Newark Transportation Plan

City of Newark, DE

Prepared for:

WILMAPCO

Participating Agencies:

Delaware Department of Transportation
DART – Delaware Transit Corporation
City of Newark
University of Delaware

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Approved:

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Executive Summary

This report was prepared as an update to the *Newark/Elkton Intermodal Transportation Plan* that was completed in 1998. Specifically, this update addresses components of the plan relative to the City of Newark. The purpose of this update is to re-examine the City's transportation system, gather a renewed round of agency and public input, and develop a set of updated system-wide recommendations.

In recent years the City of Newark has continued to contend with the issues of growth and land use, as well as the transportation challenges that go hand in hand with such concerns. In recent years the area's traffic volumes have remained fairly constant within the City. This is directly related to the overall slow economic conditions and a changing employment landscape in and around the City. Specifically, the closure of the Newark Chrysler Plant, the Avon Distribution Center along with higher gas prices have helped keep traffic growth at a slow pace. However, despite the national economic downturn, the City is experiencing growth in housing and employment. The University of Delaware has several ongoing initiatives that will expand their presence in the City, DART's ridership has steadily increased, and areas of recurring traffic congestion have not seen notable improvement despite the recent economic downturn.

The goal of this updated *Newark Transportation Plan* is to provide a renewed direction for developing an intermodal transportation system that will provide effective and efficient movement of people and goods while preserving the character of Newark as a livable community. This study evaluated numerous alternatives for addressing these issues, and it recommends several different types of strategies and actions. The list of identified improvements include a wide range of initiatives including: signal optimization, capacity enhancements, access management, parking strategies, and mobility improvements that address walking, biking and transit accessibility. It should also be noted that this report has put added emphasis on developing economically feasible and sustainable improvements that can reasonably be approved, funded and implemented.

The finalized plan was developed in cooperation with various agencies and organizations. Participating agencies included WILMAPCO, DelDOT, Delaware Transit Corporation, City of Newark, and the University of Delaware. Additionally, three public meetings were held to gain input and comments from members of the public, along with public displays and committee presentations. In general the plan has identified several key issues which include congestion, safety, and mobility, bicycle and pedestrian travel, parking and transit.

The following table provides a brief summary of recommendations in each category:

TABLE I - Summary of Recommendations

Congestion, Safety and Mobility Improvements – Short-term	
Recommendations	**Summary**
Signal Coordination **-** Implement a Newark Corridor Optimization Program. Initially to include: 1.Elkton Rd. (10 signals) 2.Cleveland Ave. (6 Signals) 3.Library Ave (4 Signals) 4.S. College Ave. (10 Signals)	• All non-compliant/faulty equipment shall be repaired and new traffic volume data shall be collected for use in developing corridor-specific optimized signal timing plans. Faulty equipment can be reported to DelDOT as needed by calling 302/659-4600. • Installation of a modernized traffic signal system for the S. College Ave and Route 4 Corridors. DelDOT is currently working with WILMAPCO and the University of Delaware to implement signal improvements along several Newark corridors.
Land Use and Travel Demand Management	• Combining planned, mixed use development and programs to encourage use of walking, bicycling, transit and ridesharing can reduce demand for driving and thus reduce the impacts of congestion.
Access Management and Traffic Flow	
Ogletown Rd (Route 273) at Marrows Road – Roadway alignment upgrade	• Includes improvement to the existing lane alignment between Marrows Rd. and Library Ave in the westbound direction. (Paint Only)
Safety, Complete Streets and Traffic Calming	
W. Park Place traffic calming improvements from Elkton Rd to S. College Ave.	• Implement a cost-effective traffic calming plan that keeps existing mid-block curb lines intact and restores the corridor to a more residential quality. Design concepts will include: ○ A reduced road width at intersections with short sections of raised medians/pedestrian refuges on intersection approaches. Ends of medians may need to have mountable curbs to accommodate turning buses, trucks, and emergency vehicles. ○ Use of "sharrow" bicycle markings to delineate area of shared roadway use. ○ Re-evaluate signal warrants along the corridor. Conduct additional traffic counts to consider converting signals to 4-way stop control. Candidate intersections for signal removal include: • W. Park and Apple Rd, • W. Park and Orchard Rd. ○ Pedestrian-scale lighting

Congestion, Safety and Mobility Improvements – Long-range	
Recommendations	**Summary**
Access Management and Traffic Flow	
Wyoming Rd and Marrows Road Corridor Access Management	• As a means to accommodate growth and maintain acceptable levels of service along these corridors, land use decisions and access management strategies should be focused on the possibility of long term dualization (2 lanes in each direction) on these roadways.
Delaware Ave Extension to Marrows Rd.	• As means to address future growth and reduce traffic along Library Ave., any redevelopment of the College Square shopping area should include extending Delaware Ave. to Marrows Rd. • This added link would introduce a small grid system to the area, which would reduce trip lengths, distribute traffic more evenly throughout the area and provide improved driving, bicycle and walking access to this underused commercial area.
N. Chapel St. underpass and Cleveland Ave - northbound right-turn lane extension and improvement of substandard design.	• No operational traffic benefits are gained by extending the NB right turn lane within currently available space. Traffic level of service and vehicular queues would be unchanged. • Future improvements to the CSX overpass should provide for a standard right-turn lane and clearance.
Cleveland Ave. at N. College Ave. – Addition of a northbound right-turn lane	• Includes widening the northbound approach to include a 5' bike lanes, 11' through lane and an 11' right turn lane.Right turn lane will add capacity to the intersection without increasing the length of the heavy utilized north to south crosswalks. • Turn lane will require significant acquisition of property. • Signal and pedestrian improvements are currently being designed by DelDOT for this intersection.
Safety, Complete Streets and Traffic Calming	
S. College Ave Gateway/Mobility Improvements from Main St. to the bridge over Amtrak.	• Modified roadway cross-section that focuses on improved mobility along the corridor for all modes. • Includes continuous full width bike lanes throughout the corridor. • Improves connection from the City's core to the Train Station area.
Cleveland Avenue from Capital Trail (Kirkwood Hwy) to N. Chapel St. /Pomeroy Trail.	• A "road diet," or modified roadway cross-section that provides two through lanes with a two-way center left turn lane, was considered as part of the Plan. This recommendation is not included in the Plan due to

Congestion, Safety and Mobility Improvements – Long-range	
Recommendations	**Summary**
	concerns from adjacent property owners. • Sidewalk improvements in corridor should include removal of sidewalk obstructions, ADA improvements and addition of pedestrian signals and crosswalks at Winner Boulevard and Kirkwood Highway. • Work with adjacent property owners to develop on off-road bicycle and pedestrian connection parallel with White Clay Creek within an easement and city parkland.

Bicycle and Pedestrian Improvements – Short-term	
Recommendations	**Summary**
Bicycle Improvements	
Stripe bike lanes – When road width allows, restripe pavement markings to include travel lanes and ride-able bike lane/shoulders (5' preferred Min 4 ')	• W. Main St, west of Hillside • Cleveland Avenue, College to Paper Mill - bike lane WB, Sharrows in the EB direction. • Hillside Rd –bike lanes • S. Chapel St, Academy St, and N. College Ave – restripe where existing width allows.
Mark shared pavement markings (Sharrows) - Where sufficient width does not exist for bike lanes, provide "sharrows" in areas where vehicular and bike traffic share the road.	• East Main Street: Pomeroy Trail to Elkton Rd. • New London Rd – Main to Cleveland • North Chapel St. • Cleveland Ave – West of College Ave. • Casho Mill Rd – SB through underpass • Apple Rd.- Park Pl. to Elkton • County Club, Windsor, Delrem
Maintain existing facilities	• Establish schedule and funding for sweeping and maintenance of existing on-road pavement markings. • Establish schedule for maintenance of off road facilities.
Pedestrian Improvements	

Implement City-wide initiatives for walkability	• Rejuvenate maintenance operations that focus on providing well-defined crosswalks with uniform markings and signage throughout the City.
	• Develop a program to convert all pedestrian signal indications to include countdown timers.
	• For new and re-construction projects, develop strategies that minimize crossing distances. Policies should aim to keep roadway improvements focused on more traditional urban design. Items shall include:
	  ○ Controlling the number and width of travel lanes
	  ○ Using the smallest curb radius practicable to better manage pedestrian conflicts with turning vehicles.
	  ○ Placing crosswalks in a way that reduces or eliminates any degree of skew.
	  ○ Utilize curb extensions (bulb outs)
	  ○ Where medians of 4 feet or wider are present design the median as a pedestrian refuge, with two shorter and separate crossings on each side of the median.
	• Continue to design all crosswalk locations to accommodate disabled pedestrians (ADA compliant)
	• Retrofit signage that is not compliant with the Manual on Uniform Traffic Control Devices (MUTCD).

Bicycle and Pedestrian Improvements – Long-range	
Recommendations	**Summary**
Bicycle Improvements	
Delaware Ave East/West Bicycle Linkage - Includes providing a separated cycle track between Orchard Rd and Tyre Ave.	• Delaware Avenue signals would be modified to accommodate westbound bike traffic. • The westbound bike lane would terminate at Orchard Rd. Cyclists would then be directed left onto Orchard Rd. to Amstel Ave. • Marked "Bike Boxes" are proposed at eastbound signalized locations.
Bicycle signal detection improvements	• Standard loop detectors are effective but the sensitivity must be adjusted so that bicyclists are detected, and the loops must be placed in a location where a bicyclist's movements can be registered. • Implement newer technologies. Continue the increased use of above ground video detection as a replacement for traditional inductive loop detectors.
Pedestrian Improvements	
Use measures to enhance visibility and drivers yield rates at mid-block/unsignalized crossing locations –Possible measures include **High Intensity Activated Crosswalks** (HAWK), Rectangular Rapid Flashing Beacons, and in-street signs, "State Law–Yield to Pedestrians in Crosswalk."	• Evaluate possible locations including: o Delaware Ave between Academy St and College Ave. o S. College Ave. between Ritter Lane and the railroad overpass. o Elkton Rd. – mid-block crossing locations o Academy St Corridor – south of Delaware Ave.
Library Avenue – Jaywalking mitigation efforts.	• The proposed concept is to provide a center median to serve as a pedestrian refuge area with individually marked crosswalks for the eastbound and westbound travel lanes. • Slight relocation to existing bus stops facilities would also be made to enhance visibility of pedestrians.
Main Street – Bump-out/crosswalk improvements between Chapel St and College Ave.	• Provide additional intersection and crosswalk bump-outs along the corridor. To reduce crosswalk widths and discourage illegal corner parking. • Bump-outs can accommodate benches, bike racks, and trash receptacles and to better define off-street parking access points.

Parking Improvements – Short-term	
Recommendations	**Summary**
Expand supply of downtown parking	• Implement "Morepark" modular parking to provide added capacity to meet short-term economic development needs downtown.
Consolidate parking lots and entrances	• Add new Center Street entrance and/or exit to Lot #3 and reduce access points along Main Street to minimize possible pedestrian conflicts. Also continue to work with property owners to merge private parking into larger municipal lots.
Maximize space in existing lots	• Consolidate dumpsters with trash compactors to reduce space requirements and improve lot aesthetics.
Improve wayfinding to parking entrances	• Use of banners and more visible signs at and in advance of parking lots is recommended.
Expand car-sharing program. Coordinate with the University of Delaware to monitor and expand the Zipcar Program.	• This newly implemented program should be monitored for its effectiveness. If successful, the program should be expanded in the future beyond the four initial vehicles
Add bicycle parking downtown	• Install additional bicycle racks throughout Main Street.
Parking Improvements – Long-range	
Recommendations	**Summary**
Continue Parking Management Initiatives	• Construct parking garage on Lot #1 (behind Galleria) with ground level commercial or liner building to maximize use of prime location and accommodate parking needed for future economic development.

Transit Improvements – Short-term	
Recommendations	**Summary**
Transit Hub Re-establishment Efforts	• Currently, this transit facility is oriented primarily to DART bus routes while the potential connections with other bus routes are not well established. To respond to this situation, the adjacent bus stops on Main and Delaware would have special treatments that indicate the proximity of the Transit Hub. This would include features such as bus stops signs, passenger waiting shelters, real-time schedule information (e.g., Next Bus) and concrete pavers or other materials to denote the extension of the Transit Hub to the nearby cross streets.
City-wide Amenities	• The current system is lacking in terms of features that identify the transit system. This would include bus stops signs at all locations which indicates the service, route and phone and web page to obtain transit information. With the exception of City Hall, there are few bus stop signs along the UniCity bus routes. Other elements of this recommendation would be passenger waiting shelters or benches at the more heavily utilized bus stops. Another feature that can increase transit visibility and ridership is to install ride guides which list schedule times for that bus stop.
Improved Marketing Efforts	• Provide a single source of information on the transit services provided by each agency. A single transit map should be prepared for Newark which would show all routes, schedule times, fare information and contact phone numbers and web addresses to contact each agency. Information might also include other "Car-free in Newark" travel choices.
Service Modifications	• Consider consolidation of the three existing UniCity routes into one or two bus routes. Due to uniform coverage area the DART Route 31 could also be eliminated as part of this consolidation. • In addition or as an alternative, additional trips could be added to DART's best performing Newark routes (6, 33, 34, and 55).
Transit Improvements – Long-range	
Recommendations	**Summary**
Service Modifications	• Continue to add trips to support better performing routes.

Introduction

A. Purpose of the Plan

The Newark Transportation Plan provides a renewed transportation plan for the City of Newark. The plan was developed as an update to the *Newark/Elkton Intermodal Transportation Plan, Long-Range Analysis* completed in 1998 and the *Short-Term Action Plan* completed in 1996. This update takes into consideration current and expected transportation budget shortfalls and focuses on identifying cost effective and sustainable recommendations.

Using both technical analysis and community input, the Plan has re-evaluated previously identified strategies, analyzed the current traffic and parking conditions, and examined pedestrian, bicycling and transit issues throughout the City.

The Plan serves to supplement the transportation recommendations contained in the Newark *Comprehensive Development Plan.* Last approved October 27, 2008, the *Comprehensive Development Plan* describes desired future transportation improvements, as well as current and future land use and demographics.

The Plan is also intended to aid in the implementation of the *WILMAPCO Regional Transportation Plan* (RTP) by supporting economic development through planned infrastructure investment, promoting an efficient transportation system, and providing transportation opportunities and choices. As specified by the RTP, the plan aims to strengthen our community through improved traffic flow, transit, walking, and bicycling facilities along with improved visual appearance to encourage visitors and residents to use non-automobile modes, promote tourism, and reduce the need for costly roadway expansions.

B. Planning Process Used

Using technical analysis and community input, the plan has been a joint effort between the Wilmington Area Planning Council (WILMAPCO) and the City of Newark, with WILMAPCO serving the managing role. An Advisory Committee included representation from the Delaware Department of Transportation (DelDOT), Delaware Transit Corporation (DTC), and the University of Delaware (UD), as well as resident and business representatives. Input from the broader community was sought in various ways, including the project web site, public meetings and workshops, presentations to committees, Newark Community Day displays, and Facebook.

Through the process, Advisory Committee meetings were conducted in which data was shared and an assortment of comments and ideas were discussed among the various stakeholder involved. The objective was to provide strategic direction to the development of transportation initiatives within the City. The project consisted of three main tasks which included:

I. ***Identification of the current transportation and land use issues*** – This included reviewing existing conditions, future changes, and developing a list of key transportation-related issues to be addressed. This task also included a review and status update on the recommendations listed in the 1998 plan.

II. ***Identification of opportunities and solutions*** – This included determining strategies for addressing the issues and developing specific recommendations.

III. ***Identify a means to implement the plan*** – This included determining responsible agencies involved in the plan and defining a strategy for implementation.

Data was collected from various sources. Using traffic count data from DelDOT and WILMAPCO, a Synchro traffic model was developed to include all signalized intersections within the City limits. This model was developed by expanding an existing model that was previously developed by DelDOT for a smaller portion of the City. This City-wide model served as the main tool in analyzing several of the main corridors throughout the City. For corridors selected for future study, traffic projections to the year 2030 were made by applying a growth rate of one percent per year.

At Newark Community Days in September 2009 and 2010 and a public workshop in May 2010, initial public input was sought regarding transportation issues and priorities. At a November 2010 public meeting, a draft list of alternatives was presented for discussion. The technical analysis included analyzing existing and projected future traffic volumes, and assessing the potential effectiveness of proposed transportation facilities and services.

Information was also shared between planners and many of the City's advisory committees including the Newark Bicycle Committee, Newark Parking Committee, Newark Traffic Committee, the Downtown Newark Partnership Design Subcommittee, and the Newark Conservation Advisory Committee.

Based upon the meetings with the Advisory Committee, public input and additional technical analysis, the project team developed a draft Plan, presented at a May 2011 public meeting. Finally, based upon public comments and additional technical review, the planning team prepared the final report.

C. Organization of the Report

This report is divided into three sections.

Section I – Transportation and Land Use Issues, identifies the existing and future conditions used in conducting the analysis and provides a summary of the key issues identified as part of the process.

Section II – Identification of Opportunities/Solutions, examines the various areas needing improvement and focus on the detail of the recommended transportation improvement plan.

Section III – Implementation of the Plan, calls out the anticipated implementation strategies for the agencies with responsibility over the plan. In addition to the three main sections of the report, the Technical Appendix includes various materials that support the analysis and findings of the study.

I. Transportation and Land Use Issues

A. Existing Conditions

Demographic and Land Use Trends

The City of Newark is located in western New Castle County along the heavily traveled I-95 corridor. The western boundary of the City shares a border with Cecil County, Maryland. The City's current population is slightly above 30,000, including more than 7,000 on-campus students, making it the third largest municipality in Delaware. This accounts for an approximate ten percent increase between 2000 and 2010. The area surrounding the City consists largely of suburban development, and like the City of Newark, has seen consistent population growth over the last two decades. Although recently population growth has slowed, data shows that historically the annual growth rate was almost 1.3 percent over the past 40 years. Table II shows the latest population data for the City.

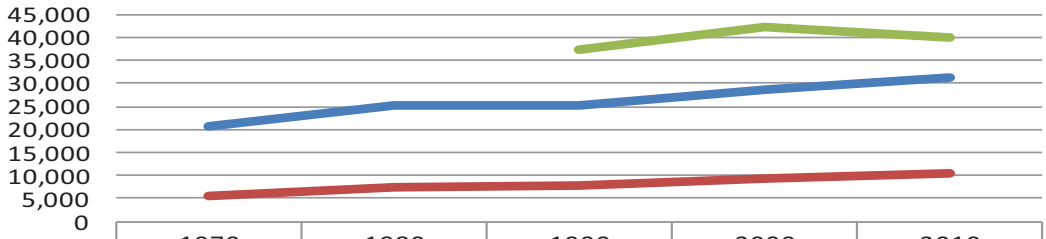
The City includes an area of roughly nine square miles and has many established residential neighborhoods and mixed-use and commercial centers. The University of Delaware's main campus is also a prominent component of the City's land use. Located in close proximity to the City's business district, the University owns roughly 1,000 acres and hundreds of buildings in the City. The student population in 2010 exceeded 21,000 students (undergraduate and graduate studies) and the University remains the City's largest employer with nearly 3,900 full-time employees (faculty and staff).

The City has experienced a reduction in private sector jobs since the 2009 closing of the Newark Chrysler Plant and downsizing of other local businesses. According to U.S. Census Bureau 2009 Origin-Destination Employment Statistics, 18,371 were employed within the municipal limits of Newark, including 16,311 commuting into Newark and 2,060 both living and working in Newark. In 2009, 7,716 residents lived within Newark and were employed outside City limits.

The 272 acre site of the Chrysler Assembly Plant on South College Avenue stopped operation in 2009. The Plant, which opened in 1951, had employed over 2,000 people in the years leading up its closing. Additionally, other local suppliers have issued their own layoffs as a result of the Chrysler Plant closing.

The Avon Distribution Center located on DE Route 273 also closed in 2009, eliminating 350 positions. JP Morgan Chase has previously announced job cuts to the areas work force and the 2005 Bank of America/MBNA merger has resulted in a restructuring and further loss of jobs.

Table II - Newark Demographic Data



	1970	1980	1990	2000	2010
Population	20,757	25,247	25,098	28,547	31,454
Housing Units	5,531	7,558	7,860	9,294	10,475
Employment			37,246	42,263	39,870

Source: US Census, employment geography is for Greater Newark Census Division

Table III – Historical Traffic Data

Main Roadway	From	To	2001 ADT	2009 ADT
Elkton Rd.	Newark Limits	Apple Rd	20,010	19,087
Main/Delaware Ave.	DE 2, Elkton Rd	DE 896, S. College Ave.	27,724	27,408
Capitol Trail	Newark Christina Rd	E. Cleveland Ave.	38,642	39,186
W. Main St.	W. Newark Limits	Hillside Rd.	9,204	11,414
W. Cleveland Ave.	DE 896, New London Rd	N. Chapel St	22,200	21,953
E. Cleveland Ave.	N. Chapel St	DE 2, Capitol Trail	24,062	26,585
N. College Ave.	DE 2, Main St.	Cleveland Ave.	6,876	10,426
New London Rd.	DE 2, Main St.	Country Club Dr	15,769	17,828
DE 4, Christina Pkwy	DE 2, Elkton Rd	DE 896, S. College Ave	22,109	23,158
S. College Ave.	DE 4, Christina Pkwy	Park Place	11,889	12,807
			198,485	209,852
			Difference	11,367
			% Growth over 8 years	5.73%
			% Growth per year	0.72%

While the private sector has reduced their work force in recent years, the University of Delaware has seen an increase in student population and has been moving forward with various expansion and redevelopment projects. Most notable in 2005, the Laird Campus housing complex was opened. This complex increased pedestrian traffic to and from the north. As a result, N. College Avenue has seen a considerable increase of pedestrian activity. Currently, the University is in the process of reallocating their residence halls with a new complex planned on the site of the former Gilbert Hall on the west end of Wyoming Avenue.

Further details regarding demographic and land use trends can be found in the Newark *Comprehensive Development Plan*.

Transportation Trends

Traffic volumes have remained reasonably consistent. DelDOT traffic volume data (Table III) shows that traffic has generally increased at an average rate of 0.72 percent per year within the City on major roads.

Based on the recent data showing a 1.2 percent annual population growth rate and a 0.72 percent average annual traffic growth rate, this report assumed a one percent annual growth rate to develop traffic projections for the year 2030.

Within the City, there are distinct areas of recurring congestion that continue to operate with poor levels of service. As identified in WILMAPCO's *Congestion Management System*, several intersections experience "significant" congestion along Library Avenue and Cleveland Avenue as well as various other congested locations as highlighted in Figure 1.

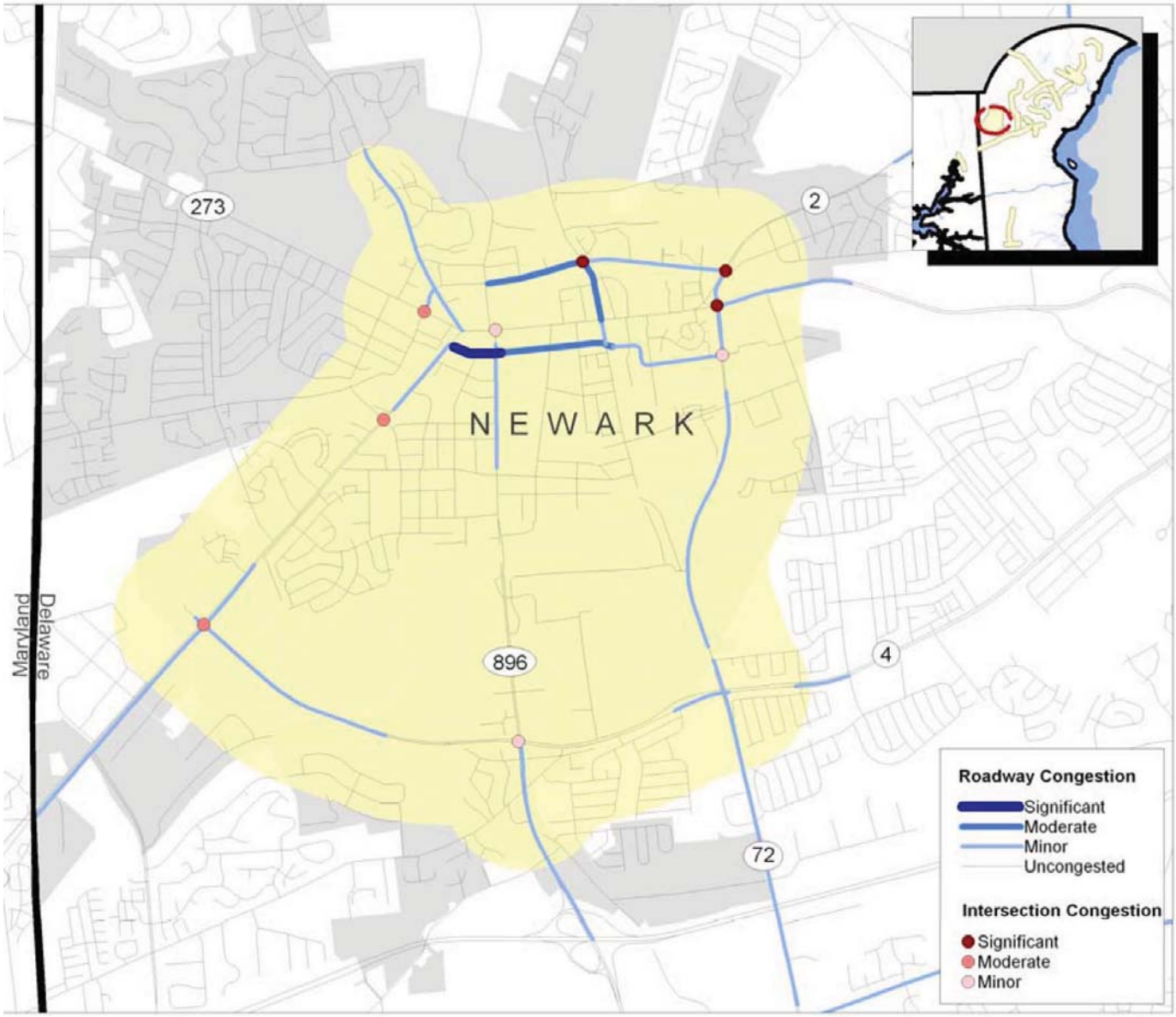
Table IV show the City's recent commuting trends. While data does not exist to fully demonstrate the amount of trips by driving, transit, walking and bicycling, existing data for commute trips do indicate greater use of walking and bicycling for transportation. For example, the number of Newark residents who claim to walk to work increased from 13 percent in 2000 to 18 percent in recent years. This is significantly above the County's average of just three percent.

Table IV - City of Newark Commuting Trends

Mode	Newark 2000	Newark 2006-8 avg.
Drove alone	69.5%	60.7%
Carpool	8.5%	11.0%
Transit	4.0%	1.8%
Walk	13.0%	17.6%
Bike	1.6%	4.7%

Source: 2000 Census, 2006-8 average American Community Survey

Figure 1 – WILMAPCO Congestion Management System, 2009



What's been done since the 1998 Transportation Plan?

The previous Transportation Plan was completed in 1998 and included a larger study area that covered both Newark, DE and Elkton, MD. Additionally the recommendations were published as two separate reports separating short-term and long-range measures. A review of the previously identified recommendations was conducted. The following recommended items have been completed in the Newark area:

Increased Roadway Capacity

- Widened DE 273 to four lanes from Marrows Road to I-95
- Extended Wyoming Road to Marrows Road.

Increased Access to all Travel Modes

- Upgrade public transit service – Ongoing
- Built Casho Mill Road bike/pedestrian underpass
- Added bicycle and pedestrian safety elements at downtown intersections - Ongoing
- Continued the Newark Bike Committee and Built Hall and Pomeroy Trails – Ongoing
- Built Newark Transit Hub
- Promote pedestrian oriented redevelopment at Main & Elkton. Work is ongoing along Elkton Road, with phase 1 currently under construction and phase 2 designed for future completion.Ongoing.

Increased Efficiency of Roadway Operations/Local Circulation

- Implemented electronic toll collection along I-95
- Install new coordinated signal system in Newark – Ongoing
- Revised operation at Main and College intersections
- Modified DE 273 and DE 2/72 intersection
- Improved signage and access to off-street parking lots - Ongoing
- Developed Newark Traffic Calming guidelines/plan

At the time when this report was prepared, construction was underway on a major DelDOT refurbishment of Elkton Road from Casho Mill Rd. to Delaware Ave. The project includes pavement reconstruction; additional turn lanes at the intersections of Elkton Road and Casho Mill and Apple Roads; reducing Elkton Road between Apple Road and Delaware Avenue from four to two lanes with a two-way center turn lane and a landscaped median just south of the Amstel Avenue Intersection; new sidewalks and curb ramps; bike lanes; and utility improvements are also planned. The project is scheduled for completion in 2012.

The Pomeroy Trail, a new asphalt pedestrian and bicycle trail, is being constructed by the City of Newark along what was once the Pomeroy rail line. The two-mile off-road trail will connect the Hall Trail to White Clay Creek State Park. The project is planned to be completed in 2012.

Existing Data Sources

To minimizes costs and reduce the project schedule, no specific data collection efforts were associated with the Plan. Instead, traffic data was requested from various sources and any recently completed and available data was then used in the analysis found in this report. Additionally, the Synchro model that was developed was also expanded from a previously completed DelDOT work effort. Specifically, DelDOT's *City of Newark Traffic Analysis,* dated September 2009 was used as a primary source of existing data. Data was also obtained from the analysis associated with the ongoing Elkton Road Project, the *Newark County Club Traffic Impact Study* (2006) while WILMAPCO supplied various data sources used in the analysis. Overall, a City-wide Synchro model was developed to include all 56 signalized intersections within the city limits. Currently the model includes actual peak hour

turning movement counts at 23 of these signalized intersections.

The DelDOT September 2009 traffic study was prepared to evaluate the impacts of various options aimed at reducing existing truck patterns, improving traffic flow, and enhancing pedestrian safety in the western portion of the City. A particular focus was on traffic operations in and around the northern limits of Elkton Road. The results of the report show that despite existing deficiencies, the current operations in place for the study are preferred over any of the analyzed alternatives.

Identification of Key Issues

As a result of various Advisory Committee meetings, public workshops, traffic analyses and planning analysis, a wide range of transportation related issues have been identified. We have identified the following key issues based on existing conditions:

- Congestion, safety and mobility
- Bicycle and pedestrian
- Parking
- Transit

B. Future Changes

As we look to the future, it is evident that significant potential for growth still exists in and around the Newark area. Despite the national downturn in the economy, the City's population and traffic numbers, albeit slowed, have continued to trend upward and Newark's unemployment rate is the lowest in Delaware. With significant redevelopment and growth of the University, Newark will remain a major residential and commercial center during the next twenty years with additional demands on the transportation network.

A summary of the projects planned for the area is as follows:

***Government funded projects*:**

- ***Elkton Rd. from Casho Mill Rd to Delaware Ave*** – The corridor is currently under construction and scheduled to be completed in 2012. A second phase to the Maryland line remains an unfunded priority.
- ***Pomeroy Trail*** – Scheduled to be complete in 2011-2012.
- ***S. College Avenue Train Station Study*** – Engineering study is investigating operational and capacity improvement alternatives. Recently $2.25 million in TIGER II funds were granted to develop a plan for improved rail operations and transit-oriented development in and around the train station area including the former Chrysler Plant site.
- ***Added Track Capacity between Newark and Wilmington*** – Funding allocated for construction for FY 2010 - 2012 will allow increased commuter rail service to Newark.

***University of Delaware projects*:**

- ***Science and Technology Campus (former Chrysler plant)*** – This redevelopment project includes the area's greatest potential for growth. Beyond an expansion of the University and other supporting services, an influx of Base Realignment and Closure (BRAC) related jobs are also anticipated for the site. No concrete timeframe or phasing plan has been set.
- ***South Campus Expansion*** – Opposite the Chrysler Plant, the University has announced plans to renovate Delaware Stadium, adding an estimated 8,200 seats. Additionally, a 51,000 SF expansion of the Carpenter Center gymnasium is also under construction with a planned 2012 completion. No timeframe has been identified for the Stadium expansion.
- ***East Campus Housing*** – A project is currently planned to shift a portion of housing from the West Campus to the East Campus. The new residence hall, on the former site of

the Gilbert Complex, will include housing for 1,500 students.

- ***Science and Engineering Building*** – Also in the East Campus area, this 200,000 SF building will serve mainly as a class room and laboratory facility. The building is currently under construction.

C. Analysis of Key Issues and Recommendations

In addition to using field observations and technical analysis, the planning team sought input from the community to identify key transportation issues and priorities. A "sticker survey" was conducted during Newark Community Day in 2009 and 2010 and at a May 2010 public workshop. Figure 2 shows responses voted on as top priority issues. Priority issues fall within the categories of:

1. CONGESTION, SAFETY AND MOBILITY
2. BICYCLE AND PEDESTRIAN
3. PARKING
4. TRANSIT

Congestion, Safety and Mobility

As evident in WILMAPCO's *2009 Congestion Management System Summary (CMS)*, areas throughout the City experience significant and recurring congestion. The Synchro model developed as part of this report confirms that specific areas along Cleveland Avenue, Library Avenue and various other corridors leading to and from the City's core have intersections that operate at levels of service E or F during peak periods. Additionally, "reducing traffic congestion" and "improving traffic signal timing" were among the most common transportation priorities identified by respondents at Newark Community Day in 2009 and 2010. Beyond addressing traffic signalization issues that exist today, the plan for Newark should also address the issue of preserving capacity for future demands.

Signal Coordination

Congestion in Newark continues to be a concern, as notable delays do exist and residents continue to comment on this quality of life issue. Newark has 56 signalized locations, many at the City's most congested intersections. A ***Corridor Optimization Program*** is recommended. An

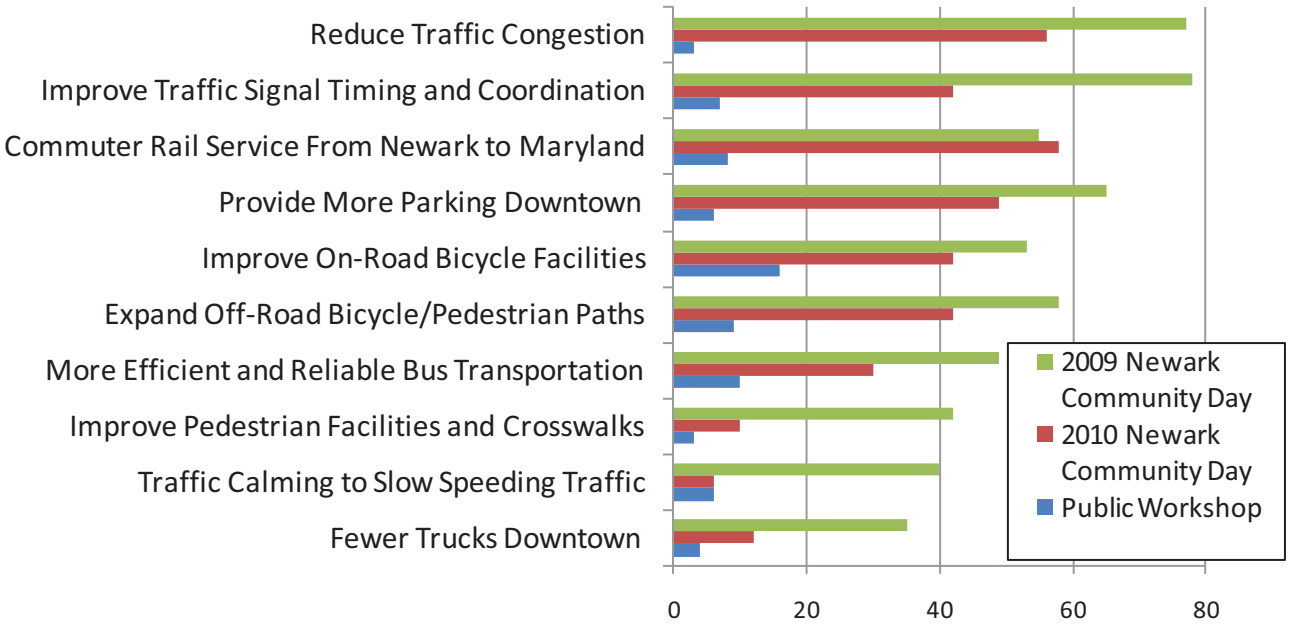


Figure 2 – Priority Transportation Issues Identified by the Community "Sticker Survey"

Optimization Program is a coordinated effort designed to make the most efficient use of traffic signals by inspecting and modernizing signal equipment and taking advantage of new technologies. "Optimization" in this context refers to all maintenance, upgrades, timing adjustments, and miscellaneous efforts to improve signals. This should include a systematic approach of inspecting, refurbishing, and updating timing of all signal equipment. More than just signal retiming, this program should aim to improve system interconnection, eliminate ongoing maintenance issues such faulty loop detectors, and eliminate all other non-compliant design issues.

Figure 3 shows the proposed locations for corridor optimization that include:

- ***Elkton Road*** – This corridor includes ten signals within City limits and is currently under construction. Upon completion of the DelDOT reconstruction project, the signals will be made fully functional and optimized.
- ***Cleveland Avenue*** – This corridor includes six signals within City limits. Field reviews showed that current signal cycles have non-uniform lengths. Although a recent signal retiming project may have corrected this, it is recommended that a complete corridor optimization effort be made on this corridor. Corridor-wide, the signal hardware, communications and timings should be inspected, evaluated and restored to modern DelDOT standards. Timing improvements to be completed by DelDOT in 2011. Table V notes existing and future levels of service for the corridor.
- ***Library Avenue*** – This corridor includes four signals within the City limits. Field reviews verified that coordinated and uniform cycle lengths currently run along this corridor. However, the Synchro analysis indicates that further optimization can be made by adjusting the peak hour cycle lengths. Additionally the analysis shows that without timing adjustment there could be considerable increase in delay as volumes increase along the corridor. Timing improvements are expected to take place in 2011. Table VI notes the existing and future levels of service for the corridor.
- ***S. College Avenue*** - This corridor includes ten signals within City limits, with the character of the roadway varying on either side of the railroad overpass. The corridor serves a key gateway into the downtown and campus areas and along the southern limit includes the City's most significant area of targeted growth. As future development is expected over the course of many years, installation of a traffic responsive signal system should be pursued for this area. Because this is a major transit corridor, particularly for campus shuttle service, it is also recommended that a responsive signal system also consider measures to improve efficiency for transit using S. College Ave. For example, transit signal priority gives buses a time advantage when approaching a signal. A sensor placed on the bus informs the signal of the approaching vehicle and holds the light green to allow it to pass. Table VII notes existing and future levels of service for the corridor.

Land Use and Travel Demand Management

As with most developed communities, the need for added roadway capacity is often limited by the value and density of adjacent land uses. Along mixed-use Main Street and Delaware Avenue, our analysis shows that vehicular congestion does exist and demonstrates the vibrancy and success of Newark's commercial district. Therefore this report offers no recommendations for added vehicular capacity along these corridors. However, due to the mixed-use, walkable land use here, demand for driving downtown can be dramatically reduced through the bicycle, pedestrian and transit improvements described later in this Plan, continuing to charge appropriately for University and municipal parking, and working with the Rideshare Delaware to promote carpooling for work and school trips.

Figure 3 – Corridor Optimization Program – Proposed Corridors

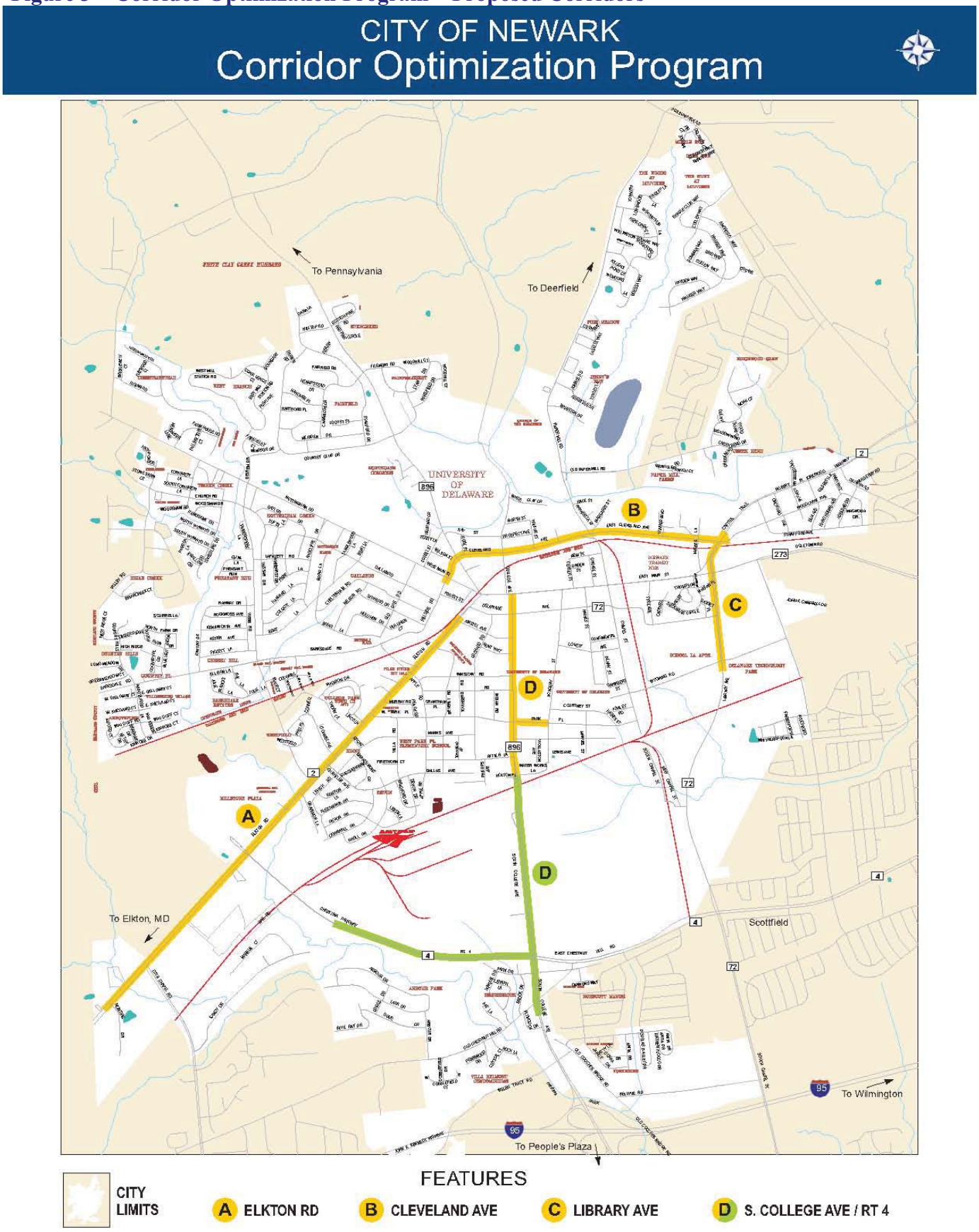


Table V
Sample Level of Service Comparisons
Cleveland Avenue Corridor

Hillside Road & Main Street (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Cleveland Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	D	54.7	0.86	F	83.4	1.06	E	74.2	1.01
	120 second cycle length			120 second cycle length			135 second cycle length		

Cleveland Avenue & New London Road (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Cleveland Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	E	61.9	0.86	F	91.9	1.06	F	90.8	1.11
	160 second cycle length			160 second cycle length			135 second cycle length		

Cleveland Avenue & College Avenue (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Cleveland Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	C	27.8	0.74	D	47.2	0.94	C	24.3	0.94
	150 second cycle length			150 second cycle length			135 second cycle length		

Cleveland Avenue & Chapel Street/Paper Mill Road/Magaret Street (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Cleveland Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	D	54.2	0.66	E	57.0	0.79	D	39.5	0.79
	120 second cycle length			120 second cycle length			135 second cycle length		

Cleveland Avenue & Winner Boulevard (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Cleveland Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	C	32.1	0.38	C	27.5	0.48	C	29.6	0.48
	120 second cycle length			120 second cycle length			135 second cycle length		

Cleveland Avenue & Capitol Trail Rd (DE Rte 2) (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Cleveland Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	C	32.2	0.74	D	46.8	0.91	D	47.7	0.93
	120 second cycle length			120 second cycle length			135 second cycle length		

Table VI
Sample Level of Service Comparisons
Library Avenue Corridor

Library Avenue (DE Rte 2) & Wyoming Road (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Library Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	D	54.5	0.94	F	106.2	1.19	F	105.8	1.24
	120 second cycle length			120 second cycle length			135 second cycle length		

Library Avenue (DE Rte 2) & Delaware Avenue (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Library Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	F	86.9	1.11	F	150.6	1.39	F	139.0	1.45
	120 second cycle length			120 second cycle length			135 second cycle length		

Library Avenue (DE Rte 2) & Main Street/Ogletown Road (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Library Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	D	38.9	0.87	E	60.9	1.05	D	53.0	1.03
	120 second cycle length			120 second cycle length			135 second cycle length		

Capitol Trail Rd (DE Rte 2) & Cleveland Avenue (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with Library Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	C	32.2	0.74	D	46.8	0.91	D	47.7	0.93
	120 second cycle length			120 second cycle length			135 second cycle length		

Table VII
Sample Level of Service Comparisons
S. College Avenue Corridor

S. College Avenue & Park Place (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with S. College Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	C	29.4	0.76	D	41.8	0.86	D	41.7	0.93
	110 second cycle length			110 second cycle length			100 second cycle length		

S. College Avenue & Kent Way (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with S. College Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	A	0.1	0.25	A	0.1	0.31	A	0.3	0.32
	125 second cycle length			125 second cycle length			100 second cycle length		

S. College Avenue & Amstel Avenue (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with S. College Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	A	5.5	0.45	A	4.9	0.44	A	3.3	0.24
	80 second cycle length			80 second cycle length			100 second cycle length		

S. College Avenue & Delaware Avenue (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with S. College Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	B	18.8	0.64	C	26.1	0.79	B	11.7	0.67
	60 second cycle length			60 second cycle length			100 second cycle length		

S. College Avenue & Main Street (Signalized)

AM PEAK

Movement/ Approach	2010 Existing			2030 Future			Future 2030 with S. College Avenue Optimized		
	LOS	DELAY	V/C	LOS	DELAY	V/C	LOS	DELAY	V/C
Overall	C	27.2	0.40	C	29.8	0.49	C	29.7	0.53
	90 second cycle length			90 second cycle length			100 second cycle length		

Access Management and Traffic Flow

The Plan has identified limited opportunities to provide added capacity and future access management, illustrated in Figure 4. As these identified areas grow or are redeveloped, access management should be implemented to ensure the impact of any planned growth can be mitigated with appropriate multimodal transportation improvements. Currently, the University of Delaware is in the process of redeveloping various sections of their East Campus. Specifically, a new 200,000 square foot Science and Engineering Building is being built and in the future a residence hall for 1,500 students will open in close proximity. This renewed area of the campus is at the western base of Wyoming Road, which connects directly to Library Avenue (DE Route 2/72) and Marrows Road. To plan for this apparent shift in development from the West Campus to the East Campus various access management and right-of-way preservation measures are recommended. Locations for future access management include:

- ***Wyoming Road and Marrows Road Corridor Access Management*** - As a means to accommodate growth and maintain acceptable levels of service along these corridors, land use decisions and access management strategies should not preclude the long-term possibility of providing two lanes in each direction or added left turn lanes. Additional efforts should also be made to minimize and consolidate new access points along these corridors.

Road extensions and intersection improvements in the Plan focus on reducing traffic burden on busy intersections while maintaining safe conditions for pedestrians. These potential locations include:

- ***Delaware Avenue Extension to Marrows Road*** – Any future redevelopment of the College Square shopping area should include extending Delaware Ave. to Marrows Rd. Adding this link would introduce a small grid system to the area, which would reduce trip lengths, distribute traffic more evenly, and provide improved driving, bicycle and walking access to this underused commercial area.
- ***North Chapel Street underpass and Cleveland Avenue*** - Future improvements to the CSX overpass should provide for a right-turn lane to be built on the northbound approach. Currently no operational traffic benefits are gained by extending the northbound right turn lane due to the short length that could be accommodated after the CSX overpass. Future intersection improvements here must also accommodate the Pomeroy Trail.
- ***Ogletown Road (Route 273) at Marrows Road*** –Upgrading the marked roadway alignment is recommended to eliminate a substandard lane shift that exists on westbound Route 273. This includes pavement marking improvement between Marrows Rd and Library Ave in the westbound direction. Figure 5 depicts the conceptual plan for this area.
- ***Cleveland Avenue at N. College Avenue*** – Figure 6 shows the conceptual cross sections for this area with the addition of a northbound right-turn lane. Project would include widening the northbound approach to include 5’ bike lanes, two 11’ through lanes and an 11’ right turn lane. The right turn lane will add capacity to the intersection without increasing the length of the heavy utilized north to south crosswalks.

Figure 4 – Access Management and Traffic Flow Improvement Areas

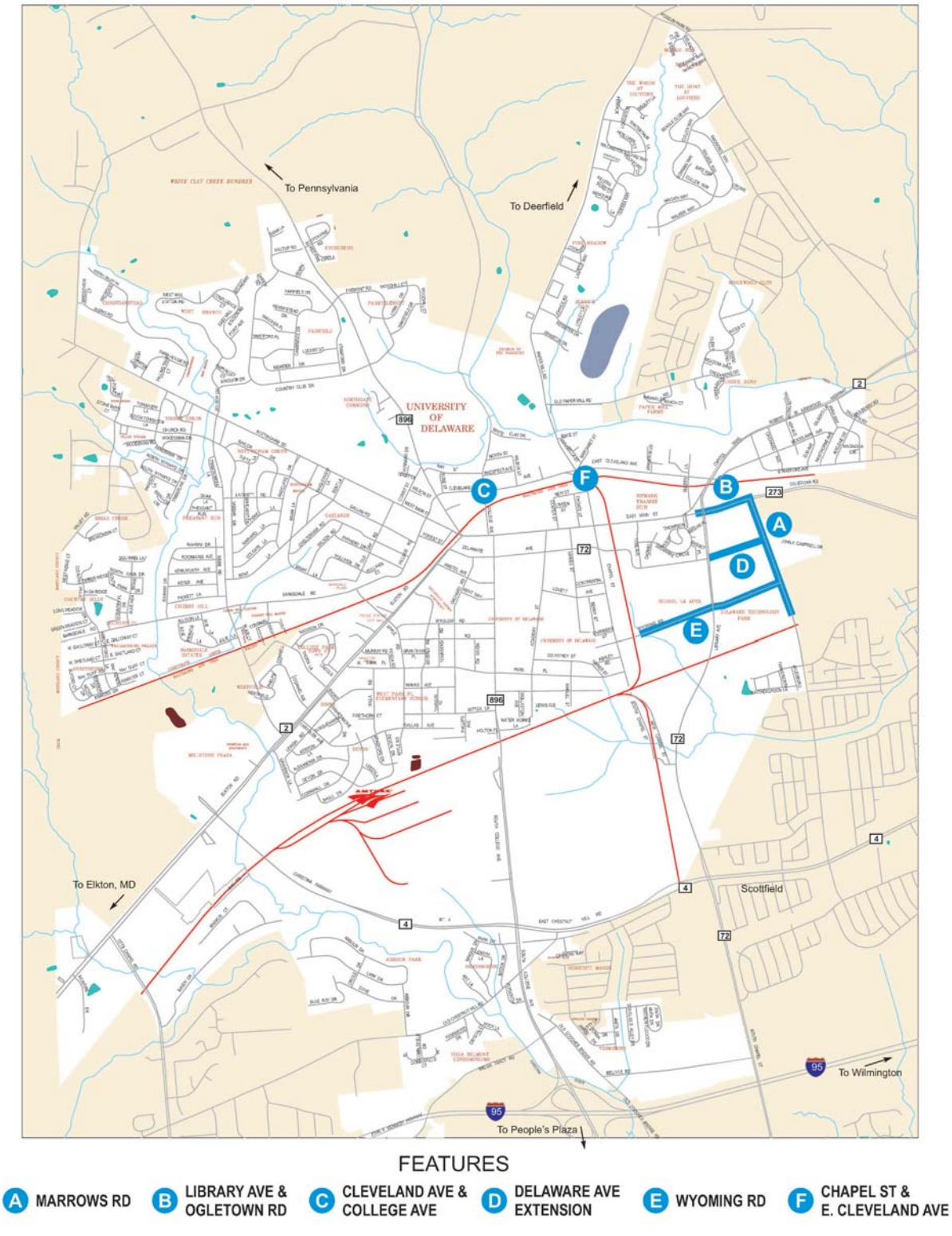


Figure 5 – Ogletown Road and Marrows Road Improvements

The improvement in this area includes properly aligning westbound lanes, improving the delineation of turn lanes, and eliminating the substandard lane shift that exists in the westbound direction. This includes pavement markings only between Marrows Rd and Library Ave in the westbound direction. If completed in conjunction with the next paving project here, remarking the lanes can be implemented at no added cost.

Figure 6 – N. College Avenue and Cleveland Avenue Improvements

The conceptual plan includes the addition of a northbound right-turn lane. Widening should be limited to the northbound approach and include a 5' shoulder/bike lane, an 11' through lane and an 11' right turn lane. The right turn lane will add capacity to the intersection without increasing the length of the heavy utilized north to south crosswalks. Significant property acquisition would be needed to implement this project.

Safety, Complete Streets and Traffic Calming

Although safety is incorporated into all aspects of the plan, there are specific improvements that were developed to address the issue of safety along various corridors by implementing "complete streets" that balance the needs of drivers, pedestrians, bicyclists and transit users. Crash data, Figure 7, shows that the crash locations tend to be widely dispersed throughout Newark. The majority of crashes are non-injury related and due to driver error or distraction. This report focuses on three corridors where crash clusters are present, shown in Figure 8:

- W. Park Place from Elkton Road to S. College Avenue
- S. College Avenue from Main Street to the Newark Train Station
- Cleveland Avenue from Capital Trail (DE Route 2) to N. Chapel Street/Pomeroy Trail

West Park Place and South College Avenue were identified as corridors for possible traffic calming in the *Old Newark Traffic Calming Plan*. Traffic calming includes providing safety measures such as reduced lane widths, medians, and curb extensions (bump-outs) to reduce speeding traffic. Additionally, traffic calming encourages walking and cycling, and can help to self-enforce speeding, reducing the burden on local police.

Before and after studies in the U.S. and abroad, show streets that have been traffic calmed, have large reductions in the number and severity of crashes. Typically a 50 percent drop in the number of collisions occurs along with an 80 to 90 percent reduction in injuries. Table VIII shows the general guidelines regarding the applicability of traffic calming measures as recommended in the *Old Newark Traffic Calming Plan*.

The plan for ***West Park Place*** includes implementing cost-effective traffic calming measures that keep existing mid-block curb lines intact and restoring the corridor to a more residential quality. Figure 9 illustrates the proposed concept. The concept includes installing short and narrow pedestrian refuge medians (approximately 25' long x 4'wide) at intersections to help reduce travel speed and pedestrian crossing distances at intersections. Mountable curbs may be used to accommodate large turning vehicles. The use of "sharrow" bicycle markings would delineate areas of shared roadway use. It is also recommended to re-evaluate traffic signal warrants along the corridor with intersection turning counts and traffic analysis. If warrants are not met, consider converting traffic signals to 4-way stop controlled intersections. Removal of unwarranted signals along with these other traffic calming features would aid in providing a more traditional residential atmosphere. Additionally, pedestrian-scale lighting should be considered to help eliminate the thoroughfare feel of the roadway and better highlight its neighborhood character.

Along ***South College Avenue*** the existing roadway includes a variety of cross-sections where bike lanes are substandard or non-existent and significant pedestrian activity exists throughout. The corridor also serves a natural "Gateway" into the heart of the University of Delaware campus and downtown Newark. The traffic calming recommendation, as shown in Figure 10, includes a modified roadway cross-section that focuses on improved mobility along the corridor for all modes. It includes full width bike lanes throughout the corridor and is intended to enhance the connection from the City's core to the Train Station area.

Figure 7 – Crash Distribution - 2008

Figure 8 – Complete Street / Traffic Calming Corridors

Table VIII – Traffic Calming Guidelines

Traffic Calming Measure	Collector Street	Local Street	Restrictions
Volume Control Measures			
Half Closures Diagonal Diverters Median Barriers Forced Turn Islands	No	500 – 5000 vpd >/= 25% non-local traffic	
Vertical Speed Control Measures			
Speed Tables Raised Crosswalks Raised Intersections	</= 10,000 vpd posted speed limit </= 35 mph	</= 10,000 vpd posted speed limit</= 35 mph	Not on primary emergency routes
Horizontal Speed Control Measures			
Mini-Traffic Circles	Entering daily </= 5000 vpd posted speed limit </=35 mph	Engineering daily </=5000 vpd posted speed limit </= 35 mph	Grade: </=10% Not on primary business/emergency routes
Roundabouts	Entering daily </= 20,000 vpd posted speed limit </= 45 mph	No	Grade: </= 6%

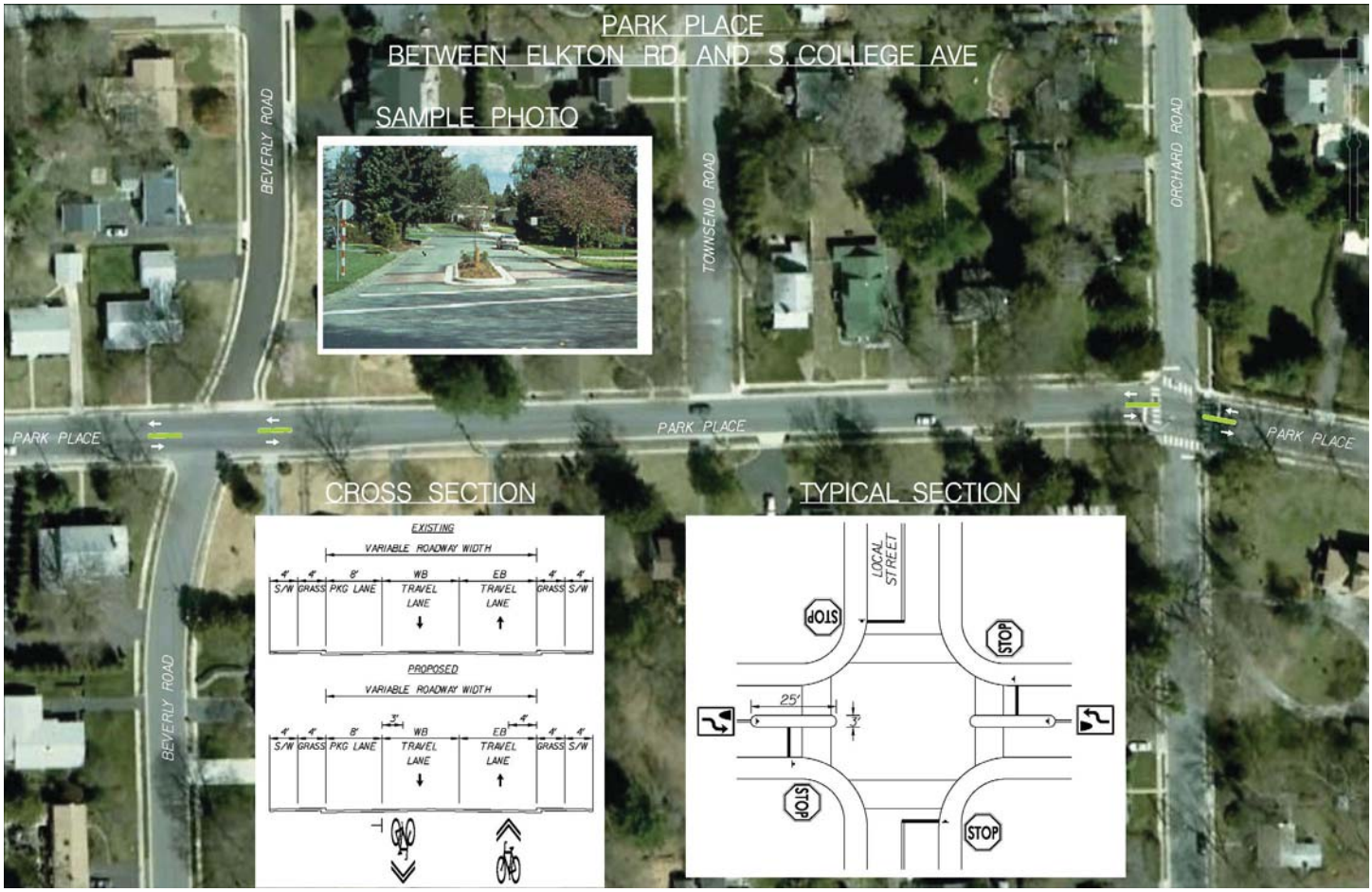
Source: Old Newark Traffic Calming Plan

Cleveland Avenue from Capital Trail to N. Chapel Street currently includes a four-lane cross-section with no shoulders and travel lanes that end at the existing curb line. Sidewalks are immediately adjacent to the travel lanes and no bike lanes exist. Car dealerships and other commercial properties line the road; no delivery zones exist and vehicles are often observed unloading from the right travel lane. Employees and shoppers have also been observed crossing midblock.

This Plan included analysis of a road diet concept that included reducing the number of mid-block vehicular lanes from 4 to 2 lanes with a two-way center left turn lane, and 5' shoulders/bike lanes, to provide further separation between moving vehicles and the existing sidewalk. This concept faced considerable opposition from adjacent property owners and has been removed as a recommendation of this Plan. Do to the narrow right of way in the corridor, the no other roadway changes are feasible.

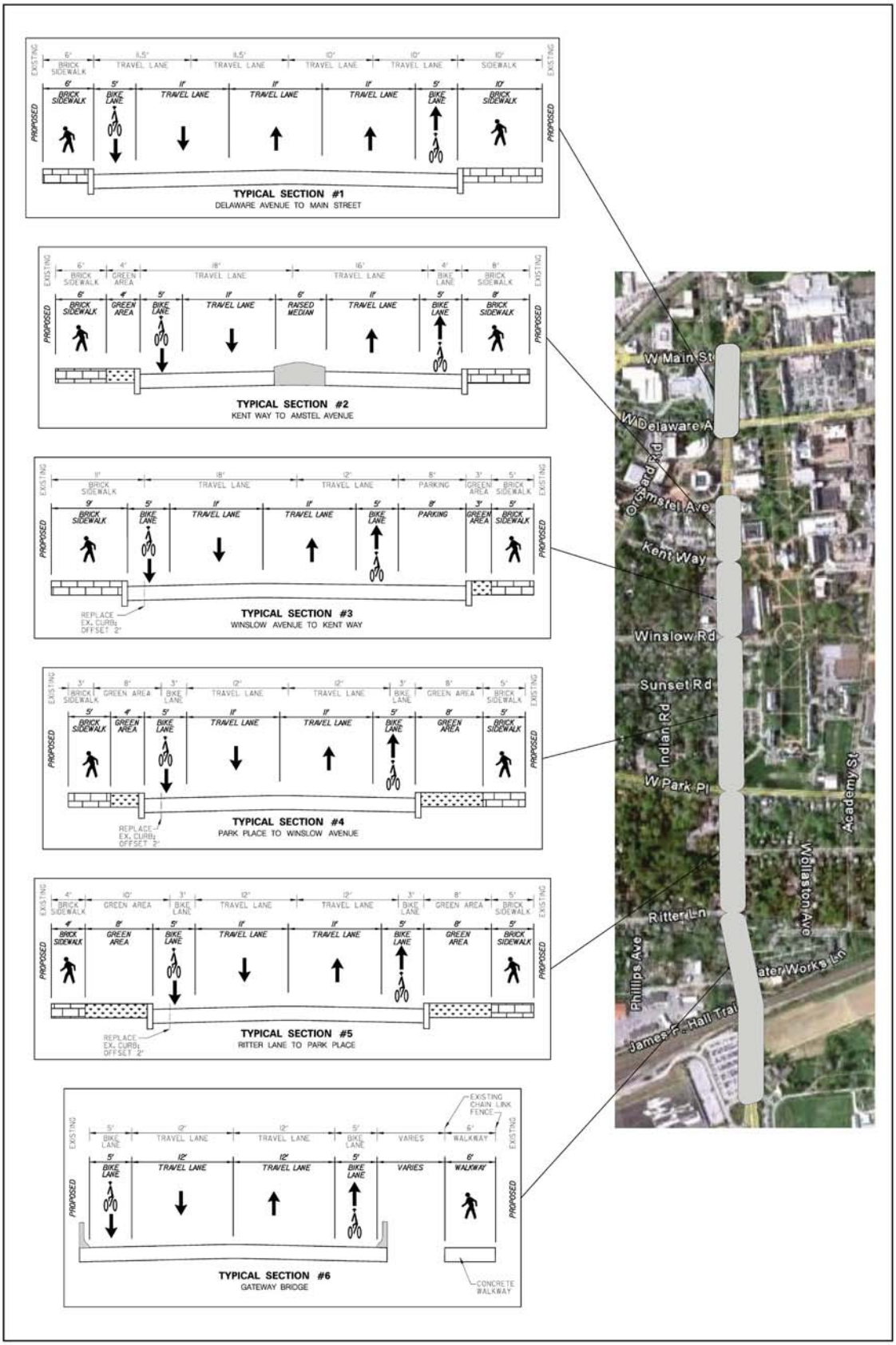
To improve pedestrian travel, sidewalks should be improved to meet ADA standards including the removal of sidewalk obstructions. Pedestrian signals and crosswalks should be added at Winner Boulevard and Kirkwood Highway. Using an easement and city parkland south of White Clay Creek, an off road bicycle and pedestrian path can off an alternative to walking and bicycling on Cleveland Avenue.

Figure 9 – W. Park Place Traffic Calming Improvements



Potential traffic calming for ***West Park Place*** includes keeps existing mid-block curb lines intact and restore the corridor to a more residential quality. The concept shown above includes short and narrow pedestrian refuge medians (approximately 25' long x 4'wide) at intersections to help reduce travel speed and pedestrian crossing distances at intersections with mountable curbs to accommodate large turning vehicles. The use of "sharrow" bicycle markings would delineate areas of shared roadway use. If bicycle lanes are preferred, alternative traffic calming measures should be used. Addition study is needed to re-evaluate traffic signals vs. 4-way stop controlled intersections.

Figure 10 – S. College Avenue – Gateway and Traffic Calming



Pedestrian and Bicycle Improvements

Cycling and walking are important forms of transportation in Newark. As with many college towns, the needs of cyclists and pedestrians are a key issue. However it should be noted that the focus on cyclists and pedestrians issues in Newark goes beyond those distinct issues associated with students. According to the US Census, 18 percent of Newark residents walk to work, while the New Castle County average was just three percent. *(Source: 2006-2008 American Community Survey 3-year estimates).* Bicycles account for 4.7 percent of Newark commuters, a rate that puts Newark in the ranks with many of the most successful bicycle friendly communities. Participants at Plan public meetings and Newark Community Day expressed the desire to see expanded bicycling facilities and the joy they experience from Newark's pedestrian-friendly streets and greenways.

In recent years, several initiatives have contributed to improved facilities for walking and bicycling. Recent projects such as the Hall Trail, the Casho Mill pedestrian tunnel, and the imminent Pomeroy Trail are significant milestones towards improved mobility.

Bicycling Improvements

Recognized nationally for bicycling improvements, Newark has been designated a "bronze" Bicycle Friendly Community by the League of American Bicyclists. The Newark Bicycle Committee has continued to work towards identifying City-wide opportunities for enhanced facilities as well as programs to promote safe cycling and encourage more trips by bicycle. The Newark Bicycle Committee has identified short-term, on-road pavement marking recommendations shown in Table IX and will be developing a comprehensive set of bicycling recommendations to expand upon those included in the Newark Transportation Plan.

City-wide, the Plan recommends improvements to bicycle detection at signalized locations. Specifically, DelDOT should continue to increase the use of above ground video detection or adjust the position and sensitivity of traditional loop detectors. Figure 11 shows the pavement stencil that may be used to show bicyclist where to position themselves in order to trigger the signal.

Figure 11 – MUTCD Bicycle Detection Pavement Marking

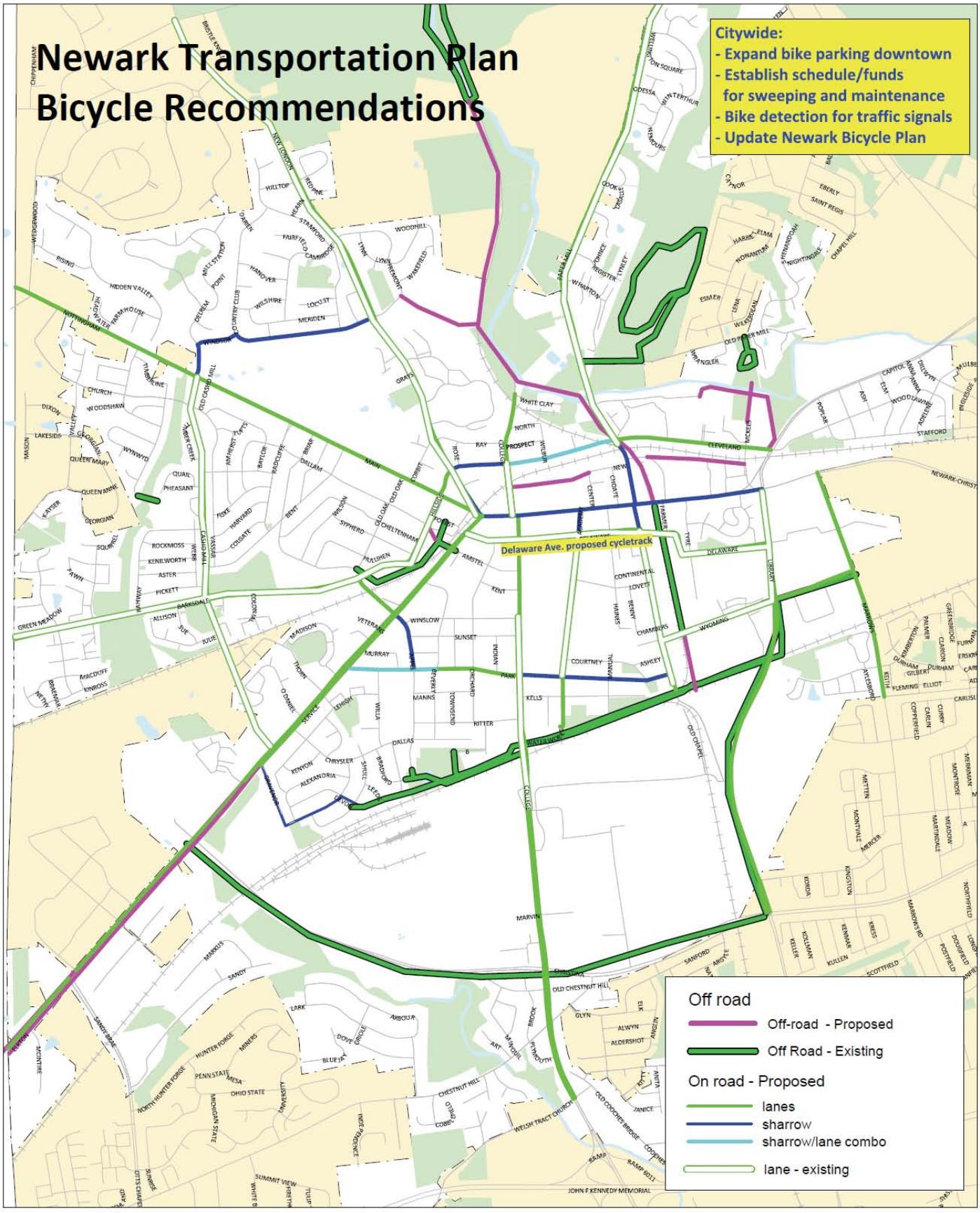
Table IX – On road bicycle recommendations, short-term

Street	Limits	Recommendation
Academy Street	South of Lovett	Bike lanes
Academy Street	North of Lovett	Bike lanes
Apple Road	South of Park Place	Local street; improvements not needed
Apple Road	Park Place to Elkton	Shared lane markings
Apple Road	Elkton to Barksdale	Bike lanes
Barksdale Road	All	Complete
Casho Mill Road	All	SB Shared lane markings through underpass
Cleveland Avenue	West of College	Shared lane markings
Cleveland Avenue	College to Paper Mill	Eastbound shared lane markings, westbound bike lane
Cleveland Avenue	Paper Mill to Library	Potential road diet
Country Club/Windsor/Delrem	All	Shared lane markings
East Main Street	All	Shared lane markings
East Park Place	All	Shared lane markings
Elkton Road	All	Bike lanes
Hillside Road	All	Bike lanes
Library Avenue	South of Delaware	Bike lanes
Library Avenue	North of Delaware	No short-term improvement proposed
Marrows Road	All	Bike lanes
New London Road	Main to Cleveland	Shared lane markings
New London Road	North of Cleveland	Bike lanes
North Chapel Street	All	Shared lane markings
North College Avenue	Main to White Clay Dr.	Bike lanes
Paper Mill Road	All	Complete except White Clay Creek bridge
South Chapel Street	South of Delaware	Bike lanes
South Chapel Street	Main to Delaware	No short-term improvement proposed
South College Avenue	All	Bike lanes
West Main Street	New London to Hillside	Remove parking (if any), sharrows at Hillside turn lanes
West Main Street	West of Hillside	Bike lanes
West Park Place	College to near Apple	Bike lanes or traffic calming with shared lane markings
West Park Place	Near Apple to Elkton	Westbound bike lane, eastbound shared lane markings or traffic calming
Wyoming Road	All	Complete

Source: Newark Bicycle Committee

Where width allows, pavement markings should be revised to include both vehicle lanes and bike lanes (5' preferred/4'min.). Bike lanes can often be added by marking shoulders as bike lanes, reducing wide lanes to 10-11 feet and reducing wide parking lanes to 7-8 feet On roads where space for bike lanes does not exist, the newly approved MUTCD shared lane use markings (sharrows), are recommended. Appropriate markings at intersections/right turn lanes are also needed. Improved pavement markings should be coordinated with paving projects.

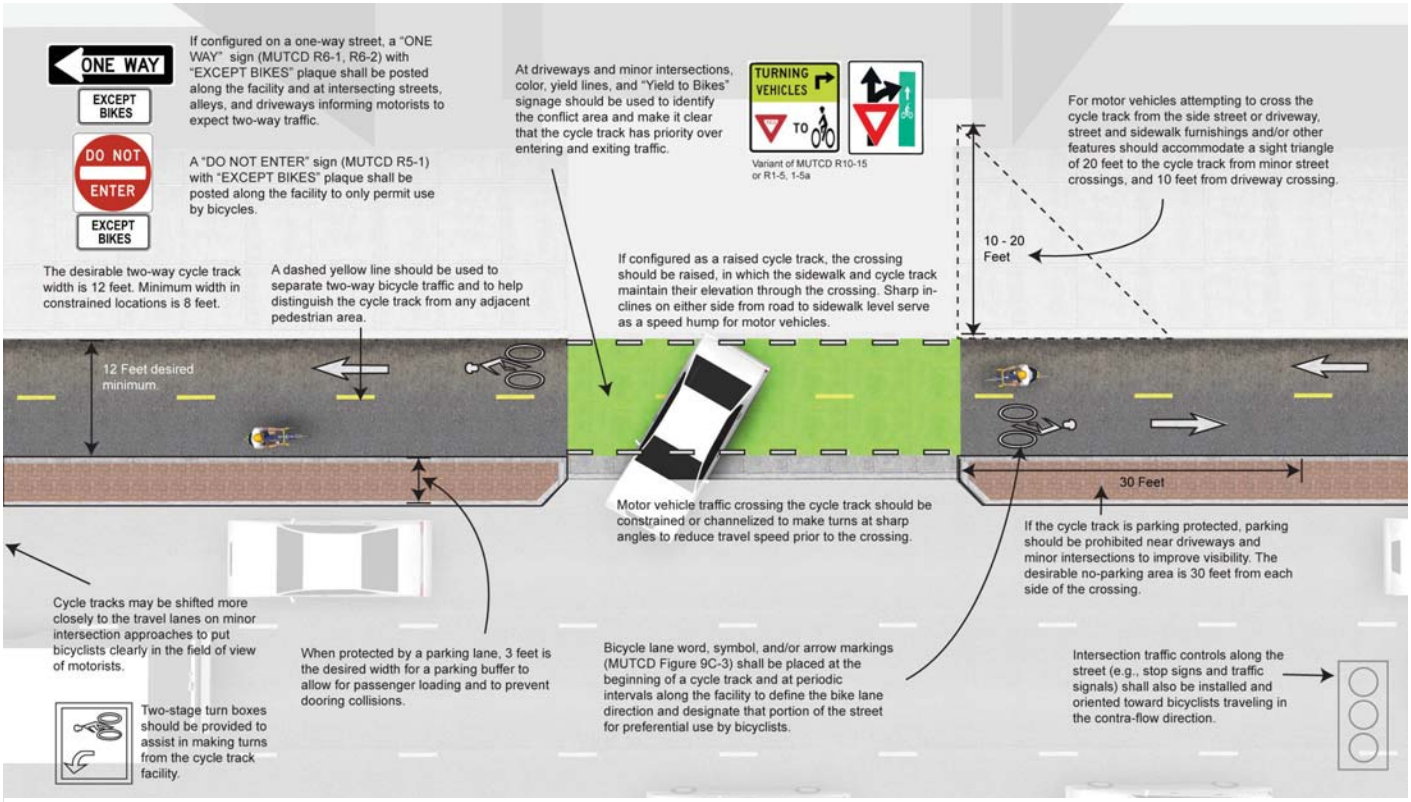
Sharrow


Newark Transportation Plan
Bicycle Recommendations
Citywide:
- Expand bike parking downtown
- Establish schedule/funds for sweeping and maintenance
- Bike detection for traffic signals
- Update Newark Bicycle Plan
Delaware Ave. proposed cycletrack
Off road
Off-road - Proposed
Off Road - Existing
On road - Proposed
lanes
sharrow
sharrow/lane combo
lane - existing

One of the critical missing links to bicycling in downtown Newark is the lack of an adequate westbound bike route. To provide for this missing link, it is recommended that Delaware Avenue be reconfigured to include a two-way, separated bike lane known as a cycle track. A cycle track is recommended from Tyre Avenue to Orchard Road. A typical section of this improvement is shown in Figure 12, subject to refinement through a comprehensive engineering study.

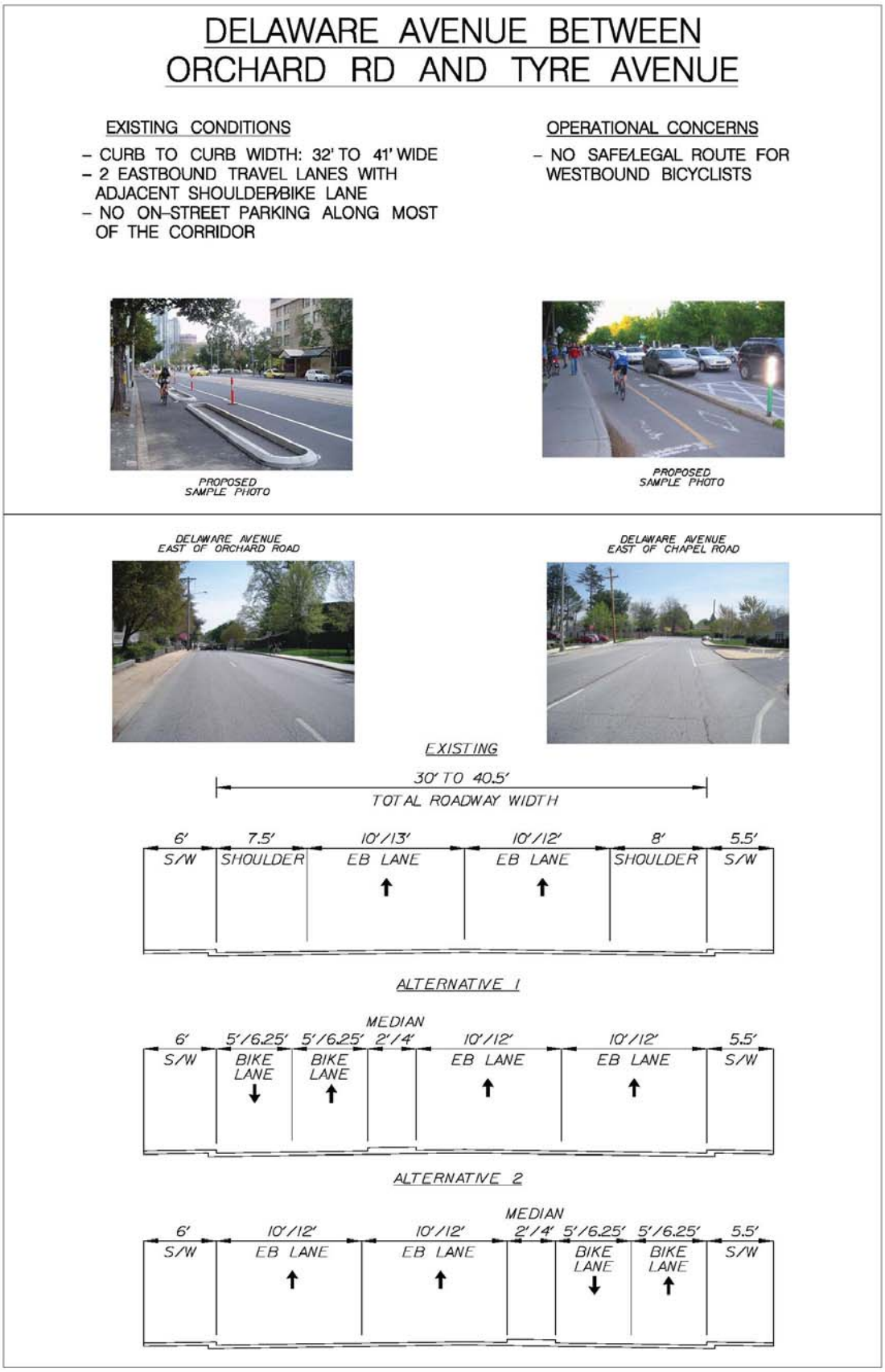
The recently released National Association of City Transportation Officials (NACTO) *Urban Bikeway Design Guide* includes design guidance for cycle tracks based on the experience of the best cycling cities in the world. NACTO recommends that cycle tracks include bicycle signal modifications and enhanced intersection and driveway markings. Bike boxes are a recommended intersection improvement to improve the ease and visibility for bicycle turns. Main Street is an additional location for potential use of bike boxes and colored pavement to enhance shared lane use markings/sharrows.

While not currently in the MUTCD, cycle tracks have now been used successfully in many cities across North America including New York City, Portland, OR, Indianapolis, IN, Saint Petersburg, FL, and Washington, DC. Thus, Delaware has the opportunity to apply best practices from the experiences of other communities.



Source: NACTO Urban Bikeway Guide, http://nacto.org/wp-content/uploads/2010/08/CycleTrack_TwoWay_Raised_Plan_Annotation.jpg

Figure 12 – Delaware Avenue Separated Bike Lane (Cycle Track)



Pedestrian Improvements

To enhance walkability throughout the City, the Plan also identifies areas where pedestrian improvements could be made.

Specifically, it is recommended that ***Main Street*** be targeted for added pedestrian and streetscape enhancements. Currently the Newark Downtown Partnership Design Committee is in the process of developing plans for added bumpouts near parking lot entrances and crosswalks on Main Street. Bumpouts along the corridor would reduce crosswalk widths and discourage illegal parking at corners. Additionally bumpouts can accommodate benches, bike racks, and trash receptacles to better define off-street parking access points and reduce clutter along sidewalks.

On ***Library Avenue*** between Delaware Ave and Main Street, significant jaywalking has been observed. Pedestrians routinely cross mid-block across this busy 4-lane road despite the lack of any pedestrian amenities due to the direct link between the library, residential area, DART bus stop and College Square. There are marked crosswalks at the adjacent signalized intersections, however, these intersections are roughly 500 feet from where the jaywalking typically occurs and it seems unrealistic to expect that pedestrian traffic would divert to these safer crossing locations. This plan proposes (Figure 13) formalizing the mid-block crossing, with a marked crosswalk and center median to serve as a pedestrian refuge area. A slight relocation of the existing bus stop shelter (further north) would also be made to enhance the visibility of pedestrians to drivers. Additional signage would also be required to define the crossing area. If this improvement is found to be unfeasible, the bus stop should be relocated closer to a marked crosswalk and crosswalk improvements should be made at adjacent intersections.

Other pedestrian enhancements throughout the City should ***crosswalks at mid-block and unsignalized locations***, Candidate locations for the additional study include:

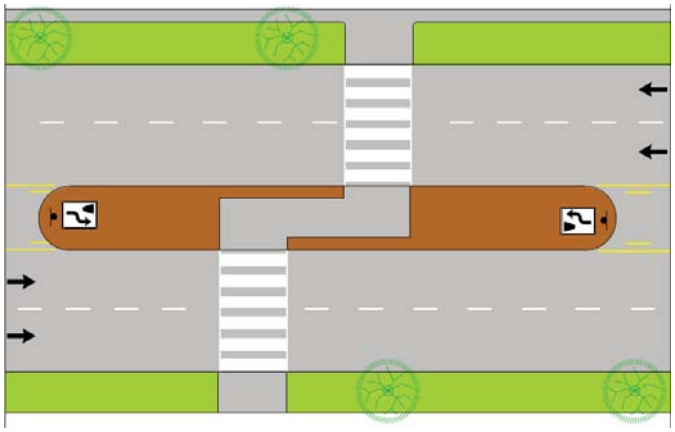


Figure 13 – Library Ave Median Improvement

- Delaware Avenue between Academy St and College Avenue.
- S. College Ave. between Ritter Lane and the railroad overpass.
- Elkton Rd. – mid-block crossing locations
- Academy Street Corridor – south of Delaware Avenue.

National research has shown that drivers are more likely to yield at mid-block crosswalks with the addition of measures beyond traditional signs and striping that enhance crosswalk visibility. Figure 14 shows possible measures include ***High Intensity Activated Crosswalks*** (HAWK), ***Rectangular Rapid Flashing Beacons***, and ***in-street signs, "State Law–Yield to Pedestrians in Crosswalk."***

Mid-block and other locations without stop signs or signals should be evaluated using national and state best practices for appropriate measures.

Figure 14 - Sample Photo – HAWK

In addition to the above listed pedestrian improvements, the Plan also recommends ***City-wide initiatives for walkability***, which include:

- Rejuvenate maintenance operations to focus on providing well-defined crosswalks with uniform markings and signage throughout the City.
- Develop a program to convert all pedestrian signal indications to include countdown timers.

For new and re-construction projects, develop strategies that minimize crossing distances. Roadway projects should be designed with the needs of pedestrians, including ADA, met. Items shall include:

- Controlling the number and width of travel lanes.
- Using the smallest curb radius practicable to better manage pedestrian conflicts with turning vehicles. (Figure 15)
- Design for urban conditions. Place crosswalks and channelization in a way that reduces or eliminates any degree of skew. (Figure 16)
- Utilize curb extensions (bulb outs).
- Where medians of 4 feet or wider are present, design the median as a pedestrian refuge, with two shorter and separate crossings on each side of the median.
- Continue to design all crosswalk locations to accommodate disabled pedestrians (ADA compliant).

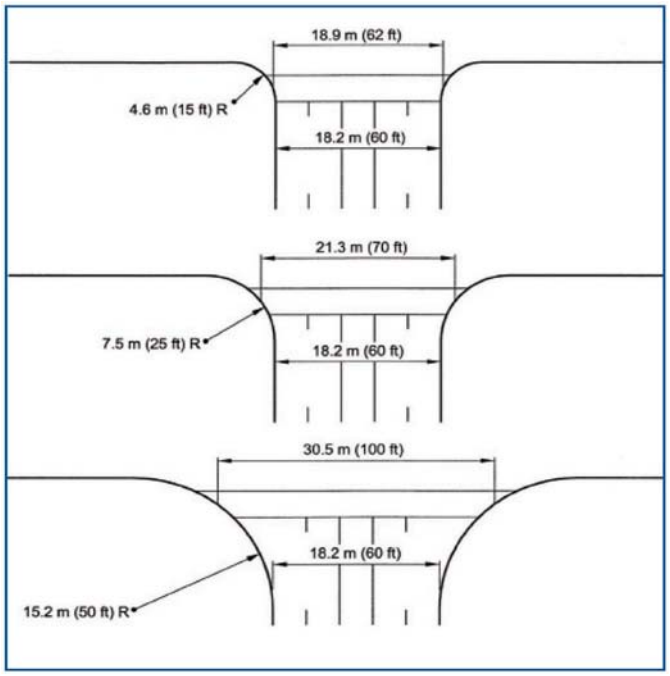


Figure 15 – Reduced Curb Radius

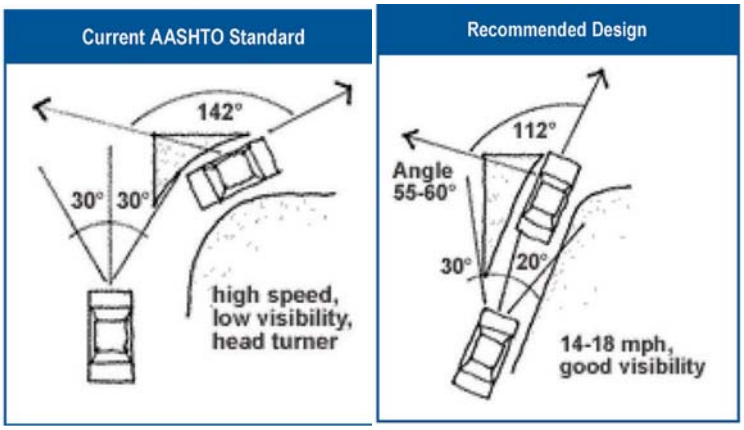


Figure 16 – Recommended right turn islands

Parking

Downtown Newark has a dense mix of on and off-street parking. Off-street facilities include public (City-operated) and private customer parking facilities. On-street parking facilities largely include meters in the Downtown for short-term use. According to the *Downtown Parking Garage Study*, June 2007, there are 1,651 off-street parking spaces in the Downtown and 198 metered parking spaces. The overall peak hour occupancy rate for the Downtown was 72 percent. This rate falls within an acceptable rate for an urban downtown area. Typically, occupancy rates of 85 to 90 percent are considered to be the upper threshold for serviceable occupancy rates. Based on these results it does appear that there is a currently adequate parking supply in the Downtown.

However, despite an acceptable overall occupancy rate, this report recognizes that added growth is expected in the future. As such, the City of Newark should be prepared to increase their supply in certain areas to ensure future needs are met. In the short-term, plans to implement the ***"Morepark"*** parking system on existing surface lots will likely provide for healthy occupancy rates in the interim.

Source: www.morepark.com

Morepark is a modular parking system that can be constructed at a fraction of the cost and time of a traditional garage. Features include:

- Foundationless – built over existing surface and can accommodate elevation changes across the lot.
- Modular – made of precast sections, it can be installed in 4-8 weeks.

Longer term, the Plan recommends implementation of the proposed ***structured parking garage on Lot #1*** behind the Galleria.

Lot #1

The advantage of a garage here, is it would be a more effective use of land and would allow added economic development activity. Currently the City is working with a developer to assess the financial feasibility. A garage would include ground level commercial or a liner building fronting Delaware Avenue, to create a more attractive appearance from this view and maximize income potential.

Other initiatives to improve parking should include:

- ***Consolidate parking lots and entrances.*** For instance, a new Center Street entrance and/or exit to Lot # 3 (behind businesses on the north side of Main Street behind Wilmington Trust/IHOP) would provide better access and would allow for fewer access points on Main Street, reducing possible pedestrian conflicts. Also, look for opportunities to merge private lots into larger municipal lots. Pay municipal lots allow for greater management of demand for parking.
- ***Maximize space in existing lots.*** An option for this includes consolidating dumpsters with trash compactors. This improves lot aesthetics while reducing space taken up by dumpsters.
- ***Improve wayfinding to parking entrances.*** Use of banners and more visible signs at and in advance of parking lots is recommended. The perceived of lack of parking exist largely

because many visitors are unable to easily find municipal lots.

Measures to reduce the demand for parking are another important strategy. These include:

- ***Expand car-sharing*** beyond the University to other parts of Newark. The University recently implemented a car sharing program (Zipcar). This newly implemented program should be monitored for its effectiveness. If successful, the program should be expanded to reduce the need for car ownership by downtown residents and students, as well as at workplaces.
- ***Add bicycle parking downtown.*** Currently, the City is working to install 16 bike racks supplied by DelDOT along Main Street. Additional racks should be installed in the future in locations with a demonstrated need.

Transit

The City, DART and the University should partner to provide a coordinated transit system befitting a world-class University town. Currently the public transportation system in the City of Newark consists of both bus and rail service. As shown in Table X, bus service is offered through three separate agencies: UniCity, Delaware Transit Corporation's DART First State service (DART), and the University of Delaware. The UniCity system offers relatively limited service in terms of frequency (Table XI) and span (Table XII). Service is oriented to trips within Newark and the routes are relatively circuitous. The UniCity is a City of Newark service that is operated by the University of Delaware with the cost underwritten by DART. With the exception of Route 31, the Newark Trolley, DART links Newark to Wilmington and other portions of New Castle County as well as Elkton, MD. The focal point for DART bus routes is the Newark Transit Hub which is situated between Main and Delaware. It provides bus loading areas, shelters and transit information. The University of Delaware operates several routes oriented to the campus. Figure 17 indicates the alignment of UniCity and DART routes while Figure 18 depicts the University of Delaware bus system. Commuter rail service is operated by SEPTA under an arrangement with DART. Amtrak trains and Greyhound buses also stop in Newark, with service that is too limited to serve commuters.

Based on a review of these services, as well as, field views and observations, a number of proposals have been formulated. They have been divided into several areas:

- ***Transit Hub*** – Currently, this transit facility is oriented primarily to DART routes while the potential connections with other bus routes are not well established. To address this, the adjacent bus stops on Main and Delaware would have special treatments that indicate the proximity of the Transit Hub. This would include features such as bus stops signs, passenger waiting shelters, real-time schedule information (e.g., Next Bus) and concrete pavers or other descriptive materials to denote the extension of the Transit Hub to the nearby cross streets.

- ***Amenities*** – The current system is substantially lacking in terms of amenities and features that identify the transit system. This would include bus stop signs at all UniCity and University stops, and for all stops, information about services, schedules, and phone and web page to obtain transit information. With the exception of the Municipal Building, there are almost no bus stop signs along the UniCity routes. Other elements of this recommendation would be passenger waiting shelters or benches at the more heavily used bus stops. A priority scheme could be devised based on ridership levels at each stop and the extent of transferring between buses. In addition, bicycle racks on buses, currently installed on all DART buses and some University shuttles, should be added to all buses.

Another feature that can increase transit visibility and ridership is to install ride guides which list schedule times for that bus stop. Even more appealing is provision of real-time information on bus arrivals and departures. The University offers this service and it should be extended to other routes equipped with Automatic Vehicle Locator technology.

- ***Marketing*** –There needs to be a single source of information on the transit services by all agencies. A single map should be prepared for Newark which would show all routes, schedule times, fare information and contact phone numbers and web addresses for each agency. Newark might prepare a schedule book which lists information (maps and schedules) for all routes in a single document. Information might also market options for other "Car-free in Newark" services including bike and walking routes, shuttles, etc.

  While there may be some issues related to liability, the University of Delaware system should be promoted as a transit service available to the general public. Many other campus bus systems permit and encourage riders not affiliated with the school. Likewise, many universities offer a U-Pass bus pass that allows students and employees free or reduced fares on public buses.

- ***Service Modifications*** – Two basic modifications are suggested for the existing bus lines. First, the University of Delaware system should provide at least a minimum service level when school is not in session. Also, better connections with the DART routes at the Transit Hub would benefit students and employees.

  The second proposal involves merging the three UniCity routes and the Trolley into one or two new routes that would provide improved circulation, transit access and frequencies in Newark. Currently, UniCity routes are too circuitous and infrequent to attain reasonable ridership levels. The Trolley does not attract sufficient ridership due to limited hours and frequencies and this bus line is being considered for elimination. Accordingly, a new shuttle route is suggested that would follow the alignment shown in Figure 19. The route would have a 12.1 Miles round trip distance and should permit frequent service with one or two buses. A merged route would no longer serve some areas that UniCity serves, but these areas do currently have DART service. If a free or reduced fare is desired, the route would need to be operated by the City and University or with a subsidy to DART. A variation would be two local routes. This could be considered later if additional resources were available.

  Concerns exist that a merged circulator route would still be unproductive. If a merged route does not meet DART service standards, resources from the circulator route should go to expanding other routes that serve Newark and surrounding areas, which are more successful. For instance, Route 6 is one of DART's most successful routes, but does not circulate beyond the Transit Hub. Ridership on Routes 55 and 34 have both grown at rapid rates but have limited service hours.

- ***Newark Regional Transit Center*** – Separate from this plan, a variety of rail improvements are being planned. An engineering plan is now underway for an improved train station at the Chrysler site. Transit oriented development and realigned local bus routes should be part of this analysis and implementation. This, along with current track work will allow for increased SEPTA service and future Maryland (MARC) commuter rail to Newark. Within the new "Science and Technology Campus," a network of multimodal transportation links to the train station as well as bus, bicycle and pedestrian connections from the new campus to other areas of Newark.

Table X - Route Description

Route Designation	Between	And
UniCity Bus System		
N-1	Kimberton Pool/Senior Center	Chestnut Hill Plaza
N-2	Kimberton Pool/Senior Center	36 E. Main Street
N-3	Kimberton Pool/Senior Center	Main Street/S. College Avenue
DART		
6	Newark Transit Hub	Wilmington Rail Station
16	Fairfield Shopping Center	Rodney Square
31/Newark Trolley	College Square Shopping Center	Newark Municipal Building
33	Newark Transit Hub	Rodney Square
34	Newark Transit Hub	Rodney Square
39	Newark Transit Hub	Rodney Square
55	People's Plaza	Rodney Square
59	Newark Rail Station	Wilmington Rail Station
65	Newark Transit Hub	Elkton Manor Apartments
Southeastern Pennsylvania Transportation Authority (SEPTA) Regional Rail		
Wilmington/Newark Line	Newark Rail Station	Suburban Station
University of Delaware		
3 Laird Campus	Ray Street	Old College
7 Elkton Road	W. Park Place & Willa Road	Winslow Road
11 Evening Route 1	Perkins Student Center	DART Bus Shelter
13 Field House	Old Paper Mill Road	Old College
16 Red/Yellow Express	Townsend Hall	Smith Overpass
22 Evening Route 2	Perkins Student Center	Pearson Hall
24 South Campus	Newark Train Station	Perkins Student Center
27 Morris Library	Morris Library	Lovett Ave. & S. Chapel St.
30 Shopping Center Express	David Hollowell Drive	Ray Street
35 Chapel/Wyoming	Univ. Courtyard (S. Chapel St.)	Student Services Bldg
44 Hen After 10	Smith Overpass	Main St. & Academy St.

DART Routes Historical Ridership for Routes Serving Newark

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
6	623,139	613,619	627,111	623,334	657,338	653,188	715,204	758,309	718,466	758,138
33	408,901	352,074	300,560	319,874	334,177	370,571	355,618	398,347	394,965	417,125
55	43,785	64,712	71,217	74,525	85,546	90,748	88,693	118,401	128,361	140,193
34	17,262	18,788	31,237	31,120	37,470	29,576	45,182	107,185	73,868	66,714
39	1,888	36,934	35,862	37,230	45,718	40,973	37,818	43,888	50,532	43,766
16	58,618	47,159	43,786	45,177	45,206	43,762	41,574	53,372	47,306	37,720
65	9,366	13,765	13,317	21,509	20,885	19,385	18,561	17,662	11,353	9,374
31	N/A	N/A	N/A	N/A	N/A	N/A	N/A	9,172	12,601	6,275
59	3,484	3,271	3,194	2,943	3,270	3,904	2,832	2,902	2,895	2,212
	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total	1,166,442	1,150,324	1,126,284	1,155,712	1,229,610	1,252,107	1,305,482	1,509,238	1,440,347	1,481,517

Source: Delaware Transit Corporation

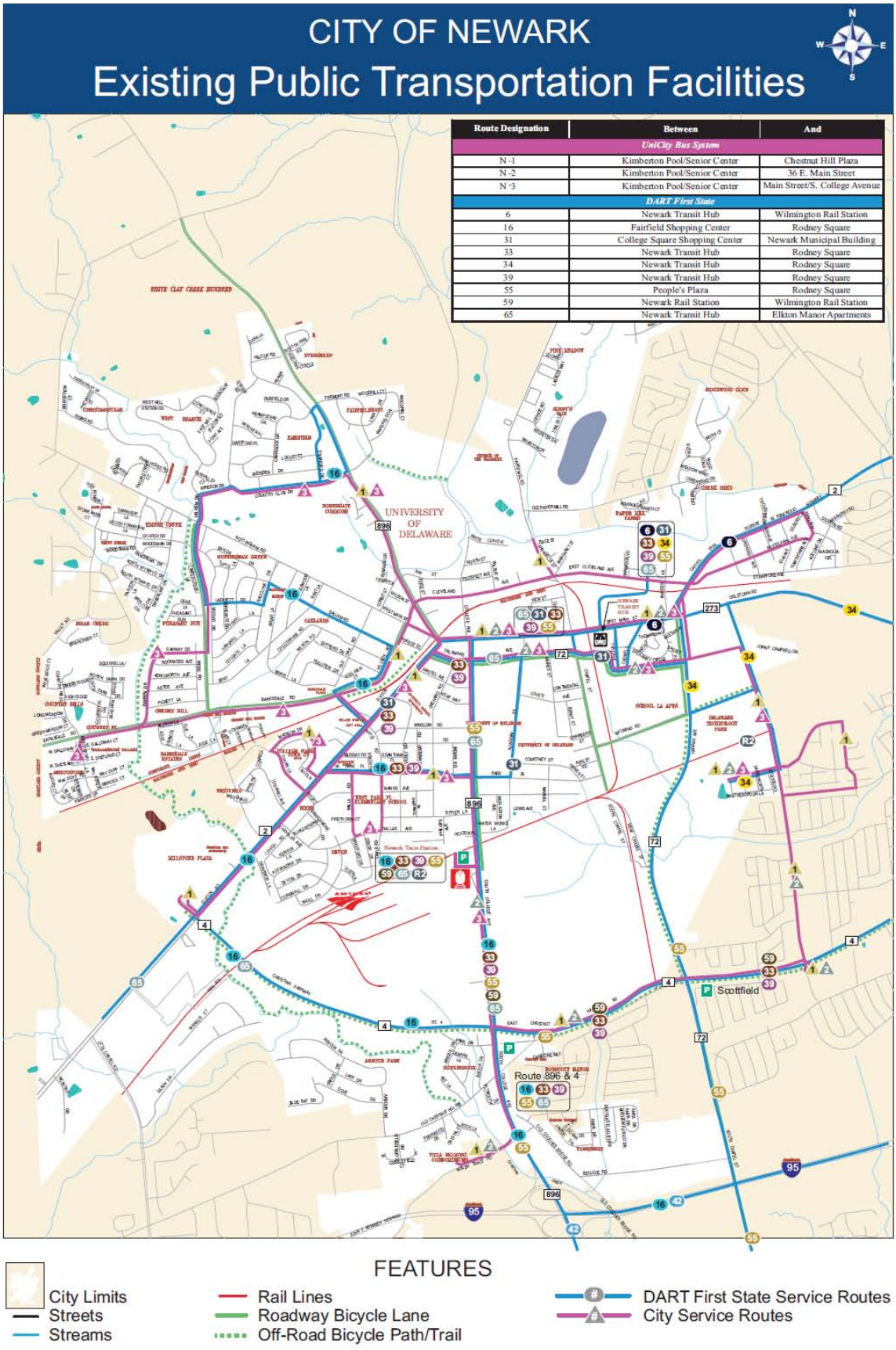
Table XI - Frequency of Service

Route Designation	Weekday				Weekend at Noon	
	AM Peak	Midday	PM Peak	Evening	Saturday	Sunday
UniCity Bus System						
N-1	--	105	--	--	--	--
N-2	1 trip	--	1 trip	--	--	--
N-3	1 trip	--	1 trip	--	--	--
DART						
6	22	30	30	30/60	30	60
16	30	--	30	--	--	--
31/Newark Trolley	--	30	--	--	--	--
33	30	60	30	30/60	60	--
34	60	--	60	--	--	--
39	30	--	30	--	--	--
55	60	60	60	60	60	--
59	--	2 trips	--	--	--	--
65	80	--	85	--	--	--
Southeastern Pennsylvania Transportation Authority (SEPTA) Regional Rail						
Wilmington/Newark Line	39	2 trips	48	--	--	--
University of Delaware						
3 Laird Campus	13	13	13	26	--	--
7 Elkton Road	20	20	20	--	--	--
11 Evening Route 1	--	--	--	40	--	--
13 Field House	45	45	45	--	--	--
16 Red/Yellow Express	8/20	8/20	15/20	--	--	--
22 Evening Route 2	--	--	--	40	--	--
24 South Campus	20	20	20	--	--	--
27 Morris Library	--	1 trip	--	--	--	--
30 Shopping Center Express	--	--	--	--	40	--
35 Chapel/Wyoming	20	20	20	--	--	--
44 Hen After 10	--	--	--	10	--	--

Table XII - Span of Service

Route Designation	Direction	Weekday		Saturday		Sunday	
		Start	End	Start	End	Start	End
UniCity Bus System							
N-1	--	8:51 AM	4:15 PM	--	--	--	--
N-2	--	7:20 AM 5:12 PM	7:59PM 5:54 PM	--	--	--	--
N-3	--	7:20 AM 4:17 PM	8:51 AM 5:40 PM	--	--	--	--
DART							
6	From Newark	5:31 AM	11:23 PM	7:05 AM	8:29 PM	9:52 AM	5:43 PM
	To Newark	4:39 AM	11:21 PM	5:54 AM	8:14 PM	8:54 AM	5:42 PM
16	From Newark	6:24 AM 5:06 PM	8:43 AM 6:55 PM	--	--	--	--
	To Newark	5:39 AM 4:15 PM	7:44 AM 6:33 PM	--	--	--	--
31/Newark Trolley	--	8:48 AM	4:21 PM	--	--	--	--
33	From Newark	5:34 AM	11:41 PM	7:15 AM	8:50 PM	--	--
	To Newark	5:21 AM	11:41 PM	6:00 AM	8:29 PM	--	--
34	From Newark	6:04 AM 2:31 PM	9:53 AM 7:24 PM	--	--	--	--
	To Newark	6:00 AM 1:30 PM	8:51 AM 7:34 PM	--	--	--	--
39	From Newark	6:10 AM 4:35 PM	8:15 AM 5:38 PM	--	--	--	--
	To Newark	6:30 AM 4:15 PM	7:23 AM 6:54 PM	--	--	--	--
55	Eastbound	5:45 AM	10:25 PM	7:20 AM	8:29 PM	--	--
	Westbound	4:42 AM	9:06 PM	6:00 AM	8:41 PM	--	--
59	From Newark	11:55 AM	12:45 PM	--	--	--	--
	To Newark	12:17 PM	1:05 PM	--	--	--	--
65	From Newark	5:14 AM 3:05 AM	8:16 AM 6:43 PM	--	--	--	--
	To Newark	5:42 AM 3:48 PM	8:50 AM 7:14 PM	--	--	--	--
Southeastern Pennsylvania Transportation Authority (SEPTA) Regional Rail							
Wilmington/Newark Line	From Newark	6:22 AM	8:28 PM	--	--	--	--
	To Newark	5:26 AM	5:27 PM	--	--	--	--
University of Delaware							
3 Laird Campus	--	7:20 AM	10:38 PM	--	--	--	--
7 Elkton Road	--	7:11 AM	6:05 PM	--	--	--	--
11 Evening Route 1	--	6:15 PM	10:59 PM	--	--	--	--
13 Field House	--	7:20 AM	6:14 PM	--	--	--	--
16 Red/Yellow Express	--	7:30 AM	7:00 PM	--	--	--	--
22 Evening Route 2	--	6:15 PM	11:45 PM	--	--	--	--
24 South Campus	--	7:19 AM	5:59 PM	--	--	--	--
27 Morris Library	--	2:17 AM	3:01 AM	--	--	--	--
30 Shopping Center Express	--	--	--	12:00 PM	3:20 PM	--	--
35 Chapel/Wyoming	--	7:20 AM	6:08 PM	--	--	--	--
44 Hen After 10	--	10:25 PM	3:59 AM	10:25 PM	3:59 AM	10:25 PM	3:59 AM

Figure 17



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UniCity Bus System		
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N -2	Kimberton Pool/Senior Center	36 E. Main Street
N -3	Kimberton Pool/Senior Center	Main Street/S. College Avenue
DART First State		
6	Newark Transit Hub	Wilmington Rail Station
16	Fairfield Shopping Center	Rodney Square
31	College Square Shopping Center	Newark Municipal Building
33	Newark Transit Hub	Rodney Square
34	Newark Transit Hub	Rodney Square
39	Newark Transit Hub	Rodney Square
55	People's Plaza	Rodney Square
59	Newark Rail Station	Wilmington Rail Station
65	Newark Transit Hub	Elkton Manor Apartments

Figure 18

CITY OF NEWARK

Existing University of Delaware Shuttle Routes

Route Description

Route Designation	Between	And
University of Delaware		
3 Laird Campus	Ray Street	Old College
7 Elkton Road	W. Park Place & Willa Road	Winslow Road
11 Evening Route 1	Perkins Student Center	DART Bus Shelter
13 Field House	Old Paper Mill Road	Old College
16 Red/Yellow Express	Townsend Hall	Smith Overpass
22 Evening Route 2	Perkins Student Center	Pearson Hall
24 South Campus	Newark Train Station	Perkins Student Center
27 Morris Library	Morris Library	Lovett Ave. & S. Chapel St.
30 Shopping Center Express	David Hollowell Drive	Ray Street
35 Chapel/Wyoming	Univ. Courtyard (S. Chapel St.)	Student Services Bldg
44 Hen After 10	Smith Overpass	Main St. & Academy St.

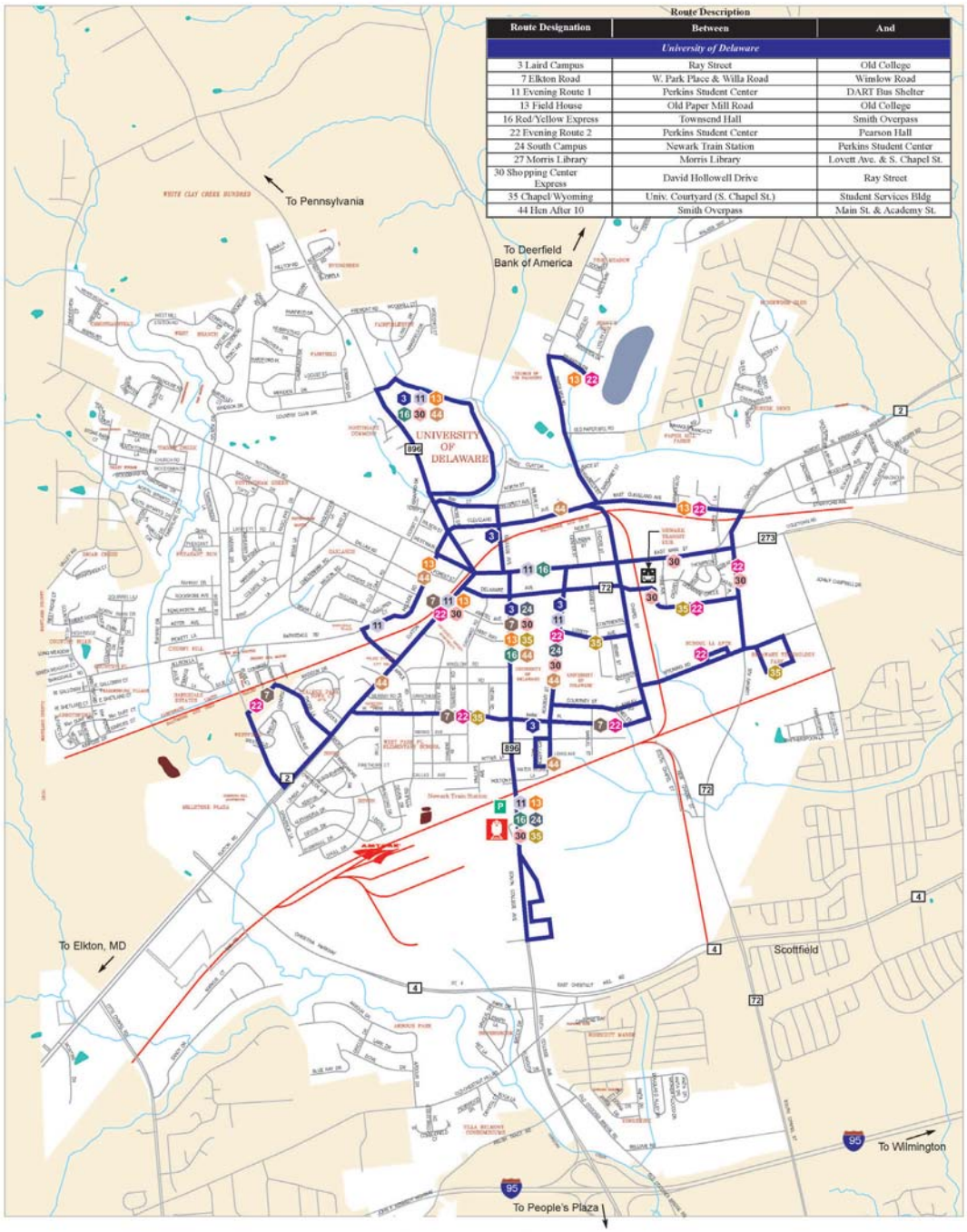
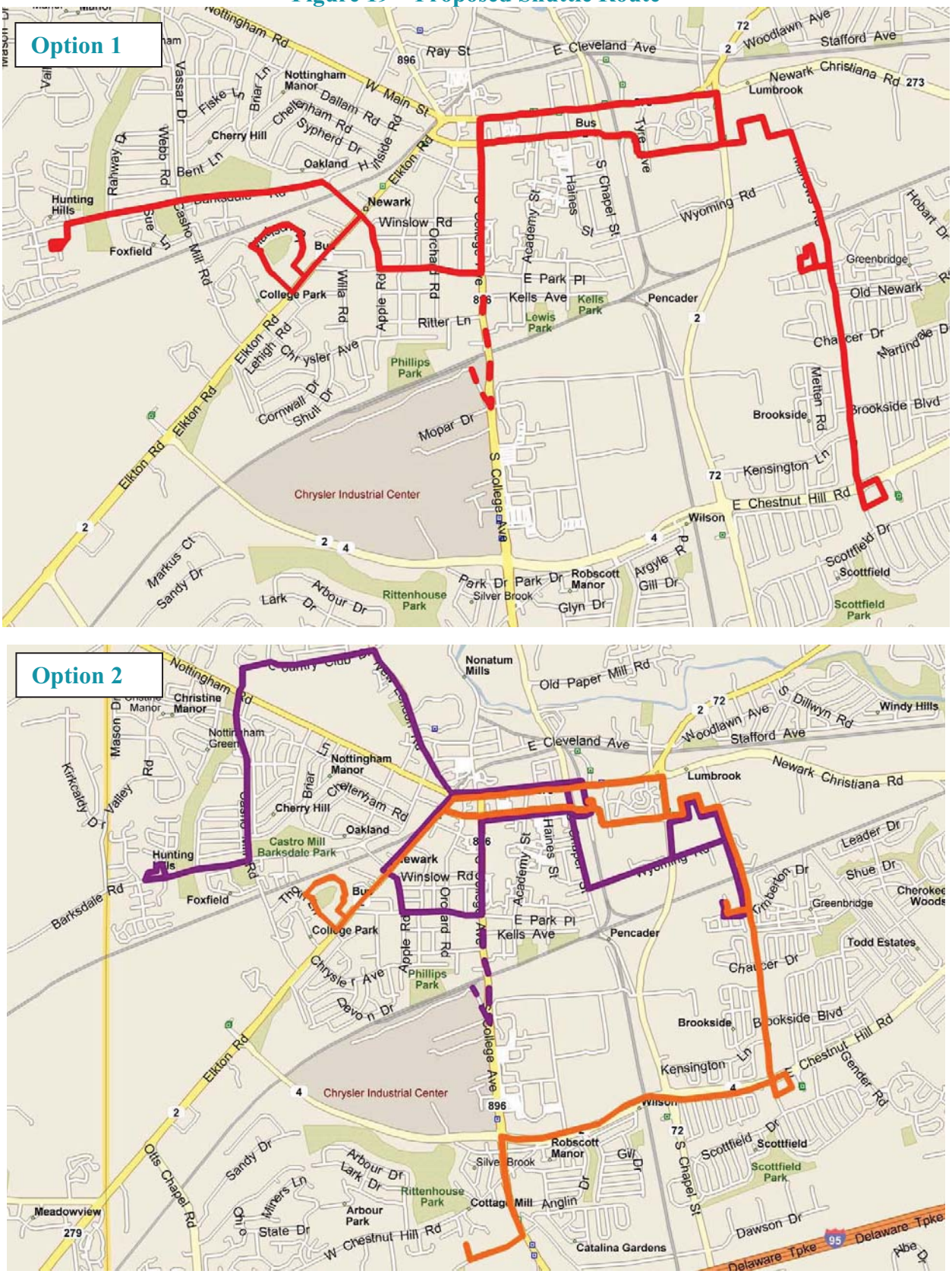


Figure 19 – Proposed Shuttle Route



II. Identification of Opportunities and Solutions

Upon completion of the planning process for this report, a wide range of recommendations were developed throughout the City. The list of proposed recommendations has been divided into a Short-Term Action Plan (Table XIII) and Long-Range Action Plan (Table XIV).

A. Short-term action plan (Summary of Recommendations)

TABLE XIII – Short Term Summary of Recommendations

Congestion, Safety and Mobility Improvements – Short-term	
Recommendations	**Summary**
Signal Coordination **-** Implement a Newark Corridor Optimization Program. Initially to include: 1.Elkton Rd. (10 signals) 2.Cleveland Ave. (6 Signals) 3.Library Ave (4 Signals) 4.S. College Ave. (10 Signals)	• All non-compliant/faulty equipment shall be repaired and new traffic volume data shall be collected for use in developing corridor-specific optimized signal timing plans. Faulty equipment can be reported to DelDOT as needed by calling 302/659-4600. • Installation of a modernized traffic signal system for the S. College Ave and Route 4 Corridors. DelDOT is currently working with WILMAPCO and the University of Delaware to implement signal improvements along several Newark corridors.
Land Use and Travel Demand Management	• Combining planned, mixed use development and programs to encourage use of walking, bicycling, transit and ridesharing can reduce demand for driving and thus reduce the impacts of congestion.
Access Management and Traffic Flow	
Ogletown Rd (Route 273) at Marrows Road – Roadway alignment upgrade	• Includes improvement to the existing lane alignment between Marrows Rd. and Library Ave in the westbound direction. (Paint Only)

Congestion, Safety and Mobility Improvements – Short-term	
Recommendations	**Summary**
Safety, Complete Streets and Traffic Calming	
W. Park Place traffic calming improvements from Elkton Rd to S. College Ave.	• Implement a cost-effective traffic calming plan that keeps existing mid-block curb lines intact and restores the corridor to a more residential quality. Design concepts will include: ○ A reduced road width at intersections with short sections of raised medians/pedestrian refuges on intersection approaches. Ends of medians may need to have mountable curbs to accommodate turning buses, trucks, and emergency vehicles. ○ Use of "sharrow" bicycle markings to delineate area of shared roadway use. ○ Re-evaluate signal warrants along the corridor. Conduct additional traffic counts to consider converting signals to 4-way stop control. Candidate intersections for signal removal include: • W. Park and Apple Rd, • W. Park and Orchard Rd. ○ Pedestrian-scale lighting

Bicycle and Pedestrian Improvements – Short-term	
Recommendations	**Summary**
Bicycle Improvements	
Stripe bike lanes – When road width allows, restripe pavement markings to include travel lanes and ride-able bike lane/shoulders (5' preferred Min 4 ')	• W. Main St, west of Hillside • Cleveland Avenue, College to Paper Mill - bike lane WB, Sharrows in the EB direction. • Hillside Rd –bike lanes • S. Chapel St, Academy St, and N. College Ave – restripe where existing width allows.
Mark shared pavement markings (Sharrows) - Where sufficient width does not exist for bike lanes, provide "sharrows" in areas where vehicular and bike traffic share the road.	• East Main Street: Pomeroy Trail to Elkton Rd. • New London Rd – Main to Cleveland • North Chapel St. • Cleveland Ave – West of College Ave. • Casho Mill Rd – SB through underpass • Apple Rd.- Park Pl. to Elkton • County Club, Windsor, Delrem
Maintain existing facilities	• Establish schedule and funding for sweeping and maintenance of existing on-road markings. • Establish schedule for maintenance of off road facilities.

Bicycle and Pedestrian Improvements – Short-term	
Recommendations	**Summary**
Pedestrian Improvements	

Implement City-wide initiatives for walk ability	• Rejuvenate maintenance operations that focus on providing well-defined crosswalks with uniform markings and signage throughout the City.
	• Develop a program to convert all pedestrian signal indications to include countdown timers.
	• For new and re-construction projects, develop strategies that minimize crossing distances. Policies should aim to keep roadway improvements focused on more traditional urban design. Items shall include:
	  ○ Controlling the number and width of travel lanes
	  ○ Using the smallest curb radius practicable to better manage pedestrian conflicts with turning vehicles.
	  ○ Placing crosswalks in a way that reduces or eliminates any degree of skew.
	  ○ Utilize curb extensions (bulb outs)
	  ○ Where medians of 4 feet or wider are present design the median as a pedestrian refuge, with two shorter and separate crossings on each side of the median.
	• Continue to design all crosswalk locations to accommodate disabled pedestrians (ADA compliant)
	• Retrofit signage that is not compliant with the Manual on Uniform Traffic Control Devices (MUTCD).

Parking Improvements – Short-term	
Recommendations	**Summary**
Expand supply of downtown parking	• Implement "Morepark" modular parking to provide added capacity to meet short-term economic development needs downtown.
Consolidate parking lots and entrances	• Add new Center Street entrance and/or exit to Lot #3 and reduce access points along Main Street to minimize possible pedestrian conflicts. Also continue to work with property owners to merge private parking into larger municipal lots.
Maximize space in existing lots	• Consolidate dumpsters with trash compactors to reduce space requirements and improve lot aesthetics.

Parking Improvements – Short-term	
Recommendations	**Summary**
Improve wayfinding to parking entrances	• Use of banners and more visible signs at and in advance of parking lots is recommended.
Expand car-sharing program. Coordinate with the University of Delaware to monitor and expand the Zipcar Program.	• This newly implemented program should be monitored for its effectiveness. If successful, the program should be expanded in the future beyond the 4 initial vehicles
Add bicycle parking downtown	• Install additional bicycle racks throughout Main Street.

Transit Improvements – Short-term	
Recommendations	**Summary**
Transit Hub Re-establishment Efforts	• Currently, this transit facility is oriented primarily to DART bus routes while the potential connections with other bus routes are not well established. To respond to this situation, the adjacent bus stops on Main and Delaware would have special treatments that indicate the proximity of the Transit Hub. This would include features such as bus stops signs, passenger waiting shelters, real-time schedule information (e.g., Next Bus) and concrete pavers or other materials to denote the extension of the Transit Hub to the nearby cross streets.
City-wide Amenities	• The current system is lacking in terms of features that identify the transit system. This would include bus stops signs at all locations which indicates the service, route and phone and web page to obtain transit information. With the exception of the City Hall, there are few bus stop signs along the UniCity bus routes. Other elements of this recommendation would be passenger waiting shelters or benches at the more heavily utilized bus stops. Another feature that can increase transit visibility and ridership is to install ride guides which list schedule times for that bus stop.
Improved Marketing Efforts	• Provide a single source of information on the transit services provided by each agency. A single transit map should be prepared for Newark which would show all routes, schedule times, fare information and contact phone numbers and web addresses to contact each agency. Information might also include other “Car-free in Newark” travel choices.

Transit Improvements – Short-term	
Recommendations	**Summary**
Service Modifications	• Consider consolidation of the three existing UniCity routes into one or two bus routes. Due to uniform coverage area the DART Route 31 could also be eliminated as part of this consolidation. • In addition or as an alternative, additional trips could be added to DART's best performing Newark routes (6, 33, 34, and 55).

B. Long-term action plan (Summary of Recommendations)

TABLE XIV – Long Term Summary of Recommendations

Congestion, Safety and Mobility Improvements – Long-range	
Recommendations	**Summary**
Access Management and Traffic Flow	
Wyoming Rd and Marrows Road Corridor Access Management	• As a means to accommodate growth and maintain acceptable levels of service along these corridors, land use decisions and access management strategies should be focused on the possibility of long term dualization (2 lanes in each direction) on these roadways.
Delaware Ave Extension to Marrows Rd.	• As means to address future growth and reduce traffic along Library Ave., any redevelopment of the College Square shopping area should include extending Delaware Ave. to Marrows Rd. • This added link would introduce a small grid system to the area, which would reduce trip lengths, distribute traffic more evenly throughout the area and provide improved driving, bicycle and walking access to this underused commercial area.
Cleveland Ave. at N. College Ave. – Addition of a northbound right-turn lane	• Includes widening the northbound approach to include a 5' bike lanes, 11' through lane and an 11' right turn lane. • Right turn lane will add capacity to the intersection without increasing the length of the heavy utilized north to south crosswalks. • Turn lane will require significant acquisition of property. • Signal and pedestrian improvements are currently being designed by DelDOT for this intersection.

Congestion, Safety and Mobility Improvements – Long-range	
Recommendations	**Summary**
N. Chapel St. underpass and Cleveland Ave - northbound right-turn lane extension and improvement of substandard design.	• No operational traffic benefits are gained by extending the NB right turn lane within currently available space. Traffic level of service and vehicular queues would be unchanged. • Future improvements to the CSX overpass should provide for a standard right-turn lane and clearance.
Safety, Complete Streets and Traffic Calming	
S. College Ave Gateway/Mobility Improvements from Main St. to the bridge over Amtrak.	• Modified roadway cross-section that focuses on improved mobility along the corridor for all modes. • Includes continuous full width bike lanes throughout the corridor. • Improves connection from the City's core to the Train Station area.
Cleveland Avenue from Capital Trail (Kirkwood Hwy) to N. Chapel St. /Pomeroy Trail.	• A "road diet," or modified roadway cross-section that provides two through lanes with a two-way center left turn lane, was considered as part of the Plan. This recommendation is not included in the Plan due to concerns from adjacent property owners. • Sidewalk improvements in corridor should include removal of sidewalk obstructions, ADA improvements and addition of pedestrian signals and crosswalks at Winner Boulevard and Kirkwood Highway. • Work with adjacent property owners to develop on off-road bicycle and pedestrian connection parallel with White Clay Creek within an easement and city parkland.

Bicycle and Pedestrian Improvements – Long-range	
Recommendations	**Summary**
Bicycle Improvements	
Delaware Ave East/West Bicycle Linkage - Includes providing a separated cycle track between Orchard Rd and Tyre Ave.	• Delaware Avenue signals would be modified to accommodate westbound bike traffic. • The westbound bike lane would terminate at Orchard Rd. Cyclists would then be directed left onto Orchard Rd. to Amstel Ave. • Marked "Bike Boxes" are proposed at eastbound signalized locations.

Bicycle and Pedestrian Improvements – Long-range	
Recommendations	**Summary**
Bicycle signal detections improvements	• Standard loop detectors are effective but the sensitivity must be adjusted so that bicyclists are detected, and the loops must be placed in a location where a bicyclist's movements can be registered. • Implement newer technologies. Continue the increased use of above ground video detection as a replacement for traditional inductive loop detectors.
Pedestrian Improvements	
Use measures to enhance visibility and drivers yield rates at mid-block/unsignalized crossing locations –Possible measures include **High Intensity Activated Crosswalks** (HAWK), Rectangular Rapid Flashing Beacons, and in-street signs, "State Law–Yield to Pedestrians in Crosswalk."	• Possible locations include: ○ Delaware Ave between Academy St and College Ave. ○ S. College Ave. between Ritter Lane and the railroad overpass. ○ Elkton Rd. – mid-block crossing locations ○ Academy St Corridor – south of Delaware Ave.
Library Avenue – Jaywalking mitigation efforts.	• The proposed concept is to provide a center median to serve as a pedestrian refuge area with individually marked crosswalks for the eastbound and westbound travel lanes. • Slight relocation to existing bus stop would also be made to enhance visibility of pedestrians.
Main Street – Bump-out/crosswalk improvements between Chapel St and College Ave.	• Provide additional intersection and crosswalk bump- outs along the corridor to reduce crosswalk widths and discourage illegal corner parking. • Bump-outs can accommodate benches, bike racks, and trash receptacles and to better define off-street parking access points.

Parking Improvements – Long-range	
Recommendations	**Summary**
Continue Parking Management Initiatives	• Construct parking garage on Lot #1 (behind Galleria) with ground level commercial or liner building to maximize use of prime location and accommodate parking needed for future economic development.

Transit Improvements – Long-range	
Recommendations	**Summary**
Service Modifications	• Continue to add trips to support better performing routes.

III. Implementation of the Plan

The final section of this report provides a plan for implementing the recommendations contained in the previous sections. The first part of this implementation plan focuses upon the public agencies and other groups that will be responsible for implementing the recommendations, and it provides a summary of each agency and its proposed respective role. The second part outlines a plan for each area of improvement, including the responsible agencies and general time frames for implementation.

A. Agency/Jurisdictional Responsibilities

Wilmington Area Planning Council (WILMAPCO) - As the metropolitan planning organization (MPO) for the study area, WILMAPCO will continue to play an important role in the inter-agency coordination and public outreach processes. In this regard, WILMAPCO will conduct technical studies and ensure continuing public involvement and coordination is obtained regarding proposed transportation investments. Through its Regional Transportation Plan (RTP), WILMAPCO provides strategic direction for land use and transportation decision-making in the region. Also, WILMAPCO will play a role in facilitating and promoting public awareness of the strategies and policies set for the Newark area.

Delaware Department of Transportation (DelDOT) - DelDOT will continue to be the key agency for planning and implementing transportation facilities and services in the study area. It will conduct technical analysis of proposed projects, ensure public involvement in the capital investment decision-making process, and provide capital funding for key projects. DelDOT will have an important role in implementing most recommendations along state-maintained roads.. It will also play a role in implementing all modes of transportation.

Delaware Transit Corporation is responsible for the planning and implementation of all DART First State services as well as contracting with SEPTA for commuter rail. DelDOT will work together with the Delaware Transit Corporation DTC in providing new and improved transit services in the study area. DTC, DelDOT and WILMAPCO will all likely be involved in future coordination with Maryland Department of Transportation and Cecil County to coordinate bus service and future rail between the Newark area and Maryland.

For the ***City of Newark***, a major emphasis of municipal involvement should be land use / growth management. Additionally, the various departments and committees currently in operation should continue to have an active role in both planning and operations. For example, the Police Department, Traffic, Parking and Bicycle committees should continue to play an active role in transportation planning issues, as their direct involvement in the development in this report, albeit unique, has been invaluable. Of particular relevance is the ongoing revitalization effort in the Train Station area. This redevelopment effort is directly related to many of the items recommended in this report. The City should also look to develop strong working relationships with the University of Delaware and new employers that may soon find a home at the former Chrysler Plant site.

University of Delaware is also an integral part of the land use and transportation situation in Newark, and as such the University should be

expected to collaborate with the City in implementing the recommendations discussed in this report. The University has been actively pursuing various expansion and redevelopment efforts, most notably is the potential for redevelopment of the former Chrysler Plant, which is also planned to spur a significant upgrade of the Newark Train Station facility. Beyond planning, one area of coordination should be in parking management, due to the overlap in parking demand between the University and the downtown area. The University should also be involved in bicycle and pedestrian circulation issues, since these issues directly impact many University students. In addition, consideration should be given to having the University play a central role in promoting public transit. The University, in coordination with DTC and the City should consider ways to increase bus ridership on all systems running within the City.

B. Implementation Strategy

This section provides an implementation plan for each recommendation identified in the Plan. For each area of improvement is listed the main agencies for implementation, a brief description of key steps involved in implementation, and an estimated time frame for implementing the recommendation. In some cases, the implementation action is already underway (ongoing). For all other recommendations, the time frames are classified as being either Short (5 years or less) or Long-Term (over 5 years). Recommendations which require state or federal funding will be prioritized by WILMAPCO and DelDOT.

Congestion, Safety and Mobility: Signal Coordination, Traffic Flow and Access Management

Short-Term Improvements

1. Implement a Newark Corridor Optimization Program
2. Revise/improve pavement markings on Ogletown Rd (DE Route 273) at Marrows Road.

Key Steps: Review concepts and confirm scope of work with DelDOT, secure resources and funding.
Key Agencies: DelDOT – Traffic Section, City of Newark

Long-Term Improvements

1. Corridor Access Management (Wyoming Rd, Marrows Rd, and
2. Delaware Ave extended to Marrows Rd
3. N. Chapel St. underpass at Cleveland Ave – Provisions for an added right-turn lane should be made upon future improvements to the CSX overpass.
4. Install NB right-turn lane on N. College Ave at Cleveland Ave.

Key Steps: Define guidelines for future development. Prior to future development, determine adequate right of way dedications; identify guidelines for access management along key corridors.
Key Agencies: DelDOT – Planning Section and Transportation Solutions, City of Newark, University of Delaware

Safety, Complete Streets and Traffic Calming

Short-Term Improvements

1. W. Park Place Traffic Calming Improvements from Elkton Rd to S. College Ave.

Key Steps: Review concepts, check signal warrants and confirm scope of work with DelDOT, secure resources and funding.

Key Agencies: DelDOT – Traffic Section and Transportation Solutions, City of Newark

Long-Term Improvements

1. S. College Ave. gateway and mobility improvements
2. Cleveland Ave pedestrian improvements and White Clay Creek Pathway

Key Steps: Review concepts and confirm scope with DelDOT, secure resources and funding, public involvement.
Key Agencies: DelDOT – Traffic Section and Transportation Solutions, City of Newark

Bicycle Improvements

Short-Term Improvements

1. City wide – When road width allows, provide striping to show separate travel lanes and bike lanes (5' preferred)
2. City wide – When width does not exist due for bike lanes, provide "sharrows".
3. Conduct project development analysis for Delaware Avenue east/west bicycle route linkage.
4. Refine bicycle recommendations with Newark Bicycle Plan

Key Steps: Review key locations as identified by the Newark Bicycle Committee, confirm scope of work with DelDOT, secure resources and funding.
Key Agencies: DelDOT – Traffic, Planning and Transportation Solutions Sections, City of Newark

Long-Term Improvements

1. Delaware Avenue east/west bicycle route linkage
2. Bicycle signal detection improvements

Key Steps: Review concepts and confirm scope with DelDOT, secure resources and funding, public involvement/education.
Key Agencies: DelDOT – Traffic Section and Transportation Solutions, City of Newark, University of Delaware

Pedestrian Improvements

Short-Term Improvements

1. City wide – implement multiple new initiatives for walkablity (as previously defined in this report)

Key Steps: Identify key existing target areas, infuse new initiatives into the development process for growth areas.
Key Agencies: DelDOT Traffic and Planning Sections , City of Newark, University of Delaware

Long-Term Improvements

1. Evaluate future use of HAWK signals
2. Library Avenue – Mid-block/ Jaywalking upgrades
3. Main Street – Bump-out/crossing improvements between Chapel St and College Ave.

Key Steps: Review, evaluate concepts and confirm scope with DelDOT, secure resources and funding, public involvement/education.
Key Agencies: DelDOT – Traffic and Planning Sections, City of Newark, University of Delaware

Parking Improvements

Short-Term improvements

1. Possible expansion of the Zipcar Program
2. Implement the "Morepark" System on existing surface lots as needed.
3. Implement Center Street entrance and/or exit
4. Consolidate parking and access points
5. Improve wayfinding to parking
6. Continue work on Lot #1 financing

Key Steps: Evaluation of participation levels for Zipcar (expand if warranted), monitor parking occupancy on a lot by lot basis to determine parking need
Key Agencies: University of Delaware, City of Newark

Long-Term Improvements

1. Provide a multi-level parking structure on Lot 1 (behind Grottos)

Key Steps: Review, evaluate demand on minimum 5 year increments, secure resources and funding
Key Agencies: City of Newark

Public Transit Service Improvements

Short-Term Improvements

1. Transit Hub Re-establishment Efforts (as per details listed in this report)
2. City-wide amenity upgrades (as per details listed in this report)
3. Improved Marketing Efforts (as detailed in this report)
4. Implement proposed services modifications – reducing UniCity from three routes into one or two routes, possible elimination of DART Route 31.

Key Steps: Develop conceptual plans for Transit Hub improvement, identify target areas for amenity upgrades, determine full scope, and secure funds.
Key Agencies: DTC, City of Newark , University of Delaware

Long-Term Improvements

1. Continue Marketing Efforts (as detailed in this report)
2. Evaluate and expand service as needed.

Key Steps: Review, evaluate alternatives, confirm new routes
Key Agencies: DTC, City of Newark, University of Delaware