



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

SHAILEN P. BHATT
SECRETARY

February 12, 2014

Mr. Michael J. Kaszyski, Jr.
Duffield Associates, Inc.
5400 Limestone Road
Wilmington, DE 19808

Dear Mr. Kaszyski,

DelDOT has completed its review of the Traffic Impact Study (TIS) for the Olivero Property commercial development prepared by Duffield Associates, Inc. (DA), dated October 13, 2013. DA prepared the report in a manner generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*.

The TIS evaluates the impacts of the Olivero Property commercial development (Tax Parcels: 10-030.00-001, 10-030.00-045, and 10-024.00-058), proposed to be located on the southbound side of US Route 13 and on the south side of Christiana Road (Delaware Route 273), within New Castle County, Delaware. The proposed development consists of a 5,585 square foot convenience store with gasoline pumps. The proposed development is to be built on approximately 9.80 acres of land. Three access points are proposed: one rights-in / rights-out access on US Route 13, a rights-out only access on US Route 13, and a rights-in / rights-out access along Christiana Road. The developer would access Christiana Road by building an access road, presently a 40-foot right-of-way identified as Valley Road, running parallel to US Route 13. Construction is anticipated to be complete by 2015.

The land is currently split-zoned as CR (Commercial Regional) and I (Industrial) within New Castle County, and the developer does not propose to change the zoning.

DelDOT currently has no relevant projects in the study area.

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

The proposed development is considered a minor plan by the New Castle County (NCC) Department of Land Use. Under Section 40.11.210 of the NCC Unified Development Code (UDC), minor plans do not need to meet County concurrency requirements.



The following intersections will not meet the standards set forth in Chapter 2 of the *Standards and Regulations for Subdivision Streets and State Highway Access*:

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
US Route 13 & Site Entrance	N/A (does not exist)	2015 PM with Olivero Property
US Route 13 & Christiana Road	Signalized	2013 AM and PM existing, 2015 AM and PM without and with Olivero Property

The site entrance on US Route 13 experiences LOS F for the 2015 PM build scenario. However, the poor LOS is limited to the northbound US Route 13 left-turn, which is caused by the heavy through volumes on the southbound US Route 13 approach. The queues for the northbound left-turn are expected to be minimal, and can be accommodated by the existing turn-lane length.

The intersection of US Route 13 and Christiana Road currently experiences LOS F, and is projected to do so in the future 2015 with and without build scenarios. However, improvements to achieve adequate LOS are considered excessive for a single developer to construct. Most of the land surrounding this intersection is already developed, which means that intersection improvements would impact existing businesses and that there would be few occasions to require new businesses to participate in the improvement. A State-funded project would be needed. A grade-separation of the intersection would address the poor LOS, but, as previously stated, this improvement is considered excessive for any single developer to construct.

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 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. The developer should construct the site entrance on Christiana Road (intersection of Valley Road and Christiana Road). The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Northbound Site Entrance	Approach does not exist	One right-turn-only lane
Eastbound Christiana Road	Two through lanes	Two through lanes and one right-turn lane

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 Site Entrance	N/A	N/A
Eastbound Christiana Road	N/A	290 feet**
Westbound Christiana Road	N/A	N/A

** turn-lane length based on deceleration + storage length per DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*

- The developer should construct Valley Road from Christiana Road into the site to meet State standards. The developer should coordinate with DelDOT's Subdivision Section on the design of Valley Road.
- The developer should construct the site entrance on US Route 13. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Northbound US Route 13	Four through lanes, one right-turn lane, and one left-turn lane	Four through lanes, one right-turn lane, and one left-turn lane
Southbound US Route 13	Four through lanes	Four through lanes, one right-turn lane
Eastbound Site Entrance	Approach does not exist	One right-turn-only lane

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 US Route 13	N/A	N/A
Southbound US Route 13	N/A	350 feet*
Eastbound Site Entrance	N/A	N/A

* turn-lane length based on deceleration + storage length per DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*

4. The following bicycle and pedestrian improvements should be included:
 - a. Adjacent to the right-turn lane added to Christiana Road at the site entrance, a minimum of a four-foot bicycle lane should be dedicated and striped with appropriate markings for bicyclists through the turn lane in order to facilitate safe and unimpeded bicycle travel.
 - b. Appropriate bicycle symbols, directional arrows, striping (including stop bars), and signing should be included along bicycle facilities and right-turn lanes within the project limits.
 - c. Utility covers should be made flush with the pavement.
 - d. Bike parking should be provided near the commercial building entrances within this development. Where the building architecture provides for an awning of other overhang, the bike parking should be covered.
 - e. A minimum of a five-foot wide sidewalk that meets current AASHTO and ADA standards should be constructed along the US Route 13 site frontage and along the Christiana Road site frontage.
 - f. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
 - 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 commercial building entrances to the frontage sidewalks on US Route 13 and Christiana Road.

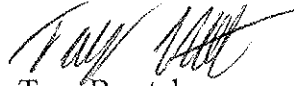
Improvements in this TIS may be considered “significant” under DelDOT’s *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT’s website at http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/index.shtml. For any additional information regarding 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.

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Additional details on our review of this TIS are attached. If you have any questions concerning this review, please contact me at (302) 760-2167 or Mr. Claudy Joinville at (302) 760-2124. My email is Troy.Brestel@state.de.us and Mr. Joinville's email is Claudy.Joinville@state.de.us.

Sincerely,



Troy Brestel
Project Engineer

TEB:cjm

Enclosures

cc with enclosures: Ms. Eileen Fogarty, New Castle County Land Use
Mr. Owen Robotino, New Castle County Land Use
Mr. John Janowski, New Castle County Land Use
Mr. Robert McCleary, Director, Transportation Solutions (DOTS)
Mr. Drew Boyce, Director, Planning
Mr. Mark Luszcz, Chief Traffic Engineer, Traffic, DOTS
Mr. J. Marc Coté, Assistant Director, Development Coordination
Mr. T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Mr. Thomas E. Meyer, Special Projects Manager, Traffic, DOTS
Mr. James Clacher, TMC Supervisor, Traffic, DOTS
Mr. Mark Alexander, Canal District Engineer, DOTS
Mr. Kevin Canning, Canal District Public Works Engineer, DOTS
Mr. Todd Sammons, Subdivision Engineer, Development Coordination
Mr. John Garcia, New Castle County Review Coordinator, Development Coordination
Mr. Pao Lin, Subdivision Manager, Development Coordination
Mr. Ahmed Abdelmoteleb, Traffic Engineer, Traffic, DOTS
Mr. Wayne Henderson, Service Development Planner, Delaware Transit Corporation
Mr. Marco Boyce, Statewide & Regional Planning
Ms. Donna Robinson, Administrative Assistant, Statewide & Regional Planning

General Information

Report date: October 13, 2013

Prepared by: Duffield Associates, Inc.

Prepared for: Olivero Property

Tax parcels: 10-030.00-001, 10-030.00-045, and 10-024.00-058

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

Project Description and Background

Description: The proposed gas station and convenience store would occupy 5,585 square feet.

Location: The Olivero Property commercial development is proposed to be located on the southbound side of US Route 13 and on the south side of Christiana Road (Delaware Route 273), within New Castle County, Delaware.

Amount of land to be developed: approximately 9.80 acres of land

Land use approval(s) needed: Subdivision approval. The land is currently split-zoned as CR (Commercial Regional) and I (Industrial) within New Castle County, and will be developed under that zoning.

Proposed completion date: 2015

Proposed access locations: Three access points are proposed: one rights-in / rights-out access on US Route 13, a rights-out only access on US Route 13, and a rights-in / rights-out access along Christiana Road.

Daily Traffic Volumes (per DelDOT Traffic Summary 2012):

- 2012 Average Annual Daily Traffic on US Route 13: 75,125 vpd
- 2012 Average Annual Daily Traffic on Christiana Road: 29,634 vpd

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 Olivero Property is located within Investment Level 1 area.

Investment Level 1

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 Olivero Property commercial development is located within Investment Level 1 area, and is to be developed 5,585 square feet gas station and convenience store with gasoline pumps. This type of development is consistent with the character of Investment Level 1 area. It is therefore concluded that the proposed development generally complies with the policies stated in the 2010 update of the "Strategies for State Policies and Spending."

Comprehensive Plan

New Castle County Comprehensive Plan:

(Source: New Castle County Comprehensive Plan Update, April 2012)

The proposed Olivero Property is located in an area with future land use designated as Office / Commercial / Industrial Development Area (OCI).

The parcel is currently zoned CR (Commercial Regional) and I (Industrial), and the developer does not plan to rezone the parcel. According to Section 40.02.225 and 40.02.227 of the New Castle County Unified Development Code (UDC), characteristics of the CR and I zoning districts, respectively, are as follows:

Characteristics of CR Zoning District

- This district is intended to provide for community and regional commercial services. Its character is suburban transition.
- Design controls are intended to promote circulation by foot and automobile within contiguous commercial or office areas. These design features are intended to lessen congestion on roads and create large commercial complexes rather than development strips.
- Mixed uses are permitted to provide residential customers within the development. Transit facilities are also required.
- The new areas to be zoned for this use should be large and deep. Small shallow frontages shall not be designated for this type of use.

Characteristics of I Zoning District

- This district retains the older industrial areas. The character of these areas is suburban transition. Many of these areas are existing industrial parks. In keeping with evolving employment trends, a wider range of uses is permitted.
- The intensities of this district are intended to encourage industrial types of uses.
- Exterior storage is permitted, but is limited and must be screened from the view of collector or arterial roads.
- This district is intended to work in general unison with the OR (Office Regional) and BP (Business Park) zoning districts to provide for a wide variety of uses by both location and general character to permit a consistency of employment related uses throughout the County.

According to section 40.02.130 of the New Castle County Unified Development Code, the provisions for developments located in more than one (1) zoning district are as follows:

Developments in more than one (1) zoning district

Where a tract or parcel of land is located in more than one (1) zoning district as of December 31, 1997, the development may be designed as if each district were a separate parcel or designed and developed as a single project. The following rules govern developments in two (2) or more districts which are developed as a single project:

- A concept plan shall be required as a condition of approval to shift densities.
- A nonresidential use shall not intrude into a residential district.
- The acreage in both districts may be used to determine minimum site area as provided in Article 4.
- The required open space and maximum dwelling units shall be the sum of that required by separate calculations for each district as provided in Article 5.

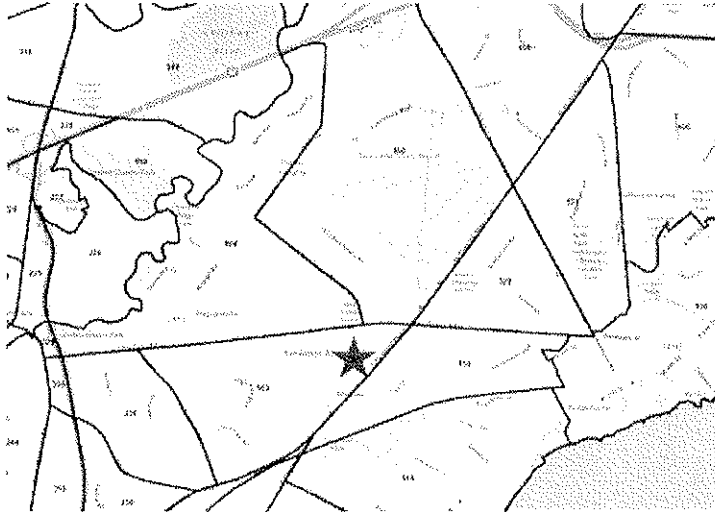
- The proportion of the density of the development in the two (2) districts need not be identical to that calculated for each district. The plan for allocating development shall be submitted as an exploratory plan for the entire property. Approval shall be based on the following criteria:
 - The proportion of land used for development shall be increased only in the higher intensity district, except as provided in E.2.
 - Where, for aesthetic or environmental reasons, the concept plan approval may permit the development to occur in the lower density zoning district resulting in the most optimum use of the site. The developer shall submit an environmental impact assessment report showing alternative siting options as part of the concept plan approval process. The above consideration and report must demonstrate the advantages of the proposed location as opposed to siting the development as required by E.1.
- Where a unified development straddles a district boundary, buffer yards are not needed between the development's portions. Where the development is in two (2) separate parts or alters use or density at the boundary, then the buffer requirements (see Table 40.04.111) shall be required.
- **Nonresidential access.** All nonresidential uses shall be permitted through-access and egress through all nonresidential zoning districts.

Proposed Development's Compatibility with Comprehensive Plan: The proposed Olivero Property is planned as a 5,585 square foot convenience store with gasoline pumps. Given that the site's future land use designation as CR and I zonings are both commercial and industrial in nature and the proposed land use (convenience market with gasoline pumps) is commercial, this development is consistent with the New Castle County Comprehensive Plan.

Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 163

TAZ Boundaries:



Current employment estimate for TAZ: 1,197 jobs in 2013

Future employment estimate for TAZ: 1,268 jobs in 2035

Current population estimate for TAZ: 8,438 people in 2013

Future population estimate for TAZ: 8,128 people in 2035

Current household estimate for TAZ: 3,435 houses in 2013

Future household estimate for TAZ: 3,445 houses in 2035

Relevant committed developments in TAZ: None

Would the addition of committed developments to current estimates exceed future projections: No

Would the addition of committed developments and the proposed development to current estimates exceed future projections: No for employment, no for households and population

Relevant Projects in the DelDOT Capital Transportation Program (FY 2013 – FY 2018)

DelDOT currently has no relevant 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:

- 5,585 square foot convenience market with gasoline pumps (ITE Land Use Code 853)

Table 1
 OLIVERO PROPERTY PEAK HOUR TRIP GENERATION

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
5,585 S.F. convenience market with gasoline pumps	115	114	229	143	142	285
PASS-BY TRIPS (AM 63%, PM 66%)	73	72	145	95	94	189
TOTAL TRIPS	42	42	84	48	48	96

Table 2
 OLIVERO PROPERTY DAILY TRIP GENERATION

Land Use	Weekday ADT		
	In	Out	Total
5,585 S.F. convenience market with gasoline pumps	2,361	2,362	4,723
Total Trips	2,361	2,362	4,723

Overview of TIS

Intersections examined:

- 1) Site Entrance & US Route 13
- 2) Site Entrance & Christiana Road (Delaware Route 273)
- 3) US Route 13 & Delaware Route 273

Conditions examined:

- 1) 2013 existing conditions (Case 1)
- 2) 2015 without Olivero Property (Case 2)
- 3) 2015 with Olivero Property (Case 3)

Peak hours evaluated:

Weekday morning and afternoon peak hours. As this TIS is for a commercial development, the morning peak period was designated for traffic counts from 7:00 AM to 9:00 AM and the afternoon peak period was designated for traffic counts from 4:00 PM to 6:00 PM, to reflect traffic conditions when afternoon traffic is at its peak.

Committed developments considered:

- 1) New Castle Town Center (476,248 square foot shopping center)
- 2) 130 South DuPont Commercial (15,760 square feet of commercial space)
- 3) Parkway Industrial Park (21,600 square feet of warehouse space)
- 4) Entrepreneurs Park (125,000 square feet of light industrial space)

Intersection Descriptions

1) Site Entrance & US Route 13

Type of Control: proposed two-way stop-controlled (T-intersection)

Northbound approach: (US Route 13) four through lanes, one left-turn lane, and one right-turn lane

Southbound approach: (US Route 13) four through lanes; proposed one right-turn lane

Eastbound approach: (Proposed Site Entrance) proposed one right-turn-only lane, stop controlled

2) Valley Road (Site Entrance) & Christiana Road

Type of Control: proposed two-way stop-controlled (T-intersection)

Northbound approach: (Valley Road) proposed one right-turn only lane, stop controlled

Eastbound approach: (Christiana Road) two through lanes; proposed one right-turn lane

Westbound approach: (Christiana Road) two through lanes and one left-turn lane

Note: Vehicles traveling westbound on Christiana Road will utilize the dedicated westbound U-turn lane, located just west of Valley Road, to potentially access the site.

3) **US Route 13 & Christiana Road**

Type of Control: signalized four-leg intersection

Northbound approach: (US Route 13) four through lanes, two left-turn lanes, and one right-turn lane

Southbound approach: (US Route 13) four through lanes, two left-turn lanes, and one right-turn lane

Eastbound approach: (Christiana Road) two through lanes, two left-turn lanes, and one right-turn lane

Westbound approach: (Christiana Road) two through lanes, two left-turn lanes, and one right-turn lane

Safety Evaluation

Crash Data: Crash data was obtained for July 2010 through July 2013 for the intersections and roadway segments within the study area. This included a total of 141 crashes, of which 91 occurred at or very near the intersection of US Route 13 and Christiana Road. As expected for signalized intersection crashes, the majority were either angle crashes or rear-end crashes. About 20% of the crashes resulted in injuries, but there were no fatal crashes reported in the study area during this three-year period.

Sight Distance: Valley Road would be located at the end of a horizontal curve; however it does not present potential sight distance issues for vehicles leaving the site.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: The Delaware Transit Corporation (DTC) currently operates two transit routes offering service near the proposed Olivero Property. DART Route 22, which offers weekday service connecting downtown Wilmington to Christiana, travels along US Route 13 and traverses along Christiana Road. DART Route 25, which offers weekday and weekend service connecting downtown Wilmington to Delaware City, travels along US Route 13. There are several bus stops in the vicinity of the proposed Olivero Property development. Of the nearest bus stops to the proposed development, one is located along Christiana Road west of Valley Road, and two are located along southbound US Route 13 with one situated north of the proposed development and the other just south of the proposed site entrance. DART Route 22 makes 26 round trips each weekday, 13 each Saturday, and 5 each Sunday. DART Route 25, makes 25 round trips each weekday, 12 each Saturday, and none on Sunday.

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Planned transit service: Mr. Wayne Henderson, a Service Development Planner for the DTC, provided comments on November 15, 22, and 25, 2013 regarding DTC's future plans for transit services in this area. He stated that the current DART Route 22 and 25 stops would serve as the transit infrastructure at this time.

Existing bicycle and pedestrian facilities: According to the bicycle level of service (BLOS) calculator developed by the *League of Illinois Bicyclists*, both US Route 13 and Christiana Road operate at BLOS A. There are currently no designated bicycle lanes in the study area. The only sidewalks in the area are found along the southbound side of US Route 13 for a short distance and along the northbound side of US Route 13 approximately 700 feet from the intersection of US Route 13 and Christiana Road. There are existing pedestrian facilities at the intersections of US Route 13 and Christiana Road.

Planned bicycle and pedestrian facilities: DelDOT contacted Marco Boyce, Anthony Aglio, and Sarah Coakley with DelDOT's Bicycle and Pedestrian Facilities Team via email on November 15, 2013 regarding planned or requested bicycle and pedestrian facilities in the area of the proposed Olivero Property development. Marco Boyce responded on November 15, 2013 with comments regarding bicycle and pedestrian facilities. He stated that he had interacted with a designer linked to the Olivero Property site and requested a buffered sidewalk from Christiana Road along Valley Road to the site frontage on US Route 13. He added that a buffered sidewalk is also needed along the US Route 13 site frontage with a sidewalk connection directly to the site frontage. A bike lane is needed along the site frontage on eastbound Christiana Road and along Valley Road and southbound US Route 13. Bike lanes should be striped in the shoulders of both roads to logical termini.

Previous Comments

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

General HCS Analysis Comments

(see table footnotes on the following pages for specific comments)

- 1) For unsignalized intersections, the TIS and DelDOT applied heavy vehicle (HV) percentages by movements. For signalized intersections, the TIS and DelDOT applied HV percentages by lane group. For future conditions, the TIS and DelDOT generally assumed future HV percentages to be the same as existing HV percentages.
- 2) For existing conditions at unsignalized intersections, the TIS and DelDOT determined and applied, for each intersection, the peak hour factor (PHF) by movements. For future conditions, the TIS assumed future PHF for some movements that were different from the PHF DelDOT applied. DelDOT used future PHF of 0.92 for movements that had significant increase in trips for future conditions.
- 3) The TIS and DelDOT input Right-Turn-on-Red (RTOR) volumes for signalized intersection analyses.
- 4) The TIS used a 6 percent down grade in the analysis of the intersection of US Route 13 and Site Entrance. DelDOT used a 3 percent down grade at that intersection.

Table 3
 PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Olivero Property
Report dated October 13, 2013
 Prepared by Duffield Associates, Inc.

Unsignalized Intersection ¹ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per DeIDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 & Site Entrance				
2013 without Olivero Property (Case 1)				
Northbound US Route 13 – Left	B (10.0)	D (29.8)	B (10.1)	D (28.0)
Eastbound Site Entrance – Right	B (10.5)	C (17.1)	B (11.0)	C (18.3)
2015 without Olivero Property (Case 2)				
Northbound US Route 13 – Left	B (10.3)	E (47.5)	B (10.6)	D (33.8)
Eastbound Site Entrance – Right	B (10.8)	C (18.0)	B (11.3)	C (19.4)
2015 with Olivero Property (Case 3)				
Northbound US Route 13 – Left	B (12.3)	E (40.3) ²	B (11.5)	F (51.1) ²
Eastbound Site Entrance – Right	B (10.9)	C (21.5) ²	B (11.8)	D (26.7) ²

¹ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

² The TIS mistakenly used lower northbound and southbound through volumes for US Route 13 approaches which resulted in better LOS. DeIDOT used the correct through volumes; therefore, LOS deteriorated.

Table 4
 PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Olivero Property
Report dated October 13, 2013
 Prepared by Duffield Associates, Inc.

Unsignalized Intersection ³ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per DeIDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Christiana Road & Site Entrance				
2013 without Olivero Property (Case 1)				
Westbound Christiana Road – Left	A (9.4)	B (10.5)	A (9.1)	B (10.9)
2015 without Olivero Property (Case 2)				
Westbound Christiana Road – Left	A (9.6)	B (11.8)	B (10.2)	B (12.5)
2015 with Olivero Property (Case 3)				
Westbound Christiana Road – Left	A (9.5)	B (11.6)	B (10.2)	B (12.6)
Northbound Site Entrance – Right	A (9.3)	A (9.7)	B (10.3)	B (12.2)

³ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 5
 PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Olivero Property
Report dated October 13, 2013
 Prepared by Duffield Associates, Inc.

Signalized Intersection ⁴	LOS per TIS ⁵		LOS per DelDOT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 & Christiana Road				
2013 Existing (Case 1)	E (55.8)	F (152.7)	D (52.3)	F (152.1)
2015 without Olivero Property (Case 2)	E (60.1)	F (178.9)	E (56.9)	F (183.8)
2015 with Olivero Property (Case 3)	E (61.1)	F (184.6)	E (59.5)	F (188.8)

⁴ For both unsignalized and signalized intersection analyses, the numbers in parentheses following levels of service (LOS) are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

⁵ TIS used 50th percentile queue length for all three cases for this intersection. In its review, DelDOT measures the 95th percentile queue length.