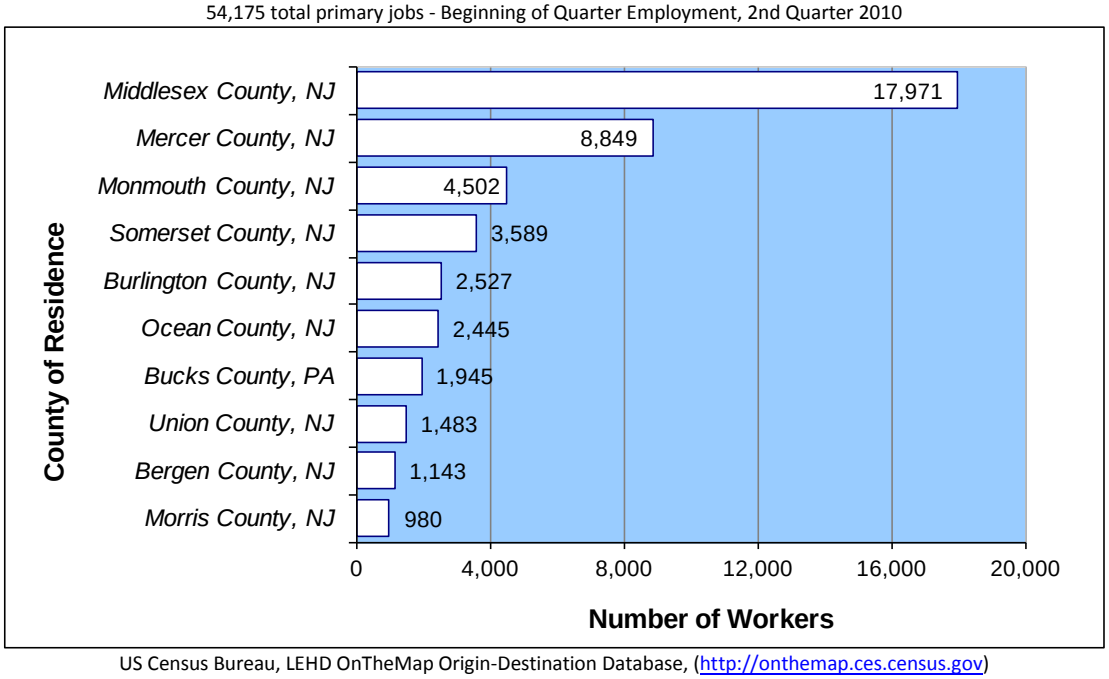
54,175 total primary jobs – Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Figure 3—16: Top 10 Counties of Residence of the South Subregion Workforce (2010)

54,175 total primary jobs - Beginning of Quarter Employment, 2nd Quarter 2010



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

3.3 Journey to Work

3.3.1 Means of Transportation to Work (Resident Labor Force)

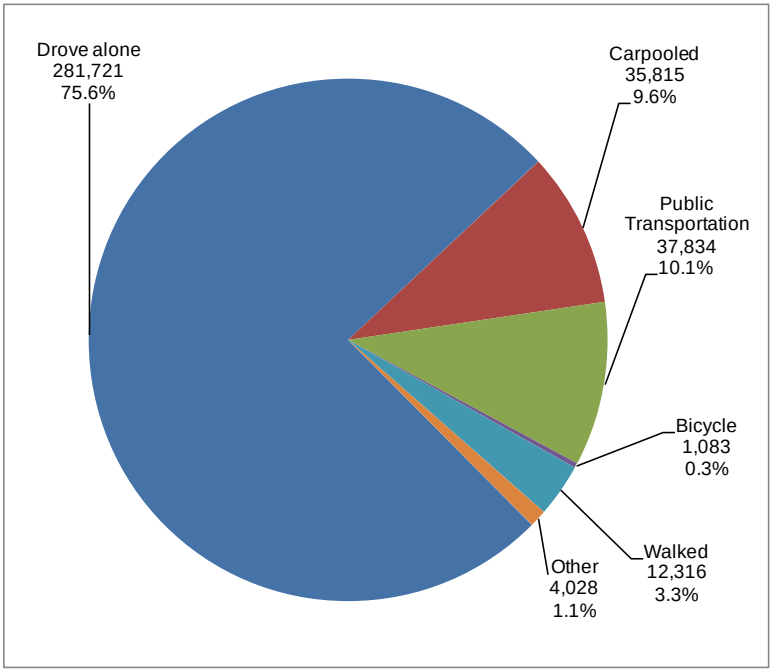
In Middlesex County, 372,797 residents commuted to jobs outside of their homes. Nearly 76% of the County's commuters drove alone to work. During 2006-2010, excluding telecommuters, 10% of workers took public transportation to get to work. By comparison, 10% of commuters countywide and 11% of commuters statewide took public transit. Slightly less than 10% of the workers in the Middlesex County reported using public transit, with less than a 900 ridership difference between bus and rail (see Figure 3—19). In the County, commute times were also noticeably longer than the state averages among public transit users.

According to 2010 LEHD data, approximately 72% (30,886 workers) of the County's out-of-state employees commuted to one of the five Boroughs of New York City. As shown in Figure 3—18, approximately 62% of those working out of state used public transit. Comparing out-of-state-bound public transit users to total transit users (in Figure 3—17) reveals that 11,321 (less than 30%) of the County's public transit commuters traveled to jobs located within the state. This illustrates the fact that public transportation is being used more often to commute to employment locations outside of the state. For the remainder of workers commuting out of state, about 30 percent, or 13,000 workers, drove alone. Presumably, many of these people were commuting to Staten Island, to which public transit connections are virtually non-existent, or Brooklyn, where public transit connections require at least one transfer through Manhattan.

The public transit mode share for all of Middlesex County (9.8%) did not get as high as the share for the state (10.6%). Regionally, the lowest share was the South Subregion's with 8.3% of commuters, which may possibly be a consequence of the fact that there is no rail station physically situated within the South Subregion itself. This is lower than the other Subregions (Central 9.8% and East 10.4%), the county (9.8%) or the state (10.6%). A comparison of the public transit mode share rates among the state, county and sub regional geographies is illustrated in Figure 3—20 .

Figure 3—17: Middlesex County Commuters' Means of Transportation to Work (2006-2010)

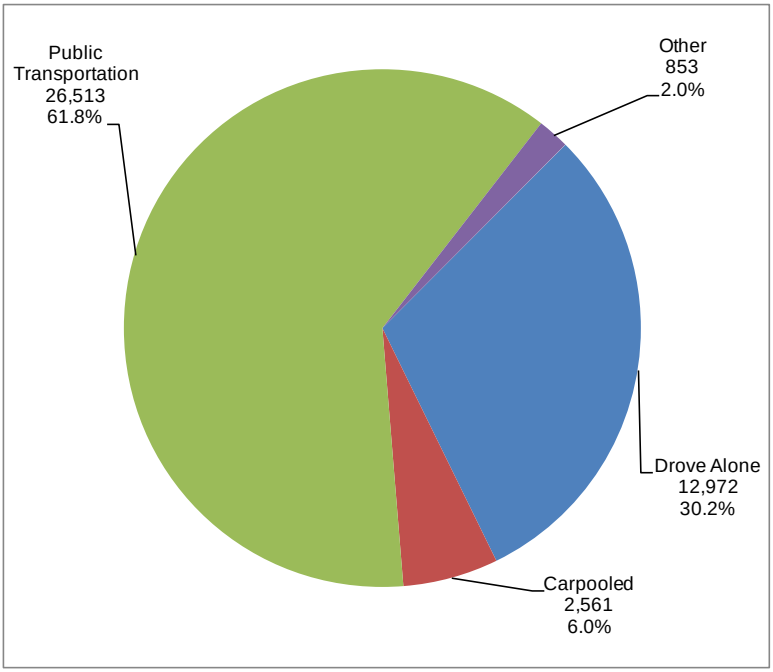
Total Commuters = 372,797 workers; pie-chart excludes the 12,412 telecommuters reportedly working from home



Source: U.S. Census, 2006-2010 American Community Survey. In the 2006-2010 ACS, "other" includes taxi, motorcycle, or other unspecified modes; and, "public transportation" includes: bus, streetcar, subway, railroad, or ferry

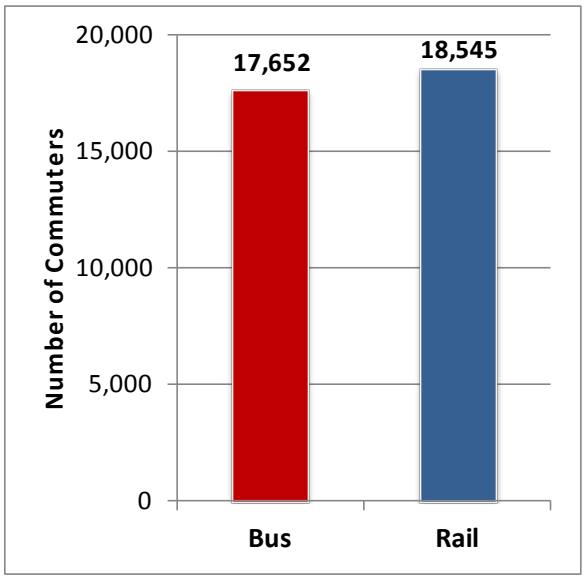
Figure 3—18: Middlesex County Commuters' Means of Transportation to Out-of-State Employment Locations (2006-2010)

Total Commuters = 42,899 workers; less than 10% to a destination other than New York State



Source: U.S. Census, 2006-2010 American Community Survey. In the 2006-2010 ACS, "other" includes taxi, motorcycle, or other modes; and, public transportation includes: bus, streetcar, subway, railroad, or ferry

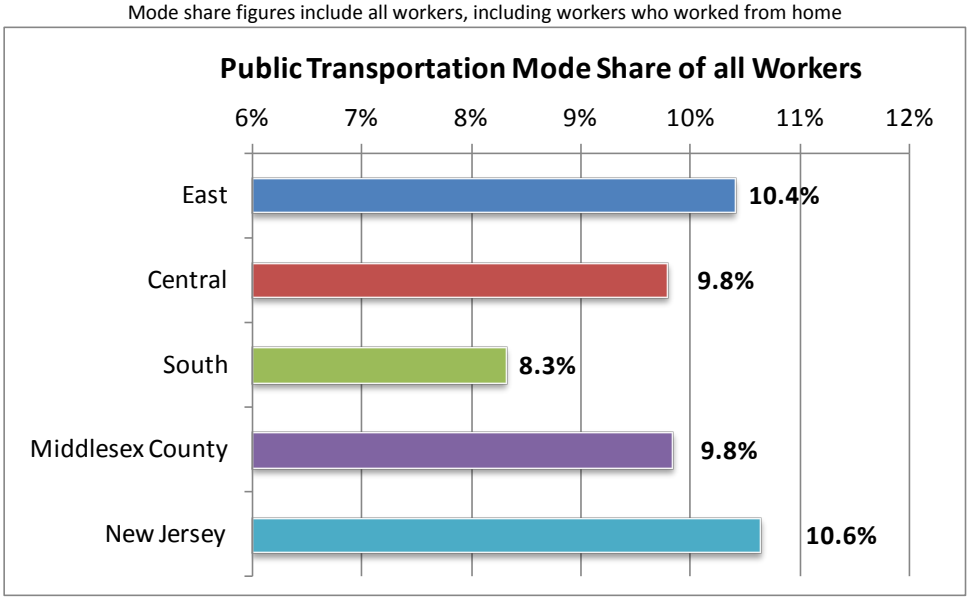
Figure 3—19: Bus vs. Rail Ridership in the Middlesex County (2006-2010)



Source: U.S. Census, 2006-2010 American Community Survey

Figure 3—20: Percentage of Study Area Residents Taking Public Transit to Work, Middlesex County, Subregions and New Jersey (2006-2010)

Mode share figures include all workers, including workers who worked from home

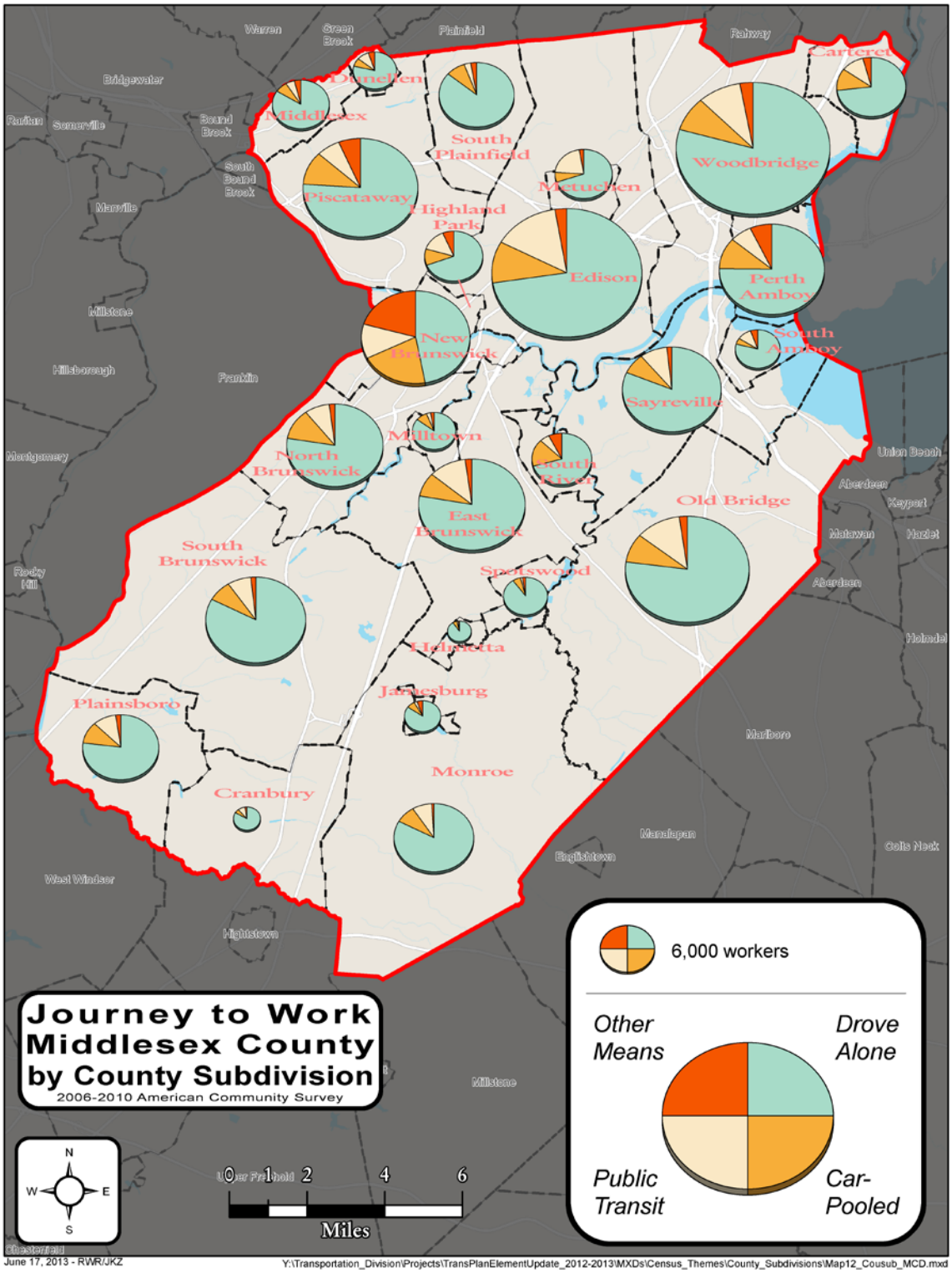


Source: U.S. Census, 2006-2008 American Community Survey

Map 3-10 on page 105 illustrates that the majority of commuters in most municipalities drove alone to work. However, in some municipalities, such as Edison, the transit mode share was visibly higher than in the rest of the County. In only one municipality did less than half of the commuters drive alone; New Brunswick.

Map 3-10: Journey to Work by Municipality (2006-2010)

Public transit includes: bus, streetcar, subway, railroad, or ferry—excludes taxicab

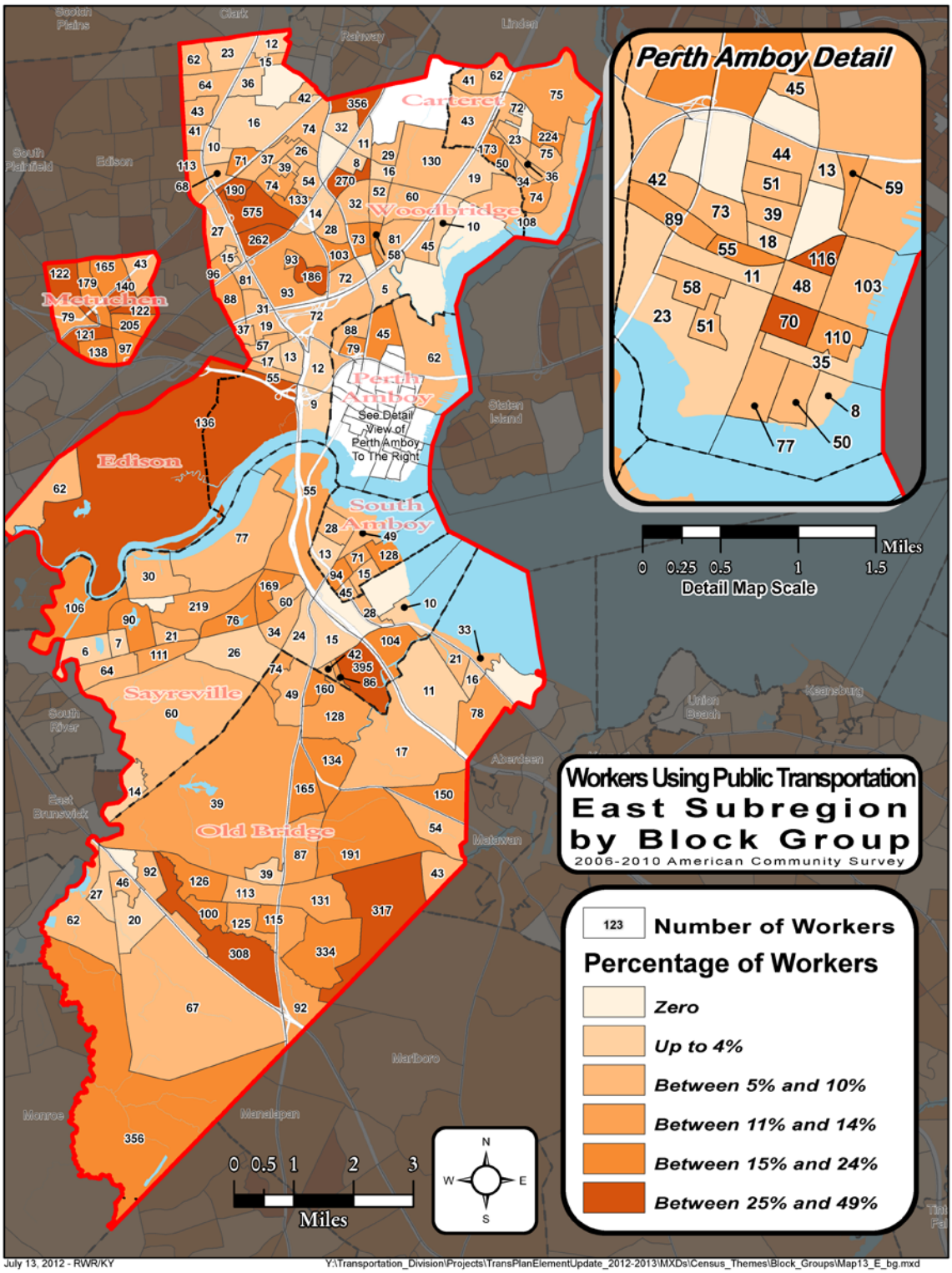


The following maps illustrate that the highest use of public transportation within the County was in the East and Central Subregions. Highest public transportation usage in the East Subregion was near the London Terrace/Ernston Road area and the area surrounding the intersection of Route 9 and Route 516, where higher density residential development and park and ride facilities exist.

The following maps illustrate the areas where highest use of public transportation can be found within the County, especially more evident in the East and Central Subregions. For example in the East Subregion, locations with relatively higher public transportation usage can be identified in areas of Route 9 corridor where express bus service to Manhattan is within close proximity to residential development. Other locations with higher public transportation usage generally seem to be correlated with the presence of a commuter rail station.

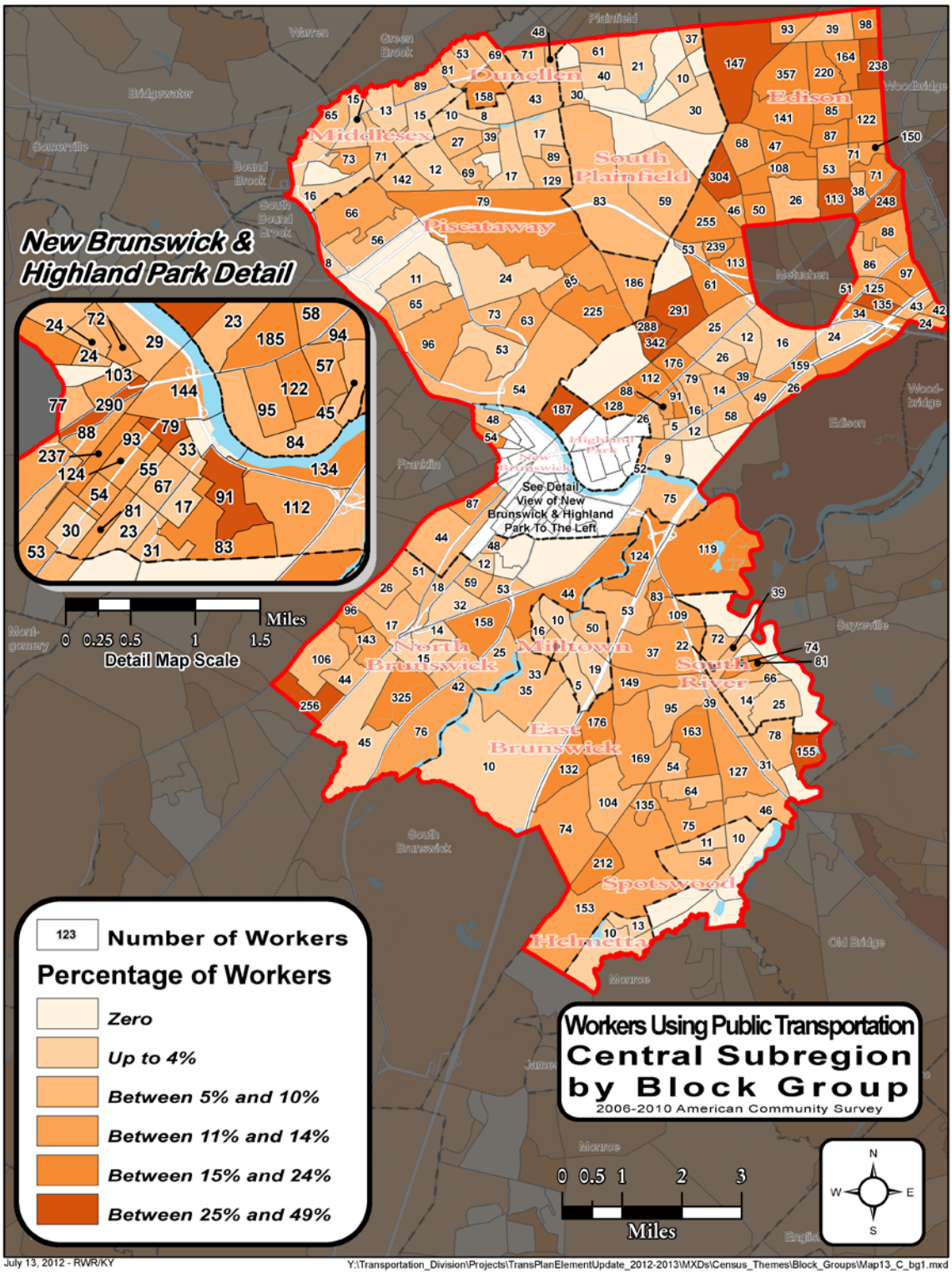
Map 3-11: East Subregion Residents Using Public Transportation to Work by Block Group (2006-2010)

Public transportation includes: bus, streetcar, subway, railroad, or ferry



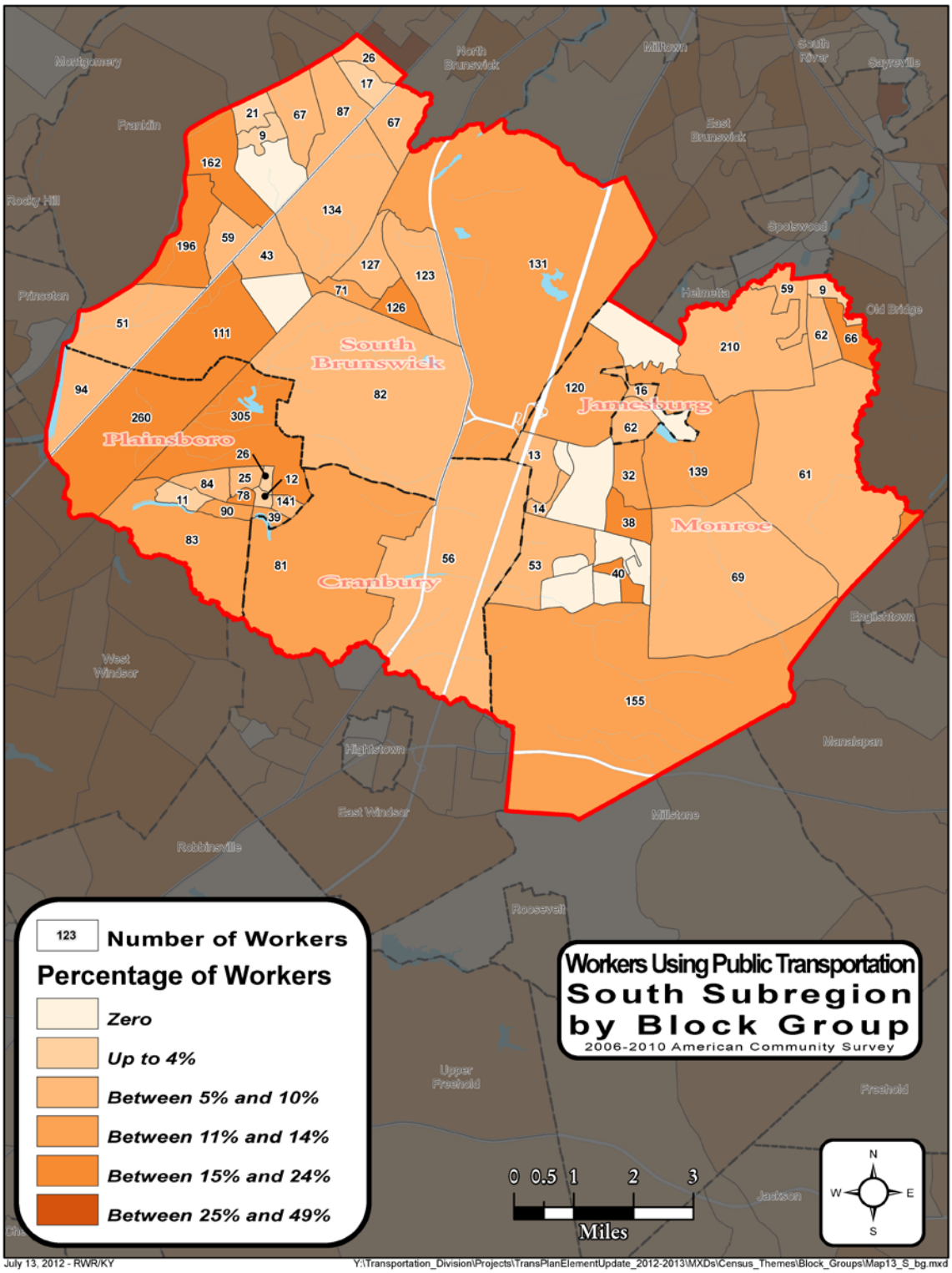
Map 3-12: Central Subregion Residents Using Public Transportation to Work by Block Group (2006-2010)

Public transportation includes: bus, streetcar, subway, railroad, or ferry



Map 3-13: South Subregion Residents Using Public Transportation to Work by Block Group (2006-2010)

Public transportation includes: bus, streetcar, subway, railroad, or ferry



According to American Community Survey 2006-2010 data, the total number of people that were estimated as commuting by non-motorized transportation modes (bike or walked) was more than 13,000 people (approximately 3.5% of total workers in the County; see Figure 3—17on page 103). The Subregion with the highest concentration of walkers and of cyclists (4.7%) was the Central Subregion. As depicted in Map 3-14, Map 3-15, and Map 3-16, walkers and cyclists were concentrated in several locations of the County, primarily in the Central and East Subregions:

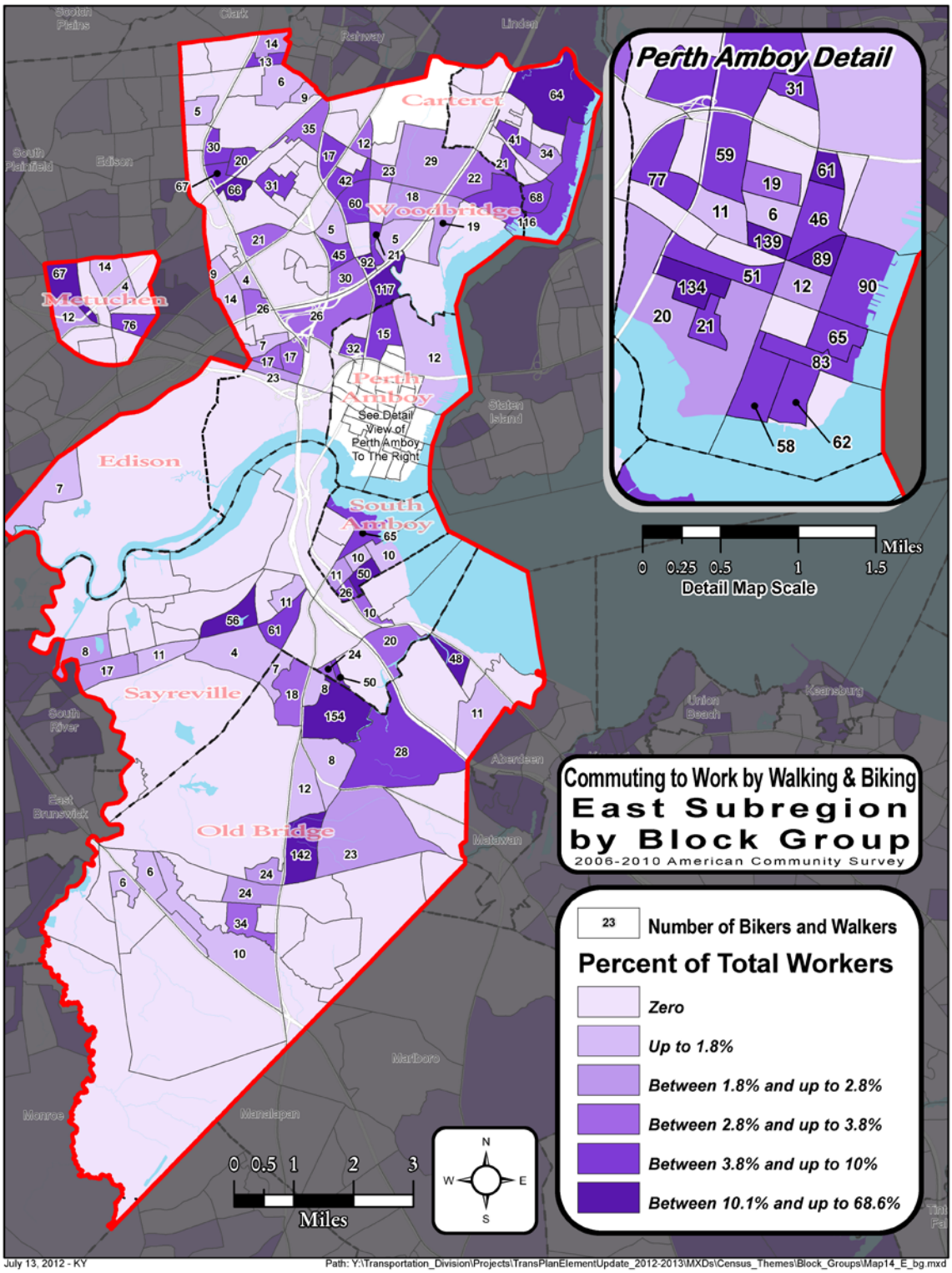
(1) in New Brunswick or within a half-mile of its city limits;

(2) within a half mile of Route 9; and

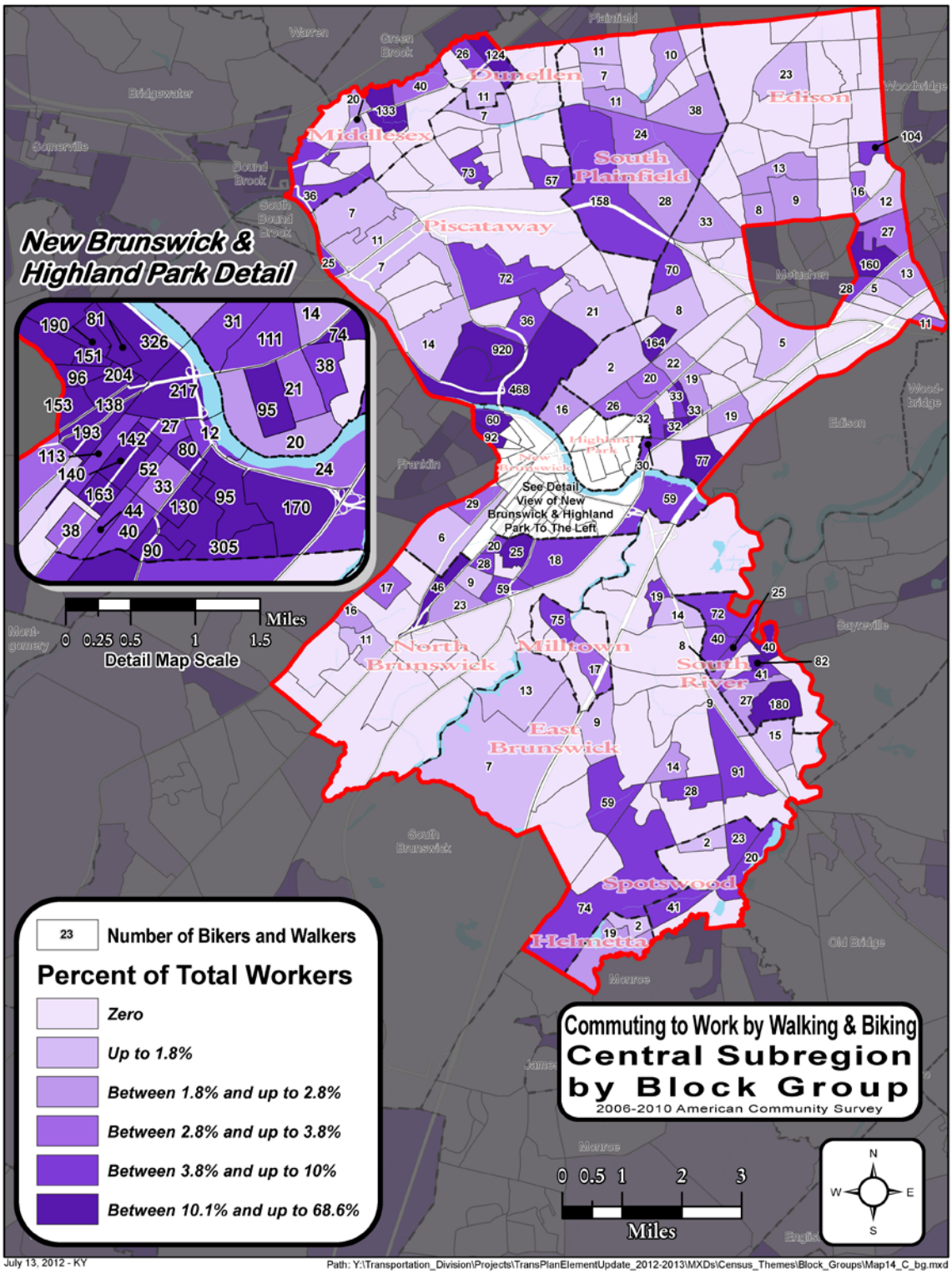
(3) within a half mile of Route 35 in and just to the North of Perth Amboy.

These above listed locations can be characterized as having high concentrations of housing and employment opportunities, as well as, areas that often coincide with higher rates of poverty generally found in these same locations (see Map 2-22 and/or Map 2-23on pages 78 and 80 that depict poverty rates of individual and families by Census tract).

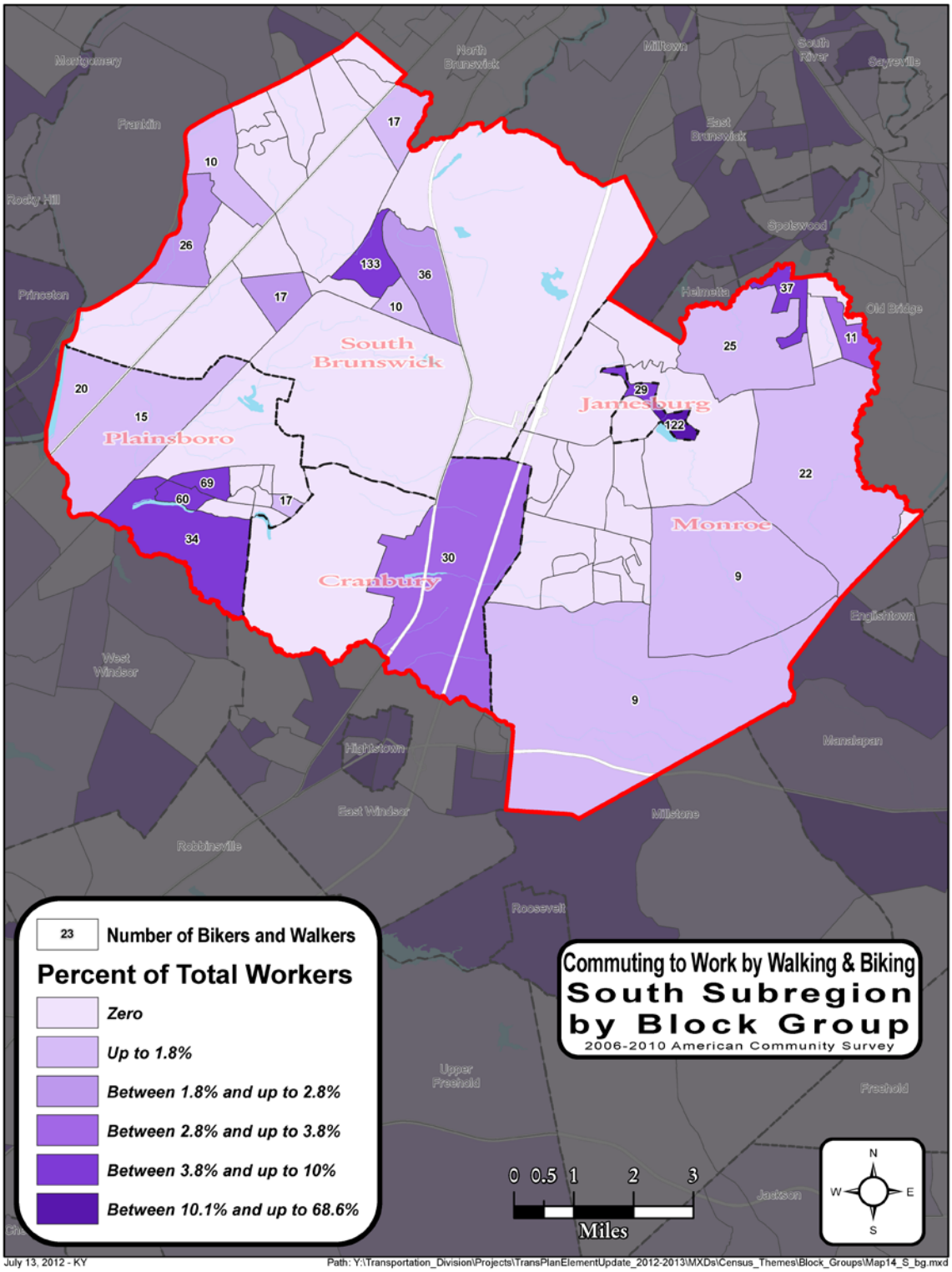
Map 3-14: East Region Commuting to Work by Walking and Biking by Block Group (2006-2010)



Map 3-15: Central Region Commuting to Work by Walking and Biking by Block Group (2006-2010)



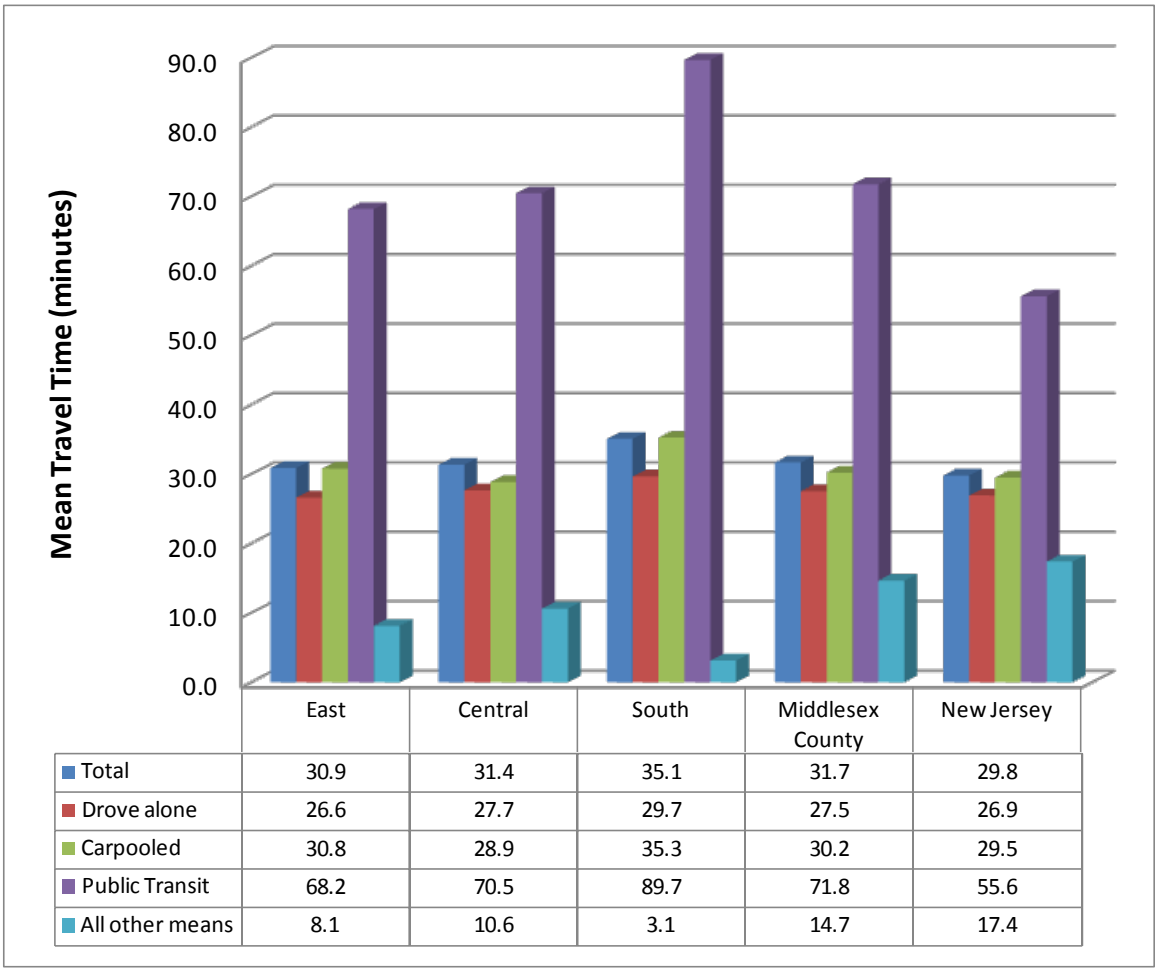
Map 3-16: South Region Commuting to Work by Walking and Biking by Block Group (2006-2010)



3.3.2 Average Travel Time

During 2006-2010, for Middlesex County residents, the average travel time to work was more than 30 minutes, which was greater than the State average of 29. The figure below illustrates that the County residents' average door-to-door commute time of over 71 minutes for trips using public transportation exceeded the state average of 56 minutes. South Subregion residents had a longer average commute time than other county residents. A possible explanation is that the South Subregion is the furthest distance from the main employment centers of New York City and the New Jersey core employment areas; or, perhaps, because the overall level of public transit access is not as extensive as exists in the East and Central subregions. The darkest green colors on Map 3-17on page 115 highlights the areas of Middlesex County where commuters experienced the longest commute times.

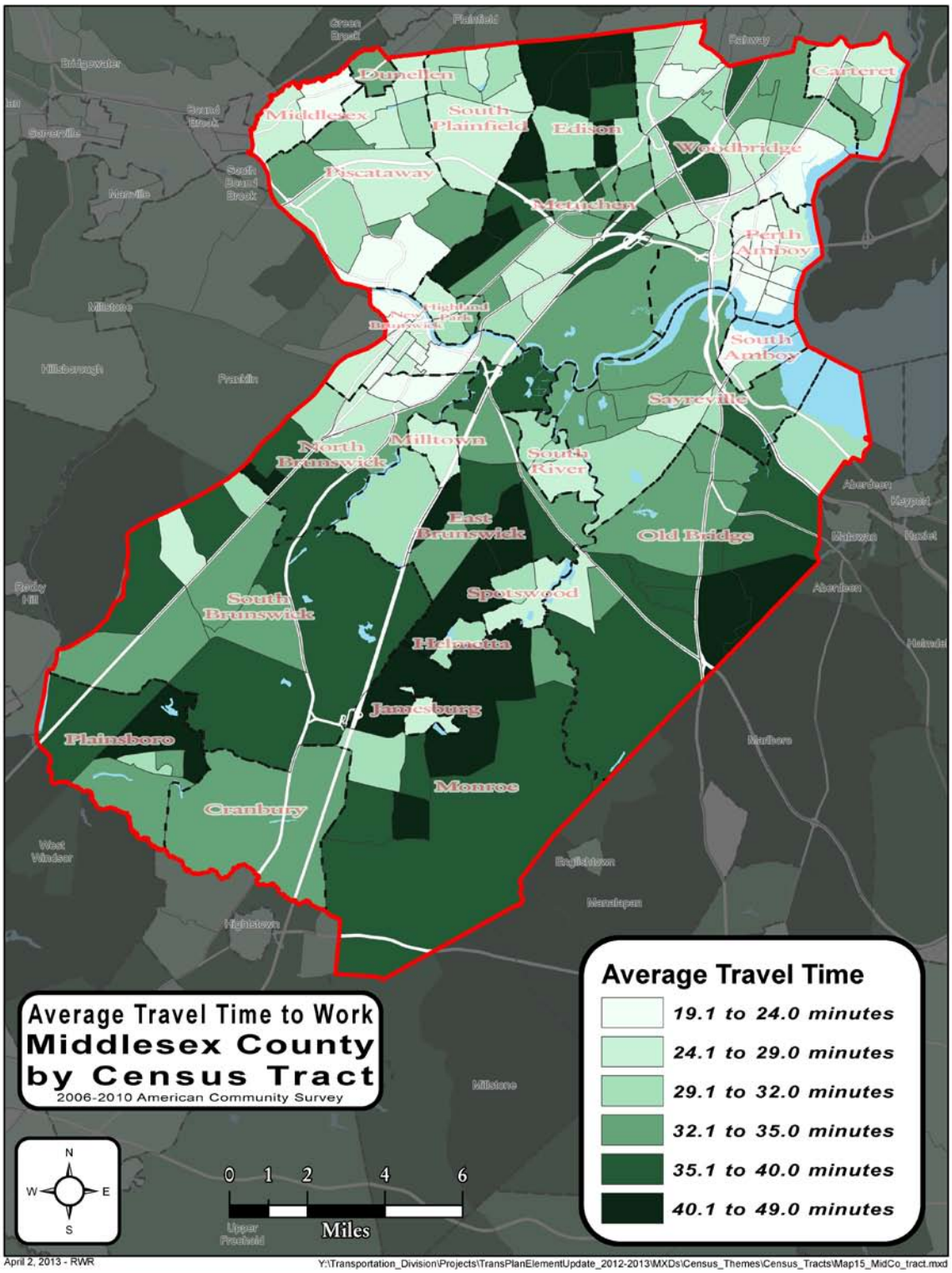
Figure 3—21: Average Travel Time to Work by Means of Transportation (2006-2010)



	East	Central	South	Middlesex County	New Jersey
Total	30.9	31.4	35.1	31.7	29.8
Drove alone	26.6	27.7	29.7	27.5	26.9
Carpooled	30.8	28.9	35.3	30.2	29.5
Public Transit	68.2	70.5	89.7	71.8	55.6
All other means	8.1	10.6	3.1	14.7	17.4

Source: U.S. Census, 2006-2010 American Community Survey

Map 3-17: Average Travel Time to Work by Census Tract (2006-2010)

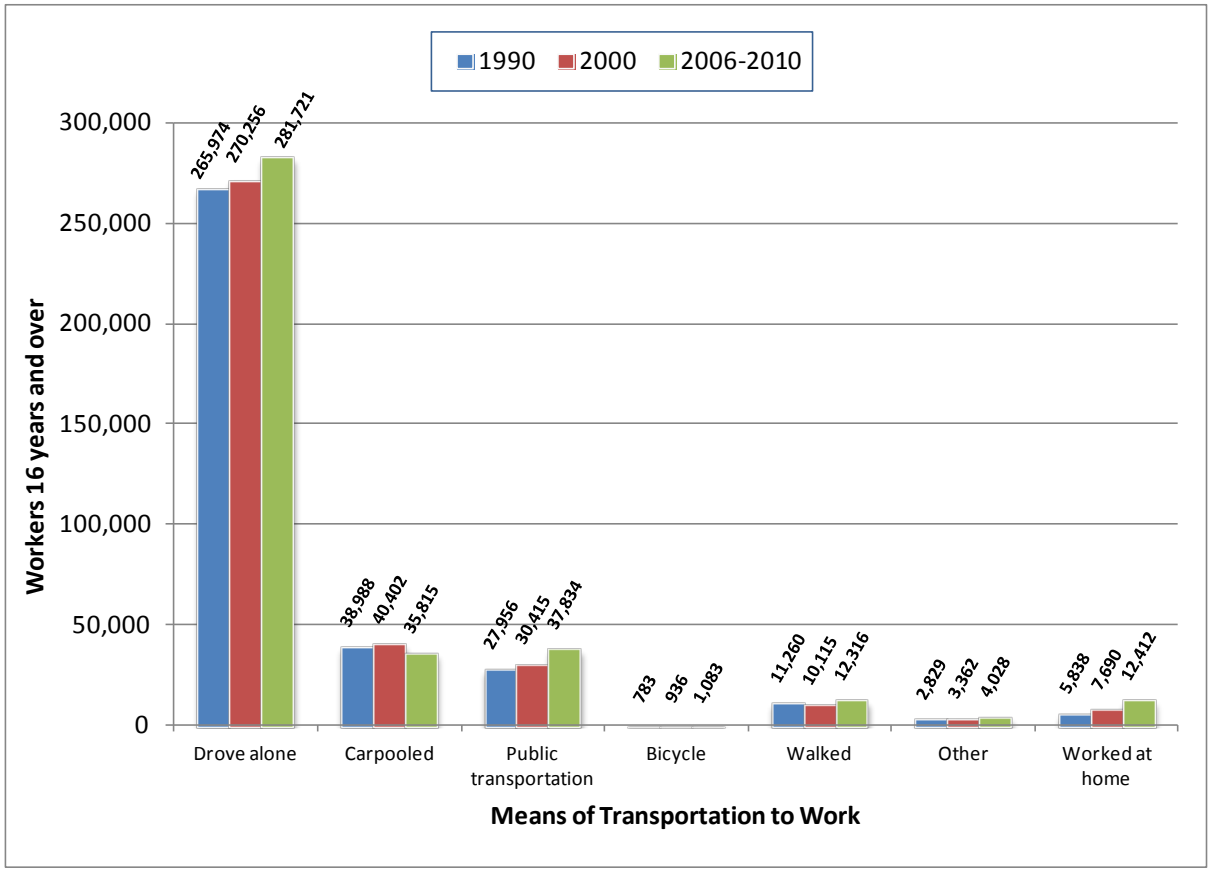


3.3.3 Journey to Work Trends

Public transportation experienced considerable increases between the 1990 Census and 2006-2010 ACS, seeing an increase of more than 35% (an increase of almost 10,000 riders between 1990 and 2006-2010). However, there was over an 8% decrease in riders who participated in carpools. "Drove alone" was the means of transportation to work category that experienced the greatest percentage point decrease during the same time period, decreasing by 2.1 percentage points. However, according to the 2006-2010 ACS, those who drove alone still accounted for more than 73% of the total commuters.

Figure 3—22: Means of Transportation to Work, Middlesex County (1990, 2000, and 2006-2010)

Public transportation includes: bus, streetcar, subway, railroad, or ferry; Other includes: taxicab, motorcycle and all other unspecified means



Source: U.S. Decennial Census, 1990 and 2000; and, 2006-2010 American Community Survey

Table 3—1: Journey to Work, Middlesex County Residents (1990, 2000, and 2006-2010)

Public transportation includes: bus, streetcar, subway, railroad, or ferry; Other includes: taxicab, motorcycle and all other unspecified means

Workers 16 years and over	1990	2000	2006-2010	1990 Percent Total	2006-10 Percent Total
Drove alone	265,974	270,256	281,721	75.2%	73.1%
Carpooled	38,988	40,402	35,815	11.0%	9.3%
Public transportation	27,956	30,415	37,834	7.9%	9.8%
Bicycle	783	936	1,083	0.2%	0.3%
Walked	11,260	10,115	12,316	3.2%	3.2%
Other	2,829	3,362	4,028	0.8%	1.0%
Worked at home	5,838	7,690	12,412	1.7%	3.2%
Total	**353,628**	**363,176**	**385,209**	**100.0%**	**100.0%**

Source: U.S. Decennial Census, 1990 and 2000; and, 2006-2010 American Community Survey

Table 3—2: Journey to Work Trends of Middlesex County Residents (1990 to 2006-2010)

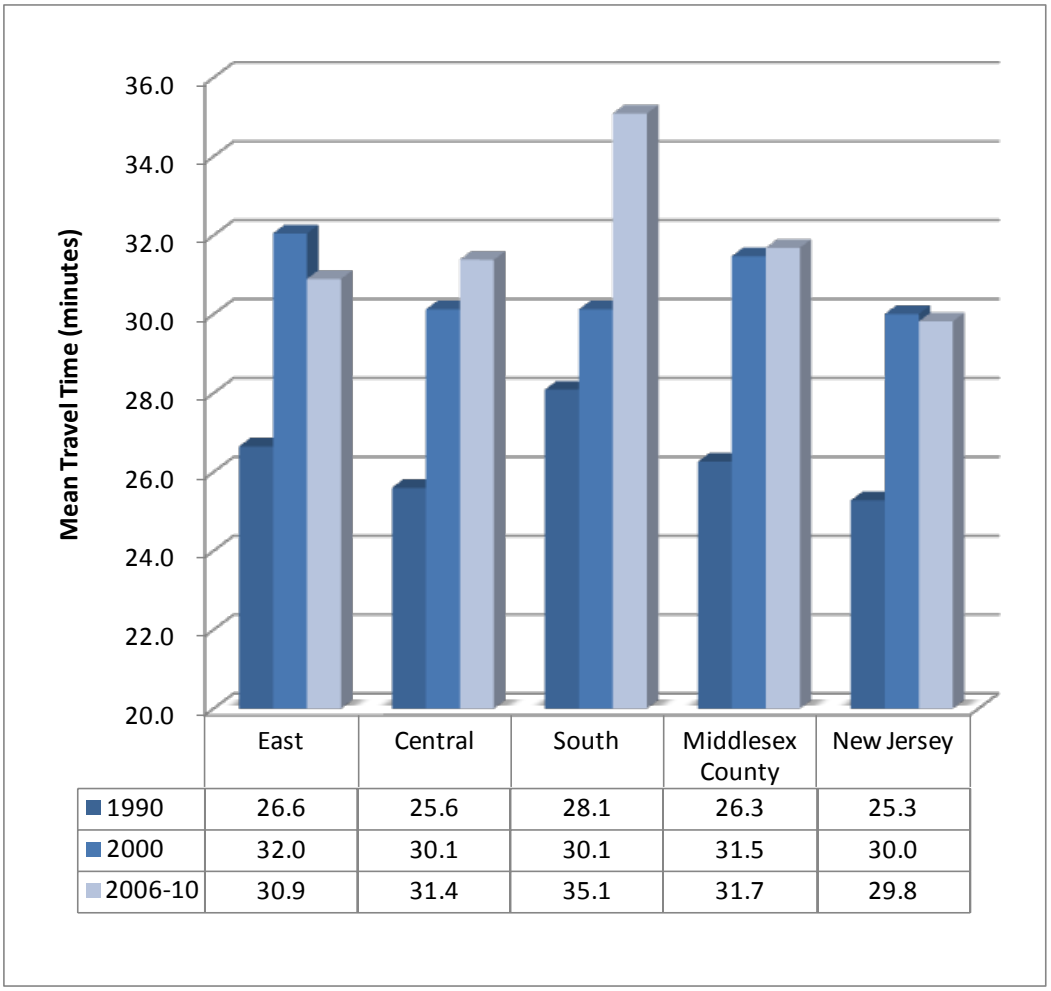
Public transportation includes: bus, streetcar, subway, railroad, or ferry; Other includes: taxicab, motorcycle and all other unspecified means

Workers 16 years and over	1990 to 2006-10 Absolute Change	1990 to 2006-10 Percent Change	1990 to 2006-10 Pct. Pts. Change
Drove alone	15,747	5.9%	-2.1 pts.
Carpooled	-3,173	-8.1%	-1.7 pts.
Public transportation	**9,878**	**35.3%**	**1.9 pts.**
Bicycle	300	38.3%	0.1 pts.
Walked	1,056	9.4%	0.0 pts.
Other	1,199	42.4%	0.2 pts.
Worked at home	6,574	112.6%	1.6 pts.
Total	**31,581**	**8.9%**	**--**

Source: U.S. Decennial Census, 1990 and 2000; and, 2006-2010 American Community Survey

From 1990 to 2006-2010, the average commute from Middlesex County was slightly longer than the state averages. The five-year estimates (2006-2010) show that the average commute times overall for the County were comparable to state averages. However, when these five-year estimates are observed broken down my subregions, the South subregion commuters had average commute times that were noticeably greater than the county, the state and the other two subregions. Historically, illustrated in both the 2000 and the 1990 datasets, the average travel times to work were more comparable across the subregions, the county and the state.

Figure 3—23: Comparative Average Travel Times to Work (1990, 2000 and 2006-2010)



	East	Central	South	Middlesex County	New Jersey
1990	26.6	25.6	28.1	26.3	25.3
2000	32.0	30.1	30.1	31.5	30.0
2006-10	30.9	31.4	35.1	31.7	29.8

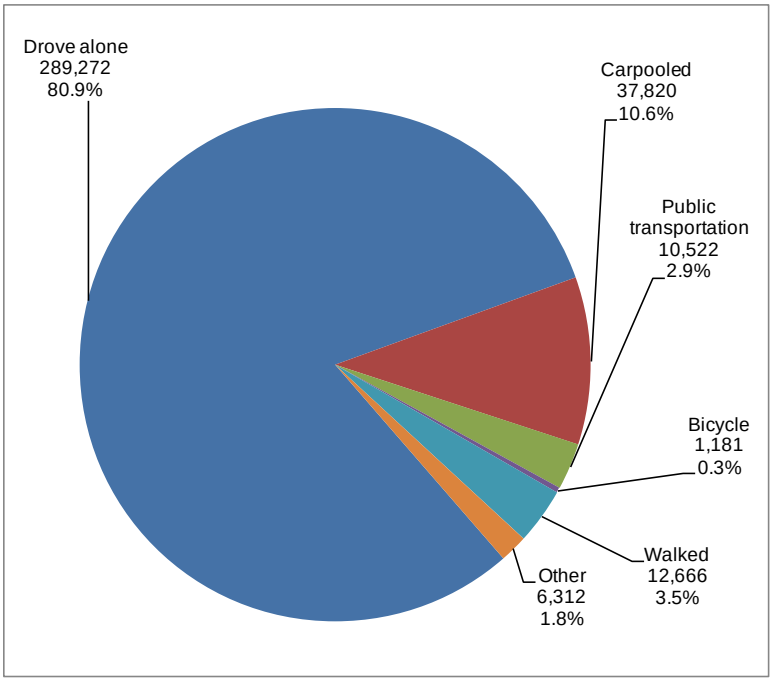
Source: U.S. Decennial Census, 1990 and 2000; and, 2006-2010 American Community Survey

3.3.4 Means of Transportation to Middlesex County as a Workplace

Figure 3—24 below illustrates how commuters (members of the work force) traveled to Middlesex County as a workplace destination. In contrast to commuters leaving the County to work in New York, the share of public transit users for work in Middlesex County was very low. Workers who traveled to out-of-state employment used public transportation almost 62% of time. During the period between 2006 and 2010, only 10,522 of 357,773 estimated workers in Middlesex County traveled to work by public transit, which amounts to less than 3% of the workforce. The dominant mode choice of commuting to employment within the County was driving alone (80.9%).

Figure 3—24: Means of Transportation to Middlesex County as a Workplace (2006-2010)

Total Commuters = 357,773 workers; pie-chart excludes the 12,412 telecommuters reportedly working from home



Source: U.S. Census, 2006-2010 American Community Survey. In the 2006-2010 ACS, "other" includes taxi, motorcycle, or other unspecified modes; and, "public transportation" includes: bus, streetcar, subway, railroad, or ferry

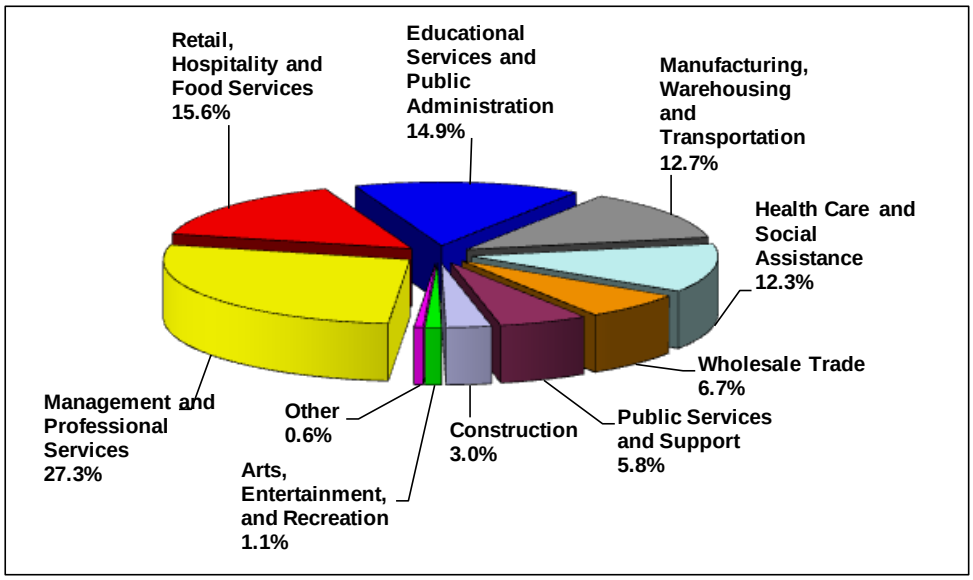
3.4 Employment Characteristics

3.4.1 Resident Labor Force

The labor force described in the pie chart below is comprised of residents of Middlesex County. The most popular industries of the resident labor force were Management and Professional Services (27.3 %) and Retail, Hospitality and Food Services (15.6%), which combined to capture 42.9% of the labor force. A significant segment of the labor force was employed in Educational Services and public Administration (14.9%), Manufacturing, Warehousing and Transportation (12.7%) and Health Care and Social Assistance (12.3%).

Figure 3—25: Industries of Middlesex County Residents (2010)

Industries are grouped for illustrative purposes and do not directly correspond to the non-grouped industries in Table 3—3



US Census Bureau, LEHD OnTheMap Origin-Destination Database, (http://onthemap.ces.census.gov)

Table 3—3 highlights the remarkable similarities between the top 5 industries of the labor force living in each of the subregions, as well as the County as a whole. In all regions, the top four largest industry segments among the resident labor force consisted of Health Care and Social Assistance; Professional, Scientific and Technical Services; Educational Services; and Retail Trade . The only difference between the regional analyses in the table is in the fifth rank – Manufacturing in the Central and Eastern Subregion, and Finance & Insurance in the Southern. Overall within the County, Manufacturing was the fifth largest industry in terms of employment.

Table 3—3: Top 5 Industries of the Labor Force Living in Subregions and County (2010)

Rank		East	Central	South	County
1	*Industry*	***Health Care and Social Assistance***	***Health Care and Social Assistance***	***Professional, Scientific, and Technical Services***	***Health Care and Social Assistance***
	Count	16,754	20,757	6,745	42,834
	Share	12.6%	12.4%	13.7%	12.3%
2	*Industry*	***Retail Trade***	***Professional, Scientific, and Technical Services***	***Educational Services***	***Professional, Scientific, and Technical Services***
	Count	14,873	18,907	5,747	37,320
	Share	11.2%	11.3%	11.7%	10.7%
3	*Industry*	***Professional, Scientific, and Technical Services***	***Educational Services***	***Health Care and Social Assistance***	***Retail Trade***
	Count	11,668	17,549	5,323	35,054
	Share	8.8%	10.5%	10.8%	10.1%
4	*Industry*	***Educational Services***	***Retail Trade***	***Retail Trade***	***Educational Services***
	Count	11,664	16,072	4,109	34,960
	Share	8.8%	9.6%	8.4%	10.0%
5	*Industry*	***Manufacturing***	***Manufacturing***	***Finance and Insurance***	***Manufacturing***
	Count	10,088	13,438	3,878	27,029
	Share	7.6%	8.1%	7.9%	7.8%
Top 5	Count	65,047	86,723	25,802	177,197
	Share	49.1%	52.0%	52.5%	50.8%
Not in Top 5	Count	67,516	80,042	23,351	171,284
	Share	50.9%	48.0%	47.5%	49.2%
Total Primary Jobs		132,563	166,765	49,153	348,481

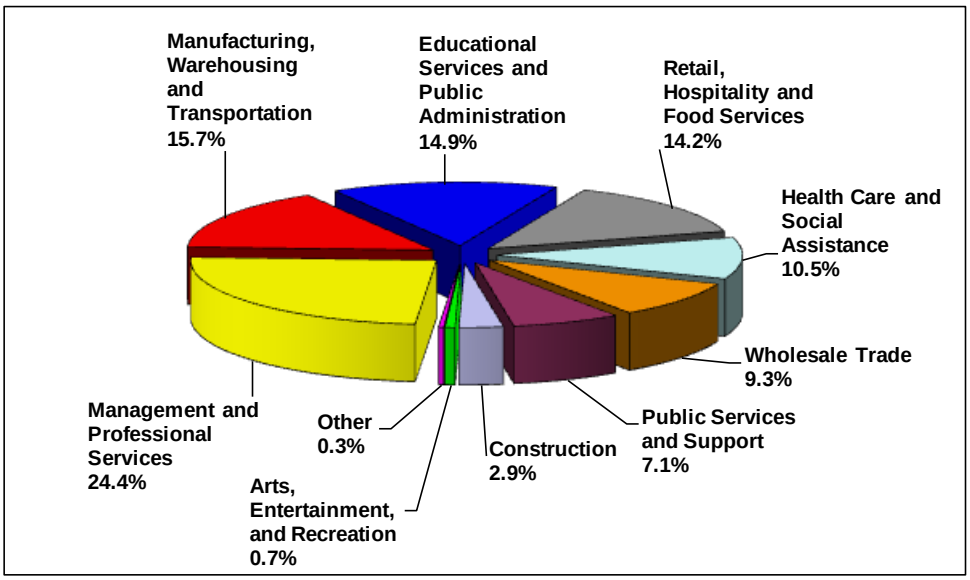
US Census Bureau, LEHD OnTheMap Origin-Destination Database (http://onthemap.ces.census.gov)

3.4.2 Workers Employed in Middlesex County

Among the jobs located in Middlesex County, the leading industries were Management and Professional Services (24.4%); Manufacturing, Warehousing and Transportation (15.7%); Educational Services and Public Administration (14.9%); Retail, Hospitality and Food Services (14.2) and Health Care and Social Assistance (10.5%).

Figure 3—26: Primary Jobs in Middlesex County, by Industry (2010)

Industries are grouped for illustrative purposes and do not directly correspond to the non-grouped industries in Table 3—4



US Census Bureau, LEHD OnTheMap Origin-Destination Database (http://onthemap.ces.census.gov)

Table 3—4 highlights the remarkable differences between the top 5 industries employing workers within each of the subregions, as well as the County as a whole. There is no single industry represented across all subregions and the County.

Table 3—4: Top 5 Industries by Subregions and County, Ranked by Number of Primary Jobs in Workplace Geography (2010)

Rank		East	Central	South	County
1	*Industry*	***Retail Trade***	***Educational Services***	***Professional, Scientific, and Technical Services***	***Educational Services***
	Count	12,337	32,007	7,831	42,250
	Share	13.1%	14.4%	14.5%	11.4%
2	*Industry*	***Health Care and Social Assistance***	***Health Care and Social Assistance***	***Manufacturing***	***Health Care and Social Assistance***
	Count	9,836	26,307	7,542	38,799
	Share	10.5%	11.9%	13.9%	10.5%
3	*Industry*	***Professional, Scientific, and Technical Services***	***Manufacturing***	***Wholesale Trade***	***Professional, Scientific, and Technical Services***
	Count	9,278	21,833	7,481	37,780
	Share	9.9%	9.9%	13.8%	10.2%
4	*Industry*	***Wholesale Trade***	***Professional, Scientific, and Technical Services***	***Transportation and Warehousing***	***Manufacturing***
	Count	7,843	20,671	4,967	35,657
	Share	8.3%	9.3%	9.2%	9.6%
5	*Industry*	***Transportation and Warehousing***	***Retail Trade***	***Finance and Insurance***	***Retail Trade***
	Count	7,576	19,594	4,089	34,579
	Share	8.1%	8.8%	7.5%	9.4%
Top 5	Count	46,870	120,412	31,910	189,065
	Share	49.8%	54.3%	58.9%	51.1%
Not in Top 5	Count	47,159	101,204	22,265	180,755
	Share	50.2%	45.7%	41.1%	48.9%
Total Primary Jobs		94,029	221,616	54,175	369,820

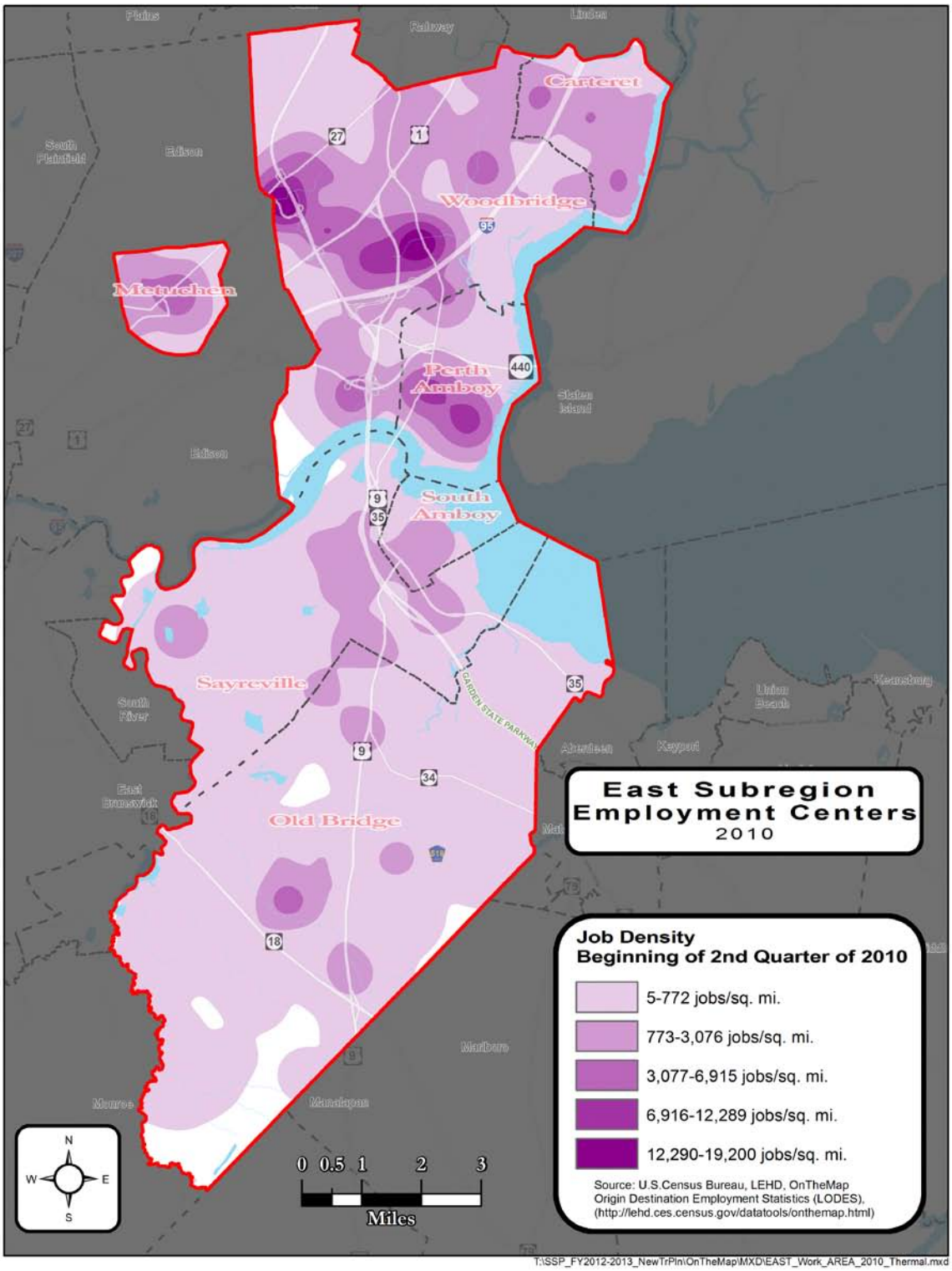
US Census Bureau, LEHD OnTheMap Origin-Destination Database (http://onthemap.ces.census.gov)

The following three maps show where jobs are concentrated within each of the county subregions. In the Central Subregion, there are major employment centers near the Interstate 287 and Route 18 interchange in Piscataway, which includes large corporate building, such as Ericsson headquarters. As a result of Rutgers University and Johnson & Johnson's corporate headquarters, New Brunswick is another area of high job concentration in the Central Subregion. In the East Subregion major employment centers are located at the corporate buildings at the Metropark complex at the 131 interchange of the Garden State Parkway (Garden State Parkway and Route 27 and Woodbridge Center Mall a major retail center located near the intersection of Route 1 and Route 9. In the South Subregion major employment centers can be found along Route 1 in Plainsboro at the Forrestal Village that are located on both the eastern and western sides of Route 1. The area on the east side of Route 1 in Plainsboro near the boundary with Mercer County is underrepresented with this data due to the fact that it is from 2010 and will grow due to the recently opened University Medical Center of Princeton at Plainsboro.

3.4.3 Goods Movement Industries

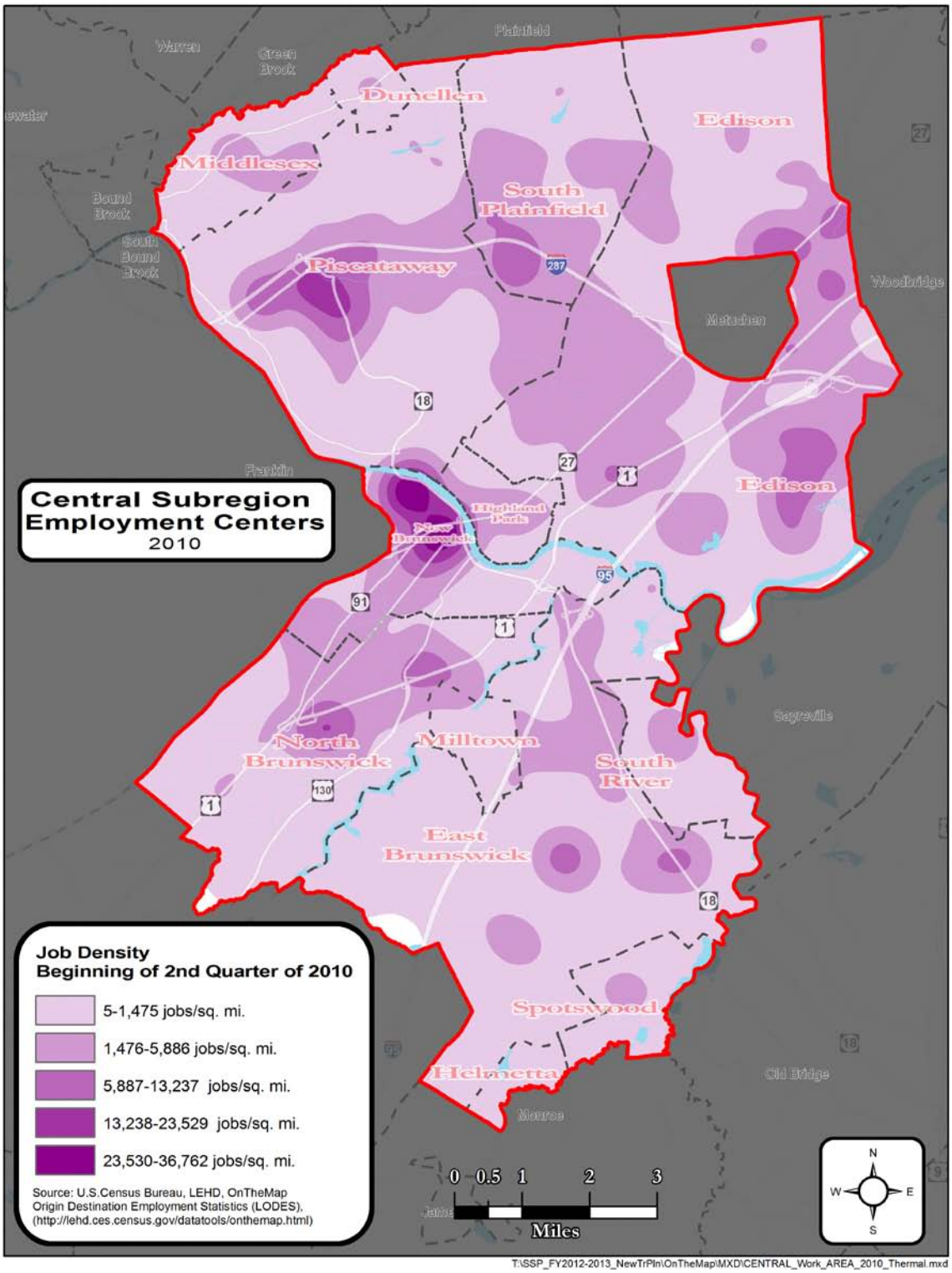
Middlesex County's strategic transportation system, with such interconnecting highways as the New Jersey Turnpike, I-287/Route 440, and US Routes 1, 9 and 130, serves as a major asset in promoting the ability to move goods efficiently and expeditiously within and through the County and spurring economic development and creation of jobs. As supported in the NJTPA's North Jersey Regional Freight Profile for Middlesex County, warehousing and distribution center activities that exist in areas such as the New Jersey Turnpike Exit 8A and Raritan Center serve as large employment centers and provide a major boost to the County's and region's economy.

Map 3-18: East Subregion Employment Centers (2010)



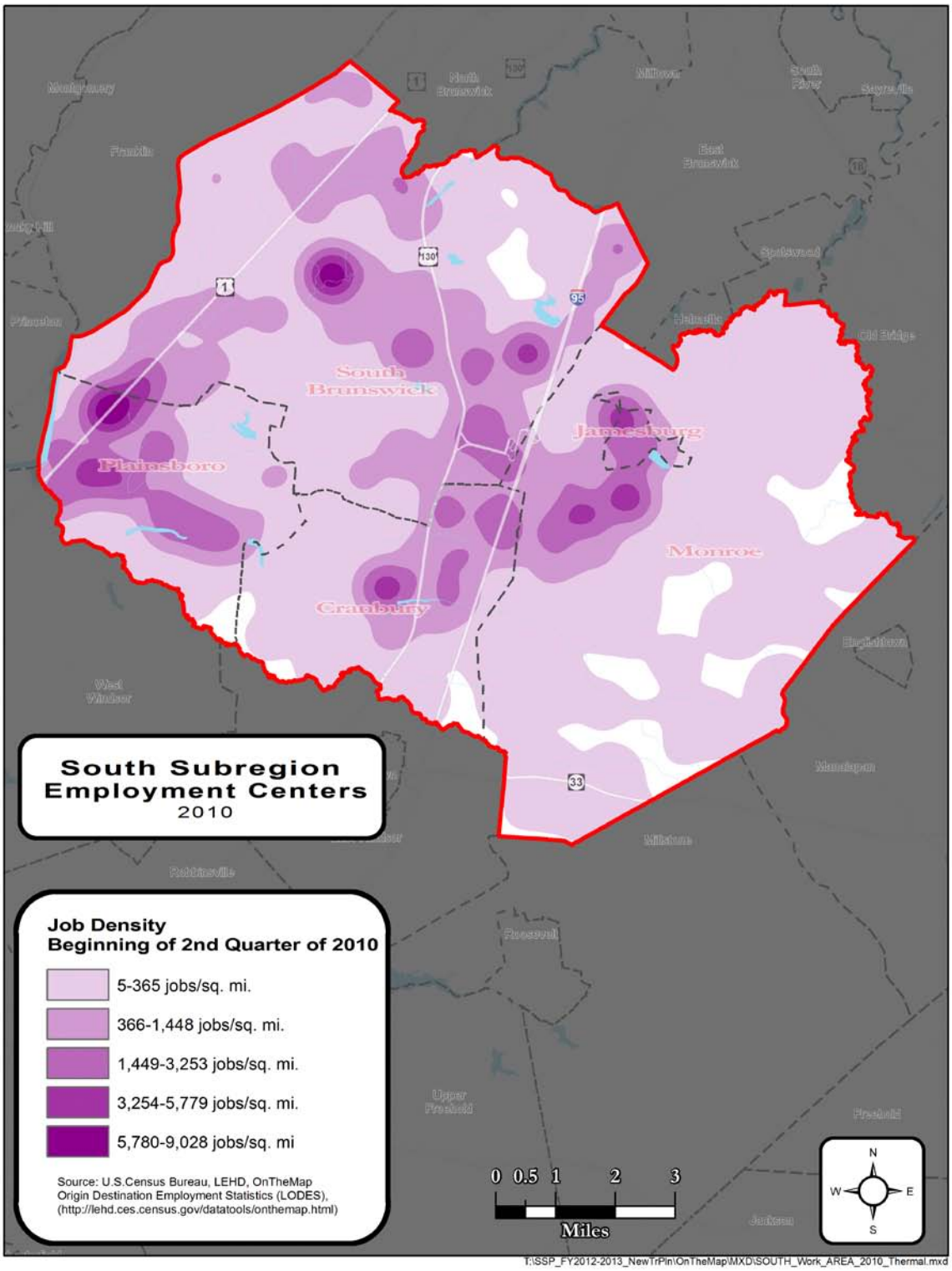
US Census Bureau, LEHD OnTheMap Origin-Destination Database (http://onthemap.ces.census.gov)

Map 3-19: Central Subregion Employment Centers (2010)



US Census Bureau, LEHD OnTheMap Origin-Destination Database (http://onthemap.ces.census.gov)

Map 3-20: South Subregion Employment Centers (2010)



US Census Bureau, LEHD OnTheMap Origin-Destination Database (http://onthemap.ces.census.gov)

Chapter Four: Existing Transportation Resources

This section describes the various transportation facilities and services that are available in the County, and offers suggestions and comments for improving their effectiveness and service delivery to traveling public.

4.1 Roadway Network

Middlesex County is situated strategically at the heart and crossroads of New Jersey halfway between New York City and Philadelphia. With easy access to Newark, Trenton, and Jersey Shore resorts, Middlesex County is a popular place to live, work, and play, containing such regionally important routes and services as: the New Jersey Turnpike, the Garden State Parkway, Interstate Route 287, US Routes 1 and 9 , US Route 130, and New Jersey Routes 18 and 440. Other inter-county arterial routes include New Jersey Routes 27, 34, 35. There are also some 320 miles of County roads that also serve significant principal and minor arterial functions throughout the County linking municipalities, major travel corridors and activity centers. These include such County routes as 514, 522, 527, 529, 535, 604, 615, and 617.

Among the major highway improvements that have occurred over the last decade, there are the Route 18 widening through New Brunswick, the Route 18 Extension projects to I–287 in Piscataway; the US Route 1-130 Interchange improvement in North Brunswick, the US Route 1 widening in Edison and Woodbridge, and the widening and reconstruction of the Route 9 Edison Bridge, The Route 35 Victory Bridge and the Garden State Parkway Bridge over the Raritan River.

All of the County's major highways with the exception of the north/south labeled I-287 and NJ-440, which actually provides for an east/west movement across the northern swath of the County, are oriented toward regional north/south movement. The lack of adequate east – west major roads places the burden for such movements on county and local roads, especially in the sections of the County south of the Raritan River.

Much of the cause of highway congestion is the result of population growth outpacing highway construction and utilization of alternative modes.

4.2 Functional Classification System

The functional classification of a road is the class, or group, of roads to which that the road belongs. There are three main functional classes as defined by the Federal Highway Administration: arterial, collector, and local. NJDOT in collaboration with Middlesex County and NJTPA has updated the Urban Area Boundary and the Functional Classification of all of the roads within Middlesex County. The updated NJDOT Functional Classification Map of Middlesex County (August 2013), which also depicts the updated Urban Area Boundary, is included as Appendix C to this plan.

4.3 Public Transportation System

Middlesex County's urban transport systems are based on a combination of rail lines, bus routes, bicycle pathways and pedestrian walkways which offer the best of all possible worlds in providing mobility, low cost transportation and a healthy urban environment.

4.3.1 Middlesex County 2013 Transit Guide

Middlesex County Office of Planning in collaboration with Keep Middlesex Moving has completed the updated and expanded 2013 Middlesex County Transit Guide to be available for distribution to the general public. The new County Transit Guide was partially funded by NJTPA grants. It updates the previous Transit Guide that was developed in 2007. The Transit Guide is provided as Appendix D to this plan.

The new guide includes a map of all local, regional and interstate bus routes that serve Middlesex County; key adjacent points bordering the County; the NJ Transit passenger rail lines along the Northeast Corridor Line, North Jersey Coast Line and Raritan Valley Line; and Amtrak service. The back of the map provides a description in both English and Spanish of useful information to transit riders. This includes bus boarding procedures and use of the rail system; fares; programs; transfers; senior/disabled resident provisions; services to Newark International Airport and Atlantic City; and listings of the various service providers and their respective routes, bus ticket agents, and related web sites and telephone numbers.

The 2013 Guide serves as an important aid in acquainting the general public with a user friendly map and relevant transit information in English and Spanish of the various transit services that are available in Middlesex County, and in key adjacent areas in Mercer, Somerset and Union counties, that can provide needed bus and/or train access to jobs, medical, shopping and recreational facilities

for many without alternate transportation. For those who have access to a personal vehicle, the Guide can help one discover various benefits of using transit when possible. The Guide offers improved awareness of alternate transit services that may be more relaxing and less costly than driving; a ride in a bus or train where one does not have to drive to work or other destination either on a regular basis or when it may become a desirable choice for personal circumstances as well as the satisfaction that we are contributing to improving traffic conditions, air quality and related social benefits.

The Middlesex County Transit Guide is provided as a public service by the Middlesex County Board of Chosen Freeholders and Keep Middlesex Moving, Inc. Additional copies of the Transit Guide are available by contacting Keep Middlesex Moving at 732-745-4465.

4.3.2 Passenger Rail

Passenger rail service is provided primarily by NJ Transit in Middlesex County along three regional rail lines. These lines include:

Northeast Corridor Line

The Northeast Corridor rail line, providing local and express services by NJ Transit and Amtrak, is accessible from five Middlesex County Stations at Metropark, Metuchen, Edison, New Brunswick, and Jersey Avenue stations. NJ TRANSIT operates trains along this corridor from Trenton in the south (with connections to SEPTA service to the Philadelphia Metropolitan area) to Liberty International Airport, Newark and Penn Station in Midtown Manhattan in the north. This line provides considerable intrastate and New York City oriented service, with stops in such regional employment and activity centers as Princeton, New Brunswick, Metropark, and Elizabeth, and access to other key NJ TRANSIT rail Lines at Penn Station in Newark, Secaucus Jct. and the Hoboken Terminal. Transfers to connecting bus service are also available at various points along this line. AMTRAK operates regional service with stops at Metropark and New Brunswick in Middlesex County, and Acela Express service with stops at Metropark.

North Jersey Coast Line

The North Jersey Coast Line provides service from New York and Northern New Jersey to Matawan and various shore resorts from Long Branch to Bay Head. The rail line stops at a number of stations within Middlesex County, including Avenel, Woodbridge, Perth Amboy, and South Amboy.

Following the shoreline north, the line crosses through Woodbridge and joins with the Northeast Corridor just north of the county border.

Raritan Valley Line

The Raritan Valley Line provides service from New York and Northern New Jersey to Westfield, and westward toward Somerville and High Bridge to Newark Penn Station, requiring a change of trains at Newark Penn Station to reach New York Penn Station. The line crosses the northwest corner of the county, with a stop in Middlesex County at Dunellen. This Station also serves a significant section of Middlesex County including residents from Middlesex, Piscataway and South Plainfield, as well as Dunellen. The Raritan Valley Rail Coalition, in which Middlesex County is represented, has advocated for one seat ride service on this line to midtown Manhattan through the use of dual powered (diesel and electric) locomotives that are undergoing testing in a variety of settings prior to their permanent deployment. The Plan supports this proposal that will need to be implemented along with any improvements that are necessary to facilitate the continuation of train movements from the Raritan Valley Line arrival point in Newark and merge to the rail line leading to New York.

NJ Transit rail lines provide fast, reliable trips to Newark and New York from stations in Middlesex County. All three lines offer all-day service, with headways of 15 to 30 minutes during the peak periods and 30 to 60 minutes during the mid-days hours. All operate on an hourly basis during the weekend. Service is dual-directional, so commuters can move both northward and southward along the rail lines as well as both into and out of Middlesex County activity centers. In addition, connecting local bus service is available at most rail stations in the County. As such, rail service provides a good transportation option especially for the markets that fall within a half-mile of the stations or along connecting bus routes.

4.3.3 Bus System

Local bus routes are typically laid out to traverse the most dense residential areas and connect to job sites, educational sites, shopping centers, medical facilities, social & recreational facilities, and places of personal business (i.e., downtown areas featuring post offices, banks, town halls, etc.) – namely to carry people to the places they want and need to go on a local level. Routes are usually spaced at half-mile increments and greater, in order to cater to different markets and travel patterns in different corridors. The system is coordinated at transfer points to interface with regional bus and rail, taxi, paratransit, and park and ride facilities. Local buses should also provide relatively frequent

service, in order to capture ridership not only during the peak-hours, but throughout the day. This has the effect of making bus transit more feasible and appealing for trips above and beyond the journey to work -- trips for such purposes as shopping and recreation that do not typically have a fixed "start" time and "end" time, for instance.

Middlesex County's local bus system comprises generally the NJ Transit 800 routes and Middlesex County Area Transit seven M routes. The NJ Transit 800 routes have received new NABI buses with improved handicapped accommodations and bicycle racks. The 800 routes are focused primarily upon downtown New Brunswick as the transportation hub.

The Middlesex County Area Transit (MCAT) Shuttle program is a modified fixed route service developed by the Middlesex County Office of Transportation that combines the best features of demand responsive paratransit and fixed route transit to meet the needs of senior citizens, individuals with disabilities and the general public. Similar to paratransit services, the MCAT shuttle routes use small buses that can be well accommodated into shopping centers, apartment complexes and medical plazas to provide more curb-to-curb type of service. Like conventional bus transit, these services operate on a fixed schedule and offer passengers greater choice of flexible trip times without advance reservation.

The MCAT Shuttle routes are designed to meet the needs of many transportation dependent persons who are able to access the service. The routes offer a 30 or 60 minute frequency of service, Monday through Saturday, are wheelchair accessible and offer connections to NJ Transit bus and rail services. The result is a service that can operate at a much higher productivity than conventional paratransit service and at a reduced subsidy per passenger trip.

The fare for the general public is very reasonable and is discounted for persons over 60 and persons with a disability of any age. Two of the seven routes in operation, the M-6 serving the southern area of the county and the M-7 with service to the Route 9 Corridor were developed in from recommendations of two NJTPA federally funded Subregional Studies undertaken by the County. The seven MCAT Shuttle routes in operation offer a major expansion of public transit for the residents of Middlesex County.

New Brunswick holds the distinction of being a transportation hub because it is one of Central New Jersey's traditional Central Business Districts (CBDs), home to an important railroad station along the Northeast Corridor Line, and a regional employment center in its own right. Many of the local bus routes tie Downtown New Brunswick to activity centers elsewhere in the County. New local bus

services such as the MCAT M-6, M-7 and the NJ Transit 655 Route are proving to be successful and are providing new service where it has not existed for many years.

There are also three local bus services that operate across County lines. One, the Davidson Avenue Shuttle (DASH), operated by Somerset County, connects New Brunswick with Somerset County via the Easton Avenue Corridor. Another is the 130- Connector, which is operated by Mercer County and connects to destinations in the Route 130 Corridor including the Cranbury, South Brunswick Exit 8A area in Middlesex County and the Mercer County towns of East Windsor, Hightstown, Robbinsville, Hamilton Twp., and Trenton. A third local service new start, bus Route 655 runs from Princeton Shopping Center, to University Medical Center at Plainsboro with service to Palmer Square, Princeton University and the rail station.

Regional transit routes in Middlesex County are mainly oriented toward New York City, specifically the employment centers of Midtown and Downtown Manhattan. NJ Transit regional routes provide service to New York and to such northern New Jersey transportation and employment centers as Newark, Jersey City, and Hoboken. Private carriers providing regional service in Middlesex County are operated by numerous transit companies such as Suburban Transit (a Coach USA Company) and Academy Lines. Regional service providers focus on a particular corridor or area of the County. For instance, NJ Transit has routes along the NJ-18 Corridor in East Brunswick, the US-9 Corridor and Route 516 Corridor in Old Bridge, but no direct service from New Brunswick. NJ Transit also operates along the Route 28 Corridor in the Borough of Middlesex and Dunellen and along the Route 35 Corridor in Perth Amboy and Woodbridge. Suburban Transit has routes in New Brunswick and through East Brunswick including the Routes 27 Corridor from Princeton to New Brunswick and Route 18 Corridor through East Brunswick, and Route 1 peak hour through North Brunswick.

A sizeable portion of this bus service travels along major corridors like the New Jersey Turnpike, the Garden State Parkway, US-9 south of Interchange 11, and NJ-18 through East Brunswick. Significant hubs and transfer points exist in New Brunswick, East Brunswick, Old Bridge, Perth Amboy, Woodbridge (Woodbridge Center and Metro Park), Edison (Menlo Park Mall), Metuchen, and Dunellen.

Municipal transportation services for senior citizens and/or people with disabilities are also available through various shuttle operations offered by municipalities in Middlesex County as well as by the County.

4.4 Benefits and Characteristics of Public Transportation

Public Transportation provides personal mobility and freedom to get to jobs opportunities, schools, social and medical facilities to people from various economic backgrounds. According to the American Public Transportation Association (APTA), investments in public transportation can generate up to quadruple the amount in economic returns. Also, from 1995 to 2010, public transportation ridership in the nation increased by 31 percent. During this same period the growth in the U. S. population increased by 17 percent, and the use of the nation's highways increased by 24 percent.

According to the Public Information Fact Book of 2011, the most common transit trip is to go to work or return home from work. The second most common is the trip to school and back (including only trips taken on transit vehicles and not school buses), and the third most common is for shopping or dining. Some 60 percent of transit riders can complete their trip without the need to transfer, 29 percent need one transfer, and 11 percent need two or three transfers. Nearly 60 percent of transit riders walk to a station or street stop, over 21 percent drive to a station or stop, and less than 17 percent transfer from another transit vehicle, and 2 percent use other modes. From the transit vehicle to the final point of destination, 64 percent walk, 22 percent transfer to another transit vehicle, 12 percent are completed by driving or riding in an automobile, and 2 percent by other modes.

Actions that could help to improve the use, attractiveness and effectiveness of the countywide transit system and improve overall mobility include the following:

- Coordinating transit services, creating new intercepts and facilitating transfers among transit providers within both local and regional bus route systems to provide new opportunities for connections between different routes that cross each other.
- Maintaining reliability and on time performance.
- Providing park and ride facilities in strategic locations, as in the US-9, NJ Route 18 and NJ Route 27 commuter corridors.
- Providing shuttle linkages to primary commuter corridors from major residential areas.
- Encouraging established and new residential developments to provide peak period shuttle services to nearby train stations or major bus terminals for access to regional employment centers.
- Improving frequency of service where possible.

- Extending service to growing areas of the County as certain areas of the County continue to grow, such as the south County area, densities will increase to such a level as to support a greater level of bus service to serve residents and workers in the area.
- Extending lines to cover gaps in service.
- Improving time transfer connections
- Maintaining low fares and incentive discount programs.
- Investing in newer and better equipment including smart bus equipment able to provide appropriate bus stop information for handicapped/ disabled riders.
- Providing outreach to major employers, welfare programs, students, seniors, and others to inform them of the transit services at their disposal.
- Investing in infrastructure improvements, including shelters, bus stop signage with user-friendly bus route information and markings, priority traffic signals, and bus pull-offs, thereby enhancing both attractiveness and safety for users.
- Exploring the feasibility with Port Authority of NY and NJ of intermodal ferry operations for South Amboy, Carteret and Perth Amboy for local and regional passenger services.
- Expand marketing for use and access to Google Transit.
- Expand marketing on the existence of transit service in various parts of the County, and on the personal and social benefits derived from the use of transit in place of the single occupant vehicle trip.
- Expanding NJ Transit My "Bus Stop" information to cover all bus routes in the County and improve it to provide real-time information that accounts for unexpected delays or detours.

In addition to the type of investments and improvements noted above, transit customers need to take a more proactive view of using transit for the societal benefits that it can help create along with individual benefits to the users. While it is difficult to compete with the on demand readiness and usual trip time advantage that the personal automobile offers when making a trip from point A to point B, public transit can offer other advantages such as allowing one to engage in some kind of relaxing activity during the time it takes to get to and from work. The benefit on not having to drive in traffic congestion can result in reduced stress and arriving to work more relaxed.

The Middlesex County Transit Map and Guide, 2013 updated edition helps promote an increased public awareness of the various transit services in the County along with new services and changes that have been initiated and implemented by the various transit providers that are current as of the update of this Plan. The recent update of the prior County Transit Guide has been done by the County in cooperation with Keep Middlesex Moving, the County's Transportation Management Association.

4.5 Bicycle and Pedestrian Facilities

In the face of growing interest in bicycle and pedestrian activities in our region and throughout the country, and the need to reduce traffic congestion, the pollution, greenhouse gas emissions and related environmental and climatic impacts that result, the *Plan* seeks to stimulate this interest and acknowledges bicycling and pedestrian movements as legitimate forms of transportation. In addition, given the "intermodal" thrust behind transportation, other options above and beyond the traditional focus on highways and transit are being brought to the forefront. In recent years, more and more bicycle and pedestrian facilities have been advanced and received funding as key transportation projects. Such projects have been supported by goals promoting bicycling and pedestrian activities which include:

- Encouraging walking and bicycling use as alternatives to single-occupant automobile use involving trips that are short and pedestrian and/or bicycle accessible. According to Active Living Research - Research Brief of May, 2013, 40 percent of trips made in the United States are less than two miles, a distance which is considered reasonable for many people to use a bicycle. This indicates that there is a significant potential for societal benefits that could be derived from greater trip making by bicycling. It has also been found that in large U. S. Cities the presence of bike lanes or bike paths can serve to increase the percentage of daily bicycle commuters.
- Making walking and cycling safer, easier, and attractive.
- Connecting major trip generators with walkways, bikeways, or roadways that provide reasonable accommodation to cycling.
- Encouraging and promoting complete streets design with .accommodations to bicyclists and pedestrians
- Reducing automobile emissions and congestion.

- Creating a Bike Route Network for recreational and transportation use.
- Promoting land uses and land development patterns that are compatible with the needs of pedestrians and cyclists.

In addition, bicycle and pedestrian facilities should be located and planned relative to their accessibility to various trip generators, including: schools, libraries, hospitals, retail centers and commercial areas, downtowns, rail stations, bus terminals, employment centers, residential areas, and areas of recreational, scenic, cultural, or historical interest.

There are a number of safety and security concerns associated with the designation of bicycle and pedestrian facilities and the co-existence of bicycle and pedestrian traffic -- on and off the roadways. The following measures could be taken in order to encourage safer and more frequent use of these alternative modes:

- Advocate for increased police presence and assistance (i.e., bicycle patrols).
- Provide adequate lighting on bike paths and other facilities.
- Provide alternatives to secluded areas wherever possible.
- Enforce laws that grant pedestrians the right of way at intersections.
- Encourage centralized bicycle registration system to improve bicycle security.
- Provide secure and abundant bike parking facilities including sheltered parking for bicycles, in activity centers (i.e., malls, commercial and retail centers, employment sites, schools, public buildings, etc.)
- Educate cyclists on safe riding techniques.
- Promote school programs to train youngsters about safe riding habits on collector and arterial streets.
- Promote public awareness and education about the rules and regulations of road and bicycle safety.
- Provide bicycle facilities at train stations and retail establishments.
- Educate motorists to "share the road" with cyclists (provide signage that indicates this) and acceptance of legitimacy of cyclists as co-users of the road.
- Promote use of bicycle helmets for all cyclists and foster acceptance by younger peer groups.

- Design combined pedestrian and bicycle facilities wide enough with marked designations to accommodate movements between the two uses such as speed and directional changes; often these facilities are too narrow.
- Provide appropriate facility maintenance for bikeways and pedestrian ways.
- Promote the maintenance of adequate sidewalk facilities.
- Prohibit / eliminate specific physical roadway hazards to cyclists, including certain storm sewer grates (replace these with those of safer design) and other hazards.
- Provide current ADA compatible exclusive pedestrian "walk" cycles with countdown timers on traffic signals at intersections with high pedestrian movement and / or at wide crosswalks.
- Relocate transit and school bus stops from the near side to the far side of an intersection in order to eliminate the sight restriction posed by the bus.
- Provide bus pull-off areas at bus stop locations wherever possible, in order to give departing passengers better visibility relative to oncoming traffic.
- Provide barrier-free curbs that conform to current ADA standards
- Provide marked crosswalks at pedestrian crossings; also promote the use of reflectorized pavement markings and rumble strips for crossings, shoulders, bike lanes, etc. to keep drivers abreast of where people are likely to be walking and bicycling.
- Promote litter control measures to keep areas of walking and bicycling activity free of debris.
- Expand use and integration of bicycling to provide linkages to transit services through adequate, sheltered and secure bicycling parking facilities, allowance of bikes on buses and trains, accommodation of bicyclists on roadways, and of and other related programs.
- Certain programs should also be undertaken to show that an area has begun to make a commitment to support and encourage bicycling. These include:
  - Bike to Work Days/Weeks promoting bike use, and employer incentives for such programs.
  - Public awareness bike rides and bike-a-thons for charity.
  - Bicycle commuting workshops at the workplace.
  - Provision of locker and shower facilities for bicycle commuters at employment sites.

- Employer incentives to employees who give up free parking spaces and opt to bike to work one or more days per week.
- Incentives to high school and college students who choose to bike to school rather than drive (Such incentives may include free movie passes, free car washes, restaurant coupons, etc.).
- Promotion of bicycle touring (in conjunction with the Division of Travel and Tourism and the Department of Community Affairs) through media, press, and other promotional material.
- "Bike Fairs" and other special events where a particular street or stretch of streets (usually within an activity center) are closed to automobile traffic for exclusive use by bicyclists and pedestrians.

Efforts must be made from a planning and engineering perspective to make existing and new facilities as safe and "friendly" as possible to the cyclist and pedestrian, and to promote a cohesive network of bicycle routes and pedestrian-compatible transportation facilities. This will likely be accomplished incrementally, as municipalities continue to advance individual proposals and projects.

4.5.1 Major Bicycle and Pedestrian Projects and Initiatives

In advancing the proposals that follow it is important to note that bicycle and pedestrian proposals need to be considered as more than just open space initiatives or recreational facilities. They are part of a transportation opportunity that expands intermodal choices. Where possible, the recreational nature of various projects should be broadened to take on this transportation aspect.

1. Middlesex Greenway: Metuchen, Edison, South Plainfield, Perth Amboy, Woodbridge

One notable bikeway proposal on exclusive right of way that has been advanced and implemented is the **Middlesex Greenway**, stretching along an abandoned rail right-of-way between Metuchen, Edison, and Woodbridge. This facility also comprises a key segment of the East Coast Greenway through Middlesex County. This project integrates recreational and transportation usage of the route by bicyclists and pedestrians. The potential exists to extend the Middlesex Greenway segment from its initial terminal points further along the rail lines in either direction northwest towards South Plainfield, southerly towards the proposed **off road East Coast Greenway** alignment along the Raritan River coastline through Raritan Center, and easterly towards Perth Amboy. The

proposed southerly extension alignment would join with the completed Middlesex Greenway at Crows Mill Road in Woodbridge and with the existing Johnson Park Bikeway in Highland Park. This bikeway along the East Coast Greenway off road alignment provides an existing connection to the **D & R Canal Towpath at Landing Lane in Piscataway** which is also part of the East Coast Greenway. As part of this East Coast Greenway - Middlesex Greenway network develop a Central Jersey Circuit linking also the privately proposed Raritan Center and Raritan River Greenways as a continuous loop serving Metuchen, Edison, Woodbridge Perth Amboy, South Plainfield and Piscataway.

2. *Route 1 Power Trail Alternate: Edison and Woodbridge*

A long standing bikeway proposal recommended that a bikeway be built along the US-1 northbound corridor within the PSE&G utility easement through Woodbridge and Edison. This utility corridor alignment was proposed to provide bicycle access to Roosevelt Park, Menlo Park Mall, Woodbridge Center, and numerous commercial establishments along US-1, and serve a number of residential areas in this vicinity of Edison and Woodbridge. However, in light of opposition from PSE&G to utilize the power lines right of way, an alternative bikeway **facility on an alignment on the southbound side of Route 1** should be explored to provide desired access to the above noted facilities. This could include utilization of AMTRAK right of way near Route 1 and Grandview Avenue.

3. *Rutgers University Bike System Proposals: New Brunswick, Piscataway, North Brunswick, East Brunswick*

Rutgers University is expanding its inter campus bikeway system to further improve bicycle access to all of its campuses in the New Brunswick-Piscataway and North Brunswick area. Initial projects that have been completed include the Busch-Livingston Trans-Campus Bikeway, the Cook-Douglass Bikeway Project, and the Cedar Lane Bikeway. New proposals from Rutgers University include the Rutgers **University Cook/Douglass Campus Bikeway Extension to Ryders Lane in North Brunswick and future southerly bikeway extension to area institutions including DeVry and Silverline, and northerly extension to Rutgers Village in New Brunswick and East Brunswick Transportation Center**. These projects will help bicycle and pedestrian traffic in the area of US Route 1 near the Rutgers campuses and facilities in the area of North Brunswick - New Brunswick - East Brunswick, and Milltown. These proposals offer a transportation alternative to the citizens of these communities and the Rutgers population.

4. New Brunswick Bikeway

Middlesex County, after more than a decade of planning and project development work, is nearing the construction of the New Brunswick Bikeway from George Street and Bishop Place at the Douglass Campus to Huntington Street at the College Avenue Campus. This project is integral in tying together the separate campuses with a facility through downtown New Brunswick, and serving the New Brunswick Train Station and other transit and downtown facilities.

Once completed, the New Brunswick bikeway system will accommodate a large number of university students and faculty, and will improve access from surrounding municipalities to Rutgers University, New Brunswick area transit services, healthcare and employment facilities.

5. Route 18 Corridor Bikeway (Piscataway–New Brunswick)

Another major **bikeway – pedestrian facility is along the Route 18 Corridor** from the Route 1 vicinity in New Brunswick to I-287 in Piscataway. The existing link that has been recommended for bicycling and pedestrian related safety and maintenance related improvements along this corridor is **the Route 18 Raritan River Multiuse Trail** between Route 27 in New Brunswick to the John Lynch Route 18 Bridge over the Raritan River, and also known as the "trench."

6. River Road Corridor Bikeway: Piscataway, Middlesex

In June, 2003 the Middlesex County completed a Feasibility Study for the proposed extension of a bicycle facility along the River Road corridor by extending the Johnson Park Bikeway from Hoes Lane to Route 28 in the Borough of Middlesex and to the Raritan Valley Line train station in the adjacent Borough of Bound Brook in Somerset County. The River Road route located along River Road in Piscataway and Middlesex was identified and is proposed in this Plan. The intent of this bikeway facility was to extend bicycle access to the East Coast Greenway alignment via the 60-mile Delaware and Raritan Canal State Park that runs from New Brunswick to Trenton. The bikeway extension would also connect to regional land uses to a major transportation facility, the Bound Brook Train Station, and through Highland Park towards Route 27, thereby enhancing intermodal connections.

7. Cranbury Road (CR 535) Bikeway Corridor from Route 18, East Brunswick to Main Street, Cranbury

8. Bicycle Parking and Bike Stations, New Brunswick, Edison, Metuchen, Metropark, Perth Amboy, South Amboy, Dunellen, Old Bridge, East Brunswick

In order to encourage more bicycle commuting in Middlesex County, especially at major transit centers the Plan supports the provision of secure and well-lighted bicycle parking accommodations such as bike stations with appropriate amenities that may include locker rooms, showers, bicycle rental, snack bar, bicycle equipment sales and repairs housed in secure indoor parking available 24 hours a day seven days a week. Major transit facilities in the County that could be considered for bike station facilities to enhance the use of bicycling by commuters from nearby residential areas include Downtown New Brunswick, Edison Train Station Metuchen Train Station, Metropark Train Station, Downtown Perth Amboy, the South Amboy Train Station, Dunellen Train Station, Route 9 & Ernston Road Bus Park and Ride and the East Brunswick Transportation Center. Where indoor bike station facilities are not feasible, the Plan recommends the provision of sheltering equipment such as canopies over the bicycle racks or new bicycle lockers to provide protection from the weather. In the vicinity of the New Brunswick Rail Station over 75 people park their bicycles at existing U-racks. In addition many cyclists that ride their bicycles to the train chain them to signposts, trees, railings, fencing and other street furniture. These conditions emphasize the need for improved bicycle parking facilities in areas of existing and increased potential demand. Hence, it is a generally accepted finding that bicycle parking improvements that provide a reasonable measure of security, protection from the elements, affordability, and attractiveness provide a great incentive in the use of bicycling as a viable transportation alternative for a various trip purposes in urban and suburban areas.

Middlesex County also accommodates a section of the designated alignment for the High Point–to–Cape May Bicycle Route in the area of South Brunswick, Plainsboro and Cranbury.

The Plan proposes that major bikeway routes through Middlesex County be enhanced through ancillary bicycling connections where possible and feasible at the discretion of the host municipalities. It is also recommended that alternative low-traffic local routes that parallel major arterials be identified by each municipality to enable cyclists to reach desired destinations without having to use major roads that are not bicycle-friendly and often unsafe for riders.

4.5.2 Metropark Station Area -- public input on bicycling and pedestrian proposals

The following is an example of public input received in the County's ongoing efforts to coordinate with other bicycle and pedestrian interest groups in ensuring effective bicycle and pedestrian facilities planning. Similar input relating to other transit facilities and areas of the County has also been received.

- Maintain sidewalks on both sides of all streets within walking distance to Metropark train station. Connect sidewalks where they are discontinuous.
- Provide a network of clearly marked bicycle routes serving residential locations and activity centers within a five mile radius of the Metropark Train Station, and expand bike lockers on station premises.
- Improve aesthetics to area around Metropark Train Station, one that is inviting to pedestrians.
- Construct a pedestrian tunnel allowing pedestrians to cross NJ-27 at Magnolia Road and install sidewalks along both sides of NJ-27 to Oak Tree Road.
- Pedestrian/bikeway tunnels should be well lighted with camera surveillance for added security. Consider traffic calming and pedestrian enhancements to traffic signals at all intersections within walking distance to Metropark Station.
- Incorporate pedestrian and bicycling accommodations on roadway improvements wherever possible.

4.6 Freight Facilities

Middlesex County, located on the NJ Turnpike just one Exit away from Port Newark / Elizabeth, is heavily impacted by the container arrivals and distribution of cargo through the port. Middlesex County, of all the counties in New Jersey, has the largest, number of square feet of industrial real estate in the region with warehouse/distribution space totaling 208 million square feet.[2] Much of the wholesale / retail distribution clusters including more than 1,300 buildings are located along the I-287 Corridor, the New Jersey Turnpike Exit 8A area, and the NJ Turnpike Exit 12 area west of the Turnpike. Six of these buildings are more than 1 million square feet and are located near the New Jersey Turnpike Exit 8A and Exit 10. Marine Terminals for petroleum and chemical related industries are located in the northeast part of the County and include such facilities as KMI Carteret, Port Reading Yard, Hess, Chevron, and KMI Perth Amboy. Manufacturing facilities are clustered near the I-287 / Route 440 corridor and along the Jersey Avenue (NJ Route 91 Corridor) in New Brunswick. Some 765 facilities in Middlesex County receive over 11.7 million tons and ship 12.2 million tons of freight annually.[3] Accommodating truck parking has been a matter of concern for many years in the vicinity of the New Jersey Turnpike Exit 8A leading to past recommendations for truck stop locations along the Turnpike in this general vicinity. As a result of concerns expressed by Middlesex County communities along some of these potential areas there has been no proposal for a truck parking facility in this area of Middlesex County. However, the Plan recognizes the need for truck accommodation(s) in light of the large warehousing and distribution facilities in this and other areas of the County. In view of this the Plan supports a collaborative effort with municipal officials, State, regional and NJ Turnpike Authority representatives to continue to address this issue. Truck parking accommodations are available at Exit 7 of the Turnpike.

The high cost of manufacturing of goods in the United States has led to the exporting of many of these jobs to Asia and to places where labor costs are lower. That movement has profoundly altered the economic base of Middlesex County, where the manufacturing sector has shed jobs and production facilities. Today, many goods made elsewhere arrive on the east coast through Port Newark / Elizabeth, in approximately 6,000 containers daily. The major freight concentrations in the County are now containers trans-shipped by truck to distribution and warehouse facilities clustered around NJ Turnpike Exits 8A, 10, and, increasingly, 12. Approximately 145,000 people, or about 37 percent of people employed in Middlesex County, are employed in freight intensive industries. According to

[2] C.B. Richard Ellis 2011 in Background Paper by Anne Strauss Weider.
[3] NJTPA Middlesex County Freight Profile (page 5).

NJTPA data, in 2007, approximately 71.6 million tons of domestic freight was transported into, out of, or within Middlesex County by truck, rail, water and air. Of this freight, 81 percent travels by truck, primarily to and from warehouses, distribution centers, manufacturing facilities and retail centers. Approximately 10 percent of freight (including mostly petroleum chemical products) travels by water and the remaining 9 percent travels by rail. The Conrail Lehigh Line through the northwestern part of the County is considered one of the most heavily traveled freight lines in the State. The project to expand Port Newark/Elizabeth has been driven by plans to widen the Panama Canal by 2014. . A very large dredging project is underway to deepen to 50 feet 45 miles of ship channels that lead to the docks in Newark, Elizabeth, Jersey City, Bayonne, Staten Island and Brooklyn that make up the Port of New York and New Jersey. Work started on the dredging in 1999 and will be complete in 2014. Congress has been funding the dredging project for 30 years at an estimated cost of $3.2 billion. That is $24 for every taxpayer in the United States.[4] In addition, the Bayonne Bridge is being raised 65 feet at its center span which will allow Port Newark and Port Elizabeth terminals to take full advantage of the increased water depth. Because of its proximity to Port Newark /Elizabeth, its strategic regional location and transportation accommodations, Middlesex County is a benefactor of the port expansion and is positioned to continue that expansion.

Major freight concentrations in Middlesex County have several locations of industrial and distribution warehouse space. This Middlesex County concentration is one of the largest in North America. These include New Jersey Turnpike Interchange 10 / I-287 market area which includes 99 million square feet, Raritan Center (13 million sq. ft.), Heller Industrial Park (8.7 million sq. ft.), and Interchange 8A which has over 64 million square feet of industrial property with several buildings with over 500,000 sq. ft. and one million square feet.[5] Recently Carteret and Port Reading at Exit 12 have added large industrial and distribution warehouse space built by ProLogis, a very large Industrial space developer.

The highway network in Middlesex County connects major freight activity centers with key destinations within the County, the State and to other parts of North America, and parts of the world via international seaports and airports.

The NJ Turnpike Exit 12 has been reconstructed and will be connected to Union County and Tremley Point in Union County with an industrial road from the Toll Plaza over a new bridge over the

[4] Argument for dredging is the numbers Alexander Lane Newark Star Ledger, September 13, 2003.
[5] NJTPA Middlesex County Freight Profile

Rahway River. The context of the supply chain / distribution industry lifting the future of Middlesex County has evolved with global economic trends. Opportunities for growth will be created by simply focusing on already accelerating trends which are attracting economies of scale at Port Newark and the access points supplied by our distribution industry leaders. The widening of the NJ Turnpike is one major opportunity for growth causing a contextual shift for the freight industry.

The freight picture in Middlesex County, in the context of what exists and is planned for to the year 2040, shows great promise for growth and expansion. The Middlesex County Transportation Plan reflects the increase of capacities for trucks which were 11,000 per day on the New Jersey Turnpike in 2007. With the $2.7 billion dollar widening of the NJ Turnpike from Exits 9 to 6 to increase capacity with separate lanes for additional trucks and buses, truck volume is estimated to reach 19,000 trucks per day by 2040. That is a 70% increase. The commodity truck flows distinguish the industry clusters and are intended to describe the future of Middlesex freight flows as accurately as possible.[6] Other major State highways in the County including portions of I-287 / Route 440, Route 1, Route 9/35, and Route 18 carry in excess of 1,000 trucks per day.

According to 2007 data, 56 percent of truck trips on Middlesex County highways were through trips to and from points in New Jersey; 34 percent were trips from an origin in Middlesex County or to a destination in Middlesex County or both; and about 10 percent were trips between origins or destinations outside the State.[7]

In 2040, it is expected that the highway network in Middlesex County will continue to be a major means of travel for freight into, out of, and through the County with trucks expecting to carry 81 percent of all freight tonnage, domestic water, 10 percent, and rail 9 percent. Other than the New Jersey Turnpike, major State routes including I-287, Routes 1, 9, 18 (in New Brunswick and Piscataway), 27 (in North Brunswick), 130, and 440 could see increases in truck traffic of more than 100 trucks per day; while State Routes 18 in East Brunswick, 27 in Edison, 34 and 35 in the Old Bridge – Sayreville area, County Routes 514, and 535 could see truck traffic increase by more than 500 trucks per day.

While roadway improvements are needed to accommodate trucks and the mix of vehicular traffic that we have in the County, freight rail facilities also need to be given similar attention for their role in the movement of shipments. Freight rail lines can be advantageous for shipments over long distances and for their benefits in terms of capacity efficiencies, air quality impacts, and relief to the

[6] NJTPA Middlesex County Freight Profile (pages 10-11).
[7] NJTPA Middlesex County Freight Profile (page 5)

wear and tear on roadways that experience heavy truck traffic. In this regard the Plan recommends resilient road and rail infrastructure including the upgrade of rails weight limit to the national standard of 286,000 lbs.

Middlesex County contains a number of freight rail facilities serving the region along various former Conrail facilities and shared rail facilities with NJ Transit and Amtrak. Middlesex County ranks high within the NJTPA region with regard to the shipment of commodities in the wholesale/retail distribution industries, and also in the manufacturing and petroleum/chemicals areas. According to the NJTPA North Jersey Regional Freight Profile 2040 Freight Industry Level Forecasts, Middlesex County ranks second within the NJTPA Region in the total number of manufacturing buildings and in the total number of warehousing/distribution buildings based on square footage. According to NJTPA Freight Profile data, 81 percent of domestic freight traveling to, from or within Middlesex County occurs by truck involving trips primarily serving warehouses, manufacturing facilities and retail centers. Approximately 10 percent of this freight travel is done by water–involving mostly petroleum and chemical products transported through terminals along the Arthur Kill; and about 9 percent by rail.

Middlesex County is home to some of the critical freight nodes in the region. These are areas with concentrated freight activities such as trucking, rail manufacturing, warehouse and distribution and support activities that include such regional areas as the New Jersey Turnpike Exit 8A and Exit 12, and the I-287 Corridor.

The New Jersey Comprehensive Statewide Freight Plan identifies freight nodes as areas with concentrated freight activities such as trucking, rail, manufacturing, warehouse and distribution and support activities. These include the northern node centered on the ports of New York and New Jersey and the southern node centered on the ports of New Jersey and Pennsylvania. Middlesex County as the nexus of major highways and travel corridors such as the New Jersey Turnpike, I-287/Route 440, and Routes 1, 9, 18 and 130 will benefit from the proposed infrastructure improvements affecting the flow of goods through the County and to areas within the County. A major project that will provide indirect benefits for freight access is the proposed replacement of the existing Goethals Bridge by the Port Authority of New York and New Jersey estimated to cost over $1 billion. This improvement can help relieve congestion along the Outerbridge Crossing between Perth Amboy and Staten Island by increasing overall capacity between the I-278 and the I-287/Route 440 Corridors.

With restructuring and cutbacks on the rail system over the past 30 years the Northeast Corridor, which is a predominantly passenger service route, remains the heaviest built line in the State.

According to the NJDOT Comprehensive Statewide Freight Plan, freight traffic along the Northeast Corridor has grown over 20 percent over the last 10 years.

4.7 Ferry, Airports, and Heliport Accommodations

Middlesex County has heliport facilities which serve businesses, hospitals, Rutgers University, the County Mosquito Commission, the New Jersey Turnpike Authority, and the National Guard 78th Division Headquarters. They are located throughout the County in such places as New Brunswick, East Brunswick, Edison, Piscataway, Perth Amboy, Sayreville, Woodbridge, South Brunswick and Cranbury. There is also an airport facility in Old Bridge which serves small airplanes and also used by the National Hot Rod Association for Drag Racing.

Ferry or waterborne transportation proposals in Middlesex County that are recognized in capital transportation programs include the South Amboy Ferry Service and terminal, and the Carteret Ferry Terminal. The Plan also encourages collaboration with the Port Authority of New York and New Jersey and with municipal/ private sector partnerships to identify potential opportunities and constraints for developing coastal areas in Middlesex County for local / regional operations that may serve passenger mobility needs, and where appropriate also freight facilities.

There is potential for a significant amount of freight flow relating to the East Coast Marine Highway and the redevelopment of Port Raritan as an important domestic freight village concentration for small container ships. The Raritan Logistics Center's strategic location with multimodal transportation distribution services promotes economic growth in the County and the State. The County has supported a NJDOT initiative in a TIGER grant application which identified the renewal of the dock at Raritan Center tied with rail access upgrades at that location. This initiative was referred as the Port Raritan Marine Terminal, and continues to be supported in the Transportation Plan.

Chapter Five: System Performance & Problem Areas

5.1 Vehicle Miles Traveled (VMT)

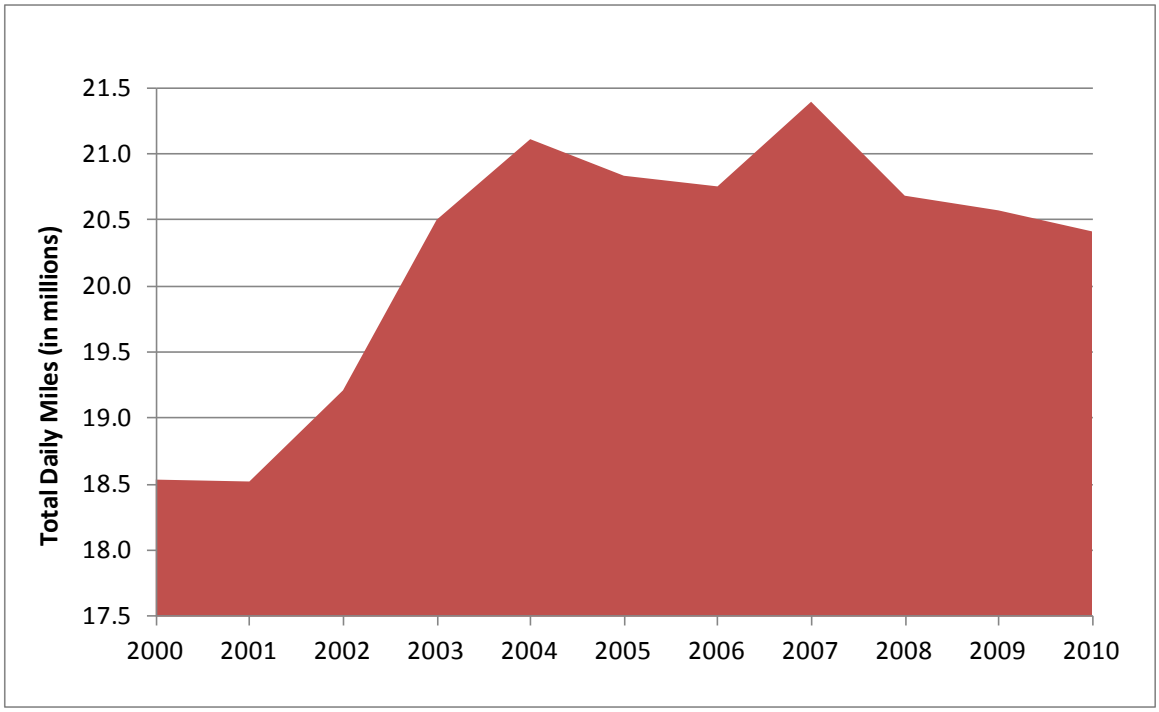
Many of the problems that impact our physical infrastructure and economic competitiveness are related to traffic congestion and its affect on travel delays, loss of valuable time, spillover of through traffic onto secondary roads and residential neighborhoods, increased fuel consumption and air pollution.

According to NJDOT statistics[8], total annual average daily **V**ehicle **M**iles **T**raveled ("VMT") in Middlesex County over the last decade from 2000 to 2010 increased from 18.5 million to about 20.4 million or approximately 10 percent (see Figure 5—1on page 152). Total Annual Vehicle Miles Traveled per Capita increased from 9,043 in year 2000 to 9,859 in year 2007 (9% growth) and then decreased to 9,201 in 2010 representing a decline from 2007 of 7% over this three year period (see Figure 5—2 on page 152). This was likely caused as a result of the recession.

Interstates and freeways experienced the most significant growth in total daily VMT from approximately 8.1 million in 2000 to about 9 million in 2010 (see Figure 5—3 on page 153). Daily VMT was more stable during this same time period on arterials, collectors and local roads (See Figure 5—4 and Figure 5—5 on pp. 153 & 154).

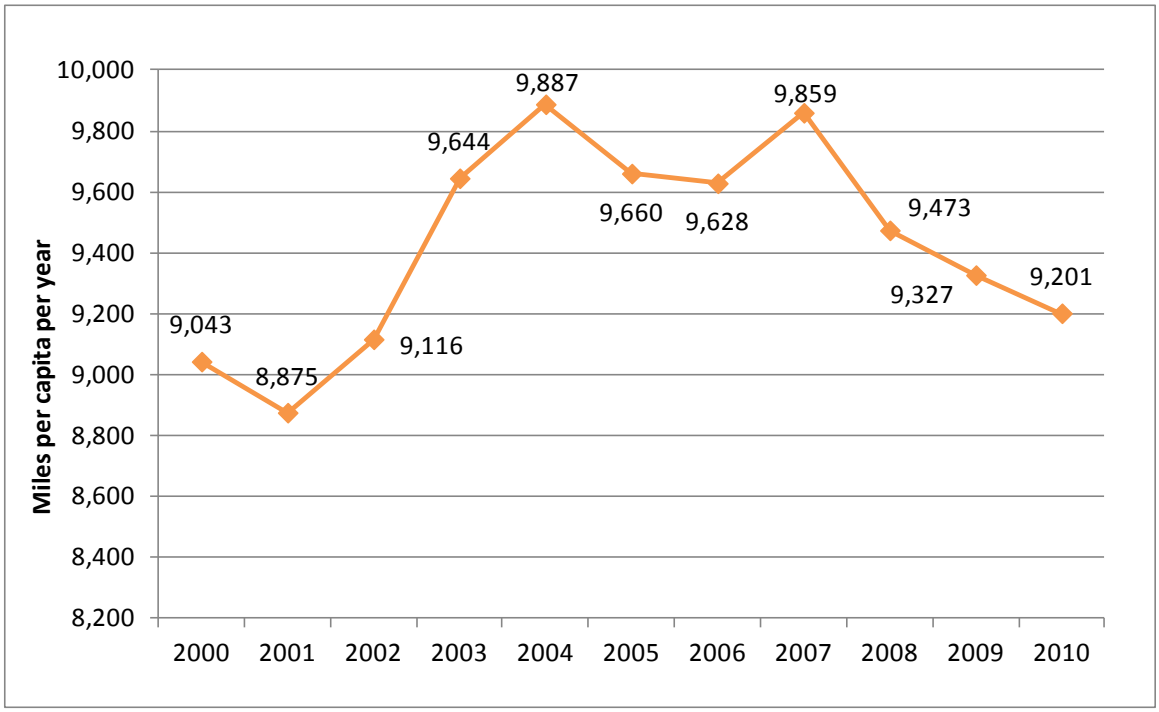
[8] NJDOT, vehicle miles traveled data: http://www.state.nj.us/transportation/refdata/roadway/vmt.shtm as retrieved June 2012, graphs and summation compiled by Middlesex County Office of Planning.

Figure 5—1: Total Daily Vehicle Miles Traveled
Middlesex County (2000 to 2010)



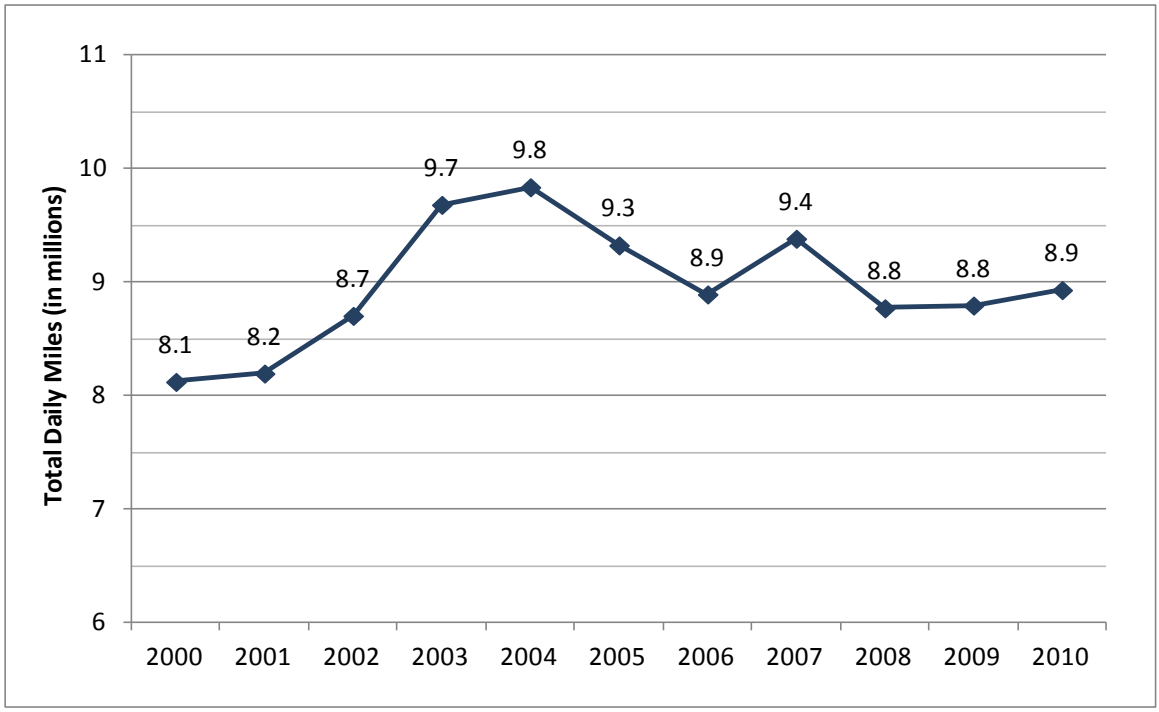
Source: NJDOT

Figure 5—2: Total Annual Vehicle Miles Traveled per Capita
Middlesex County (2000 to 2010)



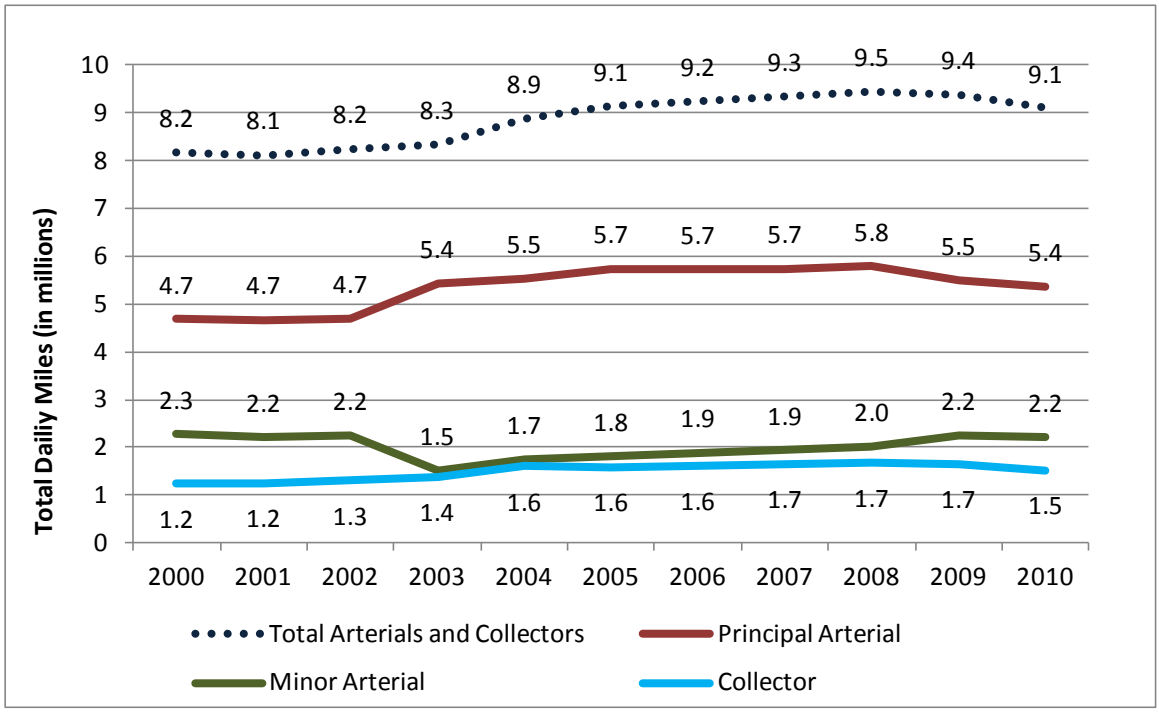
Source: NJDOT

Figure 5—3: Daily Vehicle Miles Traveled on Interstates and Freeways Middlesex County (2000 to 2010)



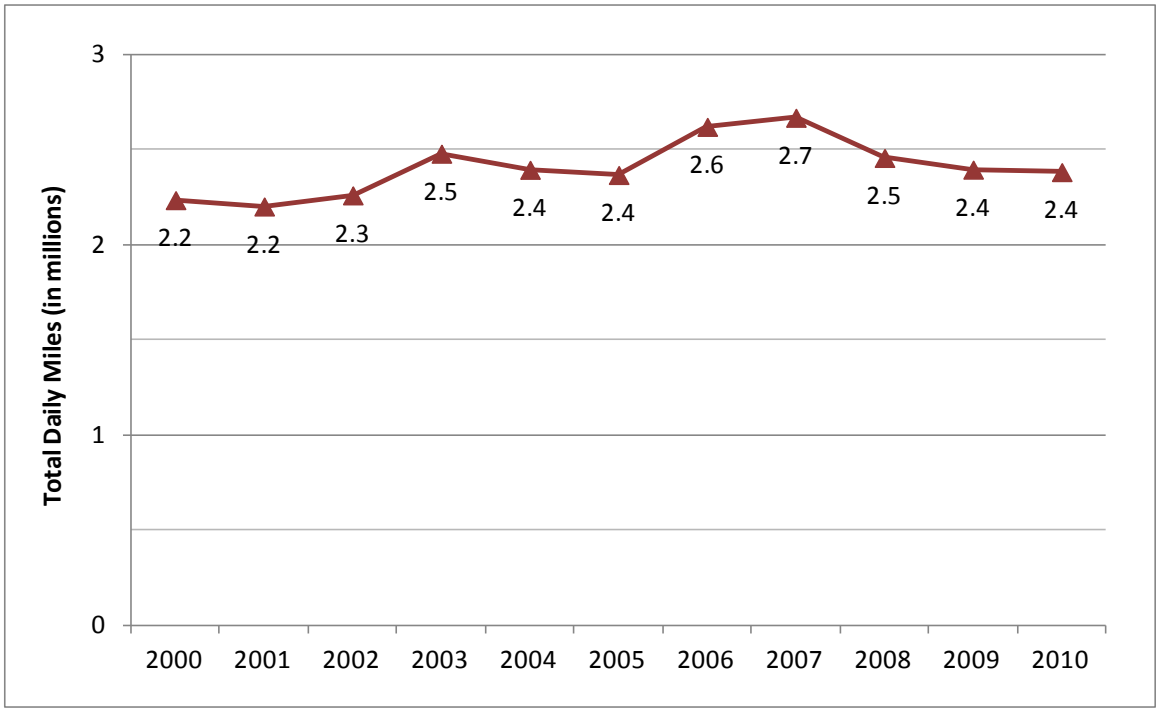
Source: NJDOT

Figure 5—4: Daily Vehicle Miles Traveled on Arterials and Collectors Middlesex County (2000 to 2010)



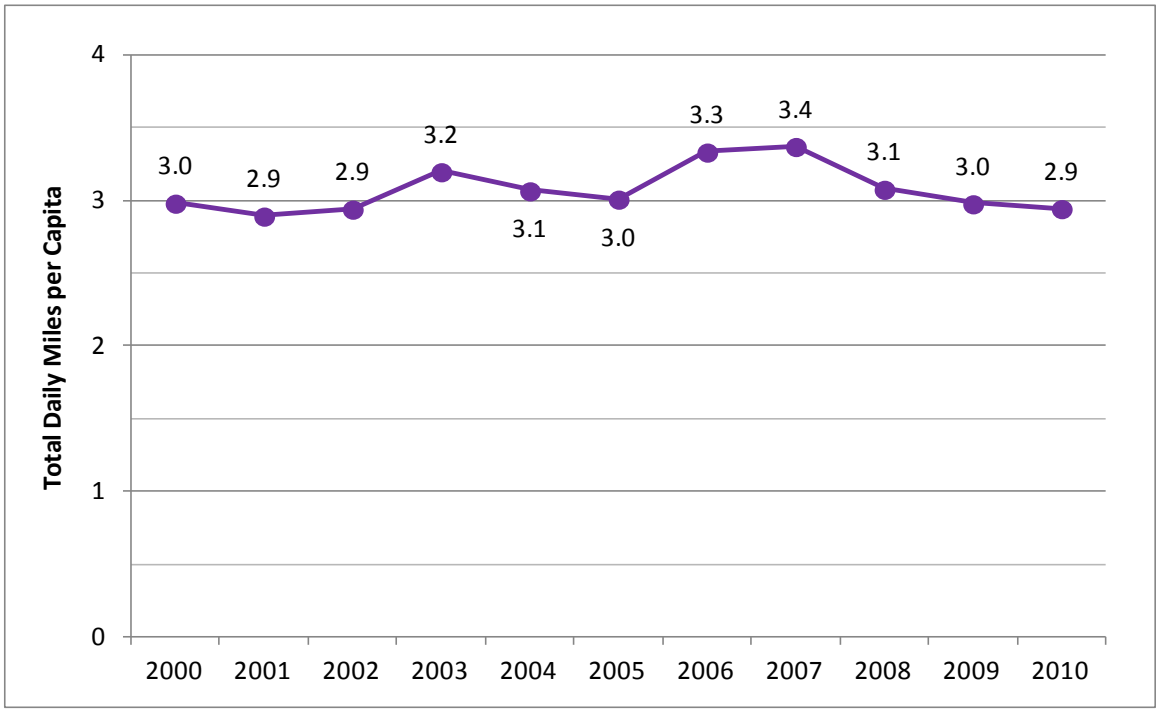
Source: NJDOT

Figure 5—5: Daily Vehicle Miles Traveled on Local Roads Middlesex County (2000 to 2010)



Source: NJDOT

Figure 5—6: Daily per Capita Vehicle Miles Traveled on Local Roads Middlesex County (2000 to 2010)



Source: NJDOT

5.2 NJDOT Congestion Management System

The overall priority rating score of each roadway link included in the NJDOT Congestion Management System considers the volume to capacity ratio ("V/C ratio") and average daily traffic (ADT) per travel lane. Each factor is weighted 50% with a total score range of 0 to 10. The most recent scores are based on V/C ratio and ADT data from 2009 and were tabulated in July of 2012 by NJDOT.

Priority rating categories are classified according to the following score ranges:

A score greater than 8.0 is classified as ***Very High***

A score from 7.0 to 7.99 is classified as ***High***

A score from 6.0 to 6.99 is classified as ***Medium-High***

A score from 5.0 to 5.99 is classified as ***Medium***

A score from 4.0 to 4.99 is classified as ***Medium-Low***

A score less than 4.0 is classified as ***Low***

Table 5—1 on page 156 summarizes all roadway mileage in the NJDOT CMS by priority ratings. More than half the mileage (12.9 miles; 54%) of Route 1 is ranked as high and very-high. About a third of both Route 9 and Route 27 are classified in the two highest rating categories of congestion. County Route 514 (Easton Avenue, New Brunswick) and County Route 529 (Stelton Rd, Piscataway; Plainfield Ave, Edison) each have notable mileages in the high category.

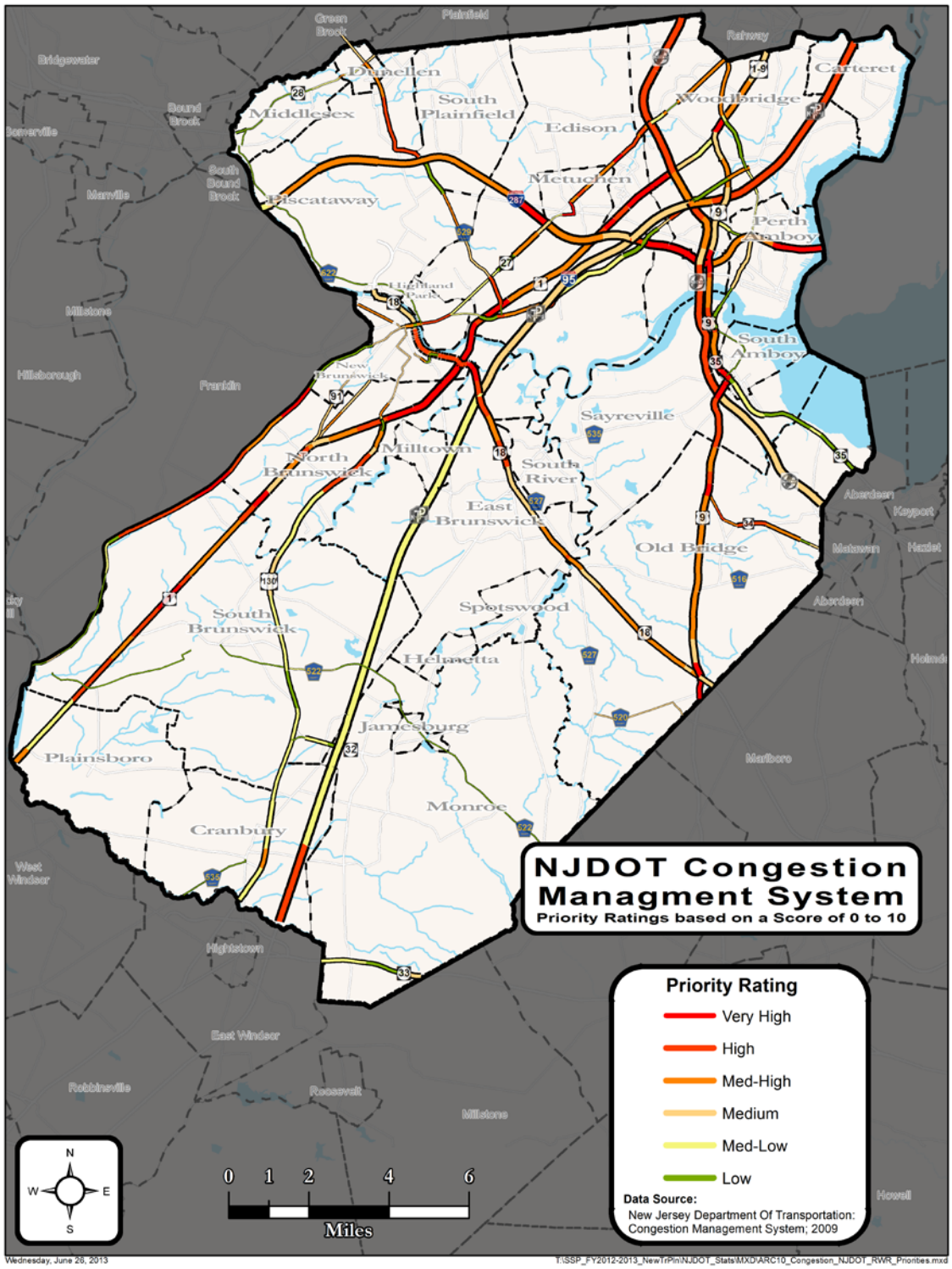
Map 5-1 on page 157 illustrates the convergence of very-high congestion levels at the interchange of Route 1 and Route 18. Other notable areas identified as highly congested are Route 1 between Route 18 and Route 529; Route 287 between Route 9 and the NJ Turnpike; and Route 440 between Route 9 and the Outerbridge Crossing.

Table 5—1: Middlesex County Road Mileage by NJCMS Priority Rating Categories

Route	Very High		High		Med-High		Medium		Med-Low		Low		Total
	Miles	Pct	Miles	Pct	Miles	Pct	Miles	Pct	Miles	Pct	Miles	Pct	Miles
1	7.0	29%	5.9	25%	7.1	29%	1.5	6%	2.5	11%	0	0	24.0
1&9	0.4	15%	0	0	1.2	49%	0.8	35%	0	0	0	0	2.4
130	0	0	1.5	11%	1.3	9%	1.2	9%	8.5	63%	1.0	7%	13.4
171	0	0	0	0	0.4	13%	2.3	75%	0.1	2%	0.3	10%	3.1
172	0	0	0	0	0.2	19%	0.2	25%	0	0	0.5	57%	0.8
18	0.5	4%	3.2	23%	5.5	40%	4.5	33%	0	0	0	0	13.8
184	0	0	0	0	0	0	0	0	1.0	69%	0.4	31%	1.4
26	0	0	0	0	0.6	25%	1.9	75%	0	0	0	0	2.5
27	3.0	12%	4.9	20%	5.5	23%	1.8	7%	3.2	13%	5.9	24%	24.3
28	0	0	0.1	3%	0.2	4%	0.3	6%	1.3	31%	2.3	56%	4.1
287	1.2	11%	0	0	8.1	79%	0.8	8%	0.1	1%	0	0	10.2
32	0	0	0	0	0	0	0	0	0.6	48%	0.6	52%	1.2
33	0	0	0	0	0	0	5.9	74%	1.1	14%	1.0	13%	8.0
34	0	0	1.1	32%	1.9	54%	0.2	6%	0	0	0.3	8%	3.5
35	0	0	0	0	1.5	13%	1.4	12%	3.4	30%	5.2	45%	11.5
440	2.9	56%	0.4	7%	1.9	37%	0	0	0	0	0	0	5.2
514	0	0	1.3	14%	1.7	19%	0.6	7%	2.8	31%	2.6	29%	9.0
520	0	0	0	0	0	0	2.5	100%	0	0	0	0	2.5
522	0	0	0	0	0	0	0	0	1.2	9%	12.9	91%	14.1
527	0	0	0	0	1.0	100%	0	0	0	0	0	0	1.0
529	0	0	2.8	32%	1.8	21%	2.6	30%	0.1	2%	1.3	15%	8.6
535	0	0	0	0	0	0	0	0	0	0	1.8	100%	1.8
622	0	0	0	0	0	0	0	0	0	0	7.4	100%	7.4
684	0	0	0	0	0	0	0	0	0	0	1.7	100%	1.7
9	3.2	22%	2.3	16%	6.4	43%	2.9	20%	0	0	0	0	14.8
91	0	0	0	0	0	0	2.2	95%	0.1	5%	0	0	2.3
95	0	0	10.4	34%	0.5	2%	7.2	24%	12.1	40%	0	0	30.3
GSP	0	0	8.2	53%	1.7	11%	5.6	36%	0	0	0	0	15.5
Ridge Rd	0	0	0	0	0	0	0	0	0	0	0.9	100%	0.9
Grand Total	**18.2**	**8%**	**42.1**	**18%**	**48.4**	**20%**	**46.4**	**19%**	**38.1**	**16%**	**46.1**	**19%**	**239.1**

Source: NJCMS 2007 version created by AECOM and updated by Systems Planning in 2011; scores created by NJDOT Systems Planning Technical Unit July 30, 2012 based on 2009 V/C and ADT data; cross-tabulation by Middlesex County Office of Planning; individual values have been rounded and may not sum up to totals.

Map 5-1: Congestion Management System Priority Ratings, 2009 data



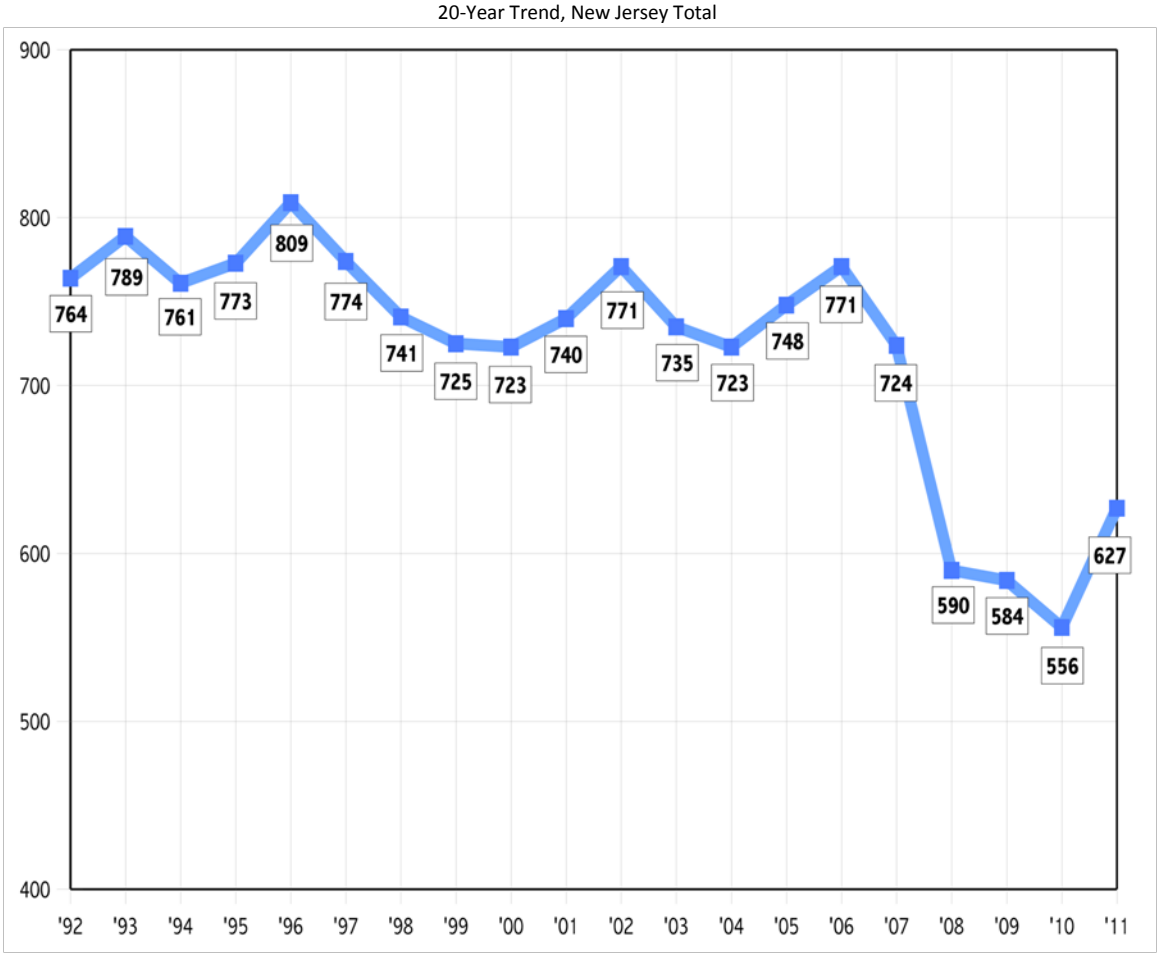
5.3 Safety in Transportation

5.3.1 National and State Trends

According to the National Highway Safety Administration data, between the five year period of 2006 to 2010, highway fatalities nationwide declined 23 percent from 42,708 to 32,885. As of September, 2012 the estimated number of fatalities nationwide for 2011 was 32,310. In New Jersey, between the 2006 to 2011 period, fatalities declined 24 percent from 771 to 627 (see Figure 5—7 below). In Middlesex County this same five year period experienced a 22 percent decline in fatalities from 69 to 54.[9]

Figure 5—7: Statewide Trends in Motor Vehicle Crash Fatalities, 1992 to 2011

20-Year Trend, New Jersey Total



Source: 2011 Motor Vehicle Crash Report compiled by New Jersey State Police (image copied from p. 2)

While this downward trend is encouraging, much more need to be done. The 32,885 nationwide fatalities counted in 2010, and the estimated 32,310 for 2011 still shows that about 90

[9] New Jersey State Police, 2006 Fatal Motor Vehicle Crash Report, p. 4; 2011 Fatal Motor Vehicle Crash report, p. 4. Retrieved at: http://www.njsp.org/info/stats.html#fatalacc

people, or about two busloads of passengers, lose their lives every day in traffic accidents throughout the country. Such a headline seen in the news everyday would be very disturbing and would be a call to some kind of immediate action by national, state and local leaders. However, as just a national statistic, it does not have the same level of urgency, and has become an unfortunate reality to which we have become complacent as a society.

In New Jersey, traffic accidents are claiming the lives of about 12 people per week. According to the 2011 Fatal Motor Vehicle Crash Report Compiled by New Jersey State Police, of the 627 in New Jersey who died from traffic accidents in 2011, 362 (57%) were drivers; 105 (17%) were passengers; 143 (23%) were pedestrians and 17 (and about 3%) were bicyclists. In Middlesex County of the 54 traffic fatalities, 35 (65 %) were drivers; 6 (11%) were passengers; and 13 (24%) were pedestrians. Also, according to the New Jersey State Police 2011 Fatal Motor Vehicle Crash Report, the highest number of crashes (63 out of 586) and fatalities (66 out of 627) in 2011 occurred in the month of October while the lowest numbers of crashes (36 out of 586) and fatalities (36 out of 627) occurred in the month of January. In hours of occurrence the highest number of crashes in 2011 occurred between 6:00 pm and 6:59 pm (39 out of 586) and the lowest number occurred between 7:00 am and 7:59 am (13 out of 586).[10]

5.3.2 Middlesex County Crash Analysis

Crash cluster analysis of Plan4Safety data of the Rutgers Center for Advanced Infrastructure and Transportation (CAIT) for the three-year period covering 2009 to 2011, shows the highest number of vehicle crashes on Route 1 in Edison, Route 9 in Woodbridge and Route 18 in East Brunswick; pedestrian accidents in areas of New Brunswick, Perth Amboy, Old Bridge and Metuchen; and bicycle accidents in New Brunswick in general and along Route 27, Route 28, and County Routes 529 and 531. See Map 5-1 through Map 5-7 found on pages 157 to 166.

The Plan supports the NJTPA 2013 Pedestrian Safety Education Program that focuses on reducing pedestrian related traffic accidents, injuries and fatalities. Based on crash data analysis,

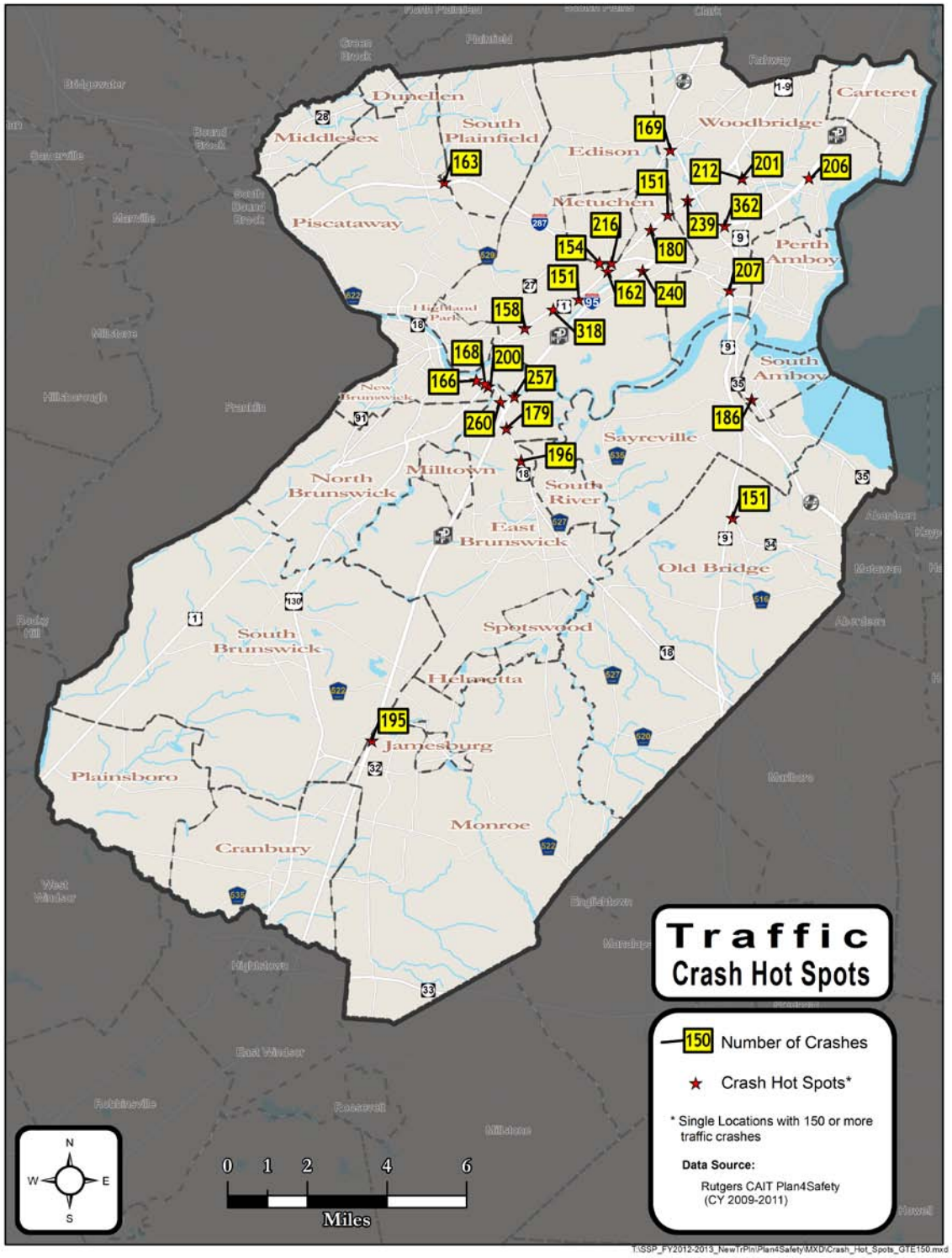
Woodbridge Township in Middlesex County was selected as one of five pilot sites (also including Newark, Jersey City, Hackettstown, and Long Beach Island) in the NJTPA region for the statewide 2013 Pedestrian Safety Education Campaign, Division of Highway Traffic Safety grant involving geographic and land use diversity. Along with Woodbridge Township, NJTPA and other study

[10] New Jersey State Police, 2011 Fatal Motor Vehicle Crash Report. Retrieved at: http://www.njsp.org/info/stats.html#fatalacc

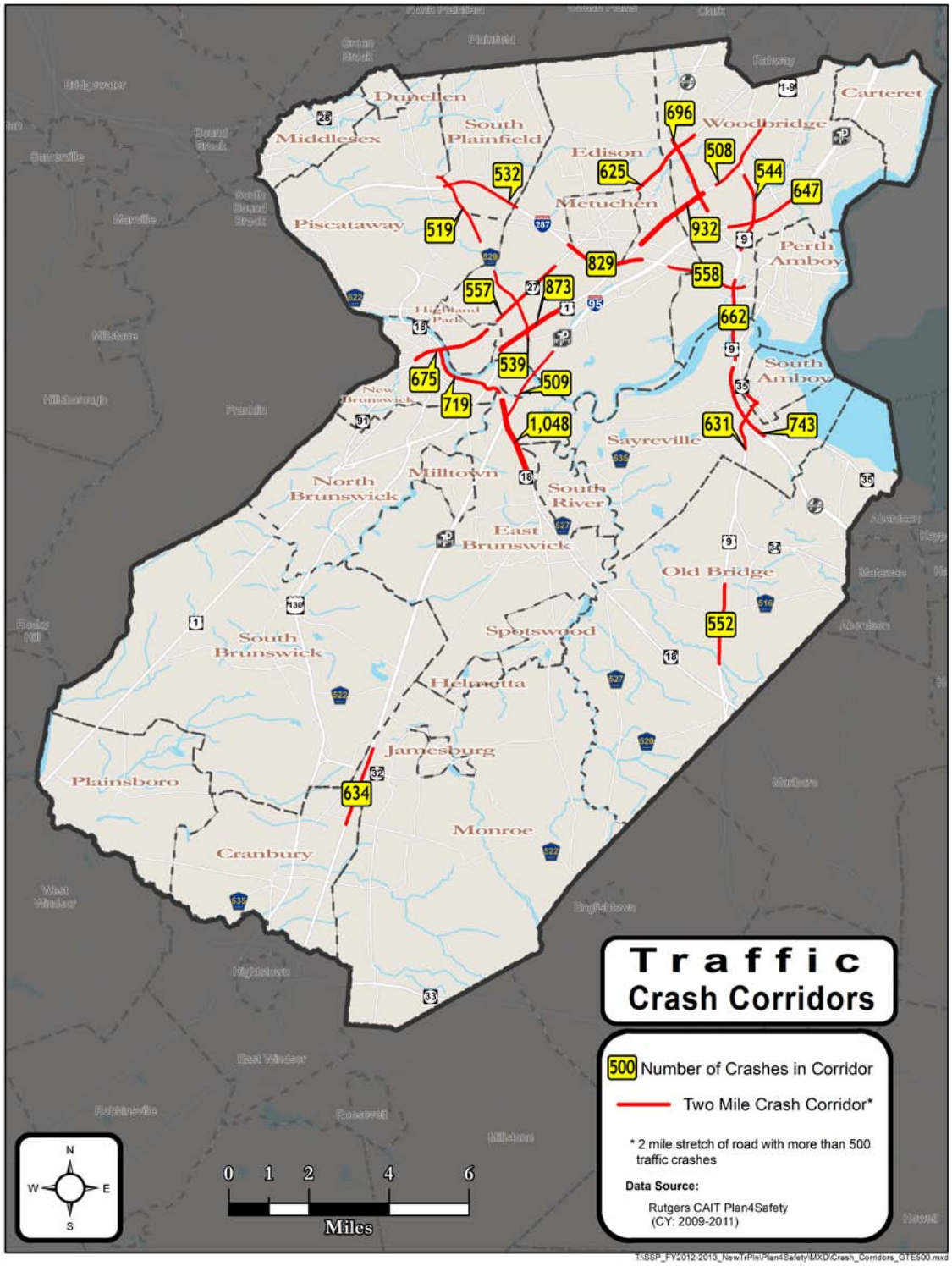
areas Middlesex County served as technical advisory member in the 2013 campaign involving agency and local stakeholders to make the pedestrian safety education campaign initiative successful in reducing pedestrian injuries and fatalities on New Jersey's roadways.

The Plan supports efforts such as this Pedestrian Safety Education Campaign to expand on the investments that have been made to improve pedestrian infrastructure on local, county and state roads. The Plan supports the educational and enforcement components of the four "E's" - engineering, education, enforcement, and emergency services of traffic safety, and encourages utilization of ongoing Highway Safety Improvement Program (HSIP) funding provided to assist in developing effective pedestrian safety initiatives and strategies from pilot programs that can also be applied throughout Middlesex County.

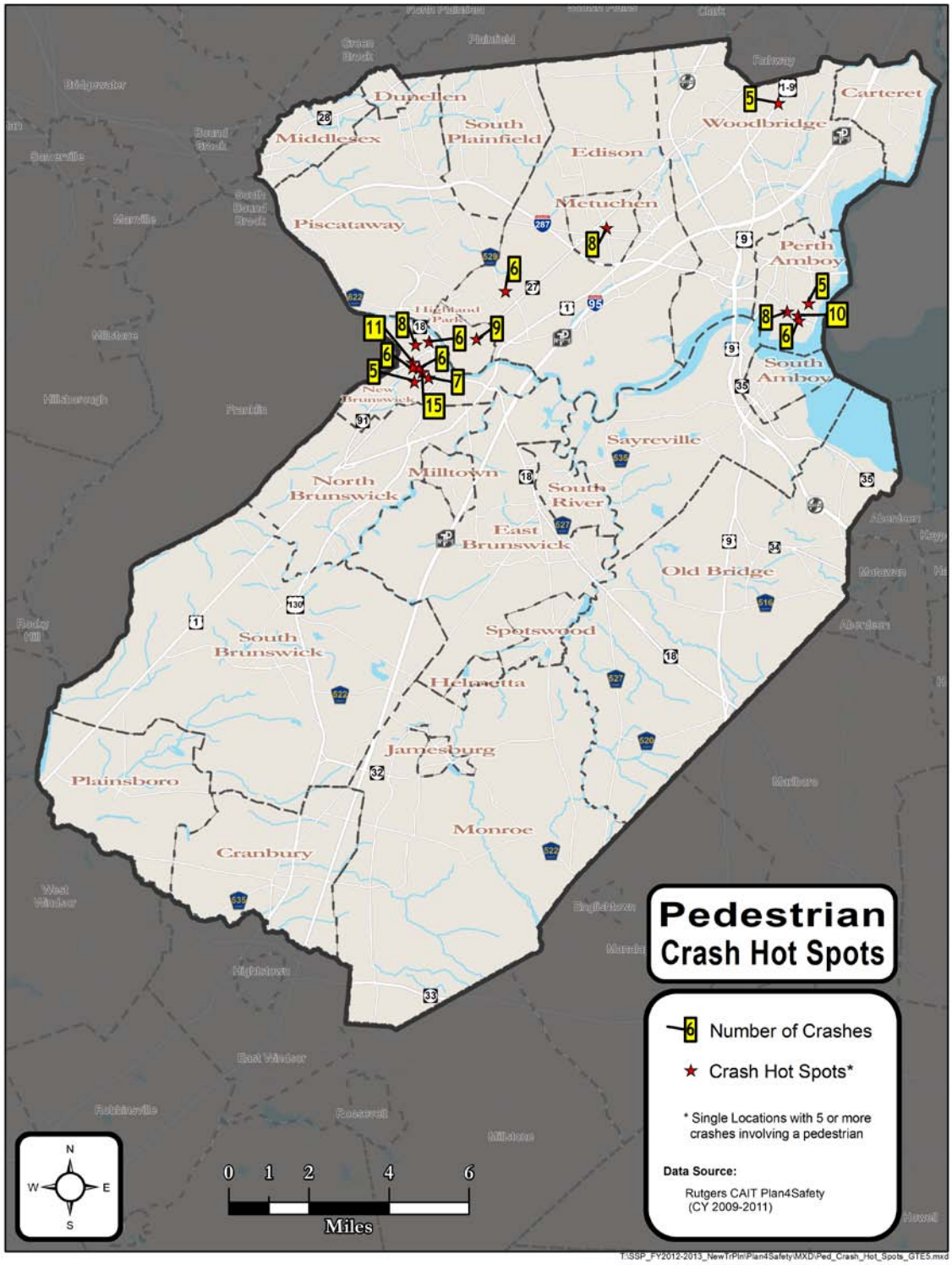
Map 5-2: Crash Hot Spots,
150 or more crashes per location (2009-2011)



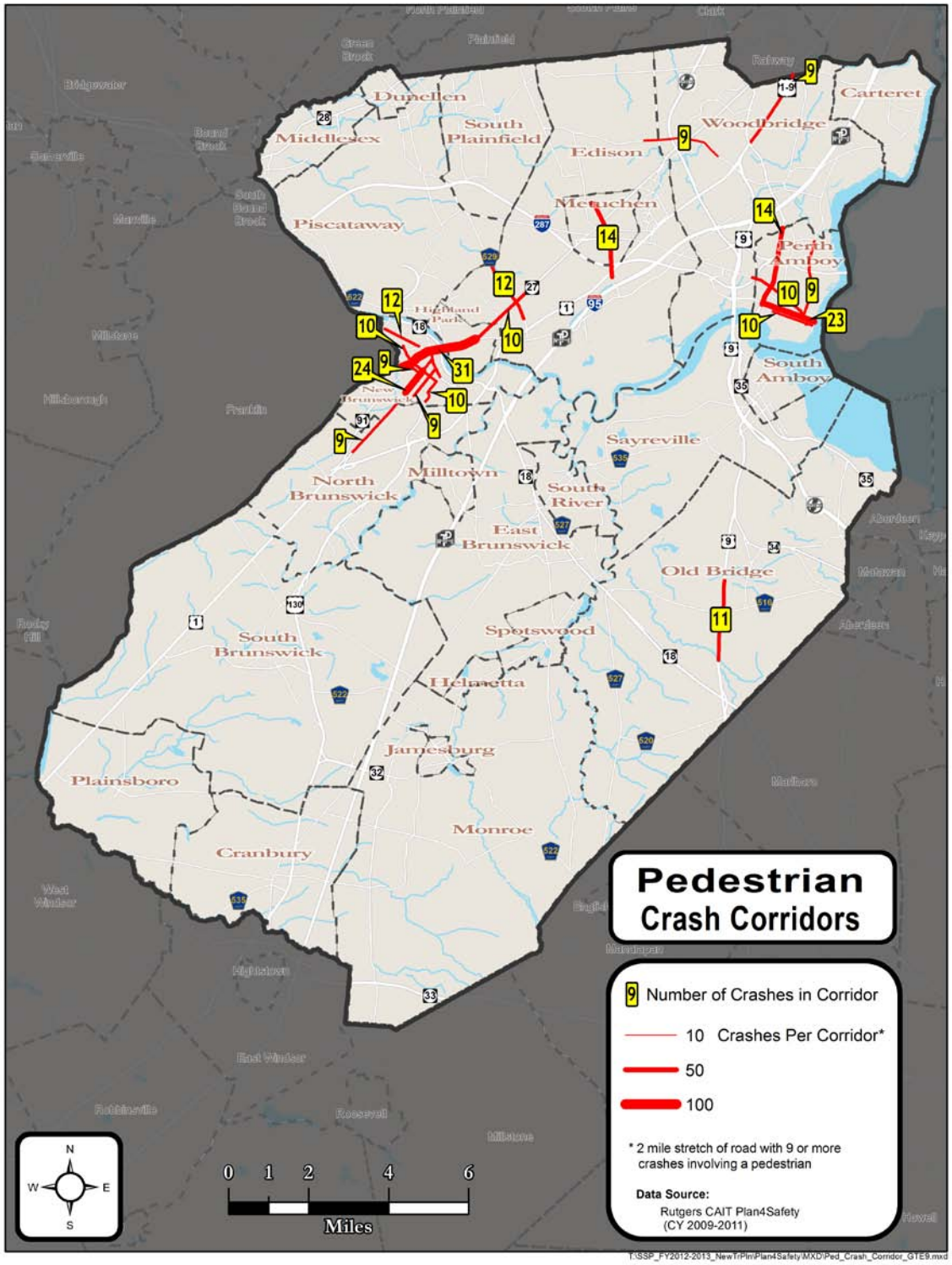
Map 5-3: Crash Corridors,
more than 500 crashes per 2 miles (2009-2011)



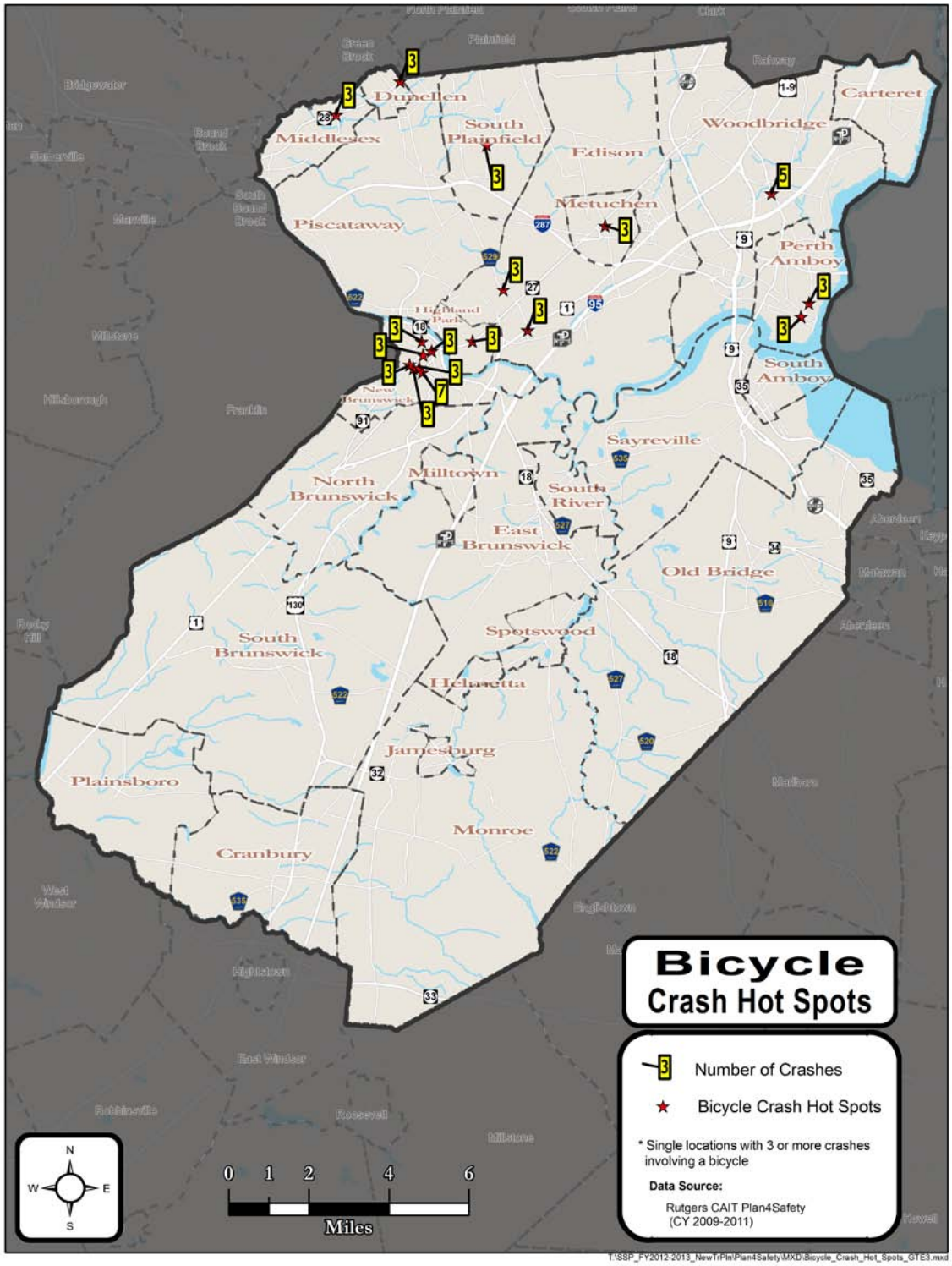
Map 5-4: Pedestrian Crash Hot Spots,
5 or more crashes per location (2009-2011)



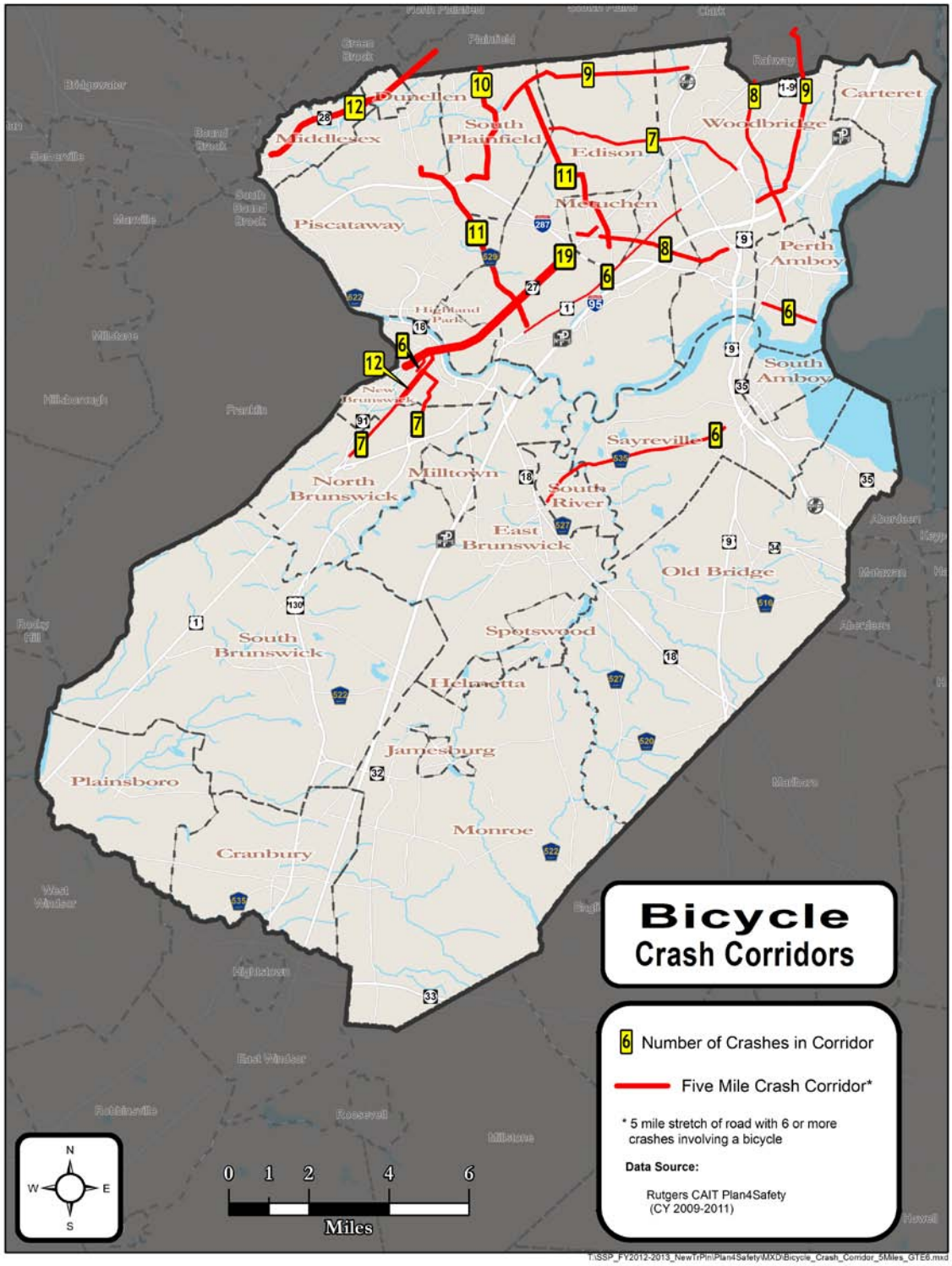
**Map 5-5: Pedestrian Crash Corridors,
more than 9 crashes per 2 miles (2009-2011)**



Map 5-6: Bicycle Crash Hot Spots,
3 or more crashes per location (2009-2011)



Map 5-7: Bicycle Crash Corridors,
6 or more crashes per 5 miles (2009-2011)



5.3.3 Countermeasures to Safety Problems

The great cost of human lives and the tremendous cost in suffering and economic losses for the many that are injured each year in traffic accidents points to the need to continue and to accelerate the utilization of highway safety programs and safety countermeasures that have helped reduce accidents and fatalities. These safety countermeasures are supported by the Federal Highway Administration and the North Jersey Transportation Planning Authority in our region.

The following highway safety measures have been identified by the Federal Highway Administration for helping to improve driving conditions, protect motorists, pedestrians and bicyclists, and reduce highway fatalities. These measures can be applied in many areas of Middlesex County in collaboration with appropriate municipal, county and state agencies. Examples of these safety countermeasures include the following:

Safety edges - shaping the edge of the pavement to the optimal angle to allow drivers who drift off the highway to return to the road safely.

Enhanced delineation and friction for horizontal curves - For challenging curves, high friction surface treatments should be considered for curves with numerous wet weather crashes or severe curves with higher operating speeds.

Backplates with retro-reflective borders - a signal head equipped with a backplate with retro-reflective border is made more visible and conspicuous in both daytime and nighttime conditions, which is intended to reduce unintentional red-light running crashes.

Corridor access management

The benefits of controlling access to roads include improved flow of traffic and less vehicle conflicts and better accommodation of pedestrians and bicyclists. Access management principles for managing access apply to roadways that range from fully access-controlled facilities, such as freeways, to local streets or those with little or no access control.

- Common access management techniques for roadway access may include:
- Driveway closure, consolidation, or relocation,
- Restricted-movement designs for driveways (such as right-in/right-out only),
- Restricted-movement and alternative designs for intersections,

- Raised medians that prevent cross-roadway movements and focus turns and/or U-turns to key intersections,
- Adding auxiliary turn lanes (including exclusive left or right and two-way left), and
- Constructing parallel, lower speed one-way or two-way frontage roads for access

A desirable approach to managing corridor access management involves balancing safety and mobility needs with the needs of accessing adjacent land uses. Access management through appropriate means is recommended for consideration on projects that have new construction, reconstruction, with major rehabilitation or widening projects, and on roads with moderate to heavy daily traffic volumes. The County review development proposals including subdivision and site plan applications to determine whether county roads, property and drainage facilities to determine the nature of impacts from traffic conditions and flooding that may be generated from proposed nearby development.

Longitudinal rumble strips with stripes on two lane roads.

Longitudinal rumble strips are raised applications on the pavement that are intended to alert inattentive drivers with vibration and sound that vehicles have left the travel lane. Types of applications include:

- ***Rumble strips*** are in the form of either edge line or center line rumble strips where the pavement marking is placed over the rumble strip. This increases nighttime visibility of pavement markings
- ***Shoulder rumble strips*** are installed on a shoulder near the edge of the travel lane. They significantly reduce run-off-road crashes.
- ***Edge line rumble strips*** are very similar to shoulder rumble strips, but placed at the edge of the travel lane, usually in line with the edge line pavement marking.
- ***Center line rumble strips*** are installed at or near the center line of an undivided roadway, and may be comprised of either a single or double line of rumbles. They reduce cross center line crashes such as head-on collisions and some run-off-road left crashes.

FHWA estimates that roadway departure crashes account for approximately 53% of fatal crashes each year across the country. Rumble strips are designed primarily to address driver error crashes caused by distracted, drowsy, or otherwise inattentive drivers who unintentionally drift from

their lane. NCHRP 641: Guidance for Design and Application of Shoulder and Centerline Rumble Strips documented the following crash modification factors:

- Center line rumble strips on rural two-lane roads: 44% reduction of head on / fatal and injury crashes.
- Center line rumble strips on urban two-lane roads: 64% reduction of head-on / fatal and injury crashes.
- Shoulder rumble strips on rural two-lane roads: 36% reduction of run-off-road fatal and injury crashes.

Medians and pedestrian crossing islands in urban and suburban areas

A ***median*** is an area between opposing lanes of traffic, excluding turn lanes. Medians in urban and suburban areas can either be open (pavement markings only) or they can be channelized (raised medians or islands) to separate various road users.

Pedestrian crossing islands (or refuge areas)—also known as center islands, refuge islands, pedestrian islands, or median slow points—are raised islands placed on a street at intersections or midblock locations to separate crossing pedestrians from motor vehicles.

Some of the ways that medians and pedestrian crossing islands may improve safety benefit both pedestrians and motorists include the following:

- Reduce pedestrian crashes by 46 percent and motor vehicle crashes by up to 39 percent.
- Decrease delays (by greater than 30 percent) for motorists.
- Allow pedestrians a safe place to stop at the mid-point of the roadway before crossing the remaining distance.
- Enhance the visibility of pedestrian crossings, particularly at unsignalized crossing points.
- Reduce the speed of vehicles approaching pedestrian crossings.
- Be used for access management for vehicles (allowing only right-in/right-out turning movements).
- Provide space for supplemental signage on multi-lane roadways.

According to FHWA studies, midblock locations, where vehicle speeds are high account for more than 70 percent of pedestrian fatalities. This is where vehicle travel speeds are higher, contributing to the larger injury and fatality rate. Studies show that more than 80 percent of

pedestrians die when hit by vehicles traveling at 40 mph or faster while less than 10 percent dies when hit at 20 mph or less. Hence, where appropriate, installing raised channelization on approaches to multi-lane intersections can be effective. Also, where pedestrians access a bus stop or where there are other clear origins/destinations across from each other, a median can be an important pedestrian safety countermeasure. Providing raised medians or pedestrian refuge areas can result in significant reduction in pedestrian accidents. At marked crosswalks medians have demonstrated a 46 percent reduction in pedestrian crashes, while at unmarked crosswalk locations; medians have demonstrated a 39 percent reduction in pedestrian crashes.

Pedestrian hybrid beacons

The pedestrian hybrid beacon (also known as the ***H***igh intensity ***A***ctivated cross***W***al***K*** (or ***"HAWK"***) is a pedestrian-activated warning device located on the roadside or on mast arms over midblock pedestrian crossings. The beacon head consists of two red lenses above a single yellow lens. The beacon head is "dark" until the pedestrian desires to cross the street. At this point, the pedestrian will push an easy to reach button that activates the beacon. After displaying brief flashing and steady yellow intervals, the device displays a steady red indication to drivers and a "WALK" indication to pedestrians, allowing them to cross a major roadway while traffic is stopped. After the pedestrian phase ends, the "WALK" indication changes to a flashing orange hand to notify pedestrians that their clearance time is ending. The hybrid beacon displays alternating flashing red lights to drivers while pedestrians finish their crossings before once again going dark at the conclusion of the cycle.

Road diets or roadway reconfiguration

A "Road Diet"" involves the conversion of an undivided four lane roadway into three lanes made up of two through lanes and a center two-way left turn lane, where appropriate and acceptable to communities. This allows the roadway to be reallocated for other uses such as bike lanes, pedestrian crossing islands, and/or parking. Road diets can result in multiple safety and operational benefits for vehicles, pedestrians, and bicyclists which may include:

- Decreasing vehicle travel lanes for pedestrians to cross, and decreasing the multiple-threat crash if one vehicle stops for a pedestrian in a travel lane on a multi-lane road, but the motorist in the next lane does not, that may result in a crash for pedestrians,
- Providing room for a pedestrian crossing island,

- Improving safety for bicyclists when bike lanes are added (such lanes also create a buffer space between pedestrians and vehicles),
- Providing the opportunity for on-street parking which can also serve as a buffer between pedestrians and vehicles),
- Reducing rear-end and side-swipe crashes,
- Improving speed limit compliance; and
- Decreasing crash severity in the event of a crash.

Roundabouts

According to the Federal Highway Administration about one-third of all intersection fatalities occur at signalized intersections in the United States resulting in about 2,300 people killed each year in addition to the approximate 700 people killed annually in red-light running collisions. The Federal Highway Administration considers the use of roundabouts as a proven safety countermeasure that has demonstrated substantial safety and operational benefits compared to many of the other intersection forms and controls, with especially significant reductions in fatal and injury crashes.

The benefits that result from roundabouts have been shown to occur in urban and rural areas under various traffic conditions. According to ongoing research, roundabouts can be an effective tool for managing speed and creating a transition area that moves traffic from a high-speed to a low-speed environment. Proper site selection, channelization, and design features are essential, however, for making roundabouts accessible to all users.

Middlesex County Comprehensive Traffic Safety Web Site

The Middlesex County Comprehensive Traffic Safety web site is a one-stop shop for all traffic safety concern or road information, including tips for drivers, pedestrians and cyclists. The web site, http://mctrafficsafety.com, also enables users to report road repair issues and provides a list of all traffic safety events within Middlesex County.

Other Programs and Initiatives

Other traffic safety measures for consideration includes conducting Road Safety Audits on areas of high incidents of traffic accidents, and the use of the reflectivity sign program which involves an extensive inventory of traffic signs to implement appropriate management/assessment methods

for maintaining traffic signs retro-reflectivity signs. This would include all regulatory, warning and guide signs that are at or above the minimum compliance levels.

The Manual on Uniform Traffic Control Devices (MUTCD) requires signs to either be illuminated or made with retro-reflective sheeting. It is also helpful to improve reflectivity of street signs in poorly lit locations to facilitate the identification of streets by drivers.

Practices to Enhance Safety

As drivers, pedestrians and bicyclists there are various practices and habits that we can embrace to promote and enhance safety on our transportation system to the engineering and implementation of infrastructure and operational improvements on the highways. Motor vehicle crashes and resulting injuries and possible fatalities harm individuals and their families, and impact the economy in terms of costs of health care interventions, vehicle repairs, public safety, personnel response, traffic congestion and increased vehicle insurance premiums. It is thus of great importance that traffic safety practices be encouraged among all drivers from teenagers, who could benefit from a strong Graduated Driver License (GDL) program when they begin to drive and apply for their licenses, and up to elderly drivers who may need to adjust their driving times and environments in accordance with their own level of comfort and driving skills. Some of these practices from which we can all benefit include the following.

- ***Allow adequate travel time.*** Allowing sufficient travel time and a margin of extra time to arrive at a destination can go a long way in minimizing the stress of driving especially in peak period conditions. Allowing adequate time can help avoid the effects of unforeseen delays, the urge to speed, and possibly violate traffic regulations to avoid being late. Having adequate or even extra time in making a trip will usually result in greater enjoyment of the trip, a greater probability of adherence to speed limits and other traffic regulations, avoidance of risky driving behavior and the potential consequences that can accompany such behavior.
- ***Avoid alcohol before driving.*** There is widespread agreement that driving with a blood alcohol content of .08 is too dangerous to allow, and thus laws are written with a .08 level being the point of legal intoxication. At this level most people will experience sedation and slow reaction time and place themselves in an impaired condition to drive in a safe manner. The .08 level of intoxication has been accepted at the legal limit for driving not

only in the United States, but throughout North America and South America, and most of Europe. For persons under 21 years of age, driving with anything higher than .00 is considered illegal. It is estimated that it can take up to six hours for the BAC level in an average person to drop from .08 to .00.* (* Drinking and Driving.org, Prevention, Education, Assistance). The financial cost of a drinking and driving conviction can cost between $7,000 and $20,000. In addition to this cost many states require first offenders install an ignition interlock device in their vehicle at a cost of approximately $100 for installation and $ 60 per month for monitoring and calibration for a year. These costs only reflect the financial costs of a routing DUI. They are only a small fraction of other potential costs involving personal injury, fatalities, vehicle and property damage. Other costs involve the social and mental impact that a DUI conviction can have on one's ability to maintain a job especially if that job requires the need to be able to drive for any reason, and the impact on one's family and personal relationships.

According to a report of World Health Organization (WHO) Alcohol causes nearly 4 percent or approximately 2.5 million deaths each year worldwide. The report found that the harmful use of alcohol is especially fatal for younger age groups among males aged 15-59.

According to a National Highway Traffic Safety Administration report in the Washington Post, January 6, 2011, alcohol was a factor in 10,839 highway traffic deaths in the United States in 2009 and accounted for about 150,000 deaths in the past decade. Besides road traffic accidents, the use of alcohol has been linked to cirrhosis of the liver, epilepsy, poisonings, violence, and several types of cancer, including cancers of the colorectum, breast, larynx and liver. In 1982 alcohol related traffic fatalities in the country accounted for 55 percent of total fatalities; in 2006 this percentage decreased to 38 percent. While this is a positive improvement, alcohol still is a factor on more than one third of traffic fatalities in the country.

- ***Always use seatbelts in vehicles.*** There is a great deal of documentation that seat belts save lives, reduce injuries, and can avoid unnecessary economic and social costs resulting from severe injuries occurring to driver and passenger(s) inside a vehicle and from possible ejection from the vehicle. For most people, buckling the seat belt when they get in a vehicle is automatic. Occupant restraint systems such as seat belts have been improved

since their inception. However, many drivers and passengers do not always use seatbelts, and for passengers this is especially so when they are seated in the back seats of a vehicle.

Since1968, manufacturers have been required by federal law to install seat belts in passenger cars and light trucks. Since that time, seat belt usage has been enhanced and promoted through redesign, awareness campaigns, and enforcement. In addition to lap and shoulder harness, supplemental systems such as air bags, head restraints, collapsible steering, and recessed knobs were added to help minimize injuries.

As of December 1997, 49 states and the District of Columbia had mandatory seat belt use laws in effect. When seat belts are properly worn, occupants may walk away uninjured or minimally injured from head-on collisions, rollovers, high-speed panic stops, etc. When not worn, in the same type scenarios, the results can be tragic. For many people, the benefits of wearing seat belts still have not registered. During a crash, the fabric or webbing of the belt stretches slightly, dissipates the energy, and extends the time that the deceleration forces are experienced by the occupant, allowing the occupant to ride down the crash. The lap-belt holds the occupant in the vehicle while the shoulder-harness restraints the upper chest and shoulders. In newer vehicles, air bags supplement the seat belts by cushioning the front seat occupants. It has been found that it is usually the second collision that injures and kills people. When one car hits another car or object, this is the first collision. The second collision occurs when unbelted occupants are thrown into or around the car's interior or thrown from the vehicle. If an occupant is seat belted, the second collision is avoided.

The average observed seat belt use rate in states with primary enforcement laws was less than 80 percent, according to the National Highway Traffic Safety Administration. European industrial nations boast 85 percent usage rates. NHTSA data also show that in 1997, 32,213 occupants of passenger vehicles were killed in motor vehicle traffic crashes. If all passenger vehicle occupants wore safety belts, it is estimated that more than 20,000 lives could have been saved in 1997. Research has found that lap and shoulder safety belts, when used properly, reduce the risk of fatal injury to front-seat passenger car occupants by 45 percent, and the risk of moderate-to-critical injury by 50 percent. For light

truck occupants, safety belts reduce the risk of fatal injury by 60 percent and moderate-to-critical injury by 65 percent. Among passenger vehicle occupants, safety belts saved an estimated 10,750 lives and air bags an estimated 842 lives in 1997. As traffic levels increase, the role of safety belt use and passenger restraints becomes more important as the best insurance for minimizing injury and surviving an accident. Nationwide surveys show that the best seat belt use rate is 79 percent; increasing the level of seat belt use is an achievable goal for an easy and effective way to reduce the severity of traffic injuries.

- ***Always use a proper helmet when riding a motorcycle or bicycle.*** Just as seatbelts are important when in a vehicle, the same can be said of wearing proper helmets when riding a motorcycle or bicycle. About 2,500 motorcycles are involved in crashes each year on New Jersey's roadways, according to the Federal Highway Administration (FHWA). New Jersey Law states that no person shall operate or ride upon a motorcycle unless he wears a securely fitted protective helmet of a size proper for that person and of a type approved by the federal DOT. Such a helmet must be equipped with either a neck or chin strap and be reflectorized on both sides. Studies show that most motorcycle crashes occur on short trips less than five miles long and a few minutes after starting out, and at speeds less than 30 mph. At these speeds helmets can reduce the number and severity of head injuries by as much as half the amount. Unhelmeted riders at any speed are three times more likely to die from head injuries than those wearing DOT approved helmets.

  With regard to bicycles, there is no federal law in the U.S. requiring bicycle helmets. States and localities began adopting laws in 1987, mostly limited to children under 18. New Jersey State law requires that children under the age of 17 wear an approved bicycle helmet while riding a bicycle. The law also applies to any child in a restraining seat which is attached to the bicycle, or in a trailer being towed by the bicycle. According to the New Jersey Head Injury Association, 40% of all bicycle deaths involve children 14 and under. Bicycle helmets can reduce the risk of head injury by 85%, and the risk of brain injury by 90%.

- ***Avoid aggressive driving and extend courtesies when driving.*** Aggressive driving is an epidemic on our nation's roads. Tension among motorists is particularly high in New Jersey. As the most densely populated state in the country, driving conditions and tensions

among drivers in New Jersey can lead to incidents of aggressive driving. Characteristics of an aggressive driver include speeding, excessive lane changing, tailgating, and gesturing at other drivers. The Division of Highway Traffic Safety offers educational and enforcement programs to reduce the threat that aggressive drivers pose. Excessive speed is the most common aggressive driving habit associated with traffic crashes. The National Highway Traffic Safety Administration (NHTSA) estimates that one-third of all crashes and two-thirds of all fatal crashes are speed-related. Speeding reduces a driver's ability to steer safely around curves or objects in the roadway, and increases the distance needed to stop a vehicle safely. In 2008, there were 22,118 crashes related to unsafe speed in New Jersey. To reduce aggressive driving behaviors, motorists can practice common courtesies on the road such as maintaining appropriate distance when following other vehicles, bicyclists, motorcyclists; providing appropriate distance when cutting in after passing vehicles; yielding to pedestrians; maintaining speeds appropriate for conditions; yielding and/or moving to the right for emergency vehicles; avoiding challenging other drivers; and, waiting for appropriate and safe conditions when desiring to pass vehicle ahead.

- ***Avoid distractions while driving, walking or biking.*** The New Jersey pedestrian fatality rate in 2010 increased to 25 percent from the previous year. The type of accidents that occurred that year included those caused by pedestrian distractions from such things as listening to an iPod or wearing headphones while texting. The Consumer Product Safety Commission reported that in 2011 there were 1152 people across the country taken to emergency rooms for injuries involving walking and using electronic devices.

- ***Move over for stationary and emergency vehicles,*** into a lane not adjacent to the stationary/emergency vehicle or, if not possible, reduce speed. The New Jersey "Move Over" law requires all motorists approaching stationary emergency vehicles or first responders and maintenance workers to move over away from the adjacent lane to the stopped vehicle, or to reduce speed and be prepared to stop if lane change is not possible. According to State statistics, since 2007, 30,000 crashes in roadside work zones have resulted in almost 10,000 injuries and 70 fatalities. Middlesex County through its Comprehensive Traffic Safety Program (CTSP) has been instrumental in promoting public

awareness for motorists to be cautious when approaching activities on sides of roads.

- ***Only cross railroad tracks when there is sufficient space*** to completely clear the tracks in the event that vehicle ahead needs to stop unexpectedly. Note that trains create optical illusions and appear to move slower than their actual speed. When approaching railroad crossings, do not pass another vehicle while crossing railroad tracks. Anticipate the need to stop behind school buses, commercial buses, and vehicles carrying hazardous materials. These vehicles by law must stop at all railroad crossings.

- ***Stop at least 15 feet from railroad crossings***, never cross railroad tracks when gates are lowering or in a lowered position and cross only when gates are raised and lights stop flashing.

- Walking, jogging, bicycling, skateboarding, or riding scooters, motorbikes, all terrain vehicles, snowmobiles, or other recreational vehicle on railroad tracks, bridges and tunnels is dangerous, is considered trespassing on private property, and is prohibited. The Transportation Plan supports the Operation Lifesaver nationwide public information program dedicated to reducing collisions, injuries and fatalities at highway-rail crossings and along railroad tracks. The Plan also supports application of the 3E's which include education, engineering and enforcement as ongoing strategies to promote and enhance safety practices on railroad crossings, on other rail facilities, and on all other transportation systems where appropriate.

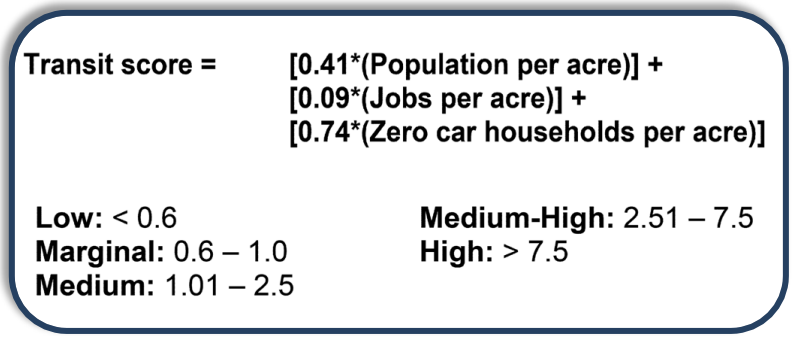
- ***Initiate safe routes to school programs*** with practices that improve safety conditions for children walking to school through such means as the walking school bus and the use of red flags by pedestrians stationed at both sides of a busy cross walk. This practice is promoted by the Middlesex County Transportation Management Association, Keep Middlesex Moving and is practiced in the Borough of Metuchen. The Plan encourages the municipalities in the County to work with KMM to initiate similar programs to enhance pedestrian safety in activity centers within their communities.

5.4 Transit System Deficiencies

5.4.1 NJ Transit's Transit Score

While the name ***"Transit Score"*** intuitively appears at first glance to be a measure of the level of transit service being provided, it actually measures the ***anticipated demand*** for transit service. The "Transit Score", jointly developed by staff of NJ Transit and staff of the Delaware Valley Regional Planning Commission (DVRPC), provides a score that represents the expected transit mode share for work-to-home and home-to-work based trips. The score itself is calculated by summation of three independent variable coefficients (population density, employment density and the density of households with no car available).[11] While the score formula and the regression analysis upon which it is derived are highly technical in nature, it offers an easy to understand way to see the relationship between land use patterns in general and public transportation service and investment. A transit score can also serve as an indicator of the relationship between land use and transit.

Figure 5—8: Transit Score Formula and Score Categories of the DVRPC Protocol

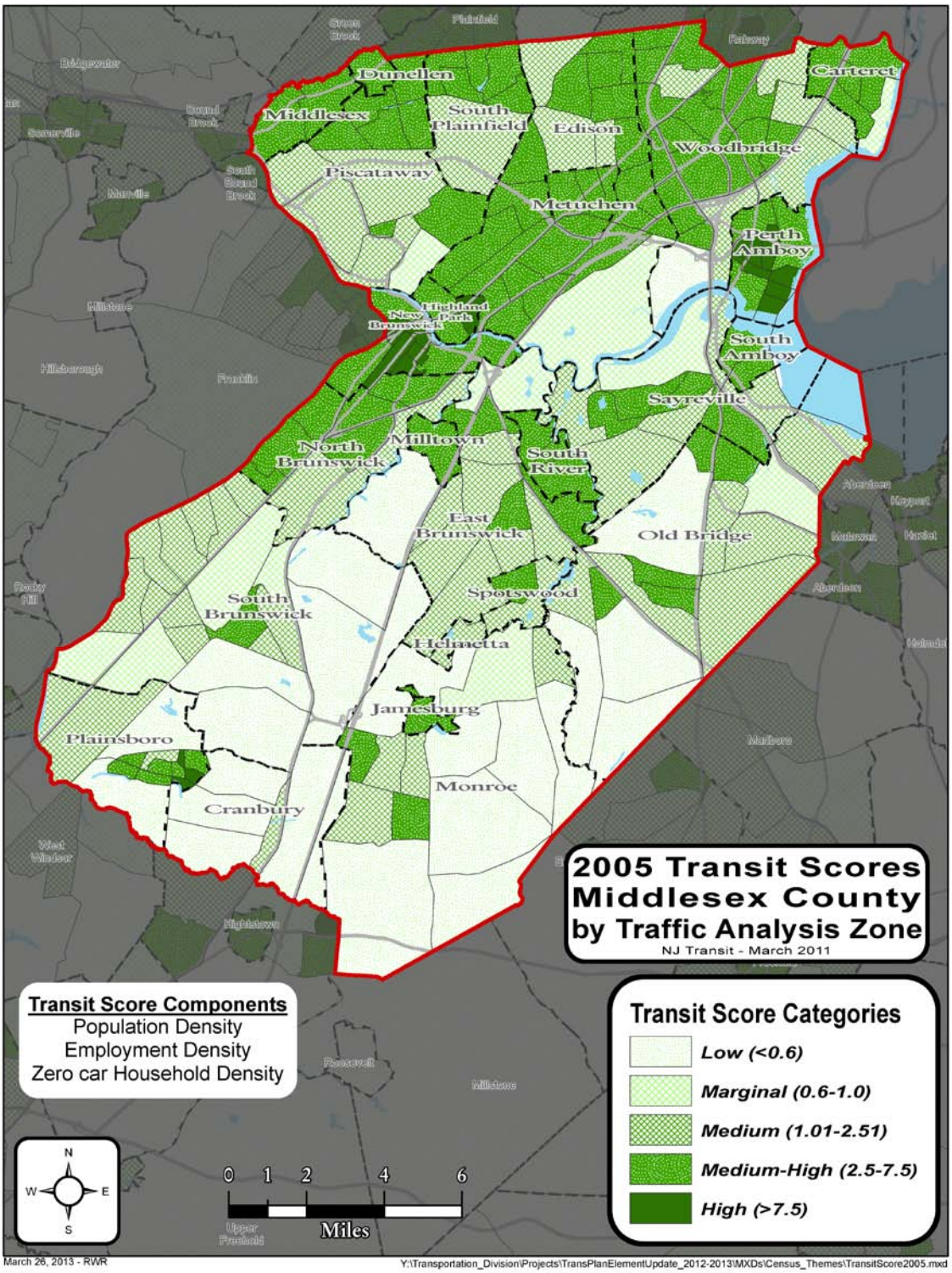


Source: DVRPC as cited in footnote

See Map 5-8 on page 179 for and Map 5-9 on page 180 which illustrate the Transit Score by Traffic Analysis Zone (TAZ) by categories of score ranges. Map 5-9 on page 180 (year 2035) highlights specific TAZ's where demographic forecasting anticipates a shift into a higher score categories by 2035 that is higher than the medium category. These are the TAZ's that may likely warrant increased levels of service commensurate with future population and employment growth.

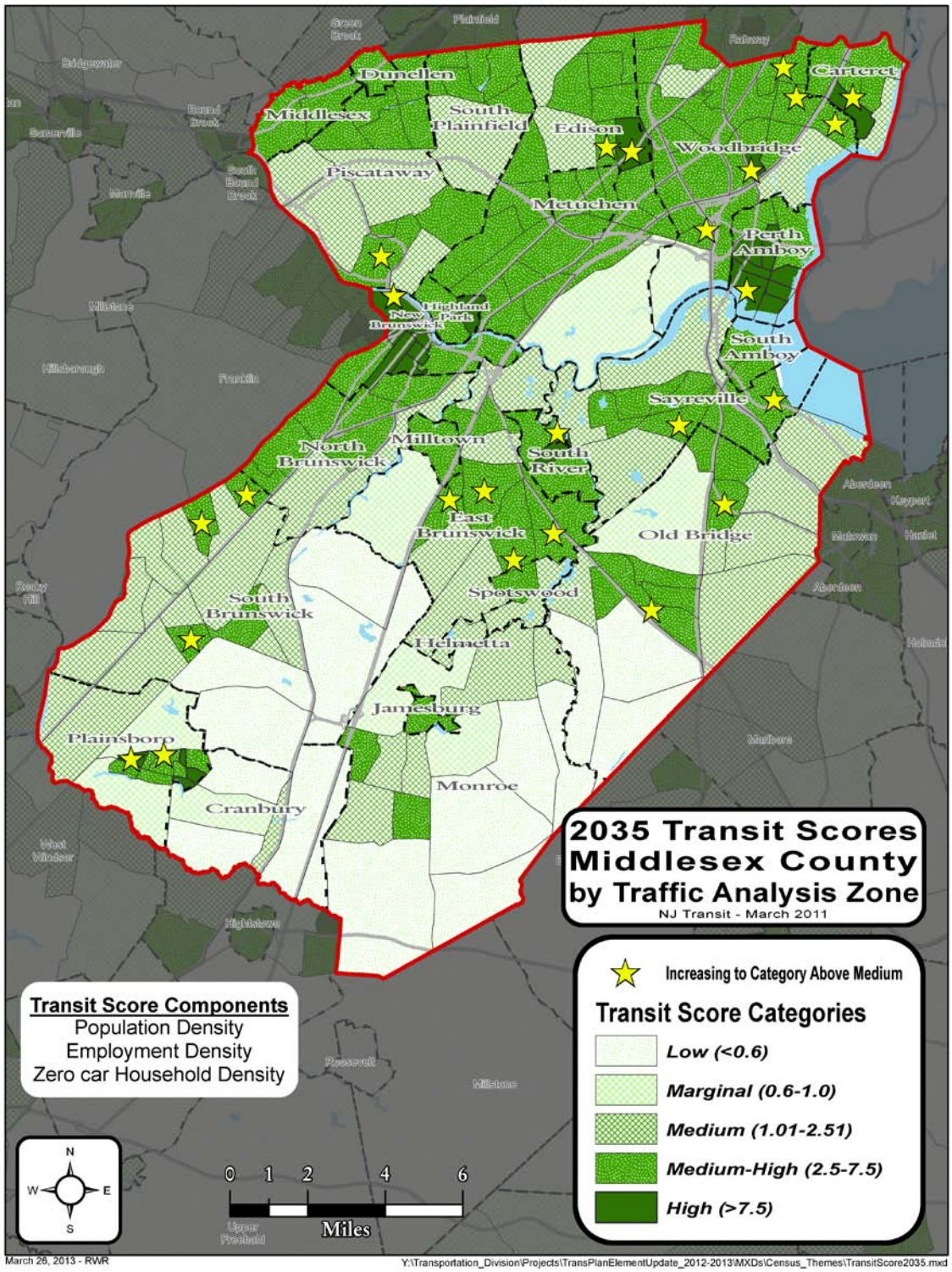
[11] For a full description of the methodology and a detailed explanation supporting the calculation "Creating a Regional Transit Score Protocol--Full Report", Delaware Valley Regional Planning Commission, 2007. Downloadable from http://www.dvrpc.org/Transit/ or directly http://www.dvrpc.org/asp/pubs/publicationabstract.asp?pub_id=07005

Map 5-8: Middlesex County 2005 Transit Scores by Traffic Analysis Zone



Source: NJ Transit (March 2011)

Map 5-9: Middlesex County 2035 Transit Scores by Traffic Analysis Zone



Source: NJ Transit (March 2011)

Chapter Six: Land Use and Transportation

Land-use and transportation are inexorably linked. Every land-use decision has transit implications, just as every transit decision has land-use implications. For example, land development affects travel demand and travel patterns, thus necessitating expansion of transit infrastructure. In turn, the access afforded by transportation network growth makes property more desirable, and drives further development. This becomes a self-perpetuating cycle, wherein each decision is based on the ones preceding it, but also shapes those that follow. Given this interconnectivity, it is crucial that any analysis of one consider its relation to the other. This section will examine the implications of land use in Middlesex County for transportation, as well as the potential impacts of transit development on land use patterns.

6.1 Background

6.1.1 Historic Patterns

In the post-World War II era, land development was driven by uncoordinated market decisions, with each developer maximizing their own personal objectives. This development pattern, which largely persists today, makes decisions without consideration for the larger regional context, resulting in a series of distinct areas rather than a coherent larger community. There are a number of factors responsible for this development pattern, most of which have their roots in the post-war policy decisions.

In the early decades of the automobile, most suburbs were arranged along streetcar and rail lines, meant to facilitate commuting to employment centers. These 'streetcar suburbs' were developed and planned by the line owners, incorporating residential and retail in multi-use, high density spaces. With the streetcar line as its central axis, the community branched out in a highly organized grid, though staying compact enough to permit walking. As the automobile became commonplace, though, this model of development faded. To fulfill postwar housing demand, developers purchased large tracts of cheap farmland, building extensive mass-produced, low-density housing developments. Combined with the elimination of streetcar lines, new suburbs expanded into distant farmlands and greenfields, far removed from both employment centers and mass transit.

This growth pattern was further accelerated by the passage of the Federal-Aid Highway Act in 1956. The law provided funding for the Interstate Highway System, a nationwide network of limited-

access superhighways meant to facilitate commerce, national defense and personal mobility. Inspired by the German autobahn network, and advocated for by President Eisenhower, the Interstate Highway System greatly increased connectivity between urban, suburban and rural areas. However, by reducing travel times, the interstate system also encouraged development in areas removed from existing towns and cities.[12]

In the modern era, this form of low-density development is usually characterized as urban (or suburban) sprawl. It is typified by low-density, single-use development, replacing an integrated commercial district with distance-separated commercial and residential areas. Oftentimes, such development occurs in previously undeveloped areas, where farms and greenfields are subdivided into large residential lots. These subdivisions are largely isolated from one-another, using a hierarchical system of dead-end roads and arterials to eliminate through-traffic. Though this minimizes noise and disruption in residential neighborhoods, it causes much greater congestion on main roads than a more traditional interconnected grid system.

The drawbacks of this land use pattern were amplified by the changing business environment of the 1950s and 1960s. Reflecting the changing density of suburbs, developers began to cluster retail stores in self-contained shopping malls. Accessible only by automobile, and surrounded by parking lots, shopping malls replaced central business districts on a regional scale. Simultaneously, local shopping was supplanted by smaller outdoor malls, comprised by a limited number of stores. Referred to as strip malls, these shopping centers were primarily placed along arterial roads.

By isolating commerce from residential areas, modern suburban land-use patterns necessitate driving. Furthermore, as these commercial corridors are developed with minimal attention to their surroundings, one cannot park in one location and walk between businesses. Individual stores or strip malls each have their own parking and access from the main road. Between people entering and exiting the roadway, as well as moving between stores, this development pattern generates substantial traffic congestion.

Investment in inner cities declined as suburbs became more economically viable. Unused urban properties were left to languish, often falling into disrepair. Both private developers and governments diverted resources from urban areas, leading to urban decay and blight. Ultimately, the

[12] In New Jersey, the construction of the New Jersey Turnpike and Garden State Parkway would be more significant factors in post-war suburban growth.

deterioration of private property and public infrastructure drove further decay, as retail establishments closed and property owners chose to abandon or stop maintaining spaces in these areas.

Modern urban areas are crippled by the industrial sites that do remain. Referred to as brownfield sites, these properties are often polluted, requiring environmental remediation before redevelopment. This can be a costly and time-consuming process, involving years of litigation and regulatory approvals, not to mention the actual process of cleaning the land. Taken together with other factors, this represents a significant impediment to the reinvigoration of high-density areas.

6.1.2 Models of Development

1. Smart Growth

Most current planning efforts follow the Smart Growth model, which emphasizes long-term sustainability over short-term goals. At the regional level, Smart Growth emphasizes clustering growth around pre-existing development, while attempting to preserve existing open space and farmland. On a local scale, Smart Growth focuses on compact, mixed use development, centered on a walkable urban or semi-urban core. This model serves as an alternative to the urban sprawl of the past half-century, recognizing that continued growth into greenfield areas is economically infeasible and socially irresponsible.

Smart Growth advocates argue that development should be limited to areas where infrastructure already exists. This means giving preference to infill development and redevelopment in established urban and suburban areas, and often placing restrictions on development in rural zones. In some regions, these restrictions take the form of urban growth boundaries (UGBs), which place a codified limit on land available for new construction. Property outside of these boundaries is zoned for open space, farmland, or very low density, thus focusing development in areas with existing infrastructure. Other governments require builders to cover all costs associated with development in non-Smart Growth areas, while costs for infrastructure within existing areas are subsidized. These costs typically include sewer and water line installation, electrical service and roads, but can also include schools, emergency services and recreation facilities.

Smart Growth strategies can also be implemented in areas that are already developed, in order to combat the problems of urban sprawl. Along retail and commercial corridors, limiting direct roadway access can improve traffic flow. This also forces businesses to consolidate parking lots, incentivizing

walking between stores, rather than driving. By installing sidewalks and bicycle lanes in already developed areas, regions can also incentivize walking or cycling, rather than driving.

2. Land-Use Strategies

Two common land-use strategies which apply Smart Growth principles are New Urbanism and Transit-Oriented Development (TOD). Both attempt to de-emphasize the automobile, as well as minimize the geographic footprint of communities. New Urbanism, though, is more focused on the aesthetic and spatial qualities that define a neighborhood. It utilizes a traditional neighborhood design, arranging commercial, residential and retail around a defined town center. These communities are built for pedestrian access, and typically arranged in a traditional grid. When possible, public transit is provided to connect the community to the wider region.

Creation of more compact, mixed-use downtowns with connected street networks tend to bring destinations closer together. Shorter blocks can provide more direct travel thereby encouraging people to walk or bike instead of drive.

TOD focuses on the development of communities around transit hubs. The emphasis is on regional interconnectivity and the use of mass transit, for both residents leaving the community and travelers coming in. In communities developed based on a TOD model, residential, commercial and retail are located proximate to transit stations, oftentimes in a designated district known as a transit village. As in other modern development models, this district emphasizes walkability and a cohesive community feel through higher development densities and comprehensive architectural guidelines.

The Plan supports developments that promote efficient land use such as focusing development in built up areas with accommodations for transit services. The Plan also supports good opportunities for multimodal access to jobs, shopping and recreational facilities, and attractive bicycling and walking environments that provide general health benefits, help to reduce traffic congestion, air pollution, and energy consumption for transportation.

6.2 Transit Villages in New Jersey

New Jersey was an early adopter of the transit village model. The New Jersey Department of Transportation (NJDOT) developed comprehensive standards for transit villages in the late 1990s, providing multi-agency assistance and funding to areas which qualified through its Transit Village Initiative. Since that time, the state has designated 19 transit villages, primarily oriented around rail

and bus transit. Four of these – South Amboy, Metuchen, New Brunswick, and Dunellen – are located in Middlesex County. South Amboy is located along the North Jersey Coast Line, while Metuchen and New Brunswick are located along the Northeast Corridor Line and Dunellen is located on the Raritan Valley Line.[13] By making it more convenient for travelers to take transit, by offering shuttle buses to the train station and areas to park and lock your bicycle, people are more likely to use transit to get to their destinations.

Municipalities qualify for transit village designation by meeting criteria established by NJDOT. By these criteria, a transit village district extends no more than ½ mile from the central transit facility. For a majority of that district, municipalities must adopt a redevelopment plan or zoning ordinance which follows transit-supportive site guidelines. Additionally, municipalities must identify specific TOD projects within the district, as well as having at least one such development project underway. Districts must also identify potential bicycle and pedestrian improvements, and establish community organizations meant to promote cultural, entertainment and community events. Lastly, state guidelines also require the inclusion of affordable housing in any new residential construction within the district.

6.3 Today's County

Middlesex County's location between the cities of New York and Philadelphia has contributed immensely to its growth. Many of the major thoroughfares between these cities pass through the county, providing easy access for businesses and workers alike. This has helped draw a sizable professional population to the county, in turn attracting businesses eager to access that labor force. Major businesses located in the county include Johnson and Johnson, Bristol Myers-Squibb, Dow Jones and Company, Merrill Lynch and Company and the Amerada Hess Corporation. The county is also home to a number of major academic institutions, including Rutgers University, UMDNJ and research facilities from Princeton University.

The Plan recommends ongoing strategies to improve the integration of land use and transportation in Middlesex County in collaboration with such efforts and groups as the Route 1 Regional Growth Strategy Study, the Central Jersey Transportation Forum, the North Jersey Together Consortium for Sustainable Development and with the County's municipalities with regard to the coordination of major developments and projects such as proposed North Brunswick Transit Village and the Point at Sayreville Development.

[13] For station and commuter rail line locations see the Middlesex County Transit Guide included as an appendix.

In an established region such as Middlesex County, creating synergies between development and transportation is a difficult but critical task. Early county planning documents recognize the immense potential for population growth, as well as the demand for transportation capacity and the needed improvements that accompanies such anticipated growth. Much of that growth has been realized over the past 60 years, as population has nearly quadrupled from 264,872 in 1950 to 809,858 in 2010.[14]

[14] Decennial U.S. Census Data.

Chapter Seven: North Jersey Transportation Demand Forecasting Model

7.1 Purpose/Overview

A vital task in preparing a meaningful comprehensive plan, in general, is to gain an understanding of possible future conditions. This chapter of the transportation plan element outlines two theoretical growth scenarios to a horizon year of 2040. These two theoretical growth scenarios are measured in terms of three variables: (1) total resident population, (2) total number of households, and (3) total number of jobs by workplace geography. The results of these two scenarios were then used as inputs into the Transportation Demand Model (TDM) model currently used by the North Jersey Transportation Authority (NJTPA) known as North Jersey Regional Transportation Model-Enhanced (NJRTM-E). The NJRTM-E is a computer modeling tool that predicts how the transportation network (roadway and transit) will accommodate the forecasted growth.

The first possible future was developed by collaborating with technical staff of the NJTPA using their Demographic and Employment Forecast Model (DEFM). As the name of this model implies, the ultimate output of the variables of the DEFM is considered to be a forecast. The forecasting model approach arrives at a judgmental estimation of a future condition based on a comprehensive set of assumptions that are intended to represent: (1) related characteristics/factors that are known to be true in the past or at the current time; or (2) related characteristics/factors that are highly probable to be sustained during the forecast time horizon.

The second possible future scenario is a somewhat simpler approach by making a projection based upon the historic trend lines of municipal-level growth—future growth in each municipality is projected to follow the trend line of historic growth of that particular municipality. This municipal-trend-line approach, is a projection that is based on a conditional “if, then” statement about the future conditions—if growth followed a certain trend line in the past, then the future rate of growth will continue on that same trend line. Strictly speaking, a projection cannot be incorrect to the extent that the calculation is performed correctly. In this instance, the “if, then” statement is the only assumption; and, for the purpose of this chapter of the transportation plan, this singular assumption is purely hypothetical and may not necessarily be a future condition that should be expected to occur. The primary purpose of the municipal-trend-line projection was for illustrative purposes as an alternate

scenario to be used as a comparison to the forecast methodology implemented by the staff of the NJTPA.

Neither scenario (the baseline DEFM forecast or the trend-based projection) is intended to constrain or to advocate specific levels of growth in Middlesex County or the allocation of specific levels of growth in any particular location within Middlesex County. The future scenarios presented in this chapter of the transportation plan are best used as a reference framework for planning, research, and policy evaluation.

7.2 Baseline Forecast–Demographic and Employment Forecast Model (DEFM)

The following is a brief narrative of the process used to arrive at the 2040 DEFM forecasts of population, households and employment that are presented in this plan. A more detailed description of the DEFM and the steps that are involved in the operation of the DEFM is more fully documented in the DEFM User Guide Model Documentation and Training Examples: Demographic and Employment Model Update Project.[15]

Concurrently with the preparation of this transportation plan element, staff of the NJTPA was actively engaged in an update of their Regional Transportation Plan (RTP) for the entire NJTPA region[16]. In conjunction with the forthcoming update to the NJTPA's RTP, their demographic and employment forecasts were being updated, including an extension of their forecast horizon year from 2035 out to year 2040. The first step of the demographic and employment forecasting revision/update process conducted by the NJTPA was the development of county-level forecasts, or sometimes referred to as the "County Control Totals".

[15] As of June 24, 2013, the DEFM user guide was available for download as posted on the web site of the NJTPA at the following address: http://www.njtpa.org/DataMap/Demog/Forecast/documents/DEFM_User_Guide_June2011revision.pdf.

[16] The NJTPA region consists of 15 subregions-comprised of the City of Newark (Essex County), Jersey City (Hudson County), and the following 13 counties of central and northern New Jersey: Bergen, Essex, Hudson, Hunterdon, Middlesex, Monmouth, Ocean, Morris, Passaic, Somerset, Sussex, Union, and Warren

7.2.1 County-level Forecasts

The initial set of "County Control Totals" were based on updated econometric modeling conducted in the spring and summer of 2011 by the New York Metropolitan Transportation Council (NYMTC) in partnership with the NJTPA.[17] This modeling used NYMTC's regional economic model using comprehensive economic data from commercial and public sources— Global Insight, Inc., the U.S. Bureau of the Economic Analysis (BEA) and the U.S. Bureau of Labor Statistics (BLS). Employment forecasts were developed first, which were then used as the basis for the population and household forecasts. NJTPA used the payroll component of employment produced from the NYMTC modeling for subsequent analyses. The forecasts for the overall NJTPA/NYMTC region were then allocated to the individual counties. Since the NYMTC econometric model does not account for the availability of land for development (a limited resource in some counties), NJTPA staff consulted with county planning staff to make inter-county adjustments to the initial set of "County Control Totals". The following table summarizes the "County Control Totals" for Middlesex County as of November 6, 2013.[18]

Table 7—1: Middlesex County Control Totals: Forecasted Households, Population and Employment, 2015 to 2040

Middlesex County by Year	2010	2015	2020	2025	2030	2035	2040
Households	281,186	296,248	313,345	331,013	350,268	365,465	378,249
Population	809,858	842,349	880,824	919,249	960,126	989,294	1,023,085
Employment	409,183	444,501	464,101	481,553	500,381	515,862	532,615

Source: NJTPA Staff (November 6, 2013); year 2010 baseline data is shown for reference purposes

[17] The New York Metropolitan Transportation Council (NYMTC) is the metropolitan planning organization for New York City, Long Island, and the lower Hudson Valley (Putnam, Rockland, and Westchester counties)——representing a total of 10 counties.

[18] In late-March/early-April of 2013, a further adjustment was made to the County Control Total for interim year periods 2015 & 2020 to suppress a jump in growth within the model forecast based on an anticipated quick recovery from the 2008/2009 recession (the jump was smoothed into later time periods). This did not impact the total forecasted growth at the horizon year of 2040.

7.2.2 Allocating County-level Forecasts to the Municipalities and Traffic Analysis Zones

Once the above County Control Totals were finalized, the DEFM was then used as the primary means to allocate the forecasted growth (households, population and employment) to the 213 Traffic Analysis Zones (TAZs) and 25 municipalities of Middlesex County.[19]

The DEFM allocates growth based on certain characteristics of each TAZ within each municipality. The primary characteristics used to produce the TAZ- and municipal-level forecasts are summarized below.

- ***Recent Historic Growth Trends:*** Measures of growth that occurred between 2000 and 2010 are used as indicators of an area's attractiveness to future development
- ***Land Development Potential:*** Growth is allocated based on an estimation of an area's potential to physically accommodate growth during the forecast time horizon
  - An estimate of the amount of vacant developable land provides an indicator of attracting future growth and to partially suppress the allocation of growth based on recent historic growth trends. This data is derived from Geographic Information System (GIS) data that is processed using GIS software to exclude: (1) land areas that are already developed; and, (2) land areas assumed to lack the ability to accommodate growth and development in the future such as wetlands, tidal areas, floodways, preserved open space, preserved farmlands, public rights-of-way and utility rights-of-way etc.
  - ***Allowable development density characteristics***, as regulated by municipal zoning ordinances, provide a reasonable means to derive the maximum extent of development that can be accommodated on vacant developable land or through the redevelopment of lands already developed. Staff of Middlesex County provided detailed zoning information in GIS data format to NJTPA staff for incorporation into the DEFM input parameters. The countywide zoning data layer table which was provided to NJTPA staff included both a residential and nonresidential density value

[19] A traffic analysis zone (TAZ) is a unit of geography primarily used to estimate and forecast trip origins and destinations. It is a geographic unit that is fine enough to discern estimated and/or to arrive at forecasted travel patterns but coarse enough for sufficient data availability. The boundaries of TAZs are constructed from U.S. Census blocks, block groups or tracts and within Middlesex County are drawn such that no TAZ is divided by an intersecting municipal boundary, thus enabling municipal summations of estimates and forecasts. The spatial extent (i.e. geographic size/area) of a TAZ varies is more dependent upon the number of people and/or job in the area itself.

for each and every municipal zoning district of the county. Residential density is measured by the maximum number of dwelling units per acre and nonresidential density is likewise measured by the maximum number of jobs per acre.

- ***Accessibility Index:*** To account for the relative transit-highway connectedness of each TAZ in each forecast year, an accessibility index is calculated by equating it to a relative numeric value that is based on an area's general accessibility between employment opportunities and the resident labor force, and overall accessibility to retail and service locations and other destinations.
- ***Planned Projects:*** An inventory of all known large scale developments at various stages of the approval and/or construction process was provided to NJTPA staff. The planned project inventory was used to adjust the weighting and allocations performed by the formulas used by the DEFM.

The DEFM allocation model uses an automated computerized iterative process that involves successive rounds of allocating and fitting the growth in a manner that can be considered most likely to occur during the forecast time horizon, based on the assumptions inputted into the model. As a final step, county staff and NJTPA staff reviewed the final DEFM forecasts for reasonableness from an empirical viewpoint and adjusted the forecasts where necessary.

7.3 Municipal Growth Trend-Based Allocation

A trend-based allocation was developed by the staff of the Middlesex County Office of Planning as a means to provide an alternate future scenario for comparison to the growth allocated by the DEFM allocation model of the NJTPA. The sole assumption of the alternate trend-based allocation is that the future rates of growth at the municipal level will tend to continue on the same trend line as experienced in the past. The trend-based allocation is an extrapolation of past trends into the future. For this reason, this alternate scenario is purely hypothetical and may not necessarily be a future condition that should be expected to occur.

The most recently available municipal-level trend line population projections prepared in 2011 and 2012 by the Middlesex County Planning Office, Division of Data Management and Technical Services were used as a reference to allocate forecasted future growth to the municipalities. To enable direct comparisons with the DEFM forecasts, the growth rates for each of the 25 individual municipal 2011 and 2012 trend line projections were averaged and then proportionally adjusted so that the sum

total of the municipal-level population would equal the "County Control Totals" for total population at each of the 5-year increments of the 2015 to 2040 time horizon. Projected population growth needed to be further allocated to the TAZ level of geography to enable input into the NJTRM-E transportation demand model used by NJTPA. Therefore, the projected municipal-level allocation of forecasted population growth was further distributed on a proportional basis (using proportions borrowed from the DEFM output) down to the TAZ level as a final step of the trend-based population allocation.

Since the Division of Data Management and Technical Services does not prepare household growth projections, trend-based household allocations were derived from the trend-based population allocations by applying the household size values from the DEFM output. This household allocation process was performed at the TAZ level, as required for use in the NJTRM-E transportation demand model used by NJTPA. The results of the trend-based household allocations have been aggregated and summarized to the municipal level of geography for presentation in this report (see following three tables on subsequent pages).

Since the Division of Data Management and Technical Services does not prepare employment growth projections, trend-based municipal-level employment projections published in a technical report incorporated as part of the rules promulgated by the New Jersey Council of Affordable Housing (COAH) were used to derive the employment allocation for the trend-based alternate scenario.[20] The employment projection time horizon for the technical report submitted to COAH covers the period from 2004 to 2018. Therefore as a first step, the municipal employment projections used by COAH for the 2004 to 2018 time period were tempered to fit the 2015 to 2040 time horizon currently being used by NJTPA forecasting staff. Then the municipal employment growth rates were proportionally adjusted so that that the sum total of municipal-level employment would equal the "County Control Totals" for total employment at each 5-year increment of the 2010 to 2040 time horizon. Likewise to the population allocation, the projected municipal-level employment growth was further distributed on a proportional basis down to the TAZ level as a final step of the trend-based employment allocation.

[20] *"Task 1 – Allocating Growth To Municipalities"*; Submitted to: New Jersey Council on Affordable Housing; Submitted by: Econosult Corporation (May 1, 2008). [Codified as Appendix F of N.J.A.C. 5:97, amendments through October 20, 2008] Downloaded on February 21, 2013 from http://www.nj.gov/dca/services/lps/hss/statsandregs/597f.pdf.

7.4 Comparison of DEFM Forecast to Municipal Trend Projections

The biggest driver of the difference in municipal allocations of forecasted growth across the two scenarios presented in this chapter of the transportation plan was the fact that the trend-based allocation did not account for land availability constraints or the permitted development intensities as predicated by municipal zoning regulations. Since the trend-based allocation was not informed of these two characteristics, the geographic distribution of growth was noticeably shifted when compared to the DEFM allocation.

As seen on the following three tables, a notable amount of the total forecasted growth to the year 2040 time horizon was shifted away from the East and Central subregions and redirected to the South subregion, which is reflective of recent growth patterns.

- The trend-based household and population growth allocation shifts more than 51,000 people and 20,000 households to the towns of the South Subregion, primarily redirected to Plainsboro, Monroe and South Brunswick. This geographic shift represents a net reallocation amounting to about 21% of the net total forecasted household growth, and 24% of the net total forecasted population growth. In the trend-based allocation, Old Bridge and Woodbridge are the two towns that experience the greatest net reduction in household growth as compared to the DEFM allocation.
- The trend-based employment growth allocation shifts more than 14,000 jobs to the towns of the South Subregion, primarily redirected to Monroe and Cranbury. This geographic shift represents a net reallocation amounting to about 12% of the net total forecasted employment growth. In the trend-based allocation, Sayreville, Woodbridge and New Brunswick are the three towns that experience the greatest net reduction in employment growth as compared to the DEFM allocation.

Table 7—2: Future Households by County Subregion and Municipality: Year 2040 NJTPA Forecast vs. Municipal Trend-Based Allocation

Municipality By County Subregion	Households 2010 (US Census)	Households 2040 (NJTPA Forecast)	Households 2040 (Trend Allocation)	Trend vs. Forecast Difference
East	**105,657**	**140,646**	**127,715**	**-12,931**
Carteret Borough	7,591	10,526	9,471	-1,055
Metuchen Borough	5,243	6,211	6,049	-162
Old Bridge Township	23,781	32,874	27,383	-5,492
Perth Amboy City	15,419	18,502	21,343	2,842
Sayreville Borough	15,636	23,104	19,519	-3,585
South Amboy City	3,372	4,971	5,298	327
Woodbridge Township	34,615	44,458	38,652	-5,806
Central	**131,073**	**174,305**	**166,717**	**-7,588**
Dunellen Borough	2,566	3,103	3,182	79
East Brunswick Township	16,810	20,122	19,477	-645
Edison Township	34,972	41,574	42,713	1,138
Helmetta Borough	891	1,238	1,738	501
Highland Park Borough	5,875	6,281	6,308	27
Middlesex Borough	4,984	7,750	5,562	-2,188
Milltown Borough	2,599	4,344	2,834	-1,510
New Brunswick City	14,119	23,155	22,104	-1,052
North Brunswick Township	14,551	20,612	20,761	148
Piscataway Township	17,050	24,670	22,632	-2,038
South Plainfield Borough	7,876	10,802	9,032	-1,769
South River Borough	5,652	6,774	6,996	222
Spotswood Borough	3,128	3,881	3,379	-503
South	**44,456**	**63,298**	**83,817**	**20,519**
Cranbury Township	1,320	1,822	2,228	405
Jamesburg Borough	2,172	2,373	2,674	302
Monroe Township	16,493	23,912	30,964	7,052
Plainsboro Township	9,402	10,257	17,326	7,069
South Brunswick Township	15,069	24,933	30,625	5,692
Middlesex County Total	**281,186**	**378,249**	**378,249**	**0**

Sources: NJTPA DEFM output of November 6, 2012 and Middlesex County Office of Planning trend-based allocation scenario of March 4, 2013

Table 7—3: Future Total Population by County Subregion and Municipality: Year 2040 NJTPA Forecast vs. Municipal Trend-Based Allocation

Municipality By County Subregion	Population 2010 (US Census)	Population 2040 (NJTPA Forecast)	Population 2040 (Trend Allocation)	Trend vs. Forecast Difference
East	**303,539**	**376,641**	**346,516**	**-30,125**
Carteret Borough	22,844	29,132	26,444	-2,688
Metuchen Borough	13,574	15,486	15,074	-412
Old Bridge Township	65,387	82,773	70,037	-12,736
Perth Amboy City	50,814	58,442	67,299	8,857
Sayreville Borough	42,704	57,618	49,227	-8,390
South Amboy City	8,631	11,978	12,765	786
Woodbridge Township	99,585	121,212	105,670	-15,542
Central	**391,011**	**490,955**	**469,792**	**-21,163**
Dunellen Borough	7,227	8,368	8,579	211
East Brunswick Township	47,512	54,560	52,804	-1,756
Edison Township	99,967	114,740	117,769	3,029
Helmetta Borough	2,178	2,823	3,964	1,141
Highland Park Borough	13,982	14,695	14,758	63
Middlesex Borough	13,635	19,580	14,054	-5,526
Milltown Borough	6,893	10,600	6,914	-3,686
New Brunswick City	55,181	79,599	76,059	-3,540
North Brunswick Township	40,742	54,359	54,866	507
Piscataway Township	56,044	73,178	67,155	-6,023
South Plainfield Borough	23,385	30,293	25,353	-4,940
South River Borough	16,008	18,449	19,053	603
Spotswood Borough	8,257	9,710	8,464	-1,246
South	**115,308**	**155,489**	**206,777**	**51,289**
Cranbury Township	3,857	4,793	5,645	853
Jamesburg Borough	5,915	6,333	7,136	803
Monroe Township	39,120	54,955	71,622	16,668
Plainsboro Township	22,999	24,943	43,283	18,340
South Brunswick Township	43,417	64,465	79,090	14,625
Middlesex County Total	**809,858**	**1,023,085**	**1,023,085**	**0**

Sources: NJTPA DEFM output of November 6, 2012 and Middlesex County Office of Planning trend-based allocation scenario of March 4, 2013

Table 7—4: Future Total Employment by County Subregion and Municipality: Year 2040 NJTPA Forecast vs. Municipal Trend-Based Allocation

Municipality By County Subregion	Employment 2010 (US Census)	Employment 2040 (NJTPA Forecast)	Employment 2040 (Trend Allocation)	Trend vs. Forecast Difference
East	**104,826**	**144,342**	**132,480**	**-11,862**
Carteret Borough	8,008	9,893	9,773	-120
Metuchen Borough	5,900	7,033	7,897	864
Old Bridge Township	11,215	17,196	17,756	560
Perth Amboy City	13,761	17,713	15,310	-2,403
Sayreville Borough	9,674	19,101	13,215	-5,886
South Amboy City	1,952	3,021	2,615	-406
Woodbridge Township	54,317	70,385	65,913	-4,471
Central	**245,289**	**298,372**	**295,605**	**-2,767**
Dunellen Borough	1,011	1,358	1,011	-347
East Brunswick Township	24,526	28,778	30,809	2,031
Edison Township	75,450	87,201	87,580	379
Helmetta Borough	199	303	444	141
Highland Park Borough	2,616	3,116	3,970	855
Middlesex Borough	5,507	8,004	5,949	-2,056
Milltown Borough	1,515	2,507	1,515	-992
New Brunswick City	41,922	51,018	46,633	-4,385
North Brunswick Township	24,293	31,512	31,697	185
Piscataway Township	40,967	51,786	51,085	-702
South Plainfield Borough	22,277	26,120	27,610	1,489
South River Borough	2,757	3,761	4,782	1,021
Spotswood Borough	2,250	2,908	2,521	-387
South	**59,068**	**89,901**	**104,530**	**14,629**
Cranbury Township	7,793	11,558	14,665	3,107
Jamesburg Borough	3,501	3,842	3,501	-341
Monroe Township	8,945	14,424	26,141	11,717
Plainsboro Township	14,519	26,119	26,555	436
South Brunswick Township	24,310	33,957	33,668	-289
Middlesex County Total	**409,183**	**532,615**	**532,615**	**0**

Sources: NJTPA DEFM output of November 6, 2012 and Middlesex County Office of Planning trend-based allocation scenario of March 4, 2013

7.5 NJRTM-E Results

The results of the two demographic and employment scenarios detailed in the preceding section of this chapter were used as inputs into the Transportation Demand Model (TDM) model currently used by the North Jersey Transportation Authority (NJTPA) known as North Jersey Regional Transportation Model-Enhanced (NJRTM-E). The NJRTM-E is a computer modeling tool that predicts the growth in travel resulting from demographic and employment growth, and how the transportation network (roadway and transit) will accommodate the forecasted growth in travel.

Essentially, the predicted data for households and employment at a future point in time is entered into the model to estimate future volume on the transportation network and to determine the network's ability to accommodate that volume. The four steps of the NJRTM-E are summarized below:

1. **Trip Generation:** Household demographic and employment information, land use considerations and other factors are used to derive the frequency of origins and destinations of trips in each traffic analysis zone (TAZ).
2. **Trip Distribution:** Origins and destinations are matched using a mathematical model which represents the relationships between the places of origin and the places of destination. The model considers and balances factors such as the travel cost, distance decay, and other related factors which may determine travel choice
3. **Trip Mode:** The trip distribution is assigned to the mode of travel, such as automobile or public transit.
4. **Route Assignment:** Allocates the trips by a particular mode to a specific path along the network by considering the multiple possible paths between the selected origin and destination, attempting to reach an equilibrium state whereby the total travel time is minimized for all travelers.

The following tables summarize and compare the results of the NJRTM-E using the DEFM allocation of future growth and the trend-based allocation scenario.

Table 7—5: NJRTM-E Average Weekday Indicators for Scenarios Middlesex County Total

Middlesex County	2010 Baseline	2040 DEFM Forecast	2040 Municipal Trends
Person Trips (millions)	2.96	3.68	3.70
Transit Person Trips	66,746	78,321	75,849
Transit Trips (pct. person trips)	2.26%	2.13%	2.05%
Auto Person Trips, including light & medium commercial trucks (millions)	2.96	3.69	3.70
Heavy Truck Trips	49,414	60,239	60,202
Vehicle-Miles Traveled (millions)	22.17	24.51	24.50
Percent of VMT in Delayed Condition (total day)	13.65%	18.99%	18.28%
Vehicle-Hours Traveled	585,215	752,168	751,531
Percent of Travel Time Delayed During the PM Peak	36.35%	49.23%	49.51%
Percent Increase in Travel Time Over Free Flow During the PM Peak	57.10%	96.96%	98.06%
Average Delay to a 20-minute Trip Made During the PM Peak	11 to 12 minutes	19 to 20 minutes	19 to 20 minutes

Source: NJRTM-E outputs as of February and March 2013 by NJTPA staff; summations by Middlesex County Office of Planning

Table 7—6: NJRTM-E Average Weekday Indicators for Scenarios East Subregion

East Subregion	2010 Baseline	2040 DEFM Forecast	2040 Municipal Trends
Person Trips (millions)	1.10	1.39	1.29
Transit Person Trips	32,533	38,327	34,973
Transit Trips (pct. person trips)	2.95%	2.75%	2.71%
Auto Person Trips, including light & medium commercial trucks (millions)	1.09	1.39	1.28
Heavy Truck Trips	16,629	20,833	19,463
Vehicle-Miles Traveled (millions)	9.66	10.61	10.35
Percent of VMT in Delayed Condition (total day)	20.16%	24.87%	22.45%
Vehicle-Hours Traveled	241,739	304,016	288,866
Percent of Travel Time Delayed During the PM Peak	34.96%	47.78%	45.61%
Percent Increase in Travel Time Over Free Flow During the PM Peak	53.74%	91.51%	83.86%
Average Delay to a 20-minute Trip Made During the PM Peak	10 to 11 minutes	18 to 19 minutes	16 to 17 minutes

Source: NJRTM-E outputs as of February and March 2013 by NJTPA staff; summations by Middlesex County Office of Planning

Table 7—7: NJRTM-E Average Weekday Indicators for Scenarios Central Subregion

Central Subregion	2010 Baseline	2040 DEFM Forecast	2040 Municipal Trends
Person Trips (millions)	1.76	2.11	2.07
Transit Person Trips	30,879	35,815	34,153
Transit Trips (pct. person trips)	1.75%	1.70%	1.65%
Auto Person Trips, including light & medium commercial trucks (millions)	1.77	2.12	2.08
Heavy Truck Trips	28,039	32,741	32,396
Vehicle-Miles Traveled (millions)	8.70	9.70	9.67
Percent of VMT in Delayed Condition (total day)	8.23%	18.56%	18.78%
Vehicle-Hours Traveled	250,582	338,141	337,094
Percent of Travel Time Delayed During the PM Peak	40.12%	55.27%	55.97%
Percent Increase in Travel Time Over Free Flow During the PM Peak	66.99%	123.55%	127.13%
Average Delay to a 20-minute Trip Made During the PM Peak	13 to 14 minutes	24 to 25 minutes	25 to 26 minutes

Source: NJRTM-E outputs as of February and March 2013 by NJTPA staff; summations by Middlesex County Office of Planning

Table 7—8: NJRTM-E Average Weekday Indicators for Scenarios South Subregion

South Subregion	2010 Baseline	2040 DEFM Forecast	2040 Municipal Trends
Person Trips	488,240	678,588	850,124
Transit Person Trips	5,920	7,318	9,781
Transit Trips (pct. person trips)	1.21%	1.08%	1.15%
Auto Person Trips, including light & medium commercial trucks (millions)	493,831	687,325	859,101
Heavy Truck Trips	9,408	12,258	13,923
Vehicle-Miles Traveled (millions)	3.82	4.19	4.48
Percent of VMT in Delayed Condition (total day)	9.54%	5.11%	7.61%
Vehicle-Hours Traveled	92,894	110,010	125,572
Percent of Travel Time Delayed During the PM Peak	29.08%	32.10%	39.12%
Percent Increase in Travel Time Over Free Flow During the PM Peak	41.00%	47.28%	64.26%
Average Delay to a 20-minute Trip Made During the PM Peak	8 to 9 minutes	9 to 10 minutes	12 to 13 minutes

Source: NJRTM-E outputs as of February and March 2013 by NJTPA staff; summations by Middlesex County Office of Planning

Chapter Eight: Ongoing Transportation Improvement Strategies

8.1 Public Participation in Transportation Planning

Middlesex County Transportation Coordinating Committee

The Middlesex County public outreach mechanism through its Transportation Coordinating Committee (MCTCC) provides the public forum to address transportation issues, concerns, solicit public input, and provide information on transportation activities and events of interest to Middlesex County and the region. Officers of the MCTCC include the Chairman, the Vice Chairman, the Freeholder liaison, and the Secretary who is responsible for the preparation of the minutes of the meetings, distribution of meeting notices and agendas, and keeping the membership current. Monthly meeting dates and agendas of the MCTCC are sent to each member of the MCTCC about two to three weeks before the scheduled meeting date in accordance with the Open Public Meetings Act.

Activities of the broad-based MCTCC help to promote active public participation on transportation-related matters and issues. Following the annual reorganization meeting of the Board of Chosen Freeholders, and of municipal administrations in the County, the MCTCC begins its first meeting of the year at the traditional time and place. Letters are sent to offices of the mayors and to the Middlesex County State legislative and congressional delegation requesting the reappointment or new appointments of representatives to their offices. Each mayor and legislator may appoint one or more representatives to attend meetings of the TCC on their behalf or in addition to him or herself. A typical meeting will often generate public input and one or several inquiries which are addressed either by County staff or staff of NJDOT, NJ Transit or other appropriate agency. The membership of the MCTCC is extended to:

- The mayors of the twenty five (25) municipalities in the County and/or their designees
- A Freeholder liaison representing the Middlesex County Board of Chosen Freeholders
- The Middlesex County State Legislative delegation
- Congressional representatives
- New Jersey Department of Transportation (NJDOT)
- New Jersey Transit
- private transit operators

- North Jersey Transportation Planning Authority (NJTPA)
- New Jersey Turnpike Authority
- Rutgers University
- Middlesex County College
- National Transit Institute
- the Middlesex County Office of Engineering
- the Middlesex County Office of Transportation
- the Middlesex County Office of Public Works
- the Middlesex County Department of Business Development and Education
- the Middlesex County Office of Social Services
- the Middlesex County Improvement Authority
- Keep Middlesex Moving (KMM), the County Transportation Management Association
- the East Coast Greenway Alliance, representing bicycling and pedestrian interests
- Representatives of the planning departments of adjacent Counties of Somerset, Union, Monmouth and Mercer.
- Citizens at large

There is a provision on the monthly MCTCC agendas for staff reports as needed of any special activities of the respective key agencies/transportation providers that are represented in the MCTCC. These include the NJ Department of Transportation, NJ Transit, the North Jersey Transportation Planning Authority, the New Jersey Turnpike Authority, Rutgers University, Keep Middlesex Moving, the Middlesex County Office of Transportation, the Middlesex County Engineering Office, the Middlesex County Board of Social Services, the Bicycle Pedestrian Task Force and the Transit Subcommittee of the TCC, the East Coast Greenway Alliance, Suburban Transit/Coach USA and Academy Bus Company.

The regular meetings of the MCTCC are held at a traditional time and location and opened to the general public with provision for public comments. Meetings are held at a traditional time and location usually on a monthly basis with the exception of July, August and December; unless there is a special need to do so at the request of the Chairman or Freeholder liaison. The Middlesex County Office of County Planning provides the staffing services to the MCTCC.

The MCTCC also:

- Serves as a forum for the presentation and dissemination of information of local and/or regional significance by public and/or private sector officials and agency representatives of highway and/or transit organizations to insure involvement by the general public in the transportation planning and implementation process affecting the County to inform and educate the public on transportation matters.
- Responds to public inquiries and recommendations raised by TCC members and the general public at regularly held meetings
- Provides advice and recommendations on transportation related issues to the Middlesex County Board of Chosen Freeholders
- Serves as host for needed special presentations or public outreach meetings or forums of regional significance on plans, products, or special services at the request of agencies such as: NJTPA, NJDOT, NJ Transit, NJ Turnpike Authority, the Port Authority of New York and New Jersey, and the Voorhees Transportation Center and National Transit Institute. This may also include conveyance of public information on the results of NJTPA project development, such as project funding announcements, groundbreakings and ribbon-cuttings.
- Assigns review of special plans and projects on transit and bicycling – pedestrian issues to its Bicycle – Pedestrian Task Force or Transit Subcommittees as needed for review and recommendations.
- Provides coordination with other committees of the County, such as the Transportation Infrastructure Advisory Committee, in the development of recommendations that are submitted for action by the Board of Chosen Freeholders.
- The TCC has provided an ongoing forum for public participation in the development of the Transportation Plan Update. Also, the Draft Plan was distributed to all Middlesex County municipalities prior to the formal public hearing held May 14, 2013. Comments on the Plan have been received through the review period and considered for inclusion in the Plan.

8.2 Transportation Demand Management

In other sections of this plan document, various capital improvements have been identified to help reduce the existing and projected traffic congestion throughout Middlesex County. Although such improvements are an essential part of the solution to the traffic problem, they cannot by themselves provide the long-range solution addressing the growing transportation needs of the region. Improved roads that may serve adequately today will likely become congested as rapid growth outpaces programmed improvements in certain areas of the County.

Therefore, solutions to the overall transportation problem -- a problem that is compounded by traffic congestion, limited financial resources, and environmental constraints which may arise to challenge "quick and easy" implementation of capital improvements -- must go beyond merely seeking the temporary elimination of the symptoms of daily peak-hour congestion. Effective solutions must also consider various transportation management options that can help to reduce congestion.

Keep Middlesex Moving, Inc. (KMM), Middlesex County's transportation management association, is an active participant in coordinating and implementing various transportation management options. Among other initiatives in this vein, KMM is a part the statewide computerized carpooling and vanpooling ride-matching service. This program is geared toward encouraging carpooling, vanpooling, and ridesharing by finding commuters who live and work near one another, whose schedules mesh, and who share an interest in either full- or part-time shared commutation. KMM also works closely with the Middlesex County Department of Planning in preparing and distributing mass transit and park and ride information, including such publications as the *Middlesex County Transit Guide*.

With the help of KMM, transportation management alternative strategies should be advanced, as these will continue to be an important component in the mix of strategies seeking to ameliorate the congestion of today -- and tomorrow. Possible strategies for further consideration are outlined in the following pages (pp. 204-212).

8.2.1 Staggered or Flexible Working Hours

The option to stagger working hours requires the cooperation of major industrial parks and large employers (100+ jobs) in instituting flex-time and off-peak work arrival and departure times. This staggering could range from 15 minutes to an hour off-peak wherever possible. Major public centers

such as city halls, colleges, hospitals, etc. offer opportunities in this arena as well. A number of large private firms have explored and implemented this option, as well as many County Departments.

This option can and should be coordinated through non-profit transportation management associations (TMAs) such as KMM, and the New Jersey Office of Ridesharing. In addition, various Chambers of Commerce and related municipal jurisdictions could be effective in targeting large employers and government offices within the boundaries of a municipality. Field experience with this option elsewhere suggests that congestion could be reduced by up to 10 percent, if staggered work hours are utilized to the fullest extent possible.

8.2.2 Promoting Employer-Operated Shuttle Vans

As major employers continue to leave the urban core for more attractive and increasingly accessible suburban locations, locales such as Middlesex County for the first time face the prospect of being a net importer of labor.

With existing and new office complexes clustering around such Middlesex County transportation hubs as Metropark and the New Brunswick vicinity, and along such key corridors as I-287 and the Princeton "Zip Strip" along US-1, an opportunity arises to provide new linkages where feasible. Employer-operated shuttle vans could provide such linkages to major employment sites (corporate and industrial parks, large office complexes, clusters of employers) from bus transfer points, rail stations, fringe parking areas, and other transportation hubs.

8.2.3 Ridesharing Initiatives

There is considerable potential to implement ridesharing programs at large employers including hospitals, colleges, and other major activity centers throughout the County. This option should be promoted where feasible at employment centers of at least 100 jobs, as discussed in the staggered work hours section.

Individuals can help achieve a higher vehicle occupancy rate by sharing the drive to work with a co-worker who lives nearby and puts in a similar work schedule. Unfortunately, in Middlesex County, as elsewhere, the number of workers per vehicle has continued to drop in recent years, from 1.13 to 1.08 between 1980 and 1990. This reaffirms the stronghold that the single-occupant vehicle has on the journey to work. In light of this, strategies geared toward increasing the vehicle occupancy rate should be advanced as a means of taking more cars off the road.

8.2.4 Extending and Improving Local and Regional Transit

The focus here should be to work with transit providers to investigate new and expanded markets, as well as to improve service on existing lines. Areas with the density and commutership potential necessary to warrant expanded transit services should be identified as a guide for transit operators in the County.

About 8 percent of Middlesex County residents rely on traditional transit as a means of getting to work (4 percent each for bus and rail commutership). Greater efforts to promote personal and societal benefits of transit could increase the percentage of Middlesex County residents utilizing transit as a means of getting to work.

A larger piece of the commutership pie could be carried by transit if service was to be extended to serve newly developing areas of the county -- those areas that have achieved or are rapidly approaching the densities necessary to warrant such transit service. Where possible, transit should be improved to provide more comprehensive and on-time service, relative to the hours and frequency of operation. In addition, improvements should be made at transit stops, in order to provide potential riders with reliable information, as well as comfortable and safe surroundings.

Attention to local and regional transit should not simply be limited to bus and rail transit initiatives, but should also consider the feasibility of ferry service, paratransit, and improved linkages between modes at intermodal centers.

8.2.5 Parking Management and Park & Ride Facilities

Parking management options can offer effective ways to reduce traffic congestion and improve flow conditions especially in urban centers and areas of activity where congestion problems are usually greatest. The vast majorities of automobile trips require a parking space at the destination end of the trip, and are therefore very much affected by the kind of parking accommodations that are available for commuting, shopping and recreational trips. Given that most urban-peak highway trips are for commuting, employee parking pricing can have a similar effect as a road toll in influencing the mode with which a trip is made. Hence the cost of parking and relative ease in finding a parking space near destinations can affect decisions we make on how we travel to certain destinations. Limiting parking accommodations in areas of high demand and providing alternative means of access which are comfortable, convenient, affordable and reliable, can help significantly in reducing Vehicle Miles

Travelled (VMT) levels, congestions delays, pollution, noise and thereby help achieve short term and long term benefits.

The Plan recommends parking management strategies that could lead to improved driving efficiency, less driving congestion, fuel consumption and pollution such as “Parking Cash-Out Programs”. A Parking Cash-Out Program is when employers provide free or subsidized parking to their employees and give them the choice to keep their parking space at the work site, or accept a cash payment in place of their parking space. This can encourage employees to carpool or consider transit options that may be available for their work trip. This program works best for employers who lease rather than own a parking facility. Continued investment in park and ride facilities with preferred parking for carpools/vanpools and bicyclists, is also recommended along with parking cash out programs.

Investment in formal park and ride facilities should continue along such commuter corridors as US-9, NJ-18, and NJ-27, and at key interchanges of the Garden State Parkway and New Jersey Turnpike. These routes serve as major conduits of bus service destined for New York City, and each is home to a number of regional bus lines. In addition, the potential to develop and expand park and ride lots in the vicinity of rail stations and bus transfer points should be recognized. The recently completed deck expansion at the Metropark Rail Station along the Northeast Corridor Line in the Metropark area is one example of this, serving large numbers of commuters from nearby Woodbridge and Edison.

Park and rides may also be appropriate in particular in-commuter and intra-county corridors, relative to the location of major employment centers such as New Brunswick and Raritan Center. Strategic placement of these relative to origin and destination patterns can help to reduce congestion on such highways as NJ-18 (in the case of New Brunswick) and I-287/NJ-440 (in the case of Raritan Center).

Along these lines, fringe parking areas could also be used to take commuters bound for large trip generators off the roads. For instance, the large number of commuting students, staff, and administration bound for Rutgers University could be collected at parking areas near major approach roads (e.g., near the junction of US-1 and NJ-18) into the New Brunswick area to relieve some of the heightened peak-hour congestion whenever class is in session.

8.2.6 Promoting Transportation Centers Where Feasible

As another measure to reduce congestion, especially in downtown areas, the *Plan* supports consideration of additional transportation centers in areas of the County where they are found to be warranted and feasible as a means of relieving existing facilities and/or providing added capacity to accommodate areas of growing activity. For instance, such a center in New Brunswick would serve housing, office, and industrial development and provide access to various modes including automobile, bus, rail, bicycle, pedestrian, paratransit/taxi, and helicopter transportation. Ideally, these transportation centers should be developed as intermodal centers, addressing multiple modes of transportation and the inherent links and transfer capabilities among them.

The variety of options discussed in this section includes a mixture of capital and operational solutions for reducing traffic congestion. Those that are more oriented to capital investments such as park and ride facilities and transportation centers lend themselves to incorporation into a definitive transportation plan and program. Others such as ridesharing and staggered work hours are operational and will require ongoing attention as opportunities to implement them arise. Some of these options should continue long after the capital improvements are completed and should be extended to other key corridors of the County.

8.2.7 Integrated Corridor Management (ICM)

Integrated Corridor Management provides for the operation of a corridor in a true multimodal, inte-grated, efficient, and safe fashion where the focus is on the convenience of the transportation customer. The ICM Initiative focuses on providing real-time traveler information and multimodal operations and using technology to reduce congestion. Historically state and local agencies have developed independent systems between freeways, arterials, and transit. ICM will help bridge the gap between these systems, allowing them to function as one. By developing ICM on an integrated corridor, transportation agencies can better utilize existing capacity along multiple networks, especially in times of incidents or special events.

8.2.8 Home-based Telecommuting programs

With today's advanced computer technologies working at home on a full or partial week basis can be a viable option for certain jobs that do not require the physical presence of the employee in the

office on a steady basis. The social benefits of telecommuting relate to reductions in vehicle miles traveled, peak period traffic congestion, and related pollution emissions including greenhouse gases.

People have been complaining about traffic congestion since the days of the Roman Empire when Julius Caesar banned some traffic from downtown Rome. According to a US News and World Report article from May, 2007, the amount of hours that Americans spent in traffic increased fivefold over a 20 year period starting from the early 1980's and during which the amount of free flowing traffic decreased by less than half. In 2007 the average commuter lost some 47 hours, almost two full days, in traffic congestion every year. This article also states that on America's worst commutes, Middlesex County ranked 24th out of 50 counties in the nation with the highest mean travel time to work. Richmond County (Staten Island), NY (which borders Middlesex County east of the Raritan Bay) ranked 1st with 42 minutes as the mean travel time to work followed by three other New York City counties of Queens, Bronx and Brooklyn), and Middlesex County tied Manhattan (New York) County with a mean travel time of 31.1 minutes.

8.2.9 Safe Routes to School program

Safe Routes to School (SRTS) Programs involve the development and implementation of strategies that seek to achieve benefits for students, for the school and for the community by promoting walking and bicycling as means for students to travel to their schools. SRTS programs involve the collaboration of the State Department of Transportation, schools, parents, community members, county and municipal representatives. These programs which are taking place worldwide result in numerous benefits for the students, the schools and the community.

In New Jersey the Safe Routes to School Program began as a school demonstration program in 2005 under the sponsorship of the New Jersey Department of Transportation Bicycle and Pedestrian Unit with assistance from the National Center for Bicycling and Walking. This program sought to initiate safe routes to school activities by exploring effective ways that New Jersey public schools and municipalities could collaborate. Three school/municipal teams were initially selected in New Jersey which included Rand Elementary School, Montclair in northern New Jersey, John F. Kennedy Elementary School, Jamesburg in central New Jersey and Ashbrook Elementary School, Lumberton in southern New Jersey. Within Middlesex County, Safe Routes to School programs have also been developed by Keep Middlesex Moving (KMM) in Metuchen, Woodbridge and New Brunswick.

Benefits derived from SRTS programs include: safer and improved access to schools for pedestrian and bicyclists; reduced traffic in the vicinity of the schools; reduced economic and environmental costs of busing; increased physical activity for students for overall health and to reduce obesity among school age children; and improving the quality of life for the host community and making it a more desirable place to live.

In Middlesex County, the Safe Routes to School Program is coordinated through the Keep Middlesex Moving, Inc. (KMM), the County Transportation Management Association. The Plan supports improved walking and bicycling facilities between residential area and schools to help promote SRTS programs throughout the County.

8.2.10 Middlesex County Transportation Information Facility

Develop and maintain a one stop centralized Middlesex County Transportation Information Facility (MCTIF) unique in the State to provide County residents and visitors with all inclusive transportation customer information covering:

- All NJ Transit, County and Private Operator fixed route transit services operating in the County,
- All special services offered by municipalities
- bus and rail park and ride facilities,
- bicycle friendly routes and designated bikeways and trails
- ridesharing / carpool match.

8.2.11 Marketing, Education and Awareness of Public Transportation

- Increase marketing strategies to expand public awareness of existing transit services, trip information sources, and ongoing changes to the transit system in the County.
- Increase the promotion of the various economic and non-economic benefits of commuting by public transit such as arriving to work more relaxed and the opportunities for better utilization of the commute time (reading, resting, dozing, etc) between home and place of work.

- Promote the utilization / public awareness of transportation improvements that have been recently completed / implemented to improve mobility, traffic capacity, level of service, and provide alternative transportation options.
- Conduct periodic transit and general transportation information fairs with major employers, at public libraries, and/or shopping malls, with promotions and incentives for using transit means (where possible), bicycling, carpooling or walking to get to work.
- Engage in communication with municipalities in the County on the benefits of expanding transit amenities along existing bus routes and/or train stations to make transit more attractive and improve the level of comfort and convenience. At designated locations along bus routes develop recommendations / procedures for designating new legal bus stops and/or acquiring bus shelters where needed at new and existing stops. These should be accompanied with receptacles for trash and recyclables to avoid problems with litter. Where municipalities do not have the resources to maintain new bus shelters explore partnering arrangements that will generate advertising revenue which can be applied to the cost of maintaining a bus shelter. Near transit facilities where bus shelters are not feasible consider also providing concrete or wooden benches.

8.2.12 Promotion of Bicycle Stations

Promote bicycle stations in transit centers throughout the County, and opportunities for integration of bicycling and transit connections at bus and rail facilities. These facilities may include showers, lockers and convenient bicycle rentals for short utilitarian urban trips, as well as secure parking for bicycles owned by patrons. These facilities should be sensitive to:

- ***Visibility*** - Racks should be highly visible so cyclists can locate them immediately when they first arrive. This will also discourage theft and vandalism.
- ***Security*** - Good lighting and surveillance is important for the security of the bicycles and the riders. Bicycle racks and lockers must be well secured to avoid vandalism and theft.
- ***Weather Protection*** - A portion of bicycle parking should be protected from the weather (some short-term bicycle parking can be unprotected since bicycle use tends to be higher during fair weather). Consider using an existing overhang or covered walkway, a special covering, weatherproof outdoor bicycle lockers, or provide an indoor storage area.

- ***Clearance*** - There should be adequate clearance around racks to give cyclists room to maneuver, and to prevent conflicts with pedestrians or parked cars. Racks should not block access to building entrances or fire hydrants.
- ***Amenities*** - Bicycle parking should be located near washrooms to the extent possible and clothes changing facilities. There should also be an electric power supply to recharge bicycle batteries.

8.2.13 Promotion of Non-motorized Travel

- Promote cycling and walking as part of tourist activities and access to local recreational destinations and other places of interest.
- Expand awareness, benefits and utilization of public bikeways, bike routes and multiuse trails throughout the County.
- Create financial/community recognition incentives for bicycling or walking to work.
- Expand emergency ride home programs that provide commuters who regularly carpool, vanpool, bike, walk or take transit with a reliable ride home when an unexpected emergency arises. Keep Middlesex Moving, Middlesex County's Transportation Management Association, offers this program to carpoolers, vanpoolers and public transit users who are registered in KMM's ridesharing program.

8.2.14 Miscellaneous

- Develop an inventory of proposed new bus stop locations and bus shelter sites along all of the Middlesex County Area Transit (MCAT) routes.
- Improve Access to New Jersey 511 Web Site Traveler Information and Backdoor Hot Line Number 1-866-511-NJDT (6538) for information on traffic conditions, NJ Transit, EZ Pass, New York 511, and Pennsylvania 511.

8.3 Maintaining Mobility for the Elderly

It is a common fact that older people want to maintain their independence, mobility and ability to drive as long as possible to avoid isolation, depression and institutionalization. Today older adults are the fastest growing segment of the population involving many baby boomers. There will be more of these drivers who will drive at older ages and more miles per year than previous generations. By 2020, it is estimated that there will be 40 million older Americans as licensed drivers compared to 28 million older licensed drivers in 2004.

Demand for alternative transportation to grow as Americans outlive safe driving ability

America faces a strong demand for alternative means of transportation as a growing number of senior drivers give up their driving privileges. The issue could become a critical one as America ages, according to a new study, which finds older men and women who outlive their ability or willingness to drive must depend on alternative transportation for more than a decade in later life.

"Many older people quit driving each year and must rely on alternative transportation to meet their daily travel needs. This change in status can create unforeseen economic and social burdens that need to be addressed in a similar manner as planning for retirement", according to Dan Foley, M.S., a biostatistician at the National Institute on Aging (NIA) and lead author of a study, published in the August 2002 issue of the American Journal of Public Health, "there has not been adequate attention given to problems of transitioning from drivers to non driver status by many in the aging population."[21]

The approximate 10 percent of the nation's drivers who are older than 65, is prone to increase as the post-World War II "baby boom" generation begins to reach that age period.. In addition, a greater proportion of women age 65 or older is driving than in the past. By 2030, projections suggest one in five Americans will be 65 or older, and the number of people aged 85 and older -- currently the fastest growing segment of the older population -- could exceed 10 million, suggesting more of the older population may be dependent on other forms of transportation in the future.

Findings from the Asset and Health Dynamics Among the Oldest Old (AHEAD) study suggest that more than 600,000 people age 70 or older stop driving each year in part because they believe they

[21] Foley, DJ, Heimovitz HK, Guralnik JM, Brock DB, "Driving Life Expectancy of Persons Aged 70 Years and Older in the United States," 'American Journal of Public Health,' vol. 92, no. 8 pp. 1284-1289. (DJ Foley, JM Guralnik, and DB Brock are with the laboratory of Epidemiology, Demography, and Biometry at the National Institute on Aging. Bethesda, Maryland. HK Hemovitz is with Sytel, Inc., Rockville, Maryland.)

cannot safely drive due to problems related to physical fitness, mental clarity, and vision. The loss of driving ability requires that these people become dependent on others to meet their transportation needs. The Plan recognizes the need for the elderly population to extend their personal freedom of mobility after they stop driving as a way of improve personal well being and quality of life. The Plan responds to this need through proposals that advance the goal of promoting public transportation and intermodal improvements described under Section 2.3 that include the following recommendations:

- Provide more consistent out-of County transportation, particularly addressing destinations within 5 miles of the Middlesex border with contiguous counties.
- Expand availability of group ride (charter) transportation services on weekends and evenings.
- Improve schedule coordination between community shuttles operated by the County and municipalities.
- Expand evening and weekend service beyond the special (charter) trips and community shuttle pilot efforts.
- Provide integrated fare structure between the County and NJ Transit to encourage passenger transfer activity between community transit and traditional rail and bus transit systems.
- Encourage employer transportation services addressing unmet off-peak needs.
- Open senior municipal transportation services to persons with disabilities.
- Address non-English language barriers to obtaining community transportation services beyond bi-lingual customer reservations.
- Coordinate vehicle trips between NJ Transit Access Link and MCAT to address areas outside Access Link ¾ mile band around fixed route system.

8.4 Middlesex County Comprehensive Traffic Safety Web Site

The new Middlesex County Comprehensive Traffic Safety Web site is a one-stop shop for all traffic safety concern or road information, including tips for drivers, pedestrians and cyclists. The web site, http://mctrafficsafety.com, also enables users to report road repair issues and provides a list of all traffic safety events within Middlesex County.

Freeholder H. James Polos, chair of the county's Public Safety and Health Committee, debuted the web site at the Freeholders' regular meeting on a Thursday night. The web site links to various county offices, the state and each of the county's 25 municipalities provide access to the individual sites so that users can report a traffic safety or road repair problem on any local, county or state road within Middlesex County.

It assimilates ***the three Es of traffic safety*** — ***Enhancement, Enforcement and Education*** — Middlesex County's Traffic Safety Web site offers a one-stop shop for information: safety tips, safety data, traffic safety events and reporting roadway concerns and problems. "Whether you are a driver or passenger, pedestrian or cyclist, our new Comprehensive Traffic Safety Web is an incredibly useful tool," said David Gregor, Middlesex County's CTSP Coordinator. "Not only have we assembled valuable tips and data, we offer information on all types of programs and events and are even making it easier to help keep our roads in top condition by giving users an easy path to report a problem."

The Web site is funded through grants from the New Jersey Division of Highway Traffic Safety and Keep Middlesex Moving (KMM), the County's transportation management association. The site was developed in partnership with KMM. Users can access the site by visiting http://mctrafficsafety.com. Starting in March, users will be able to access the site through the KMM Web site, www.kmm.org. This traffic safety web site is a great resource for everyone who uses Middlesex County's vast network of roads. It offers timely, useful information that will go a long way in increasing safety.

8.5 Complete Streets Policies

New Jersey has received national recognition for advancing Complete Streets policies, which requires that future roadway improvement projects funded through the New Jersey Department of Transportation Capital Program not only accommodates motor vehicles, but includes safe accommodations for all users, including bicyclists, pedestrians, transit riders and the mobility-impaired.

The State encourages counties, regional agencies and municipalities who apply for funding through the NJDOT Local Aid Programs to adopt and use similar policies.

At the State level, this policy is implemented through the planning, design, construction, maintenance and operation of new or rehabilitated transportation facilities within public rights of way that are federally or state funded, including projects processed or administered by the New Jersey Department of Transportation. The Commissioner of NJDOT signed the Complete Streets policy on December 20, 2009. The adoption of the Complete Streets Policy of the NJDOT recognized the following benefits of complete streets:

- Complete Streets improve safety for pedestrians, bicyclists, children, older citizens, non-drivers and the mobility challenged as well as those that cannot afford a car or choose to live car free
- Provide connections to bicycling and walking trip generators such as employment, education, residential, recreation, retail centers and public facilities
- Promote healthy lifestyles
- Create more livable communities
- Reduce traffic congestion and reliance on carbon fuels thereby reducing greenhouse gas emissions
- Complete Streets make fiscal sense by incorporating sidewalks, bike lanes, safe crossings and transit amenities into the initial design of a project, thus sparing the expense of retrofits later

The Middlesex County Board of Chosen Freeholders passed a resolution on July 19, 2012 that supports complete streets design practices, acknowledging the needs of all users including pedestrians, bicyclists, motorists, and transit users of all ages and abilities in the design, construction and maintenance of Middlesex County roadways. The County resolution also encourages its municipalities to adopt similar municipal level complete streets design goals in the planning, design, construction and maintenance of municipal projects. As of the writing of this plan, two municipalities in Middlesex County have adopted complete streets policies. The City of New Brunswick adopted a policy on May 6, 2012 and the Township of Woodbridge adopted a policy on July 12, 2012.[22] Adoption of complete

[22] Complete Streets in NJ website of the NJ Bicycle & Pedestrian Resource Center, http://njbikeped.org//?page_id=2279, retrieved March 2013.

streets policies in additional municipalities of Middlesex County will help foster safer, enjoyable and more livable communities in urban and suburban streets throughout the county.

According to Complete Streets studies, residents are 65 percent more likely to walk in a neighborhood with sidewalks than in a neighborhood without sidewalks. Complete Streets are planned, designed and constructed to blend with the local community while meeting transportation needs. This Plan supports NJDOT and organizations such as New Jersey Future in Transportation (FIT), in encouraging communities to improve the convenience and safety of walking and bicycling by designing roads with consideration for pedestrians and bicyclists as a measure to help make roads more attractive for all and reduce congestion and pollution.

8.6 American Disabilities Act Requirements

The Americans with Disabilities Act (ADA) requires that transportation facilities constructed or altered by State, regional, and local agencies be made readily accessible and usable by people with disabilities. The Federal Highway Administration (FHWA) encourages the planning and design of proposed facilities to be fully accessible. It requires that federal funded projects comply with ADA regulations to ensure that persons with disabilities have the opportunity to use public rights of way and facilities. Projects involving new construction and those altering existing street and highway facilities are required to have pedestrian accessibility and usable by persons with disabilities to the maximum extent possible. Types of disabilities may involve vision, hearing, physical, or mental.

Projects involving new construction and those altering existing street and highway facilities are required to have pedestrian accessibility and usable by persons with disabilities to the maximum extent possible. Types of disabilities may involve vision, hearing, physical, or mental.

ADA requirements may be met by Accessibility Guidelines for Buildings and Facilities (ADAAG) located outside the public right-of-way, and for Public Rights-of-Way Accessibility Guidelines (PROWAG) relating to facilities within the public right-of-way excluding structures. All projects sponsored by Middlesex County comply with ADA requirements.

As per the USDOT, Federal Highway Administration guidelines, ***basic ADA requirements*** can apply to facilities such as:

- Curb ramps, median openings and ramp surface to be stable, firm and slip resistant; curb ramps and other transitions may be installed at each end of a crosswalk at intersections,

midblock crossings and trail crossings, accessible on street parking spaces; passenger loading zones and bus stops.

- Landings at the top of the curb ramp and at the bottom of the ramp outside of vehicle travel lanes.
- Detectible warning surfaces (DWS) which are raised truncated domes in a rectangular array usually placed at the bottom of a curb ramp to identify the end of a ramp.
- Elevation differences along a pedestrian path to a maximum of ¼-inch to avoid unexpected vertical drops or vertical rises in grade that could cause falls and impede wheelchairs.
- Grate openings must be oriented so that the wide opening is perpendicular to pedestrian travel and the horizontal gaps no more than a ½-inch maximum.
- Flares on streets near curbside sidewalks.
- Location of gratings, access covers and other appurtenances.
- Driveway paths.
- Pedestrian activated traffic signals.

On public transit systems ADA requirements include provisions such as the following:

- Detectible warning surfaces (DWS) at the edge of a train station platform to identify the area to avoid while waiting for the train.
- Station displays on trains and stop announcements on buses / trains.
- Accommodations for wheelchair passengers for boarding trains and buses and for securing wheelchairs onboard trains and buses.
- Priority seating for disabled on buses.
- Accommodations for service animal such as a seeing eye dog to accompany disabled passenger on board a train or bus.
- Paratransit accommodations as a safety net for eligible individuals with functional disability that prevents them from using a conventional fixed route transit system.
- Information displays at stations.

Compliance with ADA requirements in the planning, design and implementation of transportation projects and system-wide improvements has become an important national concern in

the last two decades. Maximizing the degree to which we can achieve a barrier free transportation system providing adequate mobility to the extent possible to people with certain disabilities, as we do to the majority of the mobile population, has far reaching implications relating to public health, public safety, access to employment, community development, and personal feeling of independence to function as an active member of society, despite one's disability.

8.7 Mitigating Climate Change Impacts and Green Transportation Alternatives

Transportation sources emit greenhouse gases that contribute to climate change. According to a recent report of the U.S. Environmental Protection Agency, "Our Built and Natural Environments: a Technical Review of the Interactions among Land Use, Transportation and Environmental Quality," transportation sources contributed approximately 27 percent of total U.S. greenhouse gas emissions. Transportation is also the fastest-growing source of U.S. greenhouse gas emissions, accounting for 47 percent of the net increase in total U.S. emissions since 1990, and is the largest end-use source of C02, which is the most prevalent greenhouse gas. At the state level 35 % of greenhouse gas emissions are attributed to transportation according to New Jersey's Global Warming Response Act Recommendations Report.

Addressing climate change impacts on transportation needs to be done from the perspective of mitigation and adaptation. Mitigation of transportation related green house gas emissions needs a multiple approach. These include transportation and land use policies that reduce vehicle miles traveled (VMT) and person trips when possible; improving the operational efficiency of the road network; improving vehicle emissions through vehicle technology and fuel efficiency, and adoption of renewable and low carbon fuels. In combination, these strategies can reduce transportation-related emissions significantly. Measures that help reduce VMT growth include travel demand management strategies that provide alternatives to driving alone, telecommuting options, carpooling, making transit more competitive with the auto and more attractive by increasing its level of affordability, comfort and convenience for the user. While transportation continues to contribute a large percentage of U.S. emissions, technological advances are quickly transforming the sector into a key source of greenhouse gas reductions.

In addition to mitigating measures, it is important also to increase the adaptability of our transportation infrastructure and system to severe weather conditions as much as possible in the

project planning and design stages. For existing infrastructure adaptation may include the scheduling of increased / more frequent maintenance and expanding quick response capabilities at for emergencies at all levels of government. Other strategies include the use of new technologies to project future hazards, gaining political support to fund hazard planning, manage storm water, evaluate structural and non structural flood management approaches, and engage the public and private sectors including developers and community leaders to participate in flood planning activities to make communities more flood resilient.

Climatic Impacts on Transportation Infrastructure

Transportation infrastructure in Middlesex County of high critical significance and susceptible to climatic impacts include the New Jersey Turnpike, Garden State Parkway, Route 287, US Route 1, US Route 130, NJ Route 18, NJ Route 35, various County arterial routes, the North Jersey Coast Line, the Northeast Corridor and Raritan Valley passenger rail services, and the electrical infrastructure ranging from traffic signals to power on the railways that supports the operations of the roadway and transit systems. Disruptions on roadways will usually also accompany the inability to use bike paths as ancillary facilities to facilitate mobility.

Mitigating measures to improve the resilience of the transportation infrastructure to severe storm related damage includes regular inventory program for conditions of bridges and culverts, investments in appropriate drainage projects to minimize and mitigate potential storm related impacts, adoption of zoning regulations to limit development in flood prone areas; regional cooperation among public and private sector entities to limit activities that exacerbate flooding in flood prone areas.

Sustainability Strategies

The Middlesex County Sustainability Plan developed in 2009 promotes sustainability through local action and engagement of community members. It encourages local residents to incorporate more sustainable practices into their daily routines and the public to be educated about the impact that their behaviors have on the environment, the economy, or their community at large. Residents need to understand how small changes in their lifestyles can make a positive difference and contribute to the sustainability effort. As these changes often result in reduced energy costs or improved health, residents should be also made aware of associated financial and personal benefits. Education and outreach engages the community in the County's pledge to become more sustainable and illustrates how a collective effort can create a significant impact. The public needs to understand that although

the actions of one individual may not be very significant, when combined by the thousands and millions they can begin to have an effect. In a similar manner that recycling was embraced across the country, so we now must also embrace strategies and activities that minimize emissions of greenhouse gases, reduce waste, improve environmental quality and strengthen the resilience of our infrastructure.

The New Transportation Plan supports the County Sustainability Plan and acknowledges that sole reliance on individual gasoline vehicles contributes to sprawling development patterns, significant increases in impervious surfaces, emissions of greenhouse gases, inactivity that leads to health problems, traffic congestion, and lack of community adhesiveness. In place of this scenario it promotes sustainable transportation that is affordable, offers choice in transportation modes, provides accessible and efficient services that help residents achieve a healthy and desirable quality of life; and also minimizes greenhouse gas emissions and land consumption.

Conventional transportation technologies involve the use of fossil fuels for vehicle propulsion. According to the Board of Public Utilities, the transportation sector, of which passenger vehicles comprise the lion's share, contributes more than one third of the state's greenhouse gases. According to Plan Smart NJ, Middlesex County contributes approximately 10 percent of the States CO2 emissions that come from the transportation sector. As per the New Jersey long Range Transportation Plan, 2030, Middlesex County has one of the highest numbers of occupied housing units with three or more cars. Studies suggest that energy efficiency and conservation has the potential to reduce the nation's current energy consumption by 33% over the course of 10 years. The largest energy savings can be realized in the transportation sector.

Emissions from vehicles cause air and water pollution in addition to contributing to global warming. The emissions from vehicles that burn fossil fuel can also create smog that can intensify asthma and particles from diesel can contribute to respiratory illness by intensifying the effects of pollen and mold in the lungs. Improving energy efficiency of vehicles, reducing vehicle miles traveled, and converting to hybrid or alternative energy vehicles will help reduce operational costs and will improve public and environmental health. Middlesex County has taken steps to acquire hybrids as part of its vehicle fleet as a means of reducing CO2 per mile emissions from its fleet of vehicles.

As wealth increases, motor vehicle ownership tends to increase, as do VMTs, energy consumption, carbon dioxide emissions, traffic accidents, and unproductive time spent on the road. One effective way to reduce the level of VMTs is by encouraging Transit Oriented Development (TOD) that facilitates transit services and which is supported by the State Strategic Plan and by the private

sector as well. Such groups as homebuilders and developers of commercial properties are recognizing built-up market demand for TOD's. More people now are expressing a preference for driving less and walking more and the benefits of locating in places that have multiple transportation choices.

Rising fuel prices are also increasing mainstream awareness and interest in alternative transportation technology. Additionally, an aging population requires alternative modes of transportation on a greater level. Currently 20 percent of Americans 65 or older do not drive. Higher development density puts destinations closer together, which increases the possibility that trips can be made by walking or bicycling, provides density necessary to support public transit, and reduces travel distances for those trips that are still taken by car. A mix of land uses with residences, offices, public buildings, and shopping all located in close proximity ensures that higher density actually translates into fewer and shorter automobile trips.

For those that are considering acquiring electric powered vehicles, there needs to be an infrastructure that accommodates the recharging of these vehicles in a convenient manner during times that they are on the road. For example, the possibility of incentives for installing solar panels on the canopies of gas stations that would generate electric power to accommodate electric vehicles at a low cost could be explored. Voluntary programs such as "Sustainable Jersey" that can be utilized by municipalities provide state and private financial incentives and technical support to empower communities towards achieving sustainability goals for the future.

In the use of conventional gasoline powered vehicles, there are simple ways of maximizing mileage and vehicle operating efficiency. These include the following:

- Eliminate unnecessary weight carried in the trunk of a car
- Maintain tires properly inflated
- Stay within the speed limit; every 5 miles over 60 mph can burn about 5 % more fuel
- Avoid abrupt starts and stops
- Change engine oil and air filter on schedule
- Avoid idling when possible to reduce fuel consumption and engine wear
- Reduce use of air conditioning when possible
- Use cruise control when conditions permit
- Tighten fuel cap to prevent leakage

8.8 Improvements through Intelligent Transportation Systems Technology

Intelligent transport systems (ITS) involve advanced applications which look to provide innovative services for different modes of transportation and traffic management. They allow various users on highways and transit systems to be better informed and make safer, more coordinated, decisions on their use of transportation networks.

ITS generally may refer to all modes of transportation; however, in the area of highways and bridges and for interfacing with other transportation modes, ITS can be defined as systems in which information and communication technologies are applied in the field of road transport, including infrastructure, vehicles and users, and in traffic management and mobility management, as well as for coordinating with other modes of transportation.

A major purpose of ITS is to address in part the problems caused from traffic congestion through a combined effort of computer applications and telecommunications equipment for real-time control, and communications networks. With the increasing traffic congestion there has been related increases in the efficiency of transportation infrastructure, travel time, air pollution and fuel consumption.

Governmental activity in the area of ITS, has also been motivated by an increasing focus on homeland security. Many of the proposed ITS systems also involve surveillance of roadways, which is a priority of homeland security, such that funding of some systems comes either directly through homeland security organizations or with their approval in addition to conventional funding programs from the US Department of Transportation. Further, ITS can play a role in the rapid mass evacuation of people in urban centers after events such Super Storm Sandy.

Intelligent transportation systems also vary in the type of technologies that are applied. These include basic management systems such as high speed or plaza toll collection systems as EZ PASS, car navigation; traffic signal control systems; container management systems; variable message signs; automatic number plate recognition, red light cameras or speed cameras to monitor applications, and to more advanced applications that integrate live data and feedback from a number of other sources, such as parking guidance and information systems; weather information; bridge deicing systems; and the like. Additionally, predictive techniques are being developed to allow advanced modeling and comparison with historical baseline data.

In Middlesex County ITS applications exist through variable message signs on major highways that provide real time traffic information, advance notice of upcoming events such as Rutgers Football games, and amber and silver alerts to motorists. Other tools for communicating travel information to users include websites such as the 511nj.org, telephone hotlines, and smart phone applications.

ITS technologies on transit services in the County are also improving with the "My Bus" transit information made available at NJ Transit Bus Stops throughout the State. NJ Transit has begun the "*MyBus Now*", first real-time service information system for bus customers as a pilot program on 16 Mercer County-area bus routes including two routes – the No. 600 and the No. 655 which also serve Plainsboro in Middlesex County. Expansion of this technology in Middlesex County is expected by mid, 2013.

The MyBus Now pilot program is the start toward system-wide implementation of a very useful customer information tool. With access to real-time bus location and arrival information via telephone or computer bus customers will be able to make informed decisions about their travel, even while they are traveling.

MyBus Now uses "smart bus" technology to provide customers with access to real-time bus arrival estimates to a specific bus stop within a 30-minute window. Customers are able to access the information in three ways: from a desktop computer through njtransit.com; from a web-enabled Smartphone through the mobile version of njtransit.com, and via SMS-text messaging directly to their cell phones.

As part of the NJ Transit program to improve its bus operations, Middlesex County has received new NABI buses on the NJ Transit 800 series local bus routes serving various areas of the County with some ITS applications. These buses include smart bus technology for automatic stop announcements, automatic vehicle condition monitoring to enable proactive maintenance, automatic passenger counting to enable accurate and timely schedule changes to meet customer demand, and video surveillance to enhance safety and security, and improved communications to driver of road/traffic/safety information to increase passenger safety and minimize delays.

Greater implementation and use of ITS regional and local system technologies can help address problems with traffic congestion and stress of driving.

8.9 Implementation of Strategies

The Plan lends support to the advancement of these strategies and recommends their further development and implementation with the help of appropriate county, municipal, state and regional agencies and private sector participation where appropriate.

Chapter Nine: Federal Transportation Funding

As per federal regulations, all projects using federal funds are included in the NJTPA's federally required Transportation Improvement Program (TIP). This is a four year schedule of transportation improvements in the 13-county region of northern and central New Jersey of which Middlesex County is a member. Projects in the TIP have undergone the necessary planning work and are ready for preliminary engineering, design, right of way acquisition or construction work and included federal, state and other funding sources to meet their total project cost. The TIP is updated annually and is fiscally constrained. Prior to eligibility in the TIP a project must conform to goals of the Regional Transportation Plan (RTP); then it must be selected for inclusion in the Study and Development Work Program (formerly known as the Project Development Work Program), which is released every two years to identify project concepts for further development; and then undergo a concept development study. Federal funds are derived primarily from the Federal Highway Administration and the Federal Transit Administration of the U. S. Department of Transportation.

There are various federal funding sources established by federal and state transportation legislation which determine the project eligibility and the type of work that qualifies for funds under each federal funding program category. As an example, the National Highway Performance Program "NHPP" as established by MAP-21, provides support for the construction of new facilities on the National Highway System (NHS), the condition and performance of the NHS, and achieving performance targets, as set by that state's asset management plan.

9.1 Capital Investment Strategy

In today's challenging fiscal climate, Middlesex County continues to be aggressive in seeking out a diverse array of transportation funding sources. Chief among these sources are federal transportation funds programmed by the region's metropolitan planning organization, the North Jersey Transportation Planning Authority (NJTPA).

In ***PLAN 2035,*** the NJTPA outlines its efforts to advance the region's broad mobility and accessibility goals through a Regional Capital Investment Strategy (RCIS).[23] This strategy informs the project selection process and provides general policy direction driven by core principles for regional transportation plan investments. The core principles of the investment strategy are as follows:

[23]North Jersey Transportation Planning Authority, Inc. *Plan 2035 Regional Transportation Plan for Northern New Jersey.* 2009

- Help the Region Grow Wisely: Transportation investments should encourage economic growth while protecting the environment and minimizing sprawl.
- Make Travel Safer: Improving safety and security should be explicitly incorporated in the planning, design and implementation of all investments.
- Fix It First: The existing transportation system requires large expenditures for maintenance, preservation and repair, and its stewardship should be the region's highest priority.
- Expand Public Transit: Investment to improve the region's extensive transit network should be a high priority, including strategic expansions to serve new markets.
- Improve Roads but Add Few: Road investments should focus on making the existing system work better, and road expansion should be very limited without compromising the tremendous accessibility provided by the existing highway system.
- Move Freight More Efficiently: Investments should be made to improve the efficiency of goods movement because of its importance to the region's economy and quality of life.
- Manage Incidents and Apply Transportation Technology: Investments should be made to improve information flow, operational coordination and other technological advances that can make the transportation system work smarter and more efficiently.
- Support Walking and Biking: All transportation projects should promote walking and bicycling wherever possible.

The NJTPA Board of Trustees uses these eight investment principles to establish goals for levels of investments among the following categories of funding: Bridges, Roads, Transit, Freight, Intelligent Transportation Systems (ITS), Travel Demand Management (TDM), Safety and Bicycle/Pedestrian. The current NJTPA investment goals are as follows:

- Transit Preservation and Enhancement: 40.3%
- Road Preservation and Enhancement: 20.2%

- Transit Expansion: 16.1%
- Bridges: 15.0%
- Freight/ITS/Safety/Bike/Ped: 6.6%
- Road Expansion: 1.8%

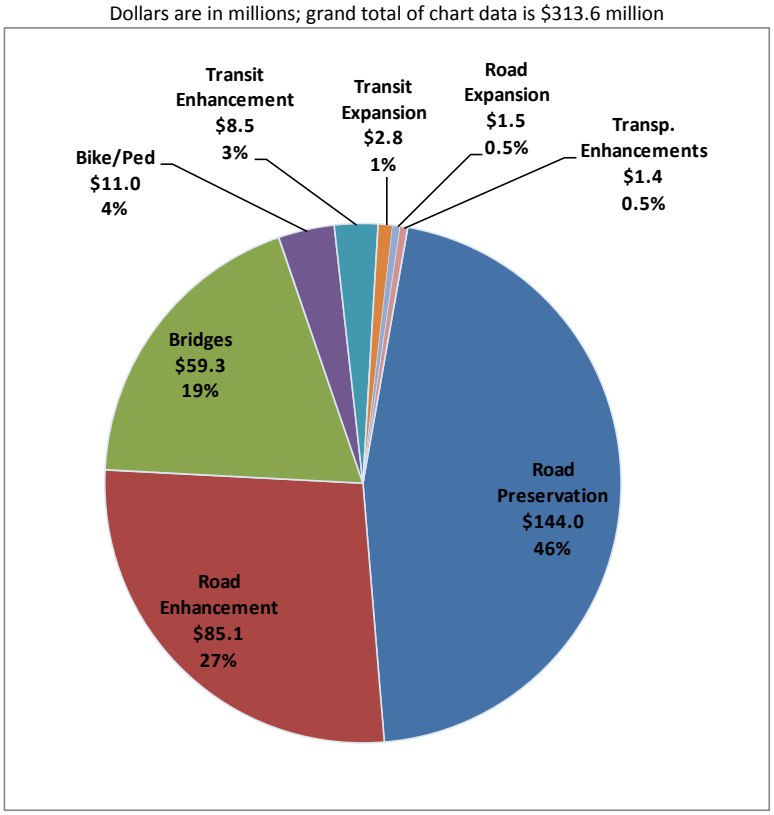
The RCIS complements the NJDOT's Statewide Capital Investment Strategy (SCIS) in developing the financial assumptions and scenarios that underpin long term transportation planning and investment in the NJTPA region. This is a result of collaborative efforts involving NJDOT, NJ Transit, the New Jersey Turnpike Authority (NJTA), the South Jersey Transportation Authority (SJTA), the South Jersey Transportation Planning Organization (SJTPO), the Delaware Valley Regional Planning Commission (DVRPC) and NJTPA. The SCIS is a requirement of the Transportation Trust Fund Authority Act of 2000 and provides transportation investment recommendations based on goals, objectives and performance measures.

Every two years, the NJTPA works with its 15 member subregions, including Middlesex County, and partner agencies to develop the Transportation Improvement Program (TIP). The TIP includes an index of all federally-funded transportation projects in the NJTPA region, as well as other projects of regional significance, such as those funded by the Port Authority of New York and New Jersey and the New Jersey Turnpike Authority. Project concepts under development by various agencies are included in the NJTPA's Study and Development Program; projects that graduate from this program are eligible for inclusion in the TIP. Middlesex County works closely with the NJTPA to identify, advance, and prioritize a broad range of transportation projects and project concepts with federal funding.

As a critical part of the NJTPA region's economy and transportation system, Middlesex County strives to spend allocated federal transportation funds consistent with the NJTPA RCIS and Investment Goals. The age of the county's infrastructure, coupled with the high financial, environmental and other costs of roadway expansion, dictates that "Fix It First" be the highest investment priority. The following chart illustrates how Middlesex County planned to spend federal transportation funds in FY 2012. The top categories of Road Preservation and Road Enhancement accounted for 73% of federal transportation funds programmed for Middlesex County projects. This investment approach is consistent with the NJDOT, NJ TRANSIT, and other transportation agencies around the state that are focusing on preserving and maintaining a state of good repair for existing facilities, rather than adding new ones.

Figure 9—1: Federal Transportation Funds Programmed for Middlesex County by Capital Investment Category, FY2012-2015

Dollars are in millions; grand total of chart data is $313.6 million



Source: NJTPA FY2012 TIP PDWP Database version June 21, 2012
Note: Includes congressional earmarked funding which does not necessarily reflect full costs of projects; includes full dollar amount of inter-county projects; excludes NJ turnpike authority projects

9.2 List of Federally-Funded and New Jersey Turnpike Authority Projects, FY 2012

The project listing below contains federally-funded and NJTA candidate projects in Middlesex County that were identified through the NJTPA's metropolitan planning process, approved in the FY 2012-2015 TIP or the FY 2012 Project Development Work Program, and whose estimated costs can be calculated based on 25-year funding assumptions. Near-term projects are those projects that are anticipated to be completed within the four years of the approved TIP (2012-2015). Mid-term projects are scheduled to be completed within five to ten years (2016-2021). The DBNUM refers to a number assigned to all projects to allow them to be tracked electronically in a database storage environment. Projects are sorted and grouped by the investment category assigned to each project, based on the eight investment principles covering the following categories: Bicycle/Pedestrian, Highway/Bridges, and Transit.

Project Name	DBNUM	RCIS Category	SPONSOR	TIP Est. 2012 to 2015 (in $millions)	TIP Est. 2016 to 2021 (in $millions)	YOE Est. to 2021 (in $millions)	Est. Completion Date
Bike/Ped							
Near-Term							
* East Coast Greenway, Middlesex/Union Counties	04327B	Bike/Ped	NJDOT	$0.72		$0.72	N/A
New Brunswick Bikeway	NS0301	Bike/Ped	Middlesex County	$8.30		$8.30	N/A
Route 18, South Woodland Ave., Intersection Improvements	X221D	Bike/Ped	NJDOT	$1.40		$1.40	N/A
* Veterans Field Pedestrian Walkway / Bike Path	09318	Bike/Ped	Middlesex County	$0.62		$0.61	N/A
Highway/Bridges							
Near-Term							
Route 1, Northbound, South of CR 514 to Route 287, Resurfacing	11389	Road Preservation	NJDOT	$3.24		$3.24	N/A
* Route 1, South Brunswick, Drainage Improvements	93253	Road Preservation	NJDOT	$3.62		$3.62	8/1/2014
Route 1, Various Locations from N. of College Rd. to NJ 91 Connector, Resurfacing	10311	Road Preservation	NJDOT	$9.93		$9.93	N/A
Route 9, Green Street Interchange, Woodbridge	95115	Road Preservation	NJDOT	$6.07		$6.07	10/6/2015
Route 9, Pavement Rehabilitation, Middlesex/Monmouth Counties	09307	Road Preservation	NJDOT	$49.19		$49.19	12/16/2013
Route 18, Bridge over Route 1	FS09644	Bridges	NJDOT	$21.20		$21.20	N/A
Route 27, N. of Evergreen St. to vicinity of Elizabeth River, Pavement	10316	Road Preservation	NJDOT	$10.99		$10.99	N/A
Route 27, Six Mile Run Bridge (3E)	146	Bridges	NJDOT	$5.62		$5.62	11/19/2013
Route 27, South Plainfield Branch (Lake Avenue Bridge)	95102	Bridges	NJDOT	$5.75		$5.75	7/30/2013
Route 27, Wood Avenue	93227C	Road Enhancement	NJDOT	$13.75		$13.75	5/18/2016
Route 35, Cherry Tree Lane to Rt 9, Resurfacing Various Locations	10319	Road Preservation	NJDOT	$6.78		$6.78	N/A

Project Index

***: denotes projects with Congressional earmark funding which does not necessarily reflect the full cost of projects, nor the Year of Expenditure amount.**

Project Name	DBNUM	RCIS Category	SPONSOR	TIP Est. 2012 to 2015 (in $millions)	TIP Est. 2016 to 2021 (in $millions)	YOE Est. to 2021 (in $millions)	Est. Completion Date
Route 35, Greenwood Drive to Prospect Avenue	177A	Road Preservation	NJDOT	$19.65		$19.65	8/1/2014
Route 130, Adams Lane (16)	9155	Road Enhancement	NJDOT	$3.26		$3.26	N/A
Route 130, Westfield Ave. to US Rt. 1, Pavement	11309	Road Preservation	NJDOT	$13.00		$13.00	N/A
Route 28, from Branch of Green Brook to Hamilton Avenue	11392	Road Preservation	NJDOT	$5.31		$5.31	N/A
* Route 440, High Street Connector	99379	Road Expansion	Perth Amboy	$1.49		$1.49	N/A
Schalk's Crossing Road Bridge, CR 683	00321	Bridges	NJDOT	$8.70		$8.70	2/10/2015
Mid-Term							
Oak Tree Road Bridge, CR 604	99316	Bridges	NJDOT	$2.50	$15.50	$18.00	N/A
Route 18, East Brunswick, Drainage and Pavement Rehabilitation	10354	Road Preservation	NJDOT	$3.00	$13.20	$16.20	N/A
Route 18, Edgeboro Road (CR 527), Intersection Improvements	X221C	Road Enhancement	NJDOT	$0.50	$5.40	$5.90	N/A
Route 18, Interchange of CRs 516/527	9394	Road Enhancement			$26.00	$26.00	N/A
Route 27, Renaissance 2000, Bennetts Lane to Somerset Street	97079	Road Enhancement			$10.17	$10.17	N/A
Route 34, Amboy Road/Morristown Road (5)	9227	Road Enhancement			$6.11	$6.11	N/A
Route 287, Interchange 10 Ramp Improvements	9169Q	Road Enhancement	NJDOT	$1.00	$11.75	$12.75	N/A
Route 287, River Road (CR 622), Interchange Improvements	9169R	Road Enhancement	NJDOT	$1.50	$5.70	$7.20	N/A
Projects Under Study							
Route 1, Cattle Pass, Culvert Replacement	11347	Bridges					
Route 1, Forrestal Road to Aaron Road	08417	Road Expansion					

Project Index

***: denotes projects with Congressional earmark funding which does not necessarily reflect the full cost of projects, nor the Year of Expenditure amount.**

Project Name	DBNUM	RCIS Category	SPONSOR	TIP Est. 2012 to 2015 (in $millions)	TIP Est. 2016 to 2021 (in $millions)	YOE Est. to 2021 (in $millions)	Est. Completion Date
Route 9/35, Main Street Interchange	079A	Bridges					
Route 18, Route 1 to NJ Turnpike	X221E	Road Enhancement					
Route 287, Middlesex Co., Culvert Replacement	11356	Bridges					
Transit							
Near-Term							
* Carteret Ferry Service Terminal	06316	Transit Expansion	NJDOT	$2.83		$2.83	N/A
* South Amboy Intermodal Center	98541	Transit Enhancement	South Amboy	$8.51		$8.51	N/A
NJ Transit Projects Under Study							
Central New Jersey Route 1 Bus Rapid Transit	TN10002	Transit Expansion					
Monmouth – Ocean – Middlesex Corridor Project	TN05001	Transit Expansion					
Route 9 Bus Enhancements	TN12001	Transit Enhancement					
Other							
Near-Term							
* Robert Wood Johnson University Hospital Parking Facility	08449	Transp. Enhancements	To be determined	$1.44		$1.44	N/A
Authority Projects							
Near/Mid-Term							
New Jersey Turnpike Authority							
Bridge Painting Phase I	TPK1007	Bridges					
Bridge Painting Phase II	TPK1016	Bridges					
Bridge Preservation and Security	TPK1006	Bridges					
Deck Reconstruction Phase II	TPK1015	Bridges					

Project Index

***: denotes projects with Congressional earmark funding which does not necessarily reflect the full cost of projects, nor the Year of Expenditure amount.**

Project Name	DBNUM	RCIS Category	SPONSOR	TIP Est. 2012 to 2015 (in $millions)	TIP Est. 2016 to 2021 (in $millions)	YOE Est. to 2021 (in $millions)	Est. Completion Date
Improvements to Roadway Appurtenances (Safety Improvements)	TPK1010	Safety					
NJ Turnpike Widening, Interchange 6 to Interchange 9 Program	TPK0501	Road Expansion				$2,500.00	
Parkway Interchange 125 (Phase I)	GSP1003	Road Enhancement				$40.00	
Parkway Mainline Shoulder Improvements	GSP1007	Road Preservation					
Parkway Substructure Repairs	GSP1008	Bridges					
Sign Replacements Phase II	TPK1018	Road Preservation					
Turnpike Interchange 8A to Route 130 Connection	TPK1004	Road Expansion				$100.00	
Turnpike Specialized Bridge Structure Work	TPK1008	Bridges					

Project Index

***: denotes projects with Congressional earmark funding which does not necessarily reflect the full cost of projects, nor the Year of Expenditure amount.**

Chapter Ten: Funding Alternatives for Transportation Infrastructure and Services

This chapter summarizes funding sources that are sought for transportation improvement projects and initiatives.

State

- NJ Department of Transportation
- NJ Transit

Federal

- Together North Jersey Local Demonstration Grants
- U.S. Economic Development Administration Public Works Grants
- U. S. Transportation and Community Systems Preservation Program
- United States Army Corps of Engineers
- Federal Emergency Management Agency

County of Middlesex

- ***County Site Plan Review Process Developer Fees.*** The Middlesex County Office of Planning reviews development proposals i.e. Subdivision and Site Plan Applications to determine whether County roads/property and or drainage facilities would be adversely affected. The objective is to reduce hazards to the general public caused by unsafe traffic conditions and or flooding.
- Reviews are carried out for a fee, in accordance with the County Subdivision and Site Plan Resolutions, which are based on, and in conformance with the New Jersey County Enabling Act. This allows the County to assess developers for contributions for downstream drainage improvements, and requires developers to install and bond for the required improvements to County roads and facilities. Application procedures for development activity include Developer's Agreement, Future Improvements Agreement, and Stormwater Maintenance Agreement.

- In the spirit of public and private cooperation in advancing improvements that are in the public interest, Middlesex County successfully has obtained about 44 linear miles of sidewalk and curbing over the last decade from developer contributions.

➢ ***Dedicated Funding for special transportation projects/improvements***

- The Plan also recommends a dedication of funding towards bicycle and pedestrian projects in Middlesex County similar to monies that have been applied to these projects from the Middlesex County Open Space Trust Fund.
- The Plan encourages and supports continued and expanded partnerships among municipal, county, state and federal levels of government and with private sector entities in advancing and funding transportation improvement projects and strategies that are in the public interest.

Conclusion

As we move forward into the years ahead, the goals, strategies and proposals identified in this Plan help to provide guidance and possible actions to address the diverse and complex transportation challenges that we face in meeting the needs of the various population groups in Middlesex County, the second most populated County in the State. We continue to face the main challenge of moving closer to achieving the kind of transportation system that is sensitive, responsive and accommodating to the needs of the different transportation customers in Middlesex County. While many accomplishments have been made over the last decade, more needs to be done to respond to everyday problems and achieve the balance, equity and safer conditions on all modes of transportation that is envisioned in this Plan.

The problems discussed in the Plan are intended to address the pervasive traffic congestion and delays we face as drivers; the loss of lives, injuries and property losses caused by traffic accidents; the inability of people who do not drive or own automobiles to get to where they need to go such as places of work, shopping, worship, healthcare, educational and recreational facilities; the deteriorating bridges and transportation infrastructure that everyone depends on every day; and the lack of adequate accommodations for many of the elderly, disabled and economically disadvantaged. In the process of addressing these various issues the Plan calls for a streamlining of the transportation project delivery process and a continuing collaborative approach and active participation of state, regional and local stakeholders including public and private entities to help bring the vision of this Plan to fruition. As possible solutions, the Plan proposes a range of intermodal measures involving engineering, education, enforcement and travel management strategies and proposals for the purpose of creating a transportation system with greater balance, equity and with a better quality of life in Middlesex County.

Plan Adoption and Endorsements

Middlesex County Planning Board

RESOLUTION

MIDDLESEX COUNTY PLANNING BOARD
ADOPTION OF THE MIDDLESEX COUNTY TRANSPORTATION PLAN
"NEW HORIZONS IN MOBILITY"

WHEREAS, The Middlesex County Transportation Plan is a component of the County's Adopted Comprehensive Master Plan; and

WHEREAS, the previous Middlesex County Transportation Plan which was adopted on June 8, 1999 has since served as a planning guide for transportation needs in the County; and

WHEREAS, the new Transportation Plan, "New Horizons in Mobility," updates the prior Plan to address more accurately present and future growth, transportation improvement needs, and projects and strategies for addressing these needs in the County; and

WHEREAS, the Transportation Plan as an element of the Middlesex County Comprehensive Master Plan has been developed in close collaboration with regional planning efforts of the North Jersey Transportation Planning Authority and other key local and regional transportation agencies; and

WHEREAS, the goals and objectives of the updated Middlesex County Transportation Plan include increasing mobility and reducing traffic congestion; improving safety and security; promoting public transit and intermodal improvements; maintaining a state of good repair; promoting adequacy and safety in bicycling and pedestrian facilities that support mobility and recreation; promoting integration of transportation and land use plans; supporting freight transportation improvements with system upgrades and operational efficiencies; protecting the environment with consideration on energy conservation and climate change impacts; enhancing economic vitality and access to jobs; and promoting public and private sector partnerships; and

WHEREAS, these goals support policies and actions that will help provide a more balanced, attractive and integrated transportation system that improves the overall quality of life in the County, and are consistent with the goals of the North Jersey Transportation Planning Authority (NJTPA) Regional Transportation Plan 2035; and

WHEREAS, copies of the Plan have been circulated for comments to the municipal clerks and planning board secretaries of all Middlesex County municipalities, to counties and municipalities adjacent to Middlesex County, and have also been made available for public review at the Middlesex County Planning Board offices and Middlesex County Office of Planning website; and

WHEREAS, the input received during this outreach process has been considered and incorporated as appropriate into the proposed updated Middlesex County Transportation Plan Element, "New Horizons in Mobility;" and

1

WHEREAS, the Middlesex County Transportation Coordinating Committee endorsed the Middlesex County Transportation Plan Update, "New Horizons in Mobility" as an element of the County Comprehensive Master Plan at its meeting of June 25, 2013;

NOW THEREFORE BE IT RESOLVED, that the Middlesex County Planning Board has reviewed the proposed updated Transportation Plan, "New Horizons in Mobility," and finds the Plan consistent in promoting a balanced transportation system in the County, consistent with the transportation needs that have been presented, and in conformance with the goals of the Regional Transportation Plan (RTP) of the North Jersey Transportation Planning Authority;

BE IT FURTHER RESOLVED, that the Middlesex County Planning Board adopts the Transportation Plan shown in 'Attachment A' as an element of the County adopted Comprehensive Master Plan;

BE IT FURTHER RESOLVED, that copies of this resolution be sent to the Middlesex County Board of Chosen Freeholders, the Middlesex County Office of Planning, the Middlesex County Transportation Coordinating Committee, the North Jersey Transportation Planning Authority, the New Jersey Department of Transportation, NJ Transit, the New Jersey Turnpike Authority, to the Planning Departments of the municipalities in Middlesex County, and to the adjacent counties of Mercer, Monmouth, Somerset, and Union.

MIDDLESEX COUNTY PLANNING BOARD

Olga Sgambettera, Chairman

ATTEST:

Steven D. Cahn, Esquire
Planning Board Counsel

Dorothy K. Power, Secretary
Middlesex County Planning Board

DATE: September 10, 2013

2

Middlesex County Transportation Coordinating Committee

RESOLUTION

MIDDLESEX COUNTY TRANSPORTATION COORDINATING COMMITTEE ENDORSEMENT OF THE MIDDLESEX COUNTY TRANSPORTATION PLAN

WHEREAS, The Middlesex County Transportation Plan is a component of the County's Adopted Comprehensive Master Plan; and

WHEREAS, the preceding Middlesex County Transportation Plan which has served as a planning guide for transportation needs in the County was adopted on June 8, 1999; and

WHEREAS, the existing Transportation Plan has been updated to meet the present and future growth needs of the County and to comply with Federal and State planning requirements/guidelines; and

WHEREAS, the Transportation Plan as an element of the Middlesex County Comprehensive Master Plan is updated in close collaboration with municipal input, the Regional Transportation Plan of the North Jersey Transportation Planning Authority and in accordance with federal emphasis areas and other regional transportation agencies; and

WHEREAS, the goals and objectives of the updated Middlesex County Transportation Plan include increasing mobility; reducing traffic congestion; improving safety and security, public transit, bicycling and pedestrian facilities, and movement of freight; integration with land use plans; protecting the environment; and pursuit of economic vitality and public and private sector partnerships which are consistent with the North Jersey Transportation Planning Authority (NJTPA) Regional Transportation Plan 2035; and

WHEREAS, these goals encourage policies, strategies and projects that help provide a more accessible, attractive, affordable and integrated transportation system and a better quality of life; and

WHEREAS, the Middlesex County Transportation Coordinating Committee has reviewed and commented on the proposed Transportation Plan Update, and has served as a major forum through which many of the goals and project proposals included in the Plan have emerged;

NOW THEREFORE BE IT RESOLVED, that the Middlesex County Transportation Coordinating Committee endorses the Middlesex County Transportation Plan Update, *New Horizons in Mobility,* as an element of the County Comprehensive Master Plan, and finds the Plan consistent with achieving a balanced transportation system and addressing the short term and long term transportation needs of Middlesex County;

BE IT FURTHER RESOLVED, that copies of this resolution be sent to the Middlesex County Planning Board, the Middlesex County Board of Chosen Freeholders, and to the North Jersey Transportation Planning Authority.

Richard Zipp, Vice Chairman
Middlesex County Transportation Coordinating Committee

ATTEST:
Danielle Britton, Secretary

DATE: **June 25, 2013**