OCEAN CITY CIRCULATION ELEMENT

Cape May County, New Jersey

March 2005

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TRANSPORTATION ENGINEERS and PLANNERS

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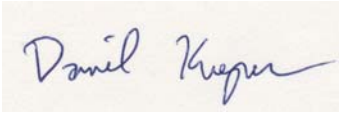

Daniel A. Kueper, PP, AICP License No. 5332

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INTRODUCTION AND GOALS

A circulation element is one of the recommended elements of a municipal master plan; as described in the Municipal Land Use Law (NJSA 40:55D-28), a circulation element shows the "location and types of all modes of transportation required for the efficient movement of people and goods into, about and through the municipality."

All circulation improvements recommended in this plan have been evaluated not only for their effect on vehicular traffic, but for their effect on pedestrian, bicycle and transit modes. Appropriate to Ocean City's status as one of the most important tourist destinations in the State of New Jersey, and a popular haven for recreating pedestrians and bicyclists, multi-modal transportation planning has received increasing emphasis in the City in recent years. Through implementation of the strategies presented in this plan, the City is poised to encourage multi-modal transportation to an even greater degree than exists at the current time.

Increasing the capacity of the vehicular roadway system, particularly on heavily trafficked streets such as 9th Street or 34th Street, remains a desirable goal when this can be achieved through such means as signalization improvements, as opposed to roadway expansion. However, traffic congestion is not a significant issue on the large majority of City streets. Since the City is largely built out, future traffic growth will likely continue to be incremental, as it has been in the recent past.

Given the above, following are the primary goals of the Ocean City Circulation Element:

- Provide a safe and efficient traffic flow on Ocean City roadways;
- Continue to evaluate opportunities for new public parking facilities, and make more efficient use of the City parking supply;
- Encourage increased bicycle activity, primarily through the designation of new on-road facilities;
- Encourage increased pedestrian activity, through improved pedestrian facilities and the use of traffic calming; and
- Increase use of transit services.

The Circulation Element provides information on both existing conditions and recommendations for improvements, using the categories below:

- Vehicular
- Transit
- Parking
- Bicycle
- Pedestrian

VEHICULAR

Street System

With the exception of several areas, Ocean City is built upon a grid system. Numbered streets, from 1st Street in the north to 59th Street in the south, provide east-west access across the city. Ninth Street is the major entrance into the City; it is the continuation of NJ Route 52, which spans Egg Harbor Bay from Somers Point. Route 52 is the sole state highway within city limits.

North-south access is provided by nine avenues (in the widest part of the island, in the north; the city narrows to only three avenues in the south). Key north-south arterials include Bay Avenue and West Avenue. Bay Avenue, a two-lane roadway, is designated as CR 656 from Battersea Road in the north, to Roosevelt Boulevard in the south. The CR 656 designation continues to the north of Bay Avenue, on Battersea Road and Wesley Road. West Avenue is a four-lane roadway south of 9th Street, and two lanes north of 9th Street. West Avenue is designated as a county route (CR 619) only from 34th Street to 55th Street. At 55th Street, the CR 619 designation continues south on 55th Street and Ocean Drive.

The primary east-west access is provided by 9th Street and 34th Street. Ninth Street, a four-lane roadway, runs from Bay Avenue to the Boardwalk, and is a continuation of State Route 52. 34th Street, a two lane-roadway, runs from Bay Avenue to the ocean, and is a continuation of Roosevelt Boulevard, CR 623, to the west.

In general, at unsignalized locations in Ocean City, east-west streets are controlled by stop signs, while the north-south avenues are free flowing. To abet cross-island traffic flow, a number of streets in the downtown area have been informally designated as cross-town streets, and are signalized at key intersections. These streets include 6th Street; 8th Street; 9th Street; 10th Street; 14th Street and 18th Street.

There are four entrance points into the City:

- the Longport Bridge, which leads into Gardens Parkway/ Wesley Road (also signed as CR 656);
- Route 52 bridge, which leads into 9th Street;
- Roosevelt Boulevard, or CR 623; and
- Ocean Drive, or CR 619.

The first two entrance points have recently been, or currently are, the subject of major improvements. The Longport Bridge is a new facility, having been replaced three years ago. The Route 52 causeway is scheduled to be replaced by a new facility, with construction starting in 2005 and continuing through 2008. Both the Longport bridge and the Route 52 causeway represent improvements in traffic flow onto and off the island. The drawbridge was eliminated on the Longport Bridge, thus eliminating long delays during the summer season. The same improvement is scheduled for the Route 52 causeway. The Longport Bridge provides bicycle-compatible shoulders. The Route 52 causeway will be especially pedestrian and bicycle friendly; it will be constructed with a 10 foot sidewalk eastbound, and two 10 foot shoulders.

Volumes

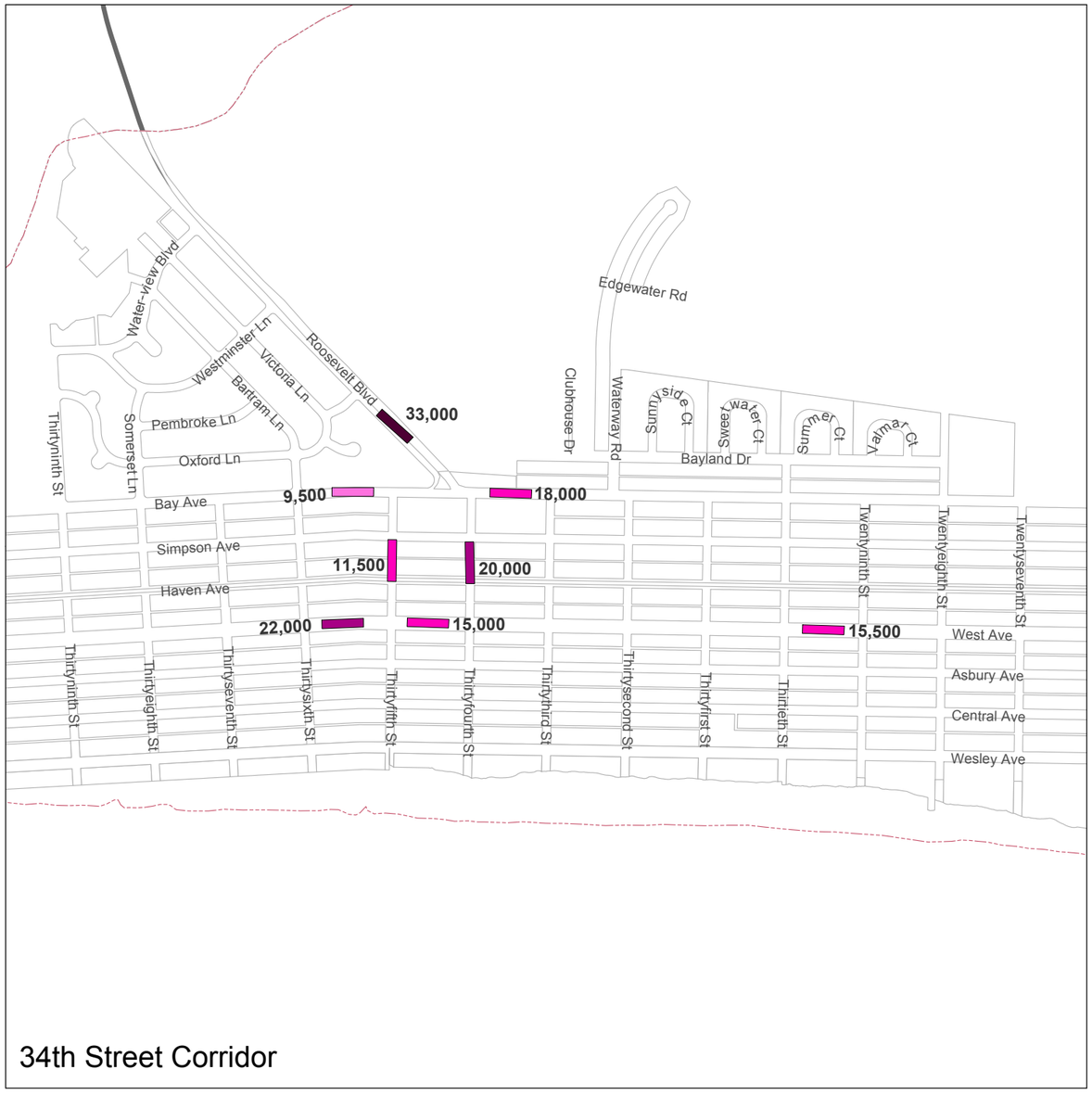
Average Daily Traffic (ADT) volumes for key roadways during the summer season are depicted in Figure 1. (These volumes were calculated based upon manual turning movement counts and automatic traffic recorder counts taken the summer of 2003, as well as from counts taken during the summers of 1999, 2000, and 2001 for other studies. The counts indicate that there is no pronounced trend in traffic volumes on Ocean City roadways in recent years.)

As indicated, volumes are highest on 9th Street east of the touchdown of the Route 52 bridge, with 35,000 ADT. Volumes on 9th Street progressively decline toward the Boardwalk, as motorists turn onto and from the avenues; volumes are reduced to 21,000 ADT west of 9th Street, and to 19,000 east of West Avenue.

Following 9th Street, the heaviest traffic volumes downtown are found on West Avenue, at 18,000 ADT immediately south of 9th Street. Daily volumes on West Avenue drop to 15,000 south of 14th Street, where they remain fairly constant until 35th Street. Daily traffic volumes on West Avenue spike at 22,000 immediately south of 35th Street, due largely to the infusion of southbound vehicles entering the City from Roosevelt Boulevard. Although ATRs were not installed on West Avenue south of 35th Street as part of this study, based on field observations, volumes on West Avenue decline toward the southern end of the island.

The second highest traffic volumes in Ocean City are on Roosevelt Boulevard before the transition to 34th Street, at 33,000 ADT. Similar to 9th Street, volumes on 34th Street drop toward the ocean, with an ADT of 20,000 east of Simpson Avenue.

East of West Avenue, the heaviest traffic volumes on north-south roadways are found on Ocean Avenue; volumes are especially heavy immediately south of 9th Street, as vehicles seeking access to attractions along the beach have their last chance to turn at this point.



34th Street Corridor

Downtown

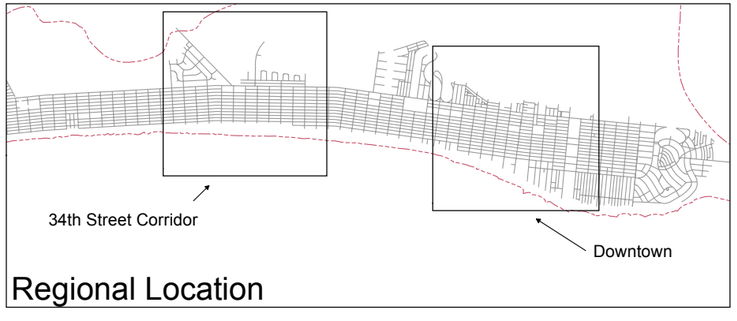
Average Daily Traffic (Summer Volumes)

- 0 - 4,999
- 5,000 - 9,999
- 10,000 - 19,999
- 20,000 - 29,999
- 30,000 or Greater

N

0 1,000 2,000 Feet

1 inch equals 1,001 feet



Regional Location

Figure 1
Average Daily Traffic Volumes (Summer Season)

Ocean City
Circulation Element
Ocean City, Cape May County

Date: September 2004
Source: Ocean City, NJDEP, and Orth-Rodgers & Associates

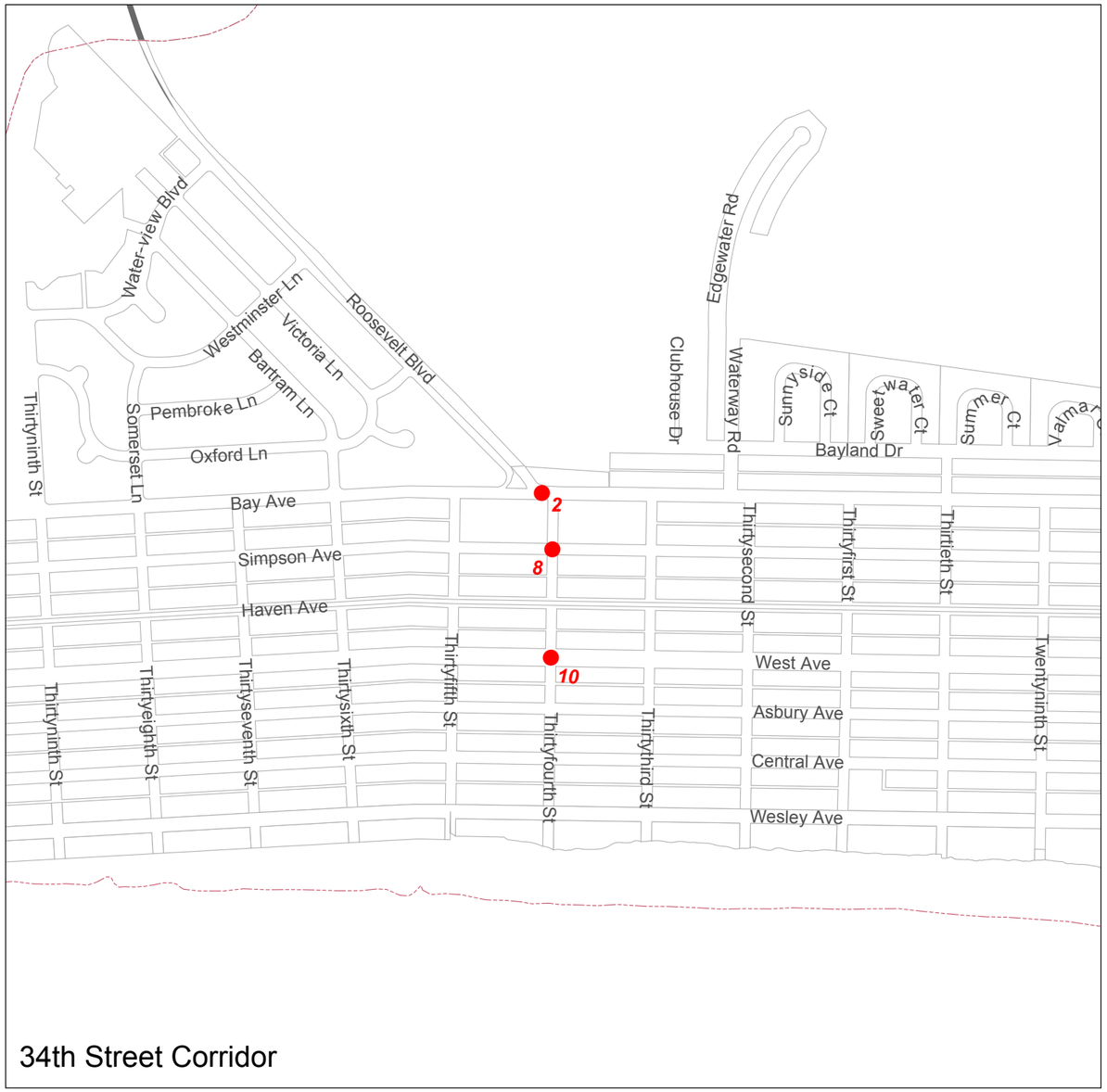
(S:\Project_Files\2003207 - Ocean City\GIS\Projects\ADT.mxd) 09/22/2004

Crashes

There were a total of 618 crashes on Ocean City roadways in the calendar year 2002. Not surprisingly, given the much higher traffic volumes in the summer, 60% of these crashes occurred in June, July and August. Figure 2 and Table 1 indicate the location of vehicular crash concentrations in Ocean City for 2002 (it should be noted that the numbers in Figure 2 are map keys for Table 1, and do not indicate the number of crashes). Crash concentrations are prominent on 9th Street, 34th Street, 10th Street and West Avenue, due to the heavier volumes along these roadways. The intersection of West Avenue and 9th Street – home of the greatest number of conflicting traffic movements in the city – was also site of the highest number of crashes, with 13. The intersection of Bay Avenue and 34th Street was second highest with nine (9) crashes.

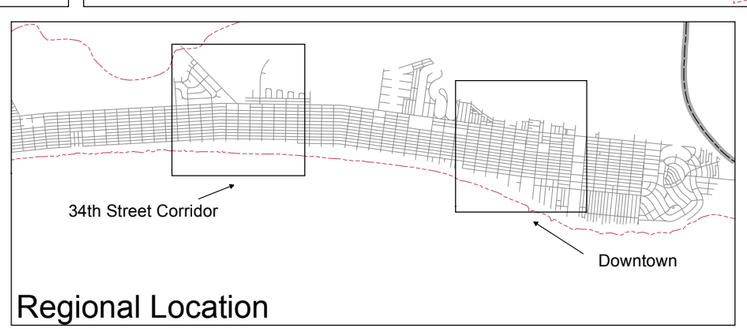
Four intersections had 8 crashes each; the intersections of West Avenue and 13th Street, and Central Avenue and 14th Street, are particularly interesting since they each had five right-angle crashes in 2002. Both could thus be considered for signalization, based upon signal warrants for crash history as outlined in the *MUTCD (Manual on Uniform Traffic Control Devices*). Right angle crashes can ameliorated by signals, through reducing the discretion that motorists normally employ at Stop-controlled intersections. The City requested NJDOT approval of a traffic signal at Central Avenue and 14th Street based upon the crash history there in January 2003, but has not yet received word on the status of this application.

The use of signalization on the cross-town streets in Ocean City is not completely consistent, which appears to contribute to safety problems. Of greatest concern, Central Avenue is not signalized at 18th Street, 14th Street, 10th Street, 8th Street, and 6th Street. At each of these locations, Central Avenue is controlled by a stop sign. Based upon the recorded crash history, the lack of traffic signals at these locations has contributed to vehicular crashes. Because motorists on north-south streets are acclimated to either having free flow conditions, or traffic signals, some motorists on Central Avenue may fail to account for the presence of stop signs, and do not come to a complete stop.



34th Street Corridor

Downtown



Regional Location

Vehicular Accidents

Municipal Boundary

Numbers are keyed to accompanying table

N

0 800 1,600 Feet

1 inch equals 800 feet

Figure 2
Vehicular Crash Concentrations
2002

Ocean City
Circulation Element
Ocean City, Cape May County

Date: September 2004
Source: Ocean City, NJDEP,
and Orth-Rodgers & Associates

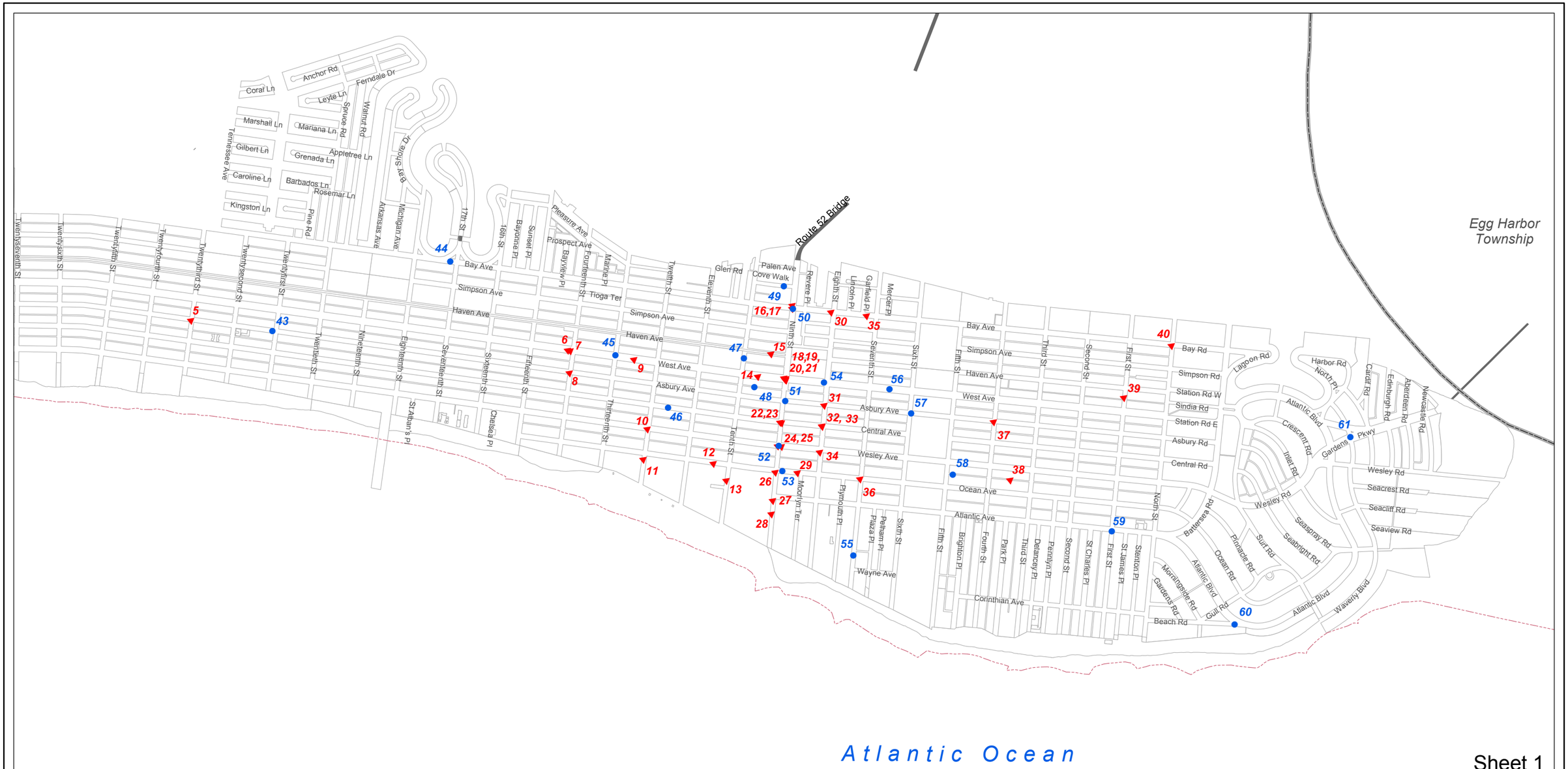
(S:\Project_Files\2003207 - Ocean City\GIS\Projects\VehicleCrashes.mxd) 09/22/2004

Table 1: Vehicular Crashes - 2002

Map Key	Location	Crashes	Prevalent Crash Type
1	West Ave. and 9th St.	13	3 vehicles turned into bicyclists
2	Bay Ave. and 34th St.	9	3 eastbound rear-end crashes for vehicles turning right
3	West Ave. and 10th St.	8	4 rear-end crashes on southbound approach
4	West Ave. and 13th St.	8	5 right-angle crashes
5	West Ave. and 14th St.	8	No prevalent type
6	Central Ave. and 14th St.	8	5 right-angle crashes
7	Asbury Ave. and 9th St.	6	3 right-angle crashes
8	Simpson Ave. and 34th St.	6	2 right-angle crashes
9	Bay Ave. and 9th St.	5	2 fixed object crashes
10	West Ave. and 34th St.	5	2 right-angle crashes
11	Bay Ave. and 12th St.	4	3 left-turn crashes
12	Haven Ave. and 9th St.	4	No prevalent crash type
13	Central Ave. and 10th St.	4	4 right-angle crashes
14	Central Ave. and 9th St.	4	4 left-turn crashes
15	Central Ave. and 8th St.	4	4 right-angle crashes
16	Wesley Ave. and 10th St.	4	No prevalent crash type
17	Wesley Ave. and 9th St.	4	3 sideswipe crashes
18	Ocean Ave. and 7th St.	4	4 right-angle crashes

Bicycle and pedestrian crashes for the years 2001 and 2002 are described in Figures 3a and 3b, and Tables 2 and 3. Three-quarters of the 40 bicycle crashes occurring in Ocean City in 2001 and 2002 were concentrated between 6th and 14th Streets, with 13 crashes on 9th Street alone. The large concentration of bicycle crashes in this area is not surprising given the heavy vehicular volumes and bicycle activity in this area. 9th Street is particularly hazardous for bicyclists, given the large volumes and especially the large number of turning movements. The highest crash location was at West Avenue and 9th Street, where four crashes took place. In two of the cases, bicyclists were riding the wrong way. The recommendations for bike lanes on 9th Street, discussed later in this Plan, are intended to help make motorists more aware of bicycle traffic, and to encourage bicyclists to ride on the correct side of the road.

Thirteen of the 21 pedestrian crashes occurred between 6th and 14th Streets, but there was no one location with two or more crashes. There was only one crash on Ocean Avenue and one crash on Atlantic Avenue, which is minimal given the very large number of pedestrian volumes across and along these two streets.



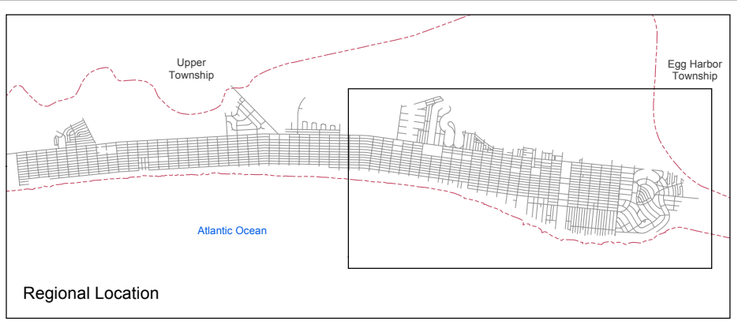
Bicycle Crashes
Pedestrian Crashes
County Boundary
Municipal Boundary

Numbers are keyed to accompanying table

N

0 1,300 2,600 Feet

1 inch equals 1,300 feet



Regional Location

Figure 3a
Bicycle and Pedestrian Crashes 2001-2002

Ocean City Circulation Element Ocean City, Cape May County

Date: September 2004
Source: Ocean City, NJDEP, and Orth-Rodgers & Associates

(S:\Project_Files\2003207 - Ocean City\GIS\Projects\Bike_Ped_CrashesS1.mxd) 09/22/2004

Sheet 2

Bicycle Crashes

Pedestrian Crashes

County Boundary

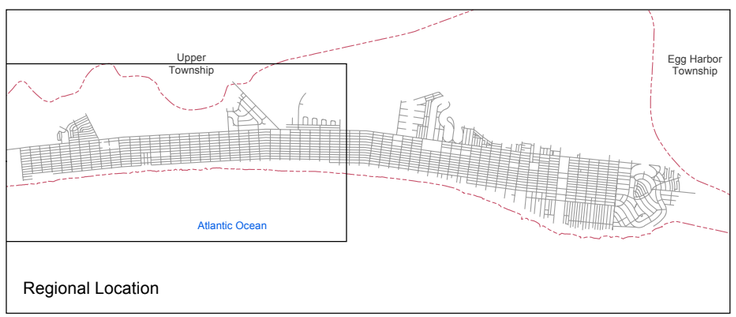
Municipal Boundary

Numbers are keyed to accompanying table

N

0 1,300 2,600 Feet

1 inch equals 1,300 feet



Regional Location

Figure 3b
Bicycle and Pedestrian Crashes 2001-2002

Ocean City
Circulation Element
Ocean City, Cape May County

Date: September 2004
Source: Ocean City, NJDEP,
and Orth-Rodgers & Associates

(S:\Project_Files\2003207 - Ocean City\GIS\Projects\Bike_Ped_CrashesS1.mxd) 09/22/2004

Table 2: Bicycle Crashes 2001-2002

Map Key	Location	Description	Year
1	Ocean Drive, 75 feet north of Toll Booth	Bicycle traveling southbound struck stopped vehicle.	2002
2	39th Street, 20 feet east of West Avenue	Vehicle traveling eastbound on 39th Street struck bicyclist exiting alley; bicyclist was obstructed by parked vehicle and utility pole.	2001
3	34th Street and Asbury Avenue	Vehicle turning left struck bicyclist who entered intersection on crosswalk.	2001
4	West Avenue and 33rd Street	Vehicle traveling northbound on West Avenue struck bicyclist traveling westbound on 33rd Street.	2001
5	23rd Street and Asbury Avenue	Bicyclist traveling northbound on Asbury Avenue with flow of traffic struck vehicle on 23 Street. Vehicle failed to yield in intersection.	2001
6	West Avenue, 75 feet south of 14th Street	Moped driver was traveling south on West Avenue, lost control and fell off.	2001
7	West Avenue, 50 feet south of 14th Street	Motorist opened door and struck southbound bicyclist.	2002
8	Asbury Avenue and 14th Street	Bicyclist traveling east on 14th Street was struck by vehicle as he entered the intersection on red.	2001
9	1250 West Avenue	Vehicle driving into parking lot struck pedestrian on scooter as he was coming off the curb.	2001
10	12th Street and Wesley Avenue	Bicyclist on 12th failed to stop and struck vehicle.	2002
11	12th Street, 90 feet east of Ocean Avenue	Surrey entering 12th Street from Boardwalk struck vehicle.	2002
12	Ocean Avenue, 200 feet south of 10th Street	Vehicle headed westbound in entranceway of parking lot was leaving parking lot and struck by bicyclist heading southbound on sidewalk.	2001
13	10th Street, 200 feet east of Ocean Avenue	Bicyclist entering road from sidewalk was struck by vehicle.	2002
14	962 West Avenue	Skateboarder struck by vehicle.	2002
15	943 Haven Avenue	Vehicle traveling southbound in parking lot, ran over skateboard which pedestrian jumped off deliberately.	2001
16	14 West 9th Street	Vehicle struck bicyclist in parking lot.	2001
17	9th Street and Bay Avenue	Bicyclist traveling westbound on 9th Street was struck by vehicle as bicyclist attempted to make right turn on Bay Avenue.	2001
18	West Avenue and 9th Street	Vehicle turning left onto West Avenue struck bicyclist in crosswalk.	2002
19	9th Street and West Avenue	Vehicle turning left from West Avenue struck bicyclist on 9th Street.	2002
20	West Avenue and 9th Street	Bicyclist riding on wrong side was struck by vehicle turning left onto West Avenue from 9th Street.	2002
21	West Avenue and 9th Street	Bicyclist riding wrong way struck by vehicle turning left onto West Avenue.	2002
22	9th Street and Central Avenue	Eastbound vehicle turning left onto Central Avenue hit bicyclist.	2002
23	Central Avenue, 10 feet north of 9th Street	Bicyclist hit door of illegally parked vehicle at northeast corner of 9th and Central Avenue.	2001
24	Wesley Avenue and 9th Street	Vehicle traveling northbound attempting to make a right turn on red struck bicyclist riding wrong way on Wesley Avenue sidewalk.	2001
25	Wesley Avenue at 9th Street	Bicyclist riding eastbound on sidewalk couldn't stop before intersection and collided with vehicle.	2001
26	9th Street at Ocean Avenue	Bicyclist traveling west on 9th Street struck side of vehicle while attempting to change from the outside to inside lanes.	2001
27	800 Block 9th Street, North	Vehicle struck bicyclist in parking lot.	2001

	Parking Lot		
28	9th Street, 250 feet east of Atlantic Avenue	Vehicle exiting parking lot struck pedestrian walking bicycle on sidewalk.	2001
29	820 Ocean Avenue	Vehicle struck bicyclist in parking lot.	2002
30	Bay Avenue, 10 feet south of 8th Street	Vehicle southbound on Bay crowded and struck bicyclist on shoulder.	2002
31	8th Street and Asbury Avenue	Vehicle on 8th Street struck bicyclist entering intersection from sidewalk through red light.	2002
32	8th Street and Central Avenue	Bicyclist traveling eastbound on 8th Street, struck vehicle traveling southbound through the intersection	2002
33	Central Avenue and 8th Street	Vehicle northbound on Central Avenue failed to stop and hit bicyclist on 8th Street. Bicyclist did not have light at night.	2002
34	612 8th Street	Bicyclist entering an alley struck vehicle.	2002
35	700 Block of Bay Avenue, 65 feet north of Garfield	Bicyclist hit door of parked vehicle which was being opened by driver to exit.	2001
36	Ocean Avenue and 7th Street	Eastbound vehicle on 7th Street struck bicyclist on wrong side.	2002
37	Asbury Avenue and 4th Street	Bicyclist on 4th Street failed to stop and entered intersection from crosswalk. Bicyclist was struck by vehicle. Fatality.	2002
38	600 Block 3rd Street Alley and Wesley and Ocean	Bicyclist traveling on north sidewalk was struck by vehicle backing out of a driveway.	2001
39	200 Block of 1st Street, 175 feet west of west Avenue	Vehicle traveling westbound struck bicyclist which emerged from alley.	2001
40	Bay Avenue and North Street	Bicyclist westbound on North Street failed to stop and hit vehicle.	2002

Table 3: Pedestrian Crashes 2001-2002

Map Key	Location	Description	Year
41	Bay Avenue, 100 feet north of 35th Street	Vehicle turning left on 35th Street struck pedestrian in crosswalk.	2001
42	Simpson Avenue, 250 feet south of 34th Street	Parking vehicle struck pedestrian.	2002
43	Asbury Avenue, 50 feet south of 21st Street	Vehicle struck pedestrian running from between parked vehicles	2002
44	Bay Avenue, 100 feet south of 17th Street	Vehicle traveling northbound on Bay Avenue struck pedestrian conducting mid-block crossing.	2002
45	1300 West Avenue	Vehicle struck pedestrian while backing into parking space. Fatality.	2002
46	Central Avenue, 219 feet north of 12th Street	Vehicle traveling northbound on Central Avenue struck pedestrian walking westbound who emerged from two parked vehicles.	2001
47	200 Block of 10th Street, 90 feet west of West Avenue	Vehicle traveling east on 10th Street struck pedestrian making mid-block crossing.	2001
48	900 Block Alley Asbury and West, 200 feet north of 10th Street	Vehicle traveling south in alley struck pedestrian who ran out into alley.	2001
49	941 Pleasure Avenue	Pedestrian grabbed onto truck that was stopped in traffic. Truck started to move and pedestrian fell.	2001
50	2 W. 9th Street Lot	Pedestrian struck by vehicle in parking lot.	2001
51	Asbury Avenue at 9th Street	Vehicle turning left onto Asbury Avenue struck pedestrian in crosswalk.	2001
52	Wesley Avenue and 9th Street	Vehicle turning left onto Wesley Avenue struck pedestrian in crosswalk.	2002
53	Ocean Avenue, 100 feet north of 9th Street	Parking vehicle struck pedestrian.	2001
54	West Avenue at 8th Street	Vehicle turning left onto West Avenue struck pedestrian in crosswalk.	2001
55	800 block of 7th Street, 200 feet west of Wayne Avenue	Parking vehicle struck pedestrian.	2001
56	652 West Avenue	Parking vehicle struck pedestrian.	2002
57	Asbury Avenue at 6th Street	Vehicle attempting to turn left onto Asbury Avenue struck pedestrian in crosswalk.	2002
58	Alleyway Ocean/Wesley, 75 feet north of 5th Street	Vehicle hit pedestrian in hit and run accident.	2001
59	1st Street, 15 feet west of Atlantic Avenue	Vehicle westbound on 1st Street struck pedestrian who came from between two vehicles stopped in eastbound traffic.	2002
60	Beach Road at East Atlantic Blvd.	Vehicle backing into parking space struck pedestrian.	2001
61	Gardens Parkway and Dundee Road	Pedestrian (protester) intentionally walking in the path of dump trucks was struck.	2002

VEHICULAR RECOMMENDATIONS

Route 52 Bridge

One of the major transportation projects anticipated to affect Ocean City in the future is replacement of the existing Route 52 causeway with a new bridge; the bridge is expected to open in 2008. Since this is the main entry point into Ocean City, any impacts from a new bridge must be carefully addressed.

The elimination of the two drawbridges, in particular, will have the greatest effect on traffic conditions in Ocean City. They open with greatest frequency in the summer time, precisely when traffic volumes are heaviest. The length of the opening varies, but is often over five minutes in duration. The opening is experienced most directly at the signalized intersection of 9th Street and Bay Avenue, which is connected to the bridge. When the drawbridge is up, the northbound left turn on Bay Avenue is eliminated from the signal, and the time for this phase is given to through traffic on Bay Avenue. The drawbridge opening also has the effect of creating long queues for outbound traffic on 9th Street.

After the drawbridge is closed, there are heavy "spikes" of inbound and outbound traffic, which typically take several cycles to clear.

After the bridge replaces the causeway, the signal at 9th and Bay Street will operate on its "normal" traffic program at all times. The outbound traffic queues on 9th Street, which currently may reach all the way to Atlantic Avenue when the drawbridge is up, will be significantly reduced.

Residents have expressed several concerns about the new bridge. There is a concern that traffic volumes will increase with the opening of the bridge. The project team for the bridge does not anticipate that to happen, since the new bridge, like the existing bridge, will still be a four-lane facility, and there will thus be no increase in capacity.

There is also a concern that incoming traffic will head into the city at a faster pace, since the drawbridge will no longer be present to serve a monitoring function. The most direct means of addressing changes in traffic flow will be through changes to the signal at 9th Street and Bay Avenue. The project team has had discussions with Cape May County about revising the signal timing to make traffic flow at this intersection more efficient. If, under future conditions, traffic flow into the City on 9th Street is moving at too high a speed, the City can elect to take time away from the inbound movement. This would increase the delay experienced by inbound motorists, but reduce vehicular speeds.

A range of strategies to improve traffic flow on 9th Street can also be considered, consistent with the opening of the new bridge. One strategy would be to synchronize all the traffic signals along 9th Street, which would result in improved traffic flow along the entire length of the corridor. The best means for synchronizing signals would be to install wire between every signal (which would also require installing conduits and junction boxes for every signal). If hard-wired in this manner, all individual signal controllers along the corridor could be effectively managed through one "master

controller." Along with installation of a physically connected signal system, system detectors should be installed so that signal splits could be altered along the corridor to respond to unique traffic conditions. For example, if a sudden thunderstorm strikes, causing significant traffic flow out of the city, the signals along the corridor could react to this peak in outbound traffic. Besides efficiently managing traffic flow, an interconnected system would give the City Emergency Services the ability to over-ride the normal signal phasing and shift to an "emergency mode" signal phasing.

It should be acknowledged that such a system would also be somewhat expensive. A wireless master controller system may be feasible, but is less reliable. Further, given the relatively close proximity of the signals along 9th Street, it may not be appreciably less expensive.

As an alternative, the City could improve traffic flow by installing less expensive time-based coordinators at each signal. Installation of these coordinators would also allow the City to synchronize signals. However, they would not permit the signals to "talk to each other," and would thus not be sensitive to unique traffic conditions, as would be the case if signals were hard-wired.

A more extensive strategy would be to link the signals on 8th, 9th and 10th Streets together. Under this scenario, programs could be established to better process vehicles attempting to reach 9th Street, and then depart the City, in the event of a weather emergency. However, this improvement would be appreciably more expensive than linking the signals on 9th Street together.

Another option for improving incoming traffic flow would be to install a dedicated eastbound right-turn lane at 9th Street and Bay Avenue. This would further improve traffic flow through the intersection. It should be noted that installation of a right-turn lane would require cutting back the sidewalk on the south side to seven (7) feet in width, which is somewhat inconsistent with the 10-foot-wide pedestrian/ bike path being installed on the eastbound side of the new bridge. This strategy should thus be considered after other strategies for improving circulation through the downtown.

Finally, signing could be improved for inbound motorists. Signs are currently in place for eastbound motorists, but the wording is not of a sufficient size to be read by a large percentage of motorists. Signs with larger legends are thus recommended.

9th Street

In addition to the improvements to 9th Street to better tie into the planned Route 52 bridge, other improvements are needed along this key street.

9th Street has two distinct characters, east and west of West Avenue. West of West Avenue, a two-way left turn lane is present along much of this roadway section. The land uses are more auto dependent than east of West Avenue, with gas stations or retail/service uses with large parking lots being representative examples. East of West Avenue, 9th Street is four lanes with no left turn lane. Land uses have a more traditional business district character, with no or minimal setbacks. Pedestrian volumes are much heavier east of West Avenue.

There are a number of issues with existing conditions on 9th Street.

- Signal equipment is inadequate. Signals lack pedestrian indications, and the signal indications are not far enough over the approach lanes to provide adequate visibility for approaching motorists.
- Left turning movements along 9th Street at driveways are not controlled. This is particularly problematic at the driveway to McDonald's, where field views have identified westbound motorists turning across the three lanes of eastbound traffic at the West Avenue approach, thus disrupting both eastbound and westbound flow. Some crashes in recent years can be traced to the conflicting movements on this block.
- Particularly east of West Avenue, sidewalks are not of the desired width to accommodate the pedestrian volumes. They are immediately adjacent to roadway lanes, making for uncomfortable pedestrian conditions.
- There is inadequate space for bicyclists in the roadway.

Looking west on 9th Street from West Avenue.

It is thus proposed to reconfigure 9th Street west of West Avenue. Figure 4 depicts 9th Street between Bay Avenue and West Avenue. Landscaped medians are proposed for the roadway, with openings to permit left turning movements at intersections with side streets. However, left-turning movements into and out of mid-block driveways, including McDonald's, would not be permitted. The medians are proposed to be 16 feet in width. Since emergency access is a consideration, the median islands should be built with low, mountable curbs; the landscaping should either be a plant material of minimal height, or an attractive textured pavement. Built in this manner, emergency vehicles could drive over the median islands if necessary.

Coincident with this design for median islands, it is also proposed to restripe 9th Street to create 11-foot travel lanes, and 5 foot bicycle lanes. This will not require reducing the number of travel lanes on 9th Street, since the existing lanes are wider than necessary, ranging from 12 to 14 feet. The bike lanes will better accommodate bicycle travel than the current roadway, and provide greater separation for pedestrians from passing vehicles. There are two options for bike lanes at the approaches with major streets; they can be dropped, and lanes widened, to reinforce the fact that bicyclists can use all lanes at the approach (illustrated at the West Avenue approach) or they can be retained, such as shown at the Bay Avenue approach.

BIKE ONLY 5'
ONLY ONLY ONLY
11' 11' 11' 11'
EXISTING MEDIAN
LANDSCAPED MEDIAN
ONLY
16'
LANDSCAPED MEDIAN
CONCRETE MEDIAN
9TH STREET
BIKE ONLY 5'
SUPERFRESH DRIVEWAY
BIKE ONLY 5'
11' 11' 11' 11'
CONCRETE MEDIAN
ONLY
LANDSCAPED MEDIAN
5'
ONLY 11'
ONLY 14'
ONLY 13'
WEST AVE.
11' 11'
BIKE ONLY 5'
ONLY
BAY AVE.
SIMPSON AVE.
HAVEN AVE.
N
0' 30' 60'
1 inch equals 60 feet

Figure 4
9th Street between Bay Avenue and West Avenue--Raised Median

Ocean City
Circulation Element
Ocean City, Cape May County

Date: October 2003
Source: Ocean City. NJDEP, and Orth-Rodgers & Associates

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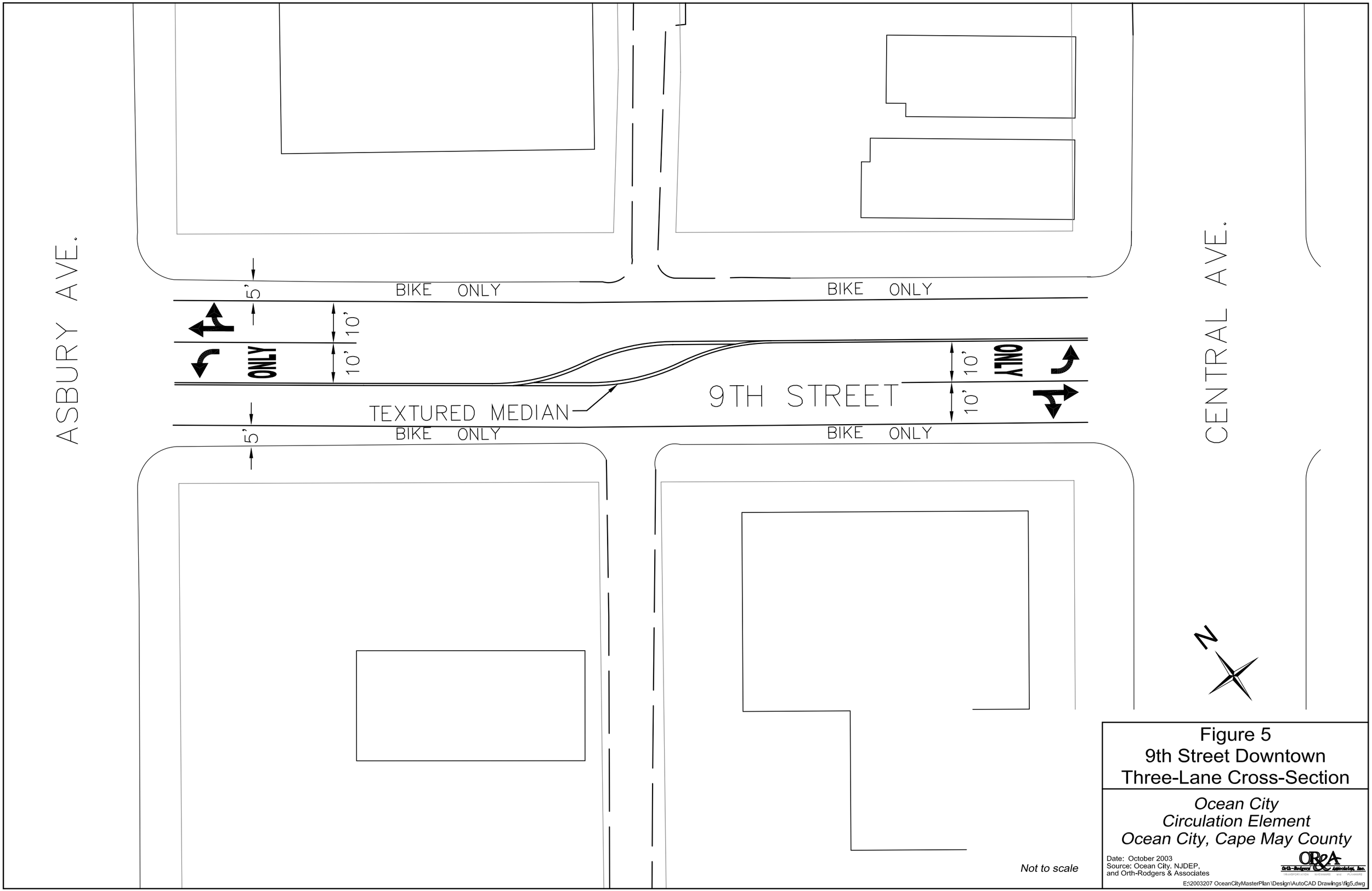
It is also possible to reconfigure 9th Street east of West Avenue. The reconfiguration here involves changing 9th Street from the existing four-lane cross-section, with 10 foot lanes, to two through lanes and a left turn lane. Under the reconfiguration, the lanes would also be 10 feet in width. This reconfiguration would permit striping of 5 foot bike lanes. The presence of bike lanes would be even more useful on this section of 9th Street than west of West Avenue. Pedestrians frequently complain about bicyclists riding on the sidewalks, which, at 8 to 10 feet in width, are too narrow to accommodate both bicycle activity and the heavy pedestrian volumes. The bike lanes would also provide a desirable separation from vehicular traffic. The narrow width of the existing travel lanes – 10 feet – means that motorists must ride directly adjacent to the sidewalks, making conditions uncomfortable for pedestrians. Of course, bicyclists would greatly benefit from the presence of bike lanes. The concept for this reconfiguration is presented in Figure 5.

The reconfiguration would result in slightly increased delays for motorists along 9th Street. Much of this delay could be addressed by synchronizing signals along 9th Street. As discussed above, significant queues can form on 9th Street while the drawbridge is opened. The queues produced by the drawbridge openings may actually be more noticeable than the increase in delays, as the reconfiguration will have the effect of reducing the vehicular storage capacity on 9th Street east of West Avenue by half. Much of the problem with outbound queues will be addressed when the new bridge is opened. Therefore, to minimize any disruption from the recommended cross-section, the City could wait until after the bridge is constructed, and after taking steps to improve traffic flow through 9th Street signals.

Several other strategies would increase capacity and improve safety along 9th Street. These strategies were identified as part of the *9th Street Road Safety Audit* commissioned by the South Jersey Transportation Planning Organization, and prepared in June 2004. These include:

- Installation of "Do Not Block the Box" signs at intersections, to improve traffic flow in congested conditions;
- Encourage the use of alternate roads through signage;
- Supplement the overhead street lighting with pedestrian-scale lighting;
- Provide better progression for traffic signals on 8th and 10th Streets, so these roads will be a more reasonable alternative to 9th Street;
- Inventory and revise truck route signing;
- Provide advance lane use control signs on Asbury Avenue approaches to 9th Street; and
- Convert alleys along 9th Street to right-in, right-out only.

The Ocean City ordinance requires that land uses adjacent to alleys be required to use the alleys for all vehicular access. For land uses located between 9th Street and 8th Street, or between 9th Street and 10th Street, this requirement serves to increase the number of mid-block turning movements on 9th Street, as inbound vehicles would access uses via the alley, rather than from one of the avenues. Given the high number of vehicular conflicts on 9th Street already, this represents an undesirable condition. This ordinance should thus be modified to exclude land uses between 8th Street and 10th Street.



Not to scale

Figure 5
9th Street Downtown
Three-Lane Cross-Section

Ocean City
Circulation Element
Ocean City, Cape May County

Date: October 2003
Source: Ocean City. NJDEP,
and Orth-Rodgers & Associates

ORA
Orth-Rodgers & Associates, Inc.

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West Avenue

Early in the Circulation Plan process, residents in the vicinity of West Avenue expressed interest in traffic calming along that roadway. Speeding is a common occurrence along West Avenue. Speed studies were taken at four different points along West Avenue; they were conducted in the PM peak hour (between 4:45 PM and 5:45 PM) for a more conservative approach. Speeding would likely be heavier in some off-peak hours. Following are the results:

Location	Speed limit	85th percentile speed
West Avenue at 20th Street	30 mph	38 mph
West Avenue at 26th Street	30 mph	39 mph
West Avenue at 31st Street	30 mph	36 mph
West Avenue at 43rd Street	35 mph	41 mph

The 85th percentile is the speed below which 85% of motorists are driving, and is often used to set the speed limit on roadways. Thus, as indicated in the table, a sizable percentage of motorists currently exceed the speed limits on West Avenue. Analyzing vehicular speeds in a different way, 64 to 90% of motorists on West Avenue north of 34th exceed the speed limit, and 60% of motorists on West Avenue south of 34th exceed the speed limit.

The speeds are likely related to the roadway's cross-section: at four lanes, and 70 feet in width, this roadway is tied with 9th Street above West Avenue as the widest street in Ocean City. Motorists find it easy to speed along West Avenue.

Because of the wide cross-section, and speed of passing vehicles, pedestrians have expressed concern about crossing West Avenue. This issue became especially prominent several years ago, when Cape May County restriped West Avenue south of 34th Street, eliminating the painted median and creating bike lanes of slightly less than 6 feet in width. Although the painted median of about 6 feet is not as desirable as a physical island, pedestrians regarded it as providing a desirable refuge if they could not cross all four lanes at one time, and believed that the reconfiguration made it more difficult to cross.

West Avenue at 21st Street.

For the above reasons, it is proposed to reconfigure West Avenue between 15th Street and 55th Street as a three-lane cross-section, with two through lanes and a left-turn lane at the approach to intersections with side streets (Figure 6). A median of 18 feet in width would provide a refuge for pedestrians to stand during their crossing. The roadway cross-section would also provide a 6-foot bike lane and 8 foot parking lane. The cross-section would thus address the safety of crossing pedestrians and simultaneously provide an improved bike lane for bicyclists. Importantly, the cross-section would also serve to slow vehicles;

the speed of vehicles would be controlled by the speed of the first vehicle in a platoon, and motorists could not change lanes to speed. This cross-section would thus accomplish the goal of traffic calming.

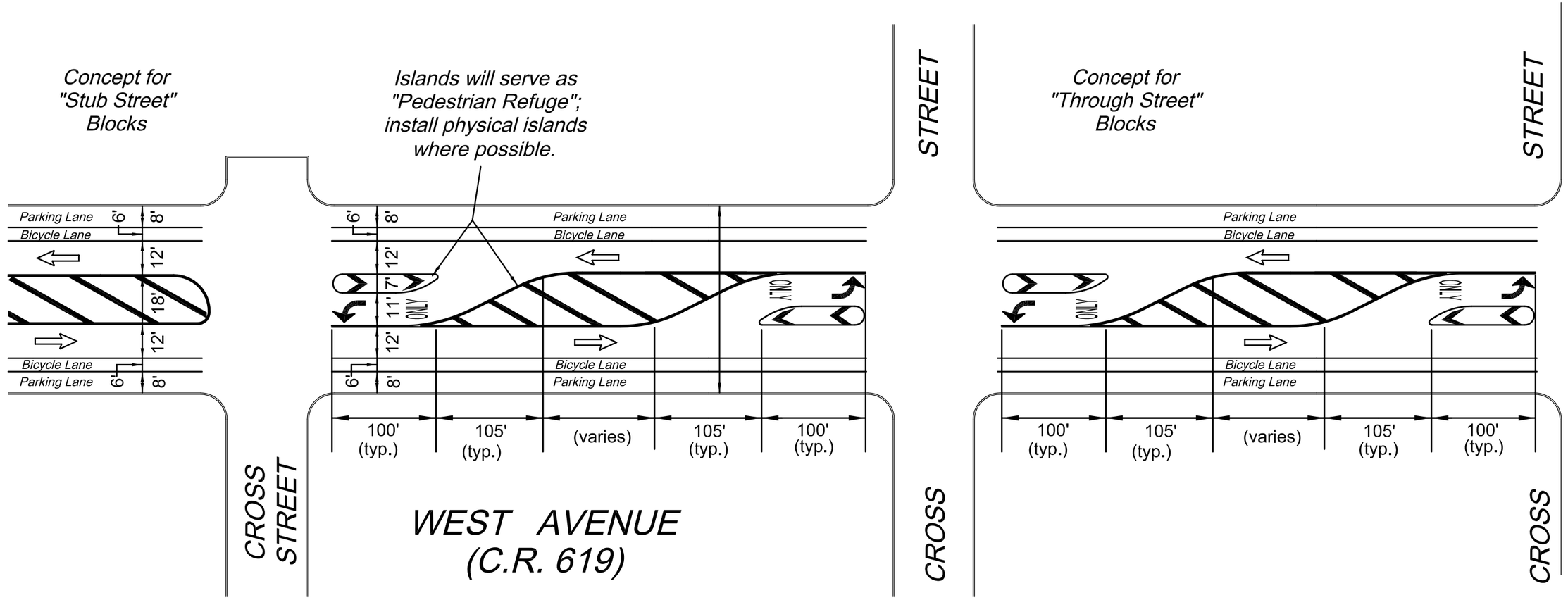
As indicated in Figure 1, volumes on West Avenue are relatively consistent between 15th Street and 34th Street at about 15,000 average daily traffic (ADT) volumes. A spike occurs at 34th Street, with reduced volumes south of this point. Typically, changing a roadway cross-section from four to three lanes has the potential for creating a problem with delays when the roadway's ADT is above 20,000. On a four-lane roadway in an urban area, the left lane is often occupied by left-turning vehicles, and so there can be a minor difference in capacity by changing to a three-lane cross-section. It should be emphasized that while the change in cross-section will likely reduce ambient traffic speeds, vehicles on West Avenue should experience only minimal increases in delay at any one intersection.

The delay for vehicles waiting to turn onto West Avenue from side streets will increase. At the busiest intersections, the level of service for vehicles waiting to turn onto West Avenue from side streets currently is 'f.' [1] Under one possible scenario, delay would increase by 7 seconds for eastbound motorists and 27 seconds for westbound motorists. It should be noted that if motorists experience excessive delay approaching West Avenue, they have the option of using a parallel north-south roadway to access a street which approaches West Avenue at a signal.

To evaluate the performance of a three-lane cross-section, Ocean City could first experiment with it for a smaller area. It is recommended that the City first re-stripe West Avenue from north of 18th Street to south of 24th Street. The City could then evaluate whether this results in significant delays; it should be left in place long enough to permit residents to become familiar with it, since any change in roadway pattern has the potential to confuse some residents initially. If the cross-section on this area does not result in major delays, or does not disturb traffic patterns, the City should then re-stripe West Avenue from 15th Street to 35th Street. Depending upon the success of this reconfiguration, the City could then move to install physical islands, which would be more aesthetic and provide a greater measure of safety to crossing pedestrians. The City could consider either an attractive textured material, or a very low-rise plant material, so emergency vehicles could cross if needed. Mountable curbs should be used.

The final step would be to coordinate with Cape May County on a possible reconfiguration of West Avenue from four lanes to three lanes south of 35th Street, since that is a county roadway.

[1] The "level of service" evaluates intersections based upon the typical delay to motorists. Grades indicate the typical amount of delay; a level of service 'f' indicates that motorists waiting to turn onto West Avenue are delayed over 50 seconds on average.



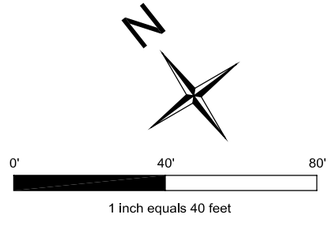


Figure 6
Proposed West Avenue Three-Lane Cross-Section

Ocean City
Circulation Element
Ocean City, Cape May County

Date: October 2003
Source: Ocean City, NJDEP, and Orth-Rodgers & Associates

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Boardwalk Blocks

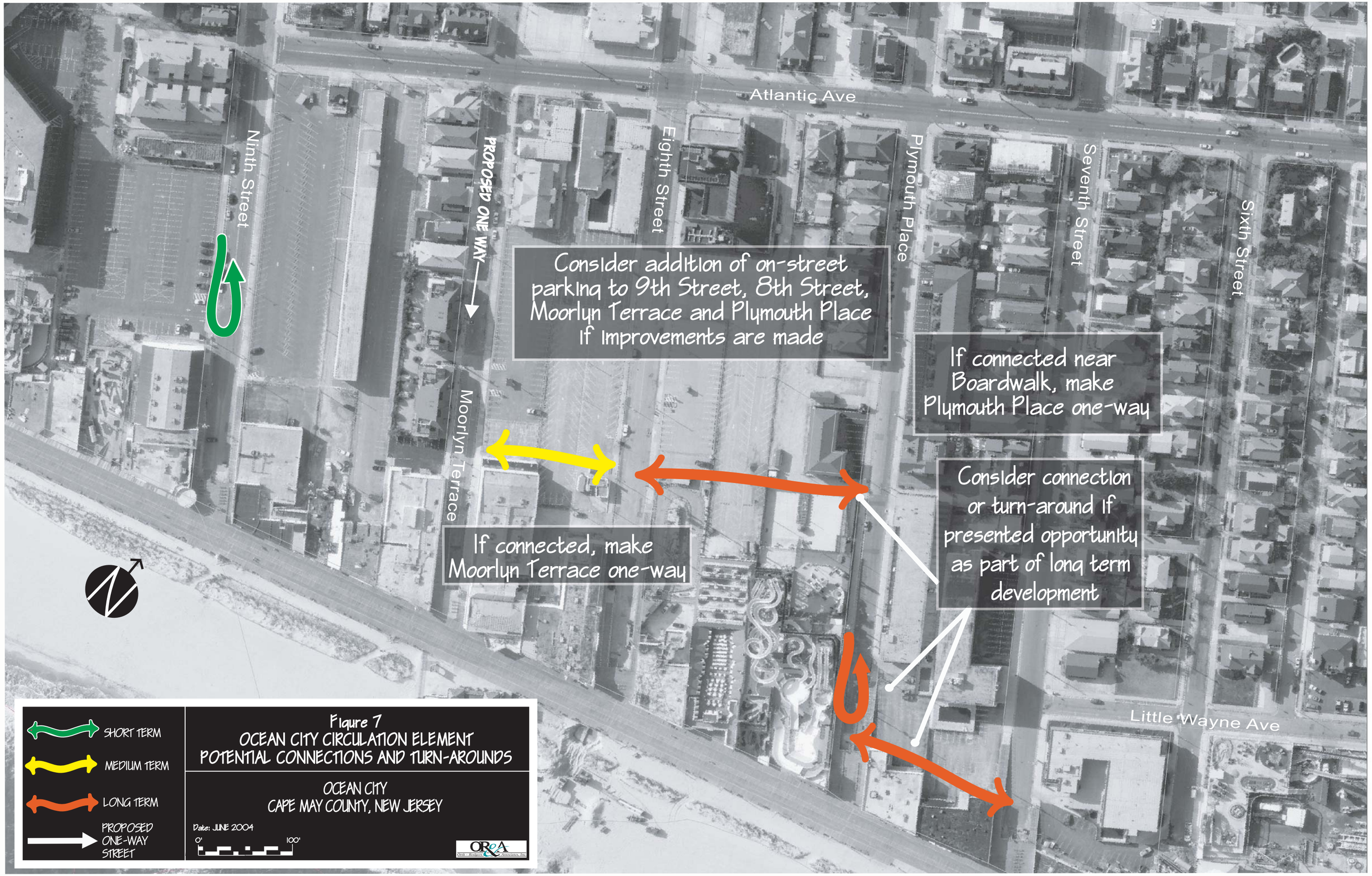
The blocks on east-west streets adjacent to the Boardwalk – referred to as the "Boardwalk blocks" in this Plan – present unique operational issues. Many motorists venture down these streets in search of a parking space, for a view of the Ocean, to make deliveries, or for other reasons, and must then turn around at the street's terminus. Because of the width of these roadways – 30 to 40 feet – motorists must engage in a variety of U-turns and K-turns to turn around. These unsightly, occasionally chaotic maneuvers, are a constant occurrence on the Boardwalk blocks. A number of the crashes in the year analyzed – 2002 – can be traced to the maneuvers on these blocks. For example, two vehicles engaging in U-turns at the top of 8th Street were involved in crashes. In 2002, there were three accidents alone at the end of Plymouth Place, with two occurring at the Plymouth Place condominiums. Two U-turning vehicles struck the building in roughly the same place.

The maneuvers on Boardwalk blocks can be addressed in several ways. The City could opt to install signage at the top of the block, and inform motorists of the status of parking availability. However, this would require variable message signing for many blocks, and constant coordination involving the parking operators.

For the most enduring solution to the issues on these blocks, the City should install turn-around areas at the end of these blocks, or connect pairs of Boardwalk blocks through building new roadways. Under either of these improvements, undesirable U-turns and K-turns at the end of the blocks would significantly diminish. Potential improvements are depicted in Figure 7.

Maneuvering at the end of 9th Street.

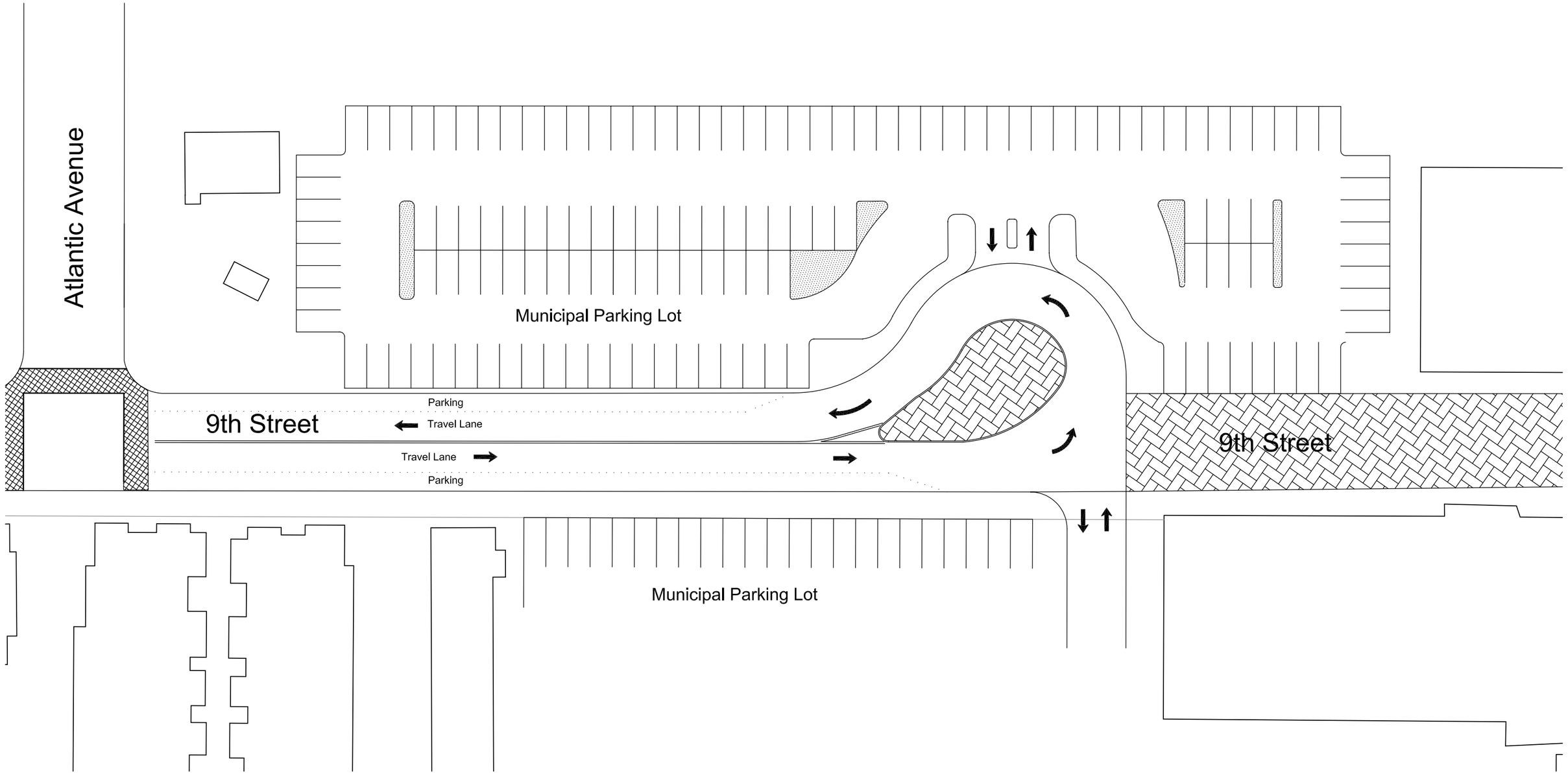
One of the most feasible improvements would be the installation of a turn-around at the end of 9th Street, since the City owns the two parking lots on either side of 9th Street. A conceptual turn-around design is depicted in Figure 8. This would serve to organize the traffic flow on this block in a much more organized fashion, and would have the further benefit of relocating the entrance to the municipal parking lot north of 9th Street away from the corner of 9th Street and Atlantic Avenue, thus reducing conflicting movements adjacent to the intersection, and reducing the disruption presented by queued vehicles. This design would necessitate removing a number of parking spaces from this lot, but would permit on-street parking to be permitted on the westbound side, thus mitigating the parking loss. (Parking is currently not permitted on the westbound side, likely because eastbound vehicles regularly queue to enter the municipal parking lot on the south side of 9th Street. As motorists tire of waiting, or realize that no parking is available, they conduct turns in the middle of the block to head back west. This presence of cars parked on the westbound side would hamper this movement.)


Atlantic Ave
Ninth Street
PROPOSED ONE WAY
Eighth Street
Plymouth Place
Seventh Street
Sixth Street
Moorlyn Terrace
Little Wayne Ave
Consider addition of on-street parking to 9th Street, 8th Street, Moorlyn Terrace and Plymouth Place if improvements are made
If connected near Boardwalk, make Plymouth Place one-way
If connected, make Moorlyn Terrace one-way
Consider connection or turn-around if presented opportunity as part of long term development
SHORT TERM
MEDIUM TERM
LONG TERM
PROPOSED ONE-WAY STREET
Figure 7
OCEAN CITY CIRCULATION ELEMENT
POTENTIAL CONNECTIONS AND TURN-AROUNDS
OCEAN CITY
CAPE MAY COUNTY, NEW JERSEY
Date: JUNE 2004
0'
100'

One connection may be facilitated in the future if a private parking lot on the south side of 8th Street is purchased by Ocean City, as currently planned. If this goes through, the City could place a roadway between Moorlyn Terrace and 8th Street, roughly as shown in Figure 7. Under this scenario, Moorlyn Terrace could be made one-way eastbound; the new connector roadway made one-way northbound; and 8th Street would remain two-way. As a one-way street, there would be the option to permit parking on both sides of Moorlyn Terrace (it is currently permitted only on the north side), and thus increase parking supply on this 30-foot wide street. The two parking lanes would total 16 feet in width, leaving 14 feet for the one travel lane. Most important, vehicles would not need to turn around at the end of Moorlyn Terrace; they would use the new connector roadway to pass through to 8th Street. This would increase the safety of traffic operations in the area, as vehicles which previously returned up Moorlyn Terrace, and entered Atlantic Avenue at an unsignalized location, would now be able to access Atlantic Avenue at the signalized intersection of 8th Street and Atlantic Avenue.

Other connections are desirable, but not feasible in the short term. Ideally - especially given the crash history at the end of Plymouth Place, and the many vehicles that wander down this roadway in search of a parking place at Water World - a roadway would be installed to connect Plymouth Place to 8th Street or 7th Street. However, currently a roadway from Plymouth Place in either direction would have to pass through private properties. It is therefore recommended that the City remain open to the possibility of a connecting roadway between Plymouth Place and parallel streets in the event of future long term redevelopment in this area.

The area between 9th Street and Plymouth Place is the highest priority area for considering connections or turnarounds on Boardwalk blocks, because of the higher volumes on these streets and their greater length. Motorists driving down 7th Street can exit via Little Wayne Avenue; the latter roadway performs the function of a connecting street in the manner proposed. From 10th Street west, the Boardwalk blocks are reduced in length. Further, the distance between parallel streets is greater, making the installation of connecting roadways more difficult and expensive.



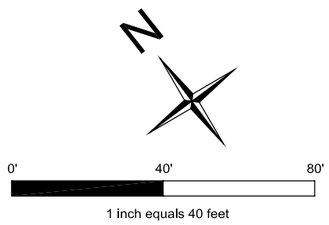


Figure 8
Ninth Street
Potential Turnaround

Ocean City
Circulation Element
Ocean City, Cape May County

Date: October 2003
Source: Ocean City. NJDEP,
and Orth-Rodgers & Associates

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Traffic Calming

Residents on Simpson Avenue, Ocean Avenue, and Atlantic Avenue have expressed interest in traffic calming. Traffic calming involves using mainly physical measures to reduce vehicular speed or to reduce traffic volumes, in the effort to make streets more amenable to non-motorized users. These measures can involve either vertical deflection (speed humps) or horizontal deflection (traffic circles).

Options for traffic calming are greatest on Simpson Avenue, since it has relatively little volume, especially compared to other north-south roadways. Speed humps are perhaps the most common traffic calming measure nationwide, since they are both inexpensive and very effective in their intended purpose. They range from 12 to 22 feet long in profile, and are typically three inches high. Another potential measure would involve installing traffic circles in the middle of intersections. These could host landscaping, and are thus more aesthetic than speed humps. These two measures are the most effective measures that could be considered for Simpson Avenue. Speed humps typically reduce vehicles speeds by 8 mph, and traffic circles by 4 to 6 mph.

Options for traffic calming are more limited on Atlantic Avenue (especially close to 9th Avenue), and particularly on Ocean Avenue, given the higher traffic volumes there. Speed humps and traffic circles would be too intrusive for these environments. On these roadways, less intrusive measures such as curb extensions could be considered.

Evacuation Plan

Ocean City does not have a formal evacuation plan at the current time. However, the evacuation policy is that all persons north of 22nd Street should evacuate the City via West Avenue to 9th Street; all persons south of 22nd Street should use the Roosevelt Boulevard Bridge.

Evacuation is a concern in Ocean City given the low elevation of many of the streets, and their consequent predisposition to being flooded. Partly for this reason, the City would like to elevate the height of 9th Street by 18 to 20 inches. Several years ago, 55th Street was elevated to permit emergency access.

TRANSIT

Ocean City is served by three NJ Transit routes, and by one private company, 5-Mile Beach Trolley. The three NJ Transit routes are:

- Route 316, which runs between Philadelphia and Cape May, and makes 3 to 4 stops per day;
- Route 507, which runs between Atlantic City and Ocean City. This has a much more regular headway, with frequencies of once per hour in off-peak, and as much as 3 times per hour during the morning peak hour; and,
- Route 551, which runs between Ocean City and Marmora. This makes only one stop in Ocean City on weekdays.

As can be seen from the above description, Route 507 has a much frequent headway than the other two routes. However, this bus only runs between 8th and 10th Street, making it more useful for regional commuters than in-city service.

The most extensive in-city service is offered by the 5-Mile Beach Trolley. This has a 60-day service during the summer peak season, from mid-June to Labor Day, and only runs from 5 to 12 PM, using Central Avenue, Wesley Avenue, Ocean Avenue and Atlantic Avenue between 59th Street and Battersea Road. It runs every 45 minutes. In the 2003 season it had 8,000 riders. Its fare is $2.

Because of the greatly reduced population during the off-peak months, it has been difficult to expand bus service. From 1990 to 1995, the City subsidized winter trolley service, with riders paying a fare of 50 cents. This service was eventually terminated.

Inconspicuous trolley stop sign on Atlantic Avenue.

The 5-Mile Beach Trolley company believes that increased frequency would have a greater effect in increasing ridership than a lower fare. Increased publicity would also be desirable. Particularly with a transient population found in Ocean City and in other shore towns, it requires a sustained effort, through many outlets, to educate visitors on the existence of trolley service. The City should upgrade the faded bus stop signs posted along the trolley route, and promote the service through website links and its normal promotional literature.

PARKING

Parking counts were conducted during the 2003 summer season, and they indicated that on-street parking spaces between Ocean Avenue and the Boardwalk, between 6th and 14th Streets, are often close to 100% occupied. Available spaces can often be found on Asbury Avenue and Central Avenue. The municipal lots by the Boardwalk are typically at capacity on evenings and many afternoons. The municipal lot behind City Hall is typically at capacity as well.

One of the few examples of lots close to the Boardwalk, and in the heart of the downtown, with ample vacancies is the 95-space municipal permit lot adjacent to the Flagship Condos between 9th Street and Moorlyn Avenue. Counts were conducted during Labor Day weekend of 2003, which indicated that there were typically 23 to 27 vehicles in the lot during the day, and 40 at night. All spaces in this lot are reserved for the summer season for $450, by such land uses as eating and lodging establishments, so the lot does generate significant revenue even when not fully occupied. However, the extent of the vacancies, in a prime location, suggests that the lot could be better utilized. There should be consideration of oversubscribing the spaces, or converting to a public lot.

Permit parking lot next to Flagship Condos.

Another lot that is not well used is the 100 space municipal lot, next to the Firehouse, at 5th Street and West Avenue. This is located slightly over 1/2 mile from the beach, and thus falls just outside the distance most people are willing to walk. However, with better promotion and awareness, some people might be willing to consider this lot since it is free. Another possibility is to incorporate the lot as a stop along the 5-Mile Beach Trolley route, or as a stop along another route in the future if more extensive service is developed.

The Transportation Center lot, with 96 spaces, is also free, and receives better usage than the 5th Street and West Avenue lot. It is much more visible to incoming motorists, since it is on 9th Street, and falls within 1/2 mile from the beach. It is currently used as a long-term parking lot by area businesses and other uses. A parking count revealed that of the 74 vehicles parked in the lot midday on Friday of Labor Day weekend 2003, 16 were there the night before. Initiating metering or a permit system for the lot at the current time is not critical, since there are regularly vacancies on adjoining streets; ultimately, if parking demand increases west of Asbury Avenue, such a system should be considered to result in more efficient use.

Businesses do not always have sufficient space on-site to provide the number of parking spaces required by the zoning ordinance. To ensure continued economic development, there should always be alternative options for downtown businesses to assist in meeting parking demand when this is the situation. A program tried by an increasing number of

municipalities, and by Ocean City in the past, is referred to as "payment in lieu of parking spaces (PILOPS)." Under such a program, businesses would be able to contribute funds on a per space basis for any spaces for which they were responsible, if they are not able to provide spaces on-site. The willingness of businesses to pay $450 per space per season for the permit parking lot north of 9th Street, and $900 per space per season for the municipal lot south of 9th Street, indicates it may be feasible for the City to initiate such a program. Nationwide, the value of a space in a PILOPS program varies from $4,000 to $23,000, with the higher prices found in California municipalities. Of note, Belmar Borough in Monmouth County - like Ocean City, a popular beach community - is investigating construction of a garage, for which it would charge $6,500 per space. The Borough is hoping to attract year-round use from the business district and marina.

As noted above, this program was tried in the City in the past. It was discontinued about eight years ago, after a number of businesses expressed concern about the costs. Perhaps a more significant problem is that the City did not have specific parking projects targeted to use the accumulated funds. In the intervening period, the City has become the largest parking lot operator in the downtown, and there is the potential for more ambitious projects, such as teaming up with private developers to build commercial or residential uses with structured parking on top of surface lots. Given the greater potential for advanced parking projects, a PILOPS program may be more feasible today.

It is also recommended that the City investigate the use of private lots, including the 1st Presbyterian and St. Peter's lots on Wesley Avenue. At the current time, there is concern about the legal logistics of renting spaces from churches for public use at certain times.

BICYCLE

Bicycling is a popular activity in Ocean City, particularly by summer visitors. However, much of the activity is focused on a relatively small number of streets, in the downtown area. In the morning, many bicyclists head to the Boardwalk, to ride in the "designated lane" for the Ocean views, until required to depart the Boardwalk at 11 AM. Bicycling activity is more diffuse in the City after this time, although visitors will typically not venture far beyond the neighborhood in which their lodgings are located.

The goal of the bicycling program for this Circulation Element is to create a bicycle network, with appropriate signs and markings, that will serve to encourage visitors to explore a larger area of the City on bike, and that will also provide safer, more convenient facilities for visitors and residents alike. Figures 9a and 9b depict a recommended bicycle network for the City, with five types of facilities:

Existing Bike Path

The only roadway that falls into this designation is Haven Avenue from 29th to 35th Street. A side path is also adjacent to the Fields Middle School, along Haven Avenue between 18th and 20 Streets; and west of the Elementary School, in alignment with Haven Avenue, between 5th and 6th Streets. All of these bike paths can be characterized as "side paths," or a two-way path along an urban street.

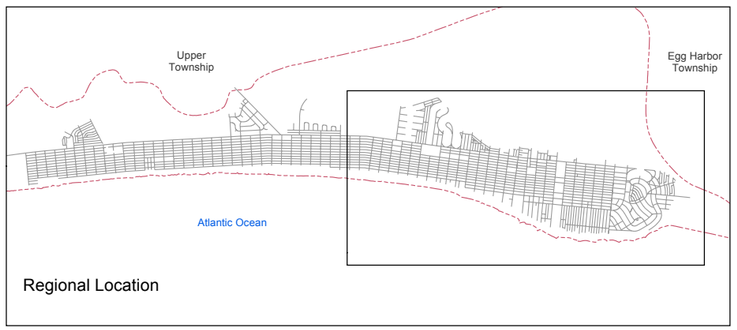
Side paths can present problems in an urban environment. When motorists approach the intersection of any roadway, they are trained to look for vehicles approaching from the left on the near side, and approaching from their right on the far side. However, bicyclists traveling on a side path could approach the intersection from the right on the near side. Because motorists do not anticipate bicyclists to come at them from this angle, they may be taken by surprise. Also, because bicyclists are riding in the part of the right-of-way designated for the sidewalk, but moving at a much faster pace than pedestrians, motorists may not always have sufficient time to react. Conversely, bicyclists may not anticipate having to stop for a vehicle than emerges in an urban driveway. Traffic control is another important issue; bicyclists riding on a side path must observe whatever traffic controls apply to the motorists on the same approach.

Fortunately, the existing side paths in Ocean City avoid many of these problems. Barriers have been set up for three of the streets that cross the Haven Avenue side path, and motorists thus do not cross the bicyclists' path. At three other streets, bicyclists are controlled by Stop signs. The side paths adjacent to the two schools are contiguous only with those blocks, and bicyclists on these paths are thus not exposed to vehicular traffic.

Compatible Width/Potential Bike Lanes
Existing Bike Lanes
Existing Bike Path
Proposed Bike Path
Shared Roadway

N

0 1,300 2,600 Feet
1 inch equals 1,300 feet



Regional Location

Figure 9a
Potential Bike Network

Ocean City
Circulation Element
Ocean City, Cape May County

Date: September 2004
Source: Orth-Rodgers & Associates

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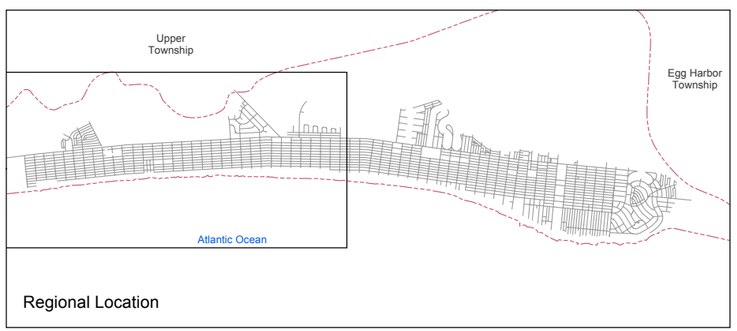
Sheet 2

- Compatible Width/Potential Bike Lanes
- Existing Bike Lanes
- Existing Bike Path
- Proposed Bike Path
- Shared Roadway

N

0 1,300 2,600 Feet

1 inch equals 1,300 feet



Regional Location

Figure 9b
Potential Bike Network

Ocean City
Circulation Element
Ocean City, Cape May County

Date: October 2004
Source: Orth-Rodgers & Associates

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The side path on Haven Avenue is not ideal from a design perspective. It passes underneath several trees, and tall bicyclists must be careful to avoid standing and striking the branches. The side path is not at street grade, and there are several pronounced elevation changes at intersections with side streets. At 8.5 feet in width, the side path does meet the minimal width for multi-use paths, although a minimum of 10 feet is typically desirable when both pedestrian and bicycle activity is anticipated. It is fine for its intended purpose – to accommodate both pedestrians and young children – but is not meant for more advanced bicyclists, and not likely to be used by them.

Proposed Bike Paths

The only facility in this category is a proposed bike path (side path) along Haven Avenue from 29th Street to 25th Street. Similar to the existing side path from 29th Street to 35th Street, a side path in this location will avoid the safety issues that sometimes befall side paths. It will be adjacent to the Wildlife Refuge, and vehicular traffic will thus not cross bicycle traffic. The scenery of the Refuge will serve to make the bike path here a desired amenity. The bike path here would ideally be designed with a more consistent elevation than the existing path to the south.

Existing Bike Lanes

The only existing bike lanes in Ocean City are on West Avenue, between 34th and 55th Streets. As noted earlier, the bike lanes were striped on this roadway several years ago, as part of a reconfiguration of this roadway by Cape May County. These bike lanes are slightly less than 6 feet in width, which is the NJDOT recommended minimum width for bike lanes on roadways of 30 to 40 mph, and over 10,000 average daily traffic volumes. However, the parking lane is striped at only 7'8" in width – as opposed to the 8 feet typically provided parking lanes – and there is thus more potential for opening car doors to extend into the parking lanes. As discussed earlier, it is recommended that the length of West Avenue from 15th Street to 55th Street be restriped with a three-lane cross-section, to provide both a pedestrian refuge and bike lanes of adequate width.

Compatible Width/Potential Bike Lane

This category of bicycle facility would represent the most far-reaching bicycle improvement in Ocean City, as it would include substantial portions of a number of the north-south roadways. Roadways of "compatible width" meet the standard established by NJDOT for roadways that, given existing traffic volumes, posted speeds, parking conditions and land uses, are deemed comfortable for the average bicyclist to travel. A bicycle compatible roadway does not necessarily have a bike lane, and may not be quite wide enough to accommodate one. Bike lanes are parts of the roadway that are specifically designated for bicycle use. (However, even if a roadway is not termed to be "bicycle compatible," it should not discourage bicyclists from riding on that roadway. Rather, this simply indicates that a roadway is not of an optimal width.) A significant opportunity is presented by the wide, two-lane roadways that predominate among the north-south avenues. Following is a description of each of these roadways and the potential opportunity. Two sub-categories are used; those roadways with potential to stripe bike lanes, and those roadways with insufficient width.

Bike Lane Potential

9th Street – this roadway has been extensively discussed earlier in the Circulation Element. Bike lanes could be created on 9th Street west of West Avenue through a

simple re-striping treatment; bike lanes could be created on 9th Street east of West Avenue only by changing the roadway cross-section from four to three lanes.

West Avenue – bike lanes could be striped on this roadway, from 15th to 34th Streets, if the three-lane cross-section recommended earlier in this Plan is implemented.

Bay Avenue – At 48 to 49 feet in width, Bay Avenue is currently compatible for bicyclist use. On sections with parking permitted, there is the opportunity to create bike lanes if the roadway is striped with 11-foot travel lanes. There would be two 8-foot parking lanes, and two 5-foot bike lanes. This road is a County facility, and Ocean City must thus work with the County to stripe a bike lane. To the south of the downtown, there are 12-foot shoulders with no parking, thus presenting ideal conditions for bicyclists. These shoulders could remain as currently striped, with the addition of bike symbol markings and bike signs being all that is necessary to comply with standards.

Wesley Avenue – At a width of 48 feet, this roadway could be striped with 11-foot travel lanes, 5-foot bike lanes, and 8 foot parking lanes. Because of its relatively low traffic volumes, and because it is the closest "compatible width" north-south roadway to the Ocean, Wesley Avenue has a potentially valuable role in encouraging bicyclists to travel from the downtown to the north end of town.

Insufficient width for bike lanes, or bike lanes not necessary:

Wesley Road east of Battersea/ Gardens Parkway – These two roadways are presented together, since they provide the link between Battersea Road and the Longport Bridge. At a width of 45 ft., and on-street parking permitted, Wesley Road between North Street and Seaspray is not quite wide enough for bike lanes. Shoulders are already existing along this segment, with 8 foot shoulders on Gardens Parkway between Cardiff Road and Crescent Road, and 6 foot shoulders north of Cardiff Road. The 6 foot shoulders north of Cardiff could be designated bike lanes. With the presence of frontage roads between Cardiff Road and the Longport Bridge, on-street parking could be prohibited on Gardens Parkway, if it is ever desired to create bike lanes.

Atlantic Boulevard – The width of Atlantic Boulevard ranges from 45 to 60 feet. The 60 foot wide section is not sufficiently long to justify striping bike lanes; minimal traffic volumes make the creation of bike lanes less critical in any case. It would be valuable to incorporate this roadway into the bike network, to introduce visitors to the quieter beaches here, far from the more populated beaches downtown.

Ocean Drive – bike compatible shoulders are present on Ocean Drive heading south from Ocean City into Strathmere. Markings or signs would be highly desirable here to remind visitors with bicycles that they can visit other Cape May communities on bicycle.

Battersea Road – at 46 feet in width, with on-street parking, this roadway is not quite wide enough for bike lanes, but it is wide enough to comfortably accommodate bicyclists. As the last east-west cross-town route before bicyclists leave the island, a bike route here is desirable to encourage access to Wesley Road and thence to the Longport Bridge, or to the "ocean-front loop road" of Atlantic Boulevard.

Shared Roadway
These roadways are not wide enough to accommodate bike lanes, but typically have low enough volumes to be appropriate for shared use. Certain streets, such as 34th Street, have higher volumes, but are the most direct route to the beach for visitors entering the city via Roosevelt Boulevard. Shared roadways should be signed as bike routes; bike route signs can be accompanied with "Share the Road" signs to remind motorists to watch for non-motorized users. They provide connections to important destinations, most typically guarded beaches.

Regional Bike Route
Two bicycle-compatible routes into Ocean City from surrounding communities already exist: Ocean Drive into Strathmere Township, and the Longport Bridge (the latter has 5-foot shoulders) into Egg Harbor Township. Yet another bicycle-compatible route into Ocean City will be available in the future, when the new Route 52 causeway is constructed. Indeed, of the four roadways connecting Ocean City to adjacent communities, the only route not bicycle compatible will be Roosevelt Boulevard. As discussed in this section, a system of bike lanes/bike compatible roadways can be incorporated into a network spanning the length and width of Ocean City. This system will heighten Ocean City's attractiveness for visitors interested in "recreational tourism" or "eco-tourism." Bicyclists will appreciate the ability to traverse both the city, and to explore nearby communities, on roadways specifically designed or marked as bicycle facilities, and will view this as a desirable addition to the tourism options offered.

Signing
Regardless of the category that it falls into, any new on-road bicycle facility should be accompanied by signing and marking. Several examples of signs for both bike lanes and bike routes are below. In addition to these standard signs authorized in the *Manual of Uniform Traffic Control Devices*, the City could consider customizing a bike route signage system, using unique logos or with names of the bike route segment in question. Examples of bike route names for Ocean City are the Atlantic Loop Road, Northern Beaches, or Barrier Islands Loop Road.

The City should create a bike network map, which could be distributed through various venues. They could be handed out at bike rental facilities, placed in other promotional material distributed by the City, placed on the City website, or mounted on bike route signs at various points in the City.

Bike Parking
The City should also install modern bicycle racks throughout the city. They should be installed at major community facilities – City Hall (currently has an old wooden rack,

which discourages use), schools, Music Pier, major stores (such as Acme), neighborhood commercial centers, and guarded beaches. Bike racks found throughout the city currently include the "comb", or a rack with evenly spaced steel bars into which bicycle tires are inserted. Bicyclists often avoid these racks, since they prefer to lock a bicycle by its main frame. It is common to see the old-style comb bike racks sitting unoccupied while bicycles nearby are propped up against, and locked, to a street sign post, parking meter, or street furniture. Examples of recommended bike racks include the "inverted U", to which two bikes can be locked – examples of these can be found at the Transportation Center, the Firehouse, or the beach pavilion at Central Avenue and 58th Street – or racks with large loops or triangles.

Bike racks are needed at this parking lot next to the Longport Bridge.

Example of desirable bike rack.

PEDESTRIAN

Major pedestrian improvements have been discussed in the context of other needed circulation improvements. Pedestrians would receive significant benefit from implementing the proposed 3-lane cross-section on 9th Street east of West Avenue, as they would be buffered from passing traffic by a 5-foot bike lanes. The presence of bike lanes would also encourage more bicyclists to ride in the street, rather than the sidewalk. West of West Avenue, the presence of physical islands will benefit pedestrians, through serving as a "pedestrian refuge." A major benefit of the proposed 3-lane cross-section on West Avenue would be the presence of a "pedestrian refuge," making it easier for pedestrians living on the west side of West Avenue to cross over to the beach.

Pedestrian volumes are heavy on blocks adjacent to the ocean, particularly in the downtown section, throughout the entire summer. Based on crash history, pedestrians and motorists normally exhibit safe behavior in the others' presence. If pedestrian improvements are desired, however, it would be possible to stripe "Continental" type crosswalks (high-visibility markings of 1 to 2 feet in width) at major crossings of the north-south avenues. These should be accompanied by "Yield to Pedestrians in Crosswalk" signs mounted on orange stanchions 100 to 150 feet in advance of the crossing. These have been installed at other locations in Ocean City.

Traffic signals throughout the City, especially the key 9th Street corridor, lack pedestrian "man/hand" indications. These should be installed at all signals throughout the City as part of a regular capital improvements program. There are many signalized intersections where pedestrians waiting for a green light are actually unable to see the signal display from the particular corner upon which they are standing.

SUMMARY OF RECOMMENDATIONS

The following table summarizes the major recommendations made as part of the Circulation Element, with an accompanying description of the recommendation (or benefit of the recommendation), and the priority and responsible party.

OCEAN CITY CIRCULATION ELEMENT
SUMMARY OF RECOMMENDATIONS

RECOMMENDATION	EXPLANATION	PRIORITY	RESPONSIBLE PARTY
Address effects of new Route 52 Bridge.			
Change signal phasing at 9th Street and Bay Avenue.	Improve traffic flow through the intersection.	Short	County
Re-evaluate phasing of traffic signal at 9th Street and Bay Avenue after Rt 52 Bridge is built; adjust if traffic patterns demonstrate significant change.	Improve traffic flow through the intersection, maximizing 9th Street throughput.	Long	County
Interconnect and synchronize traffic signals along 9th Street. Hard-wire signals together, and install master controller.	Improve traffic flow along 9th Street. Address peak traffic flows in emergency conditions and intermittent severe weather conditions.	Medium	City; seek funding from State, SJTPO
Consider installation of dedicated eastbound right-turn lane at intersection of 9th Street and Bay Avenue, to better direct incoming motorists off 9th Street.	Improve flow of incoming traffic by increasing capacity at this intersection.	Medium	City
Install improved guide signing for incoming motorists on 9th Street.	Direct motorists with destinations other than downtown to use Bay or West Avenue, to reduce congestion on 9th Street downtown.	Short	City
Improve vehicular, pedestrian and bicycle conditions along 9th Street.			
Upgrade traffic signal at 9th Street and West Avenue, and install new pedestrian indications.	Improve traffic signal function at this key intersection, by replacing outmoded signal equipment. Make motorists more aware of pedestrian crossing needs. Inform pedestrians of appropriate times to begin and terminate their crossings.	Medium	City
Install pedestrian indications for signals along 9th Street.	Make motorists more aware of pedestrian crossing needs. Inform pedestrians of appropriate times to begin and terminate their crossings.	Medium	City; seek funding from State
Reconfigure 9th Street west of West Avenue. Stripe 11 feet travel lanes, 5 feet bike lanes, and a 16 foot brick landscaped median (with mountable curbs and low shrubbery to permit emergency vehicles to cross).	Control left-turns along the corridor, particularly into McDonald's, and thus improve vehicular safety. Improve aesthetic appearance. Improve conditions for bicyclists.	Medium	City; seek funding from State, Federal
Restripe 9th Street east of West Avenue from four to three lanes. Create bike lane.	Improve conditions for bicyclists and pedestrians.	Long	City
RECOMMENDATION	**EXPLANATION**	**PRIORITY**	**RESPONSIBLE PARTY**

Address need for traffic calming on West Avenue.			
Reconfigure West Avenue between 15th Street and 55th Street from a four-lane to three-lane cross-section.	Reduce speeds on corridor, while maintaining efficient traffic flow for vehicles on West Avenue. The proposed reconfiguration would improve pedestrian crossings by creating refuge median island, as well as reducing the number of lanes for pedestrians to cross.	Implement in phases; see below.	Implement in phases; see below.
West Avenue, Phase One: on a trial basis, re-stripe West Avenue from north of 18th Street to south of 24th Street, from four lanes to three lanes.	Reduce speeds on corridor, while maintaining efficient traffic flow for vehicles on West Avenue. The proposed reconfiguration would improve pedestrian crossings by creating refuge median island, as well as reducing the number of lanes for pedestrians to cross.	Short	City
West Avenue, Phase Two: depending upon success of trial 3-lane reconfiguration of West Avenue, re-stripe section from 15th Street to 35th Street.	Reduce speeds on corridor, while maintaining efficient traffic flow for vehicles on West Avenue. The proposed reconfiguration would improve pedestrian crossings by creating refuge median island, as well as reducing the number of lanes for pedestrians to cross.	Medium	City
West Avenue, Phase Three: consider installation of textured pavements and/or modest shrubbery on median islands on West Avenue on key sections from 15th Street to 35th Street.	Improve aesthetic appearance of West Avenue.	Long	City
West Avenue, Phase Four: work with County to re-stripe West Avenue south of 35th Street from four lanes to three lanes.	Reduce speeds on corridor, while maintaining efficient traffic flow for vehicles on West Avenue. The proposed reconfiguration would improve pedestrian crossings by creating refuge median island, as well as reducing the number of lanes for pedestrians to cross.	Long	County
Address need for controlled traffic flow at end of boardwalk blocks.			
Consider turn-around at end of 9th Street.	Reduce conflicting movements, and large number of U-turns on 9th Street. Permit on-street parking on both sides of 9th Street.	Short	City
Consider connection between Moorlyn Terrace and 8th Street. If connected, make Moorlyn Terrace one-way eastbound.	Reduce conflicting movements, and large number of U-turns on Moorlyn Terrace. Permit on-street parking on both sides Moorlyn Terrace.	Medium	City
In event of future redevelopment, consider connection between Plymouth Place and 8th Street or 7th Street, or turn-around at end of Plymouth Place. If connected, make Plymouth Place one-way eastbound.	Reduce conflicting movements, and large number of u-turns on Plymouth Place. Permit on-street parking on both sides of Plymouth Place.	Long	City
RECOMMENDATION	**EXPLANATION**	**PRIORITY**	**RESPONSIBLE PARTY**
Address need for increased traffic safety at crash 'hot spots.'			
Consider intersection of Central Avenue and 14th Street for signalization.	This has been a long-documented safety problem, with high numbers of right-angle crashes.	Short	City, State
Consider intersection of West Avenue and 13th Street for signalization.	Based upon the most recent year analyzed, the number of right-angle crashes may make this a candidate for signalization.	Long	City, State

Address need for traffic calming on local streets.			
Consider traffic calming measures on Simpson Avenue, Ocean Avenue and Atlantic Avenue.	Residents have identified need for traffic calming on these streets.	Medium	City
Increase use of transit.			
Install prominent signs for 5-Mile Beach Trolley stops, and promote service through City website and promotional literature. Consider subsidy.	Increase awareness of Trolley service, and thus increase ridership.	Short	City
Increase use of parking lots.			
Increase use of permit parking lot between 8th and 9th Streets, by oversubscription or conversion to public parking.	This lot often has a significant number of vacancies on weekend nights in the summer season.	Short	City
Investigate potential of structured parking on the City lot behind Central Avenue.	This lot is in an ideal location to serve both downtown and beach traffic; improvements here should be coordinated with the adjacent private parking lot.	Medium	City
Increase use of municipal lot at 5th Street and West Avenue.	This lot has many vacancies in the summer season. Promote availability on City website; coordinate with 5-Mile Beach Trolley to investigate incorporating this lot into route.	Medium	City
Consider "payment in lieu of parking" program.	Permit new businesses to contribute to a municipal parking fund rather than provide spaces on-site.	Medium	City
Consider use of private lots, including 1st Presbyterian, St. Peter's lots on Wesley Avenue.	Investigate use of lots for days and times not needed for church activities in summer season.	Short	City
Increase bicycle ridership.			
Create city-wide bicycle network.	Stripe bike lanes on selected streets. Install appropriate signage for bike route.	Short-Medium	City, County
RECOMMENDATION	**EXPLANATION**	**PRIORITY**	**RESPONSIBLE PARTY**
Improve pedestrian safety.			
Improve pedestrian safety.	Consider "Turning Vehicle Yield to Pedestrian" signs, high visibility crosswalks, pedestrian signals at key locations.	Short	City

Priority Key: Short – 1 year
Medium – 2-3 years
Long – 4+ years