

## 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

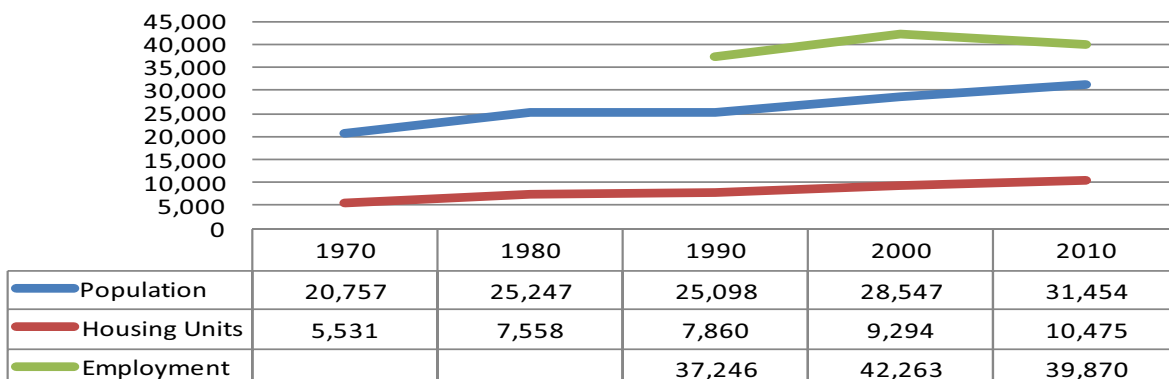
the City. The student population in 2010 exceeded 21,000 students (undergraduate and graduate studies) and the University remains the City's largest employer with nearly 3,900 full-time employees (faculty and staff).

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**



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.

### 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

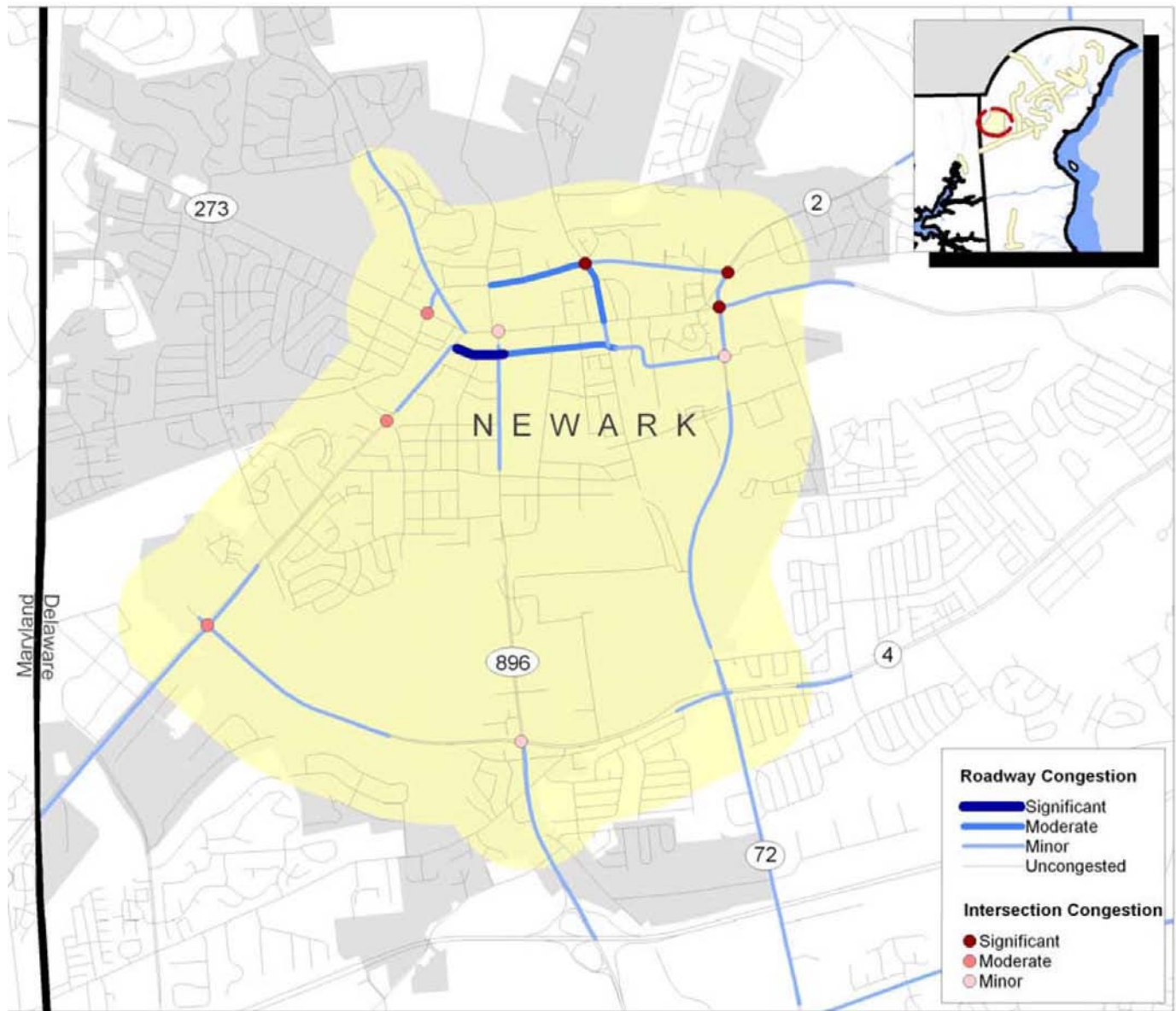
WILMAPCO's *Congestion Management System*, several intersections experience "significant" congestion along Library Avenue and Cleveland Avenue as well as various other congested locations as highlighted in Figure 1.

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.

<b>Table IV - City of Newark Commuting Trends</b>		
<b>Mode</b>	<b>Newark 2000</b>	<b>Newark 2006-8 avg.</b>
<b>Drove alone</b>	69.5%	60.7%
<b>Carpool</b>	8.5%	11.0%
<b>Transit</b>	4.0%	1.8%
<b>Walk</b>	13.0%	17.6%
<b>Bike</b>	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 minimize 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

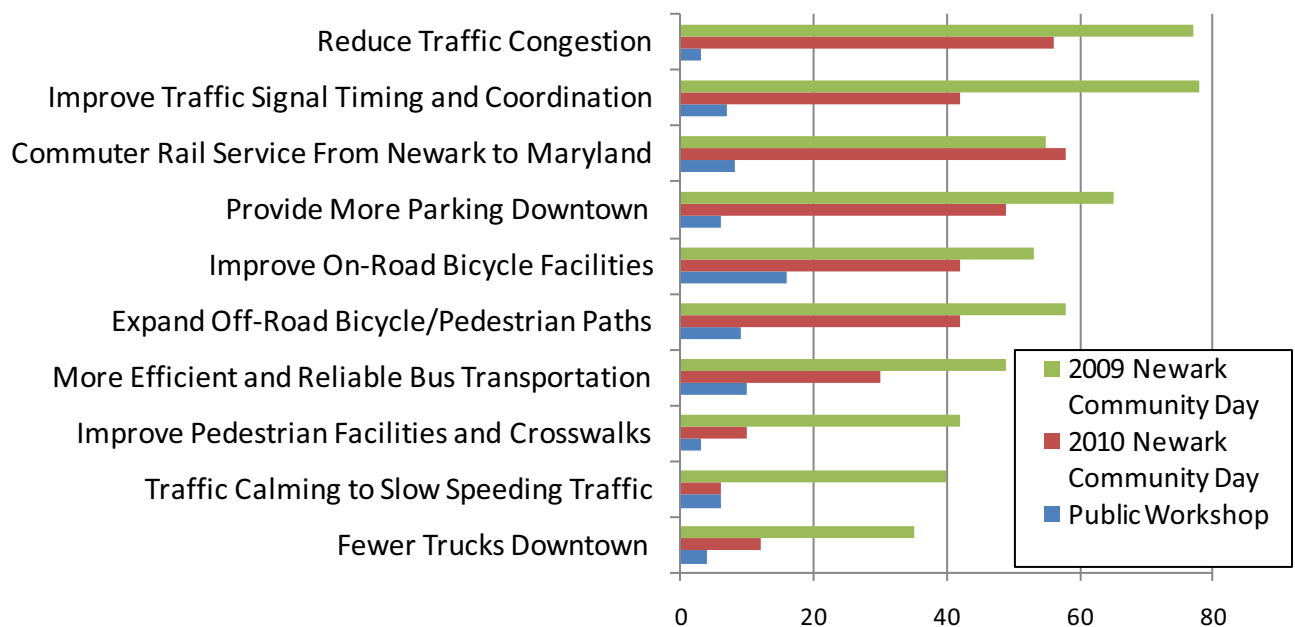


Figure 2 – Priority Transportation Issues Identified by the Community “Sticker Survey”

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 as 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, a concerted effort should be made to ensure the signals are 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. 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. Table

VI notes the existing and future levels of service for the corridor.

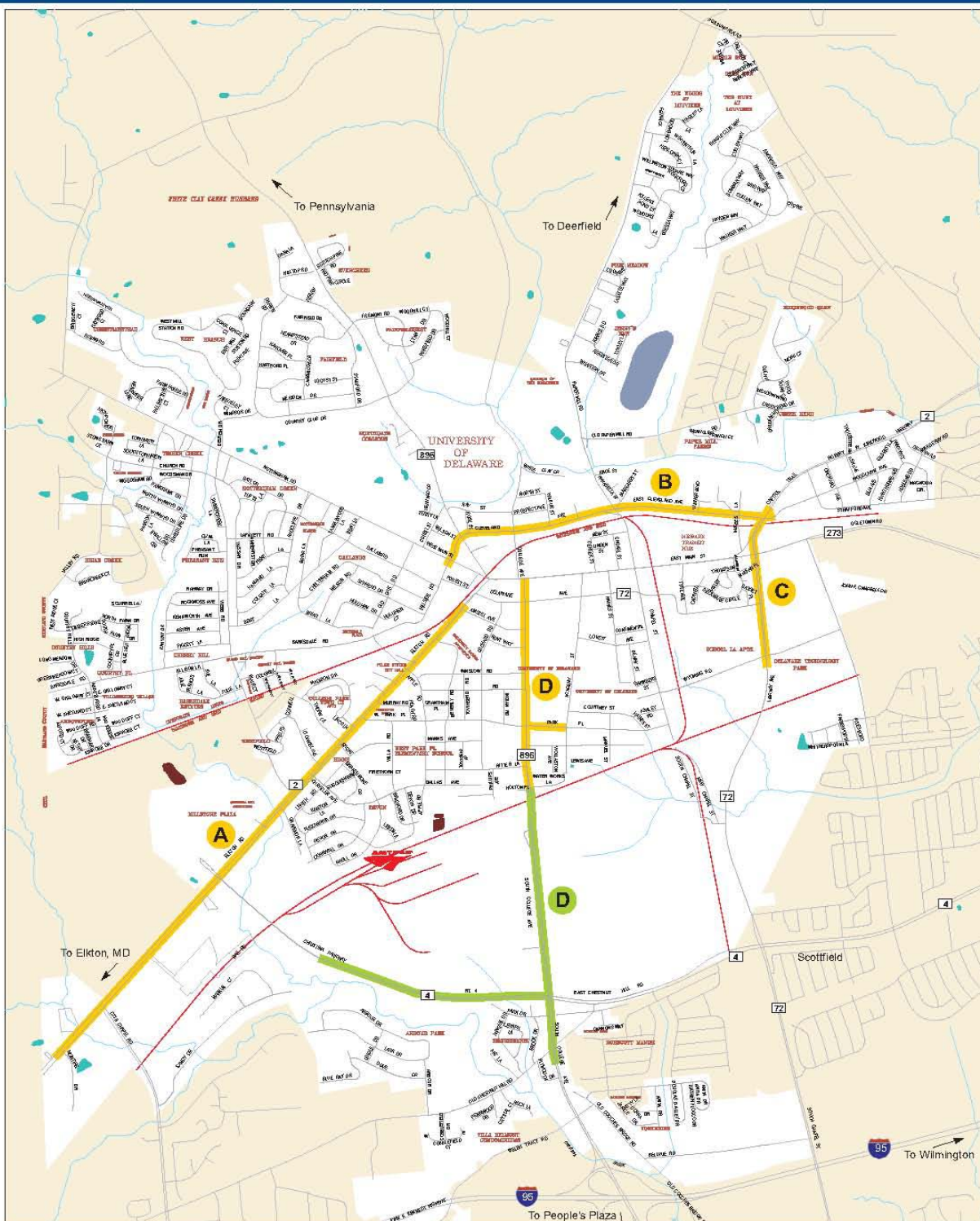
- **S. College Avenue** - This corridor includes ten signals within City limits, with the character of the roadway varying on either side of the railroad overpass. The corridor serves a key gateway into the downtown and campus areas and along the southern limit includes the City’s most significant area 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

# CITY OF NEWARK Corridor Optimization Program

CITY  
LIMITS**A** ELKTON RD**B** CLEVELAND AVE**C** LIBRARY AVE**D** S. COLLEGE AVE / RT 4

## FEATURES

**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.

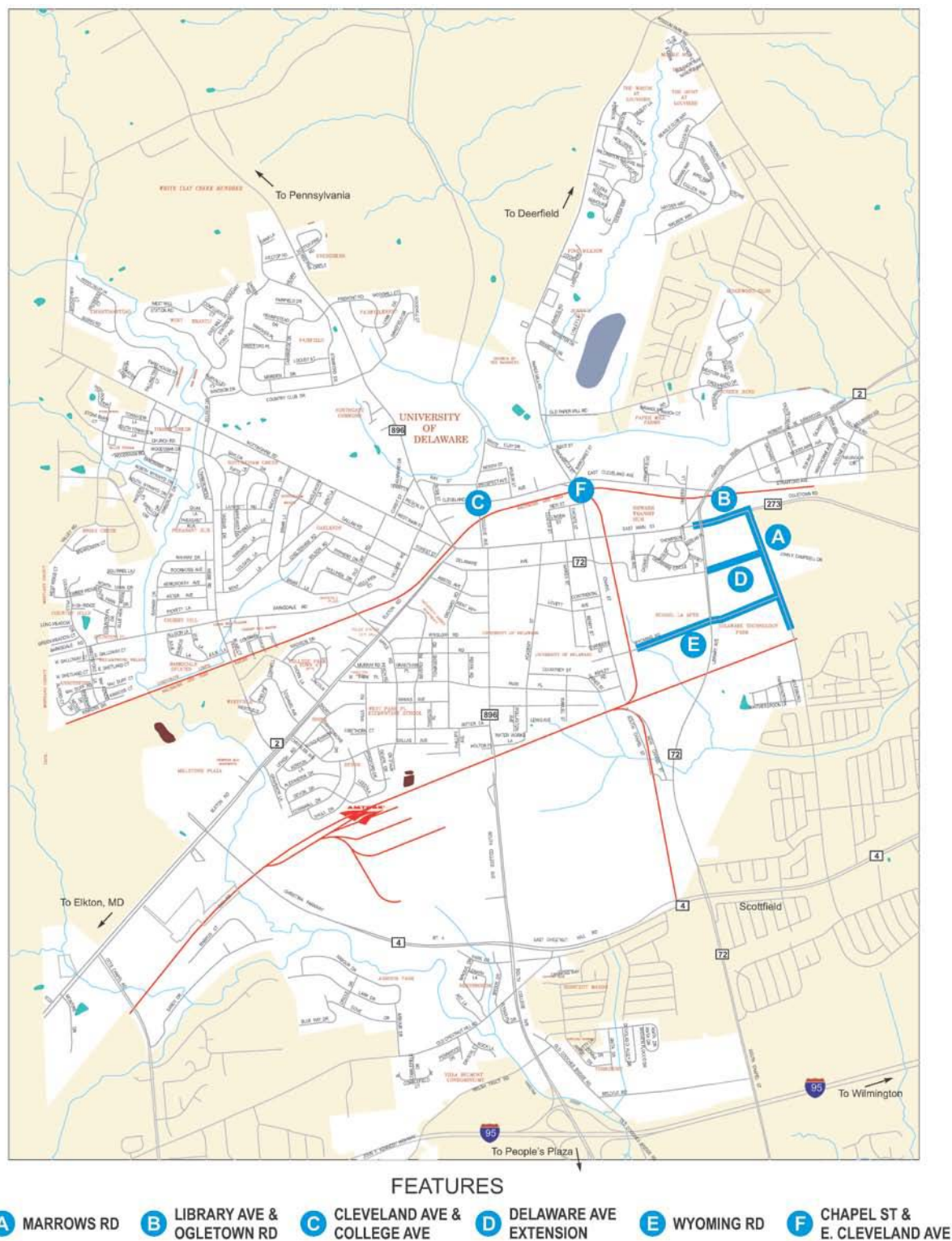
Road extensions and intersection improvements in the Plan focus on reducing traffic burden on busy intersections while maintaining safe conditions for pedestrians. These potential locations include:

- ***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.

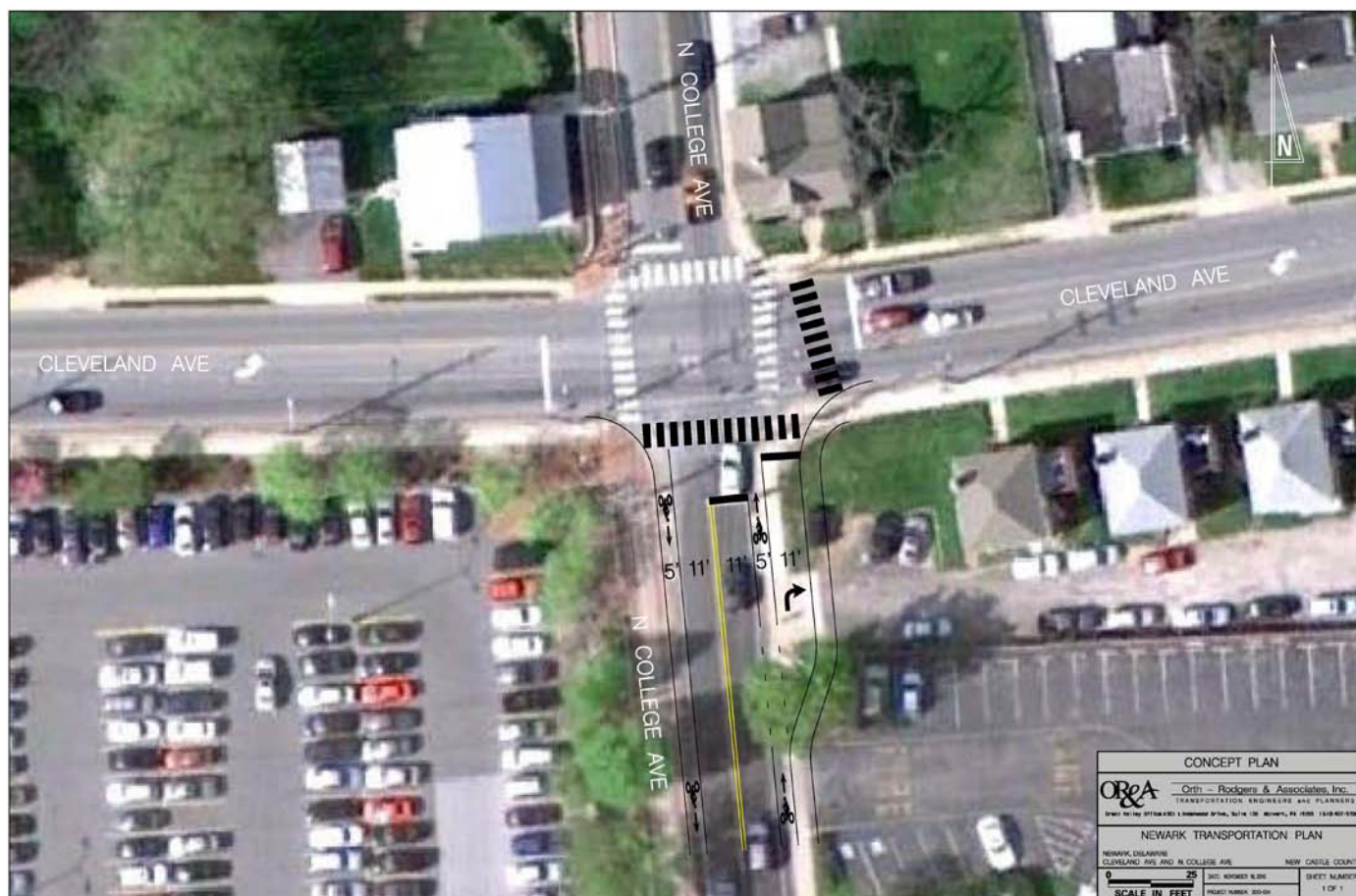
Figure 4 – Access Management and Traffic Flow Improvement Areas



**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.

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 5' shoulders, 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.

### ***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 keeps existing mid-block curb lines

intact and restore 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. 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. 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
<b>Volume Control Measures</b>			
Half Closures Diagonal Diverters Median Barriers Forced Turn Islands	No	500 – 5000 vpd >= 25% non-local traffic	
<b>Vertical Speed Control Measures</b>			
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
<b>Horizontal Speed Control Measures</b>			
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.

The road diet concept includes reducing the number of mid-block vehicular lanes from 4 to 2

lanes, provide 5' shoulders/bike lanes, which in turn will provide further separation between moving vehicles and the existing sidewalk. The center of the roadway would include a raised median and left turn bays, as needed. It should be noted that the adjacent intersections would remain as-is and only the mid-block section would see a lane reduction. Analysis shows that the signalized intersections are the limiting factors in this area, thus reducing the number of mid-block lanes would not significantly increase delay. The conceptual cross-sections for the Cleveland Avenue road diet are shown in Figure 11.

Figure 9 – W. Park Place Traffic Calming Improvements

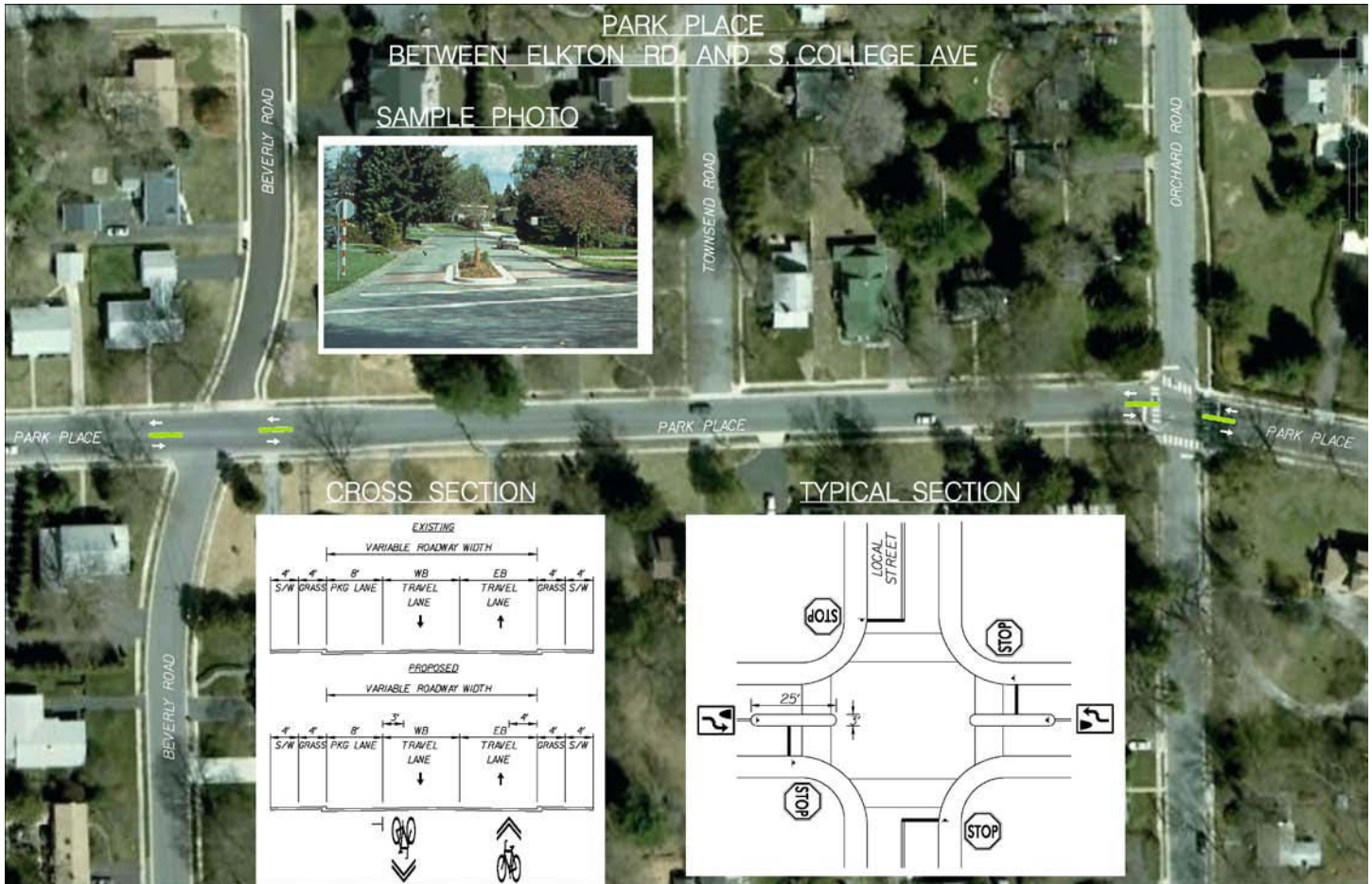
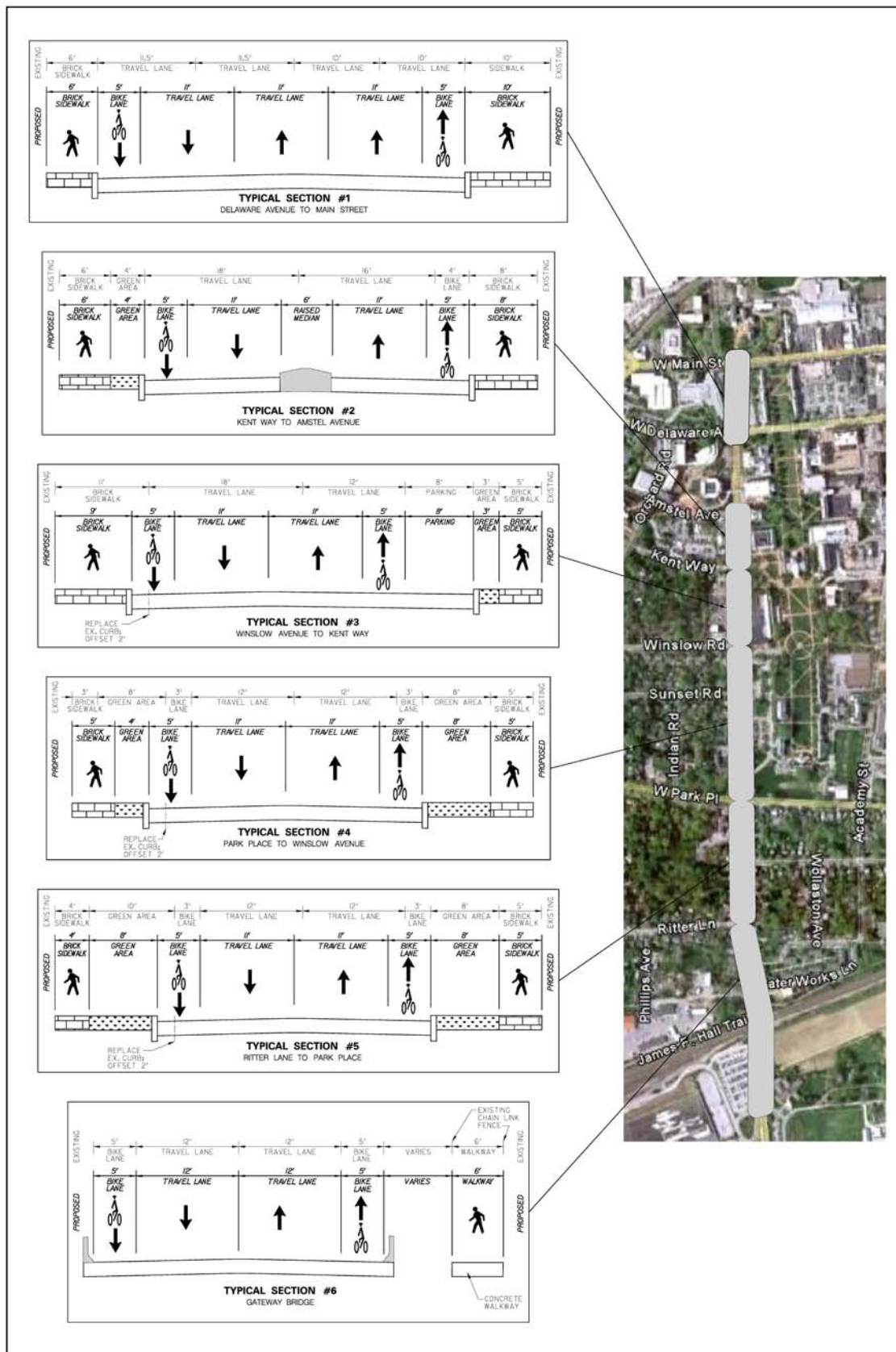
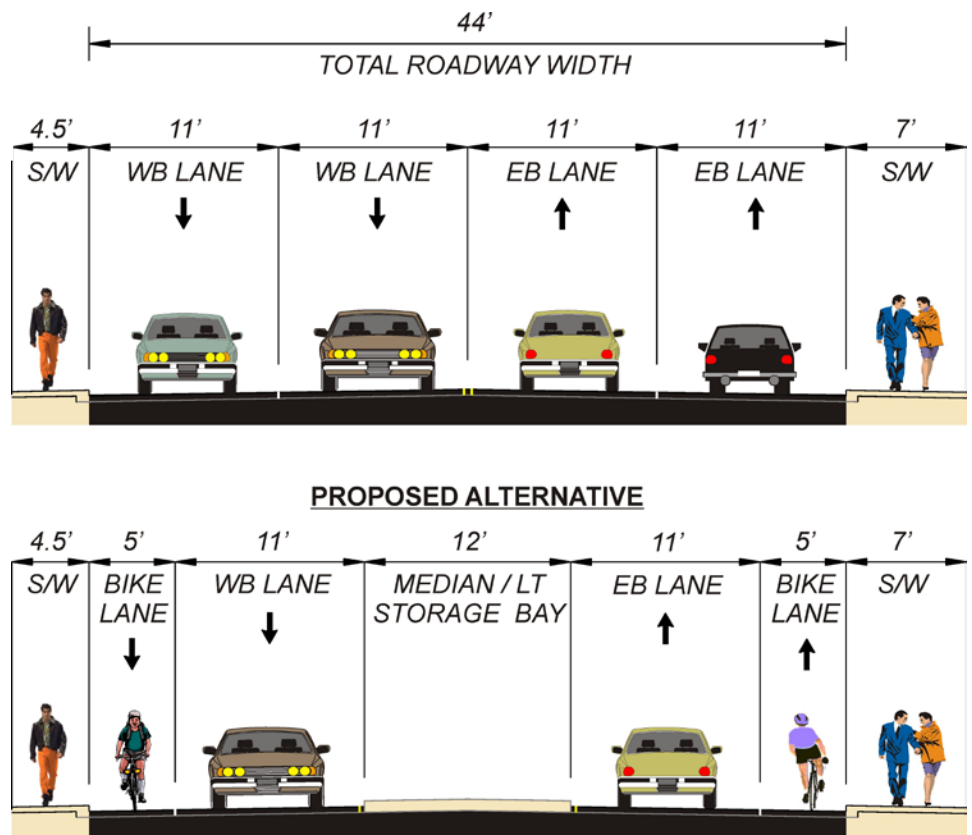


Figure 10 – S. College Avenue – Gateway and Traffic Calming



**Figure 11 - Cleveland Ave. - Road Diet**



### 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*). 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 as a replacement to traditional inductive loop detectors.

**Table IX – On road bicycle recommendations, short-term**

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

Source: Newark Bicycle Committee

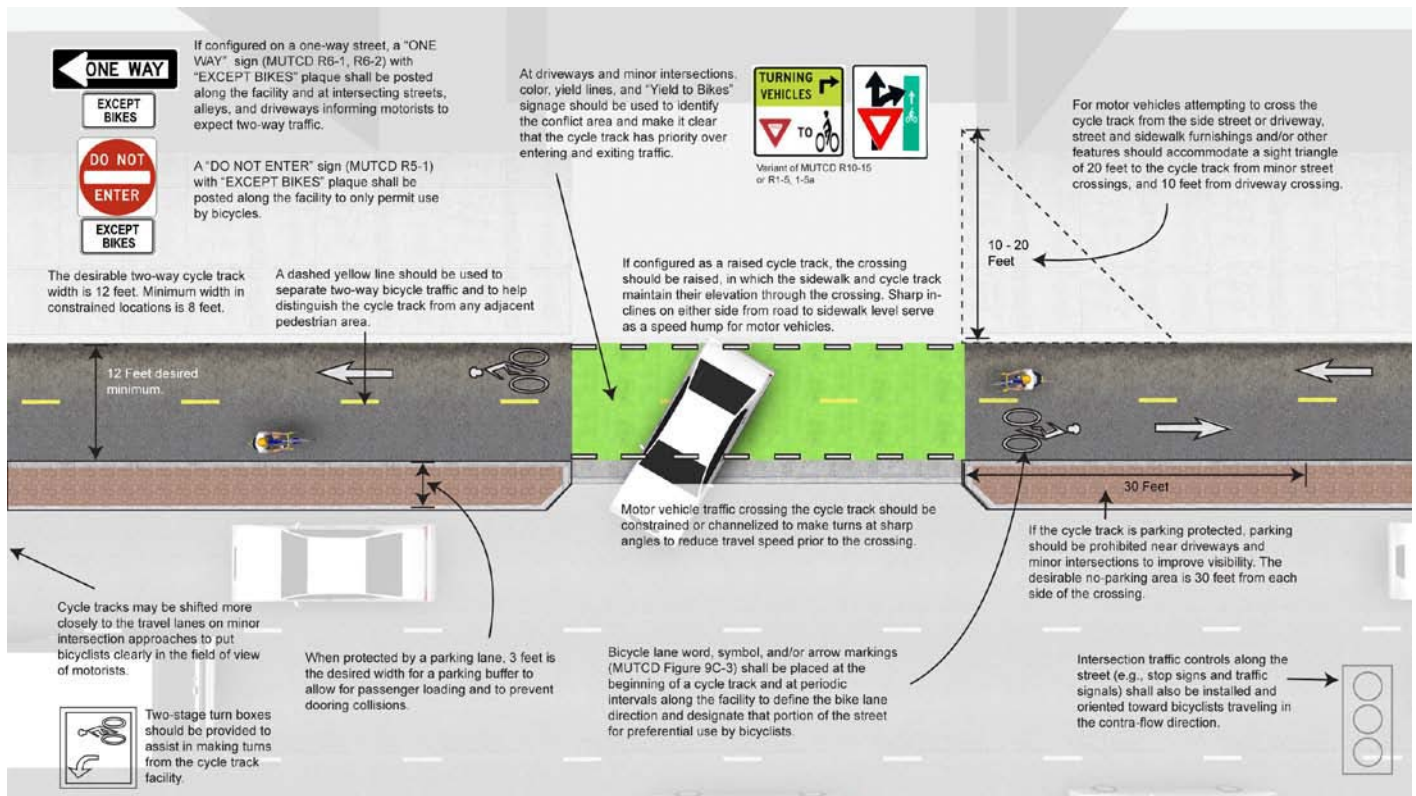
Where width allows, pavement markings should be revised to include both marked travel lanes and bike lanes (5' preferred/4'min.). On road segments where space for bike lanes does not exist, the newly approved MUTCD shared lane use markings (sharrows), are recommended. Where possible, improved pavement markings should be coordinated with paving projects.



**Sharrow**

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 linkage, 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.



Source: NACTO Urban Bikeway Guide, [http://nacto.org/wp-content/uploads/2010/08/CycleTrack\\_TwoWay\\_Raised\\_Plan\\_Annotation.jpg](http://nacto.org/wp-content/uploads/2010/08/CycleTrack_TwoWay_Raised_Plan_Annotation.jpg)

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

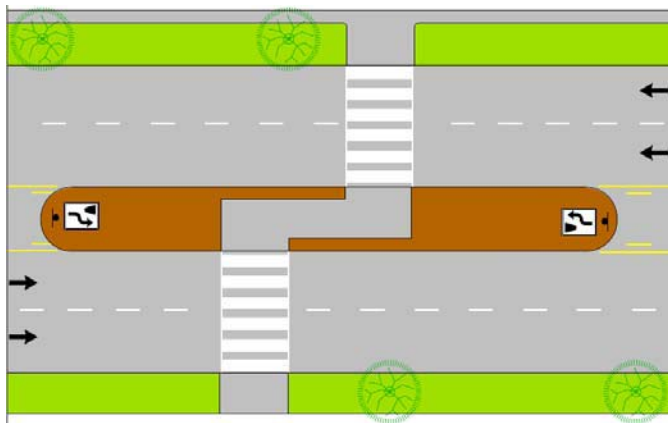


### ***Pedestrian Improvements***

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 14) formalizing the mid-block crossing, with a marked crosswalk and center median to serve as a



**Figure 14 – Library Ave Median Improvement**

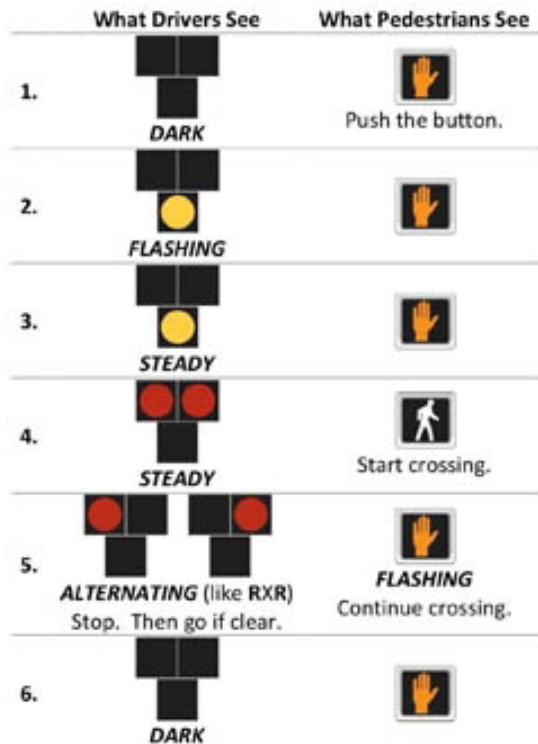
pedestrian refuge area. A slight relocation of the existing bus stop shelter (further north) would also be made to enhance the visibility of pedestrians to drivers. Additional signage would also be required to define the crossing area. If this improvement is found to be unfeasible, the bus stop should be relocated closer to a marked crosswalk and crosswalk improvements should be made at adjacent intersections.

Other pedestrian enhancements throughout the City should include possible installations of the newly approved ***High Intensity Activated Crosswalks*** (HAWK) at appropriate mid-block locations. The HAWK's standard display and sample photograph are shown. Candidate locations for the HAWK signals include:

- 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.



**Sample Photo – HAWK**



### HAWK – Operational Display

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. Policies should design roadway improvements 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).

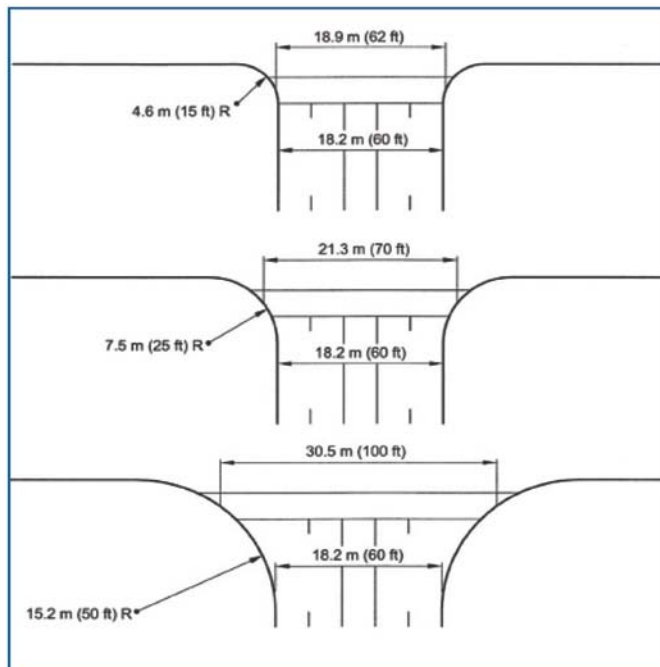


Figure 15 – Reduced Curb Radius

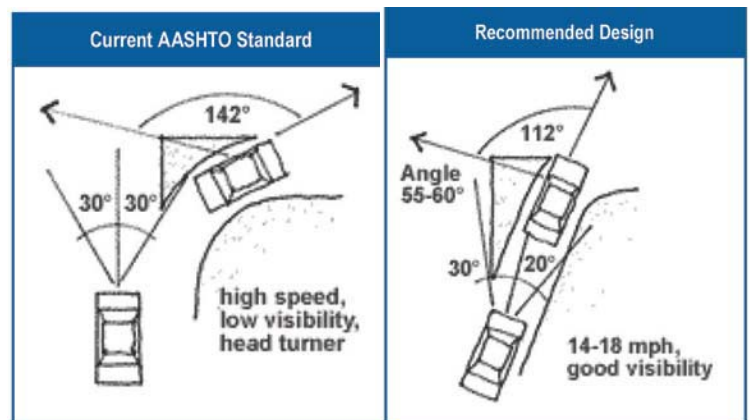


Figure 16 – Recommended right turn islands