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

JENNIFER COHAN
SECRETARY

May 21, 2015

Mr. Carl Wilson
The Traffic Group, Inc.
9900 Franklin Square Drive
Suite H
Baltimore, MD 21236

Dear Mr. Wilson:

The enclosed Traffic Impact Study (TIS) review letter for the **Laurel Elementary School** (Tax Parcel 332-1.11-87.00) has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this review letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel
Project Engineer

TEB:km
Enclosures
cc with enclosures: Mr. Michael Riemann, Becker Morgan Group, Inc.
Ms. Constance C. Holland, Office of State Planning Coordination
Ms. Jamie Smith, Town of Laurel
Mr. Lawrence Lank, Sussex County Planning and Zoning
Mr. Andrew Parker, McCormick Taylor, Inc.
Mr. Kyle Clevenger, McCormick Taylor, Inc.
DelDOT Distribution

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MaryPage Bailey, Deputy Attorney General
Robert McCleary, Director, Transportation Solutions (DOTS)
Drew Boyce, Director, Planning
Mark Luszcz, Chief Traffic Engineer, Traffic, DOTS
Michael Simmons, Assistant Director, Project Development South, DOTS
J. Marc Coté, Assistant Director, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Thomas E. Meyer, Traffic Studies Manager, Traffic, DOTS
Jeff Reed, South District Engineer, South District
Marvin Roberts, South District Public Works Manager, South District
Gemez Norwood, South District Permit Supervisor, South District
Wayne Henderson, Service Development Planner, Delaware Transit Corporation
Steven Sisson, Sussex Subdivision Coordinator, Development Coordination
Derek Sapp, Sussex Subdivision Manager, Development Coordination
Brian Clarke, Sussex Traffic Engineer, Traffic, DOTS
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Claudy Joinville, Project Engineer, Development Coordination

McCORMICK TAYLOR

May 21, 2015

Mr. Troy E. Brestel
Project Engineer
DelDOT Division of Planning
P.O. Box 778
Dover, DE 19903

RE: Agreement No. 1655
Traffic Impact Study Services
Task No. 1 Subtask 11A – Laurel Elementary School

Dear Mr. Brestel,

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Laurel Elementary School development prepared by The Traffic Group, Inc. (TTG), dated February 16, 2015. This review was assigned as Task Number 1 (Subtask 11A). TTG prepared the report in a manner generally consistent with DelDOT's *Development Coordination Manual.*

The TIS evaluates the impacts of the new Laurel Elementary School, proposed to be located east of South Central Avenue (US Route 13A / Sussex Road 13) and north of Evergreen Drive in the Town of Laurel, Sussex County, Delaware. The proposed elementary school is located adjacent to the existing Laurel Intermediate Middle School, which will be moving further south on Central Avenue. The elementary school will accommodate a total of either 1,200 students or 1,400 students. Both scenarios were analyzed in the TIS. The proposed Laurel Elementary School would be located on approximately 26.3 acres of land. Construction is anticipated to be complete by 2017.

As originally submitted, the TIS proposed four access points: one entrance-only access point along Central Avenue, one exit-only access point via an extension of East 8th Street at Spruce Street, and a one-way bus loop along Evergreen Drive (one entrance driveway and one exit driveway). Subsequently, TTG indicated that the Laurel School District would like to revise the proposed access conditions to allow two-way movements at the Central Avenue and East 8th Street access points. The revised access conditions, including updated traffic volumes and analyses, were provided by TTG in a letter to DelDOT dated May 8, 2015. McCormick Taylor also evaluated the revised access conditions as part of this TIS review.

The land is currently zoned R-1 (Single-Family Residential Use District) within a Historic District Overlay District (HD-OD) in the Town of Laurel, and no rezoning is needed to permit the proposed use.

DelDOT currently has no projects within the study area.

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

All intersections within the study area exhibit adequate level of service (LOS), so physical roadway and/or traffic control improvements to address any such deficiencies are not necessary. However, a number of items are recommended to accommodate site entrances, to satisfy requirements of DelDOT's *Development Coordination Manual*, and to address bicycle and pedestrian needs.

Should the Town of Laurel choose to approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan by note or illustration. 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. Along the Central Avenue site frontage, the developer should provide a bituminous concrete overlay to the existing travel lanes, at DelDOT's discretion, to support the striping changes described below in Item No. 2. DelDOT should analyze the existing lanes' pavement section and recommend an overlay thickness to the developer's engineer if necessary.

2. The developer should improve the existing Site Access along Central Avenue. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Northbound Central Avenue	One shared through/right-turn lane	One shared through/right-turn lane
Southbound Central Avenue	One shared through/left-turn lane	One through lane and one left-turn lane
Westbound Site Access	Entrance only (one-way eastbound only)	One shared left/right-turn lane (two-way traffic allowed)

The addition of a separate left-turn lane on the southbound Central Avenue approach will require the southbound through lane to be shifted to the west (along the curb), and a section of existing on-street parking along southbound Central Avenue in the vicinity of the site access will be prohibited. The southbound through lane and left-turn lane will each be 10 feet wide. The double-yellow centerline will remain in its current location. Widening of Central Avenue will not be required.

The developer should coordinate with DelDOT to determine the limits of the on-street parking restrictions needed along southbound Central Avenue in the vicinity of the school's site access, along with signing and/or striping changes needed to designate the parking restrictions.

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT's Subdivision Section to determine final turn-lane lengths.

Approach	Left-Turn Lane	Right-Turn Lane
Northbound Central Avenue	N/A	N/A
Southbound Central Avenue	100 feet *	N/A
Westbound Site Access	N/A	N/A

* Proposed turn-lane length based on DelDOT's *Auxiliary Lane Worksheet* for 1,400-student school

3. The developer should construct the northern Site Access at 8th Street and Spruce Street. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Southbound Spruce Street	One-way northbound	One-way northbound
Eastbound 8th Street	One left-turn lane	One shared through/left-turn lane
Westbound Site Access	Approach does not exist	One shared through/right-turn lane (two-way traffic allowed)

4. Recognizing that Evergreen Drive is a Town-maintained street, we recommend that the developer should construct a one-way bus loop and two associated site access points along Evergreen Drive. The bus loop exit onto Evergreen Drive would replace the existing full-movement site access for the middle school in the same location. The bus loop entrance on Evergreen Drive will be located approximately 625 feet east of the exit. All approaches at both site access points associated with the one-way bus loop should consist of a single shared lane, but both driveways should be wide enough to accommodate two vehicles side-by-side. "Do Not Enter" (R5-1) signs facing Evergreen Drive should be installed at the bus loop exit. Below each "Do Not Enter" sign, an additional sign should be installed to indicate the times that the "Do Not Enter" restriction will apply. While the exact times are to be determined, they would likely be weekday mornings and afternoons when school bus traffic uses the bus loop. Outside of the restricted times, the bus loop area could potentially be used for school event parking by passenger vehicles and it may be desirable to allow two-way traffic on both driveways to facilitate event parking ingress and egress.

5. School zone signing and pavement markings on the road network surrounding the proposed school should be updated per the *2012 Delaware MUTCD.*

6. The developer should coordinate with DelDOT's Subdivision Section to determine design details for the site access points described above in Item Nos. 2-4, as well as for the school zone signing and pavement marking scheme noted above in Item No. 5.

7. The following bicycle, pedestrian, and transit improvements should be included:

   a. "Sharrow" bicycle pavement markings and bicycle warning signs should be installed along both directions of Central Avenue between Evergreen Drive and 8th Street. Central Avenue is part of a statewide bicycle route.
   b. Appropriate bicycle symbols, directional arrows, striping (including stop bars), and signing should be included along bicycle facilities within the site.
   c. Utility covers should be made flush with the pavement
   d. Bike parking should be provided near the school building entrance. Where the building architecture provides for an awning or other overhang, the bike parking should be covered.
   e. The existing sidewalk along the west side of Central Avenue from 8th Street to 10th Street should be reconstructed to a minimum of a five-foot wide sidewalk (with a minimum of a three-foot buffer from the roadway) that meets current AASHTO and ADA standards.
   f. The existing sidewalk along the east side of Central Avenue from 8th Street to Evergreen Drive may also need to be improved. The need for potential sidewalk improvements will be determined by DelDOT during the site plan review process, along with the details of what improvements are needed if any.
   g. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the property. These sidewalks should each be a minimum of five feet wide and should meet current AASHTO and ADA standards. These internal sidewalks should connect the school building entrances to the frontage sidewalks on Central Avenue and 8th Street.
   h. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to eliminate vehicular overhang onto the sidewalk.
   i. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including the site entrance on Central Avenue. Type 3 curb ramps are discouraged.
   j. The developer should coordinate with the Delaware Transit Corporation (DTC) regarding the addition of ADA-compliant bus stop pads at the existing bus stop locations along northbound and southbound Central Avenue just south of 8th Street. The developer should coordinate with the DTC regarding the details and implementation of the transit-related improvements.

Improvements in this TIS may be considered "significant" under DelDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT's website at 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 DelDOT's Traffic Section. Mr. Weiser can be reached at (302) 659-4073 or by email at Adam.Weiser@state.de.us.

Please note that this review generally focuses on capacity and level of service issues; additional safety and operational issues will be further addressed through DelDOT's subdivision review process.

Additional details on our review of this TIS are attached. Please contact me at (302) 738-0203 or through e-mail at ajparker@mtmail.biz if you have any questions concerning this review.

Sincerely,

McCormick Taylor, Inc.

Andrew J. Parker, P.E., PTOE
Project Manager

Enclosure

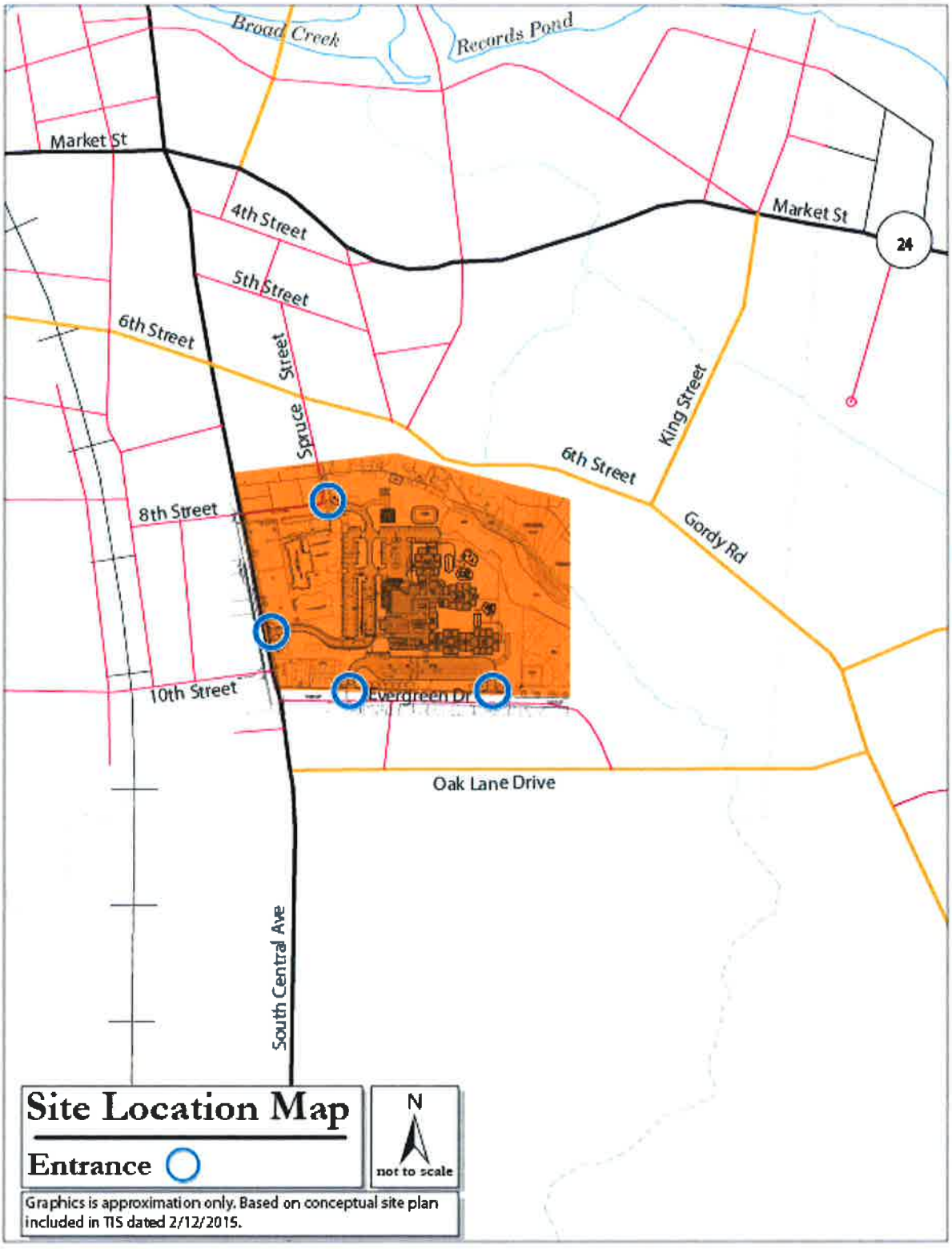
General Information

Report date: February 16, 2015, with analysis of revised access conditions dated May 8, 2015
Prepared by: The Traffic Group, Inc. (TTG)
Prepared for: Laurel School District
Tax parcel: 332-1.11-87.00
Generally consistent with DelDOT's *Development Coordination Manual*: Yes

Project Description and Background

Description: The proposed elementary school will accommodate a total of either 1,200 students or 1,400 students. Both scenarios were considered in the TIS.
Location: The new Laurel Elementary School is proposed to be located east of South Central Avenue (US Route 13A / Sussex Road 13) and north of Evergreen Drive in the Town of Laurel, Sussex County, Delaware. The proposed elementary school is located adjacent to the existing Laurel Intermediate Middle School, which will be moving further south on Central Avenue. A site location map is included on Page 7.
Amount of land to be developed: approximately 26.3 acres of land
Land use approval(s) needed: Subdivision approval. The land is currently zoned R-1 (Single-Family Residential Use District) within a Historic District Overlay District (HD-OD) in the Town of Laurel, and no rezoning is needed to permit the proposed use.
Proposed completion date: 2017
Proposed access locations: As originally submitted, the TIS proposed four access points: one entrance-only access point along Central Avenue, one exit-only access point via an extension of East 8th Street at Spruce Street, and a one-way bus loop along Evergreen Drive (one entrance driveway and one exit driveway). Subsequently, TTG indicated that the Laurel School District would like to revise the proposed access conditions to allow two-way movements at the Central Avenue and East 8th Street access points. The revised access conditions, including updated traffic volumes and analyses, were provided by TTG in a letter to DelDOT dated May 8, 2015.
Daily Traffic Volumes (per DelDOT Traffic Summary 2013):

- 2013 Average Annual Daily Traffic on Central Avenue: 5,546 vpd


Broad Creek
Records Pond
Market St
4th Street
5th Street
6th Street
Spruce Street
Market St
24
King Street
6th Street
Gordy Rd
8th Street
10th Street
Evergreen Dr
Oak Lane Drive
South Central Ave
Site Location Map
Entrance
N
not to scale
Graphics is approximation only. Based on conceptual site plan included in TIS dated 2/12/2015.

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 Laurel Elementary School is located entirely within an Investment Level 1 area.

Investment Level 1 Areas are areas of the state that are most prepared for growth and where the state can make cost-effective infrastructure investments for schools, roads, and public safety. In these areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Investment Level 1 Areas are often municipalities, towns, or urban/urbanizing places in counties. Density is generally higher than in the surrounding areas. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas.

Proposed Development's Compatibility with Strategies for State Policies and Spending:
The proposed Laurel Elementary School is located within an Investment Level 1 area, and is a redevelopment of the parcel that currently contains Laurel Middle School. A new middle/high school is in the final stages of construction and will be open for the 2015-2016 school year, and a large portion of the existing middle school will be demolished. This type of development is consistent with the character of Investment Level 1 areas. The proposed elementary school is located in downtown Laurel within walking distance to many town residents. The *Strategies* document generally encourages efficient new growth and redevelopment in Investment Level 1 areas, and the ongoing and proposed redevelopment of Laurel School District facilities is consistent with those goals. It is therefore concluded that the proposed school complies with the policies stated in the 2010 update of the "Strategies for State Policies and Spending."

Comprehensive Plan

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

The Sussex County Comprehensive Plan Future Land Use Map indicates that the proposed Laurel Elementary School is in the Town of Laurel, a municipality. Sussex County strongly favors directing development to municipalities that desire it. The specific permitted uses and densities governing new construction within an incorporated municipality will continue to be governed by that municipality's zoning ordinance, its public water and sewer capacities, and its comprehensive planning policies.

Town of Laurel Comprehensive Plan:
(Source: Town of Laurel Comprehensive Plan, 2011)

The Town of Laurel Comprehensive Plan Future Land Use Map indicates that the proposed school parcel is in within an institutional/civic zone. There is already an existing middle school at this location, and part of the old middle school will be demolished to make room for the new Elementary School, which will be situated behind the existing middle school. The Town of

Laurel Comprehensive Plan recognizes that it is important to periodically upgrade school facilities and create new space to remain attractive to parents who have the option to send their children to other schools in the region. In the spring of 2010, the Laurel School District held a referendum to implement a proposed expansion and improvement plan for the Town's schools that was passed.

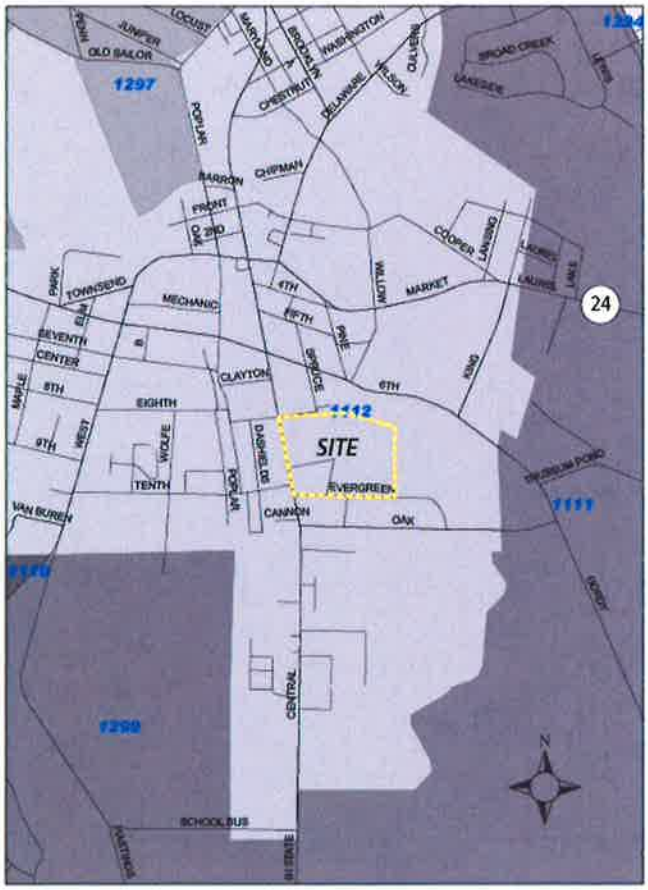
Proposed Development's Compatibility with Comprehensive Plan: The proposed Laurel Elementary School is planned to serve either 1,200 or 1,400 students. The proposed school development appears to comply with the Town of Laurel Comprehensive Plan, which points out the importance of building new schools and renovating aging schools to attract families to the Town.

The site is currently zoned R-1 (Single-Family Residential Use District) within a Historic District Overlay District (HD-OD) within the Town of Laurel, and the developer does not seek to rezone the land. The Town of Laurel Zoning Ordinance permits schools in R-1 Districts. The Town's future land use map (dated August 2013) has designated the parcel as institutional/civic. The parcel currently contains a middle school and the use of the land for educational institutions is not changing, therefore the proposed Laurel Elementary School development fits the Town of Laurel's future land use plan as well.

Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 1112

TAZ Boundaries:



Current employment estimate for TAZ: 1,565 jobs in 2010
Future employment estimate for TAZ: 1,812 jobs in 2040
Current population estimate for TAZ: 3,204 people in 2010
Future population estimate for TAZ: 3,882 people in 2040
Current household estimate for TAZ: 1,311 houses in 2010
Future household estimate for TAZ: 1,463 houses in 2040
Relevant committed developments in TAZ: None.
Would the addition of committed developments to current estimates exceed future projections: N/A
Would the addition of committed developments and the proposed development to current estimates exceed future projections: No for population and households, unknown for employment

Relevant Projects in the DelDOT Capital Transportation Program

DelDOT currently has no active projects in the study area.

Trip Generation

Trip generation for the proposed development was computed using comparable land uses and equations contained in Trip Generation, Ninth Edition, published by the Institute of Transportation Engineers (ITE). The following land uses were utilized to estimate the amount of new traffic generated for this development:

- Elementary School – 1,200 and 1,400 students (ITE Land Use Code 520)

Table 1
LAUREL ELEMENTARY SCHOOL PEAK HOUR TRIP GENERATION

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
1,200 student Elementary School	297	243	540	151	185	336
1,400 student Elementary School	346	284	630	176	216	392

Table 2
LAUREL ELEMENTARY SCHOOL DAILY TRIP GENERATION

Land Use	Weekday ADT		
	In	Out	Total
1,200 student Elementary School	774	774	1548
1,400 student Elementary School	903	903	1806

Overview of TIS

Intersections examined:

1) Central Avenue / Site Access 1
2) 8th Street / Site Access 2 / Spruce Street
3) Evergreen Drive / Site Access 3 (Bus Loop West Exit)
4) Evergreen Drive / Site Access 4 (Bus Loop East Entrance)
5) Central Avenue / Evergreen Drive
6) Central Avenue / Eighth Street
7) Central Avenue / Sixth Street / Gordy Road (Sussex Road 70)
8) Central Avenue / Delaware Route 24 (Market Street / Sussex Road 24)

9) Central Avenue / Woodland Ferry Road (Sussex Road 78) / Poplar Street (Sussex Road 28A) / Georgetown Road
10) Central Avenue / Oak Lane Drive (Sussex Road 69)

Conditions examined:

1) 2014 existing conditions (Case 1)
2) 2017 without Laurel Elementary School (Case 2)
3) 2017 with 1,200-student Laurel Elementary School (Case 3)
4) 2017 with 1,400-student Laurel Elementary School (Case 4)

Peak hours evaluated: Weekday morning and afternoon peak hours (8-9 AM and 3-4 PM for all intersections based on school operation hours)

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

Intersection Descriptions

1) **Central Avenue / Site Access 1**
Type of Control: existing and proposed T-intersection
Northbound approach: (Central Avenue) one shared through/right-turn lane
Southbound approach: (Central Avenue) one shared through/left-turn lane
Westbound approach: (Site Entrance 1) entering vehicles only; one-way eastbound
Note regarding 2/16/15 TIS: The above configuration is the same for existing and future conditions. While this is a one-way inbound entrance driveway, some vehicles were observed exiting from this location under existing conditions, so the TIS and McCormick Taylor analyses include a shared outbound lane on the westbound approach (stop-controlled) for Case 1 and Case 2 only. This outbound movement would be prohibited under Case 3 or Case 4 conditions. Also, the base condition for Case 3 and Case 4 analyzed by the TIS did not include separate turn lanes on the northbound or southbound approaches, but these were evaluated by McCormick Taylor based on DelDOT turn-lane warrant criteria.
Note regarding 5/8/15 revised access analysis: The intersection was assumed to allow two-way movements toward and away from the school on the site entrance driveway. The westbound approach would consist of one shared left/right-turn lane and it would be stop-controlled.

2) **Eighth Street / Site Access 2 / Spruce Street**
Type of Control: existing and proposed T-intersection
Southbound approach: (Spruce Street) outbound vehicles only; one-way northbound
Eastbound approach: (Eighth Street) one left-turn lane
Westbound approach: (Site Access 2) one shared through/right-turn lane (exiting vehicles only; one-way westbound)
Note regarding 5/8/15 revised access analysis: The intersection was assumed to allow two-way movements toward and away from the school on the site entrance driveway. The eastbound approach would consist of one shared through/left-turn lane.

3) **Evergreen Drive / Site Access 3 (Bus Loop West Exit)**
Type of Control: existing and proposed two-way stop-controlled (T-intersection)
Southbound approach: (Bus Loop Exit) existing one shared left/right-turn lane, stop-controlled; proposed one shared left/right-turn lane (exiting vehicles only; one-way southbound), stop-controlled
Eastbound approach: (Evergreen Drive) existing one shared through/left-turn lane; proposed one through lane
Westbound approach: (Evergreen Drive) existing one shared through/right-turn lane; proposed one through lane
Note: The existing intersection is a full-movement access (inbound and outbound) for the existing Laurel Middle School. The layout of the proposed elementary school includes a one-way bus loop that exits onto Evergreen Drive and would replace the existing intersection in the same location.

4) **Evergreen Drive / Site Access 4 (Bus Loop East Entrance)**
Type of Control: proposed T-intersection
Southbound approach: (Bus Loop Entrance) entering vehicles only; one-way northbound
Eastbound approach: (Evergreen Drive) one shared through/left-turn lane
Westbound approach: (Evergreen Drive) one shared through/right-turn lane

5) **Central Avenue / Evergreen Drive**
Type of Control: two-way stop-controlled (T-intersection)
Northbound approach: (Central Avenue) one shared through/right-turn lane
Southbound approach: (Central Avenue) one shared through/left-turn lane
Westbound approach: (Evergreen Drive) one shared left/right-turn lane, stop-controlled
Note: The TIS analyzed the offset intersection of Central Avenue and Evergreen Drive/10th Street as a four-leg, two-way stop-controlled intersection. The scoping letter did not include the 10th Street leg, which intersects Central Avenue approximately 100 feet north of Evergreen Drive. With DelDOT's approval, McCormick Taylor excluded the 10th Street leg from the analysis, redistributed the volumes, and analyzed the Central Avenue & Evergreen Drive intersection as a T-intersection only.

6) **Central Avenue / Eighth Street**
Type of Control: two-way stop-controlled (four-leg intersection)
Northbound approach: (Central Avenue) one shared through/right-turn lane
Southbound approach: (Central Avenue) one shared through/left-turn lane
Eastbound approach: (Eighth Street) one shared through/left/right-turn lane, stop-controlled (inbound vehicles only; one-way eastbound)
Westbound approach: (Eighth Street) one shared left/right-turn lane, stop-controlled

7) **Central Avenue / Sixth Street / Gordy Road**
Type of Control: two-way stop-controlled (four-leg intersection, one-way eastbound)
Northbound approach: (Central Avenue) one shared through/right-turn lane
Southbound approach: (Central Avenue) one shared through/left-turn lane
Eastbound approach: (Sixth Street) one shared through/left/right-turn lane, stop-controlled (inbound vehicles only; one-way eastbound)
Westbound approach: (Gordy Road) outbound vehicles only; one-way eastbound

8) **Central Avenue / Delaware Route 24**
Type of Control: signalized four-leg intersection (right-turns-on-red prohibited on all approaches)
Northbound approach: (Central Avenue) one shared through/left/right-turn lane
Southbound approach: (Central Avenue) one shared through/left/right-turn lane
Eastbound approach: (DE Route 24) one shared through/left/right-turn lane
Westbound approach: (DE Route 24) one shared through/left/right-turn lane

9) **Central Avenue / Woodland Ferry Road / Poplar Street / Georgetown Road**
Type of Control: signalized five-leg intersection
Northbound approach: (Central Avenue) one shared through/left-turn lane and one right-turn lane
Southbound approach: (Central Avenue) one shared through/left/right-turn lane
Southeast-bound approach: (Woodland Ferry Road) one shared through/left/right-turn lane; right-turn-on-red prohibited
Northeast-bound approach: (Poplar Street) one shared through/left/right-turn lane, right-turn-on-red prohibited
Westbound approach: (Georgetown Road) one shared through/left/right-turn lane

10) **Central Avenue / Oak Lane Drive**
Type of Control: two-way stop-controlled (T-intersection)
Northbound approach: (Central Avenue) one shared through/right-turn lane
Southbound approach: (Central Avenue) one shared through/left-turn lane
Westbound approach: (Oak Lane Drive) one shared left/right-turn lane, stop-controlled

Safety Evaluation

Crash Data: Crash data was obtained for December 30, 2011 to December 30, 2014 for six of the study intersections. The crash data request returned a total of 21 reportable crashes, 13 of which occurred at the 5-leg intersection of Central Avenue / Woodland Ferry Road / Poplar Street / Georgetown Road. Two alcohol-related pedestrian crashes with injuries occurred at the intersections of Central Avenue/Delaware Route 24 and Central Avenue/Oak Lane Drive. There were very few crashes in the low speed, residential area of the proposed school, and the crash data does not indicate any major crash trends. No additional safety improvements are recommended at this time as a result of the crash data analysis.

- Central Avenue / Evergreen Drive

  - Zero crashes reported (2 crashes without injury reported at the adjacent intersection of Central Avenue and 10th Street)
- Central Avenue / 8th Street
  - Zero crashes reported
- Central Avenue / 6th Street / Gordy Road
  - 1 crash reported (no injury)
- Central Avenue / Delaware Route 24
  - 5 crashes reported (2 injury including one alcohol-related pedestrian crash, 3 property damage)
- Central Avenue / Woodland Ferry Road / Poplar Street / Georgetown Road
  - 13 crashes reported (4 injury, 8 rear-end crashes, 4 angle crashes)
- Central Avenue / Oak Lane Drive
  - 2 crashes reported (1 alcohol-related pedestrian crash with injury)

Sight Distance: With generally straight and flat roadways, and few potential visual obstructions, sight distance is adequate throughout the study area. No problematic sight distance issues have been reported or indicated by crash data, and no major problems were observed during field observations in the area.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: The Delaware Transit Corporation (DTC) currently operates DART Bus Route 212 through the project area. Route 212 offers weekday services to Georgetown, Bridgeville, Seaford, Blades, Laurel, and Delmar, with stops near the proposed elementary school along Central Avenue at the existing Middle School, Oak Lane Drive, 4th Street, and Delaware Route 24.

Planned transit service: TTG did not provide documentation of any correspondence with the DTC in regards to future DTC service and facilities required for the proposed school. McCormick Taylor called Ms. Tremica Cherry, a Service Development Planner with the DTC in March 2015, but did not receive a response. Given that the site is proposed as an elementary school to be served by dedicated school buses, it seems unlikely that elementary school-age children would ride a DART bus to or from the school. Combined with the fact that DART buses already run along Central Avenue, it seems unlikely that any new or upgraded DTC facilities would need to be included as part of the site plan for the proposed school.

Existing bicycle and pedestrian facilities: According to DelDOT's Sussex County Bicycle Map (dated 2011), Central Avenue is classified as a High Traffic Statewide Bicycle Route. There is no bikeway along the proposed school frontage, but a bikeway begins at Evergreen Avenue and runs south to the state line in Delmar. Sixth Street / Gordy Road is also classified as a Connector Bicycle Route without a bikeway through the Town of Laurel. Central Avenue has 12' wide travel lanes with a 10' wide parking area on the southbound side of the road. There are no bicycle lanes or bicycle pavement marking symbols. According to the bicycle level of service (BLOS) calculator developed by the *League of Illinois Bicyclists*, the Central Avenue corridor operates at BLOS D. A buffered sidewalk exists along the entire Central Avenue site frontage and on the opposite side of the street. There is also a sidewalk along the 8th Street site frontage.

Planned bicycle and pedestrian facilities: The Traffic Group contacted DelDOT's Statewide Regional Planning Section regarding planned or requested bicycle and pedestrian facilities in the area of this proposed development. Ms. Sarah Coakley, a Project Planner in DelDOT's Planning Division, responded that at a bare minimum, Central Avenue and all roads providing direct access to the proposed school should have shoulders/bike lanes/shared lanes and sidewalks. An upgraded school zone signing and striping scheme is also required to meet current MUTCD standards. Bicycle racks should also be provided on the school campus near the building entrance(s).

Previous Comments

All comments from DelDOT's Scoping Letter, Traffic Count Review, and Preliminary TIS (PTIS) Review were addressed in the Final TIS submission, with the following exception:

- There were no indications that the applicant contacted the Delaware Transit Corporation (DTC) for transit-related comments.

General HCS Analysis Comments
(see table footnotes on the following pages for specific comments)

1) For unsignalized intersections, the TIS and McCormick Taylor applied heavy vehicle factors (HV) by movement using existing data. For signalized intersections, McCormick Taylor applied HV by lane group using existing data. The HCS worksheets provided in the TIS do not specify how HV percentages were applied for signalized intersections, although the Synchro analysis results for the intersection of Central Avenue / Woodland Ferry Road / Poplar Street / Georgetown Road indicate that the TIS applied HV percentages by movement instead of by lane group.

2) For existing conditions, the TIS and McCormick Taylor determined, for each intersection, overall intersection peak hour factors (PHF). For future conditions, the TIS assumed default PHF's of 0.80, 0.88 and 0.92 depending on peak hour volumes for all intersections (or existing PHF if higher). McCormick Taylor assumed existing PHF for future conditions, with the following exceptions:
   a. Central Avenue and 8th Street (default PHF values used due to substantial increase in volumes at this intersection)
   b. Central Avenue and Site Access 1 (assumed existing PHF for future scenarios where only one-way entering traffic is allowed, but assumed default PHF values for future scenarios where two-way traffic would be allowed due to substantial increase in volumes)
   c. Assumed default PHF values for the future bus loop entrance and exit on Evergreen Drive and the future access point at 8th Street and Spruce Street

3) For signalized intersections, McCormick Taylor used a base saturation flow rate of 1,750 pcphpl per DelDOT's Development Coordination Manual. The developer did not note the base saturation flow rates used in their analysis, either in the letter or the capacity analysis appendix, with the exception of the Central Avenue / Woodland Ferry Road / Poplar Street / Georgetown Road intersections where they used 1,900 pcphpl.

4) McCormick Taylor conservatively input no right-turn-on-red (RTOR) volumes for existing and future conditions analyses, except for the intersection of Central Avenue / Woodland Ferry Road / Poplar Street / Georgetown Road that was analyzed using Synchro. The developer did not note whether RTOR volumes were used in their analysis, either in the letter or the capacity analysis appendix, except where they applied a RTOR reduction for the intersection of Central Avenue / Woodland Ferry Road / Poplar Street / Georgetown Road that was analyzed using Synchro.

5) The HCS analyses included in the TIS did not always reflect the lane widths observed in the field by McCormick Taylor. McCormick Taylor's HCS analyses incorporated our field-measured lane widths.

6) The TIS and McCormick Taylor used different signal timings when analyzing the signalized intersections in some cases.

Table 3
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [1] **(T-intersection)**	**LOS per TIS**		**LOS per McCormick Taylor**	
Central Avenue / Site Access 1	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2014 Existing (Case 1) [2]				
Southbound Central Ave – Left	A (8.4)	A (8.1)	A (8.4)	A (8.1)
Westbound School Access	C (15.3)	B (10.4)	C (15.3)	B (10.4)
2017 without Laurel Elementary (Case 2) [2]				
Southbound Central Ave – Left	A (8.0)	A (8.0)	A (8.4)	A (8.1)
Westbound School Access	B (12.0)	B (10.2)	C (15.4)	B (10.5)
2017 with Laurel Elementary – 1,200 students (Case 3)				
Southbound Central Ave – Left	B (8.7)	A (8.4)	B (12.0)	A (8.7)
2017 with Laurel Elementary – 1,200 students (Case 3) *with Improvement Option 1* [3]				
Southbound Central Ave – Left	B (8.7)	A (8.4)	B (12.0)	A (8.7)

[1] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[2] The existing school access is signed as one-way inbound. The traffic counts indicate that a small number of vehicles exit the school at this access point. These westbound volumes were included in the analysis for Case 1 and Case 2, but the analysis for Case 3 does not include any westbound exiting traffic.
[3] Improvement Option 1 includes the addition of a northbound right-turn lane and a southbound left-turn lane.

Table 3 (continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [4] **(T-intersection)**	**LOS per TIS**		**LOS per McCormick Taylor**	
Central Avenue / Site Access 1	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2017 with Laurel Elementary – 1,400 students (Case 4) [5]				
Southbound Central Ave – Left	A (8.9)	A (8.5)	B (13.3)	A (8.8)
2017 with Laurel Elementary – 1,400 students (Case 4) *with Improvement Option 1* [6]				
Southbound Central Ave – Left	A (8.9)	A (8.5)	B (13.3)	A (8.8)
2017 with Laurel Elementary – 1,400 students (Case 4) *with Improvement Option 2* [7]				
Southbound Central Ave – Left	A (9.0)	A (8.5)	A (9.0)	A (8.5)
Westbound Site Entrance	D (25.8)	C (19.5)	D (26.2) [8]	C (19.8) [8]
2017 with Laurel Elementary – 1,400 students (Case 4) *with Improvement Option 3* [9]				
Southbound Central Ave – Left	A (9.0)	A (8.5)	A (9.0)	A (8.5)
Westbound Site Entrance	D (25.8)	C (19.5)	D (26.2) [8]	C (19.8) [8]

[4] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[5] The Case 4 base condition does not include any westbound exiting traffic.
[6] Improvement Option 1 includes the addition of a northbound right-turn lane and a southbound left-turn lane. It does not include any westbound exiting traffic.
[7] Improvement Option 2 includes the addition of a westbound shared left/right-turn lane. It also reflects two-way movements on this site driveway along with updated volumes per the revised TIS analysis submitted by TTG on May 8, 2015.
[8] The 95th percentile queue length for the westbound approach is less than 2 vehicles during both the AM and PM peak hour.
[9] Improvement Option 3 includes the addition of a westbound shared left/right-turn lane and a southbound left-turn lane. It also reflects two-way movements on this site driveway along with updated volumes per the revised TIS analysis submitted by TTG on May 8, 2015.

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [10] **(T-intersection)**	**LOS per TIS**		**LOS per McCormick Taylor**	
8th Street / Site Access 2 / Spruce Street	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2017 with Laurel Elementary – 1,200 students (Case 3)				
Southbound Spruce Street	A (9.9)	A (9.5)	N/A [11]	N/A [11]
Eastbound 8th Street – Left	A (8.0)	A (7.8)	A (8.1)	A (7.9)
2017 with Laurel Elementary – 1,400 students (Case 4)				
Southbound Spruce Street	B (10.2)	A (9.7)	N/A [11]	N/A [11]
Eastbound 8th Street – Left	A (8.1)	A (7.9)	A (8.2)	A (8.0)
2017 with Laurel Elementary – 1,400 students (Case 4) *with Improvement Option 1* [12]				
Southbound Spruce Street	A (9.7)	A (9.3)	N/A [11]	N/A [11]
Eastbound 8th Street – Left	A (7.9)	A (7.7)	A (8.0)	A (7.8)

[10] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[11] The TIS incorrectly analyzed the intersection of 8th Street and Spruce Street with southbound right-turn volumes from Spruce Street. Spruce Street is one-way northbound. McCormick Taylor added the southbound right-turn volumes to the westbound through volumes for future cases.
[12] Improvement Option 1 assumes the eastbound approach consists of one shared through/left-turn lane (as opposed to one left-turn-only lane without the improvement). It also reflects two-way movements on this site driveway along with updated volumes per the revised TIS analysis submitted by TTG on May 8, 2015.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [13] **Two-Way Stop Control (T-intersection)**	**LOS per TIS**		**LOS per McCormick Taylor**	
Evergreen Drive / Site Access 3 (Bus Loop West Exit) [14]	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2014 Existing (Case 1)				
Southbound Bus Loop Exit	A (9.7)	A (9.5)	A (9.6)	A (9.5)
Eastbound Evergreen Drive - Left	A (8.2)	A (7.3)	A (8.2)	A (7.3)
2017 without Laurel Elementary (Case 2)				
Southbound Bus Loop Exit	A (9.1)	A (9.2)	A (9.6)	A (9.5)
Eastbound Evergreen Drive - Left	A (8.1)	A (7.2)	A (8.2)	A (7.3)
2017 with Laurel Elementary – 1,200 students (Case 3) [15]				
Southbound Bus Loop Exit	A (9.4)	A (9.3)	B (11.7)	A (9.8)
2017 with Laurel Elementary – 1,400 students (Case 4) [15]				
Southbound Bus Loop Exit	A (9.4)	A (9.3)	B (10.8)	A (9.8)

[13] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[14] The existing intersection is a full-movement access (inbound and outbound) for the existing Laurel Middle School. The layout of the proposed elementary school includes a one-way bus loop that exits onto Evergreen Drive and would replace the existing intersection in the same location.
[15] The TIS assumed future HV% equal to existing HV% for Case 3 and 4 analyses. McCormick Taylor assumed 100% HV's for the southbound approach in Case 3 and Case 4 since it will serve buses only.

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [16] **(T-intersection)**	**LOS per TIS**		**LOS per McCormick Taylor**	
Evergreen Drive / Site Access 4 (Bus Loop East Entrance) [17]	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2017 with Laurel Elementary – 1,200 students (Case 3)				
Eastbound Evergreen Drive - Left	A (8.3)	A (8.2)	A (8.7)	A (8.4)
2017 with Laurel Elementary – 1,400 students (Case 4)				
Eastbound Evergreen Drive - Left	A (8.3)	A (8.3)	A (8.8)	A (8.4)

[16] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[17] The TIS and McCormick Taylor assumed 100% HV for the eastbound left turn in to the bus loop entrance.

Table 7
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [18] **Two-Way Stop Control (T-intersection)**	**LOS per TIS**		**LOS per McCormick Taylor**	
Central Avenue / Evergreen Drive	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2014 Existing (Case 1)				
Southbound Central Avenue – Left	A (8.4)	A (8.0)	A (8.6)	A (8.3)
Westbound Evergreen Drive	C (22.6)	C (15.7)	B (14.5)	B (12.6)
2017 without Laurel Elementary (Case 2)				
Southbound Central Avenue – Left	A (7.9)	A (8.0)	A (8.6)	A (8.3)
Westbound Evergreen Drive	B (12.2)	C (15.4)	B (14.6)	B (12.7)
2017 with Laurel Elementary – 1,200 students (Case 3)				
Southbound Central Avenue – Left	A (8.1)	A (8.1)	A (9.1)	A (8.5)
Westbound Evergreen Drive	B (13.8)	C (16.8)	C (20.4)	B (14.0)
2017 with Laurel Elementary – 1,400 students (Case 4)				
Southbound Central Avenue – Left	A (7.8)	A (8.1)	A (9.2)	A (8.5)
Westbound Evergreen Drive	B (14.4)	C (17.3)	C (22.4)	B (14.2)

[18] 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 Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [19] Two-Way Stop Control (4-leg intersection)	**LOS per TIS**		**LOS per McCormick Taylor**	
Central Avenue / 8th Street	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2014 Existing (Case 1)				
Southbound Central Avenue – Left	A (8.4)	A (8.0)	A (8.4)	A (8.0)
Eastbound 8th Street	C (16.0)	B (12.6)	C (16.0)	B (12.6)
Westbound 8th Street	C (15.7)	B (12.5)	C (15.7)	B (12.5)
2017 without Laurel Elementary (Case 2)				
Southbound Central Avenue – Left	A (7.8)	A (8.0)	A (8.4)	A (8.0)
Eastbound 8th Street	B (11.6)	B (12.4)	C (16.2)	B (12.7)
Westbound 8th Street	B (11.2)	B (12.4)	C (15.9)	B (12.6)
2017 with Laurel Elementary – 1,200 students (Case 3)				
Southbound Central Avenue – Left	A (7.8)	A (8.0)	A (7.8)	A (8.0)
Eastbound 8th Street	B (13.0)	B (14.1)	B (13.0)	B (14.9)
Westbound 8th Street	C (17.8)	C (16.1)	C (17.8)	C (16.9)
2017 with Laurel Elementary – 1,400 students (Case 4)				
Southbound Central Avenue – Left	A (7.8)	A (8.0)	A (7.8)	A (8.0)
Eastbound 8th Street	B (13.4)	B (14.6)	B (13.4)	C (15.4)
Westbound 8th Street	C (21.2)	C (17.7)	C (21.2)	C (18.8)
2017 with Laurel Elementary – 1,400 students (Case 4) *with Revised Volumes* [20]				
Southbound Central Avenue – Left	A (8.0)	A (8.1)	A (8.0)	A (8.1)
Eastbound 8th Street	B (14.4)	B (15.0-)	B (14.4)	C (15.9)
Westbound 8th Street	B (14.0)	B (13.5)	B (14.0)	B (14.0)

[19] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[20] This scenario reflects the updated volumes per the revised TIS analysis submitted by TTG on May 8, 2015.

Table 9
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [21] **Two-Way Stop Control (4-leg intersection, one-way eastbound)**	**LOS per TIS**		**LOS per McCormick Taylor**	
Central Avenue / 6th Street / Gordy Road	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2014 Existing (Case 1)				
Southbound Central Avenue – Left	A (8.0)	A (8.0)	A (8.0)	A (7.9)
Eastbound 6th Street	B (13.6)	B (14.1)	B (13.6)	B (14.1)
2017 without Laurel Elementary (Case 2)				
Southbound Central Avenue – Left	A (7.7)	A (8.0)	A (8.0)	A (7.9)
Eastbound 6th Street	B (11.3)	B (13.9)	B (13.7)	B (14.2)
2017 with Laurel Elementary – 1,200 students (Case 3)				
Southbound Central Avenue – Left	A (8.1)	A (8.4)	A (8.9)	A (8.3)
Eastbound 6th Street	B (13.9)	C (17.1)	D (25.3)	C (17.7)
2017 with Laurel Elementary – 1,400 students (Case 4)				
Southbound Central Avenue – Left	A (8.2)	A (8.4)	A (9.1)	A (8.4)
Eastbound 6th Street	B (14.6)	C (17.7)	D (28.9)	C (18.1)

[21] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 10
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Signalized Intersection [22] **(4-leg intersection)**	**LOS per TIS**		**LOS per McCormick Taylor**	
Central Avenue / Delaware Route 24	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2014 Existing (Case 1)	B (13.4)	A (9.4)	B (10.9)	A (9.0)
2017 without Laurel Elementary (Case 2)	A (9.1)	A (9.5)	B (10.0+)	A (9.1)
2017 with Laurel Elementary – 1,200 students (Case 3)	B (10.3)	B (10.2)	C (24.6)	B (10.2)
2017 with Laurel Elementary – 1,400 students (Case 4)	B (10.5)	B (10.4)	C (28.6)	A (9.9)

[22] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 11
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Signalized Intersection [23] **(5-leg intersection)**	**LOS per TIS**		**LOS per McCormick Taylor**	
Central Avenue / Woodland Ferry Road / Poplar Street / Georgetown Road	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2014 Existing (Case 1)	B (17.4)	B (18.3)	B (18.5)	B (17.4)
2017 without Laurel Elementary (Case 2)	B (15.5)	B (18.4)	B (15.1)	B (17.4)
2017 with Laurel Elementary – 1,200 students (Case 3)	B (17.2)	B (20.0-)	B (18.6)	B (18.7)
2017 with Laurel Elementary – 1,400 students (Case 4)	B (17.4)	C (20.4)	B (18.7)	B (19.3)

[23] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 12
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Laurel Elementary School
Report dated February 2015
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [24] **Two-Way Stop Control (T-intersection)**	**LOS per TIS**		**LOS per McCormick Taylor**	
Central Avenue / Oak Lane Drive	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2014 Existing (Case 1)				
Southbound Central Avenue – Left	A (8.3)	A (8.2)	A (8.3)	A (8.2)
Westbound Oak Lane Drive	C (19.8)	B (14.0)	C (19.5)	B (14.0)
2017 without Laurel Elementary (Case 2)				
Southbound Central Avenue – Left	A (7.8)	A (8.2)	A (8.4)	A (8.2)
Westbound Oak Lane Drive	B (12.4)	B (13.9)	C (20.3)	B (14.2)
2017 with Laurel Elementary – 1,200 students (Case 3)				
Southbound Central Avenue – Left	A (7.9)	A (8.3)	A (8.7)	A (8.3)
Westbound Oak Lane Drive	B (12.7)	B (14.9)	D (30.0)	C (15.2)
2017 with Laurel Elementary – 1,400 students (Case 4)				
Southbound Central Avenue – Left	A (7.9)	A (8.3)	A (8.8)	A (8.3)
Westbound Oak Lane Drive	B (12.8)	C (15.1)	D (33.1)	C (15.4)

[24] The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.