Centreville Transportation Planning Study:

Final Report

February, 2007

Prepared for:

DelDOT

Prepared by:

JMT®
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Engineering A Brighter Future®

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I. Introduction

A. Study Purpose

The Delaware Department of Transportation (DelDOT), WILMAPCO, and New Castle County have completed several studies and initiated a variety of improvements along SR 52 (Kennett Pike) within the Centreville area. DelDOT selected JMT to assist them in identifying transportation issues along the corridor and developing a recommended set of improvements to address these issues. The purpose of this study was to identify current issues along the corridor and work with the stakeholders to develop a recommended set of improvements that could help define DelDOT's future plans for transportation improvements along the corridor. This set of improvements should be designed to provide the greatest overall improvement to the corridor by enhancing the character of the Village of Centreville while allowing for necessary traffic operations.

B. Project Location

Centreville is a small unincorporated village located on State Route 52 *(also referred to as the Kennett Pike or the Pike)* north of the City of Wilmington near the Pennsylvania state line. Since the village is not incorporated there is no formal town government. Therefore, DelDOT has in the past and in the present, continues to work with the Centreville Civic Association (CCA), New Castle County and WILMAPCO on transportation improvements along the Pike and within the region. In addition to these organizations, the Kennett Pike Association (KPA) continues to express concerns about traffic related issues along the Pike and within Centreville. The study area consists of Route 52 just north of Route 52/Snuff Mill Road intersection to just south of Route 52/Center Meeting Road intersection. Refer to Centreville Traffic Planning Study Area map, Figure 1.

- Project Context

  Delaware Route 52, known locally as Kennett Pike transitions from an urban arterial in the City of Wilmington to a two-lane rural highway north of Greenville as it approaches the Pennsylvania state line. Along the way, it passes through two historic communities: Greenville and Centreville. Over the years, Greenville's original character has been supplanted by conventional suburban strip development, partly contributing to the need to convert Kennett Pike to a four-lane highway through the community. Conversely, Centreville's town center still retains its original character and has not attracted the strip development that has encompassed Greenville. The Centreville Village Plan prepared by WILMAPCO addressed integration of transportation and urban design while preserving the valued character of the historic 250 year-old Centreville community. *(Source: excerpt from the Centreville Village Plan, New Castle County, Delaware, July, 2003.)*

  The project area exhibits a variety of visual and special characteristics. The roadway and adjacent development exhibits a more rural character from north of Centreville through the northern gateway and to the intersection of Snuff Mill Road/Route 52. The rural character transitions at this point to a more suburban style of development as one approaches the village center. Village center development patterns are predominant from Chandler Avenue to just beyond the intersection of Owl's Nest/Twaddell Mill/Route 52 where the character transitions again from village center to suburban style development and then to a less intense rural character as one approaches the intersection of Center Meeting/Route 52 and points south of the village.

CENTREVILLE TRANSPORTATION PLANNING STUDY

STUDY AREA

APRIL, 2006

Figure 1

NOT TO SCALE

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C. Project Background

DelDOT, WILMAPCO and New Castle County have completed several previous studies and improvements within the Centreville area. The recent gateway improvements were made using enhancement funds with project partners including the Centreville Civic Associate (CCA) as the lead organization co-sponsored by WILMAPCO and DelDOT. WILMAPCO has completed and adopted a transportation plan for the Centreville Area entitled, the Centreville Village Plan. This plan is a transportation study with land use analysis and recommendations. This planning process included an on-line survey of the community and users of the Pike as well as public workshops and forums. DelDOT participated in this planning process by providing traffic counts, accident analysis and signal warrant analysis. The plan provides suggested traffic improvement concept options for various locations throughout the study area.

- Temporary and Permanent Traffic Calming Measures

  As part of the ongoing transportation improvements in the study area, DelDOT provided temporary traffic calming measures in an effort to work collaboratively with the community to identify more permanent measures. The temporary traffic calming measures included planters and concrete wheel stops with reflectors to imitate bulb-outs located at the corners of intersecting streets along Route 52. Permanent traffic calming measures include painted and signed crosswalks at Buckley's Tavern and at the intersection of Owl's Nest/Twaddell Mill Road and Route 52. Permanent gateway improvements *(islands with signage, lighting and plantings and roadway treatments)* provide traffic calming at both the north and south entrance points to the village. Enhancements include designated bicycle lanes, north and southbound.

- Integration of Land Use and Transportation

  Currently, the CCA is working with New Castle County to adopt a Hometown Overlay for Centreville. A draft of the proposed Hometown Overlay boundary is shown on Map 3, Integration of Land Use and Transportation. To further support these efforts, New Castle County and the CCA are working with a consultant to prepare a Manual of Design Guidelines for Centreville. The focus of these efforts is to provide regulations, guidelines and tools to enable community development that successfully integrates land use and transportation. This effort, for the most part, will provide the mechanisms to move the community from a reactive approach to a proactive approach to community development. The goal of the CCA is to successfully integrate land use and transportation planning, design and improvements in order to promote development while preserving historic and community characteristics of the village.

II. Preliminary Concept Analysis

A. Listening Tours

As a prelude to the development of the initial concept packages, JMT conducted various field investigations and observations. In addition to these investigations and observations, JMT conducted an individual interview with a representative of the CCA and group interviews with community members. The purpose of the initial interview with a representative of the CCA was to obtain necessary knowledge and background information about the community and to test the approach to conducting the listening tours.

JMT conducted individual and group listening sessions and study area tours in order to measure the community's support for traffic calming measures. The individual sessions included interviews in person and/or via telephone. Group sessions included a series of discussions with participation of various community members facilitated by JMT. All sessions consisted of identification of key issues and concerns with the use of baseline questions to focus discussion around preferences, needs and desires for traffic calming and traffic safety improvements.

Group listening tours were augmented with photographs of the study area, maps, and a graphic index of various traffic calming measures so that individuals and groups would become more educated about traffic calming measures as well as to address or alleviate concerns with respect to traffic calming and traffic safety improvements.

A summary of the issues, concerns and information gathered from the listening tours has been provided in Appendix A.

B. Concept Packages

The result of the listening tours was the development of various concept packages aimed to best address the concerns and issues identified. Three packages, varying in physical impacts and costs, were developed. The development of the packages included the identification of various roadway, pedestrian and aesthetic improvements which would address the project issues. The details of these packages were as follows:

- Concept Package No. 1

  This concept package included the extension of the two gateway treatments along the project corridor. These treatments would include the completion of the sidewalk network, standardization of parking, permanent bulb-outs, and additional crosswalks where needed. The primary focus of this concept would be to provide the highest level of traffic calming in the village center. Concept Package No. 1 would achieve this traffic calming through the use of a roundabout at the Kennett Pike and Owl's Nest/Twaddell Mill Road intersection.

- Concept Package No. 2

  The second concept incorporated the basic elements of Concept Package No. 1, and included various other roadway elements aimed to improve the project corridor. The first

of these roadway elements was be the completion of the roadway curbing between the existing village gateways located at the northern and southern limits of the project. This concept also proposed to include the following turn lanes:

- Left turn lane at Center Meeting Road
- Right turn lane from Center Meeting Road to Kennett Pike
- Left turn lane at Snuff Mill Road

The two left turn lanes along Kennett Pike would allow for an unimpeded through movement by providing dedicated left turn lanes at Center Meeting Road and Snuff Mill Road. The right turn lane from Center Meeting Road would provide a dedicated lane for the right turn maneuver, which is the dominant maneuver from Center Meeting Road during the evening peak traffic period.

- Concept Package No. 3

  The final concept package incorporated each of the elements from Concept Package No. 2, and added traffic signals along Kennett Pike at the Center Meeting Road and Snuff Mill Road intersections.

C. Public Workshop

A Public Workshop was held on October 25, 2004 to present to the public a summary of previous studies and improvements initiated along the corridor, a summary of the information gathered during the listening tour, and to present a series of concept packages of improvements that could address the issues identified along the corridor. The presentation and follow-up discussions were designed to solicit comments and reaction on the issues, goals of the study, and concept packages. The presentation made at the public meeting is included in the appendix as are the comments received during the workshop.

The following issues achieved consensus during the listening tour:

- Temporary Bulb-Outs need to be taken to the next step.
  - They are inconsistent with the Village aesthetic, they block visibility, and are perceived to be unsafe
- There is a need to improve side street access onto Kennett Pike
- Traffic is Speeding through the Village
- The Village Character must be maintained
- The Community is anticipating permanent improvements

Based upon the listening tour and comments received at the Public Workshop, the following goals were identified for the project:

- Slow Down Traffic in the Village
- Improve Pedestrian Safety
- Improve Access from Side Streets
- Coordinate Enhancements with Centreville Village Plan

III. Final Concept Analysis

A. Traffic Analysis

As a part of the final concept analysis, JMT completed a traffic analysis of the project corridor. The purpose of the analysis was to confirm the findings of previous analyses completed along Kennett Pike, as well as identify any recent changes in traffic operations along the Pike. The analysis included field investigations, the determination of the Average Daily Traffic (ADT), an examination of accident information, delay studies, speed studies, and signal warrant analysis.

- Existing Conditions

  As a part of the Study, three intersections along Kennett Pike within the Village of Centreville were evaluated. They included:

  - Center Meeting Road
  - Owl's Nest Road / Twaddell Mill Road
  - Snuff Mill Road

  Twelve-hour intersection counts were conducted on May 5, 2005. AM and PM peak volumes, daily pedestrian counts, and Average Daily Traffic (ADT) volumes are displayed on Figure 2. The ADT along Kennett Pike ranges from 13,600 vehicles per day (vpd) to 18,000 vpd.

  A condition diagram of the Kennett Pike corridor through Centreville is shown in Figure 3.

- Accident History

  Recent accident history was researched to determine if any safety concerns were identifiable within project corridor. The research included examining data from the year 2002 through the first three months of 2005. Along the Kennett Pike corridor, between major intersection streets, there were six accidents in 2002, seven accidents in 2003, six accidents in 2005 and one accident in the three month period of 2005.

  Along Kennett Pike, near the intersection of Snuff Mill Road, four accidents occurred during the period researched. There was one deer collision in 2004, one rear end and one head on collision in 2003 and one rear end collision in 2002.

  Five accidents took place near the intersection with Owl's Nest Road/Twaddell Mill Road from 2002 to 2005. In 2004 there was one angle collision, in 2003 there was one rear end and one collision with an object and in 2002 there was one rear end collision and one pedestrian related accident.

  There were a total of four accidents reported near the Center Meeting Road intersection from 2002 to 2005. In 2005 there was one angle collision, in 2004 two rear end collisions took place, and one rear end collision occurred in 2003.

During this time period, the most notable accidents were as follows:

- 2005 - Angle Accident at Center Meeting Road
- 2004 - Angle Accident at Owl's Nest Road
- 2002 - Pedestrian Accident at Twaddell Mill Road.

It should also be noted that since the completion of the accident research there has been one pedestrian fatality along the Kennett Pike corridor. The fatality occurred near the existing mid-block crossing at Buckley's Tavern.

- Delay Study

A delay study was conducted to determine the average delay per vehicle and corresponding level of service at the three main intersecting roadways. The average delay is measured as the time a vehicle enters the queue at an intersection to the time it turns onto Kennett Pike. The following table, Table 1, shows existing capacity as determined by the delay study.

TABLE 1. CAPACITY ANALYSIS

LOCATION	CONTROL TYPE	AM		PM	
		Level of Service[1]	Avg. Delay (sec/veh)[1]	Level of Service[1]	Avg. Delay (sec/veh)[1]
Snuff Mill Road	Unsignalized	F	80.0	D	26.7
Owl's Nest Road / Twaddell Mill Road	Unsignalized	F	98.9	F	175.6
Center Meeting Road	Unsignalized	E	49.5	F	> 200

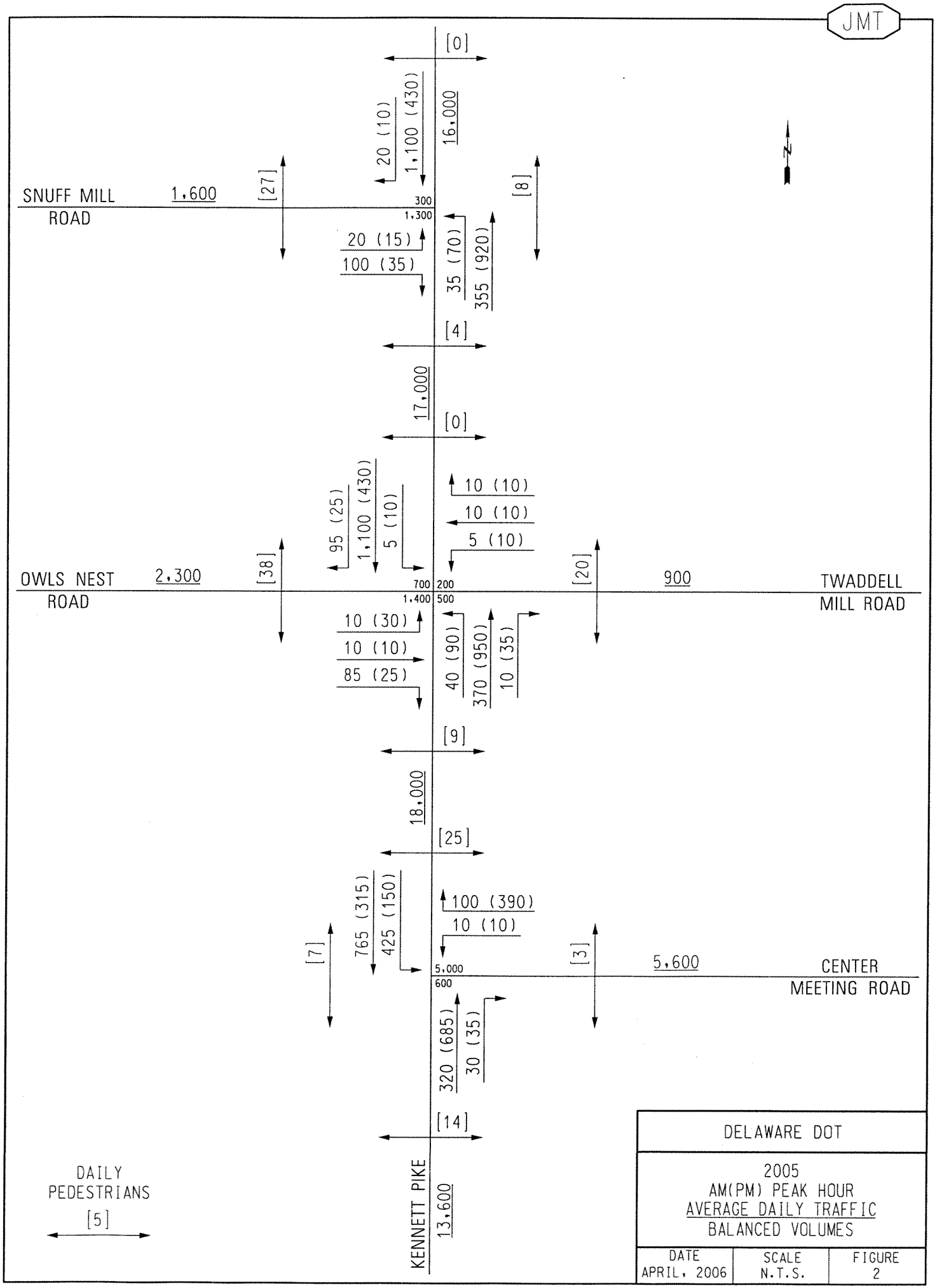
[1] HCS unsignalized intersection LOS and delay for worst approach, except where noted

- Signal Warrant

Based upon the 2003 MUTCD signal warrants, the three primary intersections within the project corridor were evaluated for signalizations. Signal warrants were met at the Center Meeting Road intersection, only.

- Speed Study

As a part of the Study, a speed study was conducted to determine 85th percentile speed along Kennett Pike to determine if speeding was an issue along the project corridor. Table 2 presents the findings of the speed study.


JMT
[0]
16,000
20 (10)
1,100 (430)
SNUFF MILL ROAD
1,600
[27]
300
1,300
[8]
20 (15)
100 (35)
35 (70)
355 (920)
[4]
17,000
[0]
95 (25)
1,100 (430)
5 (10)
10 (10)
10 (10)
5 (10)
OWLS NEST ROAD
2,300
[38]
700
200
1,400
500
[20]
900
TWADDELL MILL ROAD
10 (30)
10 (10)
85 (25)
40 (90)
370 (950)
10 (35)
[9]
18,000
[25]
765 (315)
425 (150)
100 (390)
10 (10)
[7]
5,000
600
[3]
5,600
CENTER MEETING ROAD
320 (685)
30 (35)
[14]
KENNETT PIKE
13,600
DAILY PEDESTRIANS
[5]
DELAWARE DOT
2005
AM(PM) PEAK HOUR
AVERAGE DAILY TRAFFIC
BALANCED VOLUMES
DATE
APRIL, 2006
SCALE
N.T.S.
FIGURE
2
I:\TRAFFIC\302385\II\microstation\52_kenpike_vols.dgn
3/31/2006

INSET 1 - NOT TO SCALE

KENNETT PIKE

±500'

② ① @ ±800' SOUTH OF ISLAND

SIGNS

36" X 48" SPEED LIMIT 35 ①

36" X 48" REDUCED SPEED AHEAD ②

END SPEED LIMIT 45 ③

SEE INSET 1

KENNETT PIKE

175' DRIVEWAY 36' 14' 34' DRIVEWAY 53' 15'6"

6' 5'8"

11'1" 11' 5'3" 6'5"

66' 35'

10'11" 11'8" 5'3" 4'7"

DART 10

CENTER MEETING ROAD

STOP

18'10" TOTAL WIDTH 8'10"

CENTER MEETING ROAD

CENTER MEETING ROAD

@ 118' FROM OWLS NEST ROAD ①

5' SIDEWALK

5' 8'4" 10'8" 10'3" 5'4" 9'11"

TWADDELL MILL ROAD

OWLS NEST ROAD

@ 500' FROM INTERSECTION

OWLS NEST ROAD

KENNETT PIKE STOP OWLS NEST ROAD

DW 35' PARKING 9'3" 10'5" 9'7"

SPEED LIMIT 40

TWADDELL MILL ROAD

OWLS NEST ROAD

@ 300' FROM INTERSECTION

KENNETT PIKE

12' 5'2" 10'10" 11'5" 6'3" 8'4"

MATCH LINE A

20' 21'

10' 13' 15' 13'6" 54' 29'

TWADDELL MILL ROAD

RT 52

STOP

SPEED LIMIT 30

TWADDELL MILL ROAD

SOUTH OF CENTER STREET

SOUTH OF GREGG AVENUE

35 M.P.H.

SNUFF MILL ROAD

STOP

20'8" TOTAL WIDTH 9'6"

DRIVEWAY

KENNETT PIKE

SNUFF MILL ROAD

INSET 2 - NOT TO SCALE

① @ ±800' NORTH OF ISLAND

③ APPROXIMATELY 1 MILE NORTH OF ISLAND

KENNETT PIKE

SNUFF MILL RD →
YORKLYN →

BEGIN BIKE LANE TAPER 46'

KENNETT PIKE

SEE INSET 2

DRIVEWAY 4'2" 21'4" 43'5" Ø

5'4" 10'2" 11'3" 5'6" 7'

17' 10' 30' 10' 50' 28' WIDTH 16'3" WIDTH 5'8" 131'

MATCH LINE A

33' 185' 48'

WATCH FOR TURNING TRAFFIC

SELBORNE DRIVE

DELAWARE DOT

KENNETT PIKE FROM SELBOURNE DRIVE TO CENTER MEETING ROAD CONDITION DIAGRAM

SCALE: 1" = 60'	FIGURE 3	APRIL, 2006

I:\TRAFFIC\302385\11\microstation\52_kenpike.dgn
3/31/2006

TABLE 2. SPEED STUDY RESULTS

LOCATION	POSTED SPEED (MPH)	Jan 2001		Feb 2003		Aug 2003		Sept 2003		Sept 2004		Mar 2005	
		NB 85th PERCENTILE SPEED (mph)	SB 85th PERCENTILE SPEED (mph)	NB 85th PERCENTILE SPEED (mph)	SB 85th PERCENTILE SPEED (mph)	NB 85th PERCENTILE SPEED (mph)	SB 85th PERCENTILE SPEED (mph)	NB 85th PERCENTILE SPEED (mph)	SB 85th PERCENTILE SPEED (mph)	NB 85th PERCENTILE SPEED (mph)	POSTED SPEED (mph)	NB 85th PERCENTILE SPEED (mph)	SB 85th PERCENTILE SPEED (mph)
PA Line to Snuff Mill Road	45	44	45	48	46	45	37	46	39	47	42	43	44
Snuff Mill to Owl's Nest Rd.	35	38	38	37	40	36	37	38	38	37	36	34	34
Owl's Nest to Center Meeting Rd.	35	46	46	48	48	35	41	40	44	44	43	35	41

B. Concept Packages

The final concept analysis also included the preliminary layout and further analysis of the three Concept Packages developed during the Preliminary Concept Analysis stage. The layout and analysis was used to identify the advantages and disadvantages of each of the packages. Figures 4-6 represent the horizontal alignments for each of the three concept packages previously presented. In addition, a capacity analysis for the three major intersections with Kennett Pike was completed. Below is a summary, capacity analysis, and a list of the advantages and disadvantages for each of the concept packages.

- Concept Package No. 1

  The first concept package includes the extension of gateway treatments along the project corridor, as well as a roundabout at the intersection of Kennett Pike with Owl's Nest Road / Twaddwell Mill Road.

  - Capacity Analysis

    The table below summarizes expected capacity with the Concept Package No. 1 improvements.

TABLE 3. CAPACITY ANALYSIS - CONCEPT PACKAGE NO. 1					
LOCATION	**CONTROL TYPE**	**AM**		**PM**	
		Level of Service[1]	**Avg. Delay (sec/veh)[1]**	**Level of Service[1]**	**Avg. Delay (sec/veh)[1]**
Snuff Mill Road	Unsignalized	F	80.0	D	26.7
Owl's Nest Road / Twaddell Mill Road	Roundabout	A[2]	3.9[2]	A[2]	3.9[2]
Center Meeting Road	Unsignalized	E	49.5	F	>200

[1] HCS unsignalized intersection LOS and delay for worst approach, except where noted
[2] Roundabout LOS and delay for entire intersection

  - Advantages

    - Sidewalk Extension & Bulb-outs Improve Pedestrian Safety
    - Improved Crosswalks Highlight Pedestrian Safety
    - Roundabout Reduces Side Street Delays
    - Roundabout Provides Location for DART Bus U-Turn

  - Disadvantages

    - Roundabout Results in Significant Property Impacts
      - Potential Historic & Park Impacts
    - Loss of On-Street Parking on SR 52
    - Roundabout Located in High Pedestrian Area

- More Time Required for Engineering/Construction

- Concept Package No. 2

  This concept package includes the extension of gateway treatments along the project corridor, as well as a roundabout at the intersection of Kennett Pike with Owl's Nest Road / Twaddwell Mill Road. In addition, the second package includes dedicated left turn lanes along Kennett Pike at Snuff Mill Road and Center Meeting Road and a dedicated right turn lane from Center Meeting Road to Kennett Pike.

  - Capacity Analysis

    The table below summarizes expected capacity with the Concept Package No. 2 improvements.

TABLE 4. CAPACITY ANALYSIS - CONCEPT PACKAGE NO. 2

LOCATION	CONTROL TYPE	AM		PM	
		Level of Service[1]	Avg. Delay (sec/veh)[1]	Level of Service[1]	Avg. Delay (sec/veh)[1]
Snuff Mill Road	Unsignalized	F	80.0	D	26.7
Owl's Nest Road / Twaddell Mill Road	Unsignalized	F	98.9	F	175.6
Center Meeting Road	Unsignalized	D	29.0	F	>200

[1] HCS unsignalized intersection LOS and delay for worst approach, except where noted

  - Advantages

    - Left Turn Lanes Reduce Potential for Rear-End Accidents
    - Left Turn Lanes Eliminate Thru Traffic Passing on Shoulders/Across Bike Lanes
    - Curbing Provides Additional Traffic Calming

  - Disadvantages

    - Left Turn Lanes Could Increase Speeds
    - Left Turn Lanes Create Perception of Three-Lane Roadway in Village Center
    - Curbing Requires Drainage/SWM Requirements
      - Additional Costs and Engineering

- Concept Package No. 3

  Concept Package No. 3 included the extension of the gateway treatments, a roundabout at the Owl's Nest Road / Twaddell Mill Road intersection, and traffic signals at Snuff Mill Road and Center Meeting Road.

- Capacity Analysis

  The table below summarizes expected capacity with the Concept Package No. 2 improvements.

TABLE 5. CAPACITY ANALYSIS - CONCEPT PACKAGE NO. 3					
LOCATION	**CONTROL TYPE**	**AM**		**PM**	
		Level of Service[1]	**Avg. Delay (sec/veh)[1]**	**Level of Service[1]**	**Avg. Delay (sec/veh)[1]**
Snuff Mill Road	Signalized	A[2]	9[2]	A[2]	5.5[2]
Owl's Nest Road / Twaddell Mill Road	Unsignalized	F	98.9	F	175.6
Center Meeting Road	Signalized	D[2]	52.4[2]	E[2]	63.7[2]

[1] HCS unsignalized intersection LOS and delay for worst approach, except where noted
[2] HCS signalized intersection LOS and delay for entire intersection

- Advantages

  - Helps Alleviate Left Turn Queues on 52 and Right Turn Queues at Center Meeting
  - Improves Side Street Access

- Disadvantages

  - Signal @ Snuff Mill Road Does Not Meet Warrant
  - Aesthetic Impacts to Village as a Result of Signals
  - Signal @ Center Meeting & Roundabout @ Owl's Nest Would Create Operational Concerns
    - Traffic Queue From Signal Into Roundabout

Based upon a review of the various advantages and disadvantages of these three concept packages, as well as utilizing the recently completed traffic analysis, JMT and DelDOT developed a preferred concept, as displayed in Figure 7. The specific aspects of the preferred concept were as follows:

- Curb & Sidewalk

  The preferred concept would include the completion of curb and sidewalk treatments within the project corridor between Snuff Mill Road and Center Meeting Road. This would include the installation of permanent bulb-outs, accessible pedestrian facilities and enhance pedestrian crosswalks. The inclusion of new curbing as a part of the Preferred Concept would allow for the standardization of the on-street parking widths.

- Roundabout @ Center Meeting Road

  This concept would also include a single lane roundabout at the intersection of Kennett Pike and Center Meeting Road. The roundabout would incorporate the existing gateway

treatments located to the south of Center Meeting Road to help enhance the Village entrance from the south.

A roundabout at this location is ideal because of the high amount of left turns from southbound Kennett Pike to Center Meeting Road. The left turn maneuvers from southbound Kennett Pike would help to create gaps in the northbound traffic. The hope would be that these gaps would be maintained through the village center, in turn improving access to Kennett Pike from Owl's Nest Road and Twaddell Mill Road. However, there is no certainty that the motorist would maintain the gaps through the Owl's Nest Road/Twaddell Mill Road intersection. The proposed roundabout would also be ideal because it would help to alleviate the perceived problems of traffic speeds within the project corridor.

- Roundabout @ Snuff Mill Road

  The final aspect of the Preferred Concept would be the inclusion of a roundabout at the intersection of Kennett Pike and Snuff Mill Road. Similar to the roundabout at Center Meeting Road, these improvements would incorporate the existing gateway treatments located to the north of Snuff Mill Road.

  Although the traffic analysis did not show a heavy left turn volume at this intersection, a roundabout here would still be beneficial with respect to reducing traffic speeds entering the village center. Also, a roundabout at the Snuff Mill Road intersection would allow for a location for DART Bus U-Turns. This turning maneuver was simulated and provided in Appendix F.

- Capacity Analysis

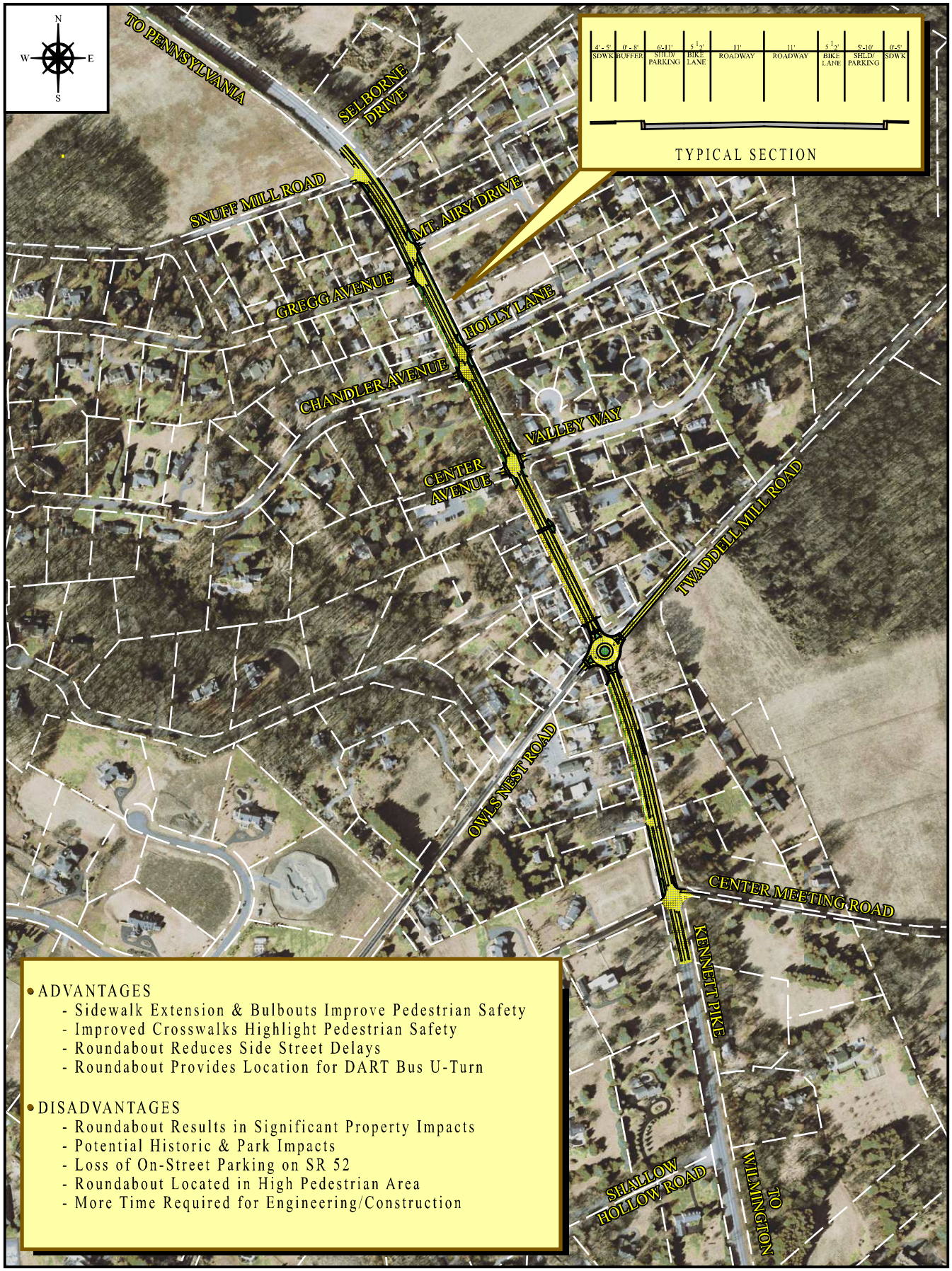
  A capacity analysis was completed for the preferred concept for the three main intersections along the project corridor. The below table summarizes the results.

TABLE 6. CAPACITY ANALYSIS - PREFERRED CONCEPT

LOCATION	CONTROL TYPE	AM		PM	
		Level of Service[1]	Avg. Delay (sec/veh)[1]	Level of Service[1]	Avg. Delay (sec/veh)[1]
Snuff Mill Road	Roundabout	A[2]	5.6[2]	A[2]	4.9[2]
Owl's Nest Road / Twaddell Mill Road	Unsignalized	F	98.9	F	175.6
Center Meeting Road	Roundabout	A[2]	7.4[2]	A[2]	7.8[2]

[1] HCS unsignalized intersection LOS and delay for worst approach, except where noted
[2] Roundabout LOS and delay for entire intersection

The implementation of the preferred concept, or any of the concept packages, would require a complete preliminary engineering and final design process. This process would include the environmental documentation necessary to gain approval for any proposed improvements, including examining impacts to the historic district that encompasses the project site.



CENTREVILLE TRANSPORTATION PLANNING STUDY

CONCEPT 1

APRIL, 2006

Figure 4

NOT TO SCALE

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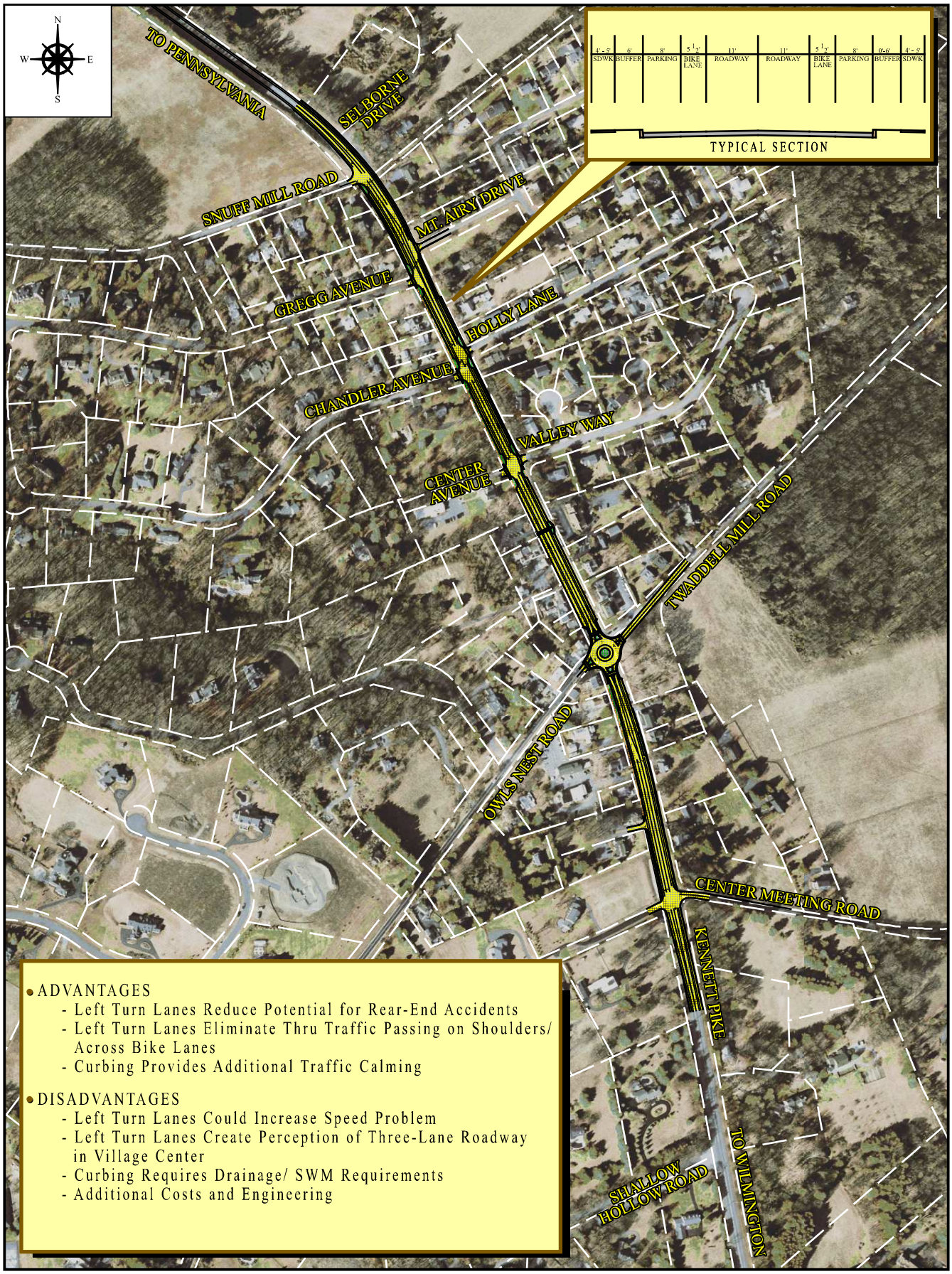

- ADVANTAGES
  - Left Turn Lanes Reduce Potential for Rear-End Accidents
  - Left Turn Lanes Eliminate Thru Traffic Passing on Shoulders/ Across Bike Lanes
  - Curbing Provides Additional Traffic Calming
- DISADVANTAGES
  - Left Turn Lanes Could Increase Speed Problem
  - Left Turn Lanes Create Perception of Three-Lane Roadway in Village Center
  - Curbing Requires Drainage/ SWM Requirements
  - Additional Costs and Engineering

CENTREVILLE TRANSPORTATION PLANNING STUDY

CONCEPT 2

APRIL, 2006

Figure 5

NOT TO SCALE

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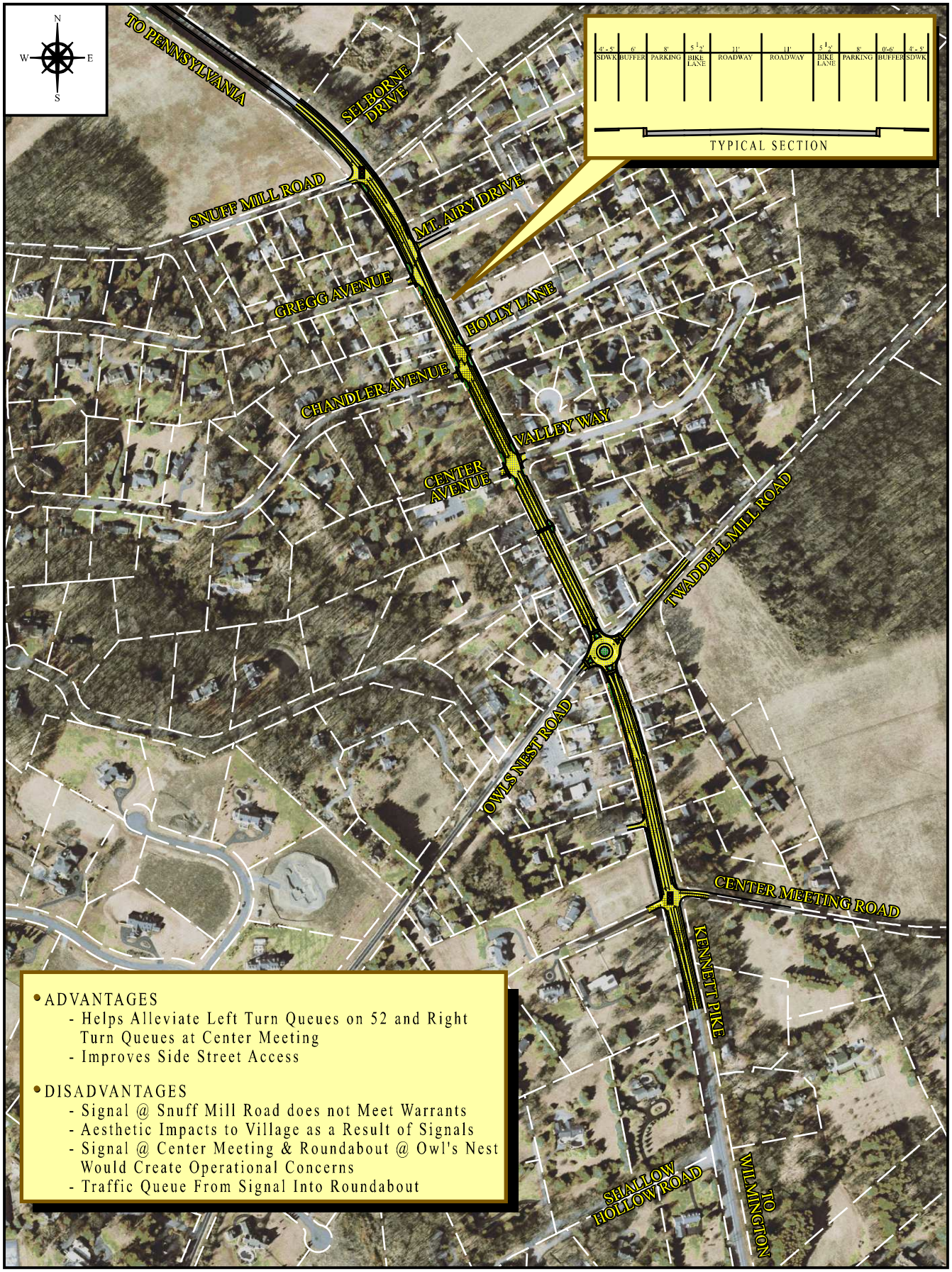

CENTREVILLE TRANSPORTATION PLANNING STUDY

CONCEPT 3

APRIL, 2006

Figure 6

NOT TO SCALE

DelDOT

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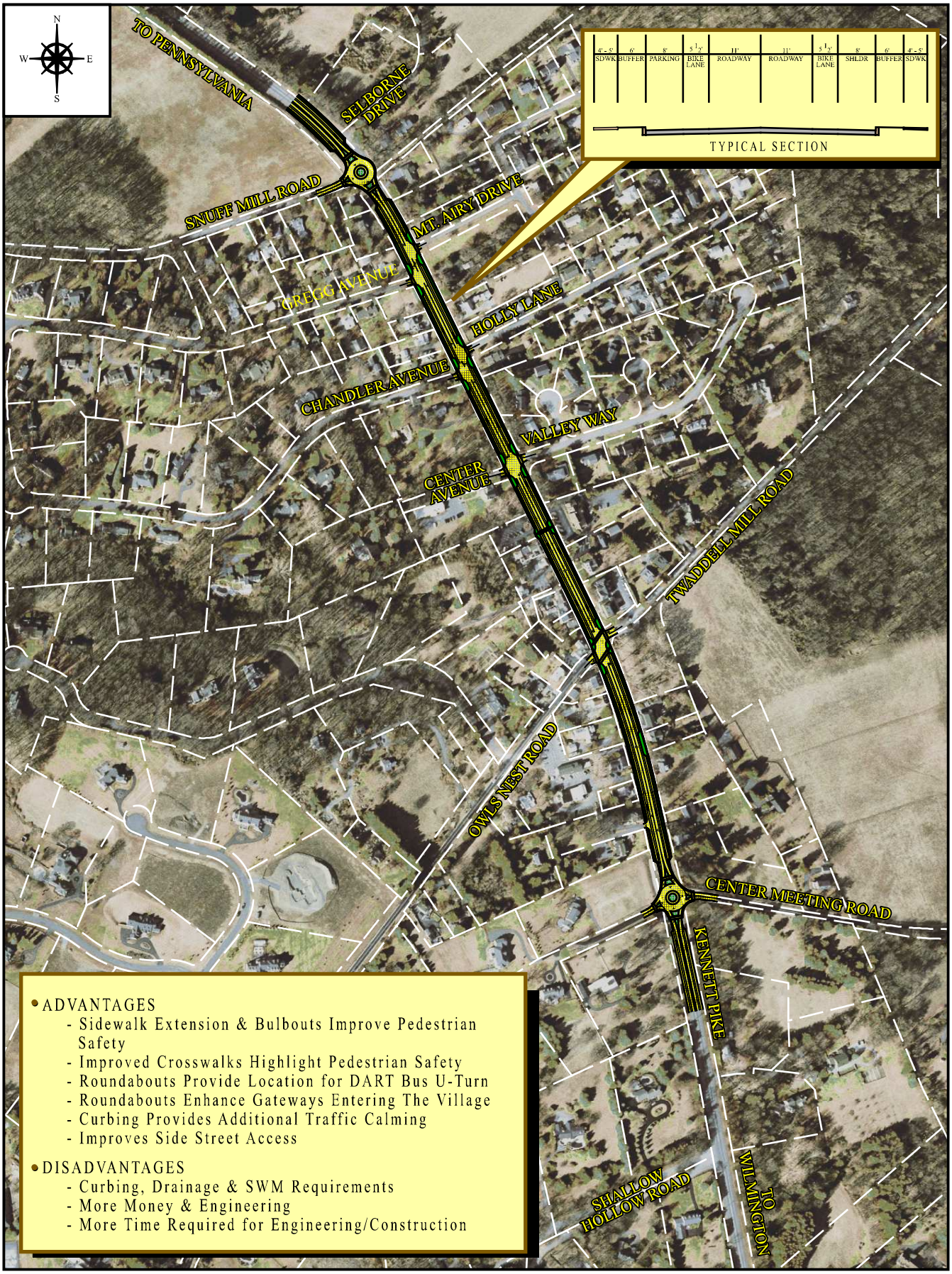

- ADVANTAGES
  - Sidewalk Extension & Bulbouts Improve Pedestrian Safety
  - Improved Crosswalks Highlight Pedestrian Safety
  - Roundabouts Provide Location for DART Bus U-Turn
  - Roundabouts Enhance Gateways Entering The Village
  - Curbing Provides Additional Traffic Calming
  - Improves Side Street Access
- DISADVANTAGES
  - Curbing, Drainage & SWM Requirements
  - More Money & Engineering
  - More Time Required for Engineering/Construction

CENTREVILLE TRANSPORTATION PLANNING STUDY

PREFERRED CONCEPT

APRIL, 2006

Figure 7

NOT TO SCALE

DelDOT

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C. Public Workshop

A public workshop was held on July 13, 2005 to present the refined traffic analysis results, concept packages, and preferred concept. This workshop consisted of two separate meetings, which both included an open forum for the public to review the information being presented, as well as a formal presentation and question session pertaining to the planning study.

The reaction of the public was supportive of the preferred concept with a small portion of those in attendance voicing strong opposition to the inclusion of a roundabout at the intersection of Center Meeting Road.

In addition to gaining general support for the preferred concept, DelDOT also received several comments and suggestions pertaining to the project corridor. A listing of all of the verbal comments and a copy of the written comments has been provided in Appendix C. Below is a few of the highlights of the open discussion resulting from the two presentations:

- Concern was expressed as to a few of the "temporary" bulb-outs and how they are actually a detriment to the safety along the corridor as a result of the poor sight distance.
- Several questions were proposed as to when any of the improvements could be implemented.
- It was suggested to utilize the existing traffic signal at the Centreville School to help create gaps in the traffic along Kennett Pike.
- Concern was still evident with respect to vehicular speeds within the Village and several stressed the importance of traffic calming being incorporated into the design to assist with this issue.

The above highlighted comments, as well as all comments received helped to form the Conclusion section of the Planning Study.

I. Conclusions

Based upon the analysis of the project corridor and the feedback received at the July 13, 2005 public workshop, the following categories of improvements or actions are recommended:

- Immediate Actions
- Short Term Actions
- Long Term Actions

Below is a summary of the potential actions that could be taken by DelDOT in each of these categories.

A. Immediate Actions

Signage

The signage concerns included, first, the fact that several of the signs located approaching and within the Village Center were blocked by tree and shrub overgrowth. This issue could be resolved by DelDOT roadside maintenance clearing vegetation to assure that adequate visibility of the signs was maintained.

The second concern was the confusion created by the "Reduce Speed Ahead" signage approaching the Village of Centreville, primarily from the north. Resolution of this issue requires coordination with the Pennsylvania Department of Transportation (PennDOT) since the confusion is created by the progression of signs and the lack of signs heading south from Pennsylvania into Delaware and eventually into the Village of Centreville.

The final concern was the insufficient size of several signs throughout the corridor. Addressing this concern would include a determination of which signs are insufficiently sized, followed by replacement of those signs. DelDOT Traffic would most likely be responsible for these signs.

DelDOT traffic officials have completed the coordination with PennDOT and have resolved the "Reduced Speed Ahead" issue. In addition, they have begun confirming that the existing signing is visible and adequately sized. If any sign is found insufficient in either regard, DelDOT will take corrective measures.

B. Short Term Actions

Short Term actions are actions that DelDOT would expect to be able to complete within 12-18 months from the date of this Study. The following short term actions described below were compiled using both the analysis completed during the planning study, as well as feedback obtained during the latest public workshop.

Bulb-Out Analysis

It was agreed at the July Public Meeting that some of the existing bulb-outs are creating sight distance issues for drivers trying to enter the Pike from the side streets. We recommend that all of the existing bulb-outs be analyzed to determine if adequate sight distance is met at the adjacent intersections.

C. Long Term Actions

Long-term actions are actions that need to be further developed through additional project development and design and for which funding for project development, design, and construction as well as the schedule, remains to be identified. While several long-term solutions were examined for Kennett Pike, including the inclusion of a traffic signal at the Kennett Pike and Owls Nest Road/Twaddell Mill Road, which ultimately did not meet the necessary warrants, the Preferred Concept would best address the wide range of concerns along the corridor. This concept involves implementation in smaller pieces that can be completed individually as small projects or phases.

Phase I – Traffic Calming Measures

The first of these small packages includes the extension of many of the existing treatments between the existing gateways. These treatments include completion of the sidewalk and curbing system to better define the roadway and provide a more urban or village center feel to the roadway. After the analysis of the bulb-out locations is complete, installation of permanent bulb-outs could take place. These would be carefully designed to allow for proper sight distance for vehicles entering the Pike from the side streets while providing the traffic calming effect of the reduction of the overall paved width. New crosswalks could be installed as part of the bulb-out package to assist with pedestrian awareness and safety. Additionally, the parking stalls and pavement markings can be standardized to assist motorists, cyclists, and pedestrians moving throughout the Village Center. The determination of what specific materials patterns, and textures to use for the sidewalk, crosswalks & within the bulb-out areas will be made as the design progresses to final construction documents.

Phase II – Center Meeting Roundabout

After installation of the traffic control measures, it is recommended that the Department carefully study the change in driver behavior so that the effectiveness of the improvements can be determined. Specific items to consider are actual speeds through the village, peak period delays both on the Pike and the side streets, and overall pedestrian safety in the Village Center. Should it be determined that additional measures are required to fully achieve the overall project goals, a second phase should be considered.

This second Phase could be the installation of a single lane roundabout at the intersection with Center Meeting Road. It was determined through the preliminary traffic modeling efforts that a roundabout at this location would be helpful in allowing the large volume of southbound left turning vehicles to negotiate the turn without undue delay. The roundabout would also help to reduce speeds for traffic entering the village from the south. There is a potential that a roundabout at this location could create gaps in the northbound traffic, which would result in improved access to Kennett Pike from Owl's Nest Road and Twaddell Mill Road. The preliminary traffic analysis conducted by JMT indicated that this intersection met the warrants for a traffic signal; however the traffic simulations showed that a signal in this location would cause traffic to queue into the Owl's Nest / Twaddell Mill Road intersection during the morning peak period. This situation would make the side street movements more difficult than the existing situation and was therefore dropped from further consideration.

Phase III – Snuff Mill Roundabout

Should the Center Meeting Roundabout be successful at reducing traffic speeds, providing for turning movements with minimal delay, and creating necessary gaps in traffic flow, a final phase of construction could be considered. This phase could consider the installation of a single lane roundabout at the intersection with Snuff Mill Road. A roundabout in this location would be designed to achieve the same goals as the Center Meeting roundabout. While the turning movements are not as great at this location, the roundabout could serve to reduce speeds in the Village and provide gaps for vehicles entering from the side streets.

It should be noted that roundabouts in the US are a relatively new traffic solution, and the modeling, design, and implementation techniques for these improvements are continuously being refined as additional data is gathered. It is possible that new modeling software and design standards may be developed and approved by the FHWA after the completion of this study. Based upon this, it is important that the final phases that have recommended roundabouts be reviewed as each phase moves toward final design to ensure that the proposed roundabouts will achieve that desired goals for the project and can meet the most current design standards. It is important to note that future analysis of the roundabouts could strengthen the case for their construction or weaken it, which would require a reassessment of these two intersections to determine if other types of improvements could be considered.

This phased approach to the project allows for a logical progression of improvements to be implemented. Each phase would build upon the level of Traffic Calming implemented in the previous phase. It would also allow DelDOT to analyze the effectiveness of each phase while designing the subsequent phase of improvements. Each of the improvements described above will initially have a positive traffic calming affect when first implemented. However, in order to maintain the effectiveness, there will need to be continued enforcement of traffic violations within the village. Consistent enforcement, combined with strategic planning, design, and implementation of improvements will ultimately help the Village of Centreville to achieve its goal of becoming a safer place for pedestrians and vehicles moving along the Kennett Pike.

APPENDIX A

LISTENING TOUR REPORT

Centreville Road Planning Study: Listening Tour Report

Prepared by:

JOHNSON, MIRMIRAN & THOMPSON

Engineering A Brighter Future

September 20, 2004

Prepared For:

DelDOT

I. Study Purpose

The Delaware Department of Transportation (DelDOT), WILMAPCO and New Castle County have completed several studies and improvements within the Centreville area. The purpose of this effort was to conduct a series of listening tours to determine the feasibility of obtaining community consensus on long range transportation improvements for Centreville. The results of this effort will determine if a planning study should be initiated. These efforts included field investigations/observations, review of existing studies, listening tours and completion of a report.

II. Project Location

Centreville is a small unincorporated village located on State Route 52 *(also referred to as the Kennett Pike or the Pike)* north of the City of Wilmington near the Pennsylvania state line. Since the village is not incorporated there is no formal town government. Therefore, DelDOT has in the past and in the present, continues to work with the Centreville Civic Association (CCA), New Castle County and WILMAPCO on transportation improvements along the Pike and within the region. In addition to these organizations, the Kennett Pike Association (KPA) continues to express concerns about traffic along the Pike and within Centreville. The study area consists of Route 52 just north of Route 52/Snuff Mill Road intersection to just south of Route 52/Center Meeting Road intersection. Refer to Centreville Traffic Planning Study Area map, Map 1.

- **Project Context**

  Delaware Route 52, known locally as Kennett Pike transitions from an urban arterial in the City of Wilmington to a two-lane rural highway north of Greenville as it approaches the Pennsylvania state line. Along the way, it passes through two historic communities: Greenville and Centreville. Over the years, Greenville's original character has been supplanted by conventional suburban strip development, partly contributing to the need to convert Kennett Pike to a four-lane highway through the community. Conversely, Centreville's town center still retains its original character and has not yet attracted the strip development that has encompassed Greenville. The Centreville Village Plan prepared by WILMAPCO addressed integration of transportation and urban design while preserving the valued character of the historic 250 year-old Centreville community. *(Source: excerpt from the Centreville Village Plan, New Castle County, Delaware, July, 2003.)*

  The project area exhibits various characteristics such as a rural characteristic from north of Centreville through the northern gateway and to the intersection of Snuff Mill Road/Route 52. These rural characteristics transition at this point to a more suburban style of development as one approaches the village center. Village center development patterns are predominant from Chandler Avenue to just beyond the intersection of Owl's Nest/Twaddell Mill/Route 52 where the characteristics transition again from village center to suburban style development and then to a less intense rural characteristic as approaching the intersection of Center Meeting/Route 52 and points south of the village.

III. Project Background

DelDOT, WILMAPCO and New Castle County have completed several previous studies and improvements within the Centreville area. The recent gateway improvements were made using enhancement funds with project partners including the Centreville Civic Association (CCA) as the lead organization co-sponsored by WILMAPCO and DelDOT. WILMAPCO has completed and adopted a transportation plan for the Centreville Area entitled, the Centreville Village Plan. This plan is a transportation study with land use analysis and recommendations. This planning process included an on-line survey of the community and users of the Pike as well as public meetings and forums. DelDOT participated in this planning process by providing traffic counts, accident analysis and signal warrant analysis. The plan provides suggested traffic improvement concept options for various locations throughout the study area.

- **Temporary and Permanent Traffic Calming Measures**

As part of the ongoing transportation improvements, DelDOT provided temporary traffic calming measures in an effort to work collaboratively with the community to identify more permanent measures. The temporary traffic calming measures include planters and bumper blocks with reflectors to imitate bulb-outs located at the corners of intersecting streets along Route 52. Permanent traffic calming measures include painted and signed crosswalks at Buckley's Tavern and at the intersection of Owl's Nest/Twaddell Mill Roads and Route 52. Permanent gateway improvements *(islands with signage, lighting and plantings and roadway treatments)* provide traffic calming at both the north and south entrance points to the village. Enhancements include designated bicycle lanes, north and southbound. Existing conditions including temporary and permanent traffic calming measures and enhancements are shown on Map 2, Centreville Traffic Planning Study – Existing Conditions *(refer to map details and photographs)*.

- **Integration of Land Use and Transportation**

Currently, the CCA is working with New Castle County to adopt a Hometown Overlay for Centreville. A draft of the proposed Hometown Overlay boundary is shown on Map 3, Integration of Land Use and Transportation. To further support these efforts, New Castle County and the CCA are working with a consultant to prepare a Manual of Design Guidelines for Centreville. The focus of these efforts is to provide regulations, guidelines and tools to enable community development that successfully integrates land use and transportation. This effort, for the most part, will provide the mechanisms to move the community from a reactive approach to a proactive approach to community development. The goal of the CCA is to successfully integrate land use and transportation planning, design and improvements in order to promote development while preserving historic and community characteristics of the village.

IV. Field Investigations/Observations and Assemblage of Relevant Information

JMT conducted field investigations and observations on July 9, 2004 and August 3 and 18, 2004. In addition to these investigations and observations, JMT conducted an individual interview with a representative of the CCA and group interviews with community members. The purpose of the initial interview with a representative of the CCA was to obtain necessary knowledge and background information about the community and to test the approach for conducting the listening tours.

JMT obtained a copy of the following reports, data, information and maps from various sources to assist in this effort.

- Orthophotography of study area *(DelDOT)*
- Study area photographs *(JMT field investigations/observations)*
- Traffic Data for Route 52 – ADDTs *(DelDOT website- www.deldot.org)*
- DelDOT Traffic Calming Manual and Program *(DelDOT website)*
- Centreville Village Plan, New Castle County, Delaware – Transportation Study, Land Use Analysis & Recommendations including community survey and results *(WILMAPCO website – www.wilmapco.org and CCA)*
- *Draft* Manual of Design Guidelines for Centreville *(CCA)*
- Project History *(CCA website – www.centrevillede.info)*

WILMAPCO staff is preparing a scaled model to depict Route 52 within the study area showing various traffic calming and intersection improvement concepts. These concepts correspond with the study, analysis and recommendations presented in the Centreville Village Plan. This model is intended to be used at upcoming public meetings to educate community members about various options to be considered through a more detailed feasibility study and engineering analysis phase *(next phase).*

V. Listening Tour Results

JMT's role was to provide technical assistance to design a process that would successfully obtain community input and feedback on both permanent and temporary traffic calming measures consisting of group interview/listening tours, educational materials and group facilitation. JMT conducted a series of eight (8) group listening tours consisting of a total of 35 participants with follow-up telephone interviews with individuals who could not attend. Participants included long time residents, new residents, commuters to Centreville, business owners, business owners and residents, association members *(CCA and KPA)*, New Castle County and WILMAPCO staff and politicians. The listening tours were designed to receive input from a cross-section of the community on traffic issues in Centreville, to document reactions to the permanent and temporary improvements and to assess community support for traffic calming measures.

- **Listening Tour Process**

  JMT conducted individual and group listening sessions and study area tours in order to measure the community's support for traffic calming measures. The individual sessions included interviews in person and/or via telephone. Group sessions included a series of

sessions with participation of various community members with group discussion facilitated by JMT. DelDOT provided JMT with an initial list of potential participants. This list was augmented to include others who had an interest in participating in the process. All sessions consisted of identification of key issues and concerns with the use of baseline questions to focus discussion around preferences, needs and desires for traffic calming and traffic safety improvements.

Group listening tours were augmented with photographs of the study area, maps and a graphic index of various traffic calming measures so that individuals and groups would become more educated about traffic calming measures as well as to address or alleviate concerns with respect to traffic calming and traffic safety improvements.

The listening tours consisted of group discussions in-doors followed by a walk-about along Route 52 to discuss site specific issues and concerns. Each group member received a traffic facts handout consisting of a description of traffic safety, traffic management and traffic calming accompanied by examples of each and a questionnaire *(copies of group handouts are provided in the appendix to this report)*. Key issues and concerns expressed by the groups were logged on flip charts and summarized in a group report. Participation was tracked by a group sign-in sheet. Once the group discussion was completed, group members accompanied by JMT staff participated in a walk-about through the study area to identify and discuss key issues and concerns. The group discussions and walk-abouts resulted in identification of key issues and concerns as well as discussion of possibly solutions.

- **Issues, Concerns and Information Gathered from Listening Tours**

The following is a summary of the issues, concerns and information gathered from the listening tours. Also, refer to Map 2, Centreville Traffic Planning Study – Existing Conditions when reviewing the matrix on the following page. Information about participants and the results of group interviews/listening tours are provided as appendix items to this report.

Community Issue/Concern	Community Goal	Location	Community Suggested Solution
Passing On the Right	Reduce accidents and traffic conflicts	Intersections and along corridor at property entrances/driveways	Appropriate signage and enforcement.
			Provide on-street parking along the corridor.
			Improve bulb-outs at key locations to prevent passing on-right into bicycle lane and parking lane.
			West side of Route 52 at and north of Snuff Mill intersection – remove additional asphalt that was put in place for bus turnaround location *(allows passing on the right and is unsightly).*
Aesthetics & Community Amenities	Improve appearance of corridor and community	Gateway to gateway	Provide for brick sidewalks, landscaping, appropriate signage, pedestrian scale lighting, benches, trash receptacles, underground utilities, on-street parking, drainage improvements and crosswalks.
			Replace temporary bulb-outs with permanent solution. Temporary solutions have an undesirable appearance, block visibility and are perceived to be unsafe.
		At key locations	Mid-block crosswalks.
		Gateway to gateway	Appropriate traffic signage, reducing sign clutter.
Poor Visibility	Improve visibility on side streets accessing Route 52	At intersecting streets along Route 52	Restrict on-street parking along Route 52 at intersections to provide adequate sight distance/ visibility.
Traffic Speed *(reduce travel speeds not posted speed limit)*	Improve traffic safety	Gateway to gateway	Additional enforcement and appropriate signage approaching gateways and within village.
			Traffic calming – use of bulb-outs throughout the village with consideration of other measures such as speed tables, medians and grooved pavement. Use traffic signals as last solution. Study appropriate solutions for appropriate locations.
			Use of speed cameras for enforcement.
			Electronic speed signs at gateways to regulate speeds.
			Improvements must accommodate snow removal.
		Greenville to Centreville	South of Centreville - reduce speed limit from 50 mph to slow traffic before reaching village gateway.
		Route 52 and Owl's Nest/Twaddell Mill	Consider a roundabout to improve traffic safety and to calm traffic.

Community Issue/Concern	Community Goal	Location	Community Suggested Solution
Traffic Volumes	Maintain village character and scenic byway	Route 52 corridor	Park-n-ride facility in Pennsylvania.
			Promote use of bus service and carpooling.
			Reduce truck traffic by restricting truck size.
Pedestrian Safety *(Neighborhood Scale and Walkability)*	Promote pedestrian movement within the village	Owl's Nest/Twaddell Mill and Route 52	Align intersection and improve with bulb-outs to provide ability to design safe crosswalks.
			Align intersection and improve with raised crosswalk and raised intersection. Yield to pedestrian signs are unsightly, but are effective.
		Route 52 at Buckley' Tavern	Provide ADA compliant facilities. Yield to pedestrian signs are unsightly, but are effective.
		Additional crosswalks at key locations	Mid-block crosswalks based upon community development efforts.
		Gateway to gateway	Sidewalks on both sides of street the entire length of village with landscaping and amenities.
Bicycle Safety	Provide for multi-modes of transportation	Along the corridor	Provide a raised bicycle lane to distinguish vehicular travel lane from bicycle lane to deter passing on right.
			Designate bicycle lane on one side only.
			Provide adequate signage and pavement markings.
Accessibility	Improve access to and from side streets	Along the corridor where appropriate	Restrict on-street parking along Route 52 at intersection to provide adequate sight distance.
		Route 52 and Center Meeting Road	Southbound left turn lane on Route 52 to allow safer access to Center Meeting Road and continued flow of thru traffic.
			Designated right and left turn lanes on Center Meeting Road to access Route 52. Consider a signal at this location if meets warrants (signal as a last resort).
		Route 52 and Snuff Mill Road	Designated left turn lanes for both southbound and northbound traffic on Route 52 accessing Snuff Mill Road. Consider a signal at this location if meets warrants (signal as a last resort).
		Route 52 and Owl's Nest	Right turn from Owl's Nest onto Route 52 with no obstructions (pots, bulb-out, etc.) would allow easier and safer access.

Community Issue/Concern	Community Goal	Location	Community Suggested Solution
On-Street Parking	Provide adequate on-street parking to support business retention and development	Along Route 52 from Center Avenue to end of commercial properties south of Owl's Nest	Re-evaluate and remove on-street parking restrictions on the eastside of Route 52 from pedestrian crosswalk to Valley Way.
			Re-evaluate and remove one hour restriction on the east side of Route 52 from Twaddell Mill Road to pedestrian crosswalk.
		At appropriate locations gateway to gateway	Limit parking restrictions to minimum space necessary for traffic calming measures and minimum required for sight visibility from side streets.
		Centreville Café *(along Owl's Nest)*	Pull-in, back-out parking at corner of property is not safe; parking should be restricted at this location.
Emergency Access	Provide adequate access for emergency vehicles	Along Route 52 corridor and access to side streets	Provide adequate lane widths for emergency access.
			Traffic calming measures must take into account emergency vehicle access.
Village Scale & Character	Maintain community character	Greenville to Centreville to Pennsylvania	Provide appropriate traffic calming measures based upon community context at various locations within study area.
	Integrate land use and transportation	From Snuff Mill Road to Center Meeting Road *(area within Hometown Overlay)*	Coordinate transportation improvements with community development goals and objectives and design review guidelines.
			Obtain input from Centreville on curb cuts prior to issuance.
			Obtain input from Centreville prior to restricting on-street parking.
		Farmers Market – sidewalk area in front of park	Widen sidewalk area for farmers market.
			Provide adequate signage for farmers market and direction to parking.
Project Timing and Funding	Promote timely transportation improvements	Study Area	Move to the next phase to analyze possible solutions, followed by design and implementation.
			Identify projects and program to include in the TIP.

VI. Recommendations

Based upon input received from participants of the listening tours, field observations and research, the following conclusions and recommendations are crucial to continuing a successful partnership between Centreville (the CCA), New Castle County, WILMAPCO and DelDOT to plan, design and implement community supported transportation projects.

- ***Conclusion:*** The consensus of the community is that the flower pots with bumper blocks and reflectors *(temporary solution)* have an undesirable appearance, block visibility and are perceived to be unsafe.

  Recommendation: Move to the next phase of project development to ensure the community that the flower pots, bumper blocks and reflectors by default are not permanent solutions.

- ***Conclusion:*** Community members have expressed possible transportation solutions at several locations throughout the study area *(many of these solutions are supported by transportation concepts presented in the Centreville Village Plan).* The consensus of representatives of the community is that the temporary traffic calming solutions must become permanent as soon as possible and additional study and analysis must be conducted to design appropriate traffic calming measures for specific locations within the study area *(this includes the appropriate design and location of the bulb-outs).*

  Recommendation: DelDOT should take a leadership role and move to the next level of study and analysis to meet community expectations. This step will provide necessary analysis and information to identify feasible solutions. Initially, DelDOT representatives should meet with the community to convey next steps in the project development process with an anticipated completion date of study and analysis. Upon completion of this level of study and analysis, DelDOT should continue the public involvement program to include public education, exchange of ideas and obtain community preferences of feasibly solutions. These steps will assist with further consensus building on a single plan of action among partners and the community. This step must be taken before final design can commence.

- ***Conclusion:*** There is a very strong desire by Centreville, New Castle County and WILMAPCO to integrate land use with transportation.

  Recommendation: Provide stronger communication and coordination between DelDOT planning, design and implementation efforts with local planning, design review and implementation efforts.

- ***Conclusion:*** There is a feeling among local residents and business owners that DelDOT has lost interest in providing permanent transportation solutions for Centreville.

  Recommendation: Participate in upcoming public meetings in the community to specifically address DelDOT's intentions and plan to move to the next phase of project development, addressing study and analysis efforts, programming and funding issues.

Recommendation: Identify some interim steps to address community issues and concerns in order to demonstrate DelDOT's commitment to the community. Interim improvements could include items such as: remove parking restrictions in the village center and relocate and locate appropriate traffic signage *(i.e. large speed limit northbound, just north of Center Meeting should be relocated immediately south of southern gateway and a regular sized speed limit sign should be placed at the original location, and any additional signage that may be necessary focusing on reducing and consolidating signage where every possible and implement sign removal/consolidation plan).*

- ***Conclusion:*** There is a strong desire on the part of the community to obtain results of studies completed to date by DelDOT and planning partners.

  Recommendation: Prepare a one or two page newsletter in a format that can be used as a meeting handout and posted on DelDOT, CCA, New Castle County and WILMAPCO's websites with results of speed study analysis *(before and post gateway and temporary traffic calming measures and any more recent studies)*, traffic volumes, accident analysis *(summary results only if possible)* and traffic warrant analysis for key intersections such as Snuff Mill/Route 52, Owl's Nest/Twaddell Mill/Route 52 and Center Meeting/Route 52. This newsletter/handout should also include information about DelDOT's next steps and a time reference if possible. This information should be disseminated at the initial meeting described in the first recommendation.

- ***Conclusion:*** Coordination of analysis of feasibility of solutions identified by the community, New Castle County, WILMAPCO and DelDOT is crucial to successful project development and implementation. Concepts have been identified by WILMAPCO in the Centreville Village Plan and WILMAPCO is proceeding with development of a scaled model. New Castle County and CCA are in process of adopting a Hometown Overlay and Design Review Guidelines.

  Recommendation: Coordinate technical analysis with WILMAPCO's efforts to produce a scaled model to use as an educational tool at community meetings. Model solutions should be consistent with design standards. Solutions that are not feasible should be identified and presented as such with supporting documentation and the focus should be placed on accurately modeling feasible solutions to present to the community.

Centreville Interviews/Listening Tours

August 03, 2004

JMT Facilitators – Jon Conner, RLA/AICP and April Showers, AICP

Description of Interview Format & Interviews/Listening Tours

JMT conducted group listening tours/interviews. The tours/interviews were conducted to measure the community's support for traffic calming measures and to assess traffic issues and concerns along Kennett Pike. A group discussion was held indoors supported by the use of aerial photographs of the study area and photographs of conditions along the Pike within the study area. The groups also toured the study area on foot to discuss site specific issues. The following is a summary of the Centreville Community Listening Tours.

Group Interviews/Listening Tour Results

The following is a summary of input received by participants of the group interviews/listening tours. JMT conducted four (4) group interviews/listening tours. All participants were given the opportunity to take home, complete and return a questionnaire that was used to focus group discussions. The summary reflects group discussions and written response to the questionnaire.

Group 1 Community Participants (7:30 AM – 9:30 AM)			
Name	**Address**	**Telephone No.**	**e-mail**
Genny Crampton - *LR*	5903 Valley Way Centreville, DE	(302) 652-0558	
Gretchen Mercer -*LR*	130 Rue Mandaleine Centreville, DE	(302) 654-6414	mercerrobert@hotmail.com
Kathy Baer -*CC*	124 Holley Drive Dtown, PA 19335	(610) 652-7729	KXPR755@aol.com
Andrea Thomson-*NR*	310 High Ridge Road Centreville, DE	(302) 778-0248	aussiethomo@msn.com

LR-Long time resident, NR-New resident, CC-Commuter to Centerville, B-Business Owner, BR-Business Owner & Resident, P-Politician

Summary List of Issues, Concerns and Comments – Group 1

- Since Traffic Calming Installed, Less Trucks Seen on 52
- Concern about emergency access during congested times (if bulb-outs remain) no room for vehicles to pass
- Many drivers violate the no passing on right signs
- At new gateways, deflection is too severe
- Large number of cyclists and walkers
- Designate Bicycle facilities on one side only
- During AM and PM rush, pedestrians cannot cross 52
- Difficult to access 52 from Owl's Nest Road or cross over to Twaddle Mill Road
- Keep on-street parking – needed for businesses
- Construct bypass for Wilmington Commuters
- Still need to slow / calm traffic more
- Construct Park-n-Ride in PA

- Need feedback from Commuters
- Slight Volume changes during school vs. summertime
- Existing pots in bulb-outs have bushy vegetation – obscures visibility
- Farmers Market is held Thursdays 2-6 PM in front of park along west side of 52. Traffic safety issues with access, turns, and parking
- Existing DART stop in front of park blocks driveway
- Relocate bus turnaround to school to north
- Public ROW parallel to 52 behind Wild Thyme not a good idea – lands east of 52 are placed in conservancy
- Passing on the right and speeding are key issues
- Too congested at Owls Nest-Twaddell Mill/52 – needs help
- Need a bypass thru Centreville
- Reroute bus to Centreville school parking lot for turn around
- Do not take our parking areas on-street, its our lifeline as a village
- Snuff Mill/Kennett intersection needs attention
- Traffic calming devices (pots) have just made motorist angrier, more obstacles make bottlenecks and difficulties (like driving through a maze)
- The traffic is not going to go away unless you build a bypass
- I'm more fearful of being involved in an accident since the islands and pots have appeared
- Waiting to turn left is hazardous
- Oppose a traffic light, four-way stop or a roundabout at Owls Nest/Twaddell Mill & Route 52
- The traffic issue at Owls Nest/Twaddell Mill & Route 52 has been made worse by the pots, walkways, trees, narrowing, etc.
- Move the farm market into the park and direct parking around the corner using signage to direct motorists
- Put the bus turn around back up to the end of town where there is plenty of paved turn around
- Have there been any studies to see if the traffic calming actually calmed traffic
- Traffic calming is a great idea at a little out of the way town or village off the beaten track (a scenic shore town maybe), but not on the major thoroughfare.
- The red bike lane was supposed to be stamped or scored with a brick pattern.
- Planters take up on-street parking. During the day-time there is not an on-street parking problem.
- Thursday evenings, Buckley's Tavern—activities require use of lot and on-street parking
- Add blinkers to the no passing on right signs
- 35 mph is adequate if enforced
- Left into Snuff Mill and existing Snuff Mill is difficult and unsafe
- Gateways are a hazard during winter
- Traffic control signs blend in and are not as noticeable
- Brick sidewalks are good, but the unevenness is unsafe
- Underground walkway to cross 52 at Owls Nest-Twaddell Mill
- What about traffic lights at each end of the village
- What about a flashing light on off peak times, then operate during peak times
- Signals cause drivers to rush between them and emissions from cars and truck would be detrimental
- What about a roundabout
- Pedestrian area is primarily from Buckley's to the commercial properties south of Owls Nest

- Pull in/back out parking at coffee shop is unsafe
- Village center is from Buckley's to Odd Fellows
- Rush hour is bad for pedestrian crossing

Group 2 Community Participants (10:00 AM – Noon)			
Name	**Address**	**Telephone No.**	**e-mail**
R.A. Nielsen - *LR*	5720 Kennett Pike & 5403 Kennett Pike, Centreville, DE	(302) 425-5720	
Liz Brown - *LR*	303 Center Hill Road Centreville, DE 19807	(302) 654-6586	lizbgb@aol.com
Patt Cannon - *LR*	5904 Kennett Pike Centreville, DE	(302) 429-0286	cannon5904@aol.com
Bill Gotwals – *B*	5727 Kennett Pike – Sharp Office *(PA Resident)*	(302) 652-7729	sharpoffice@aol.com
Bob Valihura – *P* *State Representative*	11 Laurel Ridge Centreville	888-1253	valihura@aol.com
Dorcas Taylor –*LR* *(joined group on tour)*	50-6 Valley Way Centreville, DE	(302) 658-5714	

LR-Long time resident, NR-New resident, CC-Commuter to Centerville, B-Business Owner, BR-Business Owner & Resident, P-Politician

Summary List of Issues, Concerns and Comments – Group 2

- Get Rid of Pots
- Don't put in Traffic Signal
- Difficult to get access to 52 during peaks, but can be done
- At peak times signal will create back-ups
- Pots create a safety issue for emergency vehicles
- Pedestrian yield signs slow down traffic more than gateways
- Bump-outs need to replace pots
- Owl's Nest / Twaddell Mill – Bumpouts & plantings obscure visions
- Cars parked along street slow traffic
- Interview emergency services
- Need to slow traffic
- Snow removal needs to be considered
- Where are pedestrians coming from? How much retail is there and will be proposed?
- There is a demand for retail
- Bicyclist possible market for retail
- Pots are obstacle for runners (Liz no longer runs along 52)
- Poor access from Owl's Nest onto 52 during rush hours
- Cars passing on the right into the bike lane creates safety issues
- Like wider roads – safer
- Narrower roadway slows traffic
- Snuff Mill Road difficult to get access to 52 & access from 52 to Snuff Mill Rd – rush hours
- Improve visibility on side streets (Owl's Nest, Snuff Mill, Center Meeting)
- Another signal at a key location may provide enough of a break from time to time to allow safe access from side streets

- Center Meeting a signal timed for use during rush hour (statement-not much support)
- No intersections in study area that warrants a signal
- No pots at 52 & Owl's Nest, traffic could make right hand turns easier to keep traffic moving
- What about roundabout at 52 & Owl's Nest and Twaddell's Mill
- Speed along 52 is a key issue
- Gateways are not effective at slowing down traffic (initially were)
- Traffic Safety and accessibility are key issues
- Passing on the right is a problem
- Need for sidewalks entire length of Village – walking and running
- Bike lane too close to travel lane
- Gateway sets a mindset / attitude of driver, coming into a community
- Old Kennett Pike – how does this impact study area
- There will be more commuters unless a bypass is built
- Come back the week of Sept. 12 during school to observe situations
- Valley Way – access to 52, the pots create dangerous situation – can't get around the pots
- Pot are in the way of the motorists
- Noticed more truck traffic on the Pike
- The pedestrian crossings are questionable, they make pedestrians feel safe and the motorists do not stop
- Business signs are tacky
- The pots and bulb-outs make snow removal difficult
- When cars are parked along 52, the traffic slows
- No parking on east side north of Buckley's is counterproductive
- Goal is to slow cars and make safer for pedestrians
- Snuff Mill & 52 difficult to negotiate the turn onto 52 in snow (grade and visibility are issues)
- Bump-outs negatively impact runners
- Residents of Centreville must realize that Route 52 is a commuter road and traffic flow is very important.
- Slowing the traffic should be the main concern and by the middle of Towns it is not a problem.
- Safety concerns when entering Route 52 from Owl's Nest or Snuff Mill and existing Route 52 at Snuff Mill or Center Meeting (the volume of cars is of concern).
- The pots block visibility and make the turn from Snuff Mill onto Route 52 challenging.
- It is difficult to make a left from Owl's Nest to Route 52 due to the volume of traffic.
- It is confusing when on Owl's Nest and cars are on Twaddell Mill, who will go first to access Route 52.
- Pots block view and the trucks parking close to the intersection (along Route 52) block view.
- Kennett Pike is one of 3 major routes from PA to Wilmington (we need to acknowledge that the traffic volume is not going to diminish and will continue to grow).
- The residents need to safely enter and exit the road. At this time, the light at Centreville School gives us a window of time to exit Snuff Mill during the morning. A light at some place in the south side of Centreville would give residents a chance to safely cross at Owl's Nest/Twaddell Mill.
- It is unsafe when making a left from Route 52 onto Snuff Mill. Poor visibility looking north to see southbound traffic due to curve in road.
- Overall appearance of the corridor looks like it is pieced together, it is distracting and unattractive.

Group 3 Community Participants (1:30 PM – 3:30 PM)			
Name	**Address**	**Telephone No.**	**e-mail**
John Rodowski - *B*	210 Haystack Lane Greenville, DE 19807	(302) 658-9438	
Elsie Johnson -*BR*	5727 Kennett Pike Centreville, DE	(302) 656-4631	
Mildred Tordella - *LR*	8 Hollingsworth Drive Centreville, DE	(302) 652-7721	
Susan Teiser - *BR*	5800 Kennett Pike Centreville, DE	(302) 777-4911	
Anne Wattman - *B* *KPA*	1451 Fairville Road Chadds Ford, PA 19317	(610) 388-7091	
John Cleaver - *LR*	112 Thissell Lane Centreville, DE 19807	(302) 656-1980	
David Lyons - *BR*	7 Meadows Lane Centreville, DE 19807	(302) 658-5508	

LR-Long time resident, NR-New resident, CC-Commuter to Centerville, B-Business Owner, BR-Business Owner & Resident, P-Politician

Summary List of Issues, Concerns and Comments – Group 3

- Volume and speed of traffic on Route 52 is spreading to other corridors (i.e. Old Kennett Pike, etc.)
- Temporary solution is unattractive, unsafe and unsafe for emergency vehicles.
- Route 52 is a thru-way that transports traffic, we cannot stop traffic from PA
- If you make it difficult to get to Delaware folks will not stop to shop
- Centerville is an area of specific destinations, not an area for strolling with high volume of pedestrian activity
- Centerville is ugly with signs, bump-outs, etc.
- Bulb-outs with pots slow traffic and then traffic travel as fast as they can to the next point
- Increased enforcement will help reduce traffic speeds
- Electronic speed sign to control speed
- Pedestrian signs are effective
- Business want the volume to support stores, shops, restaurants; but speed is a concern
- Bulb-outs need to be improved physically and the intent is good. Need to get to the ultimate solution.
- Safety is the biggest issue when crossing Rt. 52 at Owl's Nest/Twaddell Mill Road; they feel they need a traffic signal
- Suggest a light at Center Meeting (gives a break to allow traffic to access Rt. 52)
- Safety is in three geographic areas of concern (Snuff Mill, Owl's Nest/Twaddell Mill and Center Meeting
- Explore possibility of roundabout at Owl's Nest/Twaddell Mill/52
- Fender bender once a week at 52/Owl's Nest/Twaddell Mill (more frequent during school year)
- If we are trying the pots as a temporary solution, why can't we try a light?
- Folks have given up trying to make a turn onto and out of 52/Owl's Nest-Twaddell Mill, they use alternate routes
- If a light is placed, give space for left turn lanes

- Farmers' Market should be in the park, not the sidewalk; it is unsafe with respect to traffic and access
- Group feels that the CCA does not represent the views of the community
- KPA tries to refer to residents/businesses owners in the community
- Solution should focus on what is safe and what works
- Do not loose sight of fact that roads are for the purpose of moving traffic safely
- Bicyclists do not follow rules of the road
- Too much signage –regulatory, pedestrian, intersection signs, etc.—visual clutter and signs have become ineffective
- Traffic is not going to decrease, it will increase, we need to deal with it
- Temporary solutions have slowed traffic, but still unsafe/difficult to cross Rt. 52
- What is the ADT along 52, Route 100 and Old Kennett Pike
- Keep gateways and place signal at 52 /Owl's Nest
- Get a traffic count on Rt. 52 and other routes (i.e. Rt. 100, Old Kennett Pike, etc.)
- The community has spent meeting after meeting discussing traffic. DelDOT should go ahead and try traffic light at 53 and Center Meeting Road.
- Get rid of all pots, signs, light along the shoulders and just go back to the clean look of a village road instead of looking like grand central. (appearance along the pike in Centreville is unattractive).
- Put the farmers market in the park.
- *Note: Group chose to stay in-side for discussion.*

Group 4 Community Participants (4:00 PM – 6:00 PM)			
Name	**Address**	**Telephone No.**	**e-mail**
Gayle Croes Bezerra -*LR*	5922 Kennett Pike Centreville, DE	(302) 656-6077	nimeslo@comcast.net
Ricardo Bezerra - *LR*	5922 Kennett Pike Centreville, DE	(302) 656-6077	nimeslo@comcast.net
Ron Groff - *LR*	203 Owls Nest Road Centreville, DE	(302) 421-9969	Ron.groff@alumni.lehigh.edu
Patty Hobbs - *LR*	4310 Kennett Pike Centreville, DE	(302) 530-3393	hobbspatty@aol.com
Joanne Bahr *KPA, PA resident*	15 Orchard View Drive Chadds Ford, PA 19317	(610) 388-1560	brucebahr@aol.com
Zig Carota - *LR*	159 St. Moritz Drive Centreville, DE	(302) 777-7072	

LR-Long time resident, NR-New resident, CC-Commuter to Centerville, B-Business Owner, BR-Business Owner & Resident, P-Politician

Summary List of Issues, Concerns and Comments – Group 4

- Route 52 is the culmination of the scenic byway – it is a major arterial to Wilmington
- Signal at Rt. 52 and Owls Nest-Twaddell (a trip light) – the flower pots need to be removed
- At Center Meeting Road there are extreme backups (approximately 50+ cars)
- Accidents at 52 and Owls Nest-Twaddell occur and there is pedestrian activity at this location
- The pots have slowed traffic; northbound at Center Meeting/52 is an ideal location for bulb-outs (similar to the one in Greenville)
- Snuff Mill/52 no bulb-out

- Accessing 52 at Snuff Mill (right turn onto 52) needs an acceleration lane because of poor visibility
- Traffic calming—narrow brick medians with brick crosswalks with a pedestrian cycle (button) at a trip light located at 52/Owls Nest-Twaddell
- Get accident statistics from State Police
- Get results of signal studies at various intersections along 52 completed by DelDOT
- Pedestrian activity on Thursday nights at Tavern
- Coffee shop – parking along Owls Nest presents safety issues
- Pots at 52/Owls Nest obscure vision
- Large volumes of PA traffic are of concern (If a signal is placed, there may be changes in volumes on feeder streets)
- If a light is placed, how will access to driveways be impacted?
- DelDOT is going to do a study to determine where bulb-outs are appropriate. Not all locations where pots are located should have bulb-outs.
- Consider a traffic circle as a solution.
- Is a 4-way stop possible?
- AM traffic backups going into Wilmington (light at Lower Brandywine) – regulate (signal timing) lights in Greenville so no backups
- Speed tables in roadway similar to Greenville to slow traffic
- Dialog in Centerville is not open on this issue
- DelDOT should answer whether the pots have slowed traffic – has there been a study of this?
- Enough time has elapsed; something permanent has to be done. What is the timeline?
- Speed is most important issue – random enforcement
- Speed dropping from 50 to 35 – motorists never decelerate to 35 mph
- Medians in middle of Town
- Gateways have ugly plantings, remove the pebbles
- Why is it ok for police enforcement during the market, but no funds to support random enforcement
- Farmers' Market causes extreme backups
- Group not sold completely on a signal, but not sure what else will work beyond what is there now
- All treatments so far has focused on slowing traffic
- Speed camera (use to slow traffic – fines)
- Left hand turns from 52 are difficult
- Passing on right at intersections and when left hand turns are being made- dangerous – this is very bad at Centreville Café at 52/Owls Nest
- Visual pollution (signs, pots, bumper blocks, reflectors, poorly executed gateways, etc.)
- Remove overhead light at Snuff Mill/52 – light pollution
- Reroute bus
- Farmers' Market should be moved into the park
- Left hand turn from 52 onto Owls Nest is greater than 90 degrees
- Center median from Owls Nest to crosswalk at Buckley's Tavern
- Volume increases during school year and with drop-off/pick-up of children
- Bus should turn at Centerville School
- What about aligning Owls Nest and Twaddell Mill
- Bike groups do not like the lanes because cars do not know if it is a parking lane or a turn lane
- Note: (Zig Carota) submitted a copy of results of on-line survey of citizens, etc. about a traffic light in Centreville. *(copy is contained in project file)*

Summary of Participation

JMT conducted four (4) group discussions with a total of twenty-three (23) participants. Participants represented included citizens (long term and newly established residents), local businesses, and commuters to Centreville for employment, CCA, KPA and state elected officials. The CCA *(Centreville Citizen Association)* and the KPA *(Kennett Pike Association)* assisted with providing additional names and contact information for additional participants.

1. Summary of Key Issues and Concerns

The following is a summary of key issues and concerns with respect to traffic in Centreville, recent gateway improvements and temporary traffic calming measures based upon input from participants.

- Temporary bulb-outs are unattractive
- Passing on right violations *(cars passing on right in bicycle lanes and parking area)*
- Safe access to Route 52 from side streets
- High volume and excessive speed of motorists *(need to slow traffic)*
- Pull in/back out parking at coffee shop unsafe
- Ability for pedestrian crossing at Route 52 and Owl's Nest/Twaddell Mill intersection is difficult
- Unsafe conditions when making left turns from Route 52 onto Snuff Mill Road and from Route 52 onto Center Meeting Road *(poor visibility at 52/Snuff Mill due to roadway geometry)*
- Pots are obstacles for runners and bikers
- Access for emergency vehicles *(adequate width)*
- Improve visibility for drivers on side streets intersecting Route 52
- Improve pedestrian safety
- Too much signage and motorists do not pay attention to signage pertaining to pedestrian safety and speed limits
- What is the next step that will be taken by DelDOT to move things forward?

2. Summary of Perceived Impacts of Permanent and Temporary Traffic Calming Improvements

The following is a summary of perceived impact of permanent *(gateways)* and temporary *(pots, bumper blocks, reflectors and yield to pedestrian signs)* traffic calming improvements based upon the input from participants.

- Less trucks seen on Route 52
- Gateways – deflection is too severe
- Bushy vegetation/plantings in pots obscure visibility
- Planters take up valuable on-street parking
- Temporary bulb-outs are dangerous *(poor visibility, creates bottlenecks and is an obstacle to motorist making turns)*
- Gateways are hazardous during winter
- Either remove pots or place permanent bulb-outs as soon as possible *(temporary bulb-outs are unattractive and do not function like actual improvements)*
- Yield to pedestrian signs area effective `
- If the pot at Route 52 and Owl's Nest *(southwest side)* were removed, traffic could make right hand turns easier to keep traffic moving

- Gateways slow traffic initially, but speed picks up and then slows again as they approach Owl's Nest/Twaddell Mill intersection
- Community would like the results of DelDOT speed studies once temporary solutions where put in place

3. Summary of Suggested Solutions for Further Evaluation

The following is a summary of suggested solutions for further evaluation based upon participant input.

- Designated bicycle facilities on one side only
- Keep on-street parking to support current and future businesses
- Construct a bypass for Wilmington commuters
- Construct a park-n-ride in PA
- Roundabout or traffic circle at Route 52 and Owl's Nest/Twaddell Mill intersection
- Reduce speed limit
- Traffic signals at the ends of the village, possibly at Route 52/Snuff Mill intersection and Route 52/Center Meeting intersection *(trip lights)*
- Speed cameras to enforce speeding
- Electronic speed signs to control speed
- Increased traffic enforcement
- Study where bulb-outs will be effective
- Four-way stop at Route 52 and Owl's Nest/Twaddell Mill intersection
- Median in center of village *(from Owl's Nest to Buckley's Tavern)*

4. Local Activities Impacting Traffic

The following is a summary of local activities impacting traffic safety in Centreville.

- Farmer's Market pose traffic safety issues with respect to access, turns and parking *(move the market further into the park, yet still visible from the roadway to attract patrons)*
- High volume of on-street parking and pedestrian activity in and around Buckley's Tavern on Thursday evenings
- No parking areas and one-hour parking limitations along the east side of the Pike should be removed
- DART bus should turn around at the Centreville School

Centreville Interviews/Listening Tours

August 18, 2004

JMT Facilitators – Jon Conner, RLA/AICP and April Showers, AICP

Description of Interview Format & Interviews/Listening Tours

JMT conducted group listening tours/interviews. The tours/interviews were conducted to measure the community's support for traffic calming measures and to assess traffic issues and concerns along Kennett Pike. A group discussion was held indoors supported by the use of aerial photographs of the study area and photographs of conditions along the Pike within the study area. The groups also toured the study area on foot to discuss site specific issues. The following is a summary of the Centreville Community Listening Tours.

Group Interviews/Listening Tour Results

The following is a summary of input received by participants of the group interviews/listening tours. JMT conducted three (3) group interviews/listening tours. All participants were given the opportunity to take home, complete and return a questionnaire that was used to focus group discussions. The summary reflects group discussions and written response to the questionnaire.

Group 1 Community Participants (7:30 AM – 9:30 AM)			
Name	**Address**	**Telephone No.**	**e-mail**
Rich Abbott - *BR*	5632 Kennett Pike Centreville, DE	(302) 655-9550	rabbott@baynardfirm.com
Carl Muendel - *LR*	7 Hollingsworth Drive Centreville, DE	(302) 658-9542	
David Berndt - *BR*	5714 Kennett Pike Centreville, DE	(302) 655-5230	hardcastegallery.com
Carol Kipp - *LR*	500 Twaddell Mill Road Centreville, DE	(302) 656-4191	kwriter4@comcast.net

LR-Long time resident, NR-New resident, CC-Commuter to Centerville, B-Business Owner, BR-Business Owner & Resident, P-Politician

Summary List of Issues, Concerns and Comments – Group 1

- PA Commuters have no standing or say in what happens in the village
- Temporary Solution has been in place too long – but has been successful in slowing down traffic – pedestrian yield signs have worked
- Passing on the right still continues and is dangerous
- Signals should be the last resort
- Commuters are not sensitive to the 35 mph speed limit
- Current signage for no passing on right is for both moving & standing traffic
- Permanent bulb-outs will be attractive *(brick walkways, plantings, etc.)*
- At or prior to gateways, install yellow flashing light *(35 mph strictly enforced)*
- At gateway – signage no passing on right of moving or standing traffic
- At gateways signage alternative with side traffic
- Trip light at Center Meeting and Snuff Mill
- Substantial commuter traffic is using Center Meeting

- Camera Enforcement – Speed *(contractor)*
- Gateways have slowed traffic, bump-outs have also slowed traffic
- Encourage more parking on-street *(less no parking signs)*
- Center Meeting is the most dangerous- may need a light for safety and provide a break in traffic
- Opposed to lights *(traffic signals)* in the village – especially at Center Meeting – lights cause additional road rage
- Favor a roundabout at 52/Owl's Nest/ Twaddell Mill Road
- Take improvements in Phase – make traffic signals as last resort
- Lights encourage more traffic on side streets – then those streets become unsafe and demand widening
- Culture expects to get anywhere fast
- At bump-outs passing on right is restricted- so they work to allow access to 52 from side streets
- Does not think that a decision by committee is not good – rely on experts
- Pike is a scenic byway – don't want overload *(traffic)*
- Bus service from PA for Commuter Traffic needs to be provided
- Rt 82 designated turn lane *(LF for SE bound traffic)* will be positive
- How many improvements do you really need to make to accommodate peak traffic *(10 hrs out of the week)* – the folks who live here will have to deal with it on an ongoing basis
- Focus on community, reducing sprawl & look at solutions that make sense *(i.e. roundabouts, bump-outs, etc.)*
- Park-&-Ride in PA would reduce traffic
- Speeding thru the village occurs at all times – this to be addressed – need traffic calming
- It is difficult to gain access to 52 and due to speed and volumes *(peaks)* it is dangerous
- Pedestrian crossing signs have slowed down traffic – even if pedestrians do not cross
- DelDOT did a speed study after temp bulb-outs were in place – study indicated that traffic did slow down
- The more bulb-outs, the more loss of on-street parking
- Some of the temp. bulb-outs are not placed appropriately to deter passing on right
- Sidewalk- both sides full length of village – how should it be designed based upon location *(urban/suburban/rural characteristics)*
- No parking on-street at Buckleys Tavern should be removed to provide parking
- More activity/more uses will demand on-street parking being used – additional space for passing on right
- Farmer's market slows traffic
- Like the appearance of the brick sidewalks, the wood edging of the brick sidewalks is not attractive
- Minimize the impacts on historic resources whatever the improvements may be
- No removal of tree canopy to accommodate improvements
- Center Meeting/Route 52 – place bulb-out on the west side to prevent passing on the right
- Drivers from Center Meeting do not come to a full stop and swing around the corner *(dangerous for bikes and pedestrians—there is no sidewalk on either side at this intersection)*
- Continue sidewalk the full length of the village
- Move large speed limit sign to a place prior to the gateway at the south entrance and place a smaller one in the village
- Place no passing on the right signs at the gateways
- Raise height of bike lane with mountable curb for emergency vehicles

- Roudabout at Route 52 and Owl's Nest/Twaddell Mill intersection
- Align Owl's Nest and Twaddell Mill without impacting historic resources
- Make sure that permanent bulb-outs are appropriately placed so that passing on right can not occur
- Widen the sidewalks in the commercial area of the village
- Holly & Route 52 needs a bulb-out to prevent passing on the right
- The temporary bulb-out at Mt. Airy Drive does not work, move the bulb-out to the west side of Route 52
- Route 52/Snuff Mill intersection poor visibility in all directions on either street
- Route 52 widens at Snuff Mill on the east side *(old DART turn around area)*, asphalt should be removed and planted
- Traffic enforcement is not routine because the village has to pay for the service
- Farmer's Market needs more space to setup so pedestrians can move with a more defined identification of parking along the Pike and side streets *(possibly create a wider strip along the front of the park for the Farmer's Market)*
- Only when other methods fail should a traffic signal be considered for Route 52 and Owl's Nest/Twaddell Mill intersection
- High speeds of vehicles is key issue *(50-60+mph by some vehicles)*
- Left hand turns onto Route 52 from side streets is especially difficult and dangerous
- Pedestrian's crossing Owl's Nest at Route 52 is dangerous *(high speed of vehicles on Owl's Nest, poor visibility and vehicles charge out past the stop bar without stopping first for pedestrians)*
- Center Meeting Road intersection problems include passing left turn stopped cars, Center Meeting traffic ignores stop sign and does not look both ways
- Snuff Mill Road intersection has poor visibility of fast traffic from PA

Group 2 Community Participants (10:00 AM – Noon)			
Name	**Address**	**Telephone No.**	**e-mail**
Ginger Tronzo – *BR*	6301 Kennett Pike Centreville, DE	(302) 425-0837	gtronzo@comcast.net
Bill Duncan – *CC/B*	19 Owl's Nest Road Centreville, DE	(302) 652-7533	whoakinc@aol.com
Mary Grace Fariello – *CS*	New Castle County Land Use 87 Reads Way New Castle, DE 19720	(302) 395-5471	mfariello@new.castle.de.us
Morgan Hendry - *KPA*	Kennette Pike Association PO Box 3592 Greenville, DE 19807	(302) 655-6505	info@kennettpike.com www.kennettpike.com
Pamela Witsil - *BR*	6 Gregg Avenue Centreville, DE 19807	(302) 658-3232	pwitsil@witsil.com

LR-Long time resident, NR-New resident, CC-Commuter to Centerville, B-Business Owner, BR-Business Owner & Resident, P-Politician, CS-County Staff

Summary List of Issues, Concerns and Comments – Group 2

- Centreville Traffic – summertime is a time when volumes are low – study during school season

- Planters are not pretty, but they have slowed traffic – locations need to be adjusted and bulb-outs need to be permanent
- 2 more crosswalks needed – Holly Lane/52 Frederick's/52 – to be determined
- Yield to pedestrian signs work
- More bulb-outs
- Gateways – landscaping is not what was on plans to install *(size, species)* maintenance has been lacking
- Greenville plantings are more pleasing – Greenville is responsible for maintenance – Delaware Center for Horticulture. plants/maintains
- Centreville needs to explore maintenance of gateway medians
- Owl's Nest / Twaddell's Mill Rd / 52 not in support of traffic signal
- Reduce speed along arterial to provide access from side streets and pedestrian- solution cannot impede traffic. Signal will impede traffic. Increase in traffic is expected *(development, etc.)*
- Farmer's Market impedes traffic
- Misinformation about purpose of planters – yes they are ugly. Vast majority of complaints are due to misinformation and not understanding purpose – to slow traffic & are temporary in nature
- Temporary planters took years to get installed *(many opportunities for input through newsletters, websites, and charrettes)*
- Push for permanent bulb-outs Trust issues with DelDOT. Curbs/Bumper blocks has created ugliness around planters
- Visibility w/respect to planters – temporary solution is to determine these locations
- Greenville was a raceway before improvements. Speed and passing on right were similar problems – possible solutions.
- Kennett Square speed table works to slow traffic – possible solution
- Trucks create noise at high speeds
- Raised metal domes used in Calif. to slow traffic – placed in travel lanes to slow traffic & alert drivers that approaching village
- Majority of community is expecting the improvements shown on CCA website
- Community has gone through an elaborate process to determine that bulb-outs are the solution – the only thing remaining is how to solve problems at key intersections *(bulb-outs are a given – move on)* – DelDOT has retreated on moving forward with bulb-outs
- KPA is in support of traffic calming *(bulb-outs)* Temp. planters are not the solution
- Implement the plan – Bulb-outs solve speed issue, drainage improvements, sidewalks
- Outstanding items to solve – access from side streets
- DelDOT has left technical solutions to the community – DelDOT needs to come out to provide solutions that will work
- DelDOT needs to take more time w/community to determine problems & build consensus around that – DelDOT provide options so that the community can build consensus around preferred feasible solutions
- DelDOT does not vary from design standards – they do not think outside the box
- These issues have been discussed & studied since the 1970's (Development Guide for Centreville, New Castle County Study sponsored by KPA)
- Improvements *(including bulb-outs)* – to deter DelDOT from creating a 4 lane highway through Centreville. It has happened in other locations across the state
- Goal – Divert traffic to Concord Pike

- Uniformity along the corridor – surface, speed limit, plantings, etc.
- Character of Centreville must be maintained & strengthened with business retention & attraction
- DelDOT should be mindful of design review standards *(for example – reduction of curb cuts, promote pedestrian activity)*
- When DelDOT makes decisions they need to take into account these standards
- Less signs, the right signs at appropriate locations – overall signage plan
- Eliminate no parking signs DART signs north of Centreville
- New Castle County sign standards need to be modified for a Village - -Commercial signs
- DelDOT should go beyond just telling the community what they have heard. Community wants – next steps, funding, etc.
- Location of bulb-outs need to be studied and identified
- Need to address bike lane & how to design with bulb-outs
- About a year ago – met w/DelDOT to discuss final design for bulb-outs DelDOT cannot move forward
- No telephone poles
- Bulb-out at Center Meeting does not work – Center Meeting needs to be designated lanes for right & left *(Lane/Pavement marking)*
- 52 Southbound – Left onto Center Meeting Road Left turn for 3 cars.
- Snuff Mill / 52 52 North bound left turn onto snuff mill – left turn lane
- Possibly a roundabout at 52 / Snuff Mill
- Yield to pedestrian signs need to remain, but they do not stop
- Mix of uses in Village – need to retain existing & make successful – need more retail – while maintaining character of community
- Fredericks – Concerned about what happens on this site *(3 acres)* Design standards are important
- Community is ready to move forward now
- CCA plan for plantings in gateways was not implemented correctly
- Human nature makes a central parking lot unpopular, they would prefer to park on-street in front of the business with limited walking
- Smaller parking lots scattered throughout the village may work best
- Currently there is not much walking traffic
- Evidence of not much use of on-street parking during daytime
- Route 52 and Center Meeting intersection, traffic backs up on Center Meeting ½ mile to get out *(left or right turns only)* – suggest designated right and left turn lanes to move traffic
- Owl's Nest and Route 52 need 2 crosswalks, poor alignment
- Future use of the park is up in the air
- The best location of permanent bulb-outs needs to be studied, discussed with the community and then implemented
- Owl's Nest/Twaddell Mill and Route 52 – poor visibility due to pots and parked vehicles *(typically large trucks, SUVs, vans, etc.)* – design of permanent bulb-outs needs to take this into account
- Owl's Nest/Twaddell and Route 52 in support of a roundabout, if DelDOT can educate the community and quickly implement
- The Meadow's development on Twaddell Mill Road has requested a traffic light since the development went in

- Does not support a traffic light at Owl's Nest/Twaddell and Route 52 *(construction of traffic light is an eyesore, noise of stopping and starting of traffic, blocked access onto Owl's Nest and Twaddell Mill driveways and impedes movement of traffic on Route 52)*
- Deep parking lane along Route 52 on the west side
- No shared parking is occurring
- Crosswalk at Buckley's does not meet ADA standards
- In commercial areas, sidewalks are wide enough
- In favor of underground utilities
- Additional crosswalk at Chandler/Holley and Route 52 *(folks in the Holly development does not have access to walk outside of their neighborhood)*
- Supports permanent bulb-outs and more of them
- Consider a raised intersection at Owl's Nest/Twaddell and Route 52
- CCA is in support of taking property from the park to align the intersection

Group 3 Community Participants (1:30 PM – 3:30 PM)			
Name	**Address**	**Telephone No.**	**e-mail**
Dan Liekle – *BR*	201 Rockland Road Centreville, DE	(302) 234-2252	Barley@Magpage
Missy Liekle – *LR*	5416 Kennett Pike Centreville, DE	(302) 239-4066	Barley@Magpage

LR-Long time resident, NR-New resident, CC-Commuter to Centerville, B-Business Owner, BR-Business Owner & Resident, P-Politician

Summary List of Issues, Concerns and Comments – Group 3

- Pedestrian bridge or tunnel at 52 / Owl's Nest
- Speed Tables to slow traffic *(used interlocking brick)*
- No trucks – left turns on 52 to side streets – Speed *(35 with pedestrian crossing is fast)*
- Want to solve these problems, but not sure what the solution is other than a traffic signal – not in support of a signal
- Against parallel *(bypass)* road
- Change in speed along corridor adds to faster speeds thru Centreville
- Does not support 3-way stops
- Does not support permanent bulb-outs
- Supports sidewalks, continued bike lanes, crosswalks, pedestrian scale lighting & benches
- Concerns about maintenance of any improvement *(i.e. plantings, etc.)*
- Put utilities underground, fix drainage problems, storm sewer
- Truck noise is a problem

Group 4 Community Participants (4:00 PM – 6:00 PM)			
Name	**Address**	**Telephone No.**	**e-mail**
Linda Collier – *CC/B*	5812 Kennett Pike Wilmington, DE 19807	(302) 653-3542	

LR-Long time resident, NR-New resident, CC-Commuter to Centerville, B-Business Owner, BR-Business Owner & Resident, P-Politician

Summary List of Issues, Concerns and Comments – Group 4

- Temporary bulb-outs are ugly, dangerous – remove them
- Allow parking on both sides of the street *(currently parking is restricted on the east side for portions of the roadway)*
- Yield to pedestrian signs are ugly
- Bike lanes were painted with non-permanent red paint
- Permanent bulb-outs would take away parking, she hosts a monthly tasting event that requires the use of on-street and off-street parking
- Evenings during the week are busy and there is a need for on-street parking
- The pots at Owl's Nest obscure visibility *(before the pots, a motorist could squeeze out and turn right, now they can't)*
- If the pots are removed, a light at Owl's Nest/Twaddell Mill and Route 52 is not necessary
- Traffic needs to be slowed, but not in agreement with the proposed approach
- Try to beautify the village to support businesses
- Pot at Center Meeting on the east side obscures visibility
- During day-time there is also a demand for on-street parking
- Many businesses have left Centreville because they did not get the volume of patrons needed
- Restrict the size of trucks permitted on Route 52
- Use speed bumps or speed tables to slow traffic
- Slow traffic, but do not remove on-street parking to do so

Summary of Participation

JMT conducted four (4) group discussions with a total of twenty-three (23) participants. Participants represented included citizens (long term and newly established residents), local businesses, and commuters to Centreville for employment, CCA, KPA and state politicians. The CCA *(Centreville Citizen Association)* and the KPA *(Kennett Pike Association)* assisted with providing additional names and contact information for additional participants.

1. Summary of Key Issues and Concerns

The following is a summary of key issues and concerns with respect to traffic in Centreville, recent gateway improvements and temporary traffic calming measures based upon input from participants.

- Temporary bulb-outs are unattractive
- Passing on right violations *(cars passing on right in bicycle lanes and parking area)*
- Safe access to Route 52 from side streets
- High volume and excessive speed of motorists *(need to slow traffic)*
- Pull in/back out parking at coffee shop unsafe
- Ability for pedestrian crossing at Route 52 and Owl's Nest/Twaddell Mill intersection is difficult
- Unsafe conditions when making left turns from Route 52 onto Snuff Mill Road and from Route 52 onto Center Meeting Road *(poor visibility at 52/Snuff Mill due to roadway geometry)*
- Pots are obstacles for runners and bikers
- Access for emergency vehicles *(adequate width)*
- Improve visibility for drivers on side streets intersecting Route 52

- Improve pedestrian safety
- Too much signage and motorists do not pay attention to signage pertaining to pedestrian safety and speed limits
- What is the next step that will be taken by DelDOT to move things forward? *(temporary improvements have been in place too long)*
- Changes in speed limits along the corridor to the north and south of Centreville increases speeds along Route 52 in the village *(consistent speed limits along the corridor)*

2. Summary of Perceived Impacts of Permanent and Temporary Traffic Calming Improvements

The following is a summary of perceived impact of permanent *(gateways)* and temporary *(pots, bumper blocks, reflectors and yield to pedestrian signs)* traffic calming improvements based upon the input from participants.

- Less trucks seen on Route 52
- Gateways – deflection is too severe
- Bushy vegetation/plantings in pots obscure visibility
- Planters take up valuable on-street parking
- Temporary bulb-outs are dangerous *(poor visibility, creates bottlenecks and is an obstacle to motorist making turns)*
- Gateways are hazardous during winter
- Either remove pots or place permanent bulb-outs as soon as possible *(temporary bulb-outs are unattractive and do not function like actual improvements)*
- Yield to pedestrian signs area effective `
- If the pot at Route 52 and Owl's Nest *(southwest side)* were removed, traffic could make right hand turns easier to keep traffic moving
- Gateways slow traffic initially, but speed picks up and then slows again as they approach Owl's Nest/Twaddell Mill intersection
- Community would like the results of DelDOT speed studies once temporary solutions where put in place

3. Summary of Suggested Solutions for Further Evaluation

The following is a summary of suggested solutions for further evaluation based upon participant input.

- Designated bicycle facilities on one side only
- Keep on-street parking to support current and future businesses
- Construct a bypass for Wilmington commuters
- Construct a park-n-ride in PA
- Roudabout or traffic circle at Route 52 and Owl's Nest/Twaddell Mill intersection
- Reduce speed limit
- Traffic signals at the ends of the village, possibly at Route 52/Snuff Mill intersection and Route 52/Center Meeting intersection *(trip lights)*
- Speed cameras to enforce speeding
- Electronic speed signs to control speed
- Increased traffic enforcement
- Study where bulb-outs will be effective

- Four-way stop at Route 52 and Owl's Nest/Twaddell Mill intersection
- Median in center of village *(from Owl's Nest to Buckley's Tavern)*
- Speed bumps and/or speed tables
- Provide sidewalks the entire length of the village on both sides of the street
- Raise the height of the bike lane with a mountable curb for emergency vehicles
- Increase the width of the sidewalks in the commercial portion of the village
- Place utilities underground
- Raised intersection at Owl's Nest/Twaddell and Route 52
- Consider additional pedestrian crosswalks at key locations

4. Local Activities Impacting Traffic

The following is a summary of local activities impacting traffic safety in Centreville.

- Farmer's Market pose traffic safety issues with respect to access, turns and parking *(move the market further into the park, yet still visible from the roadway to attract patrons)*
- High volume of on-street parking and pedestrian activity in and around Buckley's Tavern on Thursday evenings
- No parking areas and one-hour parking limitations along the east side of the Pike should be removed
- DART bus should turn around at the Centreville School

Centreville Traffic Planning Study
Traffic Facts

This fact sheet provides information on traffic safety, traffic management and traffic calming.

Traffic Safety involves the use of various devices, techniques and measures to address traffic needs. The following describes various traffic safety issues and examples of traditional devices or safety measures.

Traffic Safety Issues	Examples of Traditional Devices/Safety Measures
Speed	Speed limit signing, stop signs, signals, etc.
Traffic Volume	One way streets, turn prohibitions,
Accidents	Speed limits, signage, traffic control devices, etc.
Pedestrian/Bicyclist Traffic	Sidewalks, signage, pedestrian signals, crosswalks, bicycle lanes, signage, etc.

Traffic Management involves the application of traffic control measures to address traffic safety issues. Traffic management techniques include:

Traffic Management Technique	Examples
Managing roadway space	Opening and closing lanes, blocking scene of incident, staging and parking emergency vehicles, one-way streets, pavement markings, etc.
Deploying appropriate personnel to assist with traffic management	State police, local police and service patrols
Actively managing traffic control devices	Traffic signals, stop signs, etc.
Designating, developing and operating alternate routes	Detours due to incident, truck routes, etc.

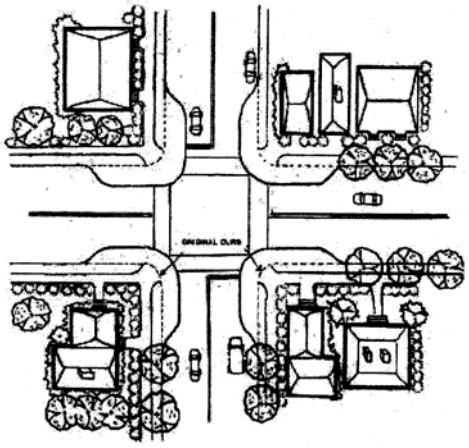
Traffic Calming is fundamentally concerned with reducing the adverse impacts of traffic on a community. Studies have shown that traffic calming measures can significantly reduce traveling speeds and accident levels.

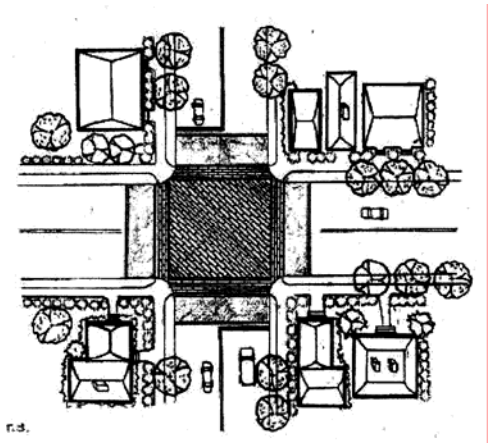
Traffic Safety Issue	Traffic Calming Techniques
Volume Reduction	Street closures and one-way streets
	Turn prohibitions and commercial vehicle prohibitions
	Raised median through intersection
	Diverters *(semi or diagonal)*
	Chicanes
	Traffic Roundabouts
	Raised crosswalks
	Speed hump
Speed Reduction	Bulb-out/curb extensions
	Chicanes
	On-street parking
	Raised median island/pedestrian refuge
	Traffic roundabout
	Speed hump
	Raised crosswalk and raised intersection
	Diverters *(semi or diagonal)*
	Roadway narrowing with edgelines
Conflict Reduction	One-way streets and street closure
	Turn prohibitions
	Traffic roundabouts
	Bulb-outs/curb extension
	Raised median/island/pedestrian refuge
	Speed hump
	Raised median through intersection
	Diverters *(semi and diagonal)*

Traffic Calming

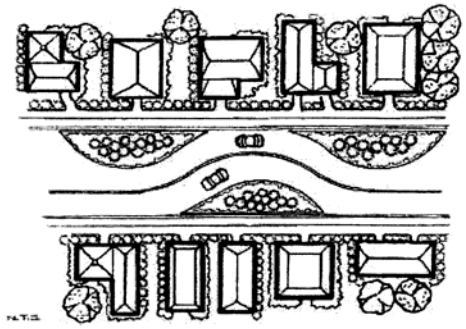
Traffic calming measures are excellent tools to change driver expectation, preserve and enhance communities, and provide safety for other modes of transportation (pedestrians, bicycles, equestrian) while maintaining traffic flow.

Bulb-Outs

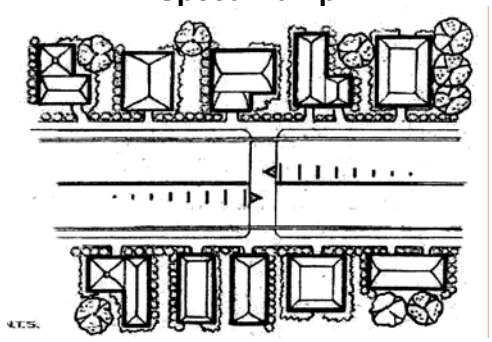




Chicane

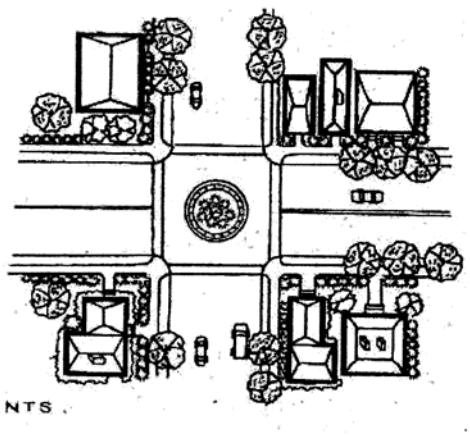


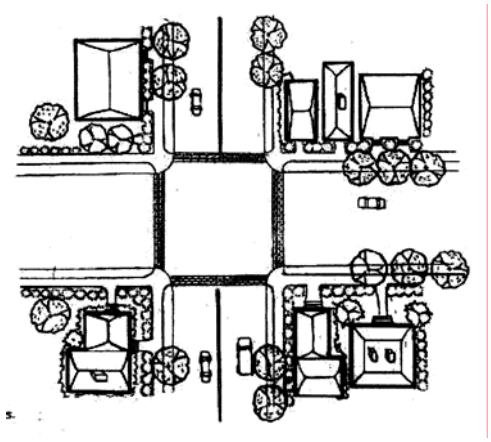
Speed Hump



Textured Crosswalk

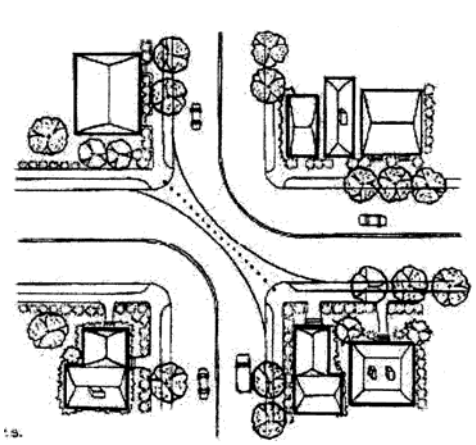
Circle

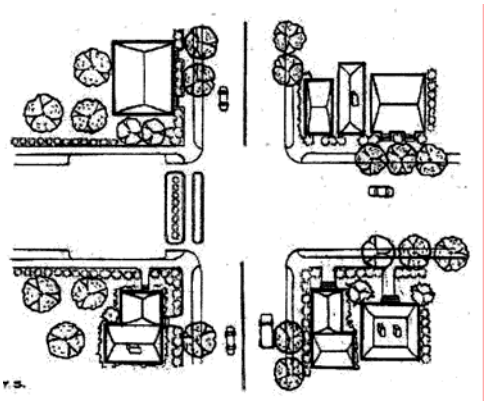




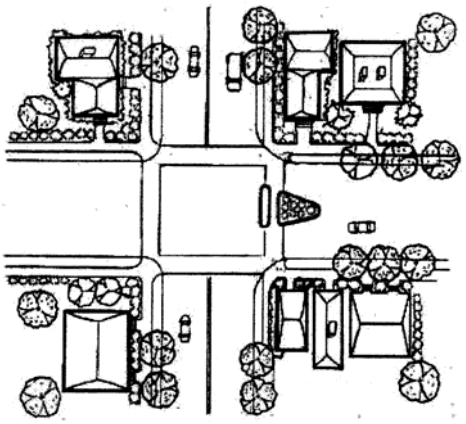
Raised intersection

Diagonal Diverters

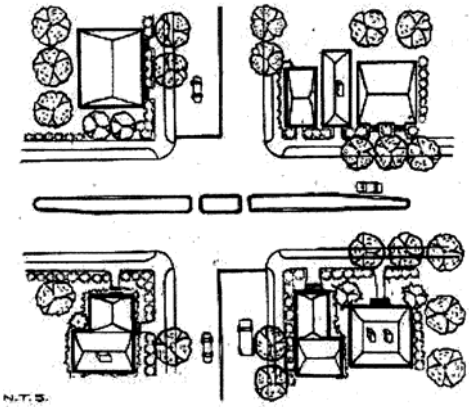




Right In – Right Out

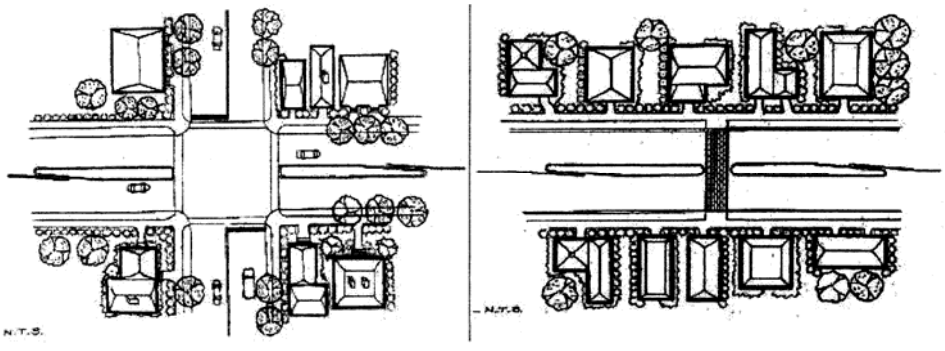


Median Through Intersection



Street Closure

Medians / Pedestrian Refuge



Group No. 1 Name:_____

Centreville Traffic Planning Study
Community Listening Tours – August 18, 2004

Group Listening Tours to Measure Public Support for Traffic Calming

Individual and Group Listening Tours/Interviews: JMT will conduct individual and group listening sessions in order to measure the community's support for traffic calming measures. These sessions will consist of discussion around key issues with the use of baseline questions to focus discussion around preferences, needs and desires for traffic calming and traffic safety improvements. This discussion will be augmented with a photo/graphic index of various traffic calming measures so that individuals and groups can become more educated about traffic calming measures as well as to address or alleviate concerns with respect to traffic calming and traffic safety improvements. Note, meeting/discussions will take place outside along the corridor, so that observations can be made while discussions take place.

Issues/Concerns (expressed to date):

- Traffic Safety – Traffic Signal Option
- Traffic Safety/Calming – Bulb-outs with Aesthetic Improvements
- Emergency Vehicle Access
- Maintenance of Traffic Calming Improvements
- Poor Visibility with Bulb-outs (for vehicular and pedestrian traffic)
- Speeding Motorists
- Passing on the right side of traffic stopped to make a left turn.
- Northbound left from Owls Nest Road onto Route 52 is dangerous and wait time is considerable.
- Flower pots and bumper-blocks are dangerous for cyclists and runners.
- Center islands are a traffic hazard.
- Consider a 4-way stop at Owls Nest and Route 52
- Traffic Signals at Owls Nest and 52, Snuff Mill and 52, Center Meeting and 52 and Burnt Mill and 52.
- Flower pots are an obstacle for those trying to pass on right when traffic is stopped to make left hand turns.

1. What are key issues or concerns with respect to the Route 52 Corridor through Centreville?

_____

_____

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_____

2. What are your concerns with respect to the intersection of Twaddell Mill Road/Owl's Nest & Route 52?

_____

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3. Other Comments:

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_____

_____

Mail to: April Showers, AICP
160 Red Rock Road
York, PA 17402
Phone: 1 800 266-5488
FAX: (717) 266-8882
Email: ashowers@jmt.com

APPENDIX B

OCTOBER 25, 2004 PUBLIC WORKSHOP - COMMENT SUMMARY

Centreville Transportation Planning Study

October 25, 2004

DelDOT

JMT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future

Status Report on Kennett Pike Improvements

- History of Improvements
- Recent Feedback
- Project Goals
- DelDOT Studies to Date
- Packaging of Potential Solutions
- Next Steps

Tonight's Goals

- Update / Inform Public on Current Status
- Review Studies Completed to Date
- Discuss Potential Packages of Solutions
- Layout Schedule for Further Work

Kennett Pike Transportation Project History

- Sidewalk / Drainage Improvements 1937-1994
- Gateway Medians - Spring, 2003
- Temporary Bulb-outs - Fall, 2003
- In-Road Pedestrian Signs - Summer, 2004

August 2004 Interviews

- Eight Separate Groups – 35 Participants
- Cross Section of Stakeholders
- Feedback received / Consensus Building
  - Temporary Improvements
  - Potential Permanent Improvements

August 2004 Interviews

- What We Heard
  - Traffic Speeds too high through the Village
  - Temporary Bulb-outs are not in keeping with Village aesthetic
  - Temporary Bulb-outs create sight distance problems
  - Side Street Access onto Kennett Pike is difficult
  - Traffic Signals are needed and are desirable
  - Traffic Signals are neither needed nor desirable

August 2004 Interviews

- Consensus Items
  - Temp Bulb-outs need to be taken to the next step. They are inconsistent with Village aesthetic, block visibility, and are perceived to be unsafe
  - Need to improve side street access onto Kennett Pike
  - Traffic speeding through the Village
  - Village Character must be maintained
  - Community is anticipating permanent improvements

September 2004 Kennett Pike Association Meeting

- Facilitated group discussion to identify issues, concerns and objectives
- KPA and residents of Greater Centreville area
- Voice ideas and concerns to reach consensus on objectives for permanent traffic calming solutions

September 2004 Kennett Pike Association Meeting – What we heard

- Issues and concerns:
  - access
  - process
  - traffic calming
  - community devel.
  - safety
  - aesthetics
  - traffic management (signals)
  - alternative routes
- Pros and Cons of traffic signals vs. no traffic signals
- Prioritization of issues, concerns and possible solutions

Kennett Pike Association Meeting Consensus Items

- Consensus on traffic signals versus no traffic signals was not reached
- DE and PA must focus on expansion of transit facilities
- Access from side streets onto Kennett Pike needs to be improved
- Traffic volumes are high and volume is expected to increase
- Community is anticipating permanent improvements

Project Goals

- Slow Down Traffic in the Village
- Improve Pedestrian Safety
- Improve Access from Side Streets
- Coordinate Enhancements with Centreville Village Plan

DelDOT Traffic Studies to Date

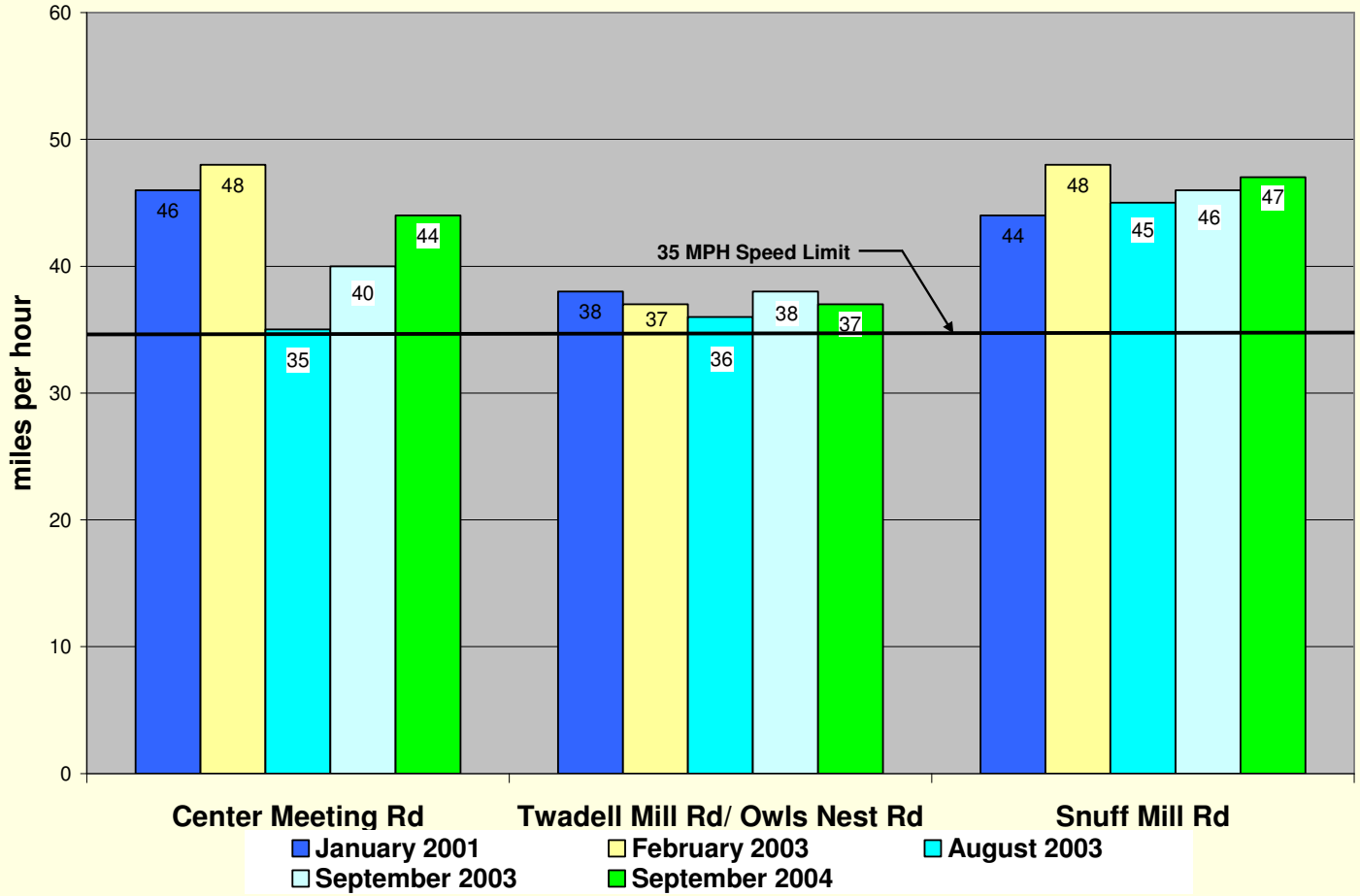
- Safety Study - 2001
- Speed Studies – 2001 to 2004
- Signal Location Studies – Nov 2002
- Signing Inventory Study 2003
- Peak Hour Delay Studies – 2004
- Signal Warrant Studies – Need for signals investigated in 2001, but much has changed since then, including the methodology for signal warrant studies. Signals revisited in 2004.

Speed Studies

- Owl's Nest Rd / Twaddell Mill Rd Intersection speeds have been slightly above posted 35 mph
- Gateways initially reduced speeds
- Speeds have returned to pre-gateway levels

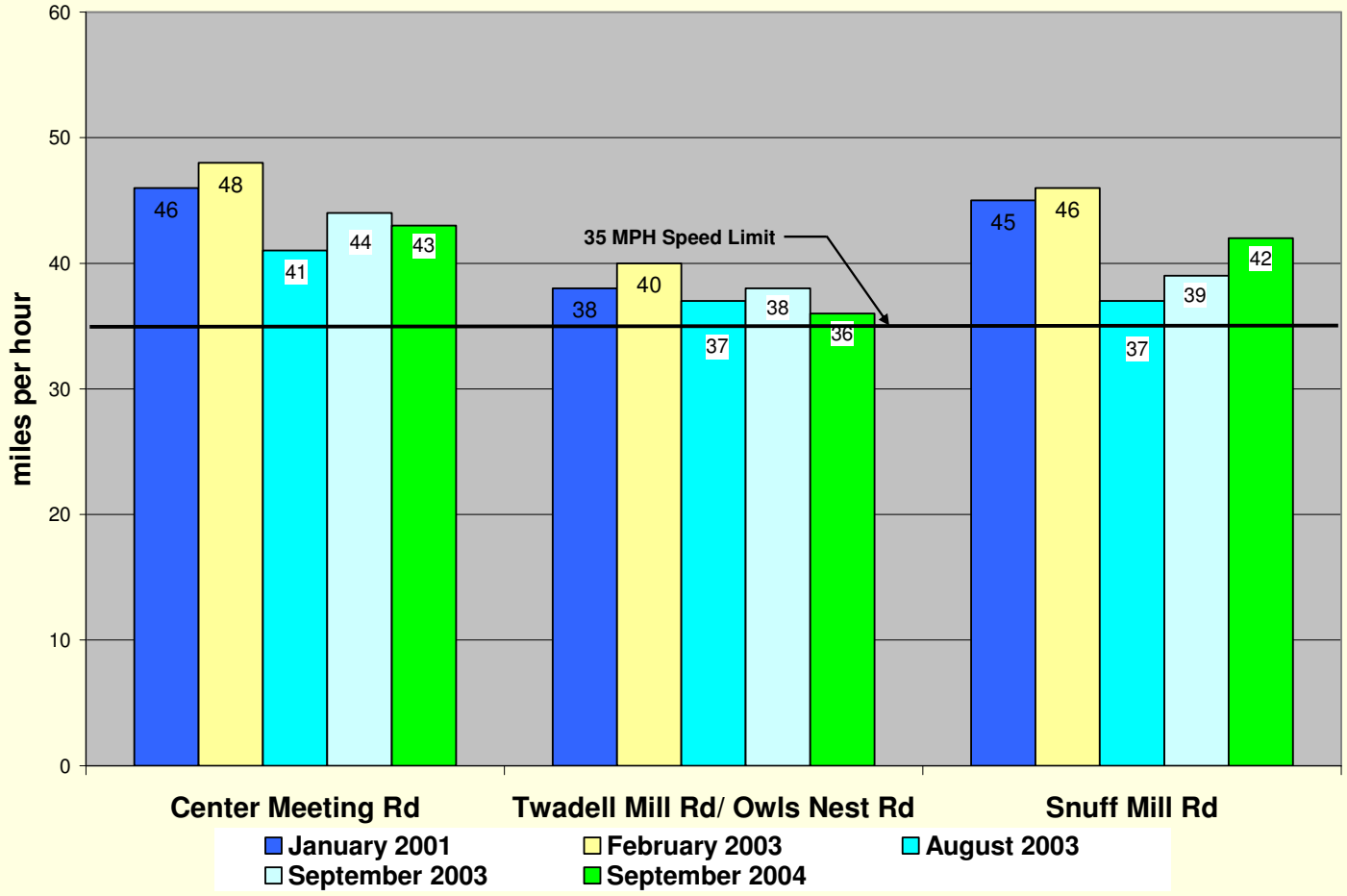
Speed Studies

Figure 1 - 85th Percentile Speeds
Northbound SR 52/Kennett Pike



Speed Studies

Figure 2 - 85th Percentile Speeds
Southbound SR 52/Kennett Pike



Peak Hour Delay Studies

- September 2004 Study – Owls Nest Road/ Twaddell Mill Road Intersection
  - Average Delay Eastbound on Owls Nest Rd was 40 seconds (8 Vehicles longest queue)
  - Average Delay Westbound on Twaddell Mill Rd was 24 seconds (2 Vehicles longest queue)

Signal Location Studies

- Nov 2002 Study Examined Signals at Snuff Mill and Center Meeting Road
- Looked at Speed Reduction, Gaps for Pedestrian Crossing, and Through Traffic Delays
- Conclusions:
  - Installing signals will not provide ample gaps for pedestrian crossings in the heart of the Village
  - Signals will not significantly reduce speeds on Kennett Pike
  - Signals will cause through delays on Kennett Pike to Increase by an average of 20 seconds
  - Signal at Center Meeting will address high delays on the westbound approach to the intersection but will create delays and queues on Route 52.

Signal Warrant Studies

- Methodology for signal warrants changed after 2001
- 2004 Study at Owl's Nest Rd and Twaddell Mill Road indicated intersection did not meet signal warrants
- 2004 Study at Snuff Mill and Center Meeting indicated signals could be supported

Scenic and Historic Byway Designation

- Phase I Completed - Application Approved as Designated Byway Spring, 2002
- Phase II Ongoing - Overall Corridor Plan being developed
- Plan will help define future land use and transportation improvements for the corridor

Packaging of Concepts

- Diversity of Goals requires packaging of many elements
- Analysis of package as a whole is required before a recommendation is made and an Option chosen
- Process is dynamic

Concept Packages

- Identify Elements
  - Bulb-Outs
  - Intersection Improvements
  - Roundabouts
  - Traffic Signals
  - In-road Pedestrian Signs
  - Signage
  - Left Turn Lanes
  - Narrowing of Lanes
  - Consistent Typical Section

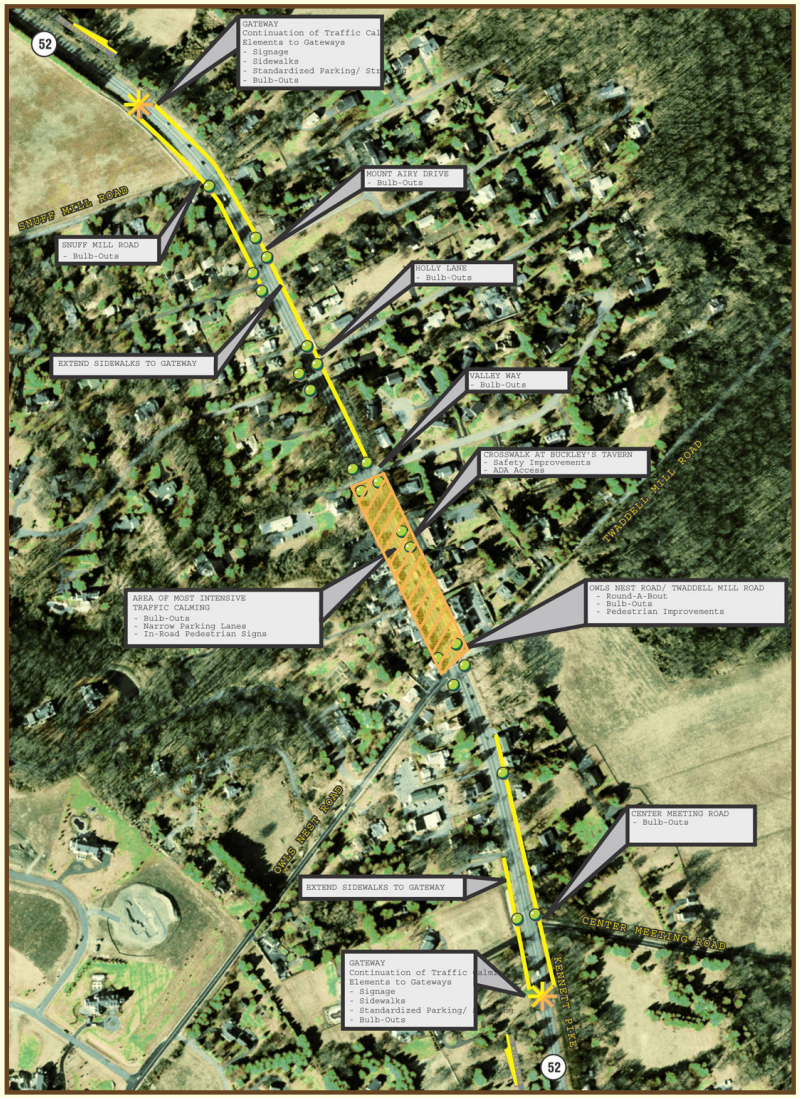
Concept Packages *(cont.)*

- Analyze Concept Packages
  - Speed Reduction
  - Safety
  - Delays
  - Access
  - Impact on Parking
  - Impact on Congestion
  - Impact on Pedestrians
  - Impact on Bikes
- Presentation
  - Final Recommended Concepts
  - Pros & Cons

Concept Packages
Concept 1

- Extend Treatments to Gateways
  - Sidewalks
  - Standardized Parking
  - Bulb-outs
  - Additional Crosswalks
- Refine Bulb-out Locations
- Highest Level of Traffic Calming in Village Center
- Roundabout at Owl's Nest / Twaddell Mill Road

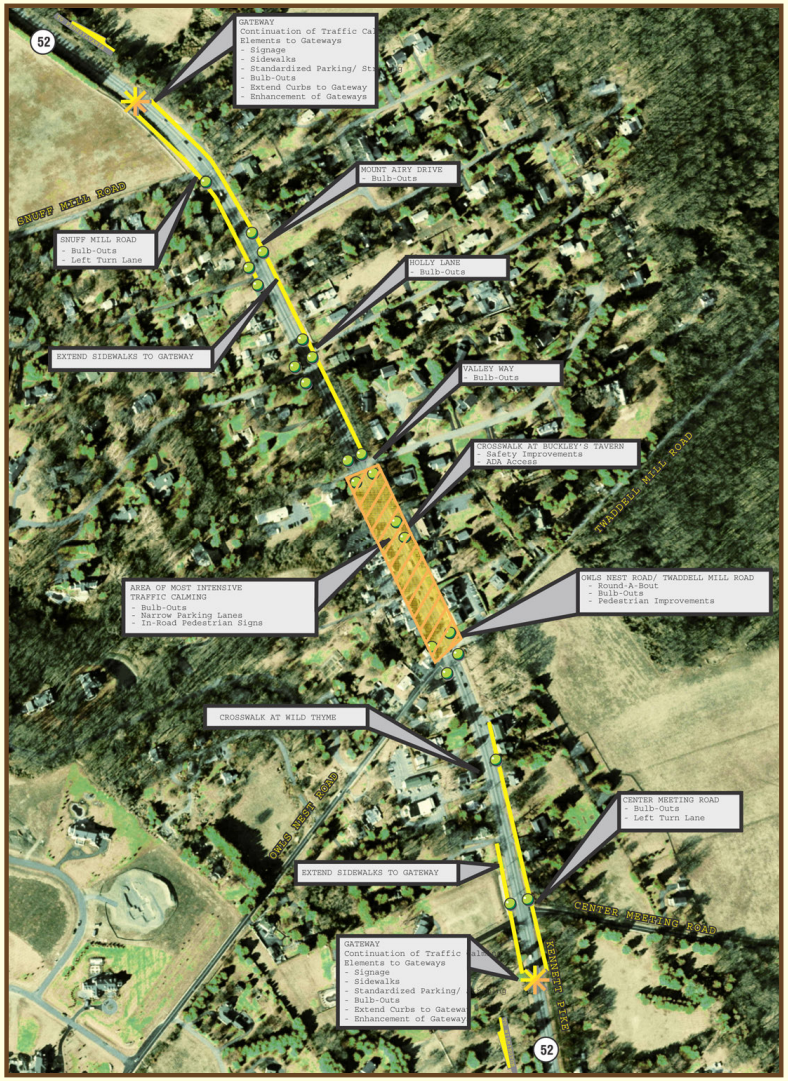
Concept-1 Package



Concept Packages
Concept 2

- Same Elements as Concept 1
- Curbs extended to Gateways
- Enhancement of Gateways
- Intersection Improvements at Center Meeting Road
- Turn lane at Snuff Mill Road

Concept-2 Package



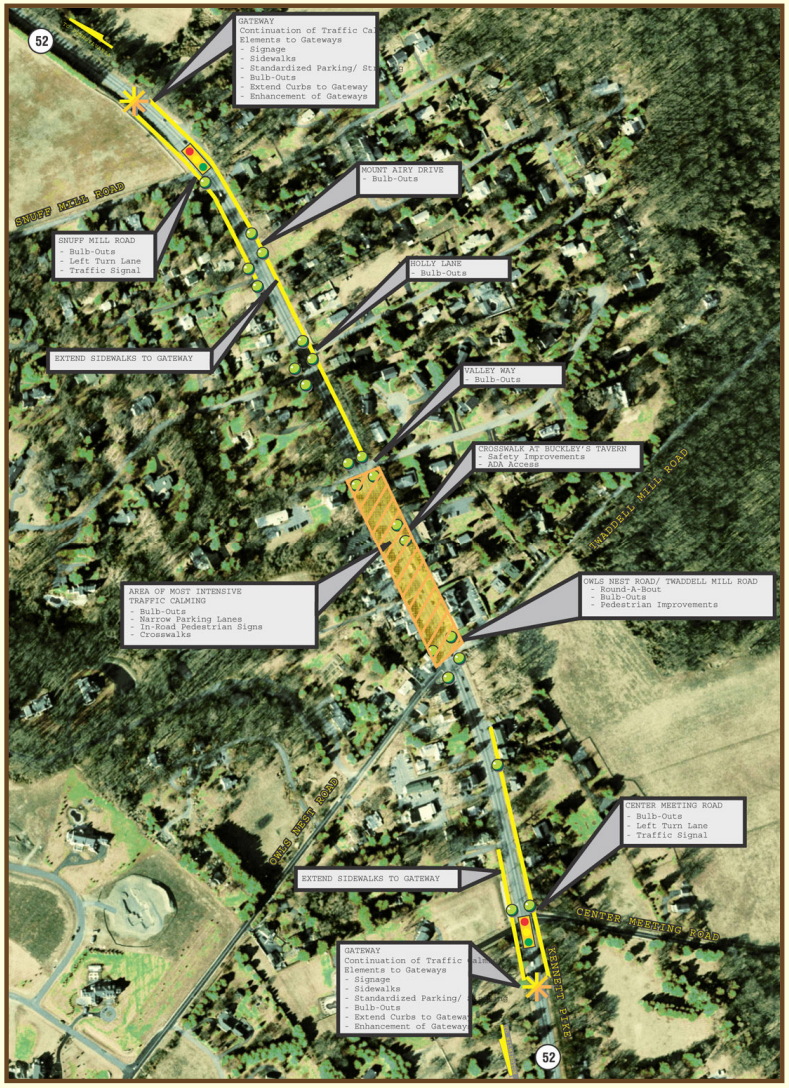
DelDOT

JMT
Engineering A Brighter Future

Concept Packages
Concept 3

- Same Elements as Concept 2
- Traffic Signal at Center Meeting Road
- Traffic Signal at Snuff Mill Road

Concept-3 Package



Next Steps

- Develop and Analyze Concept Packages
- Present Packages to Public
- Final Concept Selection
- Completion by March 2005
- Project Pipeline
  - Prioritization
  - Funding

APPENDIX C

JULY 13, 2005 PUBLIC WORKSHOP - COMMENT SUMMARY

Centreville Transportation Planning Study

July 13, 2005

DelDOT

JMT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future

Tonight's Goals

- Review of Project Goals
- Review of Project History
- Summarize Recent Traffic Studies
- Review Concepts from October, 2004 Meeting
- Present Preferred Solutions
- Define Next Steps

Project Goals

- Slow Down Traffic in the Village
- Improve Safety For All Users
- Improve Access from Side Streets
- Coordinate Enhancements with Centreville Village Plan

Kennett Pike Transportation Project History

- Sidewalk/Drainage Improvements – 1937 - 1994
- Gateway Medians - Spring, 2003
- Temporary Bulb-outs - Fall, 2003
- In-Road Pedestrian Signs - Summer, 2004

DelDOT Traffic Studies to Date

- Safety Study - 2001
- Speed Studies – 2001 to 2004
- Signal Location Studies – Nov 2002
- Signing Inventory Study 2003
- Peak Hour Delay Studies – 2004
- Signal Warrant Studies – Initiated in 2001 and Revisited in 2004.

Recent Public Involvement

- August, 2004 – Interviews
- September, 2004 – Kennett Pike Association Meeting
- October, 2004 – Public Meeting Presentation
- May, 2005 – Centreville Civic Association Annual Meeting

2005 Traffic Study

- The Average Daily Traffic (ADT) Along DE 52 ranges from 13,600 Vehicles Per Day (vpd) to 18,000 vpd
- Accidents – In three years, 3 angle accidents, 9 rear end accidents
- Warrants – signal warrants met at Center Meeting Road only.

2005 Traffic Study

- Delay Study

Location	AM		PM	
	Avg. Delay (Sec/Veh)	Level Of Service	Avg. Delay (Sec/Veh)	Level Of Service
Center Meeting Road	27.4	C	88.1	F
Owl's Nest Road	43.9	D	NA	NA
Snuff Mill Road	33.5	C	NA	NA

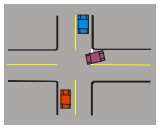
2005 Traffic Study

What is Level of Service (LOS)?

Level of Service is a quantitative measure of traffic operational conditions. Ranges of operation are defined for each type of roadway section (signalized intersections, freeways, ramp junctions and weaving sections) and are related to the amount of traffic demand at a given time as compared to the capacity of that type of roadway section. Six levels of service are defined for each type of roadway section and are given letter designations from A to F, with A representing good operating conditions and F representing unsatisfactory operating conditions.

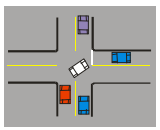
Intersection

- Highly stable, free-flow condition with little or no congestion
- Delay: <10 seconds/vehicle



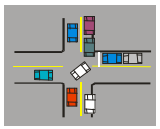
LOS A

- Stable, free-flow condition with little congestion
- Delay: 10 to 20 seconds/vehicle



LOS B

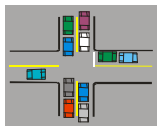
- Free-flow condition with moderate congestion
- Delay: 20 to 35 seconds/vehicle



LOS C

Intersection

- Approaching unstable condition with increasing congestion
- Delay: 35 to 55 seconds/vehicle

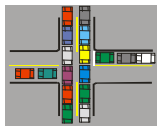


LOS D

- Unstable, congested condition
- Delay: 55 to 80 seconds/vehicle

LOS E

- Stop and go
- Delay: >80 seconds/vehicle



LOS F

2005 Traffic Study

- Speed Study

Location	Posted Speed (mph)	NB 85th Percentile Speed (mph)	SB 85th Percentile Speed (mph)
PA line to Snuff Mill Road	45	43	44
Snuff Mill Road to Owl's Nest Road	35	34	34
Owl's Nest Road to Center Meeting Road	35	45	41

2005 Traffic Study

- Existing Signing Concerns:
  - Signs Blocked by Plantings
  - Insufficient "Reduced Speed Ahead" Signage
  - Insufficient Size of Signs
- DelDOT is Investigating Solutions to Immediately Address These Concerns

October, 2004 Concepts

During the October, 2004 Public Meeting Presentation, Three (3) Concept Packages Were Identified. Further Studies Have Been Completed to Identify the Advantages & Disadvantages of the Concepts.

Concept Packages
Concept 1

- Extend Treatments Between Gateways
  - Sidewalks
  - Bulb-outs
  - Standardized Parking
  - Improve Crosswalks
- Refine/Formalize Bulb-out Locations
- Provide Highest Level of Traffic Calming in Village Center
- Investigate Roundabout at Owl's Nest / Twaddell Mill Road

Analysis of Concept 1

- Advantages
  - Sidewalk Extension & Bulbouts Improve Pedestrian Safety
  - Improved Crosswalks Highlight Pedestrian Safety
  - Roundabout Reduces Side Street Delays
  - Roundabout Provides Location for DART Bus U-Turn
- Disadvantages
  - Roundabout Results in Significant Property Impacts
    - Potential Historic & Park Impacts
  - Loss of On-Street Parking on SR 52
  - Roundabout Compromises Pedestrian Safety at this Location
  - More Time Required for Engineering/Construction

Concept Packages
Concept 2

- Incorporates Elements of Concept 1
- Additional Elements:
  - Curbs extended Between Gateways
  - Left Turn Lane at Center Meeting Road
  - Right Turn Lane From Center Meeting Road
  - Left Turn lane at Snuff Mill Road

Analysis of Concept 2

- Advantages
  - Left Turn Lanes Reduce Potential for Rear-End Accidents
  - Left Turn Lanes Eliminate Thru Traffic Passing on Shoulders/Across Bike Lanes
  - Curbing Provides Additional Traffic Calming
- Disadvantages
  - Left Turn Lanes do Not Address Perceived Speed Problem
  - Left Turn Lanes Create Perception of Three-Lane Roadway in Village Center
  - Curbing Requires Drainage/SWM Requirements
    - Additional Costs and Engineering

Concept Packages
Concept 3

- Incorporates Elements of Concept 2
- Additional Elements:
  - Traffic Signal at Center Meeting Road
  - Traffic Signal at Snuff Mill Road

Analysis of Concept 3

- Advantages
  - Helps Alleviate Left Turn Queues on 52 and Right Turn Queues at Center Meeting
  - Improves Side Street Access
- Disadvantages
  - Signal Will Create Queue @ Snuff Mill Road
  - Aesthetic Impacts to Village as a Result of Signals
  - Signal @ Center Meeting & Roundabout @ Owl's Nest Would Create Operational Concerns
    - Traffic Queue From Signal Into Roundabout

Preferred Concept

A Preferred Concept was Developed Based on Evaluation of the 3 Original Concepts and Recent Traffic Analysis.

Preferred Concept - Curb & Sidewalk

- Extend Treatments Between Gateways
  - Complete Curb & Sidewalk Network
  - Install Bulb-Outs
  - Improve Existing Crosswalk Visibility, ADA Access
  - Standardize Parking Width/ Markings

Preferred Concept - Roundabout at Center Meeting Road

- Provide Single Lane Roundabout at Center Meeting Road to Enhance/ Extend Gateway Entering Village From the South
  - Ideal for High Left Turns
  - Reduces Speeds
  - Creates Gaps in Traffic
    - Improves Operations @ Owl's Nest/ Twaddell Mill Intersection

Preferred Concept - Roundabout at Snuff Mill Road

- Provide Single Lane Roundabout at Snuff Mill Road to Create Gateway Entering Village From the North
  - Reduces Speeds
  - Creates Gaps in Traffic
    - Improves Operations @ Owl's Nest/ Twaddell Mill Intersection
  - Provides Location for DART U-Turn

Next Steps

- Obtain Public Feedback
- Finalize Preferred Concept
- Include in "Project Pipeline"

July 13, 2005 4:00 PM Presentation
Centreville Transportation Plan

Comments & Questions

Representative Hudson requested a copy of the sign in sheets.

Comment about speed studies – Pat Cannon felt that the speeds going north from Owl's Nest to Snuff Mill and the Islands are actually traveling faster than the study results. Gene Straub elaborated on the locations where speeds were measured and the results.

Can the flower pots go now that you have a concept that may move forward? DelDOT – NO, they serve a function and will remain until the final solution will be put in place.

Is there a possibility of pedestrian lighting? Del DOT – Possible.

What will the Bulb-outs look like? The design, materials, etc. will be determined during the design.

Make sure the bulb-outs are at their best location, safest and other factors? DelDOT: actual locations will be decided in design phases.

Reflectors during night time are distracting? DelDOT: they are only part of the temporary solution.

DelDOT Comment – speed limit signs along corridor need to be modified. The sign in PA will be removed. Some signs are blocked by branches – DelDOT will be conducting some maintenance.

DelDOT – maintenance will be removing the unsafe Bulbouts and maintain the temporary Bulbouts.

When will this project be implemented? DelDOT is not able to fund design. There is no money programmed for this project.

Will the roundabouts be easy to install for the preferred concept? DelDOT – The concepts are not fully engineered, the extent of row required for roundabouts will be determined during the design.

Several participants commended DelDOT on a good job so far.

The roundabout in Rehoboth is an example of how they work successfully. There are two roundabouts on the DelDOT headquarters site.

How will the roundabout at Center Meeting help the heavily northbound traffic on 5S and the volume on center meeting? At first there is a time period to get accustom to the roundabout and cars from both roads have the opportunity to keep moving.

The roundabouts proposed – the one at the north? How will that impact the property owners of small lots (property owner to the north close to the proposed roundabout at Snuff).

Parking lanes may get narrow? Is there a benefit to put in a narrow median thru the center of the village? DelDOT: the narrow median typically has more disadvantages that pluses. DelDOT would like to consider more space for sidewalks or landscaping.

Is the width the only reason may not considering angled parking? Gene – angled parking is not safe.

Is there the possibility to provide a left turn lane at the Owl's Nest on Rt 52 to Gain access to Owl's Nest? DelDOT – have not considered this.

Pedestrians on the sidewalks and crossing the street slows traffic. DelDOT: concept considers sidewalks and pedestrian crossings. The focus of all concepts was to accommodate pedestrians.

Owl's Nest on Rt 52 – consider removal or adjustment of temporary Bulbout? DelDOT: provide this comment on form and they (DelDOT) will consider when looking at maintenance and adjustment of temporary Bulbouts.

July 13, 2005 5:30 PM Presentation
Centreville Transportation Plan

Comments & Questions

Could just provide the longest delays (underlying data) for the delay table. Questions about how the average is calculated. The group would like to see the data.

Comment after the 4:30 presentation – observe traffic on Thursdays during the farmers market (at the park – Rt 52/Twaddell/Owl's Nest).

State Police usually sit in front of Buckley's to provide traffic control and to enforce speed limits. This may be an explanation for the average speeds and areas where average speeds increase.

Will poor visibility caused by planters be addressed?

Are there roundabouts on Delaware roads? DelDOT – Rehoboth, 2 on DelDOT campus, Mifflin Road in Dover (More of a Circle at 3 way intersection)

How does a roundabout work? All traffic entering the roundabout has the right of way. Will the roundabout create gaps? Increased access to side roads? Northbound/ Southbound thru traffic how do the gaps get created to provide access for traffic at the roundabout as well as for intersecting streets between the roundabouts.

When the property at the corner of Owl's Nest/Rt 52 was vacant Rich Abbott contacted DelDOT to acquire property for a roundabout.

The scale of the roundabouts should be in character with the village. They should not be oversized.

Rt 52/Owl's Nest/ Twaddell Mill – portion of park that would be affected by a roundabout is underutilized.

Roundabout at the village square is not the best solution for pedestrian movements.

Suggestion to utilize an expert from England to look at the village to size the roundabouts and to utilize flexibility in Design Standard – Flexibility in Design.

Have the concepts been modeled? Yes, example displayed on computer.

Concept 3 – How does the traffic signal create a que condition? The backups on Rt 52 will grow and delays will increase at Center Meeting.

How is a proposed signal at Center Meeting different than the signals further south on Rt 52? DelDOT – can not tell you.

Was the traffic light at the school or museum analyzed to see if it could create enough gaps to affect Rt 52 to allow access from side streets on to Rt 52? Jon described that modeling a signal at Snuff Mill is the same as meddling a light at the Centreville School and significant gaps would be created, but backups will occur.

How long would the light cycle be to trigger a 1500 ft backup – 30 secs. – Gene.

Since there is no money to build anything, would it make sense to try some of these options to see the results – such as turn on the Centreville signal and museum signal full time.

Could the traffic engineers from DelDOT with walkie talkies triggering the lights to see what happens? Do we have smart lights?

Concept (preferred) does the roundabout affect two driveways? Yes – Rich Abbott – It Will Not! Rich – Spending a lot of money for a 3-way intersection – traffic mistaking a driveway as an extension of center meeting road.

What are you going to do about the pots and visibility? Traffic will be looking at visibility and will move them.

Could Centreville citizens get the list of pots that will be moved? These sites will be listed on DelDOT website.

The presentation will be posted on DelDOT website.

Raw data can be posted on website.

Rich Abbott – What historically initiated this project, was traffic calming – primary focus – then access to Rt 52 via side streets. Accidents at center meeting are much greater than these reported – most accidents at Center Meeting Road is due to traffic speeds. Traffic on Rt 52 is moving too fast – none of the concepts address this issue. Rear end accidents are due to excessive traffic speeds. Consider a phased approach to solution – Phase I Free Solutions. Phase 2 – Traffic calming measures. Then, Phase 3 – Other improvements.

The posted speed limit is too high. Drop the speed will make it easier to get out from the side streets. Have some police direct traffic during the busiest time. Use revenue from speed enforced to control traffic in Centreville. Hire a village cop.

Centreville is not incorporated so traffic enforcement revenue can not be accounted to Centreville to pay for enforcement.

If Centreville incorporates allows Centreville to be eligible to reduce speed limit to 25 MPH.

Next step – relieve comments and see where to go next. DelDOT will see if the traffic unit will allow the phased approach and try freebees.

Preferred option will cost millions. Why shouldn't DelDOT give Centreville $1,000.00 to try traffic enforcement? Can DelDOT get an answer to this question?

KPA comments received – Bulbouts prevent ability to make a quick right turn onto Kennett Pike. All concepts show Bulbouts that will prevent you to get out.

Pot at Twaddell/Rt52 (SE Corner) needs to be moved – blocks visibility.

What is next step. Go thru comment to determine next step.

Q:\SMD\302385_11Centreville_PL\Dept\Planning\July05_verbal_comments2.doc

APPENDIX D

INTERSECTION DELAY DATA

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.:
Job No.: 302-385.00

Path: C:\Documents and Settings\GARY\My Documents\

Location: DE 52 @ Center Meeting Road
Date: 5/17/2005
Direction: WB

Weather: warm and clear
Recorder: nan
Start Time: 16:45
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	16:45	16:46	0	0	0	0	0	4
2	16:46	16:47	3	2	1	1	7	0
3	16:47	16:48	0	1	0	0	1	1
4	16:48	16:49	1	2	3	6	10	0
5	16:49	16:50	8	8	6	9	6	0
6	16:50	16:51	10	13	10	5	6	0
7	16:51	16:52	2	4	4	6	8	1
8	16:52	16:53	3	1	3	2	3	0
9	16:53	16:54	2	3	4	3	5	0
10	16:54	16:55	2	1	2	0	4	0
11	16:55	16:56	0	5	5	4	6	0
12	16:56	16:57	4	2	1	0	1	0
13	16:57	16:58	3	2	3	3	8	0
14	16:58	16:59	4	8	4	2	9	0
15	16:59	17:00	1	0	3	2	4	2
SUBTOTAL			43	52	49	43	78	8
TOTAL			187				86	

Total Delay = Total Number Stopped X Sampling Interval

= 187 X 15 = 2805 Veh-Sec/ 3600 = 0.78 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles

= 2805 / 78 = 36.0 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume

= 2805 / 86 = 32.6 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume

= 78 / 86 = 0.9

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0
Job No.: 302-385.00
Path: C:\Documents and Settings\GARY\My Documents\

Location: DE 52 @ Center Meeting Road
Date: 5/17/2005
Direction: WB
Weather: warm and clear
Recorder: nz
Start Time: 4:45:00 PM (Military)

Location Characteristics:

Number Of Lanes : 1
Number Of Pedestrians: 0
Traffic Control Devices : SS
Type of Delay (Fixed/ Operational):
Turning Lanes 0
Parking No
Transit Stop (Y/N) No

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	17:00	17:01	1	1	3	3	6	0
2	17:01	17:02	0	3	2	3	5	0
3	17:02	17:03	4	2	3	1	6	2
4	17:03	17:04	0	2	3	5	7	0
5	17:04	17:05	6	4	5	1	5	0
6	17:05	17:06	0	2	2	4	4	0
7	17:06	17:07	0	0	1	2	3	0
8	17:07	17:08	3	8	9	7	9	0
9	17:08	17:09	5	6	7	5	6	0
10	17:09	17:10	5	3	4	2	6	0
11	17:10	17:11	1	3	2	5	8	0
12	17:11	17:12	5	2	5	9	10	0
13	17:12	17:13	10	10	9	10	8	0
14	17:13	17:14	12	12	12	18	12	0
15	17:14	17:15	18	16	16	18	5	0
SUBTOTAL			70	74	83	93	100	2
TOTAL			320				102	

Total Delay = Total Number Stopped X Sampling Interval

= 320 X 15 = 4800 Veh-Sec/ 3600 = 1.33 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles

= 4800 / 100 = 48.0 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume

= 4800 / 102 = 47.1 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume

= 100 / 102 = 1.0

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Center Meeting Road **Weather:** warm and clear
Date: 5/17/2005 **Recorder:** nan
Direction: WB **Start Time:** 4:45:00 PM
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	17:15	17:16	0	0	0	0	0	0
2	17:16	17:17	0	0	0	0	0	0
3	17:17	17:18	15	12	0	0	15	0
4	17:18	17:19	0	0	0	0	1	0
5	17:19	17:20	16	0	0	0	16	0
6	17:20	17:21	16	17	14	12	2	0
7	17:21	17:22	12	11	12	10	1	0
8	17:22	17:23	9	7	3	5	5	0
9	17:23	17:24	10	8	8	3	6	0
10	17:24	17:25	9	9	7	7	8	0
11	17:25	17:26	6	4	7	2	5	0
12	17:26	17:27	0	2	0	0	1	0
13	17:27	17:28	1	1	2	2	2	0
14	17:28	17:29	2	2	1	8	8	0
15	17:29	17:30	7	8	7	8	6	0
SUBTOTAL			103	81	61	57	76	0
TOTAL			302				76	

Total Delay = Total Number Stopped X Sampling Interval
= 302 X 15 = 4530 Veh-Sec/ 3600 = 1.26 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 4530 / 76 = 59.6 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 4530 / 76 = 59.6 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 76 / 76 = 1.0

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Center Meeting Road **Weather:** warm and clear
Date: 5/17/2005 **Recorder:** nan
Direction: WB **Start Time:** 16:45
(Military)

Location Characteristics:

Number Of Lanes : 1 Turning Lanes 0
Number Of Pedestrians: 0 Parking No
Traffic Control Devices : SS Transit Stop (Y/N) No
Type of Delay (Fixed/ Operational):

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	17:30	17:31	9	8	7	4	5	0
2	17:31	17:32	6	7	12	12	2	0
3	17:32	17:33	15	14	14	14	3	0
4	17:33	17:34	15	16	15	15	4	0
5	17:34	17:35	15	16	18	19	1	0
6	17:35	17:36	18	16	17	18	1	2
7	17:36	17:37	20	16	22	22	2	2
8	17:37	17:38	24	21	24	24	3	1
9	17:38	17:39	23	24	22	22	0	0
10	17:39	17:40	22	22	23	21	4	4
11	17:40	17:41	20	22	18	18	4	1
12	17:41	17:42	19	20	19	20	5	0
13	17:42	17:43	20	20	19	19	1	0
14	17:43	17:44	20	19	18	19	0	0
15	17:44	17:45	18	17	16	13	6	1
SUBTOTAL			264	258	264	260	41	11
TOTAL			1046				52	

Total Delay = Total Number Stopped X Sampling Interval
= 1046 X 15 = 15690 Veh-Sec/ 3600 = 4.36 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 15690 / 41 = 382.7 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 15690 / 52 = 301.7 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 41 / 52 = 0.8

Total Hour

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0
Job No.: 302-385.00
Path: C:\Documents and Settings\GARY

Location: DE 52 @ Center Meeting Road
Date: 5/17/2005
Direction: WB
Weather: warm and clear
Recorder: nan
Start Time: 16:45
(Military)

Location Characteristics:

Number Of Lanes : 1
Number Of Pedestrians: 0
Traffic Control Devices : SS
Type of Delay (Fixed/ Operational): 0
Time Interval (hh:mm): 0:15

Turning Lanes 0
Parking No
Transit Stop (Y/N) No

No	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	16:45	17:00	43	52	49	43	78	8
2	17:00	17:15	70	74	83	93	100	2
3	17:15	17:30	103	81	61	57	76	0
4	17:30	17:45	264	258	264	260	41	11
5	17:45	18:00						
6	18:00	18:15						
7	18:15	18:30						
8	18:30	18:45						
9	18:45	19:00						
10	19:00	19:15						
11	19:15	19:30						
12	19:30	19:45						
13	19:45	20:00						
14	20:00	20:15						
15	20:15	20:30						
SUBTOTAL			480	465	457	453	295	21
TOTAL			1855				316	

Total Delay = Total Number Stopped X Sampling Interval
= 1855 X 15 = 27825 Veh-Sec/ 3600 = 7.73 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 27825 / 295 = 94.3 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 27825 / 316 = 88.1 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 295 / 316 = 0.9

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.:
Job No.: 302-385.00

Path: C:\Documents and Settings\GARY\My Documents\

Location: DE 52 @ Owl's Nest Road
Date: 5/12/2005
Direction: EB

Weather: warm and clear
Recorder: SSG
Start Time: 7:15
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:15	7:16	0	0	0	1	1	1
2	7:16	7:17	1	0	1	0	1	0
3	7:17	7:18	0	1	1	2	2	0
4	7:18	7:19	1	1	1	1	0	0
5	7:19	7:20	1	1	0	1	2	1
6	7:20	7:21	1	1	0	0	2	0
7	7:21	7:22	0	1	0	0	0	0
8	7:22	7:23	1	0	0	0	1	0
9	7:23	7:24	0	0	0	0	0	0
10	7:24	7:25	0	0	3	3	3	1
11	7:25	7:26	2	1	1	1	2	0
12	7:26	7:27	1	0	1	2	2	0
13	7:27	7:28	3	2	1	3	4	0
14	7:28	7:29	2	3	3	1	2	0
15	7:29	7:30	1	0	0	0	0	3
SUBTOTAL			14	11	12	15	22	6
TOTAL			52				28	

Total Delay = Total Number Stopped X Sampling Interval

= 52 X 15 = 780 Veh-Sec/ 3600 = 0.22 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles

= 780 / 22 = 35.5 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume

= 780 / 28 = 27.9 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume

= 22 / 28 = 0.8

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Owl's Nest Road **Weather:** warm and clear
Date: 5/12/2005 **Recorder:** SSG
Direction: EB **Start Time:** 0
(Military)

Location Characteristics:

Number Of Lanes : 1 Turning Lanes 0
Number Of Pedestrians: 0 Parking No
Traffic Control Devices : SS Transit Stop (Y/N) No
Type of Delay (Fixed/ Operational):

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:30	7:31	0	0	0	1	1	0
2	7:31	7:32	1	1	1	2	2	0
3	7:32	7:33	1	0	0	0	0	0
4	7:33	7:34	1	0	1	0	2	2
5	7:34	7:35	1	2	2	2	2	0
6	7:35	7:36	5	3	1	0	3	0
7	7:36	7:37	1	1	0	0	2	0
8	7:37	7:38	1	0	0	2	3	0
9	7:38	7:39	2	4	4	2	2	0
10	7:39	7:40	0	0	0	2	2	2
11	7:40	7:41	1	0	0	0	0	2
12	7:41	7:42	0	1	0	0	1	0
13	7:42	7:43	0	2	1	2	4	0
14	7:43	7:44	0	0	0	0	0	0
15	7:44	7:45	0	0	0	0	0	1
SUBTOTAL			14	14	10	13	24	7
TOTAL			51				31	

Total Delay = Total Number Stopped X Sampling Interval

= 51 X 15 = 765 Veh-Sec/ 3600 = 0.21 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles

= 765 / 24 = 31.9 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume

= 765 / 31 = 24.7 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume

= 24 / 31 = 0.8

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Owl's Nest Road **Weather:** warm and clear
Date: 5/12/2005 **Recorder:** SSG
Direction: EB **Start Time:** 0
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:45	7:46	1	3	3	3	4	0
2	7:46	7:47	3	3	4	3	1	0
3	7:47	7:48	3	2	1	0	0	0
4	7:48	7:49	2	4	5	9	9	0
5	7:49	7:50	10	10	9	8	2	0
6	7:50	7:51	8	7	5	7	4	0
7	7:51	7:52	7	7	6	4	2	0
8	7:52	7:53	2	1	0	1	1	1
9	7:53	7:54	0	0	0	0	0	1
10	7:54	7:55	1	1	0	1	2	1
11	7:55	7:56	0	0	0	0	0	1
12	7:56	7:57	1	0	0	1	2	0
13	7:57	7:58	1	2	2	1	1	0
14	7:58	7:59	0	1	1	0	1	0
15	7:59	8:00	1	0	0	0	1	0
SUBTOTAL			40	41	36	38	30	4
TOTAL			155				34	

Total Delay = Total Number Stopped X Sampling Interval

= 155 X 15 = 2325 Veh-Sec/ 3600 = 0.65 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles

= 2325 / 30 = 77.5 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume

= 2325 / 34 = 68.4 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume

= 30 / 34 = 0.9

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Owl's Nest Road **Weather:** warm and clear
Date: 5/12/2005 **Recorder:** SSG
Direction: EB **Start Time:** 6:00
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	8:00	8:01	0	0	0	0	0	0
2	8:01	8:02	1	1	0	0	2	0
3	8:02	8:03	1	2	1	1	2	0
4	8:03	8:04	1	1	2	2	1	0
5	8:04	8:05	2	0	0	0	0	1
6	8:05	8:06	0	1	0	0	1	0
7	8:06	8:07	0	0	0	1	1	1
8	8:07	8:08	0	0	0	0	0	0
9	8:08	8:09	0	0	1	2	2	0
10	8:09	8:10	2	2	0	0	0	0
11	8:10	8:11	3	5	9	10	11	0
12	8:11	8:12	8	6	5	4	1	0
13	8:12	8:13	5	4	3	3	2	0
14	8:13	8:14	2	2	4	2	4	0
15	8:14	8:15	0	0	0	0	0	0
SUBTOTAL			25	24	25	25	27	2
TOTAL			99				29	

Total Delay = Total Number Stopped X Sampling Interval
= 99 X 15 = 1485 Veh-Sec/ 3600 = 0.41 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 1485 / 27 = 55.0 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 1485 / 29 = 51.2 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 27 / 29 = 0.9

Total Hour

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0
Job No.: 302-385.00
Path: C:\Documents and Settings\GARY

Location: DE 52 @ Owl's Nest Road
Date: 5/12/2005
Direction: EB
Weather: warm and clear
Recorder: SSG
Start Time: 7:15
(Military)

Location Characteristics:

Number Of Lanes : 1
Number Of Pedestrians: 0
Traffic Control Devices : SS
Type of Delay (Fixed/ Operational): 0
Time Interval (hh:mm): 0:15

Turning Lanes 0
Parking No
Transit Stop (Y/N) No

No	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:15	7:30	14	11	12	15	22	6
2	7:30	7:45	14	14	10	13	24	7
3	7:45	8:00	40	41	36	38	30	4
4	8:00	8:15	25	24	25	25	27	2
5	8:15	8:30						
6	8:30	8:45						
7	8:45	9:00						
8	9:00	9:15						
9	9:15	9:30						
10	9:30	9:45						
11	9:45	10:00						
12	10:00	10:15						
13	10:15	10:30						
14	10:30	10:45						
15	10:45	11:00						
SUBTOTAL			93	90	83	91	103	19
TOTAL			357				122	

Total Delay = Total Number Stopped X Sampling Interval
= 357 X 15 = 5355 Veh-Sec/ 3600 = 1.49 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 5355 / 103 = 52.0 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 5355 / 122 = 43.9 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 103 / 122 = 0.8

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.:
Job No.: 302-385.00

Path: C:\Documents and Settings\GARY\My Documents\

Location: DE 52 @ Snuff Mill Road
Date: 5/12/2005
Direction: EB

Weather: warm and clear
Recorder: SSG
Start Time: 7:30
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:30	7:31	0	0	0	0	0	0
2	7:31	7:32	0	0	0	0	0	0
3	7:32	7:33	0	0	0	0	0	0
4	7:33	7:34	0	0	0	1	1	0
5	7:34	7:35	0	0	0	0	0	0
6	7:35	7:36	2	2	2	0	2	0
7	7:36	7:37	1	0	0	0	1	0
8	7:37	7:38	0	0	0	0	0	0
9	7:38	7:39	3	0	0	0	3	2
10	7:39	7:40	0	0	0	0	0	0
11	7:40	7:41	0	0	0	0	0	0
12	7:41	7:42	0	0	0	0	0	0
13	7:42	7:43	0	2	4	4	4	0
14	7:43	7:44	4	5	5	5	2	0
15	7:44	7:45	5	4	5	4	3	0
SUBTOTAL			15	13	16	14	16	2
TOTAL			58				18	

Total Delay = Total Number Stopped X Sampling Interval

= 58 X 15 = 870 Veh-Sec/ 3600 = 0.24 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles

= 870 / 16 = 54.4 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume

= 870 / 18 = 48.3 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume

= 16 / 18 = 0.9

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Snuff Mill Road **Weather:** warm and clear
Date: 5/12/2005 **Recorder:** SSG
Direction: EB **Start Time:** 0
(Military)

Location Characteristics:

Number Of Lanes : 1 Turning Lanes 0
Number Of Pedestrians: 0 Parking No
Traffic Control Devices : SS Transit Stop (Y/N) No
Type of Delay (Fixed/ Operational):

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:45	7:46	3	0	0	0	0	0
2	7:46	7:47	1	2	3	3	3	0
3	7:47	7:48	2	2	0	0	0	0
4	7:48	7:49	0	2	0	0	2	0
5	7:49	7:50	0	0	0	0	0	0
6	7:50	7:51	0	0	0	0	0	0
7	7:51	7:52	0	0	0	0	0	0
8	7:52	7:53	0	0	0	0	0	0
9	7:53	7:54	0	0	0	0	0	0
10	7:54	7:55	0	1	0	0	1	1
11	7:55	7:56	0	0	0	0	0	0
12	7:56	7:57	0	0	0	2	2	0
13	7:57	7:58	1	1	1	1	0	0
14	7:58	7:59	1	0	0	0	0	1
15	7:59	8:00	0	0	0	0	0	0
SUBTOTAL			8	8	4	6	8	2
TOTAL			26				10	

Total Delay = Total Number Stopped X Sampling Interval

= 26 X 15 = 390 Veh-Sec/ 3600 = 0.11 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles

= 390 / 8 = 48.8 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume

= 390 / 10 = 39.0 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume

= 8 / 10 = 0.8

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Snuff Mill Road **Weather:** warm and clear
Date: 5/12/2005 **Recorder:** SSG
Direction: EB **Start Time:** 0
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	8:00	8:01	1	3	3	3	3	0
2	8:01	8:02	3	3	5	5	2	0
3	8:02	8:03	5	2	1	1	1	0
4	8:03	8:04	5	5	5	2	6	0
5	8:04	8:05	2	1	1	1	0	0
6	8:05	8:06	0	0	0	0	0	0
7	8:06	8:07	0	0	0	0	0	0
8	8:07	8:08	0	0	0	0	0	0
9	8:08	8:09	0	0	0	0	0	2
10	8:09	8:10	0	0	1	1	1	0
11	8:10	8:11	2	2	2	3	2	0
12	8:11	8:12	5	4	0	0	3	0
13	8:12	8:13	0	0	0	0	0	1
14	8:13	8:14	0	0	0	0	0	0
15	8:14	8:15	0	0	0	0	0	4
SUBTOTAL			23	20	18	16	18	7
TOTAL			77				25	

Total Delay = Total Number Stopped X Sampling Interval
= 77 X 15 = 1155 Veh-Sec/ 3600 = 0.32 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 1155 / 18 = 64.2 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 1155 / 25 = 46.2 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 18 / 25 = 0.7

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Snuff Mill Road **Weather:** warm and clear
Date: 5/12/2005 **Recorder:** SSG
Direction: EB **Start Time:** 6:00
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	8:15	8:16	0	1	0	0	1	1
2	8:16	8:17	0	0	0	0	0	2
3	8:17	8:18	0	0	0	0	0	3
4	8:18	8:19	0	0	1	1	1	0
5	8:19	8:20	0	1	2	2	3	2
6	8:20	8:21	1	0	0	0	0	0
7	8:21	8:22	0	2	0	0	2	0
8	8:22	8:23	0	0	0	0	0	1
9	8:23	8:24	0	0	0	0	0	3
10	8:24	8:25	0	0	0	0	0	0
11	8:25	8:26	0	0	0	0	0	1
12	8:26	8:27	0	0	0	0	0	2
13	8:27	8:28	0	0	1	1	1	0
14	8:28	8:29	0	0	0	0	0	1
15	8:29	8:30	0	0	0	0	0	1
SUBTOTAL			1	4	4	4	8	17
TOTAL			13				25	

Total Delay = Total Number Stopped X Sampling Interval
= 13 X 15 = 195 Veh-Sec/ 3600 = 0.05 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 195 / 8 = 24.4 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 195 / 25 = 7.8 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 8 / 25 = 0.3

Total Hour

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0
Job No.: 302-385.00

Path: C:\Documents and Settings\GARY

Location: DE 52 @ Snuff Mill Road
Date: 5/12/2005
Direction: EB

Weather: warm and clear
Recorder: SSG
Start Time: 7:15
(Military)

Location Characteristics:

Number Of Lanes : 1
Number Of Pedestrians: 0
Traffic Control Devices : SS
Type of Delay (Fixed/ Operational): 0
Time Interval (hh:mm): 0:15

Turning Lanes 0
Parking No
Transit Stop (Y/N) No

No	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:15	7:30	15	13	16	14	16	2
2	7:30	7:45	8	8	4	6	8	2
3	7:45	8:00	23	20	18	16	18	7
4	8:00	8:15	1	4	4	4	8	17
5	8:15	8:30						
6	8:30	8:45						
7	8:45	9:00						
8	9:00	9:15						
9	9:15	9:30						
10	9:30	9:45						
11	9:45	10:00						
12	10:00	10:15						
13	10:15	10:30						
14	10:30	10:45						
15	10:45	11:00						
SUBTOTAL			47	45	42	40	50	28
TOTAL			174				78	

Total Delay = Total Number Stopped X Sampling Interval
= 174 X 15 = 2610 Veh-Sec/ 3600 = 0.73 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 2610 / 50 = 52.2 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 2610 / 78 = 33.5 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 50 / 78 = 0.6

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.:
Job No.: 302-385.00

Path: C:\Documents and Settings\GARY\My Documents\

Location: DE 52 @ Center Meeting Road
Date: 5/12/2005
Direction: WB

Weather: warm and clear
Recorder: SSG
Start Time: 7:15
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:15	7:16	0	0	0	0	0	0
2	7:16	7:17	0	0	3	1	4	0
3	7:17	7:18	0	0	0	0	0	0
4	7:18	7:19	0	0	0	0	0	0
5	7:19	7:20	0	1	2	2	2	0
6	7:20	7:21	0	0	0	0	0	0
7	7:21	7:22	0	0	0	0	0	0
8	7:22	7:23	0	0	0	0	0	0
9	7:23	7:24	0	0	1	1	1	0
10	7:24	7:25	1	1	1	1	0	0
11	7:25	7:26	1	0	0	0	0	0
12	7:26	7:27	1	0	0	0	1	0
13	7:27	7:28	0	0	0	0	0	0
14	7:28	7:29	1	1	2	2	2	0
15	7:29	7:30	1	1	1	1	0	0
SUBTOTAL			5	4	10	8	10	0
TOTAL			27				10	

Total Delay = Total Number Stopped X Sampling Interval

= 27 X 15 = 405 Veh-Sec/ 3600 = 0.11 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles

= 405 / 10 = 40.5 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume

= 405 / 10 = 40.5 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume

= 10 / 10 = 1.0

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Center Meeting Road **Weather:** warm and clear
Date: 5/12/2005 **Recorder:** SSG
Direction: WB **Start Time:** 0
(Military)

Location Characteristics:

Number Of Lanes : 1 Turning Lanes 0
Number Of Pedestrians: 0 Parking No
Traffic Control Devices : SS Transit Stop (Y/N) No
Type of Delay (Fixed/ Operational):

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:30	7:31	1	1	0	0	1	0
2	7:31	7:32	1	1	1	1	1	0
3	7:32	7:33	3	0	0	0	2	0
4	7:33	7:34	0	0	0	0	0	0
5	7:34	7:35	0	0	0	0	0	3
6	7:35	7:36	0	0	0	0	0	0
7	7:36	7:37	0	0	0	0	0	1
8	7:37	7:38	0	0	0	0	0	0
9	7:38	7:39	0	0	0	0	0	0
10	7:39	7:40	0	0	0	1	1	0
11	7:40	7:41	0	0	0	0	0	1
12	7:41	7:42	1	1	1	0	1	0
13	7:42	7:43	1	0	0	3	4	0
14	7:43	7:44	2	2	1	2	1	0
15	7:44	7:45	2	2	0	0	0	1
SUBTOTAL			11	7	3	7	11	6
TOTAL			28				17	

Total Delay = Total Number Stopped X Sampling Interval

= 28 X 15 = 420 Veh-Sec/ 3600 = 0.12 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles

= 420 / 11 = 38.2 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume

= 420 / 17 = 24.7 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume

= 11 / 17 = 0.6

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Center Meeting Road **Weather:** warm and clear
Date: 5/12/2005 **Recorder:** SSG
Direction: WB **Start Time:** 0
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:45	7:46	0	0	0	0	0	0
2	7:46	7:47	0	0	0	1	1	1
3	7:47	7:48	2	2	2	1	1	0
4	7:48	7:49	1	2	0	0	1	1
5	7:49	7:50	0	0	0	1	1	0
6	7:50	7:51	1	0	0	0	1	1
7	7:51	7:52	0	2	2	0	3	0
8	7:52	7:53	1	0	5	2	6	0
9	7:53	7:54	0	0	0	0	0	1
10	7:54	7:55	1	0	0	0	1	1
11	7:55	7:56	0	2	2	0	2	2
12	7:56	7:57	0	0	0	0	0	1
13	7:57	7:58	1	0	0	0	1	0
14	7:58	7:59	0	0	3	1	3	0
15	7:59	8:00	0	1	1	2	3	0
SUBTOTAL			7	9	15	8	24	8
TOTAL			39				32	

Total Delay = Total Number Stopped X Sampling Interval
= 39 X 15 = 585 Veh-Sec/ 3600 = 0.16 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 585 / 24 = 24.4 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 585 / 32 = 18.3 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 24 / 32 = 0.8

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0 **Path:** C:\Documents and Settings\GARY\My Documents\
Job No.: 302-385.00

Location: DE 52 @ Center Meeting Road **Weather:** warm and clear
Date: 5/12/2005 **Recorder:** SSG
Direction: WB **Start Time:** 6:00
(Military)

Location Characteristics:

Number Of Lanes :	1	Turning Lanes	0
Number Of Pedestrians:	0	Parking	No
Traffic Control Devices :	SS	Transit Stop (Y/N)	No
Type of Delay (Fixed/ Operational):			

Time Interval (hh:mm): 0:01

No.	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	8:00	8:01	1	1	1	4	5	0
2	8:01	8:02	3	4	3	4	2	0
3	8:02	8:03	4	4	4	5	3	0
4	8:03	8:04	4	5	5	5	4	0
5	8:04	8:05	3	3	3	0	1	0
6	8:05	8:06	1	1	0	0	1	2
7	8:06	8:07	0	1	1	0	2	2
8	8:07	8:08	2	2	1	0	3	1
9	8:08	8:09	0	0	0	0	0	0
10	8:09	8:10	0	0	0	0	4	4
11	8:10	8:11	3	2	1	0	4	1
12	8:11	8:12	1	0	3	3	5	0
13	8:12	8:13	4	2	1	1	1	0
14	8:13	8:14	1	1	1	1	0	0
15	8:14	8:15	1	1	2	5	6	1
SUBTOTAL			28	27	26	28	41	11
TOTAL			109				52	

Total Delay = Total Number Stopped X Sampling Interval
= 109 X 15 = 1635 Veh-Sec/ 3600 = 0.45 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 1635 / 41 = 39.9 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 1635 / 52 = 31.4 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 41 / 52 = 0.8

Total Hour

Maryland State Highway Administration
Highway Information Services Division
Intersection Delay Study - Field Sheet

Request No.: 0
Job No.: 302-385.00

Path: C:\Documents and Settings\GARY

Location: DE 52 @ Center Meeting Road
Date: 5/12/2005
Direction: WB

Weather: warm and clear
Recorder: SSG
Start Time: 7:15
(Military)

Location Characteristics:

Number Of Lanes : 1
Number Of Pedestrians: 0
Traffic Control Devices : SS
Type of Delay (Fixed/ Operational): 0
Time Interval (hh:mm): 0:15

Turning Lanes 0
Parking No
Transit Stop (Y/N) No

No	Begin	End	Total Number of Vehicles Stopped In Approach At Time: 0 SEC+	15 SEC +	30 SEC+	45 SEC+	Approach Volume: Number Stopped	Number not Stopped
1	7:15	7:30	5	4	10	8	10	0
2	7:30	7:45	11	7	3	7	11	6
3	7:45	8:00	7	9	15	8	24	8
4	8:00	8:15	28	27	26	28	41	11
5	8:15	8:30						
6	8:30	8:45						
7	8:45	9:00						
8	9:00	9:15						
9	9:15	9:30						
10	9:30	9:45						
11	9:45	10:00						
12	10:00	10:15						
13	10:15	10:30						
14	10:30	10:45						
15	10:45	11:00						
SUBTOTAL			51	47	54	51	86	25
TOTAL			203				111	

Total Delay = Total Number Stopped X Sampling Interval
= 203 X 15 = 3045 Veh-Sec/ 3600 = 0.85 Veh - Hr

Average Delay Per Stopped Vehicle = Total Delay / Number of Stopped Vehicles
= 3045 / 86 = 35.4 Sec

Average Delay Per Approach Vehicle = Total Delay / Approach Volume
= 3045 / 111 = 27.4 Sec

Percent of Vehicles Stopped = Number of Stopped Vehicles / Approach Volume
= 86 / 111 = 0.8