Middle Township
Transportation Improvement Study

Final Report

July 2011

Prepared for:
Middle Township, Cape May County

Baker

Prepared by:
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Funded by:
New Jersey Department of Transportation

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EXECUTIVE SUMMARY

Middle Township in Cape May County requested assistance from NJDOT, Local Transportation Planning Assistance (NJDOT-LTPA) Unit, in developing a comprehensive transportation improvement study. The overall objective of this study is to provide support for Middle Township's ongoing Master Plan update and the effort to have its Plan endorsed by the State Planning Commission. NJDOT – LTPA contracted with Michael Baker Jr., Inc. (Baker) to provide assistance to Middle Township in preparing the study. As part of this study, Baker coordinated with a study Steering Committee comprised of Middle Township and Cape May County personnel, businesspersons, residents, and other stakeholders.

The primary purpose of this study is to evaluate the transportation conditions and roadway network in Middle Township, and propose strategies to enhance mobility for the different travel modes in the Centers of Cape May Court House and Rio Grande/Whitesboro/Burleigh. Study goals approved by the Steering Committee include:

- Improving circulation and the connectivity of the roadway network to provide alternative routes to state highways and enhanced access to community facilities;
- Managing vehicular delay at highly congested locations, with a focus on low-cost improvements such as signal timing adjustments and lane configuration changes;
- Creating "Complete Streets" that can be safely traveled by motorists, pedestrians and bicyclists alike;
- Improving pedestrian facilities, such as a well-connected sidewalk network with safer crossings at intersections and busy mid-block locations; and,
- Providing additional bicycle facilities, such as shared lanes, bike lanes, and multi-use paths, to support development of a bike network.
- Evaluating the impact of the changes to the Garden State Parkway on local circulation.

To address issues identified in the study, a wide range of recommendations were made to enhance mobility and safety for vehicular, transit, bicycle and pedestrian modes in Middle Township. Following is a summary of recommendations made in the study:

Vehicular

- Enhance the existing roadway network in order to provide local residents with more options for trips throughout the township. Key recommended improvements include development of a western alternative roadway to Route 9, along with extensions to Honeysuckle Lane and Shunpike Road.
- Coordinate with K-Mart Plaza landowners to plan for alternative access to and from the site on both Route 9 and Route 47.
- Install new median on Route 47 in Rio Grande to address traffic conflicts.
- Install signage directing motorists from the south and destined for Wildwood to use Rio Grande Avenue, as an alternative route to Route 47.
- Add southbound left turn lane and modify signal timing at Route 9 and Route 47.

- Modify signal timing at Route 9 and Stone Harbor Boulevard in order to reduce delay.
- Evaluate one-way treatment for Mechanic Street and Hand Avenue in Cape May Court House.
- Install bulb-outs or median islands on Route 9 in Cape May Court House, and stripe parking spaces.
- Install directional signage to County Parking Lot in Cape May Court House.
- Adopt Complete Streets policy to improve conditions for pedestrians and bicyclists.
- Adopt access management ordinance for Route 9, Route 47, S. Dennis Road and Railroad Avenue.
- Adopt shared parking ordinance in order to reduce the area covered by parking lots.
- Adopt street connectivity ordinance.

Transit

- Evaluate feasibility of transit services for campgrounds.

Bicycle

- Develop comprehensive township-wide bicycle network.

Pedestrian

- Install sidewalks on priority roadways.

Route 9 above Cape May Court House.

1.0 Introduction

Middle Township in Cape May County requested assistance from NJDOT, Local Transportation Planning Assistance (NJDOT-LTPA) Unit, in developing a comprehensive transportation improvement study. The overall objective of this study is to provide support for the ongoing Master Plan update and Plan Endorsement process. NJDOT – LTPA contracted with Michael Baker Jr., Inc. (Baker) to provide assistance to Middle Township in preparing the study. As part of this study, Baker coordinated with a study Steering Committee comprised of Middle Township and Cape May County personnel, businesspersons, residents, and other stakeholders.

1.1 Background

Middle Township is on the mainland of Cape May County, New Jersey. It is surrounded to the north by Dennis Township, to the south by Lower Township, to the east by the barrier island municipalities of Avalon Borough, Stone Harbor Borough, North Wildwood City and Wildwood City, and to the west by the Delaware Bay. With a land area of 83.1 square miles, it is one of the largest municipalities in the state. In 2005, the estimated population was 17,274. According to the 2010 Middle Township Master Plan, the summer population increases to over 60,000.

Key roadways in the Township include Route 9, the Garden State Parkway, Route 47, Route 147, and Stone Harbor Boulevard/S. Dennis Road (CR 657). Much of the commercial development in the Township has occurred along the Route 9, Route 47, and Stone Harbor Boulevard corridors. Historic communities in Middle Township include Cape May Court House, Rio Grande, Whitesboro, Burleigh, Swainton, Green Creek, Del Haven and Goshen.

Unlike the resort communities along barrier islands to the east, the Township has significant tracts of undeveloped land. Much of the Township has a rural or low-density suburban character. To help guide future growth, Middle Township prepared a Master Plan – Land Use Plan Update, approved in July 2010. The purpose of the Update is to provide a center-based land use policy where growth is focused into "centers" and the surrounding "environs" are protected from the impacts of sprawling development.

The Township is currently seeking endorsement of its Plan by the State Planning Commission. The purpose of the Plan Endorsement process is to achieve consistency among municipal, county, regional and State agency plans and with the State Development and Redevelopment Plan, as well as facilitate the implementation of the endorsed plan.

This transportation study is intended to complement the Master Plan Update in Middle Township by identifying multimodal strategies to enhance mobility for vehicular and nonmotorized travel modes within the two proposed centers of Cape May Court House and Rio Grande/Whitesboro/Burleigh. Although the study focuses on improvements within those centers, the strategies are also intended to enhance the overall transportation network in the Township. The proposed transportation strategies were designed to be compatible with existing and planned land uses.

1.2 Public Involvement

Public involvement was structured around the study Steering Committee, and input provided by interviews with study Stakeholders. The Steering Committee consists of local and county officials and personnel, residents and businesspersons. The Committee met four times over the course of the study with Baker and NJDOT to identify key issues for study and evaluate draft strategies, as well as provide overall direction. Study stakeholders also consisted of local and county officials and personnel, and residents and businesspersons. Stakeholder interviews provided more in-depth discussions of key issues.

1.3 Study Goals

Study goals approved by the Steering Committee include:

- Improving circulation and the connectivity of the roadway network to provide alternative routes to state highways and enhanced access to community facilities;
- Managing vehicular delay at highly congested locations, with a focus on low-cost improvements such as signal timing adjustments and lane configuration changes;
- Creating "Complete Streets" that can be safely traveled by motorists, pedestrians and bicyclists alike;
- Improving pedestrian facilities, such as a well-connected sidewalk network with safer crossings at intersections and busy mid-block locations; and,
- Providing additional bicycle facilities, such as shared lanes, bike lanes, and multi-use paths, to support development of a bike network.

In chapters 1 through 5, the existing conditions of the transportation system are summarized for the following modes: vehicular, transit, pedestrian and bicycle. Recommendations for improvements to these modes are provided in chapters 6 through 9.

Although emphasis is placed on transportation conditions within the proposed centers, conditions outside centers are also reviewed. For example, the bicycle compatibility analysis reviews conditions for bicyclists on all major roadways, since a comprehensive bicycle network should enable bicyclists to travel to key destinations throughout the Township and adjoining communities, not just destinations within centers. Further, although the focus is on existing conditions, there is a projection of traffic volumes five years into the future, as well as discussion of the potential impact of improvements proposed for the Garden State Parkway.

Route 9 in Cape May Court House.

2.0 Existing Vehicular Conditions

In this section, existing traffic volumes are presented for key roadways and intersections, along with discussion of typical delays at these intersections. Volumes are projected five years into the future to help identify any near-term traffic problems. This section also summarizes the crash history for major Intersections and corridors. Parking conditions in Cape May Court House are also reviewed.

2.1 Data Collection

Data analyzed in this chapter was collected from a variety of sources. The primary vehicular, pedestrian and bicycle turning movement counts were conducted for 15 key intersections during the last two Saturdays in June 2010, for the time period of 11 AM to 3 PM. Supplemental counts were conducted during the evening peak hours on a weekday (Tuesday, Wednesday or Thursday) during the month of July. These counts were complemented by historic counts available on the NJDOT traffic data website, and counts included in the Garden State Parkway Improvement Study. Parking counts were conducted on weekdays (Tuesday, Wednesday or Thursday) during the second half of June 2010 and July 2010. Further, field views of traffic, pedestrian and bicycle conditions were conducted from June through August 2010, supplemented by field views during other months.

2.2 Daily Traffic Volumes

Average daily traffic volumes for state, county and several key local roadways during the summer are shown in Figures 1A and 1B. (Note: all maps that show the entirety of Middle Township are split into two figures, illustrating the northern and southern halves of the Township, for greater legibility.) Traffic volumes are estimated based on the counts conducted by the study team during the summer of 2010, as well as available historic traffic counts on the NJDOT website.

The highest daily volumes are present on NJ 47 east of the Parkway, at 30,000 ADT (Average Daily Traffic). Volumes are lower west of the Parkway, but at 21,000 ADT between US 9 and the Parkway, and 18,500 ADT between Railroad Avenue and US 9, volumes are still higher on NJ 47 than any other land service roadway in Middle Township.

The roadway with the second highest volume of traffic is US 9. Volumes on this roadway vary significantly along the length of the Township. They are at their highest level – about 17,000 ADT – north of Rio Grande, and through Cape May Court House. Volumes on US 9 are at the lowest level, 10,000 ADT, at the northern end of the Township. Of note, volumes on US 9 drop to about 11,000 ADT between Shell Bay Avenue and Route 147, before increasing to 15,500 south of Route 147, a difference of 4,500. Daily traffic volumes on Shunpike Road, running parallel to US 9, are about 4,500 vehicles. It is likely that the presence of a viable alternative to US 9 on this segment of roadway attracts traffic from US 9.

The effect of viable parallel routes can be seen elsewhere along the US 9 corridor. Average daily traffic volumes are 17,000 north of Satt Boulevard, but drop to 15,600 between Satt Boulevard and NJ 47.

Traffic volumes would normally be expected to increase in proximity to the major retail uses present on the segment of US 9 between Satt Boulevard and NJ 47. However, the presence of Satt Boulevard and Railroad Avenue as an alternative to US 9 likely has the effect of attracting traffic from US 9, since motorists can access the Wal-Mart complex from Satt Boulevard, but also because these roads enable motorists to bypass the intersection of US 9 and NJ 47. Limited field views conducted during the afternoon peak period indicated that about two-thirds of motorists turning onto Satt Boulevard from US 9 entered the Wal-Mart parking lot, while one-third continued on Satt Boulevard to Railroad Avenue. It is likely that a substantial percentage of the latter motorists were heading to NJ 47.

As another example of the effect of alternative routes, the ADT on US 9 south of NJ 47 is 14,000; the volume increases to 16,000 ADT south of Rio Grande Avenue. This reflects the use by motorists of Rio Grande Avenue as a bypass of US 9 and NJ 47 when they are traveling from the south and destined to the east end of the NJ 47 corridor or to the Wildwoods.

High ADT volumes are found on a number of other roadways proximate to the Parkway and US 9:

- Route 147 – 15,000 ADT east of the Parkway, and 9,400 ADT west of the Parkway;
- Avalon Boulevard (CR 601) – 14,000 ADT east of the Parkway, and 9,900 ADT west of the Parkway;
- Stone Harbor Boulevard (CR 657) – 13,500 ADT east of the Parkway, and 17,000 ADT west of the Parkway.

Volumes on major roadways are lower to the west of US 9. Examples include:

- Courthouse-S. Dennis Road (CR 657) – 16,000 ADT between US 9 and Winding Way, and 10,000 ADT north of Winding Way;
- Indian Trail Road (CR 618) – 7,900 to 6,000 ADT;
- Mechanic Street (CR 615) – 6,000 ADT;
- Hand Avenue (CR 658) – 5,000 ADT;
- Shell Bay Avenue – 3,400 ADT.

Rio Grande Avenue.

Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Garden State Parkway
- State Roads
- County Roads
- Local Roads

Average Daily Traffic

- 2,000 - 8,000
- 8,001 - 15,000
- 15,000 +

Middle Township
Transportation Improvement Study

Average Daily Traffic Volumes

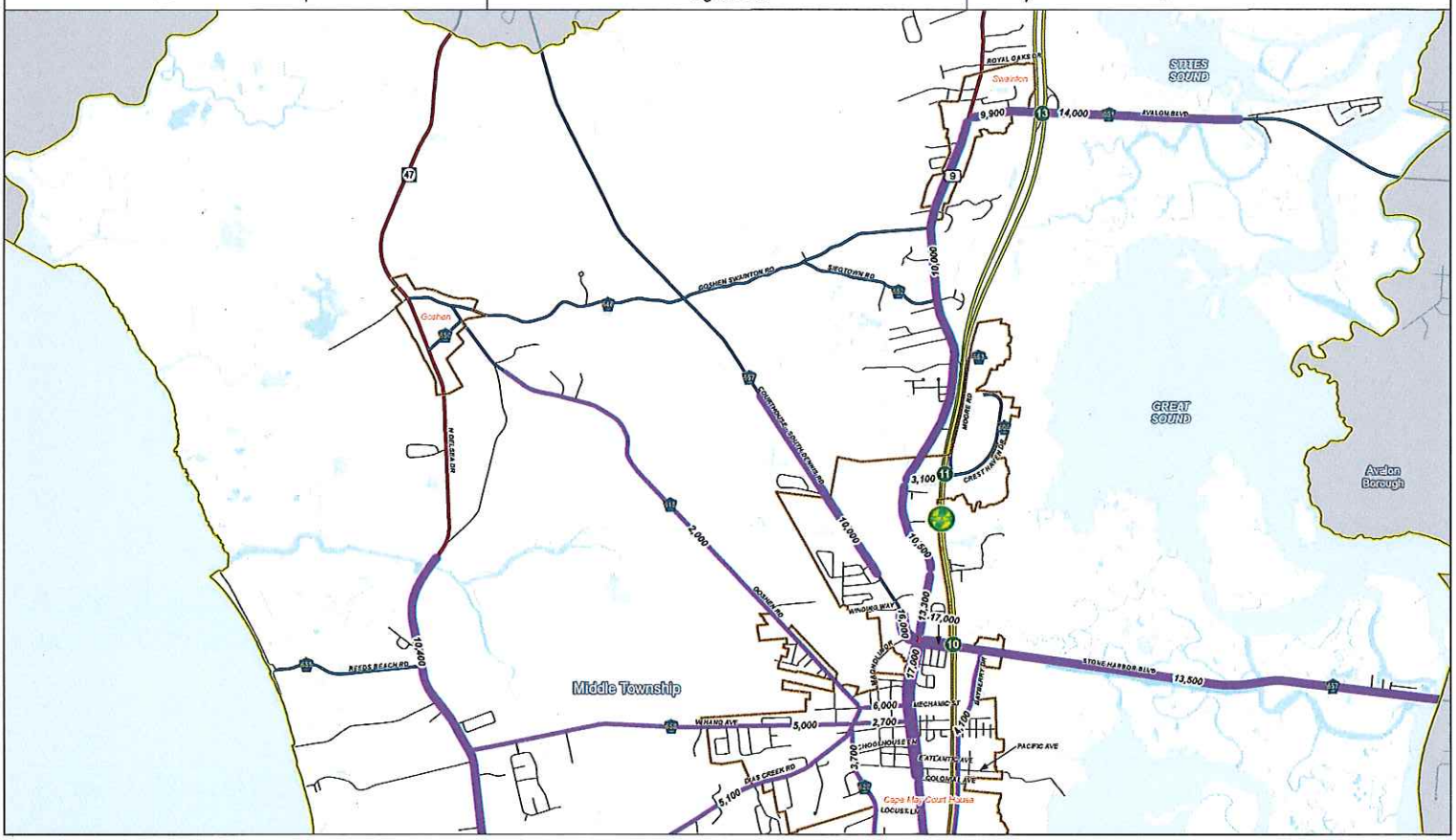
Figure 1 A

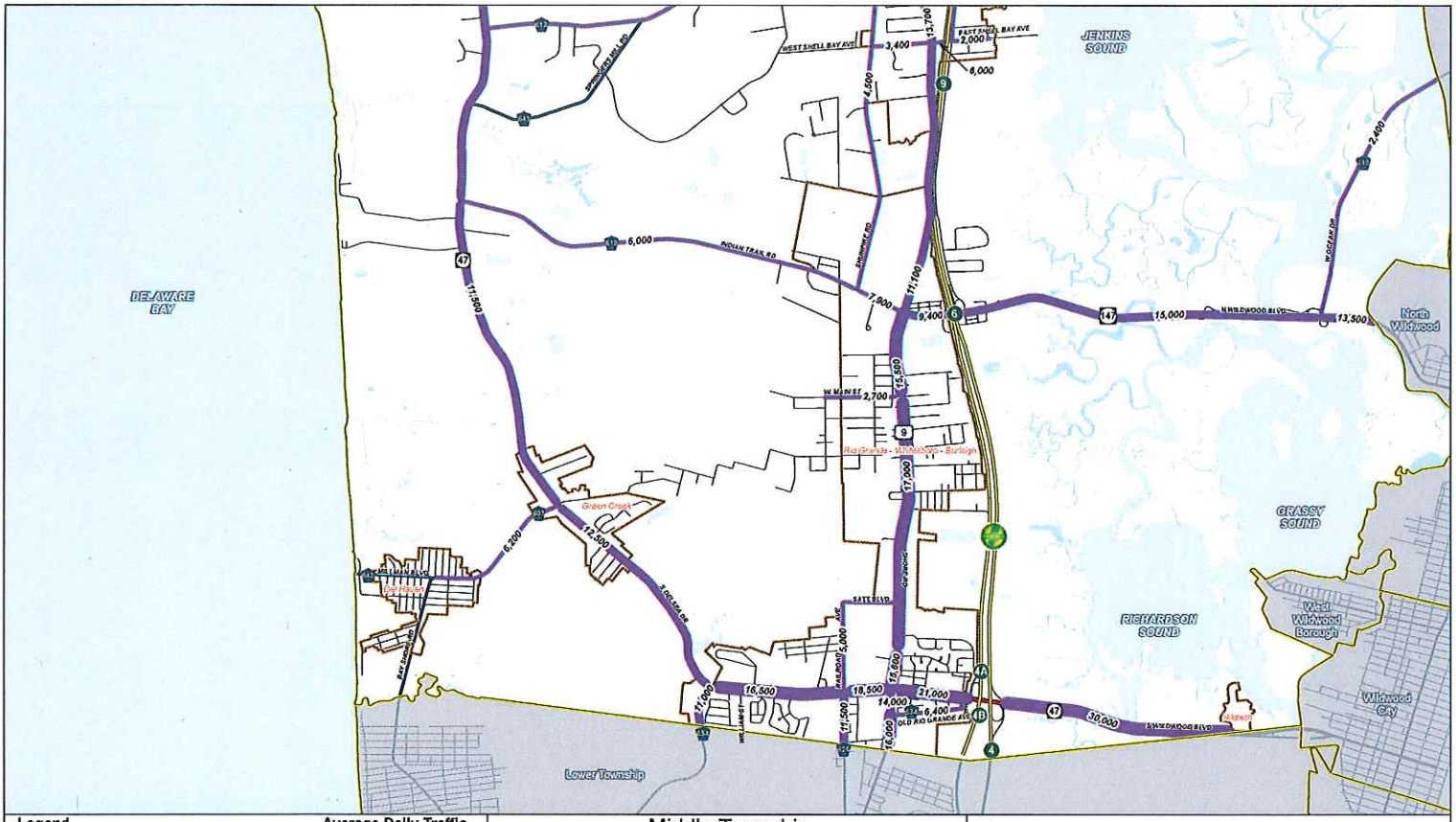
N

0 0.5 1
Miles

Baker

September 2010





Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Garden State Parkway
- State Roads
- County Roads
- Local Roads

Average Daily Traffic

- 2,000 - 8,000
- 8,001 - 15,000
- 15,000 +

Middle Township
Transportation Improvement Study

Average Daily Traffic Volumes

Figure 1 B

N

0 0.5 1
Miles

Baker

September 2010

2.3 Year 2010 Volumes and Level of Service

Peak hour volumes were determined for key signalized intersections within the proposed centers, as well as for several unsignalized intersections. The peak hour usually occurs from 11:15 AM to 12:15 PM on summer Saturdays. A number of intersections experienced peaks at 4:15 to 5:15 PM on summer weekdays, and thus, this period was also selected for analysis. Volumes are presented for the mid-day Saturday and weekday evening peak hours in Table 2.

It should be emphasized that the peak hours fluctuate across the Township, depending on the location, season and day. As indicated in Table 2, for US 9 intersections north of Shell Bay Avenue, volumes are typically higher on weekday evenings than mid-day Saturday. From Shell Bay Avenue south, volumes are typically higher on mid-day Saturdays. This difference can likely be traced to the presence of institutional uses such as the County and Township offices and Cape Regional Medical Center at Cape May Court House in the northern half of the Township, which would attract significant traffic during the week. Conversely, major shopping centers are present in Rio Grande, which attract significant traffic on Saturdays. However, the difference in peak hour volumes between weekdays and Saturdays is relatively insignificant for many of the intersections. For example, the intersection of US 9 and NJ 47 is the most heavily trafficked intersection in the Township (excluding Parkway intersections), at 3,445 vehicles per hour (vph) on mid-day Saturday. The vph during the weekday evening is 3,139, a difference of about 10%.

During the weekday peak hour, the intersection of US 9 and Stone Harbor Boulevard is second only to US 9 and NJ 47, at 3,038 vph. During the Saturday peak hour, the volume is 2,437 vph.

The peak hours selected may not represent the peak hour for every intersection in the municipality. For example, based on historic traffic counts, volumes at US 9 and Mechanic Street appear to be slightly higher at noon on weekdays than evening weekdays. Traffic volumes at intersections near the schools in Cape May Court House experience a visible spike at mid-afternoon on weekdays due to school traffic. However, the two peak hours of mid-day Saturday and the weekday evening are a good representation of traffic conditions for the large majority of the Township.

2.3.1 Level of Service

The Levels of Service (LOS) for year 2010 conditions were determined for intersections counted in the summer peak period. The 'Level of Service' is used by transportation professionals to "grade" intersections by traffic delay, expressed in terms of average stopped delay per vehicle. At signalized intersections, levels of service range from Level of Service 'A' (indicating average delays of 10 seconds or less) to Level of Service 'F' (indicating average delays of greater than 80 seconds). Level of Service 'D' is generally considered as the desirable upper limit of delay for most drivers (55 seconds), while Levels of Service 'E' and 'F' are considered undesirable. It should be noted, however, that longer traffic delays are generally considered more acceptable in traditional downtown business areas. In these areas with

higher pedestrian volumes, expeditious vehicular movement is less of a priority than in suburban or rural areas.

Levels of service classifications are defined in Table 1.

Table 1: Levels of Service Classifications

Level of Service	Signalized Intersection Average Delay per Vehicle (seconds)	Unsignalized Intersection Average Delay per Vehicle (seconds)
A	0 to 10	0 to 10
B	10.1 to 20	10.1 to 15
C	20.1 to 35	15.1 to 25
D	35.1 to 55	25.1 to 35
E	55.1 to 80	35.1 to 50
F	Over 80	Over 50

Levels of service for study area intersections are presented in Table 3. The overall levels of service for signalized intersections are graphically represented in Figure 2. (The overall level of service is not calculated for unsignalized intersections.)

The highest delays are present at the intersection of US 9 and NJ 47, which operates at an overall LOS F during peak periods on both Saturdays and weekdays. Delays are particularly high on Saturday, with average delays per vehicle over 200 seconds. The intersection of US 9 and Stone Harbor Boulevard also experiences major delays, operating at LOS F during the weekday peak hour, and LOS D during the Saturday peak hour.

Route 9 at Shell Bay Avenue.

All other signalized intersections in the study area operate at a LOS C or better, indicating that traffic conditions are generally acceptable. The intersections of NJ 47 with 5th Street and with Railroad Avenue operate at LOS C in both the weekday and Saturday periods. In the Cape May Court House center, the signalized intersections evaluated (with the exception of US 9 and Stone Harbor Boulevard) operate at LOS B during both weekday and Saturday peak periods.

Table 2: Existing Weekday Evening and Saturday Peak Hour Volumes

	Weekday Evening																
	Eastbound				Westbound				Northbound				Southbound				Intersection
Intersection	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total
US 9 & Stone Harbor Blvd (CR 657)*	105	462	162	*729*	201	491	108	*800*	256	361	213	*830*	160	419	100	*679*	3038
US 9 & Mechanic St (CR 615)*	72	52	49	*173*	69	75	32	*176*	57	630	30	*717*	32	505	60	*597*	1663
US 9 & Hand Ave (CR 658)/Steel Rd	21	0	69	*90*	0	2	17	*19*	66	655	9	*730*	10	690	61	*761*	1600
US 9 & Pacific Ave	n/a	n/a	n/a	*n/a*	n/a	n/a	n/a	*n/a*	n/a	n/a	n/a	*n/a*	n/a	n/a	n/a	*n/a*	n/a
US 9 & Shell Bay Ave*	27	83	20	*130*	83	106	131	*320*	23	332	59	*414*	125	433	48	*606*	1470
US 9 & NJ 147/CR 618*	51	154	128	*333*	243	177	27	*447*	139	334	124	*597*	47	377	71	*495*	1872
US 9 & Main St*	24	3	73	*100*	3	2	0	*5*	69	604	5	*678*	1	734	62	*797*	1580
US 9 & NJ 47 (Delsea Dr)*	159	497	59	*715*	188	732	195	*1115*	147	260	140	*547*	209	398	155	*762*	3139
US 9 & Rio Grande (CR 634)*	n/a	n/a	n/a	*n/a*	305	n/a	51	*356*	n/a	412	160	*572*	35	496	n/a	*531*	1459
NJ 47 & Railroad Ave (CR 626)*	134	85	179	*398*	33	114	75	*222*	285	695	29	*1009*	41	527	85	*653*	2282
NJ 47 & 5th St*	41	51	150	*242*	163	78	75	*316*	166	929	80	*1175*	93	705	15	*813*	2546
Stone Harbor Blvd & Bayberry Dr*	1	500	130	*631*	64	558	1	*623*	90	2	53	*145*	12	7	13	*32*	1431

	Mid-Day Saturday																
	Eastbound				Westbound				Northbound				Southbound				Intersection
Intersection	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total
US 9 & Stone Harbor Blvd (CR 657)*	57	492	164	*713*	120	344	91	*555*	188	345	104	*637*	116	364	52	*532*	2437
US 9 & Mechanic St (CR 615)*	151	39	64	*254*	29	48	20	*97*	53	500	19	*572*	31	562	54	*647*	1570
US 9 & Hand Ave (CR 658)/Steel Rd	26	0	48	*74*	5	0	21	*26*	35	520	5	*560*	9	621	33	*663*	1323
US 9 & Pacific Ave	11	1	19	*31*	5	2	7	*14*	10	555	9	*574*	9	652	22	*683*	1302
US 9 & Shell Bay Ave*	52	100	26	*178*	61	50	104	*215*	13	413	82	*508*	92	463	42	*597*	1498
US 9 & NJ 147/CR 618 *	61	245	181	*487*	154	143	56	*353*	153	354	213	*720*	112	360	49	*521*	2081
US 9 & Main St*	52	0	76	*128*	3	0	2	*5*	61	727	4	*792*	1	730	20	*751*	1676
US 9 & NJ 47 (Delsea Dr)*	154	685	82	*921*	176	688	256	*1120*	163	339	155	*657*	244	437	66	*747*	3445
US 9 & Rio Grande (CR 634)*	n/a	n/a	n/a	*n/a*	180	n/a	63	*243*	n/a	589	254	*843*	63	607	n/a	*670*	1756
NJ 47 & Railroad Ave (CR 626)*	105	116	199	*420*	35	60	67	*162*	235	603	37	*875*	65	646	92	*803*	2260
NJ 47 & 5th St*	76	67	158	*301*	216	110	86	*412*	131	820	119	*1070*	102	783	17	*902*	2685
Stone Harbor Blvd & Bayberry Dr*	0	723	49	*772*	22	342	0	*364*	78	0	104	*182*	0	0	0	*0*	1318
Mechanic St & Goshen Rd (SB) & Dias Creek Rd (NB)	3	20	4	*27*	129	15	24	*168*	3	34	197	*234*	59	47	6	*112*	541
Shell Bay Ave & Shunpike Rd	14	100	37	*151*	29	51	26	*106*	31	127	40	*198*	34	114	20	*168*	623
Indian Trail Rd & Shunpike Rd	67	322	n/a	*389*	n/a	204	132	*336*	n/a	n/a	n/a	*n/a*	152	n/a	52	*204*	929

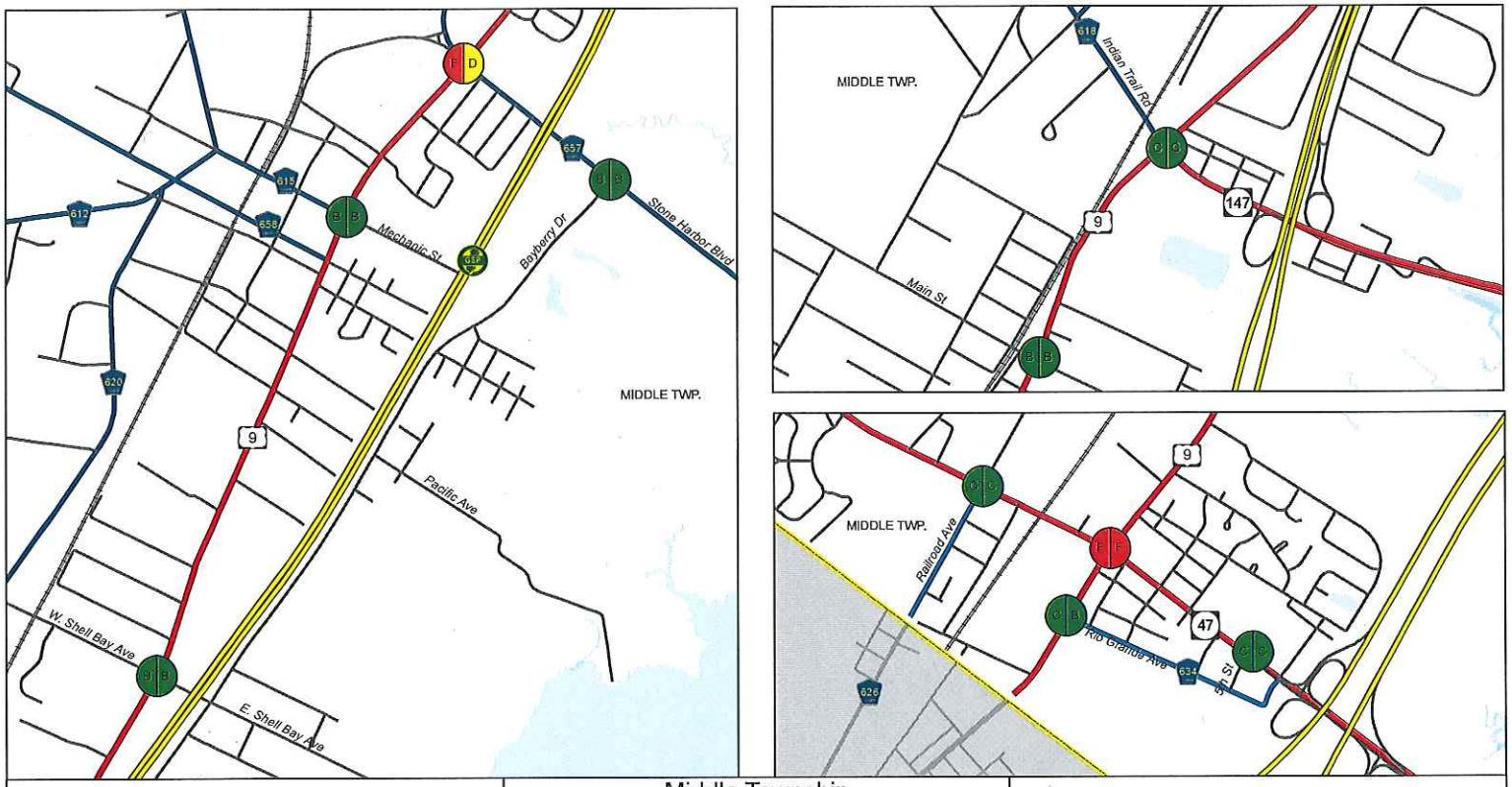
* Signalized intersection

Table 3: Existing Weekday Evening and Saturday Peak Hour Levels of Service

	Weekday Evening									
	Eastbound		Westbound		Northbound		Southbound		Overall	
Intersection	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
US 9 & Stone Harbor Blvd (CR 657)*	36.2	D	165.9	F	83.5	F	46.1	D	85.0	F
US 9 & Mechanic St (CR 615)*	19.8	B	20.1	C	15.9	B	14.1	B	16.1	B
US 9 & Hand Ave (CR 658)/Steel Rd	68.4	F	19.0	C	9.7	A	9.1	A	n/a	n/a
US 9 & Pacific Ave	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
US 9 & Shell Bay Ave*	18.1	B	20.3	C	9.6	A	16.5	B	15.8	B
US 9 & NJ 147/CR 618 (Indian Trail Rd)*	39.0	D	33.0	C	30.1	C	37.7	D	34.6	C
US 9 & Main St*	30.3	C	27.4	C	14.3	B	12.9	B	15.0	B
US 9 & NJ 47 (Delsea Dr)*	45.7	D	284.1	F	39.8	D	51.0	D	126.9	F
US 9 & Rio Grande (CR 634)*	n/a	n/a	76.9	E	10.2	B	8.8	A	28.0	C
NJ 47 & Railroad Ave (CR 626)*	48.4	D	36.9	D	15.4	B	33.2	C	28.7	C
NJ 47 & 5th St*	39.0	D	32.1	C	35.9	D	28.3	C	33.4	C
Stone Harbor Blvd & Bayberry Dr*	10.8	B	11.5	B	20.1	C	n/a	n/a	12.2	B

	Mid-Day Saturday									
	Eastbound		Westbound		Northbound		Southbound		Overall	
Intersection	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
US 9 & Stone Harbor Blvd (CR 657)*	35.6	D	37.0	D	37.3	D	34.1	C	36.1	D
US 9 & Mechanic St (CR 615)*	23.7	C	19.1	B	13.2	B	15.0	B	16.0	B
US 9 & Hand Ave (CR 658)/Steel Rd	44.5	E	19.7	C	9.4	A	8.9	A	n/a	n/a
US 9 & Pacific Ave	28.2	D	26.6	D	9.6	A	8.8	A	n/a	n/a
US 9 & Shell Bay Ave*	19.6	B	18.6	B	11.0	B	15.3	B	14.9	B
US 9 & NJ 147/CR 618 (Indian Trail Rd)*	43.3	D	33.5	C	30.0	C	30.8	C	34.0	C
US 9 & Main St*	31.9	C	27.4	C	17.2	B	12.0	B	16.5	B
US 9 & NJ 47 (Delsea Dr)*	101.1	F	444.0	F	43.2	D	133.6	F	205.5	F
US 9 & Rio Grande (CR 634)*	n/a	n/a	31.8	C	18.8	B	11.3	B	17.7	B
NJ 47 & Railroad Ave (CR 626)*	41.4	D	35.1	D	16.5	B	46.7	D	32.6	C
NJ 47 & 5th St*	36.5	D	35.8	D	29.1	C	27.9	C	30.6	C
Stone Harbor Blvd & Bayberry Dr*	15.4	B	9.3	A	21.2	C	n/a	n/a	14.8	B
Mechanic St & Goshen Rd (SB) & Dias Creek Rd (NB)	12.0	A	7.7	B	10.2	B	15.0	B	n/a	n/a
Shell Bay Ave & Shunpike Rd (CR 620)	9.7	A	9.4	A	10.5	B	9.9	A	n/a	n/a
Indian Trail Rd (CR 618) & Shunpike Rd (CR 620)	8.5	A	n/a	n/a	n/a	n/a	33.7	D	n/a	n/a

*Signalized intersection



Legend

- Garden State Parkway
- US or NJ Route
- County Route
- Local Road
- Rail

Signalized Intersection Studied

Weekday Evening Peak Hour (Left)
Saturday Mid-day Peak Hour (Right)

LOS A-C | LOS D | LOS E-F

Data Sources: Field observations, Garden State Parkway Improvement Study

Middle Township
Transportation Improvement Study
Signalized Intersection Existing LOS
Summer Peak Period
Figure 2

N

0 0.25 0.5
Miles

Baker

October 2010

2.2 Year 2015 Volumes and Level of Service

To identify any near-term issues with traffic conditions in the Township, traffic volumes were projected for the year 2015. For the analysis, traffic volumes were increased 7.5% over current volumes to project five-year growth. This growth rate was selected based on several factors. The most recent historic comparison available for traffic growth on a major roadway within the Township – NJ 47 – indicated that traffic volumes increased at a 1.5% annual rate from 1999 to 2005. Further, the 2010 Middle Township Comprehensive Plan projects:

- Permanent population growth of 6% from 2010 to 2015
- Summer population growth of 3% from 2010 to 2015
- Employment growth of 8% from 2010 to 2015

The annual rates of growth for permanent population and employment were thus indicated to be in the range of 1.5% per year.

The year 2015 projected volumes are shown in Table 4, and the year 2015 projected delays and levels of service are shown in Table 5. The average vehicular delay for the intersection of US 9 and NJ 47 is projected to increase from 205 to 284 seconds per vehicle for the Saturday peak hour. Also in the Saturday peak hour, the overall level of service for NJ 47 and Railroad Avenue is projected to worsen from 'C' to 'E', and the intersection of US 9 and Route 147 is projected to slightly worsen from 'C' to 'D.' In the weekday peak hour, the intersection of US 9 and Rio Grande is projected to slightly worsen from 'C' to 'D.'

Delay will also be noticeably higher at some unsignalized intersections. For example, during the weekday peak, the delay for eastbound vehicles at Hand Avenue and US 9 is projected to increase from 68 seconds per vehicle to 168 seconds per vehicle.

In summary, further growth in traffic volumes will likely have the most significant impact at the most congested signalized and unsignalized intersections. Continued growth will worsen delay at the key intersections of US 9 and NJ 47, and US 9 and Stone Harbor Boulevard, but most of the signalized intersections studied have the capacity to absorb additional traffic in the short term. It will also become more difficult to turn onto US 9 from side streets at unsignalized intersections, due to fewer gaps in the traffic stream.

Table 4: Year 2015 Weekday Evening and Mid-Day Saturday Peak Hour Volumes

	Weekday Evening																
	Eastbound				Westbound				Northbound				Southbound				Intersection
Intersection	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total
US 9 & Stone Harbor Blvd (CR 657)*	113	497	174	*784*	216	528	116	*860*	275	388	229	*892*	172	450	108	*730*	3266
US 9 & Mechanic St (CR 615)*	77	56	53	*186*	74	81	34	*189*	61	677	32	*771*	34	543	65	*642*	1788
US 9 & Hand Ave (CR 658)/Steel Rd	23	0	74	*97*	0	2	18	*20*	71	704	10	*785*	11	742	66	*818*	1720
US 9 & Pacific Ave	n/a	n/a	n/a	*n/a*	n/a	n/a	n/a	*n/a*	n/a	n/a	n/a	*n/a*	n/a	n/a	n/a	*n/a*	n/a
US 9 & Shell Bay Ave*	29	89	22	*140*	89	114	141	*344*	25	357	63	*445*	134	465	52	*651*	1580
US 9 & NJ 147/CR 618*	55	166	138	*358*	261	190	29	*481*	149	359	133	*642*	51	405	76	*532*	2012
US 9 & Main St*	26	3	78	*108*	3	2	0	*5*	74	649	5	*729*	1	789	67	*857*	1699
US 9 & NJ 47 (Delsea Dr)*	171	534	63	*769*	202	787	210	*1199*	158	280	151	*588*	225	428	167	*819*	3374
US 9 & Rio Grande (CR 634)*	n/a	n/a	n/a	*n/a*	328	n/a	55	*383*	n/a	443	172	*615*	38	533	n/a	*571*	1568
NJ 47 & Railroad Ave (CR 626)*	144	91	192	*428*	35	123	81	*239*	306	747	31	*1085*	44	567	91	*702*	2453
NJ 47 & 5th St*	44	55	161	*260*	175	84	81	*340*	178	999	86	*1263*	100	758	16	*874*	2737
Stone Harbor Blvd & Bayberry Dr*	1	538	140	*678*	69	600	1	*670*	97	2	57	*156*	13	7	14	*34*	1538

	Mid-Day Saturday																
	Eastbound				Westbound				Northbound				Southbound				Intersection
Intersection	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Left	Thru	Right	Total	Total
US 9 & Stone Harbor Blvd (CR 657)*	61	529	176	*766*	129	370	98	*597*	202	371	112	*685*	125	391	56	*572*	2620
US 9 & Mechanic St (CR 615)*	162	42	69	*273*	31	52	22	*104*	57	538	20	*615*	33	604	58	*696*	1688
US 9 & Hand Ave (CR 658)/Steel Rd	28	0	52	*80*	5	0	23	*28*	38	559	5	*602*	10	668	35	*713*	1422
US 9 & Pacific Ave	12	1	20	*33*	5	2	8	*15*	11	597	10	*617*	10	701	24	*734*	1400
US 9 & Shell Bay Ave*	56	108	28	*191*	66	54	112	*231*	14	444	88	*546*	99	498	45	*642*	1610
US 9 & NJ 147/CR 618*	66	263	195	*524*	166	154	60	*379*	164	381	229	*774*	120	387	53	*560*	2237
US 9 & Main St*	56	0	82	*138*	3	0	2	*5*	66	782	4	*851*	1	785	22	*807*	1802
US 9 & NJ 47 (Delsea Dr)*	166	736	88	*990*	189	740	275	*1204*	175	364	167	*706*	262	470	71	*803*	3703
US 9 & Rio Grande (CR 634)*	n/a	n/a	n/a	*n/a*	194	n/a	68	*261*	n/a	633	273	*906*	68	653	n/a	*720*	1888
NJ 47 & Railroad Ave (CR 626)*	113	125	214	*452*	38	65	72	*174*	253	648	40	*941*	70	694	99	*863*	2430
NJ 47 & 5th St*	82	72	170	*324*	232	118	92	*443*	141	882	128	*1150*	110	842	18	*970*	2886
Stone Harbor Blvd & Bayberry Dr*	0	777	53	*830*	24	368	0	*391*	84	0	112	*196*	0	0	0	*0*	1417
Mechanic St & Goshen Rd (SB) & Dias Creek Rd (NB)	3	22	4	*29*	139	16	26	*181*	3	37	212	*252*	63	51	6	*120*	582
Shell Bay Ave & Shunpike Rd	15	108	40	*162*	31	55	28	*114*	33	137	43	*213*	37	123	22	*181*	670
Indian Trail Rd & Shunpike Rd	72	346	n/a	*418*	n/a	219	142	*361*	n/a	n/a	n/a	*n/a*	163	n/a	56	*219*	999

*Signalized intersection

Table 5: Year 2015 Weekday Evening and Mid-Day Saturday Peak Hour Volumes

	Weekday Evening									
	Eastbound		Westbound		Northbound		Southbound		Overall	
Intersection	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
US 9 & Stone Harbor Blvd (CR 657)*	36.4	D	239.9	F	156.3	F	54.3	D	126.7	F
US 9 & Mechanic St (CR 615)*	20.1	C	20.1	C	17.8	B	15.3	B	17.4	B
US 9 & Hand Ave (CR 658)/Steel Rd	168.0	F	21.1	C	10.0	B	9.3	A	n/a	n/a
US 9 & Pacific Ave	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
US 9 & Shell Bay Ave*	18.4	B	20.9	C	10.0	A	19.8	B	17.5	B
US 9 & NJ 147/CR 618 (Indian Trail Rd)*	39.0	D	33.7	C	30.6	C	35.1	D	34.0	C
US 9 & Main St*	30.6	C	27.4	C	16.6	B	14.5	B	16.8	B
US 9 & NJ 47 (Delsea Dr)*	47.8	F	572.8	F	41.6	D	63.8	E	236.9	F
US 9 & Rio Grande (CR 634)*	n/a	n/a	131.1	F	10.9	B	9.6	A	43.2	D
NJ 47 & Railroad Ave (CR 626)*	59.9	E	37.7	D	19.8	B	36.8	D	33.8	C
NJ 47 & 5th St*	40.0	D	33.1	C	36.4	D	29.2	C	34.0	C
Stone Harbor Blvd & Bayberry Dr*	12.4	B	14.2	B	20.5	C	n/a	n/a	14.2	B

	Mid-Day Saturday									
	Eastbound		Westbound		Northbound		Southbound		Overall	
Intersection	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS	Delay (s)	LOS
US 9 & Stone Harbor Blvd (CR 657)*	37.3	D	40.9	D	41.1	D	35.7	D	38.8	D
US 9 & Mechanic St (CR 615)*	26.2	C	19.4	B	14.2	B	16.4	B	17.4	B
US 9 & Hand Ave (CR 658)/Steel Rd	69.6	F	22.1	C	9.6	A	9.1	A	n/a	n/a
US 9 & Pacific Ave	34.0	D	30.5	D	9.8	A	9.0	A	n/a	n/a
US 9 & Shell Bay Ave*	20.2	C	18.8	B	11.5	B	17.7	B	16.2	B
US 9 & NJ 147/CR 618 (Indian Trail Rd)*	45.0	D	33.9	C	30.9	C	32.0	C	35.1	D
US 9 & Main St*	32.9	C	27.4	C	22.1	C	13.3	B	19.3	B
US 9 & NJ 47 (Delsea Dr)*	186.3	F	587.1	F	45.4	D	178.4	F	283.8	F
US 9 & Rio Grande (CR 634)*	n/a	n/a	32.6	C	23.8	C	12.3	B	20.5	C
NJ 47 & Railroad Ave (CR 626)*	119.2	F	39.1	D	17.8	B	70.0	E	58.2	E
NJ 47 & 5th St*	38.3	D	38.6	D	30.4	C	28.9	C	32.1	C
Stone Harbor Blvd & Bayberry Dr*	18.0	B	9.5	A	21.4	C	n/a	n/a	16.4	B
Mechanic St & Goshen Rd (SB) & Dias Creek Rd (NB)	12.5	B	7.7	A	10.4	B	16.4	B	n/a	n/a
Shell Bay Ave & Shunpike Rd (CR 620)	10.1	B	9.7	A	11.0	B	10.3	B	10.4	B
Indian Trail Rd (CR 618) & Shunpike Rd (CR 620)	8.6	A	n/a	n/a	n/a	n/a	50.8	F	n/a	n/a

*Signalized intersection

2.3 Vehicular Crashes

Recent crash data was reviewed for each state and county roadway within Middle Township to identify crash "hot spots." This process involved two steps. The Transportation Safety Resource Center at Rutgers University provided a summary of crashes on state and county roadways for the period July 1, 2006 through June 30, 2009. Following a review of this crash summary, the Middle Township Police Department was requested to provide three years of crash reports for a limited number of areas in order to better document crash trends. The time period covered by these crash reports extends roughly from July 2007 through July 2010, but varies by location.

Table 6 summarizes the crash experience for intersections with at least 12 crashes in a three-year period, and for three "high-crash corridors". A discussion of key intersections and corridors follows.

Table 6: Crash History

Intersection	Number of Crashes	Time Period	Predominant Crash Types
US 9 and NJ 47	42	7/1/06 to 6/30/09	28 rear end
US 9 and Stone Harbor Boulevard	30	7/1/06 to 6/30/09	12 rear end (6 NB); 12 angle (5 NB and EB)
NJ 47 and New York Avenue	27	7/1/06 to 6/30/09	11 right angle; 8 rear end (4 NB, 3 SB); 4 left turns
South Dennisville Road and Magnolia Drive	25	7/6/07 to 7/4/10	19 right-angle (Magnolia Drive EB and S. Dennisville Road SB)
US 9 and Shell Bay Avenue	21	7/1/06 to 6/30/09	8 rear end (7 NB); 6 angle; 6 left turn (4 EB, 2 NB)
NJ 47 and Fulling Mill Road	20	7/1/06 to 6/30/09	7 right angle; 5 rear end
US 9 and Route 147/Indian Trail Road	19	7/1/06 to 6/30/09	7 rear end
NJ 47 and Railroad Avenue	16	7/11/07 to 6/27/10	10 rear end (6 westbound, 4 eastbound)
US 9 and Linden Lane	13	7/1/06 to 6/30/09	9 rear end (5 SB); 5 right angle
US 9 and Mechanic Street	12	7/1/06 to 6/30/09	5 rear end, 3 sideswipe
Corridor	**Number of Crashes**	**Time Period**	**Predominant Crash Types**
NJ 47 from 1st Street to 5th Street	62	7/1/06 to 6/30/09	18 rear end, including 10 rear end crashes at NJ 47 and 5th Street. 27 of the 62 crashes were at NJ 47 and 5th Street. 15 right angle.
Stone Harbor Boulevard from Crest Road to Brighton Road	42	7/1/06 to 6/30/09	16 right angle (7 involving SB and WB vehicles at easterly exit from Cape May Regional Medical Center); 13 rear end; 7 sideswipe
Mechanic Street from Dias Creek Road to US 9	36	10/1/07 to 4/9/10	22 crashes involved striking parked vehicles; of these 17 occurred on the block between US 9 and Boyd Street. 3 opposite-direction sideswipes.

2.3.1 Intersections

US 9 and NJ 47 – The intersection of US 9 and NJ 47 had the highest number of crashes over the three-year study period, at 42. Rear-end crashes were predominant, at 28. The number of crashes and the overall crash pattern corresponds to the high traffic volumes and the congestion often found at this intersection.

US 9 and Stone Harbor Boulevard – The intersection of US 9 and Stone Harbor Boulevard was second in the number of crashes, at 30. The number of crashes is not unexpected given the high volumes of traffic interacting at this intersection. There was no unusual concentration of crash types.

NJ 47 and New York Avenue – This is an unsignalized T-intersection; New York Avenue provides access into the Grande Center to the north of NJ 47, and accommodates both ingress and egress for Wawa. The intersection is slightly offset from a driveway to the K-Mart shopping center to the south of NJ 47. There were 27 crashes at this intersection. Eight were rear-end crashes, which may be traced to the close proximity of this intersection to US 9, and the long queues of vehicles. Of greater concern, there were also 11 right angle crashes. Contributing factors may be the heavy volume of traffic exiting the Wawa to NJ 47. On field views, it was also noted that many motorists on the New York Avenue approach drove across NJ 47 into the K-Mart shopping center, and vice-versa. Conflicts are also created when motorists turn into these two driveways. The heavy flow of traffic along NJ 47, combined with the many turning movements into and out of these offset driveways, likely contributes to crashes at this location.

South Dennisville Road and Magnolia Drive – There were 25 crashes at this unsignalized intersection, 19 of which were angle crashes. These followed the same pattern: eastbound vehicles turned left onto South Dennisville Road, colliding with southbound vehicles. South Dennisville Road has two through lanes at this point, and in many cases, motorists in the outer southbound lane would be stopped at Magnolia Drive (queued back from the intersection with US 9), obscuring the view by motorists on Magnolia Drive of vehicles approaching on the inner southbound lane. Based on the crash history, signalization of this intersection is justified.

2.3.2 Corridors

NJ 47 from 1st Street to 5th Street – A total of 62 crashes occurred along this busy corridor during the study period. Rear-end crashes were the predominant crash type, which is to be anticipated, given the heavy volumes and regular congestion at this intersection. The intersection of NJ 47 and 5th Street accounted for 27 of the crashes, with 10 of these being rear-end crashes. There were also 15 angle crashes, which is to be anticipated, given the many driveways and intersecting roads on this section.

Stone Harbor Boulevard from Crest Road to Brighton Road – A total of 42 crashes occurred along this corridor. The right angle crash was the predominant type, at 16 crashes. This can be traced to vehicles turning into and out of the various businesses and driveways along the corridor. The single greatest concentration of angle crashes, 7, occurred at the intersection of Stone Harbor Road and the easterly

driveway to the Cape Regional Medical Center. In a number of crashes, a motorist was turning left from the Medical Center onto Stone Harbor Boulevard is "waved through" by a westbound motorist stopped in the outer lane (in a queue extending back from US 9). The departing motorist would turn onto Stone Harbor, colliding with a westbound motorist approaching in the inner lane.

Mechanic Street from Dias Creek Road to US 9 – There were 36 crashes on this corridor, 21 of which occurred on the block between US 9 and Boyd Street. Parked vehicles figured prominently in the crash history of this roadway; 22 of the crashes involved parked vehicles, with 17 of these crashes on the block between US 9 and Boyd Street. Based on Middle Township Master Plan community involvement input, residents have often expressed concerns about the narrowness of this roadway. Fourteen (14) crashes can be traced to motorists driving in close proximity to parked vehicles or vehicles in the adjacent travel lane.

2.4 Parking

Concerns have been expressed about the availability of parking in downtown Cape May Court House. To evaluate demand, parking spaces within Cape May Court House were surveyed at several points during the summer of 2010. It was determined that peak parking occupancy typically occurs around 11:00 AM. Parking is generally in highest demand on Thursday, since the municipal court is in session that day. It should be noted that the parking survey was not a comprehensive survey of all on-street parking and lots within Cape May Court House Center; the focus was on several blocks of parking in close proximity to the Municipal Building and Courthouse, since this is the heart of the downtown. For purpose of comparison, several off-street lots in this area were also counted, as well as two businesses (Cape Bank office center and McDonald's Restaurant) at the transition to the more "suburban" section of US 9 to the north.

The results of the parking survey are indicated in Table 7, and Figure 3. These indicate the highest degree of occupancy during the different parking counts. As shown, parking occupancy is highest on the block of Mechanic Street between Boyd Street and US 9. An occupancy of 100% was recorded on one occasion, and an occupancy of close to 100% at other times. This block of Mechanic Street is regarded by many Middle Township residents as the "main street" in the community. US 9 between Mechanic Street and Romney Place also had high parking occupancy; many of the persons parking on this block were seen walking to the Courthouse.

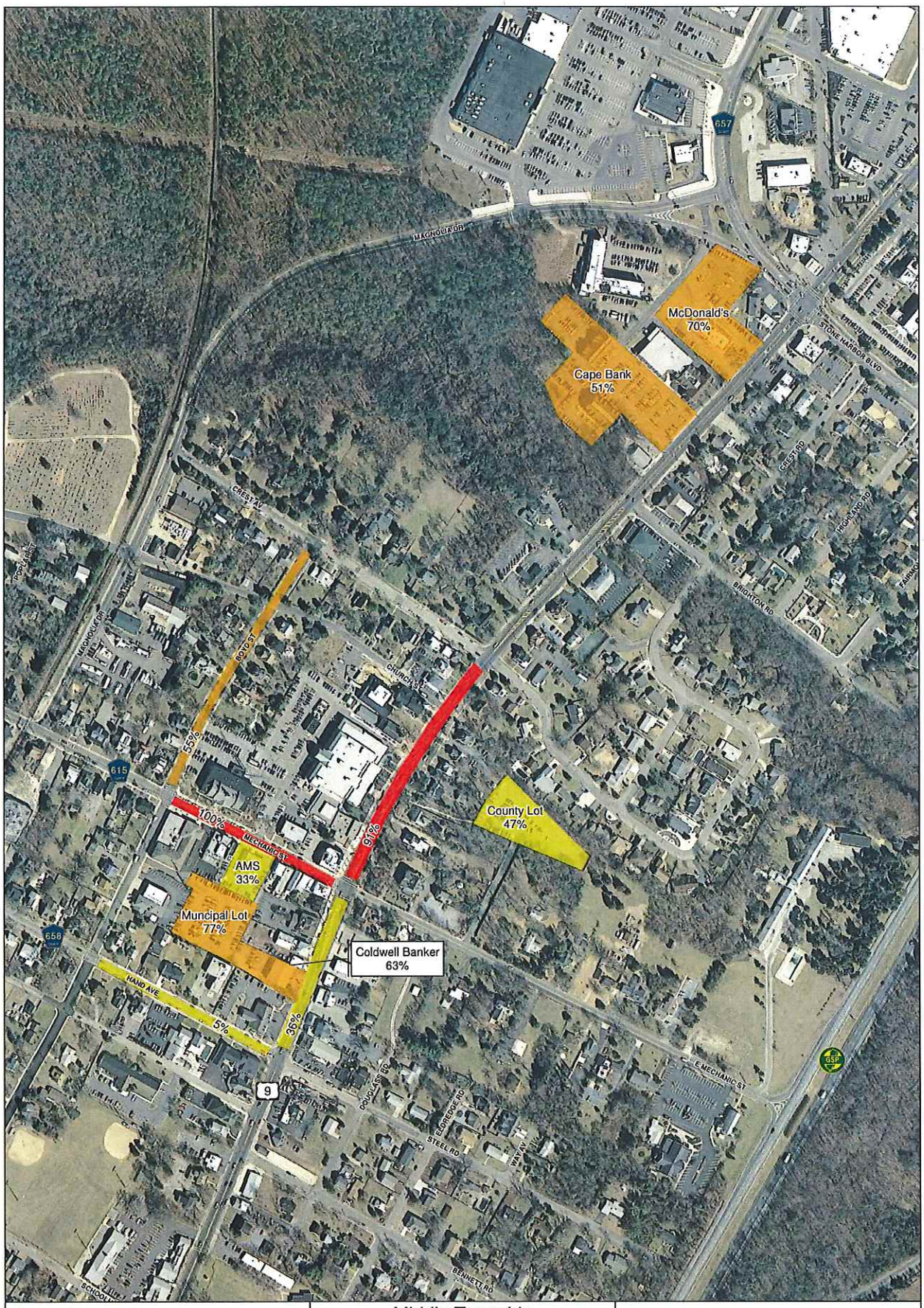
On-street parking occupancy is lower away from these blocks. Parking occupancy is 55% on Boyd Street between Mechanic Street and Romney Place, with many of the motorists here likely attending to matters in the Courthouse. Occupancy is 36% on US 9 below Mechanic Street, and only about 5% on Hand Avenue. On-street parking occupancy increases when wakes are held at the funeral home on this block, typically one to two times per week.

The highest occupancy recorded for off-street lots was for the Municipal Lot, at 77%. This level of usage is normally seen only on days that the Municipal Court is in session. The lot at the Courthouse was not

formally surveyed due to the presence of a gate at the entrance. Based on views from the street, parking occupancy was often high for this lot, and occupancy was often close to 100% for the small non-gated lot outside the main lot. Perhaps due to the physical separation from the County complex, a peak occupancy of only 47% was recorded for the County Lot to the east of US 9, but it is often less. The lots of four private businesses were also counted, with the highest level recorded at McDonald's, of 70%. Although not formally surveyed, high numbers of vacant spaces were regularly observed at the major retail centers of Court House Village and the Acme Shopping Center north of Stone Harbor Boulevard.

Table 7: Peak Parking Occupancy

On-Street Parking	Vehicles	Spaces	% Occupied
Route 9, Romney Place to Mechanic Street	39	43	91%
Route 9, Mechanic Street to Hand Avenue	9	25	36%
Mechanic Street, Boyd Street to Route 9	31	30	103%
Hand Avenue, Boyd Street to Route 9	2	38	5%
Boyd Street, Romney Place to Mechanic Street	29	53	55%
Off-Street Parking	**Vehicles**	**Spaces**	**% Occupied**
Municipal lot	85	111	77%
County lot, east of Route 9	55	116	47%
Coldwell Bankers	19	30	63%
AMS Diagnostics	9	27	33%
Cape Bank	106	206	51%
McDonald's	62	89	70%



Legend

Rail

81%-100% of Parking Occupied

51%-80% of Parking Occupied

0%-50% of Parking Occupied

Data Sources: NJDOT County Route Sidewalk Inventory, NJDEP, Cape May County, and field observations

Middle Township
Transportation Improvement Study
Peak Parking Occupancy
Weekday Morning
Figure 3

N

0 200 400
Feet

Baker

October 2010

3.0 Garden State Parkway Improvements

The New Jersey Turnpike Authority (NJTA) is proposing improvements to Interchanges 9, 10 and 11 on the Garden State Parkway located within Middle Township. Although classified as "interchanges", all three locations are currently signalized, at-grade intersections. The Garden State Parkway intersects with Crest Haven Road at Interchange 11; Stone Harbor Boulevard at Interchange 10; and Shell Bay Avenue at Interchange 9. These three intersections are the only intersections along the 173-mile length of the Parkway that are not grade separated. The proposed improvements for all three interchanges will involve construction of a grade separated interchange, with ramp connections to local and county roadways.

These proposed improvements were reviewed to determine any impact on local and county roadways, particularly whether traffic flows in the vicinity of the interchanges will be diverted from their normal routes. This involved review of the July 2006 *Draft Final Traffic Analysis Report* prepared for the NJTA, as well as the latest version of the design plans, dated April 2008. In the section below, existing conditions at the three intersections are described together with proposed changes and a summary of potential impacts.

It should be noted that as of July 2010, NJTA anticipated that environmental approvals would be received by the end of 2010, and construction would begin in early 2012.

3.1 Interchange 11 – Crest Haven Road (CR 609)

3.1.1 Existing Conditions

Crest Haven Road forms a four-leg at-grade signalized intersection with the Parkway. The intersection is signalized. Turning movements are permitted to and from all roadways. On the Parkway northbound and southbound approaches, there is one left-turn lane and three shared through/right-turn lanes. On eastbound Crest Haven Road, there is one shared left/through/right turn lane; on westbound Crest Haven Road, there is one left-turn lane, one through lane, and one right-turn lane.

3.1.2 Future Conditions

Access

The interchange will be grade-separated, with the Parkway passing over Crest Haven Road. Vehicular movements will be accommodated in all directions. Motorists on the Parkway northbound and southbound can exit via ramps to Crest Haven Road. Motorists on Crest Haven Road can access the southbound Parkway via a ramp west of the roadway. Access is afforded to the northbound Parkway via Moore Road, and then a ramp onto the Parkway opposite the northern terminus of Crest Haven Road.

An existing driveway to the Armory on the south side of Crest Haven Drive will be terminated, and a new driveway provided to the Armory to the east.

Traffic Control

The intersections of the ramps to and from the Parkway will be signalized at their intersections with Crest Haven Road.

Geometry

Crest Haven Road will have two lanes in each direction. The travel lanes will be 12 feet in width. Shoulders of 4 to 6 feet will be provided to the west of the Parkway, and shoulders of 8 feet beneath and to the east of the Parkway. A sidewalk of 11.5 feet in width will be provided on the westbound side underneath the Parkway; no sidewalk will be provided to the east or west of the Parkway.

3.2 Interchange 10 – Stone Harbor Boulevard (CR 657)

3.2.1 Existing Conditions

Stone Harbor Boulevard forms a four-leg at-grade intersection with the Parkway, and the intersection is controlled by a signal. Turning movements are permitted to and from all roadways. On the Parkway northbound there are double left-turn lanes and three through lanes with a channelized right-turn lane. On the Parkway southbound there is a left-turn lane and three through lanes with a channelized right-turn lane. The eastbound and westbound Stone Harbor Boulevard approaches have an exclusive left-turn lane, one through lane, and a yield controlled right-turn lane.

3.2.2 Future Condition

Access

Interchange 10 will be grade-separated, with the Parkway passing over Stone Harbor Boulevard. Motorists on the Parkway can exit via ramps to Stone Harbor Boulevard. It should be noted that the southbound exit ramp will pass through the parking lot of Cape Regional Medical Center, and intersect with Stone Harbor Boulevard directly opposite Brighton Road.

Motorists on Stone Harbor Boulevard will be able to access the southbound Parkway by turning onto Brighton Road. Brighton Road will be incorporated into a service road that will run parallel to the Parkway for a distance of one-half mile before merging with the Parkway just south of Steel Road. The bottom half of Brighton Road will be vacated, and the eastern end of Ormond Road will be converted into a cul-de-sac. Motorists on Stone Harbor Boulevard will be able to access the northbound Parkway via a new service road to the east of the Parkway, and merge with the Parkway one-half mile to the north.

Currently, motorists traveling southbound on the Parkway can access downtown Cape May Court House by exiting via the slip ramp onto Mechanic Street. This will not be possible in the future. Motorists will exit the Parkway at Stone Harbor Boulevard, head straight through the intersection of the southbound exit ramp and Stone Harbor Boulevard onto the new service road, and exit onto Mechanic Street from the service road.

Geometry

Stone Harbor Boulevard will have two lanes in each direction from US 9 to just east of Bayberry Drive. Additionally, Stone Harbor Boulevard will provide auxiliary lanes consisting of double left-turn lanes onto the southbound service road, and one left-turn lane onto the northbound service road. To the west of Brighton Road, the inner travel lanes will be 11 feet in width, and the outer lanes will be 15 feet in width. Underneath the Parkway, travel lanes will be 12 feet in width. To the east of the Parkway, inner travel lanes will be 11 feet in width, and outer travel lanes 12 feet in width.

There will be no shoulders west of Brighton Road. Shoulders will be 8 feet from Brighton Road to the East Service Road. East of the East Service Road, there will be no shoulders. It should be noted that shoulders are present in this area today.

West of Brighton Road, sidewalks will be present on both sides of the roadway, as is the case under existing conditions. From Brighton Road to the East Service Road, a 10-foot sidewalk will be built on both sides of the roadway. From East Service Road to Bayberry Drive, a 10-foot asphaltic surface will be provided on the westbound side, and a 4-foot sidewalk will remain along part of the eastbound side. From Bayberry Drive to 300 feet east, there will be no sidewalk on the westbound side, but a 4-foot sidewalk will remain in place along part of the eastbound side.

Traffic Control

The intersection of Stone Harbor Boulevard and the southbound off-ramp and southbound service road to the west of the Parkway will be signalized. The intersection of Stone Harbor Boulevard and the northbound off-ramp and northbound service road to the east of the Parkway will be signalized.

3.3 Interchange 9 – Shell Bay Avenue

3.3.1 Existing Conditions

Shell Bay Avenue forms an at-grade four-leg signalized intersection with the Parkway. On the northbound and southbound Parkway approaches, there is one exclusive left-turn lane and three through lanes. The eastbound and westbound Shell Bay approaches have one shared left-turn/through lane and one channelized right turn lane. All turning movements are permitted onto all roadways.

3.3.2 Proposed Future Conditions

Access

Interchange 9 will be grade separated with the Parkway passing over Shell Bay Avenue. Motorists on the southbound Parkway will exit to Shell Bay via a ramp; motorists on the northbound Parkway will exit to Golf Club Road at First Avenue, one block south of Shell Bay Avenue. Motorists on Shell Bay Avenue can access the northbound Parkway via a ramp from Bayberry Drive at 3rd Avenue, one block north of Shell Bay Avenue. Motorists can access the southbound Parkway via a ramp from Shell Bay Avenue.

Geometry

Shell Bay Avenue will have one lane in both directions, and a two-way left turn lane. Shell Bay Avenue will have 8-foot shoulders under the Parkway. Both sides of the road will have 10 foot sidewalks.

Traffic Control

None of the intersections of Parkway ramps with local roads will be signalized.

3.4 Summary of Parkway Improvements

Based on the review conducted for this study, all turning movements currently permitted at the three intersections with the Parkway will be accommodated in the future. In some cases, motorists' access to the Parkway will involve traveling brief distances on existing roadways, such as Moore Road north of Crest Haven, or one block of Bayberry Drive north of Shell Bay Avenue.

There will be one alteration to movements permitted from the Parkway outside the three intersections. Currently, motorists traveling southbound on the Parkway can access downtown Cape May Court House by exiting via the slip ramp onto Mechanic Street. This will not be possible in the future. Southbound motorists will exit the Parkway at Stone Harbor Boulevard, head straight through the signalized intersection of the southbound exit ramp and Stone Harbor Boulevard onto the new service road, and exit onto Mechanic Street from the service road.

In general, the proposed diversions are limited in scale, and there will likely be no significant change in the routes used by motorists to access the Parkway. The NJTA *Draft Final Traffic Analysis Report* projects that traffic volumes on intersecting county and local roadways will not change as a result of the proposed improvements. However, based on this review, it is possible that volumes on Stone Harbor Boulevard may see some increase. After the improvements, it will be less convenient for motorists to access Mechanic Street from the new service road than under the existing slip ramp from the Parkway, and some motorists may decide to turn right onto Stone Harbor Boulevard and then left onto Route 9 to access the downtown.

There will be impacts to adjacent land uses as a result of some of the improvements. At Interchange 10, there will be a loss of parking at Cape Regional Medical Center due to the southbound off-ramp being built through the parking lot. However, no structures are proposed to be taken at any of the three sites.

Impacts on pedestrian and bicycle movement will be mixed. The existing intersections with the Parkway are wide, since the Parkway is a multi-lane roadway in all locations. Pedestrians and bicyclists may prefer the smaller intersections of ramps with local roadways to be created in this project. However, the number of vehicular turning movements across the path of pedestrians and bicyclists, and hence the potential for conflicts, will remain unchanged. Sidewalks will be provided under the Parkway at all three locations, and in some cases sidewalks will also be added to sections of the roadway adjacent to the Parkway. The addition of sidewalks to these roadways is a net positive for pedestrians. Shoulders will

be installed on local roads underneath the Parkway, and these can accommodate bicyclists. However, existing shoulders will be removed from a section of Stone Harbor Boulevard east of the Parkway, which will be a negative impact for bicyclists.

4.0 Transit Conditions

Existing transit operations have been analyzed within Middle Township. New Jersey Transit (NJT) currently provides service on four different numbered routes, which are listed in Table 8. Routes are further described below.

Table 8: Transit Service

Route	Termini	Stops in Middle Twp	Trips Per Day	Peak Headway
313 Daily	Philadelphia –Cape May Transportation Center	**1.** Goshen-Swainton Rd. at NJ 47 **2.** Mechanic St. at US 9 **3.** NJ 47 at US 9	3-4	3 hours
315 Daily	Philadelphia – Cape May Transportation Center	**1.** US 9 at Mechanic St. **2.** NJ 47 at US 9	2-3	4-8 hours
316 Daily Summer	Philadelphia – Cape May Transportation Center	**1.** NJ 47 at US 9	13	40 minutes (afternoon, early evening)
319 Seasonal	New York City – Wildwood	**1.** NJ 47 at US 9	2	4 hours
552 Daily	Atlantic City – Cape May Transportation Center	**1.** Crest Haven County Complex **2.** Atlantic-Cape Comm. College **3.** US 9 at Mechanic St. **4.** US 9 at NJ 147 **5.** NJ 47 at US 9	32	20-30 minutes

Philadelphia Regional Service

Three routes focus on providing regional service to Philadelphia: NJ Transit Routes 313, 315, and 316. Service is relatively infrequent for Routes 313 and 315. Route 316 provides more frequent service, with headways of 40 minutes in the afternoon and early evening periods. The travel time to and from Philadelphia ranges from two to four hours, depending on the route. Some local destinations such as Lower Township, Wildwood, and Avalon are also served via these routes.

New York Regional Service

Regional service to New York via Route 319 is provided on a seasonal basis (Memorial Day through Labor Day) with two scheduled daily trips to New York City's Port Authority Bus Terminal. Access to this route is available during the non-summer months (Labor Day through Memorial Day) but requires an initial trip the Atlantic City Bus Terminal via Route 552. Average one-way travel time for this route during the seasonal time period is approximately 4.5 hours.

Cape May Local Service

The most extensive transit service in Middle Township is provided by NJ Transit Route 552, with headways of 20 to 30 minutes during much of the day. Unlike the 300-series NJ Transit routes, which enter Middle Township for short intervals before crossing to the Wildwoods, Route 552 travels much of the length of US 9 in the Township, running between Crest Haven Road and NJ 47. On weekends, service remains frequent, with two routes per hour.

5.0 Pedestrian and Bicycle Conditions

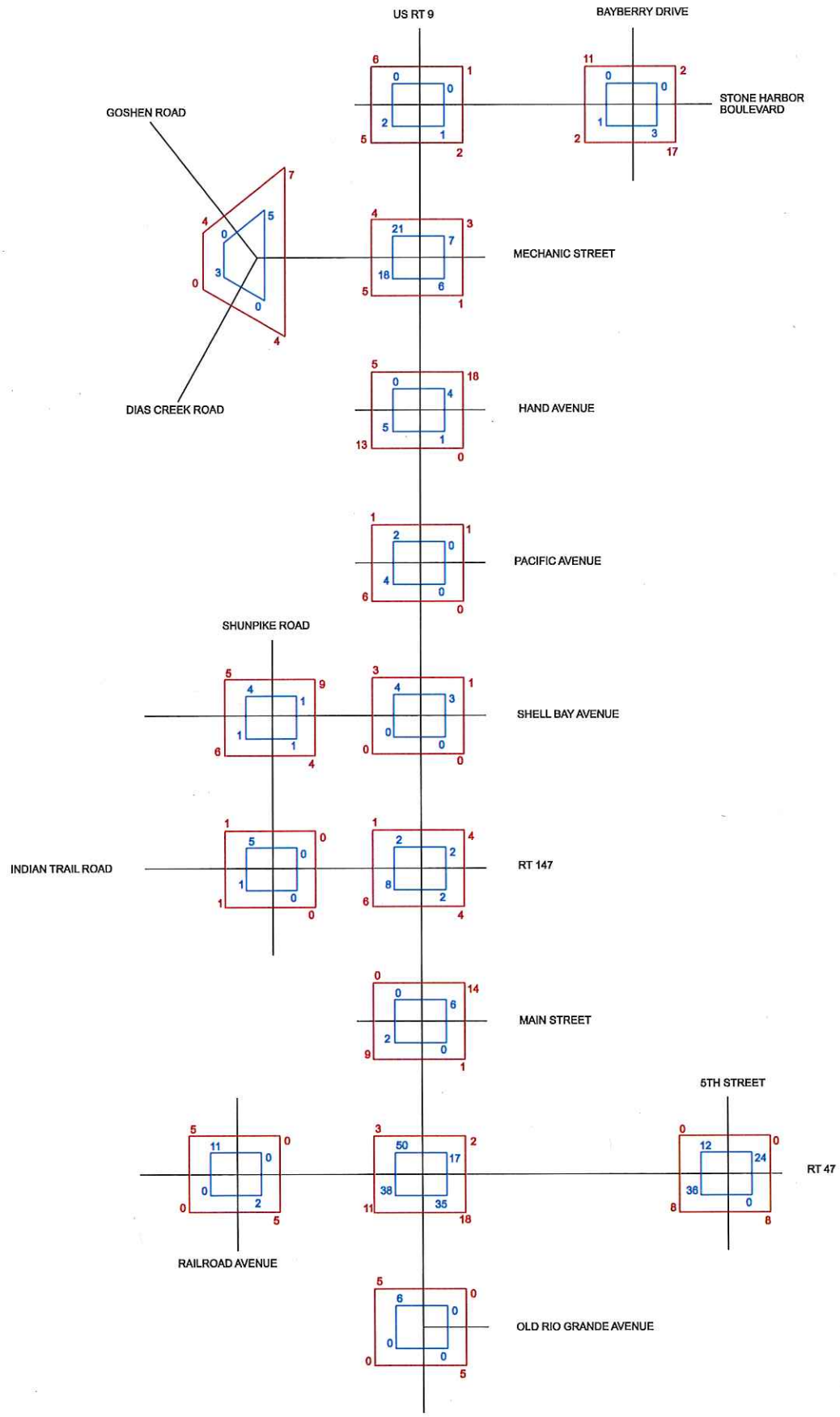
Encouraging non-vehicular transportation modes – walking and bicycling – is an important component of the study. This section summarizes existing pedestrian and bicycle activity and involvement in crashes. Roadway and sidewalk conditions for bicyclists and pedestrians are also reviewed.

5.1 Pedestrian and Bicycle Activity

Figure 4 indicates pedestrian and bicycle volumes counted on Saturday from 11 AM to 3 PM at the end of June 2010. There were a total of 285 pedestrian and 231 bicyclist crossings counted at the 15 intersections shown during this time period. However, the numbers are skewed by the intersection of NJ 47 and US 9. At this intersection, 140 pedestrian crossings were recorded – far more than any other study area intersection – and 34 bicyclist crossings. A high number of pedestrian crossings (72) was also recorded at the intersection of NJ 47 and 5th Street. Subtracting those two intersections, there were 145 pedestrian and 197 bicyclist crossings recorded in the count period. It is unusual to have higher numbers of bicyclists than pedestrians in urban or suburban areas. However, given the relatively low densities in certain areas, and the distance between land uses, bicycling is a particularly viable mode of travel in Middle.

After the intersection of US 9 and NJ 47, bicyclist volumes were heaviest at Stone Harbor Boulevard and Bayberry Drive (32 bicyclists), which likely reflects trips conducted between Middle Township and Stone Harbor. Other intersections with regular bicycling activity include US 9 and Hand Avenue (36 bicyclists, with 31 of these riding along US 9); US 9 and Main Street (24 bicyclists, with 23 of these riding along US 9); and Shunpike Road and Shell Bay Avenue (24 bicyclists, with 15 of these riding along Shunpike Road).

As noted earlier, pedestrian volumes were highest at US 9 and NJ 47. There were 140 pedestrians here, with 85 of the 140 traveling along NJ 47. Of the 72 pedestrians at NJ 47 and 5th Street, 60 were recorded crossing NJ 47. The intersection of US 9 and Mechanic Street recorded 52 pedestrian crossings. It should be noted that pedestrian activity at this intersection might have been higher during weekday hours, when the County and Township offices are open.



LEGEND:

PEDESTRIANS

BICYCLES

Middle Township Transportation Improvement Study

Pedestrian Bicycle Volumes

Saturday 11:00 AM - 3:00 PM, June 2010

Figure 4

Baker

5.2 Pedestrian and Bicycle Crashes

The project team reviewed pedestrian and bicycle crash reports from the Middle Township Police Department for the period of July 2007 to May 2010, or slightly less than three years. In this period, there were 28 pedestrian crashes, and 29 bicyclist crashes. The virtually even split in the number of pedestrian and bicycle crashes is consistent with the relative parity found among activity levels for these two modes.

The crashes reviewed are depicted on Figure 5. As shown on Figures 5A and 5B, NJ 47 had a higher number of pedestrian and bicycle crashes than any other roadway, with 10 pedestrian and 11 bicycle crashes reported. Of these 21 crashes, 16 (10 pedestrian and 6 bicycle) were concentrated in a section between the Parkway and New York Avenue/ Driveway to K-Mart. The high number of crashes corresponds with the relatively high numbers of pedestrians and bicyclists found along this roadway, mixed with high traffic volumes.

Nine of the 10 pedestrian crashes involved pedestrians crossing NJ 47 at unsignalized locations. Pedestrian activity associated with bus stops along the corridor factored into three of the crashes. Two pedestrian crashes occurred west of 1st Street as pedestrians were running to catch the NJ Transit bus. Another pedestrian crash occurred at New York Avenue when a motorist struck a pedestrian who had just alighted from a NJ Transit bus and was beginning to cross the road. Bicyclist crashes along NJ 47 were not concentrated in any one location, although 3 of the 6 did involve bicyclists riding on the sidewalk against traffic.

Bicyclists riding against traffic were involved in 10 of the 29 bicyclist crashes in the Township. This bicyclist activity is often implicated in bicyclist crashes, as motorists turning into and out of driveways or roadways are not always alert to bicyclists approaching from the wrong direction.

Other highlights of the reviewed crash data include:

- US 9 was second to NJ 47 in the number of pedestrian and bicycle crashes, with 12 (4 pedestrian crashes and 8 bicycle crashes). No single location along US 9 experienced multiple crashes. Although 2 bicycle crashes and 1 pedestrian crash occurred along US 9 north of Stone Harbor Boulevard, these were at intersections with different driveways.
- Despite the fact that the historic center of Cape May Court House (at the intersection of US 9 and Mechanic Street) had the second highest level of pedestrian activity in the Township after NJ 47, there were no pedestrian crashes in this area. It is noted that US 9 in this area has lower posted speeds than NJ 47, and only has one travel lane per direction, which may produce a more controlled environment for pedestrians.

It should also be noted that 11 of the 28 pedestrian crashes occurred within parking lots, not public roadways.

Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Roadways
- Existing Bike Paths
- Planned Bike Paths
- Pedestrian Overpass

Crashes

- Bicycle Crash
- Pedestrian Crash

Data Sources: NJDOT County Route Sidewalk Inventory, NJDEP, Cape May County, and field observations

Middle Township
Transportation Improvement Study
Pedestrian and Bicycle Crashes
July 2007 - May 2010
Figure 5 A

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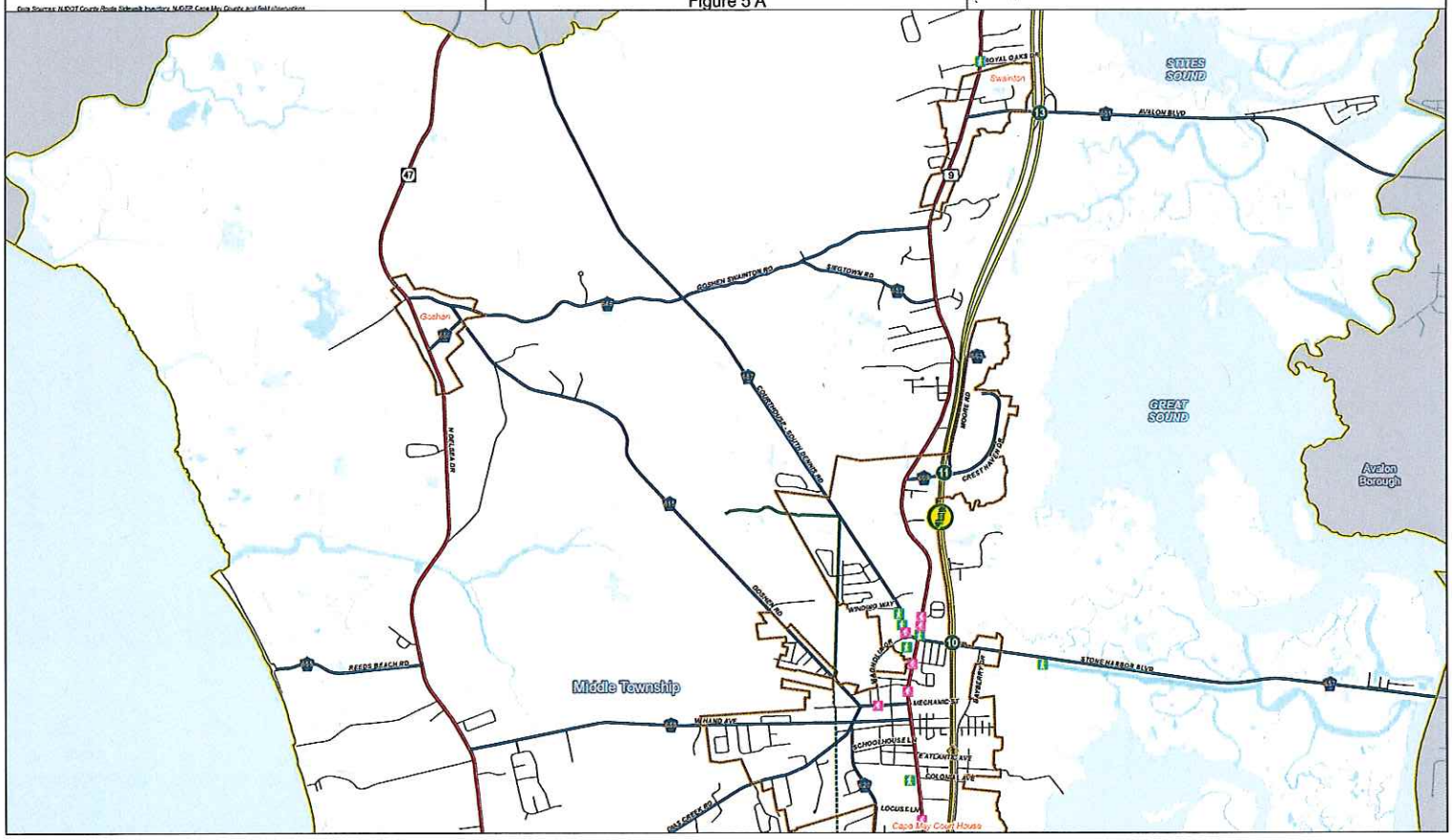
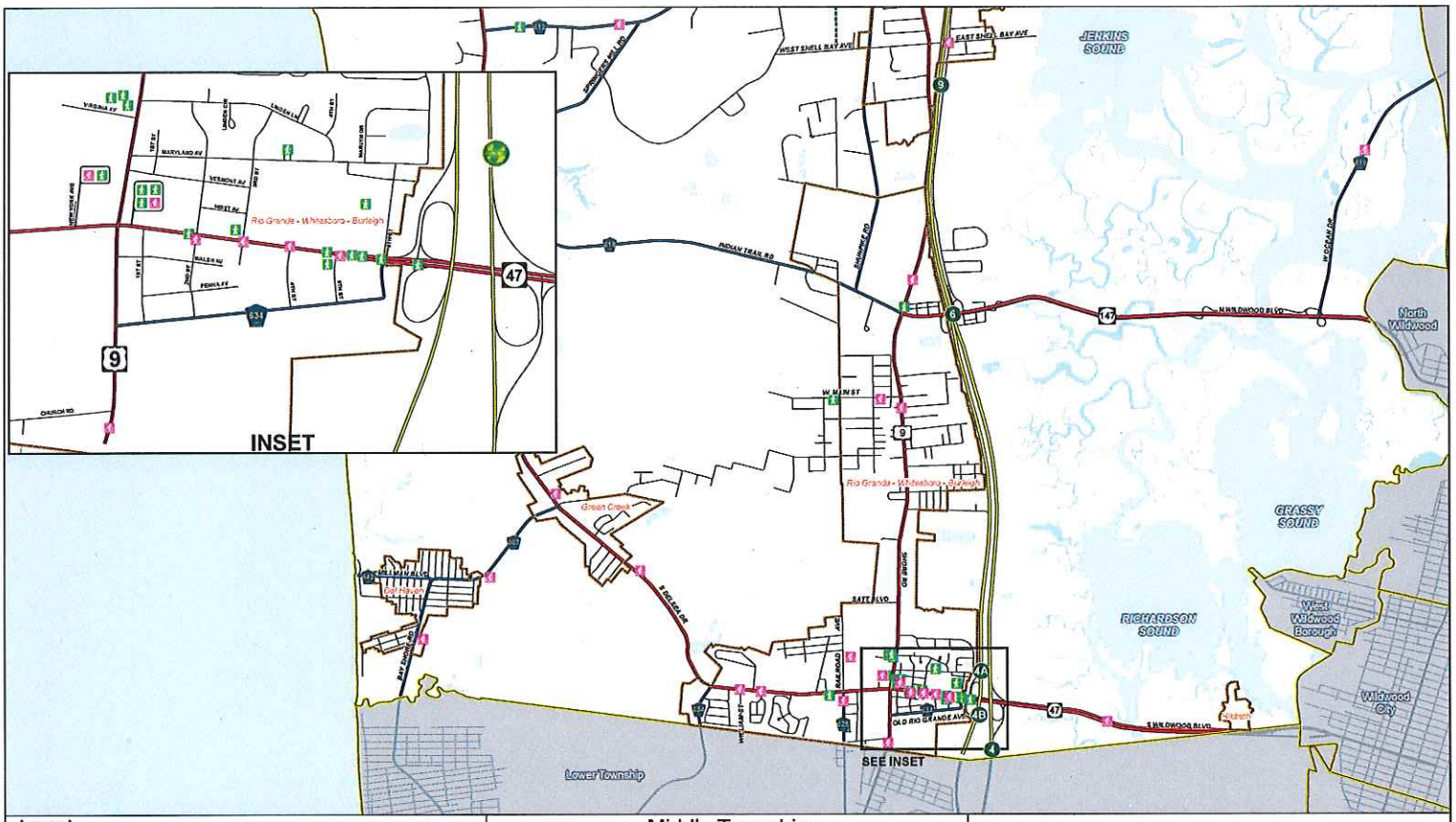
Miles

Baker

September 2010





Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Roadways
- Existing Bike Paths
- Planned Bike Paths
- Pedestrian Overpass

Crashes

- Bicycle Crash
- Pedestrian Crash

Data Sources: NJDOT County Route Sidewalk Inventory, NJGEP, Cape May County, and field observations

Middle Township
Transportation Improvement Study
Pedestrian and Bicycle Crashes
July 2007 - May 2010
Figure 5 B

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Miles

September 2010

Baker

5.3 Sidewalk Inventory

County, state and key local roadways were inventoried to determine the presence, condition and width of sidewalks. The inventory was based on field views conducted by the study team, as well as data from New Jersey's County Roadway Sidewalk Inventory (CRSI). Figures 6A and 6B indicates roadway segments on which sidewalks are present or absent, as well as the width of sidewalks where present (characterized by width of 4 feet or less, or wider than 4 feet). As indicated, sidewalks are present on US 9 in three primary segments:

- Cape May Court House center, from Orbit Drive through Pacific Avenue;
- Whitesboro, from Route 147 to East Main Street, although typically on just one side of the road; and,
- Rio Grande, from Satt Boulevard through Rio Grande Avenue.

Sidewalk is also intermittently present on other sections of US 9 the length of the Township.

The sidewalk conditions of other important roadways are:

- Sidewalk is present along NJ 47 in much of Rio Grande, but few other locations.
- Sidewalk is present along Stone Harbor Boulevard from US 9 to the Parkway, but key segments are missing just west of US 9, as well as just east of the Parkway.
- Sidewalk is present along county roadways in the heart of Cape May Court House, including Mechanic Street and Hand Avenue.
- Sidewalks are present on relatively few segments of other county roadways, whether within proposed centers or in more rural areas of the Township.
- Sidewalks are missing from Shell Bay Avenue and Main Street, two important local roadways outside the heart of Cape May Court House and Rio Grande centers.

It is further noted that much of the sidewalk in Middle Township is 4 feet or less in width. A width of 5 feet is recommended in most pedestrian facility design practices, since this width enables two persons to walk comfortably side by side. It also addresses the requirement of ADA for sidewalk widths of 5 feet at regular intervals (to allow for the passage of persons in wheelchairs).

Exceptions to the prevailing narrow sidewalk widths are found in only a few places:

- US 9 in sections of Cape May Court House, and proximate to Shell Bay Avenue;
- Magnolia Drive
- Crest Haven Drive
- Mechanic Street
- Hand Avenue

Although not depicted on the map, the grass buffer along much of the sidewalk infrastructure is typically no more than 2 to 3 feet in width.

Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Roadways
- Existing Bike Paths
- Planned Bike Paths
- Pedestrian Overpass
- No Existing Sidewalk
- Existing Sidewalk, 4' wide or less
- Existing Sidewalk, Wider than 4'

Data Sources: NJDOT County South Sidewalk Inventory, NJDEP, Cape May County and field observations

Middle Township Transportation Improvement Study

Sidewalk Inventory

Figure 6 A

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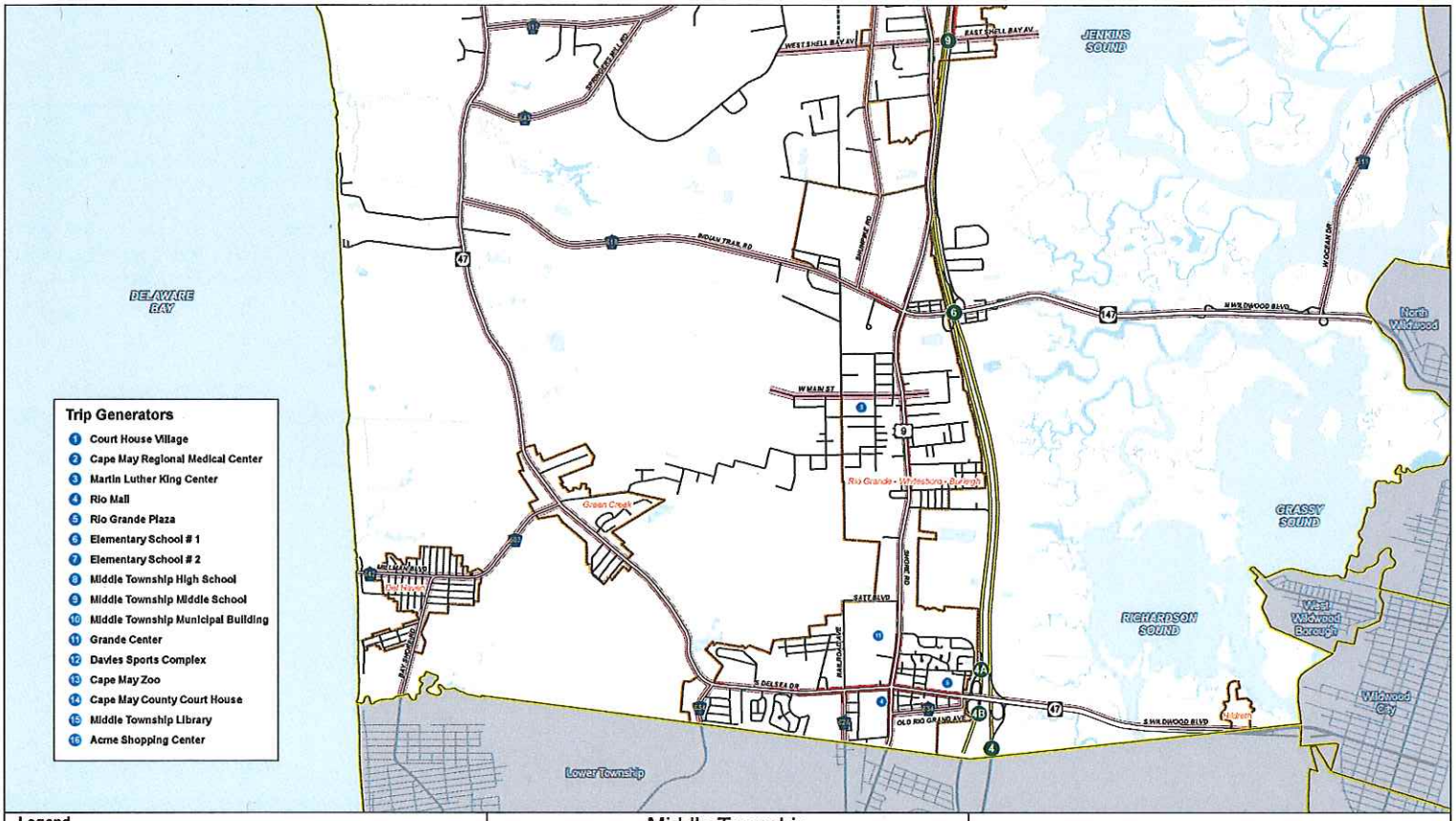
Miles

Baker

September 2010



Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Roadways
- Existing Bike Paths
- Planned Bike Paths
- Pedestrian Overpass
- No Existing Sidewalk
- Existing Sidewalk, 4' wide or less
- Existing Sidewalk, Wider than 4'

Data Sources: NJDOT County Route Sidewalk Inventory, NJDEP, Cape May County and field observations

Middle Township
Transportation Improvement Study

Sidewalk Inventory

Figure 6 B

N

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Miles

September 2010

Baker

5.4 Bicycle Compatibility

State, county and key local roadways in Middle Township were evaluated for compatibility with bicycle travel, using *NJDOT Bicycle Compatible Roadways and Bikeways* guidelines (April 1996). "Bicycle compatible" refers to roadway conditions that, taken together, are considered suitable for a fairly wide range of bicyclists. Criteria used to determine bicycle compatibility are: lane width, shoulder width, traffic volume, speed limit, character of the area (urban or rural), presence or absence of on-street parking, and truck volumes. Traffic volumes and speed are important factors; generally, as either increase on a roadway, it is recommended that a travel lane shared by motorists and bicyclists increase in width, or that shoulders or bike lanes be available for use by bicyclists. Bicycle compatible roadway pavement widths are indicated in Table 9.

Table 9: Bicycle Compatible Pavement Widths

Condition I: AADT 1,200 – 2,000			
	Urban w/ Parking	**Urban w/o Parking**	**Rural**
<30 mph	SL 12 ft	SL 11 ft	SL 10 ft
31-40 mph	SL 14 ft	SL 14 ft	SL 12 ft
41-50 mph	SL 15 ft	SL 15 ft	SH 3 ft
50 mph	NA	SH 4 ft	SH 4 ft
Condition II: AADT 2,000 – 10,000			
	Urban w/ Parking	**Urban w/o Parking**	**Rural**
<30 mph	SL 14 ft	SL 12 ft	SL 12 ft
31-40 mph	SL 14 ft	SL 14 ft	SH 3 ft
41-50 mph	SL 15 ft	SL 15 ft	SH 4 ft
50 mph	NA	SH 6 ft	SH 6 ft
Condition III: AADT Over 10,000 or Trucks Over 5%			
	Urban w/ Parking	**Urban w/o Parking**	**Rural**
<30 mph	SL 14 ft	SL 14 ft	SL 14 ft
31-40 mph	SL 14 ft	SH 4 ft	SH 4 ft
41-50 mph	SL 15 ft	SH 6 ft	SH 6 ft
50 mph	NA	SH 6 ft	SH 6 ft

Source: *NJDOT Bicycle Compatible Roadways and Bikeways: Planning and Design Guidelines.*
SH = shoulder SL = shared lane
Note: Shoulder width of 8 ft should be provided wherever possible on roadways with AADT greater than 10,000 vehicles

Roadways that are identified as bicycle compatible are often attractive candidates for incorporating into a planned bicycle network. However, it should be emphasized that roadways are open to bicyclists whether or not the roadway meets compatibility criteria, nor is the compatibility evaluation intended to assess safety. Bicycle compatible roadways may have more room for bicyclists to operate, but municipalities have successfully incorporated incompatible roadways into bicycle networks.

The results of the compatibility analysis are shown in Figures 7A and 7B. The analysis indicates that the large majority of county and state roadways in Middle Township are determined to be bicycle compatible using NJDOT criteria. The bicycle compatibility is especially pronounced outside the

proposed centers. In most cases, roadways are compatible because they have shoulders of the width called for in NJDOT guidelines. Dias Creek Road is one of the few examples of county roadways outside centers which is not bicycle compatible on both sides of the roadway; it is compatible only on the westbound side. Shoulders on the eastbound side typically measure only about 2 feet in width, less than the minimum 3 feet called for on roadways of its classification and posted speed.

Much of the mileage of county and state roadways within the proposed centers is bicycle-compatible, but there are some prominent exceptions. South Dennisville Road and Stone Harbor Boulevard (CR 657) are incompatible from Market Street to the Garden State Parkway, as shoulders are dropped to accommodate a multi-lane cross-section. Mechanic Street (CR 615) and Hand Avenue (CR 658) are both incompatible due to the narrow cross-section, comprised of a 34 to 36 foot wide two-way roadway with parking permitted on both sides.

US 9 is bicycle-compatible through most of the Township because of the presence of shoulders. However, it is incompatible in the center of Cape May Court House due to insufficiently wide lanes next to on-street parking from Romney Place to Pacific Avenue. In Rio Grande, US 9 is incompatible due to shoulders being dropped to permit multi-lane cross-section; NJ 47 is bicycle-incompatible through Rio Grande for the same reason.

Unfortunately, the roadways are incompatible in a number of areas of the Township where pedestrian and bicyclist activity is heaviest, such as Route 47 in the strip retail area. However, the large majority of the roadway network is bicycle-compatible, providing a good base for a bicycle network.

Bicyclist on Indian Trail Road.

Middle Township
Transportation Improvement Study

Bicycle Compatibility

Figure 7 A

Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Roadways
- Existing Bike Paths
- Planned Bike Paths
- Pedestrian Overpass
- Compatible in one direction
- Not Bicycle Compatible
- Bicycle Compatible

N

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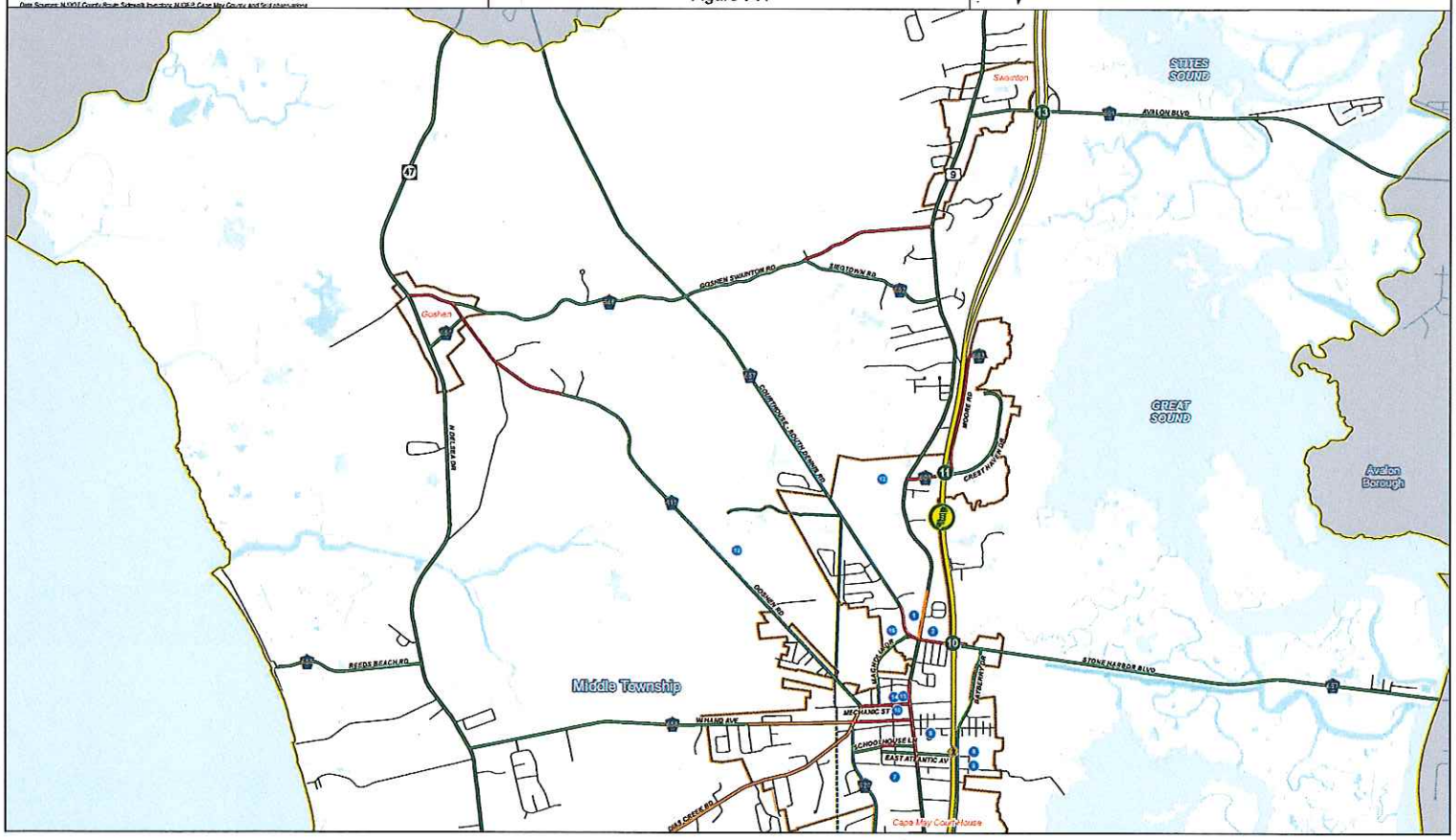
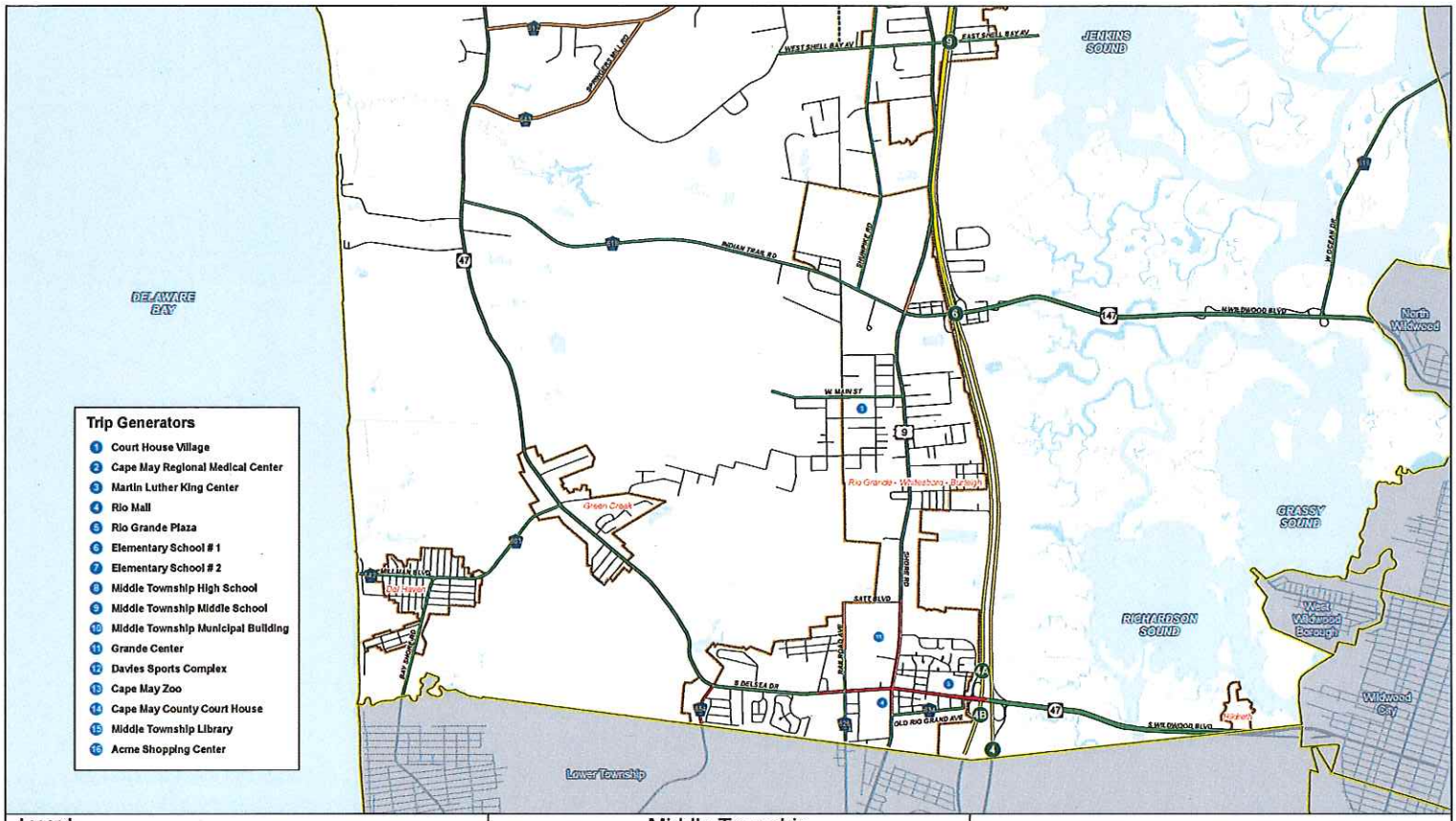
Miles

Baker

August 2010




DELAWARE BAY
JENKINS SOUND
GRASSY SOUND
RICHARDSON SOUND
North Wildwood
West Wildwood Borough
Wildwood City
Lower Township
Green Creek
Rio Grande - Wildwood - Burleigh
WEST SHELL BAY AV
EAST SHELL BAY AV
INDIAN TRAIL RD
W MAIN ST
N WILDWOOD BLVD
S WILDWOOD BLVD
W OCEAN DR
SATTE BLVD
S DELSEA DR
OLD RIO GRAND AVE
Trip Generators
1 Court House Village
2 Cape May Regional Medical Center
3 Martin Luther King Center
4 Rio Mall
5 Rio Grande Plaza
6 Elementary School # 1
7 Elementary School # 2
8 Middle Township High School
9 Middle Township Middle School
10 Middle Township Municipal Building
11 Grande Center
12 Davies Sports Complex
13 Cape May Zoo
14 Cape May County Court House
15 Middle Township Library
16 Acme Shopping Center
Legend
Center Boundaries
Municipal Boundary
Water Features
Roadways
Existing Bike Paths
Planned Bike Paths
Pedestrian Overpass
Compatible in one direction
Not Bicycle Compatible
Bicycle Compatible
Data Sources: NJDOT County Route Sidewalk Inventory, NJGER, Cape May County and field observations
Middle Township
Transportation Improvement Study
Bicycle Compatibility
Figure 7 B
N
0 0.5 1
Miles
August 2010
Baker

6.0 Stakeholder Interviews

Stakeholder interviews were conducted with a variety of local and county officials, as well as residents and business representatives, to determine key transportation issues that should be addressed. Following is a summary of issues suggested for assessment in the study. Issues suggested by multiple stakeholders have been so noted. The large majority of these issues are addressed in the following chapters covering proposed strategies. A number of the strategies were not investigated as part of this study, since they are being addressed through other projects.

6.1 Vehicular

- Provide left-turn lane and traffic signal at US 9 at Shell Bay Avenue and Main Street (multiple stakeholders).
- Provide flashing lights at Shell Bay Avenue and Shunpike Road.
- Install traffic signal at Magnolia Drive and S. Dennis Road.
- Develop Pennsylvania Avenue/ Railroad Avenue as an alternative to US 9 (multiple stakeholders).
- Place roadway through Old Cannery, and to Honeysuckle.
- Provide traffic calming on Ormond and Street and Romney Place.
- Lower speed limit on US 9 in the Courthouse.
- Provide center median barrier on NJ 47.
- Do not allow passing on NJ 47 or US 9.
- Consider a median on US 9 to make it seem like more of a "main street." Consider for the Court House, as well as for Whitesboro between the abandoned Wawa and Main Street.
- Consider extending Old Rio Grande Avenue across US 9 and to access the Parkway; consider median for this roadway.
- Convert Mechanic Street and Hand Avenue to one-way roadways (multiple stakeholders).

6.2 Parking

- Provide more on-street parking or garage in the Court House.
- Provide better signing to County parking lot on Mechanic Street.
- Consider on-street parking on US 9 in Whitesboro.
- The problem with on-street parking on Mechanic Street should be addressed.

6.3 Transit

- Provide public transportation to get workers to shore, and for vacationers and seasonal home owners (multiple stakeholders).

6.4 Pedestrian

- Improve sidewalk network to enable more children to walk to schools, and to enhance potential for school bus group stops.
- Install sidewalks on:

  - Main Street.
  - Shell Bay Avenue.
  - Goshen Road to Athletic Center.
  - US 9 south of Pacific Avenue.
  - Dias Creek Road.
  - NJ 147.
  - Hand Avenue.
- Provide more crosswalks on US 9.

6.5 Bicycle

- Continue the bike path down Railroad Avenue.
- Provide bike paths to scenic attractions on bay side.
- Designate bicycle network.
- Provide bicycle route from Cape May to Zoo.
- Create pedestrian/bicycle connection from Atlantic Cape Community College to downtown Court House.
- Provide bike racks at Goshen sports complex.
- Address obstacles for bicyclists crossing under the Parkway on NJ 47.
- Dias Creek is worst road to use for bicyclists due to minimal shoulders, poor sight distance.
- More bicycle racks are needed.
- Provide bicycle map.

7.0 Proposed Vehicular Strategies

A wide variety of strategies are recommended to enhance vehicular movement in Middle Township, ranging from simple strategies that can be accomplished in the near term – such as installing directional signs – to more complex strategies that will take years to implement, such as building up the roadway network.

7.1 Roadway Network

Enhancement of the existing roadway network is perhaps the most significant transportation improvement strategy that should be undertaken by Middle Township. Route 9 is the only continuous north-south roadway south of Indian Trail Road on the eastern side of the township, and motorists desiring to access land uses or roadways in this section have no other option. To the north of Indian Trail Road, Shunpike is the only alternative north-south roadway to Route 9. The lack of a good network requires motorists, bicyclists and pedestrians to conduct the large percentage of their trips on Route 9. It reduces the flexibility of Middle Township in planning centers along Route 9. The plans for any land uses must weigh the impact on Route 9, since virtually all trips generated by land uses will be traveling this roadway.

Figure 8 indicates recommended improvements to the roadway network that will increase the number of options available to motorists in the township. These are categorized as "Paper streets," "New ROW (Right-of-Way)," and "General locations."

7.1.1 Paper Streets

The easiest improvements will involve constructing paper streets, since the right-of-way already exists for these roadway segments. However, it should also be noted that there are many paper streets in Middle Township that will likely never be built, given the presence of significant wetlands in some of these areas. Figure 8 highlights in blue the more consequential paper streets that will be feasible to construct. They include the extension of Reading Avenue south from Main Street, and the extension of Honeysuckle Lane south of Oyster Road.

7.1.2 New ROW

To create roadways requiring new ROW, it will be necessary to acquire private property, or coordinate with property owners in developing the property. The proposed extension of Reading Avenue is part of an alternative roadway to Route 9 that would run parallel to, and to the west of, Route 9 from Main Street in Whitesboro to Satt Boulevard in Rio Grande. Right-of-way does not exist south of Cochran Street, requiring Middle Township to coordinate with landowners on the segment shown in red between Cochran Street and Satt Boulevard in assembling this roadway. Middle Township could create the roadway through either acquiring the land from the property owners, and/or through requiring the property owners to develop a rear service road as part of future developments. It will be more difficult to develop a rear service road on the parcels of land that are already developed. In these cases, the Township must either wait for a redevelopment opportunity, or work with the landowner to confer the

land via easement. By working with property owners to create the alternative road as part of future development, construction of the new roadway would take longer, but would also cost the municipality less.

The proposed western alternative route would ideally be positioned immediately east of the NJ Transit railroad line. It is noted that existing Reading Avenue above Wiley Avenue is to the west of the NJ Transit line. However, the western alternative road should be east of the railroad for the following reasons:

- Development potential is greater to the east of the railroad line than the west;
- The road is envisioned as a rear service road to Route 9 businesses; and,
- The Rio Grande-Whitesboro-Burleigh center boundary is coterminous with the railroad line between King Street and Satt Boulevard.

It is noted that the public right-of-way on both sides of the NJ Transit rail line above Cochran Street is labeled as Reading Avenue, according to the Middle Township tax maps.

Two other proposed new roadways are also shown in red:

- The extension of Honeysuckle Lane between W. Johnstown Lane and Shell Bay Avenue. This extension would improve the roadway network north of Indian Trail Road.
- The extension of Shunpike Road to the south, facilitating the movement of motorists between the northern half of the township and the southern half. If Honeysuckle Avenue can be extended from Indian Trail Road through Shell Bay Avenue, this extension becomes less important.

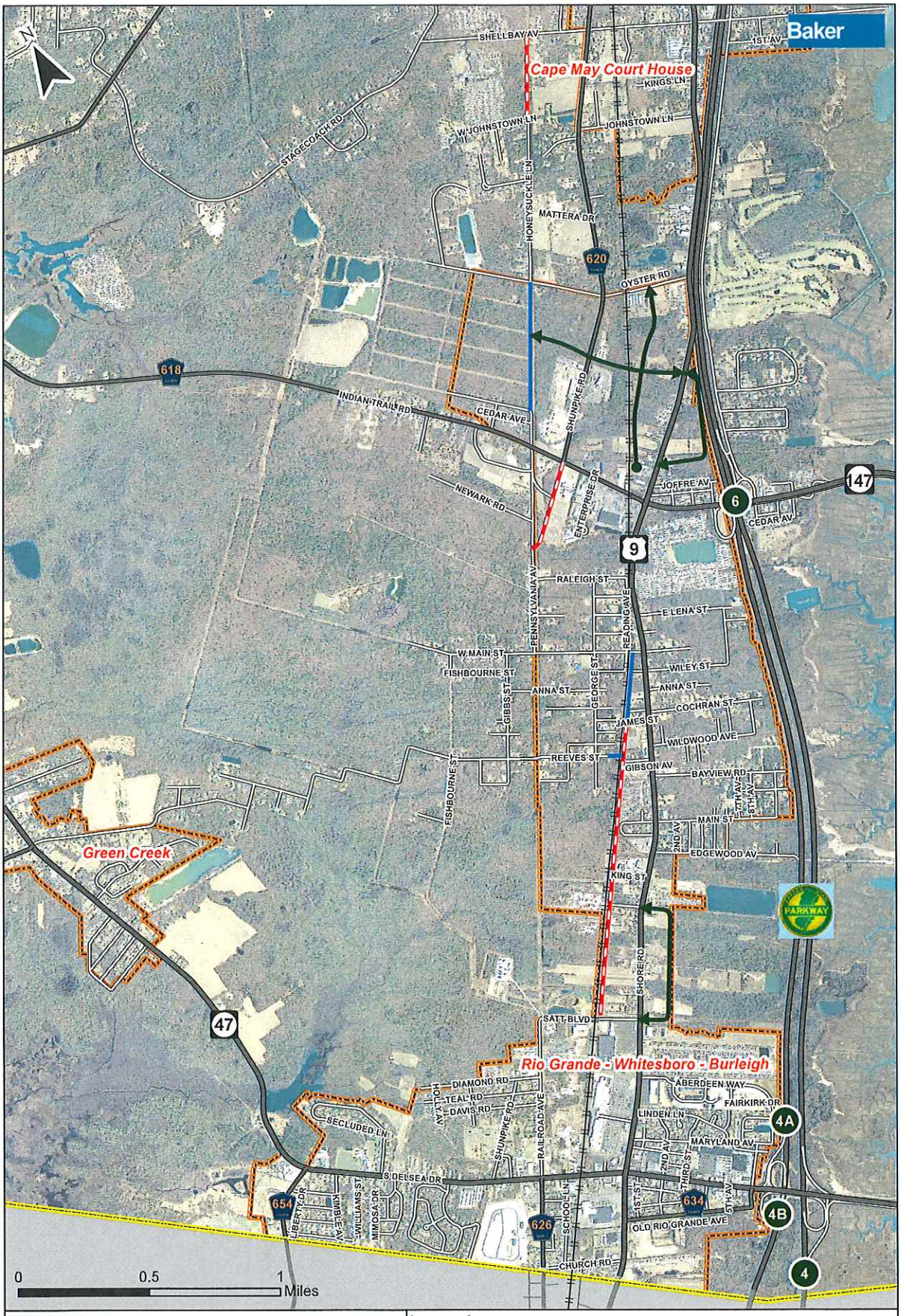
7.1.3 General Locations

Finally, there are recommendations for some roadways which have a less defined location than the paper streets or proposed new roadways. These more general roadway locations are symbolized by the green arrows on Figure 8. The exact location of these roadways will depend upon planning and coordination with local landowners. Three of the locations are intended to serve as rear service roads for the development anticipated along Route 9. These locations are: east of Route 9, just above Satt Boulevard; east of Route 9, above Joffre Boulevard; and west of Route 9, between Oyster Road and Joffre Avenue. The fourth location, an east-west roadway extending from Honeysuckle Lane to Route 9, is intended to strengthen the network in the Whitesboro-Burleigh center, and provide an option to the superblocks that would otherwise predominate here.

One alternative was investigated by the project team, and deemed infeasible. This would have extended Railroad Avenue north from its terminus at Satt Boulevard in order to connect to Pennsylvania Avenue at Main Street. A preliminary environmental screening revealed the presence of a large wetlands area that would likely qualify as wetlands of exceptional resource value due to their association with threatened and endangered species habitat. Portions of the area immediately west of Pennsylvania Avenue are owned by the US Fish and Wildlife Service and the Nature Conservancy.

The primary goal of all of these recommendations is to strengthen the roadway network in Middle Township, and provide alternatives to Route 9 for traveling throughout the township. Further, the development of rear access roadways (otherwise known as reverse frontage roadways) would provide a desirable alternative to the construction of individual driveways for all of the lots along Route 9. The latter scenario would result in increased traffic conflicts and slower travel time along Route 9.

Route 9 above Whitesboro.



Middle Township Transportation Improvement Study

Proposed Roadway Network

Figure 8

March 2011

Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Proposed Roadway, General Location
- Proposed Roadway, New ROW
- Proposed Roadway, Paper Street

7.1.4 Railroad Crossings

It should be noted that two new crossings of the NJ Transit rail line are suggested, for the east-west roadway above Indian Trail Road, and for Reeves Street. It is recognized that NJDOT prefers to minimize the number of at-grade roadway crossings of railroad tracks. The NJDOT Bureau of Railroad Engineering and Safety has a policy of maintaining no net increases to railroad crossings. If approval is sought for a new railroad crossing, NJDOT will request the applicant to assist in closing an existing rail crossing elsewhere.

The rationale for providing new crossings of the NJ Transit line in Middle Township is that it is a growing community, and would like to encourage development and redevelopment within its proposed centers, in line with the New Jersey State Plan. If providing new crossings of the railroad track will advance the ability to develop the centers, and will strengthen the roadway network – such that an alternative to using Route 9 becomes more feasible – the crossing of a railroad track would serve important planning goals.

The existing rail line in Middle Township has only marginal value as a transportation facility. NJ Transit leases the line to Cape May Seashore Lines, which is an excursion railroad line targeted at tourists, operating between Rio Grande and Cape May City, as well as between Richland and Tuckahoe. The service in Rio Grande re-started in 1999, but there was no service provided in various years, including from 2005 to 2010. The line sporadically operated from the beginning of July through Labor Day, with up to three trips per day, four days per week.

This line once hosted regular passenger service, but there are no plans for a revival. In 2002, SJTPO (South Jersey Transportation Planning Organization) conducted a study evaluating the potential for providing passenger service on four different rail corridors in the South Jersey region. One of the four corridors selected for study was the rail line between Winslow Junction and Cape May Court House. According to the study, "Much of the corridor passes through woodlands and rural areas with little or no rider-ship base located on the corridor. There appear to be no other good candidate sites for stations in this corridor. The entire corridor is given a Low Transit Score on the 2020 Transit Score Report/Map."[1]

Particularly because the NJ Transit rail line has marginal value as a utilitarian transportation facility, its location should not be used to discourage development of an effective roadway network extending to the west of Route 9. Indeed, the rail line would have greater value as a passenger transportation facility if it could be converted to a roadway. In the location of the rail line, a roadway here would be in an ideal location to serve as an alternative facility to Route 9.

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[1] SJTPO, *South Jersey Regional Rail Study: Environmental and Infrastructure Survey of Four Existing Corridors in Atlantic, Cape May, Cumberland, Salem, Camden and Gloucester Counties.* December 2002.

The promotion of alternative transportation modes in the state is a valued goal. For this reason, if the re-institution of passenger rail service along the NJ Transit line in Middle Township were determined to eventually be feasible, this should take precedence over any consideration of developing the rail line as a roadway. However, if a study should conclude that restoring passenger rail service is infeasible, and if the freight service along the railroad line remains minimal, Middle Township would be better served if the line could be converted to a roadway, serving as the "western alternative" to Route 9 discussed above.

7.2 K-Mart Plaza

As noted in section 2.3, the intersection of New York Avenue and Route 47 is one of the highest crash intersections in the Township. A contributing factor is likely the offset of the driveway to the K-Mart Plaza from New York Avenue. These are both high-volume curb cuts, resulting in many turning movements; left turns into either curb cut must cross the other. It was noted on field views that many motorists exiting the K-Mart Plaza would briefly drive on Route 47 before turning into New York Avenue, and vice-versa. This adds to vehicular conflicts in the area.

Route 47 at New York Avenue.

Two strategies are proposed to address this situation with access to the K-Mart Plaza on Route 47. They are presented below, and illustrated in Figure 9. A third access strategy would result in safer access from K-Mart to Route 9, and is also illustrated in Figure 9.

7.2.1 Improvements to Route 47 Access

Access Strategy A

Under this scenario, two median segments would be installed on Route 47. The major segment would extend from just west of the Advanced Pest Management building to the centerline of New York Avenue. So installed, this island would permit left turns onto New York Avenue, but would prohibit left turns out of New York Avenue, and left turns into or out of the K-Mart Plaza driveway. To accompany this new median, the existing concrete median west of Route 9 should be extended west to the intersection with New York Avenue. This extension is recommended to prevent westbound motorists on Route 47 from turning left into the parking lot for LeRic's Grande Plaza commercial center, as a means of ultimately accessing the K-Mart. The increase in left turns into LeRic's would serve to diminish the safety benefits of the proposed median.

These improvements would likely reduce the number of crashes associated with turning movements at this location. Most of the motorists affected by installation of the median would have other options. Instead of turning left into the K-Mart Plaza driveway on Route 47, motorists could turn left into the shopping center by proceeding southbound on Route 9 and using the access drive south of Walsh Avenue. Motorists currently turning left out of New York Avenue can instead enter Route 9 using the access drive between the Wawa and Grande Center. To accommodate the egress of emergency vehicles from the Rio Grande fire station onto Route 47, the median is proposed to be mountable at the intersection of Route 47 with fire station driveway.

Motorists currently turning left from K-Mart Plaza onto Route 47 would be the most affected by installation of a physical median, as there is no convenient alternative route. They would need to exit the K-Mart Plaza onto Route 9 and turn left again onto Route 47.

The recommended median improvement is depicted in greater detail in Figure 10.

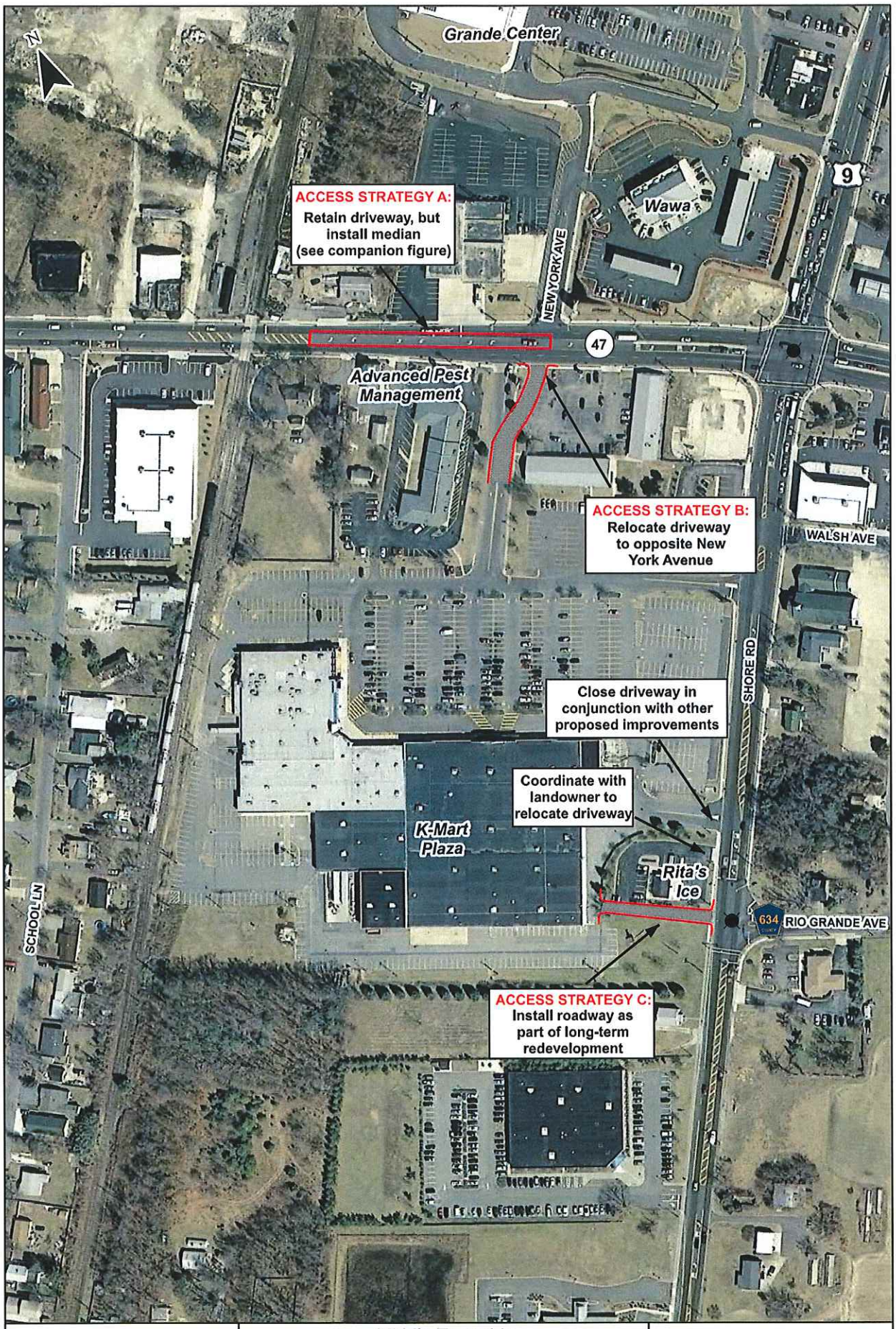
Access Strategy B

Strategy B would involve realigning the existing K-Mart Plaza driveway to intersect with Route 47 directly opposite New York Avenue. Since New York Avenue and the driveway would no longer be offset, this design should reduce the number of conflicting turning movements. Motorists passing from the K-Mart Plaza to Grande Center would be able to move directly across Route 47.

Coordination with the owner of the strip commercial center to the north of K-Mart Plaza is presumed under this scenario. Under the various scenarios proposed to address this safety issue, it is presumed that redevelopment is more likely for properties to the south of Route 47 than properties to the north. Structures on the south are older than the commercial properties to the north of Route 47, and are likely more marginal in terms of economic value.

Access Strategy C

To better integrate the K-Mart Plaza shopping center into the surrounding roadway network, it is recommended that as part of future redevelopment, consideration be given to creating a new access drive onto Route 9 at Rio Grande Avenue. Motorists leaving K-Mart Plaza would be able to access Route 9 at a signalized access drive. Along with this improvement, the existing driveway to the north of Rita's Ice should be closed. Further, coordination should take place with the Rita's Ice property owner. Their access drive onto Route 9 is within the influence area for the intersection of Rio Grande Avenue and Route 9. It should be closed, with a new driveway opening onto the proposed K-Mart Plaza access drive.



Existing Signalized Intersection

Middle Township
Transportation Improvement Study

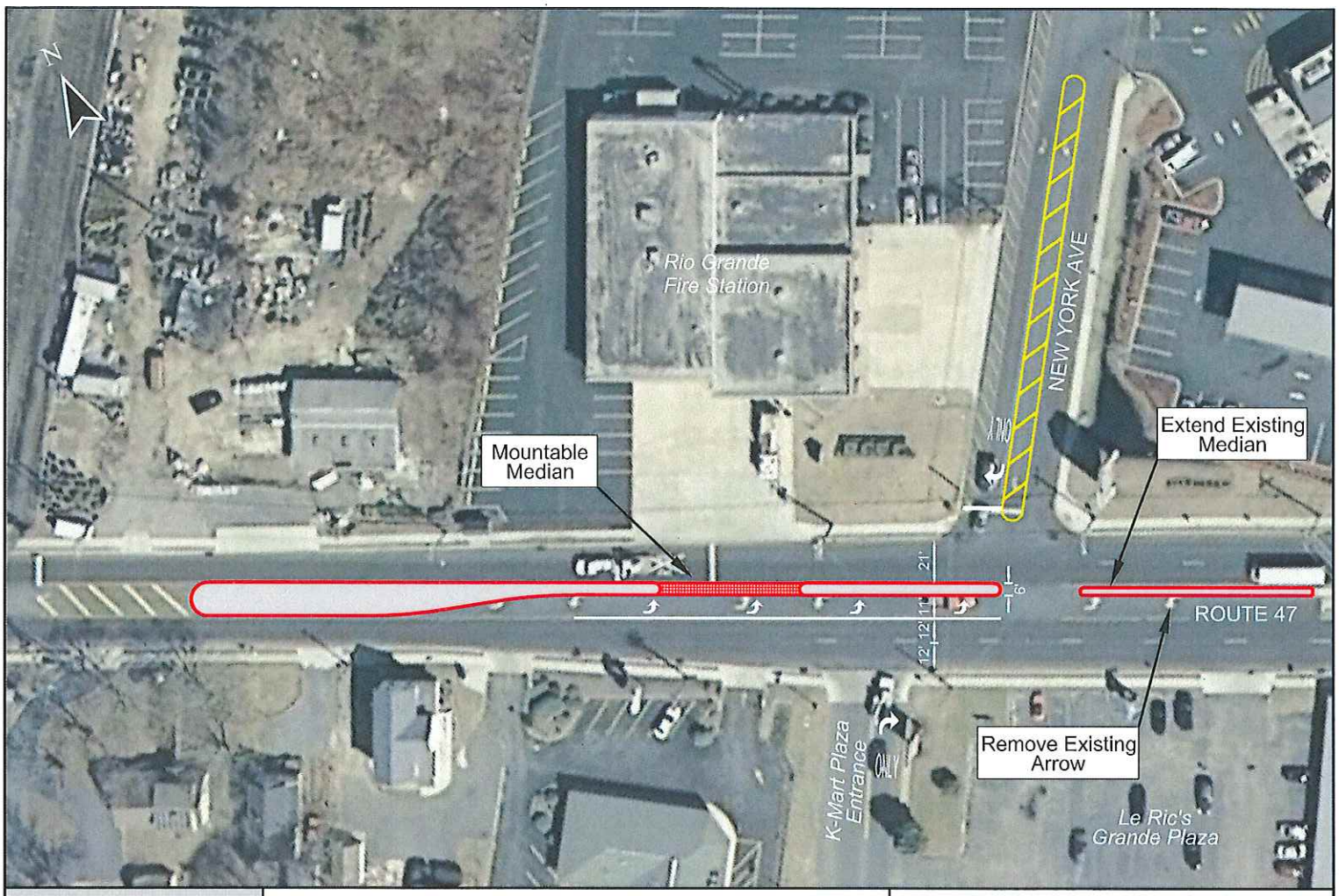
Recommended Improvements at K-Mart Plaza

Figure 9

0 100 200 Feet

Baker

June 2011



LEGEND:

PROPOSED PAVEMENT MARKINGS

PROPOSED CURB LINE

Middle Township
Transportation Improvement Study
Route 47 Median Installation
Figure 10

30 15 0 30 60
SCALE IN FEET

Baker

February 2011

7.3 Rio Grande Avenue

Middle Township officials have expressed interest in making greater use of Rio Grande Avenue, particularly as an alternative to Route 47. This is a sound traffic strategy, since the existing daily traffic volume on Rio Grande Avenue is 6,400, compared to the daily traffic volume of 21,000 on the section of Route 47 to the north of Rio Grande Avenue. Greater use of Rio Grande Avenue by motorists with origins and destinations to the south of Route 47 would help to relieve traffic and delays at the intersection of Route 47 and Route 9, the most congested intersection in the township.

Any strategy intended to make greater use of Rio Grande Avenue should be targeted at motorists traveling to or from points south of Route 47, as there is little reason for motorists traveling from the west or north to go out of their way to use this roadway.

One strategy that would likely increase use of Rio Grande Avenue would be the installation of an access drive from the K-Mart Plaza complex to Rio Grande Avenue, as discussed above. Motorists who depart the K-Mart Plaza at Rio Grande, and have destinations to the east such as Wildwood or Joe Canal Liquor at 5th Street and Route 47, would likely use Rio Grande Avenue to reach the destination. Under existing conditions, motorists departing K-Mart Plaza at the unsignalized driveways north of Rio Grande Avenue may choose to head north on Route 9 to Route 47.

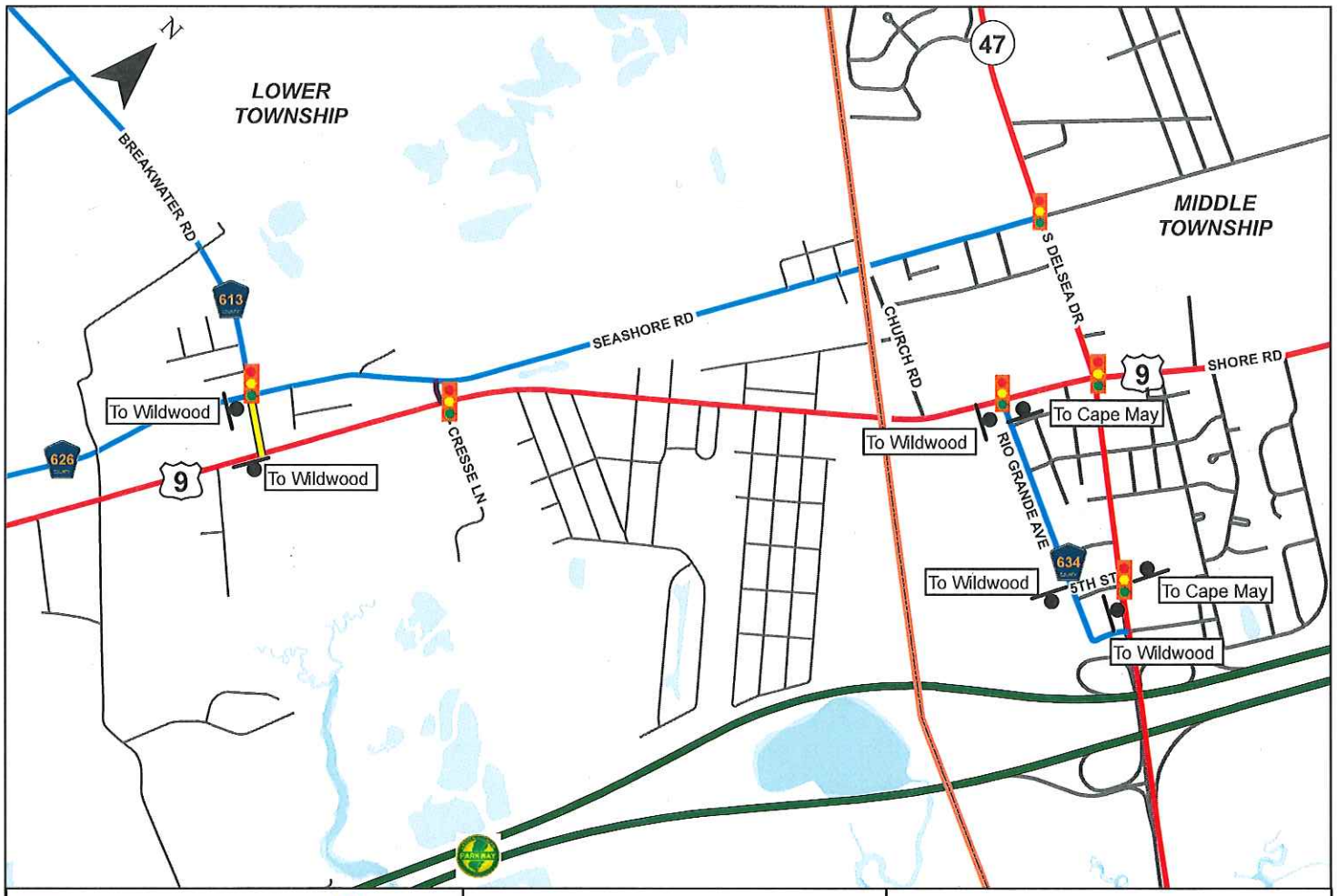
A relatively inexpensive but potentially effective strategy would involve installing basic motorist directional signage to direct motorists driving from the south to Wildwood to use Rio Grande Avenue. Signs directing motorists to use Rio Grande Avenue to access Wildwood could be installed at the following locations:

- Northbound on Seashore Road at Breakwater Road in Lower Township, directing motorists to turn right. Currently, Breakwater Road terminates at Seashore Road. However, this road will be extended to Route 9 in the future, and this intersection signalized, as part of a Cape May County project. A sign in the proposed location would be especially effective in capturing visitors staying at the large campgrounds along Seashore Road in Lower Township. Since many of these are unfamiliar with the area, signing will be useful. Along with this improvement, Cresse Lane, the next east-west roadway to the north, will be vacated.
- Eastbound on Breakwater Road at Route 9, directing motorists to turn left onto Route 9.
- Northbound on Route 9 at Rio Grande Avenue.
- Northbound on 5th Street at Route 47.

Signs directing southbound motorists to use Rio Grande Avenue to access Cape May could be installed at the following locations:

- Westbound on Route 47 before 5th Street;
- Westbound on Rio Grande Avenue at Route 9.

Figure 11 illustrates the recommended signage locations.



State Roadway
County Roadway
Proposed Roadway Extension
Proposed Roadway Elimination
Signalized Intersection
D1-1 Sign

Middle Township
Transportation Improvement Study
Tourist Signing
Figure 11

0 0.25 0.5
Miles

Baker

June 2011

7.4 Intersection Upgrades

7.4.1 Route 9 and Route 47

Of the intersections evaluated for this study, the intersection of Route 9 and Route 47 is the most congested. It operates at a Level of Service 'F' in both the weekday evening and Saturday mid-day peak hours. This intersection was not evaluated for improvements as part of this study, since it is scheduled for improvements in the near future under the Wal-Mart developer's agreement. A left turn lane will be added to the southbound approach, resulting in dual left turn lanes for the southbound movement. The signal timing of this intersection will be revised and optimized at that time. Delays will be reduced under this plan. However, significant traffic will continue to be an issue here, along with delays, and Middle Township and the state should continue to coordinate to identify strategies to improvement operations here. Roadway network strategies recommended in this plan – particularly the tourist signing for Rio Grande Avenue, and the development of western alternatives to Route 9 – are intended to reduce traffic volumes passing through this intersection, and thus delays.

7.4.2 Route 9 and Stone Harbor Boulevard

Aside from the intersection of Route 9 and Route 47, the intersection of Route 9 and Stone Harbor Boulevard had the most significant delays, with a Level of Service 'D' in the Saturday mid-day peak hour, and 'F' in the weekday evening peak hour. Traffic conditions are anticipated to improve due to the proposed Garden State Parkway improvements. There are currently two lanes on the westbound approach, and under the proposed Parkway improvements, Stone Harbor Boulevard will be widened, with three lanes on the westbound approach. The Parkway has not indicated the proposed lane assignment or signal timing, but the increase in capacity will very likely improve traffic conditions.

If a reduction in delay is desired before the construction of the Parkway improvements in 2014, an optimized timing scheme is recommended. The current timing scheme is as follows, for the 117-second cycle. An optimized timing scheme would involve shifting to a 120-second cycle, with a slightly higher fraction of time for the eastbound-westbound phase for all movements, as follows. Table 10 indicates the existing signal timing per phase, and the recommended phasing:

Table 10: Existing and Proposed Signal Timing for Stone Harbor Boulevard and Route 9

Scenario	Existing			Proposed		
	Green	Yellow	Red	Green	Yellow	Red
Phase 1: NB and SB L	15	3	0	14	3	0
Phase 2: NB and SB L-T-R	38	4	2	40	4	2
Phase 3: EB and WB L	8	3	0	7	3	0
Phase 4: EB and WB L-T-R	38	4	2	41	4	2
Cycle Length	117 seconds			120 seconds		

Table 11 compares the average delay per vehicle (in seconds) and Level of Service for each approach, and the overall intersection. With the recommended improvements, the average delay per vehicle would be reduced from 85 seconds to 76 seconds, and the overall LOS would improve to 'E' from 'F'.

Table 11: Level of Service for Stone Harbor Boulevard and Route 9

Scenario	Existing		Proposed	
	Delay (in Seconds)	LOS	Delay (in Seconds)	LOS
EB	36.2	D	36.9	D
WB	165.9	F	115	F
NB	83.5	F	99.8	F
SB	46.1	D	44.9	D
Overall	85.0	F	75.9	E

7.4.3 Route 9 and Mechanic Street

The study Steering Committee inquired into the possibility of adding a northbound-southbound left turn signal phase to Route 9 at Mechanic Street. There are currently left turn lanes on the northbound and southbound approaches, but no left turn signal phase. An analysis using Highway Capacity Software revealed that the addition of a left turn signal phase would increase overall average delay per vehicle in the evening peak hour from 16.1 seconds to 22.7 seconds, or from LOS 'B' to 'C'. The increase in delay is partly because left turn volumes on the northbound and southbound movements are relatively light, and a left turn signal phase is not needed to help process these movements. This signal time is thus not used efficiently with the addition of a left turn signal phase. It was further noted that a crash analysis revealed no pattern of crashes at this intersection associated with conflicts involving left turning vehicles. Based upon these findings, it is unlikely that NJDOT would approve implementation of a left turn signal phase at this intersection.

7.5 Parking on Mechanic Street

As discussed in Section 2, crashes related to parking vehicles are a significant issue along Mechanic Street. These crashes can be at least partly traced to the narrow width of Mechanic Street and the heavy use of on-street parking spaces. This issue was investigated in a 2005 report prepared for Cape May County, which evaluated and summarized potential solutions as follows:

1. Take no action. Because of crash history and the driving problem, this was deemed to not be a reasonable alternative.
2. Convert Mechanic Street and Hand Avenue to one-way streets between Route 9 and Dias Creek Road. This was not recommended due to the geometry of Hand Street and Dias Creek Road.
3. Convert Mechanic Street and Hand Avenue to one-way between Route 9 and Boyd Street. This was indicated to be workable, but with significant drawbacks.

4. Remove parking along the northerly curbline for the entire length between Route 9 and Dias Creek Road. The report identified this as the best solution. Alternatively, the width of the sidewalk along Mechanic Street could be reduced in order to increase roadway width.

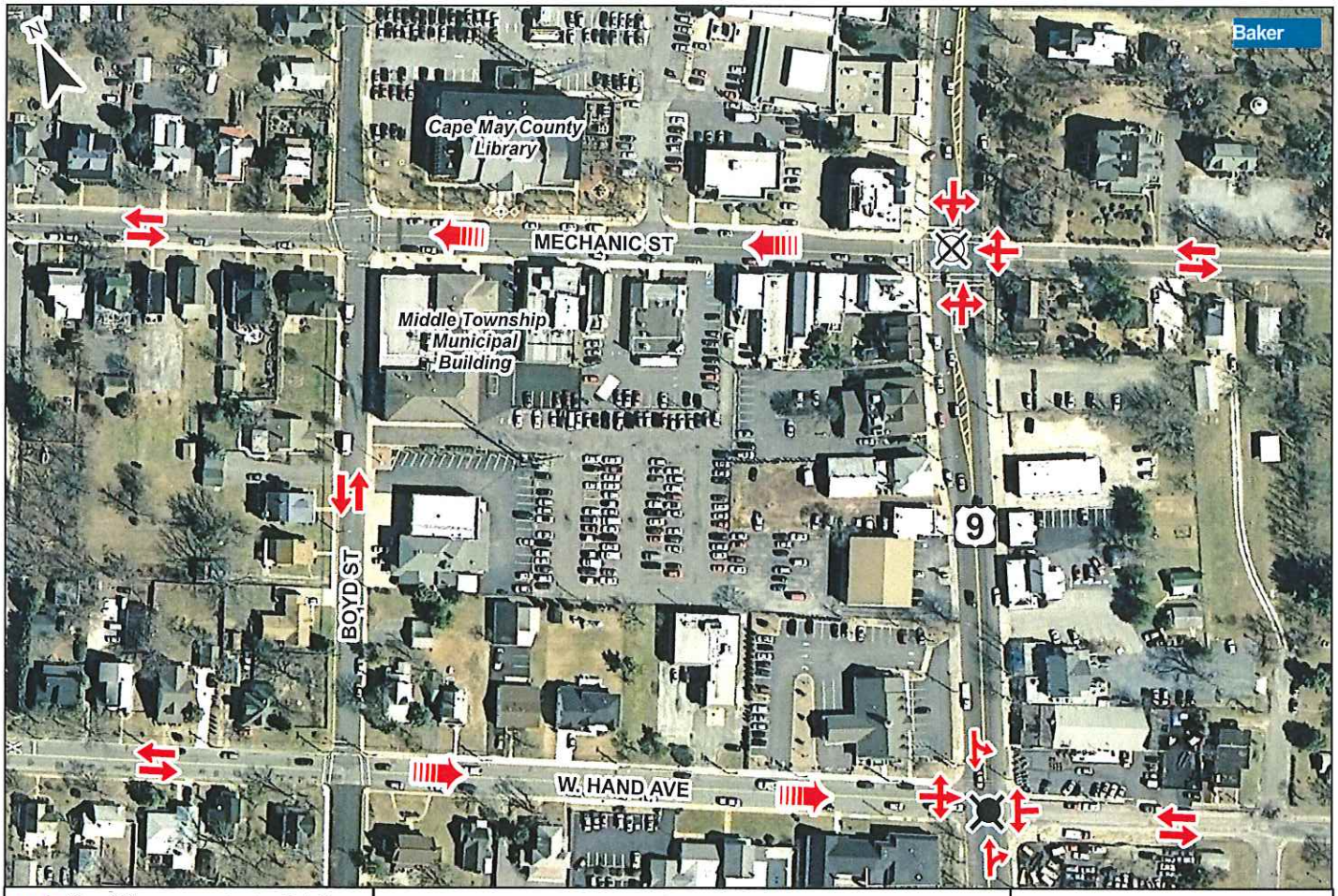
The report identified option 4, removal of parking from one side of Mechanic Street, as being the best solution. However, this idea was not adopted by the Middle Township administration.

Option 3, conversion of Mechanic Street and Hand Street to a one-way couplet is a feasible solution that now deserves a second look. The 2005 report expressed caution about this strategy, in part because it would increase traffic volumes on Hand Street. However, this may actually be an advantage. The downtown business district in Cape May Court House is limited in size, and the increased use of another roadway would help in making Hand Avenue more viable in future commercial development.

The one-way concept is illustrated in figure 12. Mechanic Street west of Route 9 is proposed to be westbound, to accommodate the many visitors destined for the municipal and county facilities along and in proximity to this roadway. Hand Avenue is thus proposed to be eastbound. Given the heavier traffic volumes anticipated to enter Route 9 from Hand Avenue under this scenario, a traffic signal is proposed for this intersection. It was noted by Steering Committee members that it had become increasingly difficult for motorists to enter Route 9 from Hand Avenue, as traffic volumes have historically increased, and the slight offset of East Hand Avenue from West Hand Avenue serves to further complicate entrance onto Route 9 under current conditions. Installation of a traffic signal at Route 9 and Hand Avenue would facilitate this movement.

Both Options 3 and 4 have advantages and disadvantages. Both should serve to reduce the number of parking-related crashes along Mechanic Street. Option 3 would retain the on-street parking spaces on both sides of Mechanic Street. However, vehicles often travel faster on one-way roads, so it is possible that speeds would increase slightly. In terms of disadvantages, Option 4 would reduce the number of on-street parking spaces on a roadway (Mechanic Street) where it is most heavily in demand.

Since both alternatives could be effective in reducing parking-related crashes, the decision on which option is preferable is a planning one, based upon local community development goals.



One-Way Traffic

Existing Signal

Directional Movements

Proposed Signal

Middle Township
Transportation Improvement Study

One-Way Scenario on Mechanic Street and Hand Avenue

Figure 12

100 0 100 Feet

June 2011

7.6 Treatments for Route 9 in Cape May Court House

Project stakeholders have expressed interest in making Route 9 in Cape May Court House look more like a "main street" and less like a highway for pass-through traffic. It should first be noted that an important component of a main street strategy is planning the appropriate land uses along the roadway. A roadway that looks like a main street will have buildings arrayed directly along the street line, with relatively few gaps for off-street parking. The density of land uses also supports a main street environment. These are valuable strategies that should be explored by Middle Township, but they lie outside the scope of this study.

Several vehicular strategies can be considered for Route 9 to enhance the main street character. A basic strategy would involve the striping of on-street parking spaces, since this is characteristic of main streets. It would also promote greater efficiency in the use of on-street parking. The lines would help to visually narrow the roadway for passing motorists, and may contribute to a reduction in vehicular speed.

The parking stalls can be accompanied by two different treatments: installation of median islands or bulb-outs. Median islands could be installed at three different locations, as illustrated in figure 13. The key location would be at the mid-block crosswalk for the County courthouse, since this accommodates regular pedestrian activity. The two islands to the south are shown placed within the existing gore striping on Route 9, to illustrate that the installation of median islands would not necessarily require a change in travel lane striping.

Figure 14 illustrates the treatment for bulb-outs. They are recommended at the mid-block crosswalk for the County Courthouse. The bulb-outs should be built at a width of 6 feet, to "shadow" the existing on-street parking. A major advantage of bulb-outs is that their use permits on-street parking to be located in greater proximity to a mid-block crosswalk. Under NJSA 39:4-138, parking is normally prohibited within 25 feet of a crosswalk. However, parking may be as close as 10 feet, if the crosswalk is constructed using a bulb-out. Bulb-outs offer greater visibility of and by pedestrians waiting to cross a street, which is the rationale for reducing distance to parked vehicles. Bulb-outs could also be considered for the intersection of Route 9 and Mechanic Street.

Both bulb outs and median islands could be accompanied by landscaping treatments, if desired. Together with striping parking spaces, either treatment will act as a traffic calming measure that should reduce motorists' speeds, and remind motorists that they are traveling through a "downtown" environment. Based on anecdotal field views, many motorists on Route 9 do not stop for pedestrians about to cross at the mid-block crosswalk by the County courthouse, and the proposed treatments may help address that condition. To further emphasize traffic calming at the mid-block crosswalk, bulb-outs could be used here in conjunction with a median island.

LEGEND:

PROPOSED PAVEMENT MARKINGS

PROPOSED CURB LINE

Middle Township
Transportation Improvement Study
Route 9 with Median Islands
Figure 13

30 15 0 30 60
SCALE IN FEET

February 2011

Baker

LEGEND:

PROPOSED PAVEMENT MARKINGS

PROPOSED CURB LINE

Middle Township
Transportation Improvement Study
Route 9 with Bulb-Outs
Figure 14

30 15 0 30 60
SCALE IN FEET

February 2011

Baker

7.7 Parking Lot Signage

Based on the parking inventory conducted for this study, parking is very well used on Mechanic Street and on Route 9 in the vicinity of the Courthouse, but vacancies can typically be found on other roadway segments or parking lots. Several stakeholders had expressed interest in building a parking garage, but given existing conditions, construction of a parking garage is not recommended. Parking garages are relatively expensive (construction costs can be over $15,000 to $20,000 per space, versus roughly $2,000 to $5,000 per space for a surface lot).

The largest supply of available parking is typically found at the County parking lot east of Route 9 and north of Mechanic Street. This has 116 spaces, and was never found to be more than 50% occupied during parking counts, even on days when courts were in session. Many visitors to Cape May Courthouse probably are not aware of its existence, since the lot is not visible from either street. There are signs posted at the driveway entrance on Mechanic Street. There is also one parking sign facing northbound traffic on Route 9 at Mechanic Street, but this sign is obscured by tree branches. Figure 15 provides recommendations for better directing motorists to this lot. The installation of new directional parking signs is recommended along southbound Route 9 and eastbound Mechanic Street. It is recommended to prune back the tree branches obscuring the sign on northbound Mechanic Street.

Parking Sign

Middle Township
Transportation Improvement Study
Parking Sign Recommendations
Cape May Court House
Figure 15

0 100 200 Feet

Baker

February 2011

7.8 Policy Recommendations

A wide range of vehicular strategies are recommended for Middle Township to implement through changes to its ordinance, as described below.

7.8.1 Complete Streets

It is recommended that a Complete Streets Policy be adopted by Middle Township. As defined by the National Complete Streets Coalition, Complete Streets are **designed and operated to enable safe access for all users (www.completestreets.org).** Pedestrians, bicyclists, motorists and transit riders of all ages and abilities must be able to safely move along and across a complete street. Interest in the idea of Complete Streets has grown significantly since the birth of the movement in 2003. Nationwide, 224 jurisdictions have adopted Complete Streets policies.

Below is a model complete streets ordinance that could be adopted by Middle Township:

Complete Streets Model Ordinance

AN ORDINANCE relating to complete streets policy for the Township of Middle, stating guiding principles and practices so that transportation improvements are planned, designed and constructed to encourage walking, bicycling and transit use while promoting safe operations for all users.

WHEREAS, implementing transportation improvements that are planned, designed and constructed to safely accommodate walking, bicycling, and transit use increase the general safety, health and overall welfare of the citizens of and visitors to the Township of Middle; and,

WHEREAS, the Township of Middle will seek to enhance the safety, access, convenience and comfort of all users, including pedestrians, bicyclists, transit users and drivers, motorists and freight drivers, and people of all ages and abilities, including children, older adults, and persons with disabilities, through the design, operation and maintenance of the transportation network so as to create a connected network of facilities accommodating each mode of travel; and,

WHEREAS, transportation improvements are to be planned and designed in a manner consistent with, and supportive of, the surrounding community, recognizing that all streets are different and that the needs of various users will need to be balanced in a flexible manner;

NOW, THEREFORE, BE IT ORDAINED BY THE TOWNSHIP OF MIDDLE AS FOLLOWS:

Section 1. All roadway projects, including construction, re-construction, re-paving and rehabilitation, will provide appropriate accommodation for pedestrians, bicyclists, transit riders and drivers, motorists and freight drivers, and people of all ages and abilities, including children, older adults and persons with disabilities, except under one or more of the following conditions:

- The roadway project is comprised of ordinary maintenance activities designed to keep assets in serviceable condition (e.g., mowing, cleaning, sweeping, spot repair and surface treatments such as chip seal);
- Where use by nonmotorized users is prohibited by law;
- The cost would be excessively disproportionate to the need or probable future use over the long term;
- There is an absence of current and future need.

Section 2. Appropriate accommodations include facilities and amenities that are recognized as contributing to complete streets, which may include sidewalks and pedestrian safety improvements such as median refuges, pedestrian signals, bulbouts and crosswalks; street and sidewalk lighting; improvements that provide ADA (Americans with Disabilities Act) compliant accessibility; transit accommodations including improved pedestrian access to transit stops and bus shelters; bicycle accommodations including shared-use lanes, wide travel lanes or bike lanes as appropriate; paved shoulders; bicycle parking; landscaping, street furniture and adequate drainage facilities; and other facilities.

Section 3. Complete streets principles will be incorporated into the comprehensive plan, subdivision and land development ordinance, and other plans, manuals, regulations and programs as appropriate.

NJDOT has a more comprehensive complete streets policy, and this may also be referred to as a good model.

To help address possible concerns about improvement costs, Section 1 indicates that complete streets policies will be followed on roadway projects in the municipality, with the exception of simple maintenance projects, and projects where there is no need or where implementation of the policy will result in disproportionate costs. These exceptions are common provisions in adopted complete streets policies nationwide. The NJDOT Complete Streets Policy specifically indicates that exceptions to the policy may be justified if the cost of the accommodation exceeds 20% of the total improvement cost.

In its essence, application of a Complete Streets policy would involve examining the opportunity for accommodating pedestrians and bicyclists on new and retrofit projects, including design, planning, maintenance and operations, for the entire right-of-way. Even a relatively simple resurfacing project should involve an evaluation as to whether the roadway can better accommodate bicyclists.

7.8.2 Access Management

Access management is an important accompanying strategy to the network improvements described above. This is the practice of managing the number, spacing, and design of driveways along a corridor. It is well established that this strategy is effective in enhancing the capacity and safety of a roadway. The following corridors, at a minimum, should be targeted for access management:

- Route 9
- Route 47
- Stone Harbor Road/ S. Dennis Road (CR 657)
- Railroad Avenue (CR 626)

These corridors have all hosted commercial development, and the potential for further development and redevelopment is especially significant along Route 9 and Route 47.

Middle Township can promote access management strategies along these corridors through ordinance. It should first be noted, however, that NJDOT has ultimate authority over applications for curb cuts on state highways. Similarly, county planning boards have the ability to review developments along county roads and to require physical improvements relating to the safety and convenience of the traveling public. Access management strategies should thus be coordinated with the appropriate agency.

Although municipalities do not have authority over the placement or design of driveways along Route 9, they control the land use and can require landowners to address circulation conditions off Route 9, such as through vehicular links to adjoining properties, as part of the subdivision or land development process. If a joint or cross access drive can be developed, this may alleviate the need for one or more driveways on the main roadway, or reduce the scale of driveways on the main roadway. Therefore, it is recommended that Middle Township incorporate the following language, or similar language, into its subdivision and land development ordinance:

Recommended Access Management Language

Property owners of all uses fronting (name of roadway) shall be required to evaluate the feasibility of a joint or cross access drive between their property and adjoining properties. The property owner shall be required to install the joint access drive if determined to be feasible. Documentation that a joint or cross access driveway is not possible may include, but is not limited to:

a. Documentation that a good faith offer to develop a joint or cross access driveway was presented to adjacent property owners, but was declined;
b. Topographical conditions or other natural features, or insufficient front yard, that make it impracticable to develop joint or cross access.
c. Costs of developing the joint or cross access drive are disproportionate to the costs of the overall development.

7.8.3 Parking Strategies

The incorporation of a shared parking strategy is recommended for inclusion in the Middle Township ordinance. On field views, a significant number of vacant parking spaces was noted at a variety of commercial uses. Reducing the number of required parking spaces can reduce the impervious areas in Middle Township, as well as reduce the expense of property owners in developing parking lots that remain vacant the large majority of the year. A shared parking ordinance can help achieve this goal. Further, by sharing parking lots, properties can also reduce the number of curb cuts onto the adjacent

roadways. A shared parking ordinance is thus a valuable access management strategy, supporting the goals of section 6.8.2 above.

As noted by the Urban Land Institute, land uses with complementary demand patterns are able to share parking facilities, thus providing fewer total parking spaces than the sum of individual peak demands. Peak parking characteristics on one property can be accommodated by available spaces on the adjoining property. The Urban Land Institute (ULI) provides a table recommending the percentage of parking spaces that can be reduced through sharing parking, and this should be incorporated in the ordinance. This is a multi-step process that first establishes the stand-alone requirements for major land use categories, and then applies a percentage to the peak requirement for each use for each hour of the day. The peak number of parking spaces, for the peak hour of the combined uses, is then used to determine the permissible reduction in the number of spaces for each use.

Middle Township has a variety of options for implementing this strategy:

- Incorporate the original ULI shared parking table[2].
- Adopt a simplified version of the ULI table. Dennis Township has prepared a version of the ULI shared parking table and methodology, which is provided below.
- Simply state that the applicants should prepare study documenting the number of spaces that can be eliminated given the greater efficiency from combining the two uses.

Dennis Township Draft Shared Parking

1. The number of shared spaces for two (2) or more land uses shall be determined by the following procedure:
   a. Determine the minimum amount of parking required for each individual use, as set forth in _____ of the Township's Ordinance.
   b. Multiply the minimum parking required for each individual use by the appropriate percentage indicated in Table 1 below, for each of the six (6) time periods.

Table 12: Shared Parking Calculations

	Weekdays			Weekends		
Land Use	**Midnight -7AM**	**7AM -6PM**	**6PM -Midnight**	**Midnight -7AM**	**7AM -6PM**	**6PM -Midnight**
Recreation/Entertainment	10%	55%	85%	10%	80%	100%
Education	5%	95%	80%	0%	95%	80%
Public Assembly	0%	95%	80%	0%	95%	80%
Residential	100%	60%	95%	100%	75%	95%
Retail & Services	5%	75%	60%	5%	90%	55%
Office	5%	90%	5%	5%	15%	5%
Restaurant	10%	55%	95%	15%	70%	100%
Hotel	90%	60%	100%	90%	60%	100%
Theater	0%	50%	95%	0%	60%	100%

[2] Urban Land Institute, *Shared Parking: 2nd Edition*, 2006.

c. Add the resulting sums for each of the six (6) columns.
d. The minimum parking requirement shall be the highest sum among the six (6) columns.
e. Select the time period with the highest total parking requirement and use that total as the "calculated" shared parking requirement.

2. A reduction in spaces can be made for shared parking if all of the items listed below are satisfied:

a. Each parking space is usable by any parker; that is, no restrictions have been placed on the use of the spaces.
b. The reduction in parking is no greater than 20%.

Example of Required Parking

Proposed Residential: 50 2-bedroom	2 per unit	=	100
Proposed Retail: 20,000 SF	1 per 200 SF	=	100
Proposed Office: 20,000 SF	1 per 250 SF	=	80

Table 13: Example of Shared Parking Calculations

	Weekdays			Weekends		
Land Use	Midnight -7AM	7AM -6PM	6PM -Midnight	Midnight -7AM	7AM -6PM	6PM -Midnight
Residential	100	60	95	100	75	95
Retail & Services	5	75	60	5	90	55
Office	4	72	4	4	12	4
TOTAL SPACES	109	207	159	109	177	154

Total shared parking requirement calculation = 207 parking spaces; however, reduction cannot exceed 20% of required parking. Final shared parking requirement = 224 parking spaces.

7.8.4 Street Connectivity

As described above, enhancing roadway connectivity in Middle Township is a key transportation strategy. One means of accomplishing this would be the development of the proposed roadways illustrated in Figure 8. The development of key roadway segments would be complemented by the incorporation of a roadway connectivity provision in the Township ordinance, and this language is recommended for Middle.

Under the existing ordinance, the Township does have some leeway in enhancing street connectivity. Section 218-76 indicates: "Where a proposed development is adjacent to vacant land capable of being subdivided into a major subdivision, a right-of-way or other approved provisions shall be made to provide future street access to the same." However, there is no provision on block size, or on restricting the use of cul-de-sacs. Section 218-76.C.(7) permits cul-de-sacs to be up to 1,000 feet, or about 1/5 mile, which is unusually long for cul-de-sacs. This same section gives the Township the authority to

apply the other provisions in this section in order to continue the circulation pattern onto adjacent properties if deemed appropriate. However, the default provision in the ordinance should be enhancement of connectivity, with construction of cul-de-sacs possible only if topographic or other circumstances warrant their use.

Below is a street connectivity model ordinance created by the American Planning Association that should be considered for Middle Township. It requires consideration of the use of multiple options for residents to access other uses, sets block length at 660 feet, and provides for a potential full-movement intersection every 1,320 feet.

Street Connectivity Ordinance

1. A proposed development shall provide multiple direct connections in its local street system to and between local destinations, such as parks, schools, and shopping, without requiring the use of arterial streets. Each development shall incorporate and continue all collector or local streets stubbed to the boundary of the development plan by previously approved but unbuilt development or existing development.

2. To ensure future street connections to adjacent developable parcels, a proposed development shall provide a local street connection spaced at intervals not to exceed 660 feet along each boundary that abuts potentially developable or redevelopable land.

3. A proposed development shall provide a potentially signalized, full-movement intersection of a collector or a local street with an arterial street at an interval of at least every 1,320 feet or one-quarter mile along arterial streets.

4. Permanent cul-de-sacs and dead-end streets are discouraged in the design of street systems and should only be used when topography, the presence of natural features and/or vehicular safety factors make a vehicular connection impractical.

5. The requirements of paragraphs (1), (2), and (3) above may be waived if, in the written opinion of the [local government] engineer, they are infeasible due to unusual topographic features, existing development, or a natural area or feature.

8.0 Proposed Transit Strategies

8.1 Objectives

During the stakeholder interviews for this study, participants indicated interest in exploring two types of transit services for the summer tourist season:

- Employees seeking to travel from Middle Township to nearby shore locations
- Transit options for visitors to Middle Township campgrounds.

An analysis was conducted to better understand the transit services currently available to Middle Township residents; review previous transit studies and demographics; prepare assumptions for simple route design and cost estimates; and assess feasibility of new transit services.

8.2 The Context for Transit

Transit services currently available in Middle Township include longer-distance NJ Transit bus routes and more localized service provided through Cape May County Fare Free Transportation. Transit run times based upon scheduled NJ Transit service help to provide estimates of travel speed in the design of new services. It was determined that increasing or modifying NJ Transit routes was impractical since this would entail increasing transit service (and cost) along routes that travel the majority of their distance outside Middle Township. The more localized service of Cape May County Fare Free Transportation was determined to be more favorable for either modification of existing routes/services or potentially operating new routes specific to seasonal employee and tourist demand. As such, the cost per revenue hour and other operating assumptions were gathered for Cape May County Fare Free Transportation in the development and cost estimates of potential strategies.

The *SJTPO Regional Human Service Transportation Plan - Final Report for Cape May County* (2007) provides insight on potential ridership and service design. Analyzing 2000 US Census journey to work data, the study showed that transit travel into Middle Township for work-based trips was almost 2.5 times greater than travel from Middle Township to employment locations elsewhere. Trips to Middle Township by transit represented 3.5% of all trips, which is a relatively high percentage for suburban/rural areas. This demographic analysis may indicate that work-based trips into Middle Township are better served than to the shore locations this analysis is considering. However, it should be noted that since Census data is collected in April, this data does not capture the number of persons traveling to shore communities only for summer employment. Data collected during the summer season would be desirable as part of future study of new transit services for employees.

For this study, it was determined to focus the transit analysis on the needs of persons visiting campgrounds that travel to shore points during the summer season. To estimate potential ridership and route design, a total of eight campgrounds were identified. These are not uniformly distributed throughout Middle Township, with concentrations near Swainton, Cape May Courthouse, and Del Haven/NJ 47. The distance to shore locations ranges from approximately 5 to 9 miles, and may take about 15-20 minutes, dependent on traffic conditions. These campgrounds comprise approximately

3,000 individual sites. Difficulty in finding suitable parking and cost (up to $3/hour – N. Wildwood) during the season would be incentives to use a transit system. The need to carry beach supplies and to travel without scheduling would be incentives to use a private automobile.

8.3 Potential Strategies and Implications

Two distinct approaches were developed for transit strategies to address the needs of visitors to campgrounds:

- Option #1 - Supplementing existing fixed route services and addressing service deficiencies (no weeknight or weekend service) on existing Cape May County Fare Free Transportation services.
- Option #2 - Developing a dedicated recreational transit service directly linking campgrounds to shore locations.

Option #1 – Enhance Existing Services via Broker: The 2007 SJTPO Regional Human Service Transportation Plan noted a need to expand the role of Fare Free Transportation on weekday evenings and weekends. This represents a Countywide and full year improvement option, different from the goals outlined for seasonal campsite service only in Middle Township. In order to serve campground visitors in the summer, the Fare Free Service would need to be expanded to weekday evening and weekend hours for the 14-week summer season. For two routes, this would represent additional weekday service totaling 40 hours per week, along with 28 hours on Saturday and 24 hours on Sunday, yielding a conservative operating cost estimate of approximately $50,000 for almost 1,300 new hours of service.

Option #2 – Private Campground Shuttle Services: The advantage of this approach is that it could be tailored to specific campground needs, be funded in large part by a transportation fee levied to all campers, and provide for a branded service, specifically aimed at transporting beach-goers to shore points. Given the dispersion of campgrounds within Middle Township, two routes could be employed, with transfer hubs in Cape May Court House and Whitesboro-Burleigh. While potentially inconvenient, the transfer options provide riders with access to more destinations and alternate travel options. The two routes, identified as the North Route (Blue) and the South Route (Red) are depicted in Figure 16.

It is recommended that a minimum of six vehicles be utilized to operate these routes with frequencies of ½ hour or better, as frequent service is a major determinant of convenience. A total of 12 service hours per route would be envisioned daily, during a 14 week seasonal period. This results in 2,352 service hours. Using the Fare Free transportation service cost, this would result in a cost estimate of approximately $82,000.

Figure 16: Conceptual Two Route System

8.4 Findings

It seems unlikely that one service would ideally serve both seasonal campsite patrons and commuters alike, due to different routing, schedule, and vehicle needs. However, the ability to provide additional employee service and subsequently utilize those vehicles in the off-peak and weekends to encourage transit use among campers could present an effective way to recoup the fixed costs of purchasing new vehicles. As a result, Option #2 was deemed to have the best ability to provide higher-level service in potentially custom tailored vehicles for seasonal travel only. Additional cost refinement was therefore prepared for this concept.

Order of magnitude cost estimations were prepared for the North and South Routes depicted in Figure #1. These include rudimentary service plans and cost assumptions. The process for generating these cost estimates followed these steps:

1. **Service** - Service was anticipated to span from 10 to 12 hours on weekdays and from 12 to 14 hours on weekends.

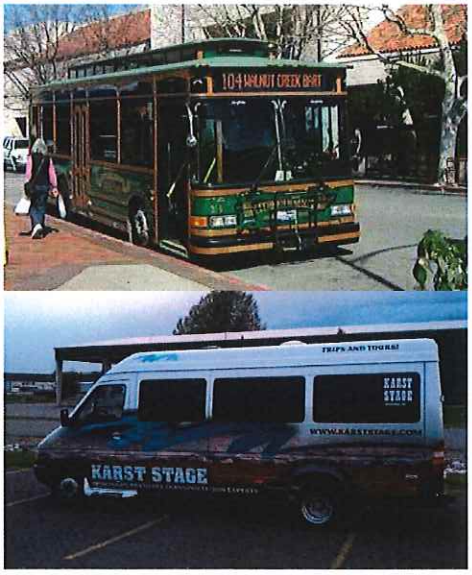
2. **Apply operating cost assumptions** –These costs include reimbursement to the vehicle owner for fuel, depreciation, etc. It was assumed that drivers would be reimbursed at market rate for this analysis. For the purposes of this analysis, a conservative $40/hour was used, slightly higher than the $33.27/hour rate (2007 dollars) using the Cape May County Fare Free service model. A range of costs was prepared, with the lower cost reflecting one vehicle operations, resulting in longer waits between vehicles. The high cost represents the most frequent service able to be operated with no more than two vehicles.

The order of magnitude costs are shown in Table 15.

Table 14: Order of Magnitude Costs for Transit Service

Concept	LOW (weekends)	HIGH, (weekends)	LOW (7 days/week)	HIGH (7 days/week)
North Route (Avalon)	$12,300	$29,000	$38,000	$90,000
South Route (Wildwood)	$11,700	$27,000	$36,000	$86,000

Due to the longer route length, the South Route requires relatively lower frequency of service, calculated at 40 minutes and 80 minutes for the LOW and HIGH options. The North Route is able to feature regular frequencies of 30 minutes and 60 minutes for LOW and HIGH options, which is ideal in terms of planning easy to follow schedules. As these costs are exclusive of vehicle capital costs, the purchase of specific branded vehicles would need to be weighed. Such vehicles, which would promote usage with high-visibility, could range from $60,000 shuttles to $150,000 replica trolleys (see inset at right).



Examples of branded buses.

This approach would have the best chances for getting private campgrounds to agree to pass along a slight service fee for all campgrounds to utilize the service. This envisions that no boarding fares would be required for campground patrons, and would enhance the service convenience. While all campgrounds would be levied, not all campers would utilize the service, therefore providing sufficient revenue without significant increases in service provision. For example, a relatively modest $2 transportation fee assessed per campsite per visit, with 3,000 sites and assuming an average stay for campers of 3.5 days, could yield around $150,000 in revenue over a 14-week tourist season. Once a lower cost initial transit service is established as a pilot demonstration, higher-frequency service could be added based on demand and funding availability. This approach would require the buy-in of private campgrounds and an operating entity, such as the Cape May County Fare Free service to procure and operate vehicles.

8.5 Conclusion

This study provides a scenario under which transit service for campground visitors could be operationally feasible for a nominal fee, but further evaluation would be required. For example, buy-in from the campsites and additional analysis or implementing short-term demonstration routes would be logical next steps to determine interest and gauge ridership potential. Ideally, a service of this nature would assist in removing vehicles from the major routes between Middle Township and the Wildwoods, such as Route 47.

9.0 Proposed Bicycle Strategies

Bicycle strategies are an important element in the development of a comprehensive transportation plan, as bicyclists will utilize the same roadways as motor vehicles. A comprehensive bicycle network is thus proposed for Middle Township. By taking into consideration those roadways that are currently compatible for bicycle use, and providing appropriate treatments, the bicycle network aims to bring attention to bicyclists on the roadway and provide sufficient facilities for them to ride safely. Enhancements to roadway segments where improvements will need to be made are also being proposed.

The primary purpose of the bicycle network will be to provide bicyclists with viable connections to identified trip generators and land uses in Middle Township. The network will serve to facilitate the movement of bicycles along preferred roadways for recreational trips, as well as functional trips which would include running small errands or commuting to work. During summer months, the bicycle network could also serve as incentive for visitors to explore Middle Township, as many of the identified trip generators would cater to visitors and residents.

9.1 Bicycle Facility Types

The Plan proposes enhancing roadways in the network for the use of bicyclists through appropriate signing, striping and markings. NJDOT's *Planning and Design Guidelines for Bicycle Compatible Roadways and Bikeways* outline the types of on-road bicycle facilities that were considered for Middle Township's roadway network: Bicycle Lane, Paved Shoulder, Shared Lane, and Shared Use Path. Specific roadway attributes (pavement width, parking provisions, traffic volumes, posted speed limit, etc.) were inventoried and assessed to determine the feasibility of each facility.

Following is a description of each facility:

Bike Lane. Bicycle lanes are designated travel lanes for exclusive or preferential use by bicyclists, and are typically 5 to 6 feet in width. Bicycle lanes are often located on roadways in urban settings with moderate to high vehicular traffic volumes, moderate to high posted speeds and permitted or designated on-street parking. Bicycle lanes must include the words "bike lane" or the bike lane symbol; they may be accompanied by bike lane signs. Studies have shown that bike lanes have many safety benefits, and one study concluded that they were the safest type of bike facility.[3] They decrease the number of bicyclists riding on the sidewalk, and they increase the compliance of bicyclists with traffic controls.[4]

[3] Moritz, W. "Adult Bicyclists in the United States: Characteristics and Riding Experience in 1996." *Transportation Research Record 1636.* Transportation Research Board, 1998, pp. 1-7.

[4] Hunter, W, J.R. Stewart, J. Stutts, H. Huang, and W. Pein. "A Comparative Analysis of Bicycle Lanes Versus Wide Curb Lanes: Final Report." Report No. FHWA-RD-99-034. FHWA, US Department of Transportation, December 1999

Paved Shoulders. A paved shoulder accommodates bicyclists on the roadway shoulder adjacent to vehicular travel lanes. Paved shoulders can be located on urban or rural roadways with moderate to high vehicular traffic volumes and moderate to high posted speeds. Paved shoulders for bicyclists typically range in width from 4 to 6 feet, and are occasionally supplemented with 'Share the Road' warning signs. Shoulders are used in a variety of circumstances. Bicyclists appreciate them because they indicate an area of roadway in which motorists normally do not encroach. On roadways where 5-foot bike lanes cannot be fit, 3- to 4-foot shoulders can sometimes be striped. Studies show that on roadways without on-street parking, the effect of shoulders is similar to bike lanes.

Shared Lane. A shared lane accommodates bicyclists and motorists in the same travel lane. Shared lanes can be located on roadways with low vehicular traffic volumes and low posted speeds, and are occasionally supplemented with 'Share the Road' warning signs. Wide (12 feet to 15 feet) outside travel lanes are often desired for shared lane facilities.

Shared Lane Markings. Informally referred to as "sharrows," shared lane markings are a sub-category of shared lanes; bicyclists shared the road with motorists, but markings guide bicyclists with lateral positioning, unlike the typical shared lane. The sharrow markings comprise two chevrons together with a bicyclist symbol, with the center of the chevron marked 11 feet from the curb on streets with parking, and 4 feet from the curb on streets without parking. These markings are placed after intersections and spaced at intervals of at least every 250 feet. They should be accommodated by "Bicycles May Use Full Lane" signs (Manual on Uniform Traffic Control Devices R4-11). They are particularly recommended for use on urban streets with on-street parking where bike lanes cannot be accommodated. They are a relatively new marking, having just been approved for inclusion in the 2009 MUTCD. Initial studies show a number of safety benefits of sharrows. In one study in San Francisco, sharrows were shown to reduce sidewalk riding by 35% and the number of wrong-way bicyclists by 80%. They also were demonstrated to increase the distance between bicyclists and passing cars and parked cars.[5]

[5] San Francisco Department of Parking and Traffic, *San Francisco's Shared Lane Pavement Markings: Improving Bicycle Safety*, 1984.

Shared Use Paths. Shared use paths are dedicated rights of way for sole use by bicyclists and pedestrians. These paths provide a separate facility for the movement of bicycles and pedestrians in areas where roadway accommodations may not be available, or are less desirable. They can provide valuable connections between existing facilities. Shared use paths vary in width, from 8-10 feet and typically provide bi-directional traffic for bicyclists and pedestrians.

9.2 Bicycle Network

The proposed bicycle network is depicted in Figures 17A and 17B, and the application of bicycle facilities to Middle Township roadways is described below.

9.2.1 Bike Lanes

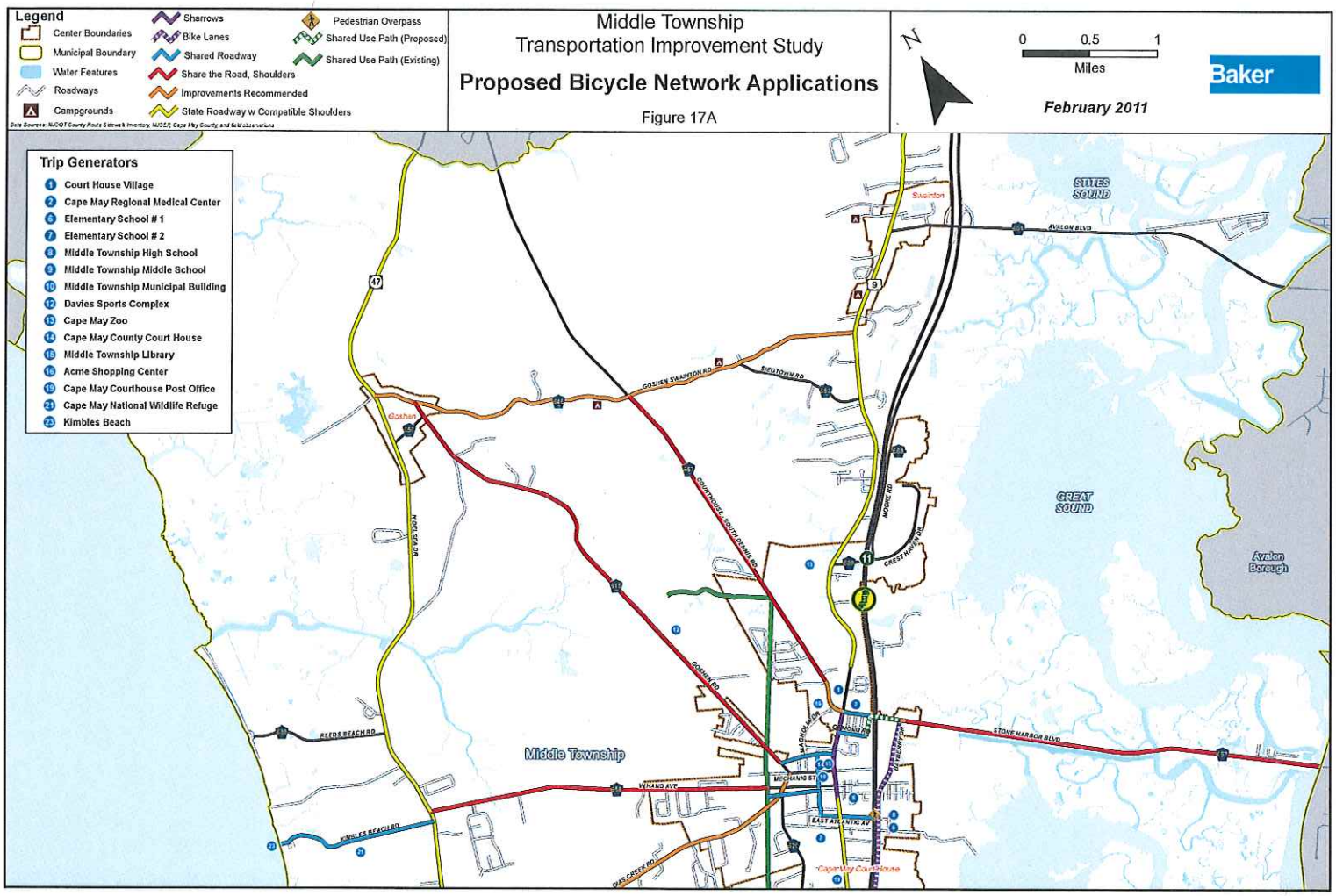
Bike lanes are the preferred bicycle facility for the average bicyclist. For this reason, bike lanes have been recommended on roadways that have the potential to generate the highest bicycle volumes, and connect to major trip generators in Middle Township. The selected roadways provide connections to and from the Middle Township Bike Path, and provide an alternative to using US Route 9. Their use is recommended on three roadways, and will fit within the existing cross section:

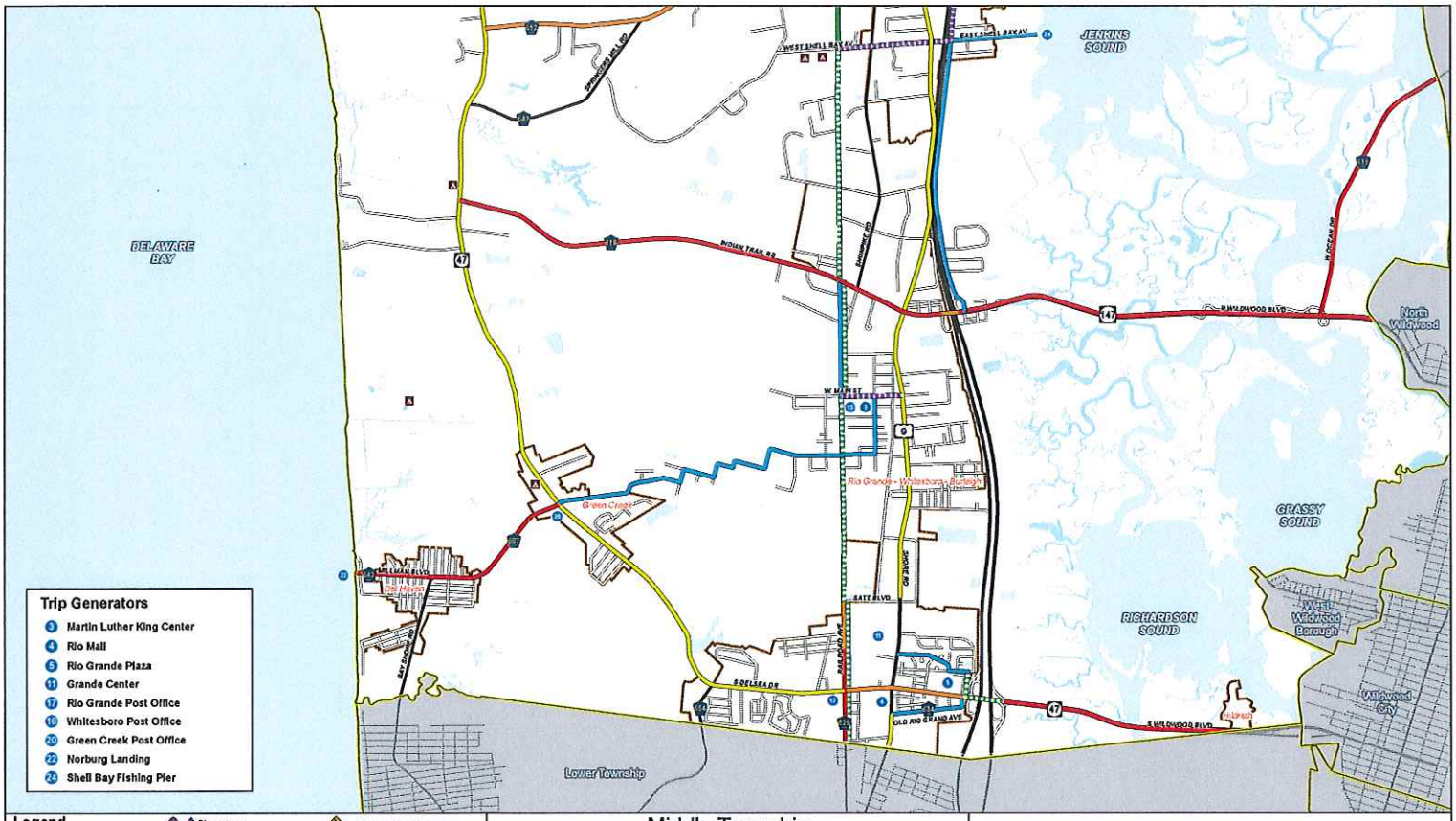
- West Main Street between Route 9 and Pennsylvania Avenue. This would serve to connect bicyclists from the Martin Luther King Community Center to Route 9.
- West Shell Bay Avenue/East Shell Bay Avenue between Bayberry Avenue and the current terminus of the Middle Township Bike Path. This is proposed as a connection to the Shell Bay pier, located at the end of East Shell Bay Road.
- Bayberry Road between East Shell Bay Avenue and Stone Harbor Boulevard. This would provide a bicyclist with a parallel route to Route 9, east of the Garden State Parkway. Connections to the Middle Township High School and Middle Schools are also located along this route. This treatment is illustrated in Figure 18.

Middle Township
Transportation Improvement Study

Proposed Bicycle Network Applications

Figure 17A





Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Roadways
- Campgrounds
- Sharrows
- Bike Lanes
- Shared Roadway
- Share the Road, Shoulders
- Improvements Recommended
- State Roadway w Compatible Shoulders
- Pedestrian Overpass
- Shared Use Path (Proposed)
- Shared Use Path (Existing)

Data Sources: NJDOT County Route Sidewalk Inventory NJDEP Cape May County and field observations

Middle Township
Transportation Improvement Study

Proposed Bicycle Network Applications

Figure 17B

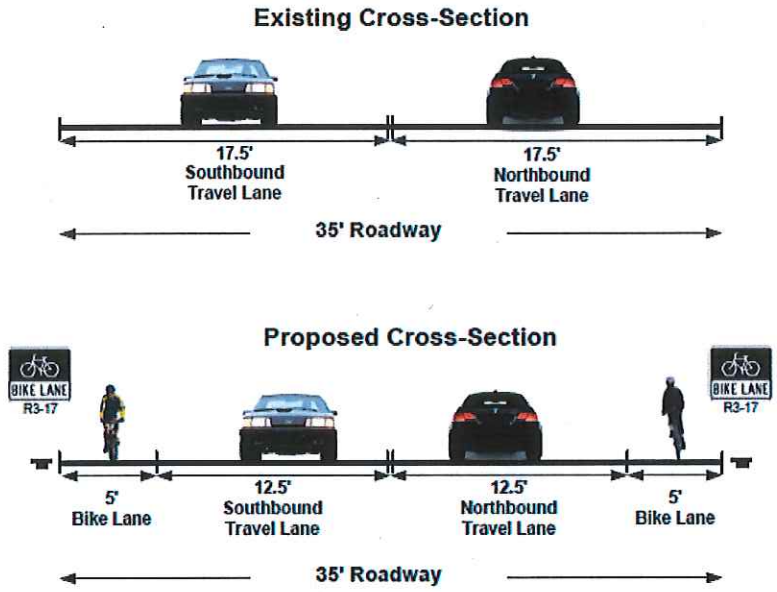
N

0 0.5 1
Miles

February 2011

Baker

Figure 18: Bike Lanes on Bayberry Road



9.2.2 Paved Shoulders

Bicycle compatible shoulders exist on many roadways in Middle Township. The most highly trafficked roadways, Route 47 and Route 9, have compatible shoulders for considerable distances throughout the Township; these segments are identified on Figure 17. High vehicular volumes and speeds on these roadways may intimidate the less experienced bicyclists, so several lower volume alternatives are also identified. These are shown as the category "Share the Road, Shoulders" on Figure 17.

- Courthouse – S. Dennis Road (CR 657) has a minimum of 7-foot shoulders between Goshen – Swainton Road and Winding Way.
- Goshen Road (CR 615) has a minimum of 4-foot shoulders between Goshen – Swainton Road and Church Street.
- West Hand Avenue (CR 658) has a minimum of 4-foot shoulders between Route 47 and the Middle Township Bike Path.
- Indian Trail Road (CR 618) has a minimum of 7-foot shoulders between Route 47 and Route 9.
- North Wildwood Boulevard (Route 147) has a minimum of 8-foot shoulders between Route 9 and Middle Township's eastern boundary with North Wildwood.
- South Wildwood Boulevard (NJ 47) has a minimum of 8-foot shoulders east of the on/off ramps for the Garden State Parkway to Middle Township's eastern boundary with Wildwood City.
- West Ocean Drive (CR 619) has 8-foot shoulders between North Wildwood Boulevard and Middle Township's eastern boundary with Stone Harbor. For the segment of the roadway where bicyclists must cross the bridge, cyclists must use the travel lane. Adequate signage should be installed notifying cyclists and motor vehicles of this condition.

- Bayshore Road (CR 642)/Millman Boulevard (CR 603) has a minimum of 7-foot shoulders between South Delsea Drive (NJ 47) and Norburg Landing.

The shoulders for all of the roads mentioned above should be maintained, and it is recommended that Bicycle Warning and "Share the Road" (MUTCD W11-1 and W16-1P) signage be installed to increase motorist awareness of the presence of bicyclists in the roadway.

Additional segments of roadway have been identified as potential bicycle routes, but the creation of bicycle compatible shoulders would be necessary before they could be deemed compatible. These roadways, in the category of "Improvements Recommended" on Figure 17, are symbolized by the orange line.

- Dias Creek Road (CR 612) between Route 47 and Mechanic Street – restripe the existing two 11.5-foot travel lanes and the 2-foot eastbound shoulder and 3-foot westbound shoulder to two 11-foot travel lanes and two 3-foot shoulders.
- Goshen – Swainton Road (CR 646) between US Route 9 and NJ 47 – restripe the existing cross section to provide a consistent 4-foot shoulder for the entire distance. Some areas along this segment may need to be widened in the future, since sufficient width may not exist.
- South Delsea Drive (NJ 47) between Railroad Avenue and 5th Street – restripe the existing cross section by reducing the existing 16-foot center turn lane and four travel lanes of varying widths to a 13-foot center turn lane with four travel lanes with an equal width of 11-feet. This will allow for the inclusion of 5-foot shoulders in each direction. This treatment is illustrated in Figure 19.
- Railroad Avenue between Davis Road and Satt Boulevard – restripe the existing two 12-foot travel lanes to two 11-foot travel lanes and two 3-foot shoulders. This treatment is illustrated in Figure 20.

Figure 19: Paved Shoulder on South Delsea Drive between Railroad Avenue and 5th Street

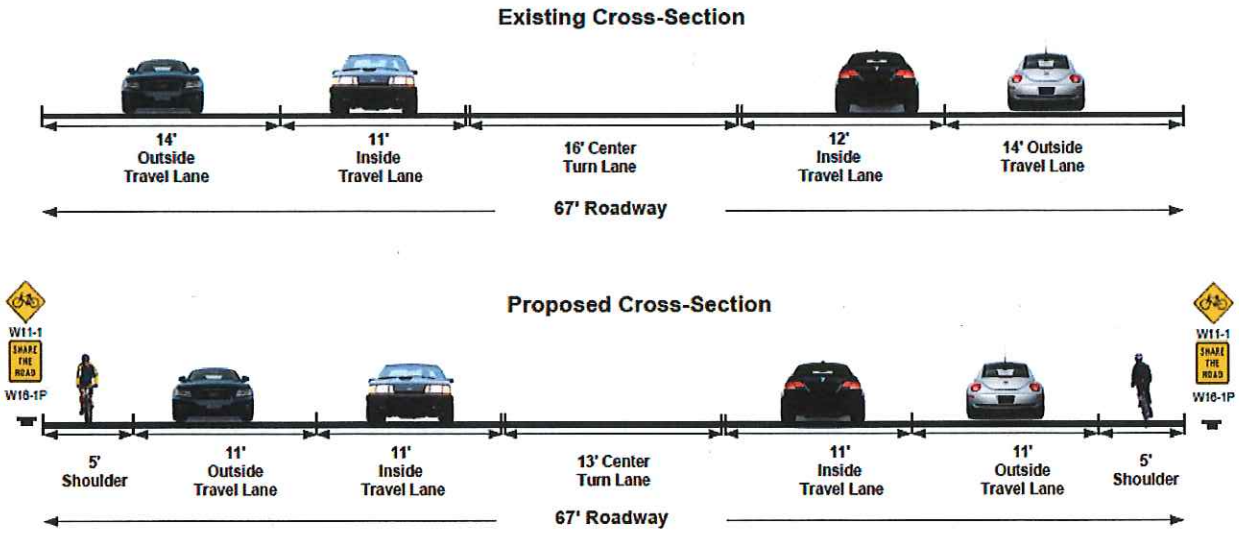
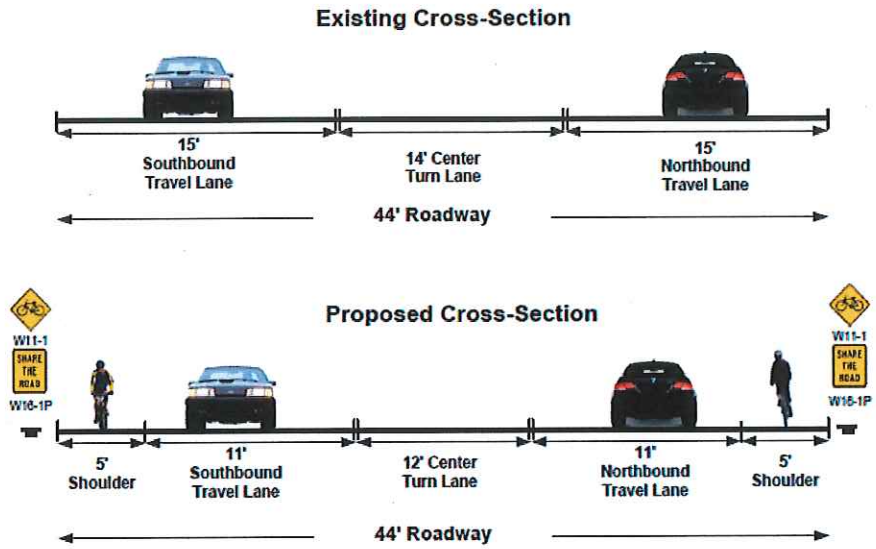


Figure 20: Paved Shoulder on Railroad Avenue between Davis Road and Satt Boulevard



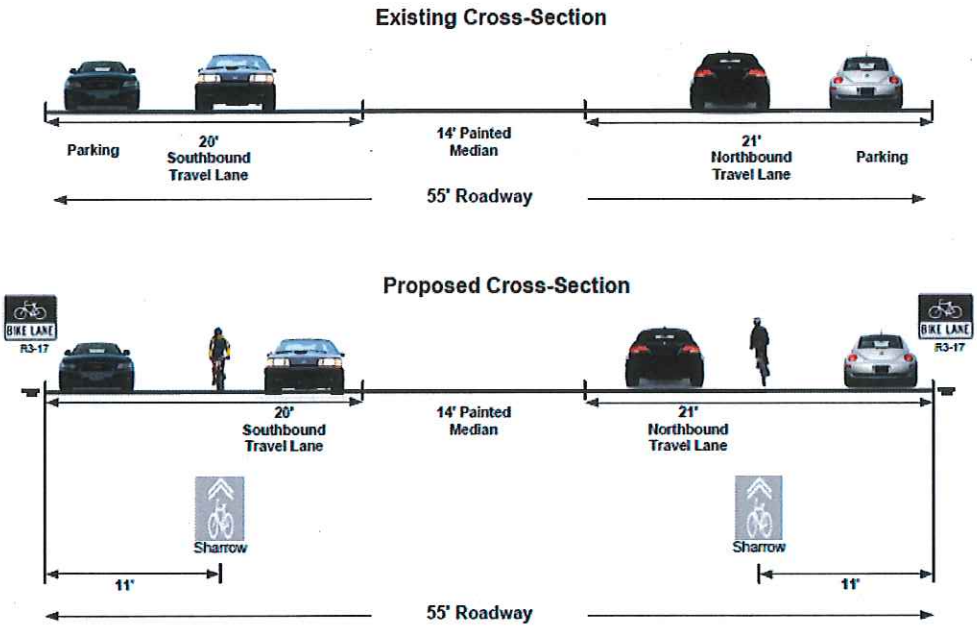
9.2.3 Shared Lane Markings

Only one roadway has been proposed for the use of Shared Lane Markings or "sharrows" in Middle Township: Route 9, between Stone Harbor Boulevard and Bennett Road.

The cross section for Route 9 varies through Cape May Court House. The use of sharrows is intended to encourage those bicyclists who may ride on the sidewalk along Route 9 or who ride the wrong way, to ride in the roadway in a safer manner. They are also intended to encourage motorists to give a greater berth to bicyclists when passing them.

For areas where parking is not permitted, the center of the sharrows would be placed 4 feet from the curb. The center of the markings would be placed 11 feet from the curb where parking is permitted. The placement of the markings will assist bicyclists in aligning themselves correctly on the roadway, and outside the "door zone" where parking is permitted. Signage is also recommended, and be placed at locations which correspond to the marking along the roadway. This treatment can be seen as applied to the segment of US Route 9 within Cape May Courthouse with on-street parking in Figure 21.

Figure 21: Sharrows on Route 9 between Church Street and West Hand Avenue



9.2.4 Shared Lanes

Roadways proposed for shared lanes (without shoulders) include:

- Roadways collectively known within the Township as the "zipper roads," between the Whitesboro and Green Creek Town Centers.
- Bayberry Road south of East Shell Bay Avenue
- Church Street
- East Atlantic Avenue
- North Boyd Street
- Old Rio Grande Ave (CR 634)
- Ormond Road
- Pennsylvania Avenue
- Kimbles Beach Road
- South Boyd Street
- South George Street, between West Main Street and Reeves Street
- Stites Avenue, between Boyd Avenue and the Middle Township Bike Path
- Stone Harbor Boulevard, between US Route 9 and Brighton Road
- West Atlantic Avenue

Minimal treatments are recommended for these roadways, since widening or the removal of on-street parking is generally impracticable. Roadway widening is costly, and local residents and merchants often

oppose the removal of on-street parking. If desired, "Share the Road" signs may be installed at 1000-foot intervals. Traffic volumes and speeds are relatively low on these roadways, which make them appropriate for use by bicyclists even in the absence of special roadway markings. The use of on-street parking is also low on most of these roadways.

9.2.5 Shared Use Path

Two locations are recommended for the installation of shared use paths: the Stone Harbor Boulevard corridor, and the Route 47 corridor. Both Stone Harbor Boulevard and NJ Route 47 have generous shoulders east of the Garden State Parkway, thereby increasing comfort for riders who are looking to travel by bicycle to the east. The installation of a shared use path along Route 47 will provide important connections through complex intersections at interchanges that might otherwise discourage less experienced bicyclists from riding east to the barrier islands. The two concepts are discussed below.

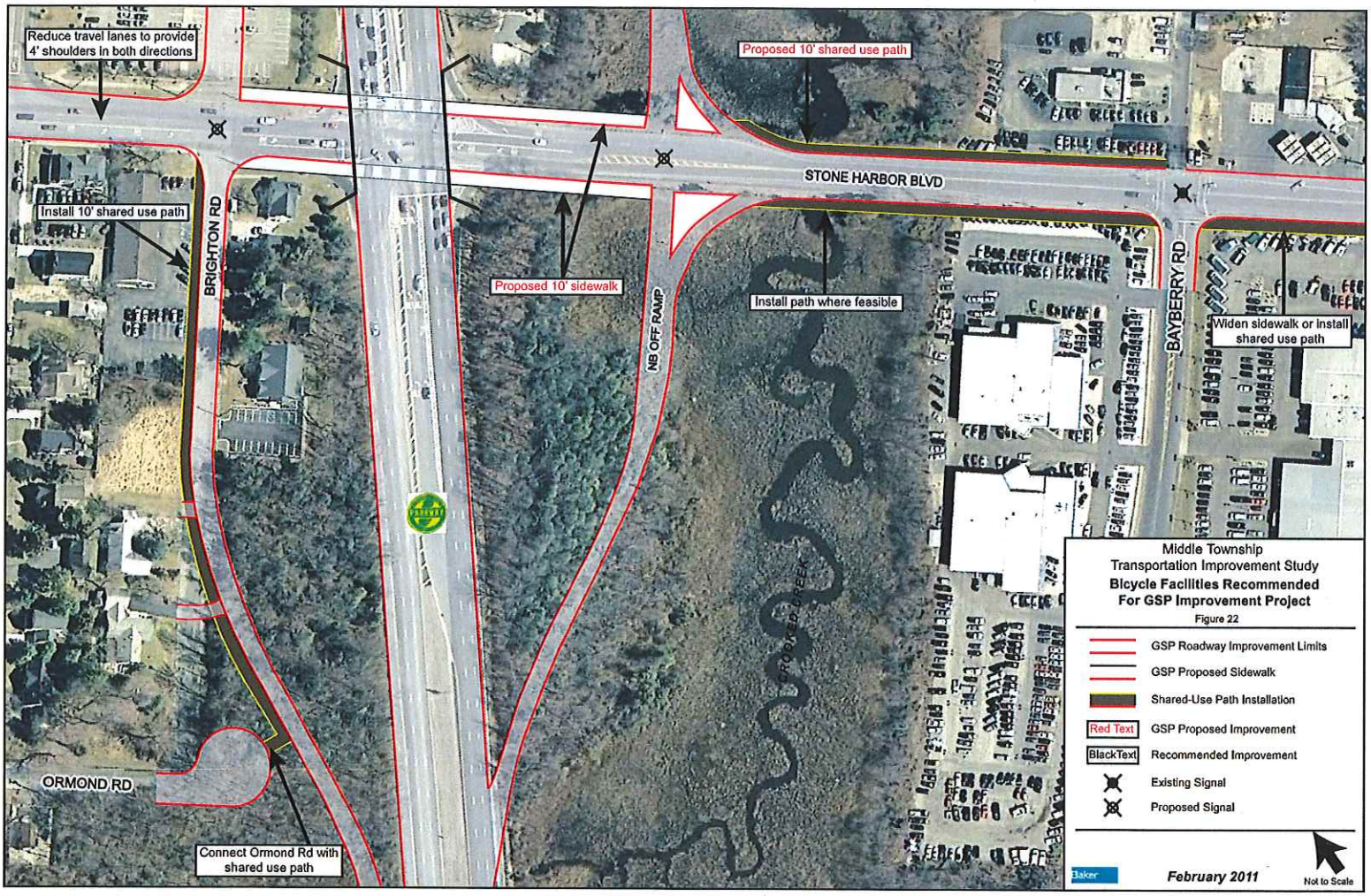
Stone Harbor Boulevard

The improvements shown in Figure 22 are proposed to occur in conjunction with the Garden State Parkway improvement project. Since many bicyclists are intimidated at the prospect of bicycling along Stone Harbor Boulevard, and Route 9 in vicinity to Stone Harbor Boulevard, it is recommended that an alternative parallel network be developed. As shown on Figure 17, Ormond Roadway is recommended as a shared roadway from Route 9 to Brighton Road. A shared use path should be installed along Brighton Road as part of the GSP Improvement Project. The NJ Turnpike Authority is proposing to cul-de-sac Ormond Road at its current intersection with Brighton Road, although there has also been discussion of maintaining a vehicular connection. If a cul-de-sac is installed, a connection needs to be made to the proposed path along Brighton Road. This would enable a bicyclist riding on Route 9 from the Court House to turn right onto Ormond Road, and then transition to Brighton Road to reach Stone Harbor Boulevard. Since a traffic signal is proposed to be installed at the intersection of Brighton Road and Stone Harbor Boulevard in conjunction with the Parkway improvements, bicyclists riding on the north side of Stone Harbor Boulevard will have the option of crossing the roadway safely at this point to reach the shared use path on Brighton Road.

On Stone Harbor Boulevard, a wide sidewalk is proposed between Brighton Road and the northbound off-ramp, and this could be used to accommodate bicyclists. A path should be installed along Stone Harbor Boulevard to the east as well.

Route 47

The installation of a shared use path is recommended to accommodate bicyclists and pedestrians traveling from Rio Grande to Wildwood along Route 47. Regular pedestrian and bicycle activity was noted along this roadway, even on cold days in the winter. Figure 23 illustrates the recommended shared use path on the north side of Route 47. This side of the roadway was determined to typically have higher pedestrian and bicycle volumes than the south side. The path is recommended to be 8 feet in width, not 10 feet, so there will be no reduction in width when the path passes under the Parkway. The bridge abutments here are set back 8 feet from the Route 47 curbline.


Reduce travel lanes to provide 4' shoulders in both directions
Proposed 10' shared use path
STONE HARBOR BLVD
Install 10' shared use path
BRIGHTON RD
Proposed 10' sidewalk
NB OFF RAMP
Install path where feasible
BAYBERRY RD
Widen sidewalk or install shared use path
ORMOND RD
Connect Ormond Rd with shared use path
Middle Township
Transportation Improvement Study
Bicycle Facilities Recommended
For GSP Improvement Project
Figure 22
GSP Roadway Improvement Limits
GSP Proposed Sidewalk
Shared-Use Path Installation
Red Text
GSP Proposed Improvement
BlackText
Recommended Improvement
Existing Signal
Proposed Signal
Baker
February 2011
Not to Scale

Signalized intersection

Sign location

February 2011

Middle Township
Transportation Improvement Study
Recommendations for Shared Use Path
Adjacent to NJ Route 47
Figure 23

Not to Scale

Baker

Along with this improvement, high-visibility crosswalks are recommended at the intersection of Route 47 and the northbound on-ramp. Bicycle and pedestrians warning signs (W11-15 and W16-7p) are recommended at the intersection of the path with the southbound off-ramp and on-ramp.

Figure 23 also illustrates a proposed shared use path running along North 6th Street. This roadway is currently signed "Do Not Enter" for northbound motorized vehicles, since it is used only as an exit by service vehicles for the Rio Mall. A path in this location would permit bicyclists traveling between Wildwood and Route 9 to the north to avoid bicycling along Route 47. As discussed earlier in the report, Route 47 in Rio Grande was the site of the greatest number of bicycle and pedestrian crashes. Bicyclists using this route could then travel on Maryland Avenue and Linden Lane to reach Route 9 at a signalized intersection.

Route 47underpass at the Parkway.

9.3 Promotion

Along with the development of a bicycle network in Middle, the Township should promote bicycling. Many of the roadways are very suitable for bicycling, as discussed above. The Township should encourage visitors to consider Middle as not only a place to camp before driving over to the shore communities, but as a place where bicycling can be an enjoyable experience, given the natural beauty of the area.

A map showing the bicycle network could be posted to the municipal website, or included in literature for tourists. Visitors can bicycle to such scenic locations as Norburg Landing in Del Haven, and the Cape May National Wildlife Refuge. One idea for promoting bicycling would be the establishment of a "Bay to Bay" bike ride. Bicyclists should be encouraged to ride their bicycles between the Shell Bay Pier and the National Wildlife Refuge. The route could follow, in turn, Shell Bay Avenue to the Middle Township Bike Path to Hand Avenue to Kimbles Beach Road. The traffic volumes are modest on all of these roadways.

On the left: Norburg Landing at Del Haven. On the right: a walking trail at Cape May National Wildlife Refuge.

9.4 Bicycle Parking

Bicycle parking is an important element of the bicycle infrastructure. Well-maintained bicycle parking can help encourage persons to take bicycle trips to destinations that they otherwise might avoid. Further, in the absence of visible and functional bicycle parking, bicyclists may simply choose to lock their bikes to lamp posts, parking meters, signs, and other street furniture.

An effective way to determine where bike racks should be located is to identify where bicyclists currently park their bikes. Bike racks should be placed at key community facilities, such as the Middle Township municipal building. They are already present at the County Library and at places such as the high school and middle school. They should already be installed at major retail facilities.

The following criteria are recommended by the Association of Pedestrian and Bicycle Professionals for a bike rack design:

- Support the bicycle upright by its frame in two places.
- Prevent the wheel of the bicycle from tipping over.
- Enable the frame and one or both wheels to be secured.

Given these criteria, Middle Township should discourage the installation and placement of "Comb Type" bicycle racks, which are currently used at several locations, such as the County Library. This rack provides limited means for a bicyclist to secure their bicycle, as only the front wheel is able to be secured effectively.

The two most common and recommended racks include the Inverted-U, and Post and Ring, and these are recommended for installation throughout Middle Township. Both support bicycles at two points, are intuitive to use, and are relatively inexpensive. These can be easily arranged in a series to expand capacity of parking at any one location.

On the left: unique example of post-and-ring bike rack. On the right: the inverted-U bike rack can fit into many different settings.

10.0 Pedestrian Strategies

Sidewalks are missing along many roadways in Middle Township. Given the size of the Township, the focus of the pedestrian strategy was identification of the key roadways for sidewalk installation. Field views were performed to identify gaps in the sidewalk network and locations for network expansion in the future. In an attempt to quantify and prioritize improvements, a Sidewalk Priority Rating System was developed to identify the most important sections for improvement.

The Sidewalk Priority System utilized a quantitative ranking system based on the proximity of county roadways and key municipal roadways with missing sidewalk to adjacent land uses, as well as on roadway characteristics. Geographical Information Systems (GIS) was utilized to identify the locations of missing sidewalk and to assign values to these roadway segments. A priority was also placed on roadway segments within the proposed centers.

Sidewalks are needed on S. Dennis Road.

Table 15: Sidewalk Priority System Ranking

Adjacent Land Use			**Block Frontage with Sidewalk**	
Pedestrian-Friendly Commercial	5		Neither side has sidewalk	4
Other Commercial	3		1 side has sidewalk	2
Residential			**Posted Speed**	
4 or more units/acre	4		40+ mph	4
<4 units/acre	2		35 mph or below	2
School Proximity (max. of 2 schools)			**Daily Traffic Volumes**	
Elementary School			10,000 +	4
<1/4 mile	6		<10,000	2
1/4 to 1/2 mile	4			
Middle or High School				
<1/2 mile	6			
>1/2 mile to 1 mile	4			
Transit Route Proximity				
<1/4 mile	4			
1/4 to 1/2 mile	2			
Public Facilities				
<1/4 mile	4			
1/4 to 1/2 mile	2			

Sidewalk ends at Route 9 above Rio Grande.

From these values, a map was generated to identify specific areas for improvement, ranking priorities as low, medium, and high. Areas with missing sidewalk that were determined to not be a priority were also identified. These areas received a value of 6 or lower by the Sidewalk Priority Ranking System. Sidewalk that received medium and high priorities were concentrated within the town centers, with some low priority areas extending beyond their boundaries. The priorities are illustrated in Figures 24A and 24B.

Legend

- Center Boundaries
- Municipal Boundary
- Water Features
- Roadways
- Pedestrian Overpass
- High Priority
- Medium Priority
- Low Priority
- Not Recommended
- Proposed Sidewalk
- Existing Sidewalk

Data Sources: NJDOT County Route Sidewalk Inventory, NJDEP, Cape May County and field observations

Middle Township
Transportation Improvement Study

Sidewalk Priority

Figure 24A

N

0 0.25 0.5
Miles

Baker

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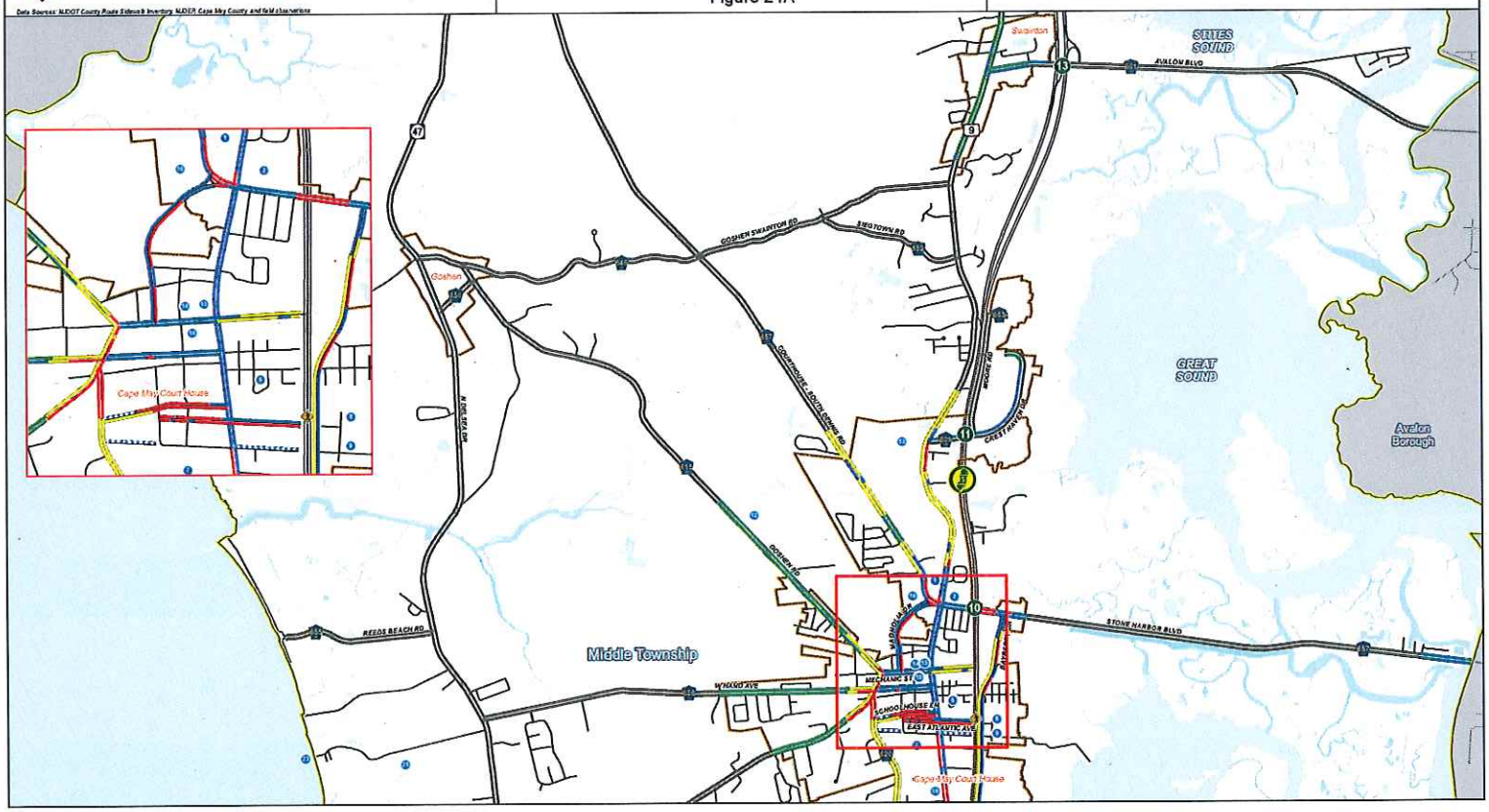

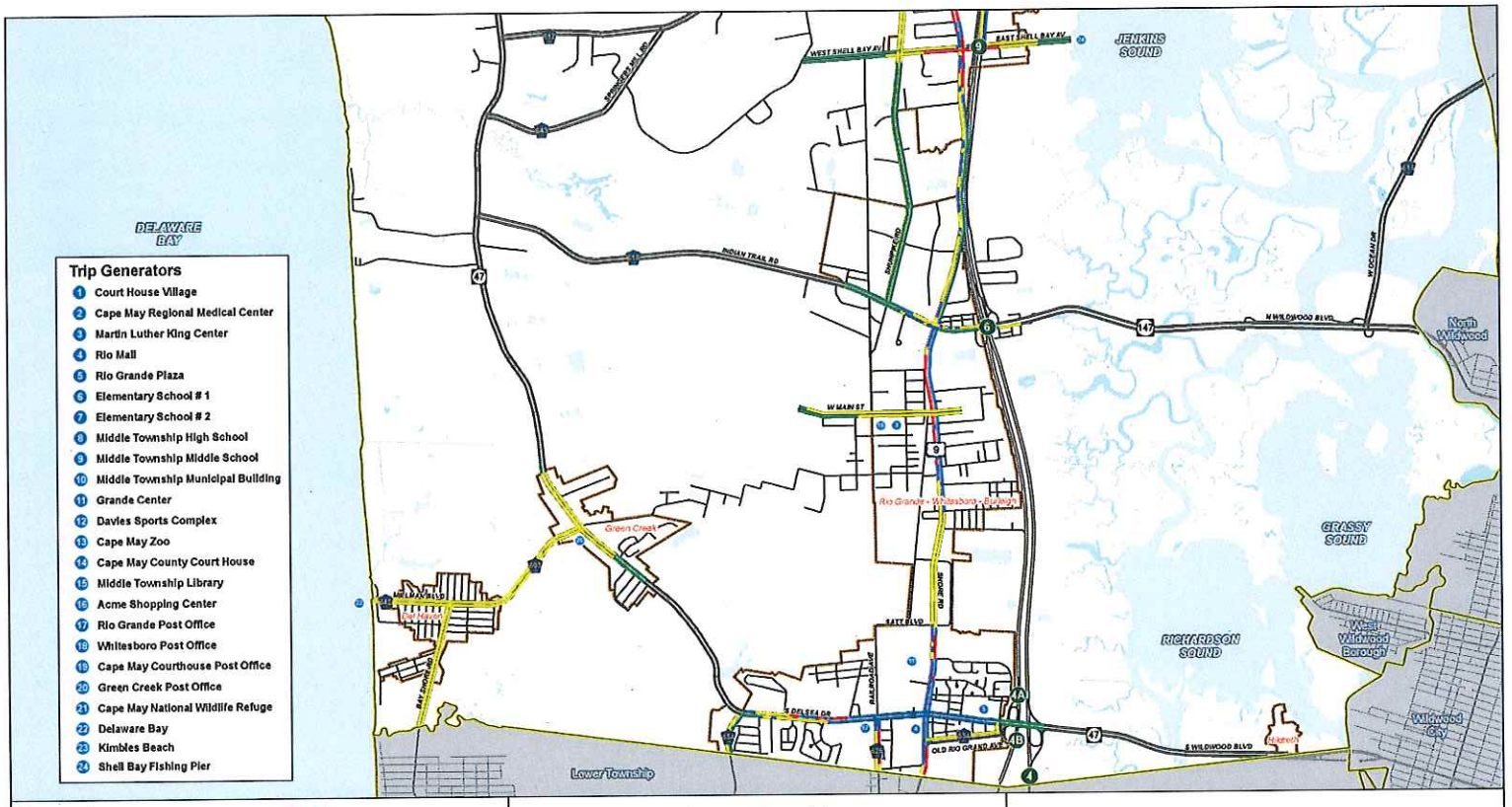
DELAWARE BAY
Trip Generators
1 Court House Village
2 Cape May Regional Medical Center
3 Martin Luther King Center
4 Rio Mall
5 Rio Grande Plaza
6 Elementary School # 1
7 Elementary School # 2
8 Middle Township High School
9 Middle Township Middle School
10 Middle Township Municipal Building
11 Grande Center
12 Davies Sports Complex
13 Cape May Zoo
14 Cape May County Court House
15 Middle Township Library
16 Acme Shopping Center
17 Rio Grande Post Office
18 Whitesboro Post Office
19 Cape May Courthouse Post Office
20 Green Creek Post Office
21 Cape May National Wildlife Refuge
22 Delaware Bay
23 Kimbles Beach
24 Shell Bay Fishing Pier
JENKINS SOUND
GRASSY SOUND
RICHARDSON SOUND
North Wildwood
West Wildwood Borough
Wildwood City
Lower Township
Green Creek
Rio Grande - Whitesboro - Burleigh
Cape May
WEST SHELL BAY AV
EAST SHELL BAY AV
INDIAN TRAIL RD
W MAIN ST
N WILDWOOD BLVD
S WILDWOOD BLVD
OLD RIO GRANDE AVE
BAYSHORE RD
W OCEAN DR
Legend
Center Boundaries
Municipal Boundary
Water Features
Roadways
Pedestrian Overpass
High Priority
Medium Priority
Low Priority
Not Recommended
Proposed Sidewalk
Existing Sidewalk
Data Sources: NJDOT County Roads Sidewalk Inventory, NJDEP, Cape May County, and field observations
Middle Township
Transportation Improvement Study
Sidewalk Priority
Figure 24B
N
0 0.5 1
Miles
Baker
February 2011

11.0 Implementation Plan

Following is a table that summarizes the improvements recommended in this study, along with the responsible party, order-of-magnitude cost range, and general time frame. It should be noted that the cost ranges are based on planning level estimates; detailed cost estimates were not performed. The three governmental jurisdictions of Middle Township, Cape May County, and NJDOT will need to coordinate on many of the improvements.

Table 16: Implementation Matrix

Improvement	Responsible Party	Cost Range	Time Frame
Construct key paper streets	Middle Township	High	Long
Develop western alternative roadway to Route 9	Middle Township, coordinating with landowners	High	Long
Develop new roadway of Honeysuckle Lane extension	Middle Township	High	Long
Develop new roadway of Shunpike Road extension	Cape May County or Middle Township	High	Long
Plan for other roadway connections in general locations	Middle Township, coordinating with landowners	Variable for roadway	Long
Coordinate with K-Mart Plaza landowners to plan alternative access	Middle Township; NJDOT	Low to Medium, depending on improvement	Long
Install new median on Route 47	NJDOT	Low	Long
Install signage directing motorists to Rio Grande Avenue	Cape May County	Low	Short
Add southbound left turn lane, modify signal timing at Route 9 and Route 47	NJDOT, coordinating with Wal-Mart developers	Medium	Medium
Modify signal timing at Route 9 and Stone Harbor Boulevard	NJDOT	Low	Short
Evaluate one-way treatment for Mechanic Street and Hand Avenue	Cape May County; Middle Township	Low	Short
Install bulb-outs or median islands on Route 9 in Cape May Court House, and stripe parking spaces	NJDOT	Low	Short
Install parking lot signage to County Lot	Cape May County	Low	Short
Adopt Complete Streets policy	Middle Township	Low	Short
Adopt access management ordinance	Middle Township	Low	Short
Adopt shared parking ordinance	Middle Township	Low	Short
Adopt street connectivity ordinance	Middle Township	Low	Short

Evaluate feasibility of transit services for campgrounds	Middle Township	Low	Medium
Develop bicycle network; phase in physical improvements	NJDOT; Cape May County; Middle Township	Variable for improvement; cumulatively High	Long
Install sidewalks on priority roadways	NJDOT; Cape May County; Middle Township	Variable for improvement; cumulatively High	Long

Cost Range:
Low <$100,000
Medium $250,000 to $1,000,000
High >$1,000,000

Time Frame:
Short- <1 year
Medium – 1 to 3 years
Long - >3 years