



STATE OF DELAWARE  
**DEPARTMENT OF TRANSPORTATION**  
800 BAY ROAD  
P.O. Box 778  
DOVER, DELAWARE 19903

SHAILEN P. BHATT  
SECRETARY

July 10, 2012

Ms. Nicole Kline  
McMahon Associates, Inc.  
840 Springdale Drive  
Exton, PA 19341

Dear Ms. Kline:

DelDOT has completed its review of the traffic impact study (TIS) for the proposed **Woodbridge High School** in Sussex County, prepared by your firm and dated April 24, 2012.

The TIS evaluates the impact of a 1,000-student high school that the Woodbridge School District proposes to build on a 123.65-acre parcel in Sussex County. The parcel is located on the south side of Woodbridge Road (Sussex Road 585) between Scotts Store Road (Delaware Route 36 and Adams Road (Sussex Road 583). Three access points, all located on Woodbridge Road, are proposed. Construction is expected to begin in 2013.

Based on our review, we have the following comments and recommendations:

All intersections analyzed in the study currently operate at level of service (LOS) D or better, and are projected to do so under the 2013 conditions with or without construction of the proposed land use.

Should the County choose to approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan. All applicable agreements (i.e., letter agreements for off-site improvements and traffic signal agreements) should be executed prior to entrance plan approval for the proposed development.

1. The School District should improve Woodbridge Road between the main student entrance and Adams Road in order to meet DelDOT's local road standards. Local road standards include two eleven-foot travel lanes and two five-foot shoulders. The School District should provide a bituminous concrete overlay to the existing travel lanes at DelDOT's discretion. DelDOT will analyze the existing travel lanes' pavement section and recommend an overlay thickness to the School District's engineer if necessary.
2. The School District should eliminate the existing access to the high school agricultural building located on Woodbridge Road.

3. The School District should construct the proposed school bus access in the following manner:

Approach	Current Configuration	Proposed Configuration
Northbound Site Entrance	Approach does not exist	One left-turn lane, one right-turn lane
Eastbound Woodbridge Road	One through lane	One through lane
Westbound Woodbridge Road	One through lane	One left-turn lane, one through lane

The required left-turn lane on westbound Woodbridge Road should be constructed to have a storage length of 170 feet and a taper length of 100 feet.

4. The School District should construct a multi-use path along the site frontage. The limits of this construction will be determined by DeIDOT's Subdivision section during review of the site plan.

Please note that this review generally focuses on capacity and level of service issues; any additional safety and operational issues may be addressed through our subdivision review process.

Improvements in this TIS may be considered "significant" under DeIDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DeIDOT's website at [http://www.deldot.gov/information/pubs\\_forms/manuals/de\\_mutcd/index.shtml](http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/index.shtml). For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Adam Weiser of DeIDOT's Traffic Section. Mr. Weiser can be reached at (302) 659-4073 or by email at [Adam.Weiser@state.de.us](mailto:Adam.Weiser@state.de.us).

Ms. Nicole Kline  
July 10, 2012  
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Additional details on our review of the TIS are attached. Please contact Mr. Troy Brestel at (302) 760-2167 if you have any questions concerning this review.

Sincerely,



T. William Brockenbrough, Jr.  
County Coordinator

TWB:tbm  
Enclosures  
cc with enclosures:

Jennifer Murphy, CDA Engineering, Inc.  
Lawrence Lank, Sussex County Planning and Zoning  
Frederick H. Schranck, Deputy Attorney General  
Terry Gorlich, Legislative Liaison, Public Relations  
Nicole Majeski, Deputy Chief of Staff  
Natalie Barnhart, Director, Transportation Solutions (DOTS)  
Jennifer Cohan, Acting Director, Planning  
Michael H. Simmons, Assistant Director, Project Development South, DOTS  
Donald D. Weber, Chief Traffic Engineer, Traffic, DOTS  
Jeff Reed, South District Engineer, Maintenance & Operations (M&O)  
Adam Weiser, Safety Programs Engineer, Traffic, DOTS  
Thomas E. Meyer, Traffic Studies Manager, Traffic, DOTS  
Monroe Hite, III, System Design Manager, Traffic, DOTS  
Naa-Atswei Tetteh, Traffic Studies Engineer, Traffic, DOTS  
Marvin Roberts, Public Works Manager, South District, M&O  
Jennifer Pinkerton, Chief Materials Engineer, M&O  
Lisa Collins, Service Development Planner, Delaware Transit Corporation  
Ann Gravatt, Bicycle & Pedestrian Reviewer, Statewide & Regional Planning  
Marc Coté, Subdivision Engineer, Development Coordination  
Leonard Massotti, Sussex County Subdivision Coordinator, Development  
Coordination  
Derek Sapp, Subdivision Manager, Development Coordination  
Troy Brestel, Project Engineer, Development Coordination  
W. Paul Hogge, Project Engineer, Development Coordination  
Andrew J. Parker, McCormick Taylor

### **General Information**

**Report date:** April 23, 2012

**Prepared by:** McMahon Associates, Inc.

**Prepared for:** Woodbridge School District

**Tax Parcels:** 530-13.00-30.00

**Generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*:** Yes

### **Project Description and Background**

**Description:** High school campus to accommodate 1,000 students

**Location:** South side of Woodbridge Road (Sussex Road 585), between Scotts Store Road (Delaware Route 36) and Adams Road (Sussex 583)

**Amount of land to be developed:** approximately 123.65 acres

**Current zoning:** AR-1 (Agricultural Residential)

**Proposed zoning:** AR-1 (Agricultural Residential)

**Land use approval(s) needed:** Subdivision approval, Sussex County land use approval

**Proposed completion date:** 2014

**Proposed access location:** Woodbridge Road

### **Livable Delaware**

*(Source: Delaware Strategies for State Policies and Spending, 2010 Update)*

**Location with respect to the Strategies for State Policies and Spending Map of Delaware:** The proposed location of the development is located within Investment Level 2.

### **Description of Investment Level for Education:**

#### *Investment Level 2*

Education: It is the goal of the State Department of Education (DOE) to direct new school construction to areas that will integrate school facilities into the communities and neighborhoods they serve. DOE recognizes the integral role of educational facilities within communities. As such, DOE seeks to assure that residential growth that generates additional demand on educational facilities is managed and planned with adequate educational infrastructure in mind.

- Where possible, retrofit and renovate older schools that still serve the community in the general proximity.
- Assure adequate civil infrastructure availability to accommodate current and future educational facilities.
- Assure transportation-system connections and availability to support multimodal access within the community, to include, but not limited to, walk paths, bike paths, and safe pedestrian grade crossings.
- Assure transportation system adequacy to accommodate bus and delivery-vehicle traffic to current, planned, or potential educational facilities.
- Provide recreation and athletic facilities and opportunities to the communities served.

**Proposed Development’s Compatibility with Livable Delaware:** Based on the above description, it appears that this development proposal is generally consistent with the policies in the 2010 update of the Livable Delaware “Strategies for State Policies and Spending.”

**Comprehensive Plans**

The proposed development is located within Sussex County.

**Sussex County Comprehensive Plan: (Source: Sussex County Comprehensive Plan Update, 2008)**

The site is located in an area with a Future Land Use designated as a Developing Area.

**Developing Area**

The Developing Areas are newer, emerging growth areas. They are often located near main arterial roads that connect major destinations within the County. Most of the proposed Developing Areas are adjacent to municipalities and most are within potential future annexation areas of a municipality. In some cases, the developing areas are not yet served by sewer and water systems but have the potential to secure these services either from public or private providers that provide service to nearby locations.

Permitted Uses – A range of housing types are appropriate in most Developing Areas, including single family homes, townhouses and multi-family units. In selected areas, commercial uses should be allowed. A variety of office uses would be appropriate in many areas. Portions of the Developing Areas with good road access and few nearby homes should allow for business and industrial parks. Careful mixtures of homes with light commercial and institutional uses can be appropriate to provide for convenient services and to allow people to work close to home.

**Proposed Development’s Compatibility with Comprehensive Plan:** Based on the above description, the proposed development generally adheres to this section of the Sussex County Comprehensive Plan.

**Trip Generation**

Trip generation for the proposed development was computed based on rates and equations established in the Institute of Traffic Engineers (ITE) Trip Generation Manual (8<sup>th</sup> edition) and the ITE Trip Generation Handbook (2<sup>nd</sup> edition).

**Woodbridge High School Trip Generation**

Land Use	Morning Peak Hour			Afternoon Peak Hour		
	In	Out	Total	In	Out	Total
<i>1,000-student high school (ITE Code 530)</i>	286	134	420	96	194	290

## **Overview of TIS**

### **Intersections examined:**

- 1) Western athletic field entrance / Woodbridge Road (Sussex Road 585)
- 2) Main student entrance / Woodbridge Road
- 3) School bus entrance / Woodbridge Road
- 4) Woodbridge Road / Adams Road (Sussex Road 583)
- 5) Scotts Store Road (Delaware Route 36) / Woodbridge Road
- 6) US Route 13 / Adams Road
- 7) Newton Road (Sussex Road 584) / Adams Road
- 8) US Route 13 / Newton Road

### **Conditions examined:**

- 1) Existing (2011);
- 2) 2014 without development;
- 3) 2014 with development.

**Peak hours evaluated:** All intersections were examined during the weekday morning and weekday afternoon peak hours.

**Committed developments considered:** There are no committed developments within the area of study.

### **Transit, Pedestrian, and Bicycle Facilities**

**Existing transit service:** Currently, no local transit service is provided within the area of study.

**Planned transit service:** Currently, no future transit service is planned for the area.

**Existing bicycle and pedestrian facilities:** The Sussex County Bicycle Map indicates US Route 13 is considered a Connector Bicycle Route with a separate bikeway, while Adams Road is considered a Connector Bicycle Route without a separate bikeway.

**Planned bicycle and pedestrian facilities:** Comments relating to future bicycle and pedestrian improvements may be made during DeIDOT's site plan review process.

### **General HCS Analysis Comments**

*(see table footnotes on the following page for specific comments)*

There were no general differences between the TIS and DeIDOT's review of it.

Table 1  
 PEAK HOUR LEVELS OF SERVICE (LOS)  
 Based on Traffic Impact Study for Woodbridge High School  
 Report dated April 23, 2012  
 Prepared by McMahon Associates, Inc.

Unsignalized Intersection <sup>1</sup>	LOS per Analysis		LOS per DeIDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Western athletic field entrance / Woodbridge Road				
2014 with development (Case III)				
Western athletic field entrance Eastbound	N/A	N/A	N/A	N/A
Woodbridge Road Northbound Left-Turn	A (7.3)	A (7.3)	A (7.3)	A (7.3)

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<sup>1</sup> For unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 2  
 PEAK HOUR LEVELS OF SERVICE (LOS)  
 Based on Traffic Impact Study for Woodbridge High School  
 Report dated April 23, 2012  
 Prepared by McMahon Associates, Inc.

Unsignalized Intersection <sup>1</sup>	LOS per Analysis		LOS per DeIDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Main student entrance / Woodbridge Road				
2014 with development (Case III)				
Main student entrance Eastbound	B (10.0)	A (9.5)	A (9.4)	A (9.4)
Woodbridge Road Northbound Left-Turn	A (8.2)	A (7.4)	A (7.9)	A (7.4)

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<sup>1</sup> For unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 3  
 PEAK HOUR LEVELS OF SERVICE (LOS)  
 Based on Traffic Impact Study for Woodbridge High School  
 Report dated April 23, 2012  
 Prepared by McMahon Associates, Inc.

Unsignalized Intersection <sup>1</sup>	LOS per Analysis		LOS per DelDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
School bus entrance / Woodbridge Road 2014 with development (Case III)				
School bus entrance Eastbound	A (9.9)	B (10.3)	A (9.3)	A (9.5)
Woodbridge Road Northbound Left-Turn	A (7.7)	A (7.9)	A (7.6)	A (7.7)

<sup>1</sup> For unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 4  
 PEAK HOUR LEVELS OF SERVICE (LOS)  
 Based on Traffic Impact Study for Woodbridge High School  
 Report dated April 23, 2012  
 Prepared by McMahon Associates, Inc.

Unsignalized Intersection <sup>1</sup>	LOS per Analysis		LOS per DelDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Woodbridge Road / Adams Road				
2011 existing (Case I)				
Woodbridge Road Eastbound	A (8.6)	A (8.7)	A (8.6)	A (8.7)
Adams Road Northbound Left-Turn	A (7.2)	A (7.4)	A (7.2)	A (7.4)
2014 without development (Case II)				
Woodbridge Road Eastbound	A (8.6)	A (8.7)	A (8.6)	A (8.7)
Adams Road Northbound Left-Turn	A (7.2)	A (7.4)	A (7.2)	A (7.4)
2014 with development (Case III)				
Woodbridge Road Eastbound	B (10.5)	B (10.4)	B (10.2)	A (9.9)
Adams Road Northbound Left-Turn	A (7.9)	A (7.6)	A (7.9)	A (7.5)

<sup>1</sup> For unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 5  
 PEAK HOUR LEVELS OF SERVICE (LOS)  
 Based on Traffic Impact Study for Woodbridge High School  
 Report dated April 23, 2012  
 Prepared by McMahon Associates, Inc.

Unsignalized Intersection <sup>1</sup>	LOS per Analysis		LOS per DelDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Scotts Store Road / Woodbridge Road				
2011 existing (Case I)				
Scotts Store Road Eastbound	A (7.2)	A (7.8)	A (7.2)	A (7.8)
Scotts Store Road Westbound	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Woodbridge Road Northbound	A (9.1)	A (9.9)	A (9.1)	A (9.9)
Woodbridge Road Southbound	A (9.5)	B (10.0)	A (9.5)	B (10.0)
2014 without development (Case II)				
Scotts Store Road Eastbound	A (7.2)	A (7.8)	A (7.2)	A (7.8)
Scotts Store Road Westbound	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Woodbridge Road Northbound	A (9.1)	A (9.9)	A (9.1)	A (9.9)
Woodbridge Road Southbound	A (9.5)	B (10.1)	A (9.5)	B (10.1)
2014 with development (Case III)				
Scotts Store Road Eastbound	A (7.2)	A (7.8)	A (7.2)	A (7.8)
Scotts Store Road Westbound	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Woodbridge Road Northbound	A (9.1)	A (9.8)	A (9.1)	A (9.8)
Woodbridge Road Southbound	A (9.7)	B (10.1)	A (9.7)	B (10.1)

<sup>1</sup> For unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 6  
 PEAK HOUR LEVELS OF SERVICE (LOS)  
 Based on Traffic Impact Study for Woodbridge High School  
 Report dated April 23, 2012  
 Prepared by McMahon Associates, Inc.

Unsignalized Intersection <sup>1</sup>	LOS per Analysis		LOS per DelDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 / Adams Road <sup>2</sup>				
2011 existing (Case I)				
Adams Road Eastbound	C (19.3)	E (37.5)	B (14.2)	C (19.3)
US Route 13 Northbound Left-Turn	B (10.5)	B (11.3)	B (10.5)	B (11.3)
2014 without development (Case II)				
Adams Road Eastbound	C (19.7)	E (40.3)	B (14.4)	C (19.9)
US Route 13 Northbound Left-Turn	B (10.6)	B (11.4)	B (10.6)	B (11.4)
2014 with development (Case III)				
Adams Road Eastbound	D (26.6)	F (74.4)	C (16.2)	C (24.3)
US Route 13 Northbound Left-Turn	B (11.4)	B (11.7)	B (11.4)	B (11.7)

<sup>1</sup> For unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>2</sup> DelDOT analyzed this intersection as a "raised curb" median type, while the consultant analyzed this intersection as an "undivided" median type.

Table 7  
 PEAK HOUR LEVELS OF SERVICE (LOS)  
 Based on Traffic Impact Study for Woodbridge High School  
 Report dated April 23, 2012  
 Prepared by McMahon Associates, Inc.

Unsignalized Intersection <sup>1</sup>	LOS per Analysis		LOS per DeIDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Newton Road / Adams Road				
2011 existing (Case I)				
Newton Road Eastbound Left-Turn	A (8.3)	A (8.1)	A (8.3)	A (8.1)
Adams Road Southbound	B (10.8)	B (11.6)	B (10.9)	B (11.9)
2014 without development (Case II)				
Newton Road Eastbound Left-Turn	A (8.3)	A (8.1)	A (8.3)	A (8.1)
Adams Road Southbound	B (10.8)	B (11.7)	B (11.0)	B (12.0)
2014 with development (Case III)				
Newton Road Eastbound Left-Turn	A (9.0)	A (8.3)	A (9.0)	A (8.3)
Adams Road Southbound	B (14.4)	C (15.5)	C (15.2)	C (16.7)

<sup>1</sup> For unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

**Table 8**  
**PEAK HOUR LEVELS OF SERVICE (LOS)**  
 Based on Traffic Impact Study for Woodbridge High School  
 Report dated April 23, 2012  
 Prepared by McMahon Associates, Inc.

<b>Signalized Intersection<sup>1</sup></b>	<b>LOS per Analysis</b>		<b>LOS per DeIDOT</b>	
	<b>Weekday AM</b>	<b>Weekday PM</b>	<b>Weekday AM</b>	<b>Weekday PM</b>
US Route 13 / Newton Road <sup>2</sup>				
2011 existing (Case I)	D (48.1)	D (49.9)	C (23.4)	C (23.7)
2014 without development (Case II)	D (49.1)	D (49.4)	C (23.6)	C (23.9)
2014 with development (Case III)	D (50.9)	D (51.0)	D (42.3)	C (33.7)

<sup>1</sup> For unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>2</sup> For analysis of this intersection, DeIDOT used a cycle length of 120 seconds and a different movement sequence than what was analyzed by the consultant.