

MARSHALLTON CIRCULATION STUDY



WILMINGTON AREA PLANNING COUNCIL
MARCH 2014

WHO IS WILMAPCO?

The Wilmington Area Planning Council (WILMAPCO) is the Metropolitan Planning Organization (MPO) for Cecil County, Maryland and New Castle County, Delaware. We are charged with planning and coordinating transportation investments for the Wilmington region.

The Wilmington region is home to nearly 640,000 people, most of whom (84%) live in New Castle County. Wilmington, a financial hub supporting a population of more than 70,000, serves as the principal city. Urbanized development stretches outside of Wilmington along the I-95 corridor, from the Town of Elkton to the Pennsylvania border. Natural and rural landscapes, sprawling suburbs, and small towns blanket the rest of the region.

WILMAPCO's mission is to create the best transportation Plan for the region, one that meets all the requirements mandated by the Federal Clean Air Act and its Amendments (CAAA) and Moving Ahead for Progress in the 21st Century (MAP-21).



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Old Capitol Trail at Red Clay Creek, looking west.

INTRODUCTION AND PURPOSE OF THE STUDY

The Wilmington Area Planning Council (WILMAPCO) partnered with the Historic Village of Marshallton Civic Association, the Delaware Department of Transportation (DelDOT), and New Castle County to conduct the Marshallton Circulation Study.

Marshallton residents have long expressed safety concerns related to heavy traffic volumes and speeds on Old Capitol Trail, the “main street” of the village. Residents are also interested in improving the pedestrian environment, and increasing non-motorized connections from the village. DelDOT has worked to address these concerns through new sidewalk, signs and pavement markings on Old Capitol Trail, and a sidewalk project on Duncan Road funded by the federal Transportation Enhancements program.

However, DelDOT deemed that a more comprehensive study was required to fully address traffic flow, speed, and non-motorized transportation concerns of the village, and asked WILMAPCO to lead it. This study combined analysis of existing transportation conditions and traffic modeling to estimate future conditions with a public outreach process. Recommendations were primarily focused within the boundary of the Historic Village of Marshallton Civic Association, which is bounded on the north by SR 2, on the west by Farrand Drive, and by the rail lines to the south and east.

This study was informed by a number of previous efforts in Marshallton. WILMAPCO conducted a Walkable Community Workshop, New Castle County’s Draft Marshallton Community Plan, previously completed work by DelDOT Traffic, WILMAPCO’s notes from the November 18, 2010 public meeting and other previously submitted written comments from the Historic Village of Marshallton Civic Association.

This report provides a description of the study process, existing conditions, future traffic, and transportation needs. It presents alternatives considered to address those needs, as well as recommendations for improving multimodal transportation in Marshallton.

Study area

The study includes the historic core of the village of Marshallton. Marshallton has a population of nearly 2,000 and is located in northern New Castle County, Delaware, about five miles west of downtown Wilmington. Old Capitol Trail is the “main street” of Marshallton; the village blossomed where that road crosses the Red Clay Creek. Although Old Capitol Trail was the focus of the study, the area extends as far north as Kirkwood Highway, south to the CSX railroad tracks, west to Farrand Drive, and east to the Wilmington & Western Railroad. The study area is illustrated in Figure 1.

Figure 1. Study area.



PUBLIC OUTREACH

The present study is a realization of WILMAPCO's aspiration for extensive, inclusive public involvement in transportation planning. Community stakeholders helped shape the study from beginning to end. The project was guided from vision through completion by an Advisory Committee comprising agency staff and community representatives. Input was also received through two public workshops. A summary of each committee and public meeting is provided below. Meeting materials and summaries can be found at <http://www.wilmapco.org/marshallton>.

Advisory Committee Members

- Delaware Department of Transportation
- Marshallton Civic Association
- New Castle County Government
- Wilmington Area Planning Council

Walkable Community Workshop, June 9, 2011

Prior to the kickoff of the Marshallton Circulation Study, WILMAPCO conducted a Walkable Community Workshop (WCW) with 31 residents and other local stakeholders. The WCW was a four-hour session that included an educational presentation on what makes a community walkable, a walking audit of Marshallton, and a mapping session where participants engaged in brainstorming solutions. Participants found the exercise very worthwhile, experiencing some pedestrian conditions first-hand for the very first time. The recommendations developed during the WCW, shown in Figures 2 and 3, were ideas provided by the study participants. Many of them form the bulk of the pedestrian recommendations of the Marshallton Circulation Study.

The WCW report is available online at <http://www.wilmapco.org/walkable>.



A group of WCW participants heads south on Stanton Road.



Community leader Bob Grabowski identifies some pedestrian concerns at the June 2011 WCW.

Figure 2. Walkable Community Workshop recommendations: village core.

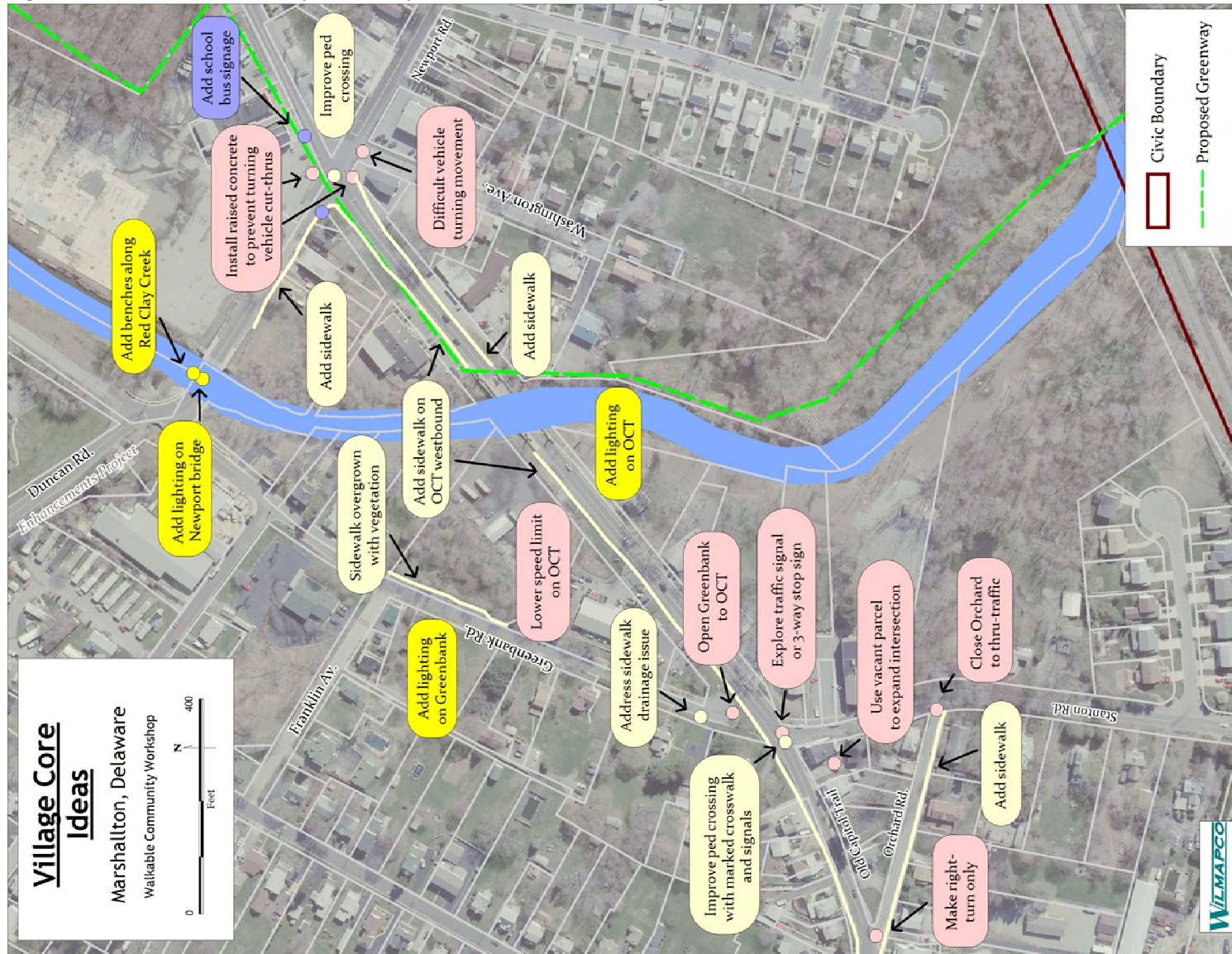
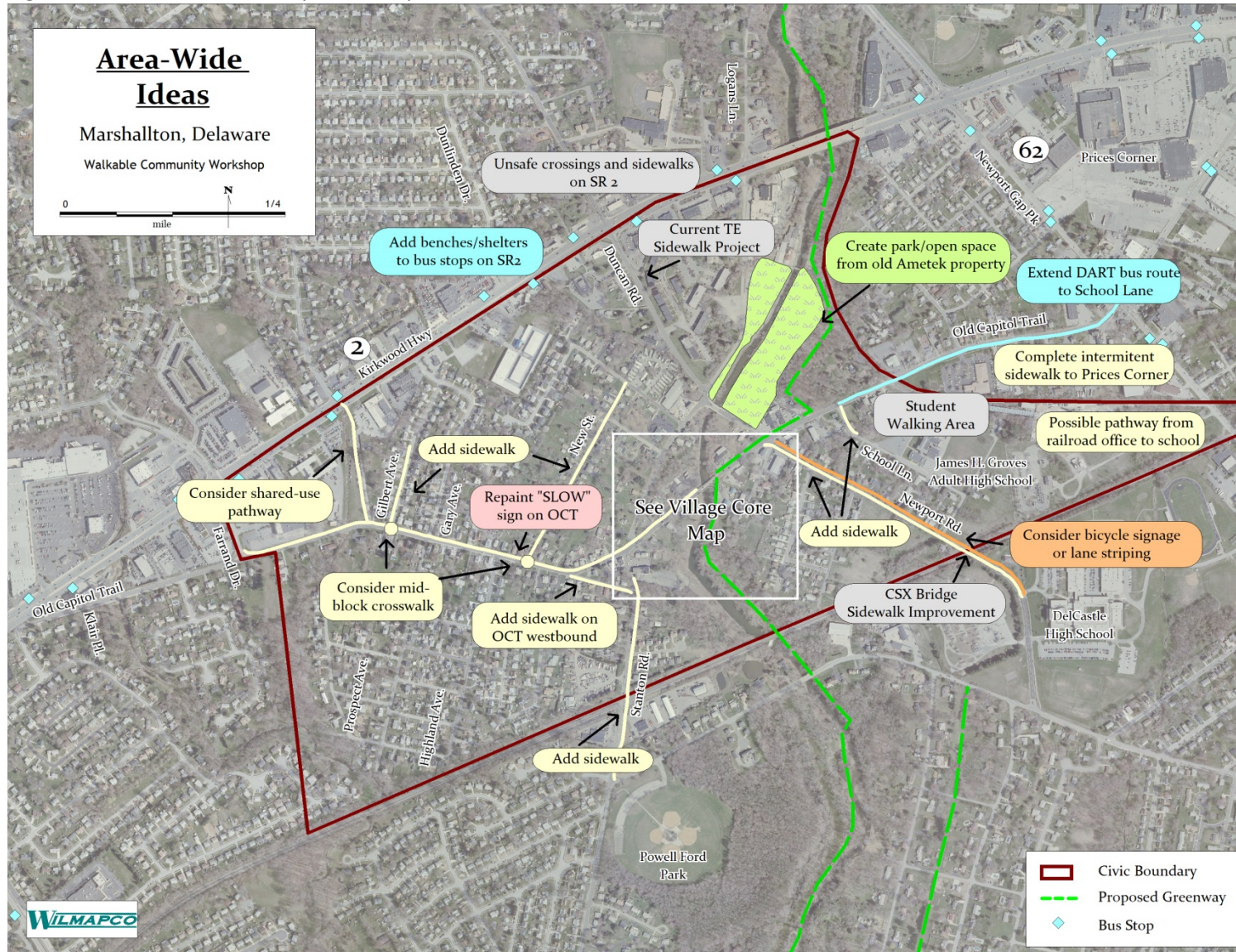


Figure 3. Walkable Community Workshop recommendations: area-wide.



Advisory Committee Meeting 1, August 11, 2011

A kickoff meeting was held to introduce the Advisory Committee to the project. WILMAPCO reviewed the findings of the WCW and asked for Committee input on issues to be addressed. Information received prior to and during the meeting indicated that community concerns generally fall into three categories:

1. cut-through traffic bypassing Kirkwood Highway
2. speeding
3. walkability

Another key issue that led to the Marshallton Circulation Study was the intersection of Old Capitol Trail and Newport Road. DelDOT has identified the need to upgrade the signal at this intersection to meet current standards. However, it isn't possible to do that because parking lots are found in the public right of way on three of the four corners. An appropriate solution would ensure parking can be provided safely while bringing the signal up to standard.

Advisory Committee Meeting 2, October 27, 2011

The project team reported on the status of the technical work, including a study of crash data and traffic patterns. The Committee also discussed preparations for the project's first public workshop.



Marshallton residents brainstorm transportation problems at the November 7, 2011 workshop.

Public Workshop 1, November 7, 2011

This workshop was held from 4 to 7 pm at Marshallton United Methodist Church. The workshop began with a brief presentation about the study, including background and schedule. Based on comments heard during the first two Advisory Committee meetings, the 22 attendees were asked to comment on the applicability of two common themes:

1. Controlling traffic speeds and volumes on Old Capitol Trail would improve the village character of Marshallton.
2. Making Marshallton more walkable would improve residents' quality of life.

A number of specific points were provided related to each of the two common themes. Participants had the opportunity to vote on which of those points were most important to them. The following issues received the most votes.

Traffic

- Cars turning at the Old Capitol Trail /Newport Road intersection sometimes go through parking lots (11 votes)
- Residents have trouble getting out of their driveways (10 votes)
- Speeding, inconsistent speed limits, no place for police to park for enforcement (9 votes)
- There have been many crashes on eastbound Old Capitol Trail at the curve (7 votes)
- The new bridge on Newport Road (under construction) may increase traffic in Marshallton (7 votes)
- Traffic on Old Capitol Trail is bypassing delays on Kirkwood Highway (7 votes)
- There are no bicycle facilities in Marshallton (7 votes)
- Preserve the character of the community (6 votes)
- Westbound Old Capitol Trail traffic sneaks by left turns onto Stanton Road (6 votes)

Walkability

- There are no crosswalks anywhere in Marshallton (12 votes)
- Walking is difficult along Newport Road (12 votes)
- It's hard to walk across the intersection of Old Capitol Trail and Newport Road (10 votes)
- Walking is difficult along Stanton Road to Powell Ford Park (10 votes)
- There are gaps in the sidewalk network (9 votes)
- Walking is difficult along New Street (7 votes)

- There's an opportunity to extend the recent streetscape project to/through the Ametek site (5 votes)
- School bus stop at Old Capitol Trail and Newport Road is unsafe (5 votes)

Moreover, participants were able to place stickers on study area maps to provide comments on issues at specific locations.

Advisory Committee Meeting 3, May 16, 2012

Alternatives to address both traffic and walkability concerns were presented at this meeting. The agenda focused on three key areas: the intersection of Old Capitol Trail and Newport Road, the intersection of Old Capitol Trail and Stanton Road, and Orchard Road. Participants provided comments on the alternatives. Given the potential for property impacts, the Committee members recommended focused outreach to potentially affected property owners at the Old Capitol Trail intersections with Newport Road and Stanton Road. Preparations for the next public workshop were also discussed.

Property owner outreach, July-September 2012

WILMAPCO invited potentially affected property owners at the two key intersections along Old Capitol Trail to an information session on July 19, 2012 at the Mill Creek Fire Hall. Members of the project team also held individual discussions with property owners most directly impacted by the proposed intersection alternatives, both in person and by phone.

On September 4, 2012, project team staff met with residents on Orchard Road to discuss traffic concerns. Although all property owners and residents along Orchard Road were invited, only one participated. Marshallton Civic Association members were also present. Past community discussions included mention of speeding and cut-through traffic issues on Orchard Road. Those issues did not arise during the September 4 meeting.

Public Workshop 2, September 13, 2012

The Marshallton Circulation Study's second public workshop was held at Mill Creek Fire Hall. While the first workshop was dedicated primarily to listening to community concerns, the purpose of this workshop was twofold: (1) to present alternatives and (2) to ask for participant feedback. To guide the discussion, results of the previous public workshop were also shared. General recommendations were as follows:

Traffic

- Improve the intersection of Old Capitol Trail and Newport Road to reduce speeding, keep cars from cutting through parking lots, improve pedestrian crossings, and make drainage work better

- Improve the intersection of Old Capitol Trail and Stanton Road to reduce speeding, enhance safety, and improve pedestrian crossings
- Ensure speed limits are consistent throughout Old Capitol Trail in Marshallton

Walkability

- Install new sidewalks where recommended by the summer 2011 Walkable Community Workshop and this study, creating a complete pedestrian network
- Identify opportunities for streetscape elements such as lighting, benches, and bus shelters
- Plan all improvements to accommodate a future greenway along Red Clay Creek

At the Newport Road and Stanton Road intersections with Old Capitol Trail, alternatives were presented illustrating both conventional intersection improvements and roundabouts. As noted in the Locally Preferred Alternative section of this report, the roundabout alternatives at both intersections were supported by at least 80 percent of attendees expressing a preference.

Civic Association Meeting, October 10, 2013

The Marshallton Civic Association invited the project team to present at the Association's regular meeting. The study recommendations were presented and questions answered. The participants, many of whom attended past study workshops, expressed general support for walkability improvements and roundabouts at Newport and Stanton Roads. Some concern was expressed about impacts during construction, which would typically be addressed when projects enter the design phase.

The public outreach process described above was the primary means by which transportation needs in Marshallton were identified. Moreover, the recommendations in this report constitute the locally preferred alternative, reflecting community feedback.



Old Capitol Trail at Gilbert Avenue, looking west.

EXISTING TRANSPORTATION CONDITIONS

The existing transportation network is shown in Figure 4.

Roadways

As mentioned above, **Old Capitol Trail** was at the core of the study. Classified by DelDOT as a collector roadway, Old Capitol Trail runs east-west through the length of the study area. Originally serving as the primary route between Wilmington and Newark, it was bypassed many years ago by Kirkwood Highway to the north. Old Capitol Trail has one lane in each direction with occasional narrow shoulders. According to DelDOT's 2012 Traffic Summary (the source for all daily traffic volumes in this report), Old Capitol Trail carries about 7,500 vehicles per day. The speed limit varies from 30 to 35 mph in keeping with Marshallton's village character. The most notable feature of Old Capitol Trail's alignment comes in the form of two relatively sharp curves: one just west of Gilbert Avenue and one at the Orchard Road intersection.

Paralleling Old Capitol Trail to the north is **Kirkwood Highway**, a principal arterial forming the main intra-county east-west route across northern New Castle County. Kirkwood Highway is about 1/3 mile north of the center of Marshallton. It has three travel lanes in each direction and is dominated by commercial development. The section of Kirkwood Highway in the study area has a speed limit of 45 mph and no shoulders in most areas. The highway carries over 40,000 vehicles per day. Kirkwood Highway forms the northern boundary of the study area and was not specifically studied in this report.

The rest of the primary roads in the study area run north-south, connecting Old Capitol Trail with Kirkwood Highway to the north and/or adjacent communities to the south.

- **Farrand Drive** is a short connector between Old Capitol Trail and Kirkwood Highway, then extending north as a residential street. It is unposted (assumed 25 mph speed limit) and consists of one lane in each direction plus turn lanes.
- **Stanton Road** connects Marshallton with the village of Stanton to the southwest. It is a narrow two-lane road with no shoulders and a speed limit of 30 mph. This collector roadway is the route for Marshallton residents to access New Castle County's Powell Ford Park, the largest park in close proximity to the village.
- **Newport Road** runs between Marshallton and the Town of Newport to the southeast. It is a two-lane collector roadway with a speed limit of 35 mph. Although most of the road has no shoulders or sidewalks, the section at the south end of the study area approaching the bridge over the CSX railroad was recently rebuilt to include five-foot shoulders and a five-foot sidewalk on the east side. This sidewalk connects to Delcastle High School.
- **Duncan Road** essentially functions as a northern extension of Newport Road north to Kirkwood Highway and beyond. It is a two-lane collector roadway without a posted speed limit. A recent Transportation Enhancements project installed sidewalk along the east side of most of Duncan Road in the study area.

Figure 4. Existing transportation network.



- **Greenbank Road** begins at the northeast corner of the study area at Kirkwood Highway and extends southwest to Duncan Road. It then continues southwest to a dead end, where it used to connect to Old Capitol Trail opposite Stanton Road.

The study area also includes a number of neighborhood streets.

Key intersections

- There are three primary intersections on Old Capitol Trail in the study area.
- **Farrand Drive:** This is a T intersection with Farrand Drive forming the north leg. Farrand Drive is stop-controlled. There are sweeping right-turn lanes from westbound Old Capitol Trail onto Farrand Drive and from southbound Farrand Drive onto Old Capitol Trail.
- **Stanton Road:** This is a T intersection with Stanton Road forming the south leg. Stanton Road is stop-controlled. A small neighborhood street, Orchard Road, cuts off the southwest corner of the Old Capitol Trail/Stanton Road intersection. Because Orchard Road runs one-way westbound, about one-quarter of northbound Stanton Road left-turning vehicles use Orchard Road to turn left onto Old Capitol Trail rather than proceeding to the Old Capitol Trail/Stanton Road intersection. This is perceived as a safety problem because Stanton Road crests a hill where it intersects Orchard Road, limiting sight distance.
- **Newport Road:** This is the only traffic signal along Old Capitol Trail in the study area. As shown in Figure 5 the intersection is surrounded on three corners by commercial parking lots, with little or no physical separation between the roads and the

parking areas. Further complicating this location is Washington Avenue, which joins Newport Road immediately south of Old Capitol Trail. It is stop-controlled, but it is difficult for drivers exiting Washington Avenue to see oncoming traffic from many directions. At the outset of the study DelDOT noted that this traffic signal is one of DelDOT's oldest and is in need of replacement. However, the surrounding parking areas provide no safe location for signal poles. Furthermore, parking vehicles must back into the intersection, creating an unsafe situation.

Figure 5. Newport Road intersection. (Source: Google Maps)



Most left turns and cross traffic on Kirkwood Highway take place at traffic signals, of which there are two in the study area: at Farrand Drive and Duncan Road.

Pedestrian facilities

One of the most notable observations of this study was the complete lack of crosswalks throughout the study area, except at the Kirkwood Highway signals.

Sidewalks are scattered throughout Marshallton. In 2012, DelDOT took advantage of a pavement rehabilitation project along Old Capitol Trail to install nearly continuous sidewalks along the south side of the road from west of Farrand Drive to Newport Gap Pike, east of the study area. This sidewalk construction addressed a key recommendation from the Walkable Community Workshop. Only the vicinity of Newport Road still lacks sidewalks due to conflicts with parking lots and the inability to provide pedestrian signals due to the issues noted above. Other key locations of sidewalks on primary roads include:

- A short portion of Stanton Road immediately south of Old Capitol Trail
- Most of both sides of Greenbank Road between Duncan Road and the dead end near Old Capitol Trail
- Both sides of the Old Capitol Trail and Duncan Road bridges over Red Clay Creek
- East side of Newport Road between Kiamensi Street and Delcastle High School
- Southeast side of Kiamensi Street and northeast side of School Lane, accessing James H. Groves Adult High School
- East side of Duncan Road between Greenbank Road and a point south of Kirkwood Highway, providing access to sidewalks in the Village at Red Clay apartment complex

DelDOT has formed a Pedestrian/Bicycle Safety Working Group to review locations with concentrations of pedestrian crashes and make recommendations to improve safety in these areas. The

Group held a Pedestrian Safety Field Meeting to observe pedestrian safety along the SR 2 corridor from Saint James Church Rd to SR 141 and discuss potential countermeasures. During the field meeting, the group observed jaywalking near mid-block bus stops, right-turning drivers failing to yield at intersections, and faulty pedestrian signal buttons. Next steps include developing recommendations for the corridor which might include signal changes, ADA curb ramps and relocated bus stops.



The 2012 paving project involved construction of new sidewalks called for in the Walkable Community Workshop.

Bicycle facilities

There are no dedicated bicycle facilities in the study area. In fact, there are relatively few shoulders at all on study area roadways. The primary exception, as noted above, is Newport Road near the CSX railroad bridge. Portions of Old Capitol Trail and Newport Road have informal shoulders that range in width from one to three feet, but these are not continuous and do not provide a comfortable cycling environment for less confident cyclists. More experienced riders are able to share most study area roads (except Kirkwood Highway) due to their speed limits of 35 mph or less.

Transit facilities

The Delaware Transit Corporation provides statewide transit service through Delaware. Its fixed route bus services are branded as DART First State, or simply DART. DART bus routes 6 (Newark) and 19 (Pike Creek Valley) serve Kirkwood Highway along the north edge of the study area. Less than a mile east of the study area, at the corner of Newport-Gap Pike and Old Capitol Trail, these routes and bus routes 9 and 36 meet at the Prices Corner park-and-ride.

Crashes

As shown in Figure 6, the study considered just over five years of crash data, from August 2006 through September 2011. Crashes were focused at five intersections along Old Capitol Trail as follows:

- Newport Road (signalized): 29 crashes
- Farrand Drive (unsignalized): 19 crashes
- School Lane (unsignalized): 10 crashes
- Stanton Road (unsignalized): 9 crashes
- Orchard Road (unsignalized, at a sharp curve on Old Capitol Trail): 8 crashes

During the study period there were no crashes involving pedestrians or bicyclists.

In 2013, the intersection of Old Capitol Trail and Farrand Drive was reviewed by DelDOT as part of the agency's Hazard Elimination Program (HEP). The short-term HEP recommendation is to install STOP signs in all directions at the intersection. The effectiveness of this improvement will be reviewed over time. If it is determined that the STOP signs do not sufficiently alleviate crashes, a roundabout will be considered at the intersection.



A March 2012 crash at Old Capitol Trail and Newport Road.
(Photo: Denis Hehman)

Speeds

Speeding concerns along Old Capitol Trail have been expressed by stakeholders for years, both before and during the course of this study. The speed limit on Old Capitol Trail in the study area varies between 30 and 35 mph as defined by DelDOT. The 35-mph zone begins at the west end of the study area and extends as far east as a point 360 feet west of Gilbert Avenue. From that point east to the eastern limit of the study area, the speed limit is 30 mph.

Prior to this study, DelDOT conducted speed measurements at three locations along Old Capitol Trail in fall 2010. A summary is provided in Table 1 below; each line represents 100 observations. Average speed is the mean of the 100 vehicles, while the 85th percentile speed is the speed below which 85 percent of vehicles travel. As a rough guideline, the speed limit is often set between these two figures.

Table 1. Fall 2010 speed data.

Location	Direction	Time of day	Posted speed	Average speed	85th percentile speed
near Farrand Drive	eastbound	mid-morning	35 mph	36 mph	40 mph
near Farrand Drive	westbound	mid-morning	35 mph	35 mph	39 mph
Gary Avenue	eastbound	late morning	30 mph	34 mph	38 mph
Gary Avenue	westbound	late morning	30 mph	35 mph	39 mph
Gary Avenue	eastbound	PM peak hour	30 mph	34 mph	38 mph
Gary Avenue	westbound	PM peak hour	30 mph	33 mph	37 mph
Red Clay Creek	eastbound	early afternoon	30 mph	36 mph	39 mph
Red Clay Creek	westbound	early afternoon	30 mph	35 mph	39 mph
Red Clay Creek	eastbound	PM peak hour	30 mph	37 mph	41 mph
Red Clay Creek	westbound	PM peak hour	30 mph	35 mph	39 mph

Average speeds ranged from 0 to 7 mph above the posted speed, while 85th percentile speeds (the speed below which 85% of traffic moves) ranged from 4 to 11 mph above the posted speed. In fact, speeds were remarkably consistent throughout the area regardless of the posted speed limit, with averages from 33 to 37 mph and 85th percentile speeds between 37 and 41 mph. These data indicate that reduction of the speed limit in the center of Marshallton from 35 to 30 mph has not materially reduced motorist speeds.

Anecdotal information from stakeholders indicates the primary concern may be with occasional late-night travelers driving at very high speed. Of the 1,000 daytime observations in Table 1, two did exceed 50 mph. Alternatives were developed with a potential goal of reducing the highest speeds along the corridor.

Traffic analysis

Figures 7 and 8 illustrate base year (2010) turning movement traffic counts at the intersections in Marshallton.

Figure 7. Base year AM peak hour turning movement traffic volumes.

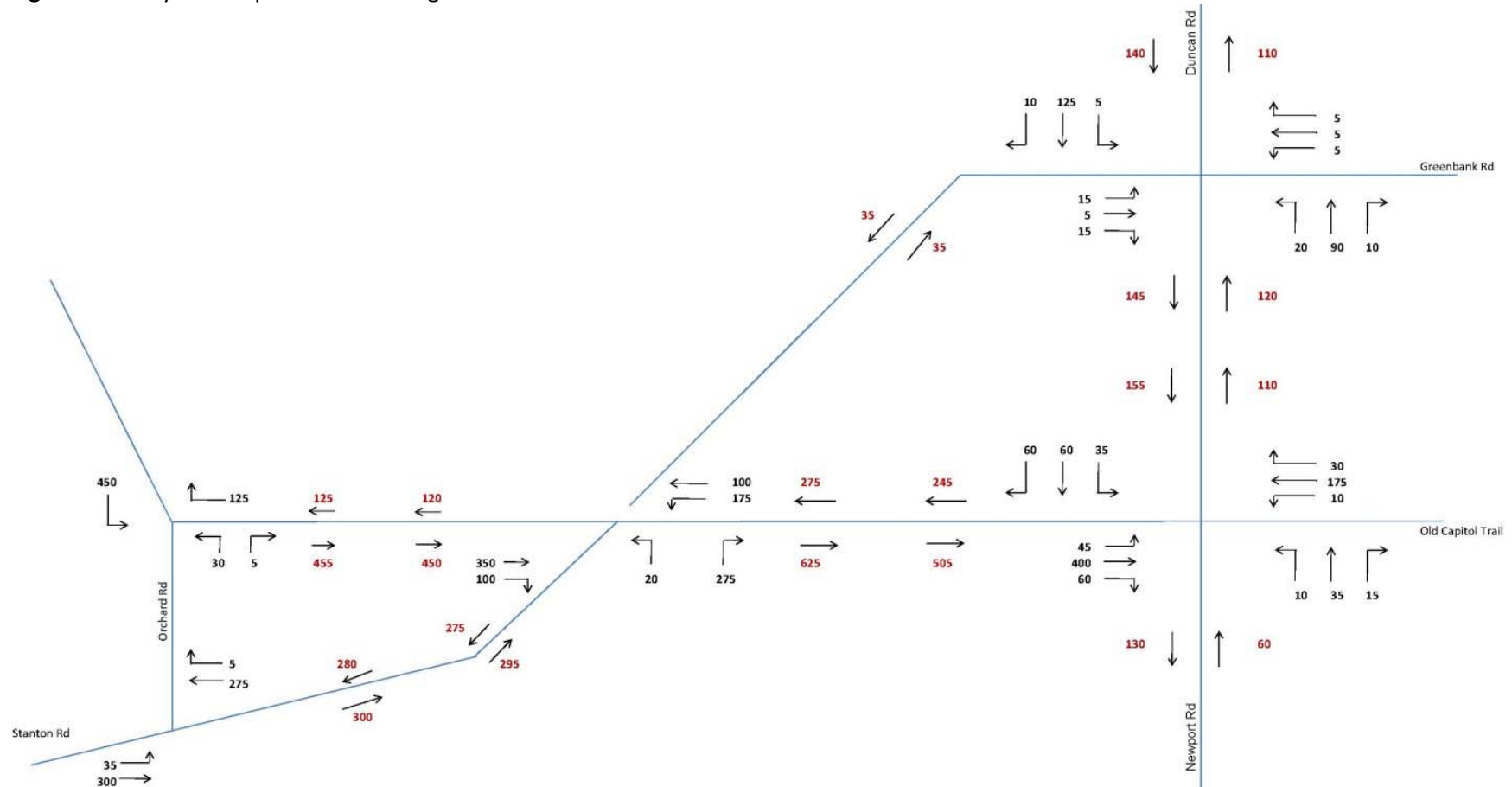
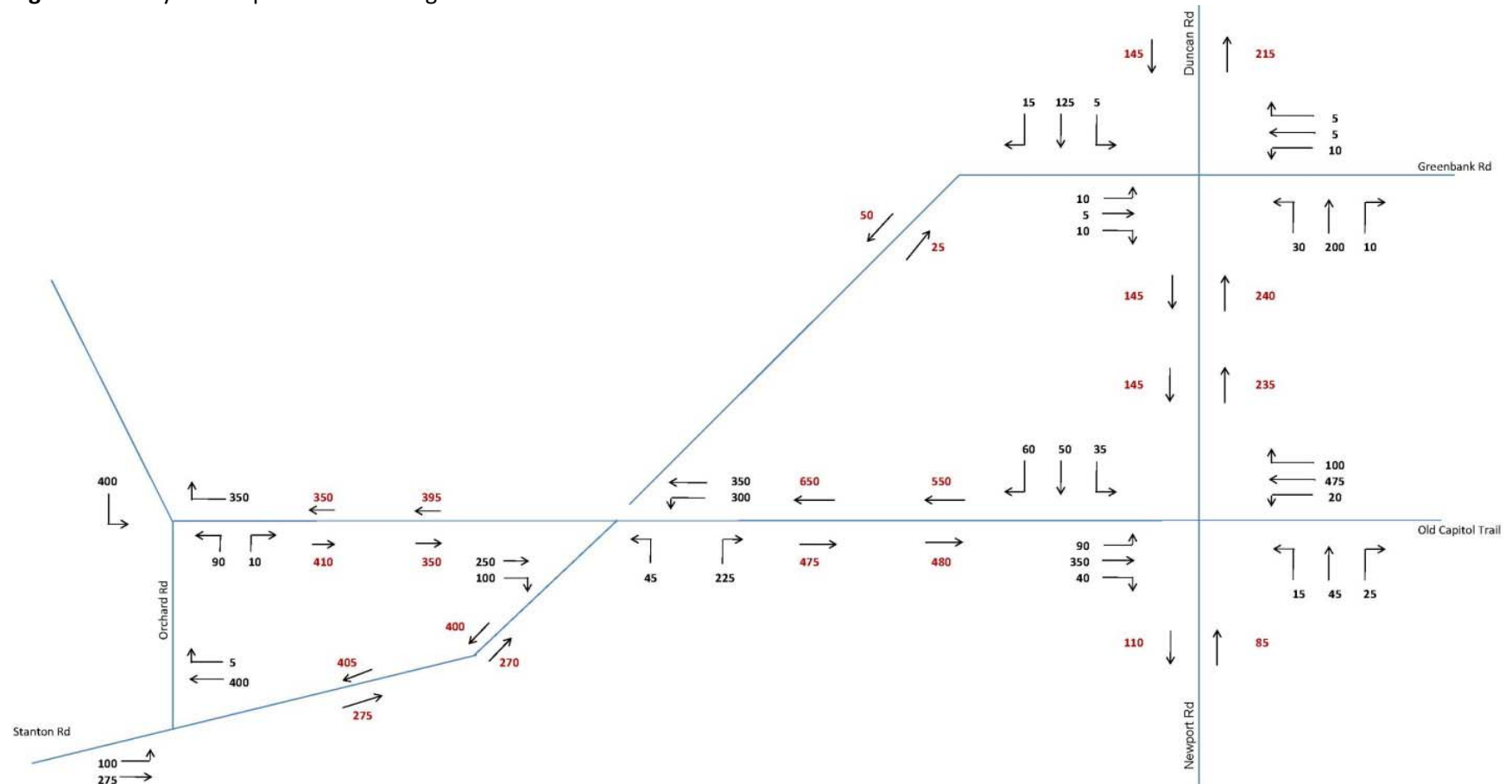


Figure 8. Base year PM peak hour turning movement traffic volumes.





Old Capitol Trail at Red Clay Creek, looking west.

ANTICIPATED FUTURE CONDITIONS

The Delaware Department of Transportation's (DelDOT's) "Peninsula Model" was used to estimate future traffic volumes in the core of the study area.

The study area is largely developed, with little opportunity for additional land development that would materially impact locally-generated traffic. The primary undeveloped site is the former location of the Ametek factory along the east bank of Red Clay Creek north of Old Capitol Trail. This factory was demolished due to repeated flooding, and the site's location in the floodplain makes redevelopment unlikely.

East of the Ametek site is a wooded parcel on the north side of Old Capitol Trail just west of the Wilmington & Western Railroad. This property is currently the subject of a resubdivision plan, the Marshallton Commerce Center. The project proposes 49,995 square feet of flex warehouse space on a 5.81-acre parcel. These types of developments typically generate fairly low peak hour traffic in relation to their size.

Because little new development is expected in and immediately adjacent to Marshallton, future traffic growth is mostly limited to new traffic passing through the area. Future traffic forecasts for 2035 developed by the Peninsula Model are shown in Figures 9 and 10.

How do you know how much traffic there will be in the future?

A travel demand model like the Peninsula Model is the standard for estimating future travel in a region. The model determines how many people start and end trips in every neighborhood in that region, where each trip ends, whether they choose to travel by walking, biking, taking transit, or driving, and which route they use to get there.

The model makes its decisions based upon how many people live and work in each neighborhood, how far neighborhoods are from one another, what methods of travel are available, how much each method of travel costs, how long each method of travel takes, and how congested the roadways are that they would take to get there.

Figure 9. 2035 AM peak hour turning movement traffic forecasts.

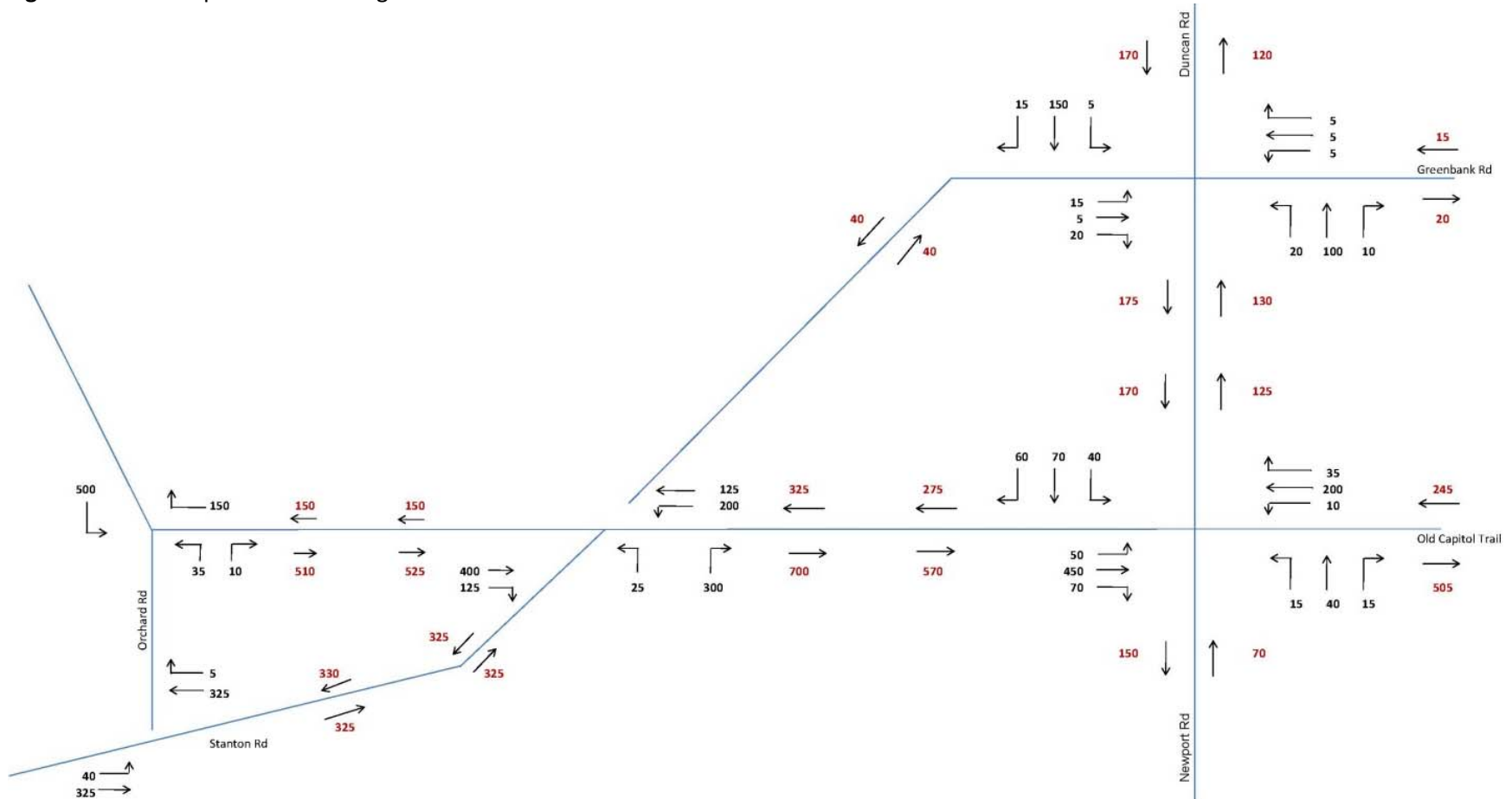
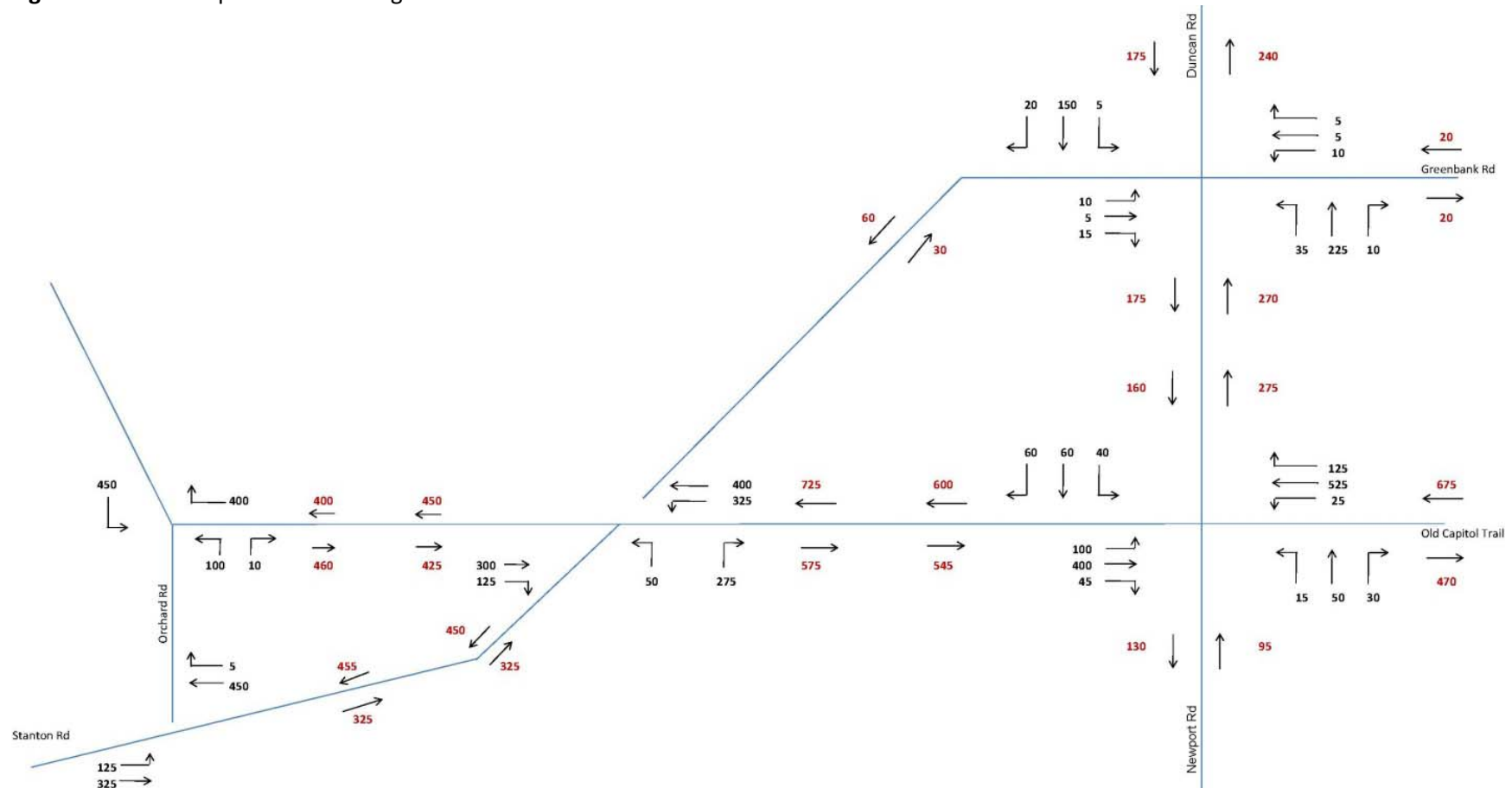


Figure 10. 2035 PM peak hour turning movement traffic forecasts.

These forecasts illustrate that over the next 25 years, a modest traffic increase of between 13 and 16 percent is expected along study area roadways. Intersections in Marshallton are not expected to be congested during that timeframe.

SUMMARY OF TRANSPORTATION NEEDS

Based on technical analysis and stakeholder input, the following transportation needs were identified in Marshallton.

- Sidewalks are missing in many locations where there is demand for walking, most notably:
 - South side of Old Capitol Trail in the Newport Road vicinity
 - North side of Old Capitol Trail between Stanton Road and Newport Road
 - Newport Road between Red Clay Creek and Kiamensi Street
 - Stanton Road between Old Capitol Trail and Powell Ford Park
 - New Street
 - Gilbert Avenue
- Crosswalks are missing throughout Marshallton.
- The Old Capitol Trail/Newport Road intersection functions poorly from many perspectives:
 - 29 crashes occurred at this intersection over a five-year period
 - Turning vehicles often bypass the light by going through parking lots
 - Parked vehicles need to back into the intersection to exit lots
 - There are no pedestrian facilities
 - Signal equipment is antiquated and can't be rebuilt because there are no safe locations to place new poles
 - Drainage functions poorly, even in relatively small storms
- Traffic speeds are somewhat in excess of posted speed limits. Residents are concerned about occasional vehicles traveling at very high speeds, particularly at night.
- The intersections of Old Capitol Trail with Stanton Road and Orchard Road experienced 17 crashes over a five-year period. They are perceived by residents as dangerous. Due to the continuous flow of traffic and the curve at Orchard Road, residents report difficulty leaving their driveways.
- The community has expressed interest in construction of a Lower Red Clay Valley Greenway, which would function as a spur of the East Coast Greenway.

ALTERNATIVES CONSIDERED

Alternatives were developed to address the transportation needs identified via public outreach and technical analyses. These alternatives are simultaneously intended to enhance Marshallton's village atmosphere and quality of life, while not sacrificing economic development potential in and around Marshallton. The alternatives are broken into four broad areas:

1. Pedestrian improvements
2. Speed reduction strategies (traffic calming)
3. Old Capitol Trail/Newport Road intersection improvements
4. Old Capitol Trail/Stanton Road intersection improvements

Pedestrian improvements

As illustrated in Figures 1 and 2, residents suggested a variety of pedestrian improvements during the June 2011 Walkable Community Workshop conducted by WILMAPCO. Feedback received during the Marshallton Circulation Study committee meetings and public workshops was entirely consistent with the WCW recommendations, and field work by the Marshallton Circulation Study team identified no insurmountable barriers in implementing those recommendations. Therefore the WCW sidewalk improvements recommended by the community were incorporated into this project. More detail is provided in the Locally Preferred Alternative section below.

Speed reduction strategies (traffic calming)

As noted in previous sections, controlling traffic speeds on Old Capitol Trail is very important to Marshallton residents. DelDOT's Delaware Traffic Calming Design Manual includes criteria for traffic calming measures that may be appropriate for reducing speeds on

different types of roadways. An excerpt from the 2000 version of the manual, which was in effect at the time these alternatives were developed, is provided in Figure 11. (An updated version was published in 2012.) The following types of measures were considered for a collector roadway with a traffic volume of about 7,500 vehicles per day and a posted speed of 30-35 mph.

- **Speed tables, raised crosswalks, or raised intersections:** These measures deflect a traveling vehicle vertically, causing it to slow down. They are less severe than the speed humps found in many Delaware neighborhoods, so they can be installed on collector roads. The idea of raised crosswalks is particularly interesting in Marshallton, with its lack of crosswalks.
- **Roundabouts:** Roundabouts are not just traffic calming measures, they are intersection controls that can replace traffic signals or stop signs. When installed in appropriate locations they have an enviable safety record. DelDOT cites the Insurance Institute for Highway Safety on its website, indicating that roundabouts have been found to reduce overall crashes by 39 percent and injury crashes by 76 percent as compared to a traffic signal at the same intersection. As noted below, roundabouts were considered at Old Capitol Trail's intersections with Newport Road and Stanton Road.
- **Lateral shifts:** Rather than requiring a vehicle to move vertically, lateral shifts require the driver to move horizontally instead, in a short enough distance that requires reduced travel speed. With the history of crashes

associated with the curves on Old Capitol Trail, lateral shifts were not an appropriate fit for Marshallton.

driver speed. Because Old Capitol Trail is already relatively narrow with minimal shoulders, these measures are not particularly applicable in Marshallton.

- **Neckdowns, two-lane chokers, or center islands:** These measures depend on narrowing the roadway to reduce

Figure 11. Traffic calming measures. (Source: DeDOT Traffic Calming Design Manual, 2000)
(measures relevant to Old Capitol Trail are highlighted)

	FHWA/DELDOT FUNCTION CLASSIFICATIONS						SUBDIVISION STREETS				
	Interstates Freeways Expressways	Principal Arterials	Minor Arterials	Major Collectors	Minor Collectors	Local Roads	Major Collector Subdivision Streets	Minor Collector Subdivision Streets	Minor Streets	Other Restrictions	
Volume Control Measures											
Full Closure Half Closure	Not Recommended					Only on an exception basis	Not Recommended		≥500 vpd ≥25% non-local traffic		
Diagonal Divider Median Barriers Forced Turn Islands	Not Recommended					≤5,000 vpd ≥25% non- local traffic	Not Recommended		≥500 vpd ≥25% non-local traffic		
Vertical Speed Control Measures											
Speed Humps	Not Recommended					Only on an exception basis	Daily volume ≤3,000 Posted speed ≤30 mph			grade ≤8% not on primary emergency routes or bus routes	
Speed Tables Raised Crosswalks Raised Intersections	Not Recommended	Daily volume ≤ 10,000 vpd posted speed ≤35mph								grade ≤8% not on primary emergency routes	
Horizontal Speed Control Measures											
Mini-traffic Circles	Not Recommended					Combined approaches - daily volume ≤ 5,000 vpd posted speed ≤ 35mph				grade ≤10% not on primary emergency routes or bus routes	
Roundabouts	Not Recommended	Combined approaches - daily volume ≤ 20,000 vpd posted speed ≤45mph							Not Recommended	grade ≤6%	
Lateral Shifts	Not Recommended	≤10,000 vpd posted speed ≤35mph									
Chicanes	Not Recommended			Daily volume ≤5,000 vpd posted speed ≤35mph							grade ≤8%
Realigned Intersections	Not Recommended							Daily volume ≤5,000 vpd posted speed ≤35mph		grade ≤8%	
Narrowings											
Neckdowns Two-Lane Chokers Center Islands	Not Recommended	Daily volume ≤ 20,000 vpd posted speed ≤45mph									
Combined Measures	Not Recommended	Subject to limitations of component measures									

Old Capitol Trail/Newport Road intersection improvements

The following options were initially considered for the intersection of Old Capitol Trail and Newport Road:

- Sidewalk improvements with curbs at each corner to allow for upgraded traffic signal equipment
- Four-leg roundabout
- Five-leg roundabout incorporating Washington Avenue

The sidewalk improvement alternative is shown in Figure 12. This alternative retains the same traffic function as the current signalized intersection. However, there are three primary changes that address transportation needs at this location.

1. Sidewalks and curbs would be provided at each corner to eliminate traffic passing through parking lots to bypass the signal. These curbs would be tight enough to reduce speed of right-turning vehicles, and would also allow for placement of new signal poles.
2. Crosswalks would be provided across all four legs of the intersection.
3. Commercial properties on the south side of Old Capitol Trail would be modified to eliminate the issue of parked vehicles backing into the intersection.
 - The building at the southeast corner of the intersection, currently the home of Marshallton Steak Shop, would need to be acquired to provide sufficient room for even a tight curve connecting northbound Newport Road and eastbound Old Capitol Trail.

- The adjacent building is owned by N. Barton & Associates, a manufacturing concern located across Old Capitol Trail. The parking for this building would be relocated to a new parking lot on the same parcel, located just to the east.
- The small office building at the southwest corner of the intersection would also require a new parking lot on the adjacent tax parcel, which has the same owner.

The sidewalk improvement alternative would be less expensive and have fewer property impacts than the roundabout alternatives.

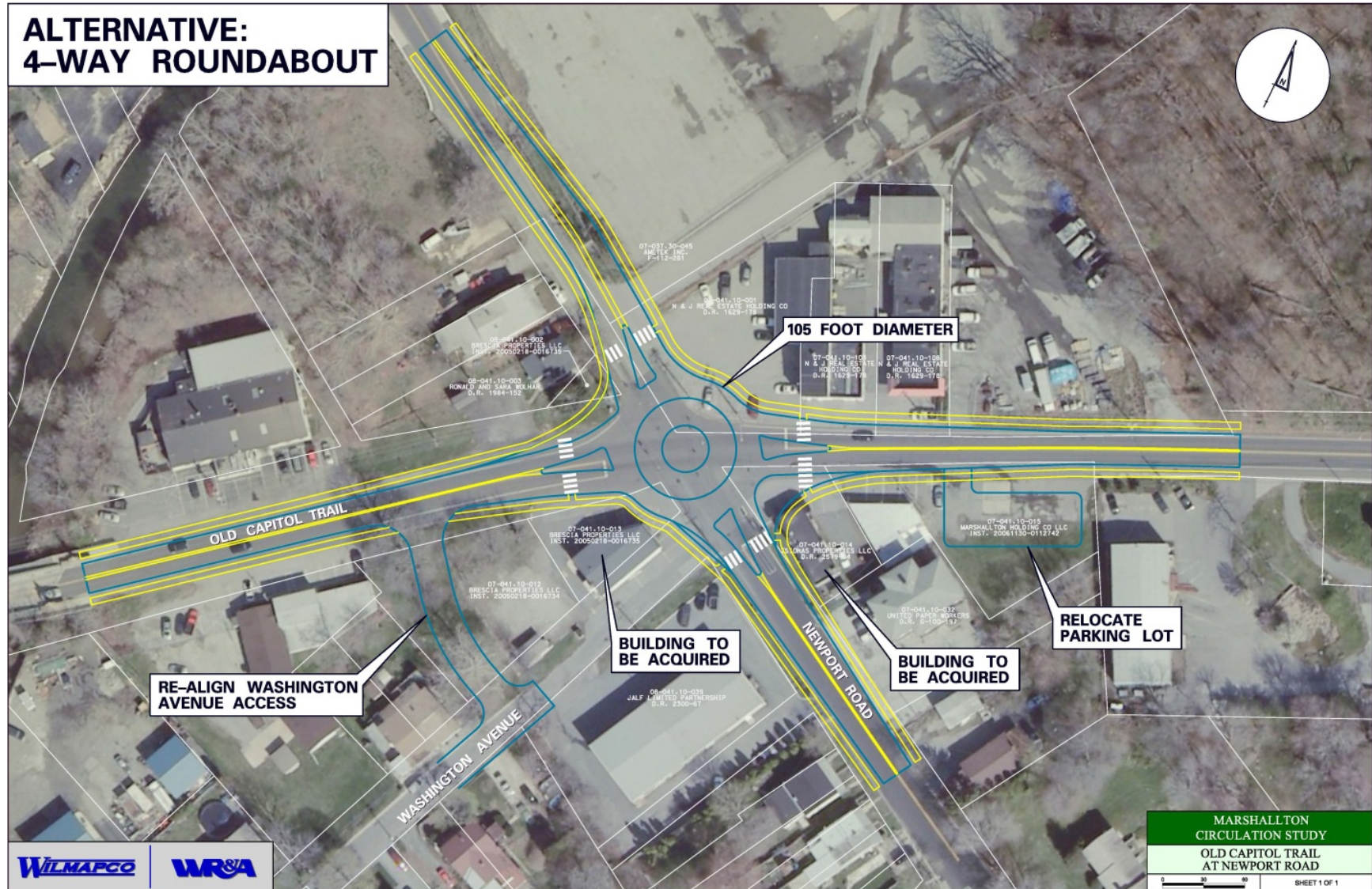
Figure 13 illustrates the four-leg roundabout alternative. This alternative replaces the existing traffic signal with a roundabout 105 feet in diameter, which is the smallest possible size to safely allow for all traffic movements. As noted above, roundabouts tend to dramatically decrease crashes when replacing traffic signals because they reduce the number of potential conflict points and the severity of crashes. New sidewalks and crosswalks would be provided.

The four-leg roundabout alternative would also have property impacts. Like the sidewalk improvements alternative, it would require acquisition of the Marshallton Steak Shop and relocation of the N. Barton parking next door. The southwest corner property would also be acquired. Because the four-leg alternative would not incorporate Washington Avenue, that street would need to have a new access to Old Capitol Trail west of Newport Road. The resulting parcel bounded by the former Washington Avenue, Newport Road, and Old Capitol Trail, could serve as open space for the community, possibly as a pocket park or landscaped stormwater management pond.

Figure 12. Sidewalk improvement alternative at Old Capitol Trail and Newport Road.



Figure 13. Four-leg roundabout alternative at Old Capitol Trail and Newport Road.



The five-leg roundabout alternative, shown in Figure 14, is similar to the four-leg roundabout option but would handle access to Washington Avenue differently. Four of the legs of this roundabout (both legs of Old Capitol Trail, the south leg of Newport Road, and Washington Avenue) would be very closely spaced, potentially creating a confusing situation for travelers determining where to exit the roundabout. Property impacts would be the same as the four-leg option.

Table 2 illustrates traffic evaluation of the sidewalk improvement and four-leg roundabout alternatives. (Early committee feedback indicated the five-leg roundabout option was not desirable, so it was not evaluated with respect to traffic operations.) Both alternatives would function at acceptable levels of service in 2035, with the roundabout showing a slight edge both in traffic capacity and queue lengths.

Table 2. Intersection alternatives, Old Capitol Trail and Newport Road, year 2035 volumes.

Condition	Peak Hour	Eastbound OCT				Westbound OCT				Northbound Newport Road				Southbound Newport Road				Over-all
		Delay Sec.	V/C Ratio	LOS	95% Queue veh.	Delay Sec.	V/C Ratio	LOS	95% Queue veh.	Delay Sec.	V/C Ratio	LOS	95% Queue veh.	Delay sec.	V/C Ratio	LOS	95% Queue veh.	Avg. Delay (sec)/ LOS
Roundabout, Single Lane Approaches	AM	16	0.70	C	6	6	0.29	A	1	8	0.16	A	1	6	0.16	A	1	10 / B
	PM	13	0.62	B	5	23	0.81	C	9	9	0.22	A	1	10	0.30	B	1	17 / C
Traffic Signal, Single Lane Approaches (existing conditions)	AM	14	0.66	B	18	8	0.29	A	7	19	0.19	B	3	21	0.44	C	7	14 / B
	PM	13	0.63	B	15	10	0.63	B	18	24	0.36	C	5	25	0.50	C	9	13 / B

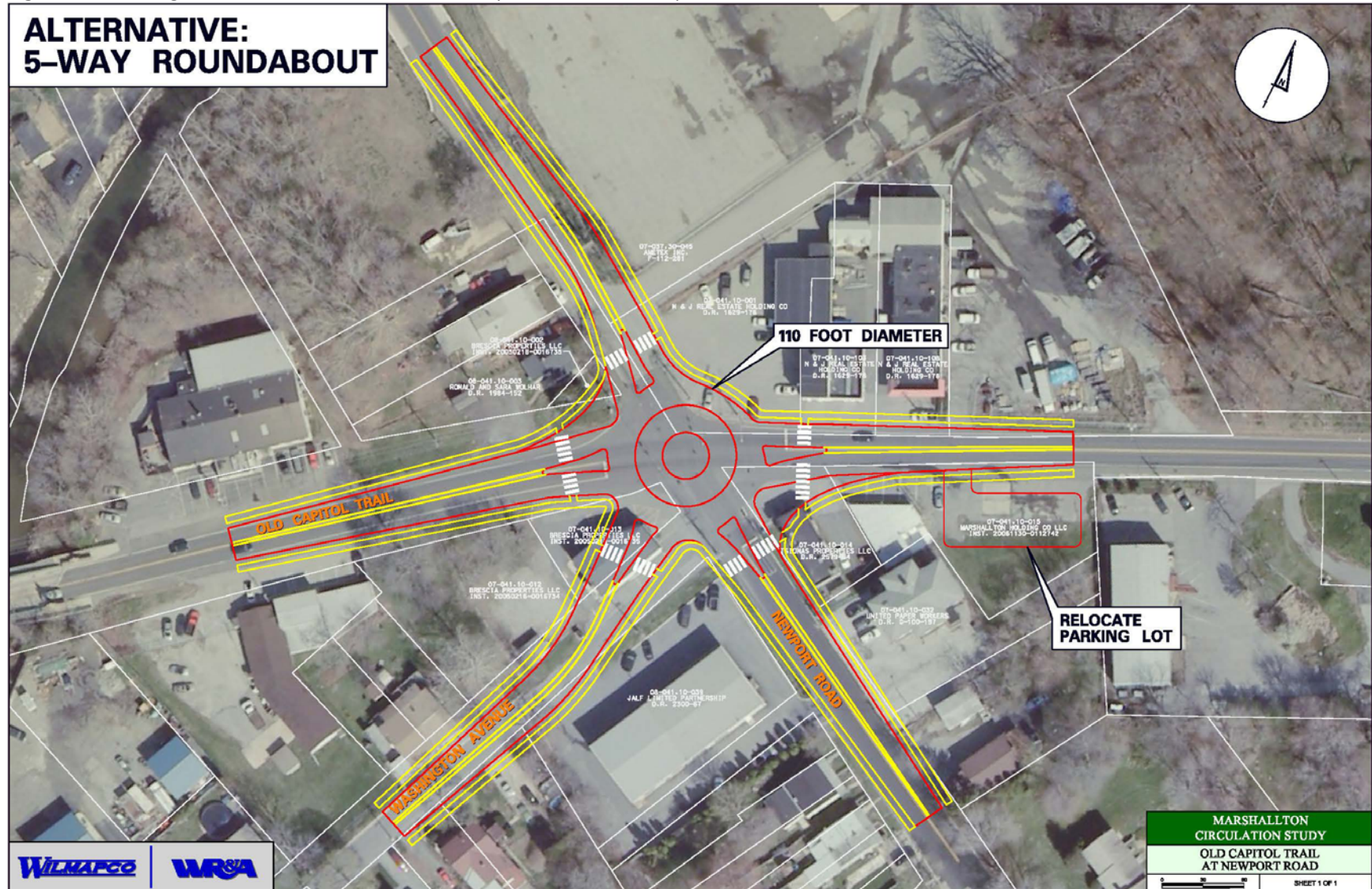
Delay = Average delay experienced by each driver approaching the intersection, in seconds.

V/C ratio = Ratio of traffic volume approaching the intersection divided by traffic capacity.

LOS = Level of service, ranging from A (excellent) to F (poor). LOS D or better is acceptable in urbanized parts of Delaware.

95% queue = 95% of the time, the number of cars stopped on this intersection approach will not exceed this number.

Figure 14. Five-leg roundabout alternative at Old Capitol Trail and Newport Road.



Old Capitol Trail/Stanton Road intersection improvements

Alternatives considered at the unsignalized intersection of Old Capitol Trail and Stanton Road were somewhat more varied. A number of operational factors needed to be considered:

- Level of service (LOS), or congestion
- Eastbound queues – because of the proximity of the curve at Orchard Road, there would need to be sufficient room for an eastbound vehicle to negotiate the curve, notice a queue, and stop in time to avoid a crash
- Northbound queues – this situation is similar to eastbound Old Capitol Trail, but is instead caused by a crest on Stanton Road that limits sight distance

Table 3 shows evaluation of a number of intersection control schemes, both with and without additional turn lanes to reduce queues. For two of the schemes – all-way STOP control and traffic signal control – warrants established by the Manual on Uniform Traffic Control Devices (MUTCD) were checked. All-way STOP control may or may not be warranted based on engineering judgment. The warrant for a traffic signal is met.

From an operational standpoint, the roundabout and traffic signal with turn lanes options would function best. All movements would operate at level of service D or better in 2035. The traffic signal would have slightly less delay, while the roundabout would result in shorter queues on all approaches.

Figure 15 illustrates the “pedestrian corner” alternative, which could function with either a traffic signal or the current configuration of a STOP sign on Stanton Road. Because this option would not have the built-in speed control of a roundabout, median islands and raised crosswalks would be included for traffic calming. Sidewalks would be provided on all quadrants of the intersection. Any right of way impacts to private parcels would be minimal, and the cost of this alternative would be less than the roundabout alternative.

A three-leg roundabout alternative is shown in Figure 16. The roundabout incorporates a minimal 105-foot diameter similar to the four-leg roundabout alternative at Newport Road. There is a vacant parcel owned by the State of Delaware on the southwest corner of the intersection, so the alignment of the roundabout is pushed as far to the southwest as possible to reduce impacts to privately-owned properties. Although portions of the front yards of the property immediately north of the intersection and the Marshallton United Methodist Church would need to be purchased, neither property would be fully acquired to accommodate the roundabout.

Table 3. Intersection alternatives, Old Capitol Trail and Stanton Road, year 2035 volumes.

Condition	Peak Hour	Eastbound OCT				Westbound OCT				Northbound Stanton				Overall
		Delay sec.	V/C Ratio	LOS	95% Queue veh.	Delay sec.	V/C Ratio	LOS	95% Queue veh.	Delay sec.	V/C Ratio	LOS	95% Queue veh.	Avg. Delay (sec)/ LOS
Stanton Rd Stop with Turn Lanes	AM	0	-		0	10	0.29	A	1	185	1.15	F	10	59 / F
	PM	0	-		0	10	0.33	A	2	565	2.0	F	16	61 / F
All-Way Stop single lane approaches	AM	122	1.0	F	<i>past New St</i>	54	0.94	F		77	1.0	F		64 / F
	PM													
All-Way Stop with Turn Lanes	AM	39	0.91	E	<i>past curve</i>	19	0.66	C		18	0.61	C		20 / C
	PM	23	0.72	C		37	0.87	E		18	0.65	C		27 / C
Roundabout, single lane approaches	AM	19	0.74	C	7	9	0.45	A	3	19	0.69	C	6	17 / C
	PM	15	0.63	C	5	28	0.87	D	11	16	0.65	C	5	20 / C
Traffic Signal with Turn Lanes	AM	25	0.63	C	19	12	0.55	B	8	20	0.49	C	14	19 / B
	PM	22	0.46	C	13	12	0.58	B	12	20	0.40	C	11	17 / B

See Table 2 for definitions of terms.

Figure 15. Pedestrian corner alternative at Old Capitol Trail and Stanton Road.

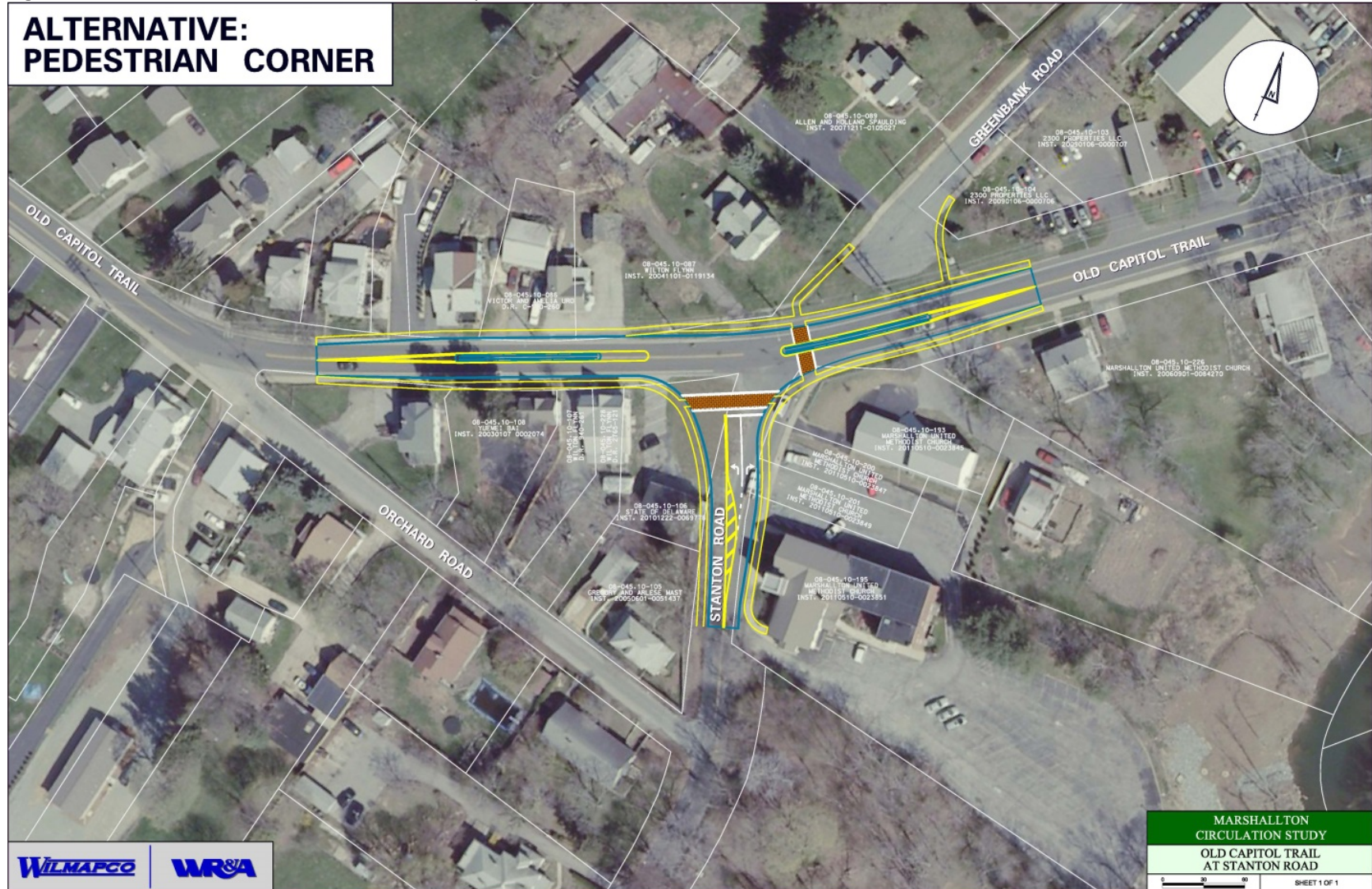
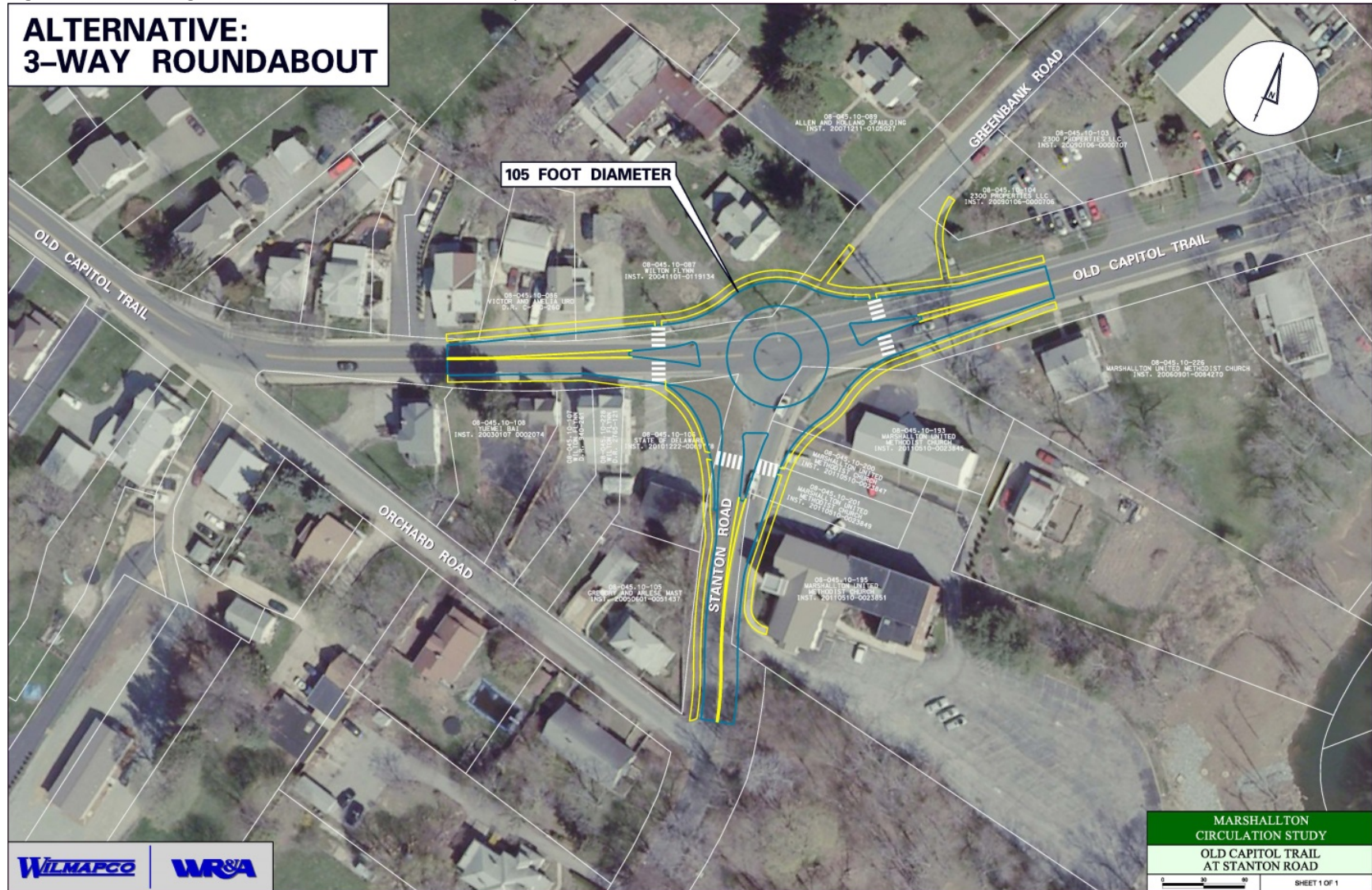


Figure 16. Three-leg roundabout alternative at Old Capitol Trail and Stanton Road.



At the request of some residents, the study team also considered reconnecting Greenbank Road to Old Capitol Trail opposite Stanton Road. Anecdotal information indicates that this connection was originally closed due to safety concerns. A number of options were considered at a conceptual level, including a conventional four-leg intersection, a four-leg circular roundabout, and a four-leg oval roundabout.

All had significant concerns associated with the acute angle between Greenbank Road and the east leg of Old Capitol Trail. Furthermore, the roundabout options, while somewhat alleviating the alignment concern, would have much greater property impacts. For those reasons and the limited benefits of providing an additional travel route, the reconnection of Greenbank Road to Old Capitol Trail is not recommended.

LOCALLY PREFERRED ALTERNATIVE

The locally preferred alternative was developed by the community during the public outreach process. The improvement alternatives discussed in the previous section were prepared based on input received during committee meetings and the spring 2012 public workshop. Likewise, the technical analysis presented above allowed the committee and the public at large to evaluate the alternatives and recommend their preferences. The fall 2012 workshop mentioned in the Public Outreach section was the primary venue at which those preferences were stated. The project team combined those public preferences into the package of improvements described below. The costs provided are planning-level estimates in 2013 dollars and will need to be refined through survey and engineering.

Recommended pedestrian improvements

- Construct a new sidewalk along the east side of Newport Road from Old Capitol Trail to Kiamensi Street. (about \$700,000)
- Construct a new sidewalk along the east side of Stanton Road from Old Capitol Trail to Powell Ford Park. (about \$900,000)
- Construct a new sidewalk along one side of New Street from Old Capitol Trail to Jackson Avenue. (about \$600,000)
- Construct a new sidewalk along one side of Gilbert Avenue from Old Capitol Trail to a point about 600 feet north to tie into the existing sidewalk. (about \$225,000)
- Construct a sidewalk along Newport Road north of Old Capitol Trail to connect with sidewalk on Duncan Road and, ultimately, Kirkwood Highway. (about \$150,000)

- Improve pedestrian lighting on Old Capitol Trail between Stanton Road and Newport Road, depending on DelDOT lighting guidelines. (cost varies; may be included in roundabout projects below)
- Clear vegetation on the east side of Greenbank Road south of Franklin Avenue (this should be done by the adjacent property owners).
- Install benches/shelters at bus stops on Kirkwood Highway where they can be provided in accordance with DART guidelines. (cost varies depending on feasibility and site constraints)

The study also recommends that consideration be given to advancing a greenway trail along Red Clay Creek. This suggestion was made by several residents during the public outreach process. This trail would provide a connection between Marshallton and anticipated regional trail improvements under consideration by DelDOT through the First State Trail and Pathway Initiative.



A view of Stanton Road near its intersection with Orchard Road. Note the unpaved path on the right, which extends to Powell Ford Park.

Recommended improvements at Old Capitol Trail and Newport Road

The four-leg roundabout alternative is recommended at this intersection. The roundabout project would incorporate crosswalks across all four legs and sidewalks in the immediate vicinity. Sidewalks would continue north along both sides of Newport Road to the Red Clay Creek bridge and west along the north side of Old Capitol Trail to the creek.

The roundabout alternative was preferred by 85 percent (17 of 20) of commenters at the fall 2012 workshop. Principal reasons cited included safety benefits, speed reduction, and opportunities for landscaping. The roundabout may also lessen the appeal of through traffic through Marshallton, which is a significant community concern.

The community expressed several drainage concerns in this area during the public outreach process. Although the Red Clay Creek floods the area frequently, residents and business owners mentioned that the current drainage system is insufficient to handle smaller storm events that do not involve creek flooding. Drainage improvements would be incorporated into the project to the extent feasible.

There is also some community concern that the roundabout could increase cut-through traffic on Greenbank Road, Franklin and Jackson Avenues, and New Street. This is not likely, given that the roundabout is expected to decrease peak hour queues and not increase delays as compared to the traffic signal. However, the roundabout implementation may include a provision to monitor traffic volumes and provide additional traffic calming measures on those streets if the roundabout is found to increase cut-through traffic.

Recommended improvements at Old Capitol Trail and Stanton Road

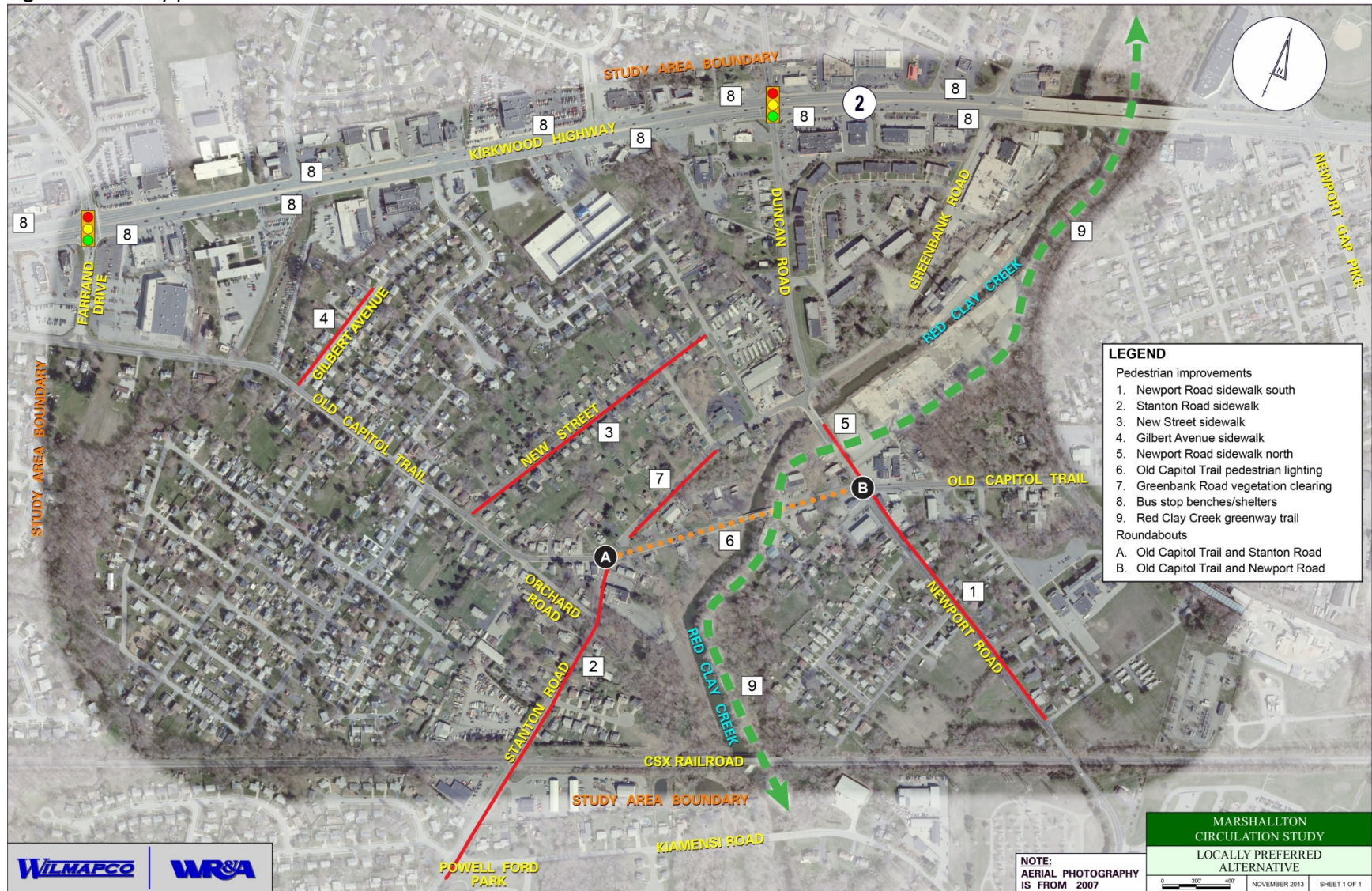
The three-leg roundabout alternative is recommended at this intersection. The roundabout would incorporate crosswalks across all three legs and sidewalks in the immediate vicinity, as well as a new sidewalk along the north side of Old Capitol Trail extending east to the Red Clay Creek bridge. The roundabout would have similar traffic performance to a traffic signal in terms of average delay to drivers. Moreover, it would operate with significantly shorter queues on northbound Stanton Road and eastbound Old Capitol Trail. The 80 percent of commenters (16 of 20) that expressed preference for a roundabout at the fall 2012 workshop also noted anticipated reductions in crashes and speeding, as well as potential reduction in through traffic.

Anticipated costs for the roundabouts will depend on a number of factors including survey, detailed engineering, and property values in effect at the time the project is undertaken. Planning-level estimates in 2013 dollars are as follows.

- Old Capitol Trail and Newport Road: \$2.8-3.2 million
- Old Capitol Trail and Stanton Road: \$2.2-2.5 million

All improvements included in the locally preferred alternative are illustrated in Figure 17.

Figure 17. Locally preferred alternative.





Stanton Road approaching Old Capitol Trail, looking north.

NEXT STEPS

This study has found that transportation improvements can be constructed in Marshallton that improve walkability, reduce traffic speeds, and retain the village's historic character. These improvements include new sidewalks and two new roundabouts as specified in the previous section.

The present study will be placed on WILMAPCO's unfunded "aspiration list" of projects in the long-range plan, and submitted to DelDOT for implementation. Final concept, design, and ultimately construction of the recommended transportation improvements will likely occur piecemeal during the decades to come as funding allows. To ensure commercial viability in Marshallton, it is strongly recommended that DelDOT or other implementing agencies work closely with business owners during the construction process to minimize business disruption.

There are three general pools of transportation funding which can be used to implement each recommendation of this study.

- **DelDOT/WILMAPCO project development (ideal for the roundabouts and associated pedestrian and bicycle work).** DelDOT administers funding for transportation projects throughout Delaware and sees to their implementation. WILMAPCO tracks those projects with federal funding and also develops a long-range transportation plan (the Regional Transportation Plan). DelDOT will prioritize these projects and work to complete them. In the meantime the proposed roundabouts will be placed on WILMAPCO's unfunded "aspiration list" in the long range plan. For more information please visit www.wilmapco.org/rtp and www.wilmapco.org/tip.

DelDOT selects projects for implementation based on "project prioritization criteria." These criteria are used to ensure that selected projects help the agency meet its stated goals and provide accountability to the public.

The locally preferred alternative, particularly the roundabouts on Old Capitol Trail at Stanton Road and Newport Road, would likely score favorably in the prioritization process because of the goals they address. Although DelDOT uses a formal process to evaluate each candidate project, the list below provides some insight into how the Marshallton improvements might perform.

- *Safety* (33% of total score): If the proposed roundabouts are tied to the improvements at Old Capitol Trail and Farrand Drive noted in the Crashes section above, Marshallton could score high in this area. The improvements also address an important strategy of the Delaware Strategic Highway Safety Plan, namely making walking and street crossing safer.
- *System operating effectiveness* (24.8%): Although the existing intersections along Old Capitol Trail function at acceptable levels of service, nearby Kirkwood Highway has been identified as a Congestion Management System (CMS) corridor by WILMAPCO.
- *Multimodal mobility/flexibility/access* (15.6%): One of the primary purposes of the Marshallton improvements is to improve multimodal mobility and access, so the project should score very high in this area.

- *Revenue generation/economic development/jobs and commerce* (7.9%): This criterion is not relevant to Marshallton.
- *Impact on the public/social disruption/economic justice* (7.2%): The Marshallton improvements were developed by the public and strongly support investment in an existing historic community.
- *Environmental impact/stewardship* (6.5%): The locally preferred alternative is expected to have no meaningful environmental impact.
- *System preservation* (5%): The Marshallton improvements do not specifically address previously identified system preservation needs.

See http://www.deldot.gov/information/pubs_forms/CTP/ctp15-20/DelDOT_project_prioritization_criteria.pdf for more information on the prioritization process.

- **DeIDOT/WILMAPCO Transportation Alternatives Program (ideal for other pedestrian and bicycle work, including the Greenway trail).** The Transportation Alternatives Program (TAP) provides federal reimbursement funding for on- and off-road pedestrian and bicycle facilities and other activities. Eligible sponsors include local governments, transit agencies, natural resource or public land agencies, school districts, education agencies, or schools. Nonprofits are not eligible as direct recipients of the funds, but may partner with any eligible entity. A minimum local funding match of 20% is required. The TAP is administered by DeIDOT and WILMAPCO. For more information please visit www.wilmapco.org/tap.

- **Community Transportation Funds.** Each Delaware state legislator receives an annual allocation for the purpose of transportation improvements in her or his district. These funds can be used directly for the construction of small projects, or can be used as the local match for federal funding (as in the TAP described above). Legislators may pool their CTF funds to support projects of more regional significance. They also have the option of banking a portion of their annual budget for up to three years in order to fund a more expensive project.

There are currently hundreds of unfunded transportation projects in Delaware which will compete with these proposed projects in Marshallton for the state's limited transportation allocations. It is therefore critical for residents, business owners, and elected officials in Marshallton to have patience with the administrative processes in place, be active participants in them, and strongly and continuously advocate for these projects. Officials and representatives should be reminded often that they are a community priority.



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