



March 29, 2018

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

RE: Agreement No. 1774
Project Number T201769002
Traffic Impact Study Services
Task 14A-Warren Tract a.k.a. Regency at Middletown

Dear Mr. Brestel:

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Impact Study (TIS) for the Warren Tract a.k.a. Regency at Middletown residential development, prepared by Century Engineering, Inc. dated December 2017. This task was assigned Task Number 14A. Century Engineering prepared the report in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TIS evaluates the impacts of a residential development proposed in New Castle County on the north side of the intersection of Port Penn Road (New Castle Road 2) and Pole Bridge Road (New Castle Road 420). Per the TIS, the development consists of 125 age-restricted detached houses with one access point along Port Penn Road. The subject property is on an approximately 120.25-acre assemblage of parcels currently zoned S (Suburban) and the developer does not plan to rezone the land. Construction is expected to be completed in 2022.

DelDOT currently has one relevant capital project within the study area: the *US 301 Mainline Project* (Contract Nos. T200911308, T200911302, T200911301, T201011302, T200911303, T201011301, T200811301, and T200911305) which contains improvements that aim to improve safety, manage truck traffic, and reduce traffic congestion. The project starts ¼ mile west of the Maryland/Delaware state line and ends approximately ½ mile north of the intersection of US Route 13 and Port Penn Road. The US 301 project will provide a new alignment for a four-lane tolled US 301 and the existing US 301 will be converted to a local roadway. The project is divided into several contracts that will be built concurrently. The construction of the projects started in 2016 and is expected to be completed in three years. Section 4 (Contract No. T200911305) of the project includes a new Spur Road which is planned to be built at a later date. Additional information regarding the US 301 Mainline Project can be found on the DelDOT website at: <https://www.deldot.gov/information/projects/us301/>

DelDOT's 2010 High Risk Rural Roads Program (HRRRP) identified one location within the project area. The HRRRP Site 9 is a 0.39-mile corridor along Port Penn Road from 0.18 mile west of Pole Bridge Road to 0.21-mile east of Pole Bridge Road. The report included a crash summary,



speed data, and a ball bank summary along Port Penn Road at the intersection with Pole Bridge Road. Recommendations from the report include signage and striping improvements (upgrade and new installation) in accordance with the *DE MUTCD* at the Port Penn Road/Pole Bridge Road intersection. These signage improvements include the installation of a STOP sign for the eastbound Port Penn Road right turn onto westbound Pole Bridge Road and the installation of a YIELD sign for the eastbound Port Penn Road right turn onto Pole Bridge Road. Based on field observations, the signage and striping improvements have been completed.

Delaware Route 9 and Port Penn Road are both part of Delaware's Bayshore Byway and the Harriet Tubman Underground Railroad Byway network. A collaborative effort by DelDOT, DNREC (Delaware Department of Natural Resources and Environmental Control), Delaware Greenways, Inc., and other groups developed the *Corridor Management Plan* in November 2013 for Delaware's Bayshore Byway. This was done as part of the *Delaware Byways Program*. The *Delaware Byways Program* includes the identification, promotion, preservation, and enhancement of Delaware roadways with at least one of the following qualities: scenic, historic, natural, cultural, recreational, and archaeological. Delaware's Bayshore Byway is an approximately 50-mile long section of roadway starting from the City of New Castle, traveling south on Delaware Route 9 and ending on the east side of the Dover Air Force Base at its junction with SR 1. A recommendation from the plan for Delaware Route 9 includes modifying any unimproved segments without paved shoulders to have 5-foot turf shoulders and minimum 10-foot wide travel lanes. Additional information regarding the Delaware's Bayshore Byway can be found at the DelDOT website: <https://deldot.gov/Programs/byways/index.shtml>

A collaborative effort by DelDOT, the Underground Railroad Coalition, and the FHWA created the *Corridor Management Plan* in May 2012 for the Harriet Tubman Underground Railroad Byway. This was created to provide a collection of information that will assist in the preservation, promotion, interpretation, enhancement, and management of the intrinsic resources found throughout the byway. The Harriet Tubman Underground Railroad Byway is approximately 98 miles long and travels from Sandtown in the southwestern part of Delaware and ends north of Wilmington at the Delaware/Pennsylvania border. A recommendation from the plan is to become familiar with the byway and reference the *Context Sensitive Solutions for Delaware Byways* manual when design elements are planned. Additional information regarding the Harriet Tubman Underground Railroad Byway can be found at the DelDOT website: <https://deldot.gov/Programs/byways/index.shtml>

Based on our review of the traffic impact study, we have the following comments and recommendations:

None of the intersections within the study area experience level of service (LOS) deficiencies in the existing scenario, nor are they anticipated to experience LOS deficiencies in 2022 with or without the proposed residential development. It should be noted that all the study intersections are two-way stop-controlled intersections, therefore the New Castle County Level of Service



(LOS) Standards as stated in Section 40.11.210 of the Unified Development Code (UDC) are not applicable as no all-way stop, roundabout, or signalized intersections were analyzed.

Although all the study intersections would operate at acceptable LOS, the installation of a bypass lane is recommended along the eastbound Port Penn Road approach to the site entrance. The bypass lane is warranted per DelDOT's *Development Coordination Manual*. Furthermore, the updated October 23, 2017 Auxiliary and Bypass Lane Warrants from DelDOT states that a bypass lane may be required for unique conditions, such as at age-restricted communities, to accommodate drivers who may wait for longer gaps to execute left turns.

Should New Castle County 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 developer should reconstruct Port Penn Road along the site frontage limits to provide two eleven-foot travel lanes and two five-foot shoulders. The developer should provide a bituminous concrete overlay to the existing travel lanes, at DelDOT's discretion. DelDOT should analyze the existing lane's pavement section and recommend an overlay thickness to the developer's engineer if necessary.

2. The developer should construct a full movement entrance on the northerly side of Port Penn Road, approximately 1,200 feet west of the Port Penn Road/Pole Bridge Road intersection, to be consistent with the proposed lane configurations as shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Port Penn Road	One through lane	One through lane and one bypass lane
Westbound Port Penn Road	One through lane	One through lane and one right turn lane
Southbound Site Entrance	Approach does not exist	One shared left turn/right turn lane

Based on DelDOT's *Development Coordination Manual* and the updated Auxiliary and Bypass Lane Warrants from October 23, 2017, the recommended minimum storage length (excluding taper) is 145 feet for the westbound Port Penn Road right turn lane and 50 feet for the eastbound Port Penn Road bypass lane. Per the October 23, 2017 Auxiliary and Bypass Lane Warrants from DelDOT, the approach taper length and departure taper length for the bypass lane are recommended to be 215 feet and 110 feet, respectively. The



calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths.

3. Per the site plan, two interconnections to the adjacent property (TP #13-009.00-016) are proposed on the westerly limits. Based on Section 3.5.7 of DelDOT's *Development Coordination Manual*, interconnections with age restricted communities are regulated by the provisions of 17 Del.C.§531. As interconnections with age-restricted communities are dependent on the adjacent land uses, easements to the neighboring parcels for future connectivity should be provided in lieu of the interconnections. The developer should coordinate with DelDOT's Development Coordination section during the plan review process to determine the exact limits of the easements.
4. The following bicycle, pedestrian, and transit improvements should be included:
 - a. As the proposed site is within an Investment Level 4 area and does not abut an existing facility, the provision of sidewalk or a shared-use-path is not required. Also, no fee in lieu of construction is required if a pedestrian facility is not required, at DelDOT's discretion. Although a pedestrian facility is not required, a minimum fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT along the Port Penn Road site frontage. The developer should coordinate with DelDOT's Development Coordination section during the plan review process to identify the exact locations of the easement.
 - b. All internal roads should be provided with sidewalks on both sides.
 - c. ADA compliant curb ramps and marked crosswalks should be provided at the site entrance. The use of diagonal curb ramps is discouraged.
 - d. Five-foot wide bicycle lanes should be incorporated in the shoulder along both directions of Port Penn Road within the site frontage limits.
 - e. When a right turn lane is added along Port Penn Road, a five-foot wide bicycle lane should be maintained through the right turn lane to facilitate safe and unimpeded bicycle travel. A RIGHT TURN YIELD TO BIKES sign (MUTCD R4-4) should be added before the start of each right turn lane.
 - f. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks/shared-use paths or should be flush with the pavement.



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 Plan Review process. 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 https://www.deldot.gov/Publications/manuals/de_mutcd/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Scott Neidert of DelDOT's Traffic Section. Mr. Neidert can be reached at (302) 659-4075 or by email at Scott.Neidert@state.de.us.

Additional details on our review of the TIS are attached. Please contact me at (302) 266-9600 if you have any questions concerning this review.

Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

Mir Wahed
Mir Wahed, P.E., PTOE

cc: Joanne Arellano, P.E., PTOE

Enclosure

General Information

Report date: December 2017

Prepared by: Century Engineering, Inc.

Prepared for: Gary C and Gale B Warren

Tax Parcel: 13-009.00-015 and 13-009.00-024

Generally consistent with DelDOT's *Development Coordination Manual*: Yes.

Project Description and Background

Description: The developer seeks to develop 125 age-restricted detached houses.

Location: The land is located on the north side of the intersection of Port Penn Road (New Castle Road 2) and Pole Bridge Road (New Castle Road 420) in New Castle County.

Amount of Land to be developed: The subject property is on an approximately 120.25-acre assemblage of parcels.

Land Use approval(s) needed: Entrance Plan approval.

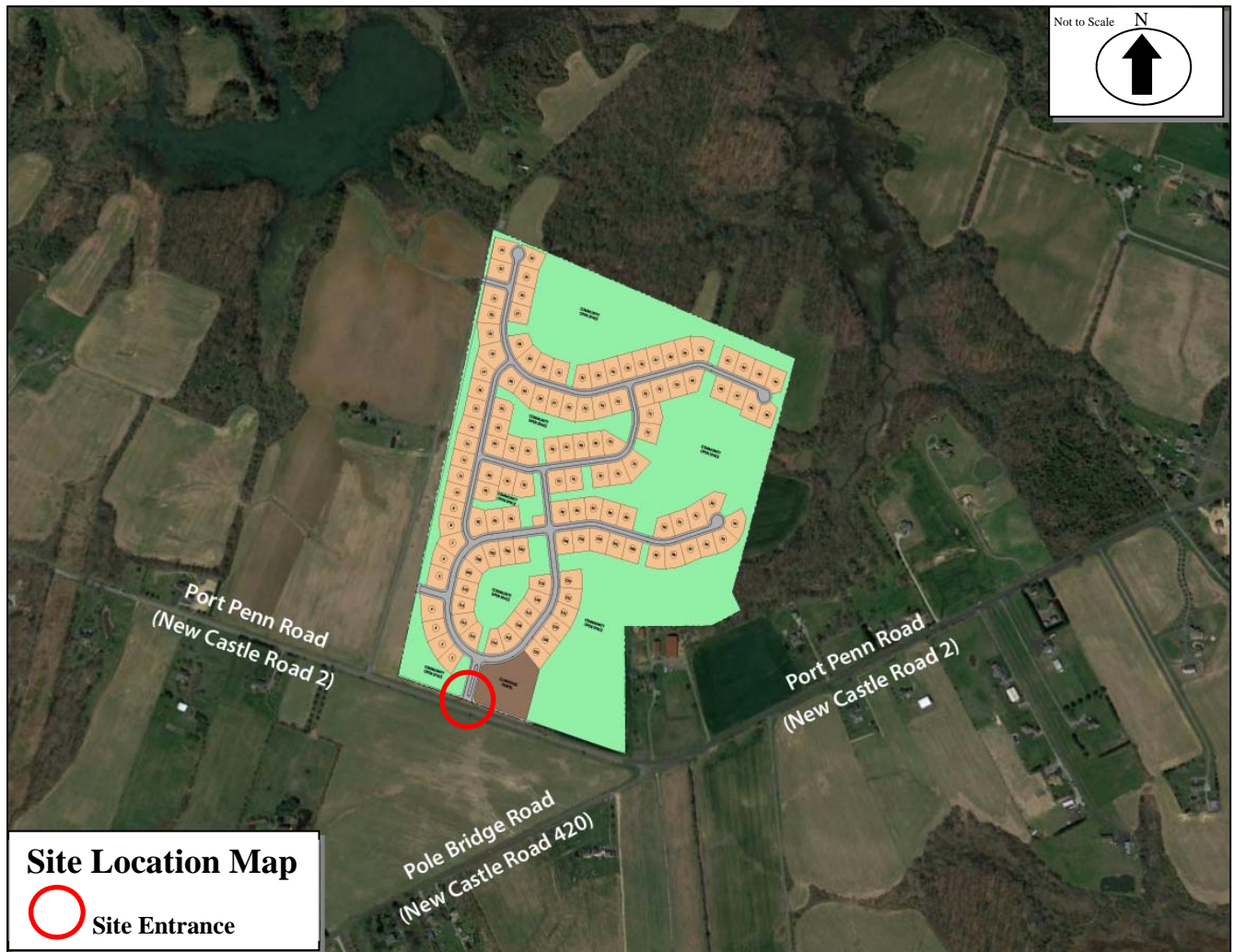
Proposed completion date: 2022

Proposed access locations: One full access is proposed along Port Penn Road.

Daily Traffic Volumes:

- 2017 Average Annual Daily Traffic on Port Penn Road: 1,165 vehicles per day.

Site Map



*Graphic is an approximation based on the TIS Exhibit Striping Plan prepared by Carpenter Engineering, LLC. dated September 20, 2017.

Relevant and On-going Projects

DelDOT currently has one relevant capital project within the study area: the *US 301 Mainline Project* (Contract Nos. T200911308, T200911302, T200911301, T201011302, T200911303, T201011301, T200811301, and T200911305) which contains improvements that aim to improve safety, manage truck traffic, and reduce traffic congestion. The project starts ¼ mile west of the Maryland/Delaware state line and ends approximately ½ mile north of the intersection of US Route 13 and Port Penn Road. The US 301 project will provide a new alignment for a four-lane tolled US 301 and the existing US 301 will be converted to a local roadway. The project is divided into several contracts that will be built concurrently. The construction of the projects started in 2016 and is expected to be completed in three years. Section 4 (Contract No. T200911305) of the project includes a new Spur Road which is planned to be built at a later date. Additional information regarding the US 301 Mainline Project can be found on the DelDOT website at:

<https://www.deldot.gov/information/projects/us301/>

DelDOT's 2010 High Risk Rural Roads Program (HRRRP) identified one location within the project area. The HRRRP Site 9 is a 0.39-mile corridor along Port Penn Road from 0.18 mile west of Pole Bridge Road to 0.21-mile east of Pole Bridge Road. The report included a crash summary, speed data, and a ball bank summary along Port Penn Road at the intersection with Pole Bridge Road. Recommendations from the report include signage and striping improvements (upgrade and new installation) in accordance with the *DE MUTCD* at the Port Penn Road/Pole Bridge Road intersection. These signage improvements include the installation of a STOP sign for the eastbound Port Penn Road right turn onto westbound Pole Bridge Road and the installation of a YIELD sign for the eastbound Port Penn Road right turn onto Pole Bridge Road. Based on field observations, the signage and striping improvements have been completed.

Delaware Route 9 and Port Penn Road are both part of Delaware's Bayshore Byway and the Harriet Tubman Underground Railroad Byway. A collaborative effort by DelDOT, DNREC (Delaware Department of Natural Resources and Environmental Control), Delaware Greenways, Inc., and other groups developed the *Corridor Management Plan* in November 2013 for Delaware's Bayshore Byway. This was done as part of the *Delaware Byways Program*. The *Delaware Byways Program* includes the identification, promotion, preservation, and enhancement of Delaware roadways with at least one of the following qualities: scenic, historic, natural, cultural, recreational, and archaeological. Delaware's Bayshore Byway is an approximately 50-mile long section of roadway starting from the City of New Castle, traveling south on Delaware Route 9 and ending on the east side of the Dover Air Force Base at its junction with SR 1. A recommendation from the plan for Delaware Route 9 includes modifying any unimproved segments without paved shoulders to have 5-foot turf shoulders and minimum 10-foot wide travel lanes. Additional information regarding the Delaware's Bayshore Byway can be found at the DelDOT website: <https://deldot.gov/Programs/byways/index.shtml>

A collaborative effort by DelDOT, the Underground Railroad Coalition, and the FHWA created the *Corridor Management Plan* in May 2012 for the Harriet Tubman Underground Railroad Byway. This was created to provide a collection of information that will assist in the preservation, promotion, interpretation, enhancement, and management of the intrinsic resources found throughout the byway. The Harriet Tubman Underground Railroad Byway is approximately 98 miles long and travels from Sandtown in the southwestern part of Delaware and ends north of Wilmington at the Delaware/Pennsylvania border. A recommendation from the plan is to become familiar with the byway and reference the *Context Sensitive Solutions for Delaware Byways* manual when design elements are planned. Additional information regarding the Harriet Tubman Underground Railroad Byway can be found at the DelDOT website: <https://deldot.gov/Programs/byways/index.shtml>

Livable Delaware

(Source: *Delaware Strategies for State Policies and Spending*, 2015)

Location with respect to the Strategies for State Policies and Spending Map of Delaware:

The proposed development is located within the Investment Level 4 area.

Investment Level 4

Delaware's Investment Level 4 Areas are rural in nature and are where the bulk of the state's open space/natural areas and agricultural industry is located. These areas contain agribusiness activities, farm complexes, and small settlements. They typically include historic crossroads or points of trade, often with rich cultural ties. Delaware's Investment Level 4 Areas are also the location of scattered residential uses, featuring almost entirely single-family detached residential structures. Delaware's Investment Level 4 Areas also include many unincorporated communities, typically with their own distinctive character and identity. Investment Level 4 Areas depend on a transportation system primarily of secondary roads linked to roadways used as regional thoroughfares for commuting and trucking.

It is the state's intent to discourage additional urban and suburban development in Investment Level 4 Areas unrelated to agriculture and to the areas' needs. In Investment Level 4 Areas, the state's investments and policies should retain the rural landscape and preserve open spaces and farmlands, support farmland-related industries, and establish defined edges to more concentrated development. The focus for the Level 4 Areas will be to preserve and maintain existing facilities in safe working order, corridor-capacity preservation, and the enhancement of transportation facilities to support agricultural business.

Proposed Development's Compatibility with Livable Delaware:

The proposed development is located in Investment Level 4 Areas. According to Livable Delaware, Level 4 areas contain single-family detached residential houses for those who value quiet settings. Therefore, the proposed development is generally consistent with the 2015 update of the Livable Delaware "Strategies for State Policies and Spending."

Comprehensive Plans

(Source: New Castle County, Comprehensive Plan Update, April 24, 2012)

New Castle County Comprehensive Plan:

The subject property is currently zoned as S (Suburban) in New Castle County and no rezoning is necessary to permit the proposed land use. According to the *New Castle County Comprehensive Plan*, the future land use of the property would be within the New Community Development Area which is expected to experience the development of new residential buildings. As such, the proposed development is generally compatible with the *New Castle County, Comprehensive Plan*.

Trip Generation

The trip generation for the proposed development was determined by using the comparable land use and rates/equations contained in the *Trip Generation, 9th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 251 (Senior Adult Housing-Detached).

The peak period trip generation utilized in the TIS for the proposed development is included in Table 1.

Table 1
Warren Tract Site Trip Generation

Land Use	ADT	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
125 Units Senior Adult Housing-Detached (ITE Code 251)	577	18	33	51	32	21	53

Overview of TIS

Intersections examined:

1. Port Penn Road (New Castle Road 2) / Site Entrance
2. Port Penn Road / Pine Valley Road
3. Port Penn Road / Dutch Neck Road (New Castle Road 417)
4. Dutch Neck Road / Windmill Way
5. Port Penn Road / Jeffery Pine Drive
6. Port Penn Road / Pole Bridge Road (New Castle Road 420)
7. Pole Bridge Road / Waterbird Lane
8. Pole Bridge Road / Augustine Boulevard / Snowy Egret Lane
9. Port Penn Road / Thorntown Road (New Castle Road 418)
10. Delaware Route 9 / Thorntown Road
11. Port Penn Road / Delaware Route 9

Conditions examined:

1. Case 1 – 2017 Existing
2. Case 2 – 2022 without development
3. Case 3 – 2022 with development

Peak hours evaluated: Weekday morning and weekday evening peak hours.

Committed Developments considered:

1. Lighthouse Farms (43 single-family detached houses)
2. Pennfield Subdivision (138 single-family detached houses)
3. Pine Valley Farms (12 single-family detached houses)

Intersection Descriptions

1. Port Penn Road (New Castle Road 2) / Site Entrance

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

Eastbound Approach: (Port Penn Road) existing one through lane; proposed one shared through/left turn lane

Westbound Approach: (Port Penn Road) existing one through lane; proposed one through lane and one right turn lane

Southbound Approach: (Site Entrance) proposed one shared left turn/right turn lane, stop controlled

2. Port Penn Road / Pine Valley Road

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

Eastbound Approach: (Port Penn Road) existing one shared through/right turn lane

Westbound Approach: (Port Penn Road) existing one shared through/left turn lane

Northbound Approach: (Pine Valley Road) existing one shared left turn/right turn lane, stop controlled

3. Port Penn Road / Dutch Neck Road (New Castle Road 417)

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

Eastbound Approach: (Port Penn Road) existing one shared through/left turn lane

Westbound Approach: (Port Penn Road) existing one shared through/right turn lane

Southbound Approach: (Dutch Neck Road) existing one shared left turn/right turn lane, stop controlled

4. Dutch Neck Road / Windmill Way

Type of Control: existing two-way stop controlled intersection

Eastbound Approach: (Windmill Way) existing one shared through/left turn/right turn lane, stop controlled

Westbound Approach: (Windmill Way) existing one shared through/left turn/right turn lane, stop controlled

Northbound Approach: (Dutch Neck Road) existing one shared through/left turn/right turn lane

Southbound Approach: (Dutch Neck Road) existing one shared through/left turn/right turn lane

5. Port Penn Road / Jeffery Pine Drive

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

Eastbound Approach: (Port Penn Road) existing one shared through/right turn lane

Westbound Approach: (Port Penn Road) existing one shared through/left turn lane

Northbound Approach: (Jeffery Pine Drive) existing one shared left turn/right turn lane, stop controlled

6. Port Penn Road / Pole Bridge Road (New Castle Road 420)

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

Eastbound Approach: (Port Penn Road) existing one through lane and one channelized stop controlled right turn lane

Westbound Approach: (Port Penn Road) existing one shared through/left turn lane

Northbound Approach: (Pole Bridge Road) existing one channelized left turn lane and one right turn lane, stop controlled

7. Pole Bridge Road / Waterbird Lane

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

Eastbound Approach: (Pole Bridge Road) existing one shared through/right turn lane

Westbound Approach: (Pole Bridge Road) existing one shared through/left turn lane

Northbound Approach: (Waterbird Lane) existing one shared left turn/right turn lane, stop controlled

8. Pole Bridge Road / Augustine Boulevard / Snowy Egret Lane

Type of Control: existing two-way stop controlled intersection

Eastbound Approach: (Pole Bridge Road) existing one shared through/left turn lane and one right turn lane

Westbound Approach: (Pole Bridge Road) existing one shared through/left turn lane and one right turn lane

Northbound Approach: (Snowy Egret Lane) existing one shared through/left turn/right turn lane, stop controlled

Southbound Approach: (Augustine Boulevard) existing one shared through/left turn/right turn lane, stop controlled

9. Port Penn Road / Thorntown Road (New Castle Road 418)

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

Eastbound Approach: (Port Penn Road) existing one shared through/left turn lane

Westbound Approach: (Port Penn Road) existing one shared through/right turn lane

Southbound Approach: (Thorntown Road) existing one shared left turn/right turn lane, stop controlled

10. Delaware Route 9 / Thorntown Road

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

Eastbound Approach: (Thorntown Road) existing one shared left turn/right turn lane, stop controlled

Northbound Approach: (Delaware Route 9) existing one shared through/left turn lane

Southbound Approach: (Delaware Route 9) existing one shared through/right turn lane

11. Port Penn Road / Delaware Route 9

Type of Control: existing two-way stop controlled intersection

Eastbound Approach: (Port Penn Road) existing one shared through/left turn lane

Westbound Approach: (Port Penn Road) existing one shared through/right turn lane

Southbound Approach: (Delaware Route 9) existing one left turn lane and one right turn lane, stop controlled

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Delaware Transit Corporation (DTC) currently does not provide any service in the study area.

Planned transit service: JMT contacted Mr. David Dooley, Senior Planner at the DTC. Per email correspondence on January 18, 2018 from Mr. Dooley the following improvement was recommended:

- To accommodate potential future service, pedestrian access should be provided along the Port Penn Road site frontage as well as within the development connecting to the Port Penn Road site frontage.

Existing bicycle and pedestrian facilities: According to DelDOT's *New Castle County Bicycle Map*, Statewide Bicycle, Regional Bicycle and Connector Bicycle routes exist within the study area. The Statewide Bicycle Route exists along Port Penn Road and traverses through seven of the study intersections. The Regional Bicycle Route exists along Delaware Route 9 and traverses through two study intersections. The Connector Bicycle Route exists along Pole Bridge Road and traverses through three study intersections. No pedestrian facilities exist within the study area.

Planned bicycle and pedestrian facilities: Per email correspondence on January 12, 2018 from Mr. John Fiori, DelDOT's Bicycle Coordinator, the following improvements were recommended:

- The installation of W11-1 (bicycle warning) signs for roadways with narrow travel lanes and no shoulders.
- A 10' shared use path should be installed if a pedestrian facility is required.
- Along Port Penn Road, the site entrance and any roadway/intersection improvements shall incorporate bicycle and pedestrian facilities, which will include but is not limited to providing a shoulder across the site frontage.
- Cross-access to adjoining properties for motorized and non-motorized use.

Bicycle Level of Service and Bicycle Compatibility Index: According to the League of Illinois Bicyclists (LIB), Bicycle Level of Service (BLOS) is an emerging national standard for quantifying the bike-friendliness of a roadway by measuring on-road bicyclist comfort levels for specific roadway geometries and traffic conditions. Utilizing the 10-year projected AADT along the Port Penn Road frontage with a 50 miles per hour speed limit, and the provision of a 5-foot bike lane, the BLOS with the full build out construction of the proposed development are summarized below. The BLOS was determined utilizing the calculators published on the LIB website:

<http://rideillinois.org/blos/blosform.htm>

- Port Penn Road – BLOS: B (1.51-2.50)

Previous Comments

The comments from the Preliminary TIS have been addressed in the TIS.

General HCS Analysis Comments

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

1. For the intersection analyses, the TIS used HCS7 version 7.2.1 whereas JMT used HCS 2010, version 6.90.
2. Per DelDOT's *Development Coordination Manual*, JMT used a heavy vehicle percentage of 3% for each movement in a future scenario analysis, unless the existing heavy vehicle percentage was greater than 3% and there was no significant increase of vehicles along that movement, in which case the existing heavy vehicle percentage was used for analysis of future scenarios. The TIS maintained the heavy vehicle percentages utilized in their existing cases throughout the future cases.
3. Per DelDOT's *Development Coordination Manual*, JMT utilized the future PHF of 0.80 for roadways with less than 500 vph, 0.88 for roadways between 500 and 1,000 vph, and 0.92 for roadways with more than 1,000 vph or the existing PHF, whichever was higher, whereas the TIS utilized existing or arbitrary factors.
4. JMT utilized updated Cases 1, 2 and 3 volumes. As discussed with DelDOT, the updated volumes were created to address some volume development inconsistencies identified in the TIS report.

Table 2
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road (New Castle Road 2)/ Site Entrance				
2017 Existing (Case 1) ²				
Eastbound Port Penn Road Left Turn	A (7.3)	A (7.3)	-	-
Eastbound Port Penn Road Approach	A (0.0)	A (0.1)	-	-
Southbound Site Entrance Approach	A (8.5)	A (5.0)	-	-
2022 Without development (Case 2) ²				
Eastbound Port Penn Road Left Turn	A (7.3)	A (7.4)	-	-
Eastbound Port Penn Road Approach	A (0.1)	A (0.1)	-	-
Southbound Site Entrance Approach	A (8.5)	A (5.0)	-	-
2022 With development (Case 3) ³				
Eastbound Port Penn Road Left Turn	A (7.3)	A (7.4)	A (7.4)	A (7.4)
Eastbound Port Penn Road Approach	A (1.5)	A (1.8)	A (1.5)	A (1.8)
Southbound Site Entrance Approach	A (8.9)	A (9.3)	A (9.1)	A (9.3)

¹ For all the analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

² JMT did not analyze Cases 1 and 2 as a driveway does not exist at the proposed site entrance location.

³ For the PM peak hour, the TIS used a volume of 6 for the westbound Port Penn Road right turn movement whereas JMT utilized a volume of 11 consistent with the Case 3 volume diagram (Figure 25).

Table 2 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road (New Castle Road 2)/ Site Entrance				
2022 With development (Case 3) and Auxiliary Lanes ⁴				
Eastbound Port Penn Road Left Turn	-	-	A (7.4)	A (7.4)
Eastbound Port Penn Road Approach	-	-	A (1.4)	A (1.7)
Southbound Site Entrance Approach	-	-	A (9.0)	A (9.2)

⁴ Auxiliary Lanes scenario includes the provision of an eastbound Port Penn Road bypass lane and a westbound Port Penn Road right turn lane. The TIS did not conduct a scenario with auxiliary lanes provided along Port Penn Road.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road/Pine Valley Road				
2017 Existing (Case 1)				
Westbound Port Penn Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Westbound Port Penn Road Approach	A (1.3)	A (2.3)	A (1.3)	A (2.3)
Northbound Pine Valley Drive Approach	A (8.8)	A (8.8)	A (8.8)	A (8.8)
2022 Without development (Case 2)				
Westbound Port Penn Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Westbound Port Penn Road Approach	A (1.2)	A (2.4)	A (1.3)	A (2.2)
Northbound Pine Valley Drive Approach	A (8.9)	A (8.9)	A (8.9)	A (8.9)
2022 With development (Case 3)				
Westbound Port Penn Road Left Turn	A (7.3)	A (7.4)	A (7.4)	A (7.4)
Westbound Port Penn Road Approach	A (0.8)	A (1.9)	A (0.8)	A (1.7)
Northbound Pine Valley Drive Approach	A (9.1)	A (9.1)	A (9.0)	A (9.0)

Table 4
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road/Dutch Neck Road (New Castle Road 417)				
2017 Existing (Case 1)				
Eastbound Port Penn Road Left Turn	A (7.6)	A (7.4)	A (7.6)	A (7.4)
Eastbound Port Penn Road Approach	A (2.3)	A (4.4)	A (2.3)	A (4.4)
Southbound Dutch Neck Road Approach	A (9.1)	A (9.2)	A (9.1)	A (9.2)
2022 Without development (Case 2)				
Eastbound Port Penn Road Left Turn	A (7.6)	A (7.4)	A (7.6)	A (7.4)
Eastbound Port Penn Road Approach	A (2.2)	A (4.3)	A (2.0)	A (4.3)
Southbound Dutch Neck Road Approach	A (9.1)	A (9.2)	A (9.0)	A (9.3)
2022 With development (Case 3)				
Eastbound Port Penn Road Left Turn	A (7.7)	A (7.4)	A (7.7)	A (7.5)
Eastbound Port Penn Road Approach	A (1.6)	A (3.6)	A (1.5)	A (3.6)
Southbound Dutch Neck Road Approach	A (9.3)	A (9.4)	A (9.2)	A (9.4)

Table 5
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Dutch Neck Road/Windmill Way				
2017 Existing (Case 1)				
Eastbound Windmill Way Approach	A (8.5)	A (8.5)	A (8.5)	A (8.5)
Westbound Windmill Way Approach	A (8.9)	A (9.3)	A (8.9)	A (9.3)
Northbound Dutch Neck Road Left Turn	A (7.2)	A (7.3)	A (7.2)	A (7.3)
Northbound Dutch Neck Road Approach	A (1.0)	A (2.7)	A (1.0)	A (2.7)
Southbound Dutch Neck Road Left Turn	A (7.2)	A (7.3)	A (7.2)	A (7.3)
Southbound Dutch Neck Road Approach	A (0.7)	A (1.0)	A (0.7)	A (1.0)
2022 Without development (Case 2)				
Eastbound Windmill Way Approach	A (8.5)	A (8.5)	A (8.5)	A (8.5)
Westbound Windmill Way Approach	A (8.9)	A (9.3)	A (8.8)	A (9.3)
Northbound Dutch Neck Road Left Turn	A (7.2)	A (7.3)	A (7.3)	A (7.3)
Northbound Dutch Neck Road Approach	A (1.0)	A (2.6)	A (0.7)	A (2.7)
Southbound Dutch Neck Road Left Turn	A (7.2)	A (7.3)	A (7.2)	A (7.3)
Southbound Dutch Neck Road Approach	A (0.6)	A (1.0)	A (0.4)	A (1.1)

Table 5 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Dutch Neck Road/Windmill Way				
2022 With development (Case 3)				
Eastbound Windmill Way Approach	A (8.5)	A (8.5)	A (8.5)	A (8.5)
Westbound Windmill Way Approach	A (8.9)	A (9.3)	A (8.8)	A (9.3)
Northbound Dutch Neck Road Left Turn	A (7.2)	A (7.3)	A (7.3)	A (7.3)
Northbound Dutch Neck Road Approach	A (1.0)	A (2.6)	A (0.7)	A (2.7)
Southbound Dutch Neck Road Left Turn	A (7.2)	A (7.3)	A (7.2)	A (7.3)
Southbound Dutch Neck Road Approach	A (0.6)	A (1.0)	A (0.4)	A (1.1)

Table 6
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road/Jeffery Pine Drive				
2017 Existing (Case 1)				
Westbound Port Penn Road Left Turn	A (7.3)	A (7.5)	A (7.3)	A (7.5)
Westbound Port Penn Road Approach	A (0.0)	A (0.7)	A (0.0)	A (0.7)
Northbound Jeffery Pine Drive Approach	A (9.5)	A (9.5)	A (9.5)	A (9.5)
2022 Without development (Case 2)				
Westbound Port Penn Road Left Turn	A (7.3)	A (7.5)	A (7.3)	A (7.6)
Westbound Port Penn Road Approach	A (0.0)	A (0.7)	A (0.0)	A (0.7)
Northbound Jeffery Pine Drive Approach	A (9.6)	A (9.6)	A (9.5)	A (9.7)
2022 With development (Case 3)				
Westbound Port Penn Road Left Turn	A (7.3)	A (7.6)	A (7.3)	A (7.6)
Westbound Port Penn Road Approach	A (0.0)	A (0.6)	A (0.0)	A (0.6)
Northbound Jeffery Pine Drive Approach	A (9.9)	A (9.9)	A (9.8)	A (9.9)

Table 7
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road/Pole Bridge Road (New Castle Road 420) ⁵				
2017 Existing (Case 1)				
Westbound Port Penn Road Left Turn	A (7.5)	A (7.4)	-	-
Westbound Port Penn Road Approach	A (4.0)	A (4.1)	-	-
Northbound Pole Bridge Road Approach	A (9.0)	A (9.1)	-	-
2022 Without development (Case 2)				
Westbound Port Penn Road Left Turn	A (7.5)	A (7.4)	-	-
Westbound Port Penn Road Approach	A (4.0)	A (4.1)	-	-
Northbound Pole Bridge Road Approach	A (9.0)	A (9.2)	-	-
2022 With development (Case 3)				
Westbound Port Penn Road Left Turn	A (7.5)	A (7.4)	-	-
Westbound Port Penn Road Approach	A (3.9)	A (3.9)	-	-
Northbound Pole Bridge Road Approach	A (9.2)	A (9.3)	-	-

⁵ Due to the unique configuration of the Port Penn Road/Pole Bridge Road (New Castle Road 420) intersection, JMT separated the intersection into 3 independent analysis locations and the results are depicted in Tables 7-a, 7-b and 7-c.

Table 7-a
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road/Pole Bridge Road (New Castle Road 420) ⁶				
2017 Existing (Case 1)				
Eastbound Port Penn Road Right Turn	-	-	A (8.6)	A (8.6)
Northbound Pole Bridge Road Left Turn	-	-	A (7.4)	A (7.3)
Northbound Pole Bridge Road Approach	-	-	A (2.8)	A (2.3)
2022 Without development (Case 2)				
Eastbound Port Penn Road Right Turn	-	-	A (8.6)	A (8.7)
Northbound Pole Bridge Road Left Turn	-	-	A (7.4)	A (7.4)
Northbound Pole Bridge Road Approach	-	-	A (2.9)	A (2.7)
2022 With development (Case 3)				
Eastbound Port Penn Road Right Turn	-	-	A (8.7)	A (8.7)
Northbound Pole Bridge Road Left Turn	-	-	A (7.4)	A (7.4)
Northbound Pole Bridge Road Approach	-	-	A (3.3)	A (3.2)

⁶ Due to the unique configuration of the Port Penn Road/Pole Bridge Road (New Castle Road 420) intersection, JMT separated the intersection into 3 independent analysis locations. This table depicts the analysis conducted at the location with the eastbound Port Penn Road approach modeled as a stop-controlled right turn for the right turn movements from Port Penn Road to Pole Bridge Road, the westbound Port Penn Road approach modeled as a through lane for the left turn movement from Port Penn Road westbound to Pole Bridge Road, and the northbound Pole Bridge Road approach modeled as a shared through/left turn lane for the right and left turn movements from Pole Bridge Road to Port Penn Road.

Table 7-b
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road/Pole Bridge Road (New Castle Road 420) ⁷				
2017 Existing (Case 1)				
Northbound Pole Bridge Road Left Turn	-	-	A (9.0)	A (8.9)
2022 Without development (Case 2)				
Northbound Pole Bridge Road Left Turn	-	-	A (9.0)	A (9.0)
2022 With development (Case 3)				
Northbound Pole Bridge Road Left Turn	-	-	A (9.1)	A (9.1)

⁷ Due to the unique configuration of the Port Penn Road/Pole Bridge Road (New Castle Road 420) intersection, JMT separated the intersection into 3 independent analysis locations. This table depicts the analysis conducted at the location with the eastbound Port Penn Road approach modeled as a shared through/right turn lane, westbound Port Penn Road approach modeled as a through lane for the Port Penn Road westbound through movements, and the northbound Pole Bridge Road approach modeled as a left turn lane for left turn movements from Pole Bridge Road to Port Penn Road.

Table 7-c
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road/Pole Bridge Road (New Castle Road 420) ⁸				
2017 Existing (Case 1)				
Westbound Port Penn Road Left Turn	-	-	A (7.4)	A (7.3)
Westbound Port Penn Road Approach	-	-	A (4.0)	A (4.0)
Northbound Pole Bridge Road Right Turn	-	-	A (8.5)	A (8.5)
2022 Without development (Case 2)				
Westbound Port Penn Road Left Turn	-	-	A (7.4)	A (7.3)
Westbound Port Penn Road Approach	-	-	A (4.0)	A (4.0)
Northbound Pole Bridge Road Right Turn	-	-	A (8.5)	A (8.5)
2022 With development (Case 3)				
Westbound Port Penn Road Left Turn	-	-	A (7.4)	A (7.3)
Westbound Port Penn Road Approach	-	-	A (3.8)	A (3.9)
Northbound Pole Bridge Road Right Turn			A (8.5)	A (8.5)

⁸ Due to the unique configuration of the Port Penn Road/Pole Bridge Road (New Castle Road 420) intersection, JMT separated the intersection into 3 independent analysis locations. This table depicts the analysis conducted at the location with the eastbound Port Penn Road approach modeled as a through lane for the Port Penn Road eastbound through movements, the westbound Port Penn Road approach modeled as a shared through/left-turn lane, and the northbound Pole Bridge Road approach modeled as a right turn lane for the right turn movements from Pole Bridge Road to Port Penn Road.

Table 8
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Pole Bridge Road/Waterbird Lane				
2017 Existing (Case 1)				
Westbound Pole Bridge Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Westbound Pole Bridge Road Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Northbound Waterbird Lane Approach	A (9.4)	A (9.5)	A (9.4)	A (9.5)
2022 Without development (Case 2)				
Westbound Pole Bridge Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Westbound Pole Bridge Road Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Northbound Waterbird Lane Approach	A (9.6)	A (9.5)	A (9.5)	A (9.6)
2022 With development (Case 3)				
Westbound Pole Bridge Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Westbound Pole Bridge Road Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Northbound Waterbird Lane Approach	A (9.5)	A (9.7)	A (9.5)	A (9.7)

Table 9
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Pole Bridge Road/Augustine Boulevard/ Snowy Egret Lane ^{9,10,11}				
2017 Existing (Case 1)				
Eastbound Pole Bridge Road Left turn	A (7.4)	A (7.5)	A (7.5)	A (7.5)
Eastbound Pole Bridge Road Approach	A (1.6)	A (2.3)	A (1.7)	A (2.3)
Westbound Pole Bridge Road Left Turn	A (7.3)	A (7.5)	A (7.3)	A (7.5)
Westbound Pole Bridge Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Northbound Snowy Egret Lane Approach	B (10.2)	B (11.1)	A (9.9)	B (10.6)
Southbound Augustine Boulevard Approach	A (9.0)	A (9.1)	A (9.0)	A (9.0)
2022 Without development (Case 2)				
Eastbound Pole Bridge Road Left turn	A (7.4)	A (7.5)	A (7.5)	A (7.5)
Eastbound Pole Bridge Road Approach	A (1.6)	A (2.3)	A (1.6)	A (2.3)
Westbound Pole Bridge Road Left Turn	A (7.3)	A (7.5)	A (7.3)	A (7.5)
Westbound Pole Bridge Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Northbound Snowy Egret Lane Approach	B (10.4)	B (11.2)	B (10.0)	B (10.8)
Southbound Augustine Boulevard Approach	A (9.1)	A (9.1)	A (9.1)	A (9.1)

⁹ During the AM peak hour, JMT utilized heavy vehicle percentages consistent with the traffic count data whereas the TIS did not.

¹⁰ JMT configured westbound Snowy Egret Lane approach as a Flared approach but the TIS did not.

¹¹ During the AM peak hour, JMT input a volume 1 for the northbound Snowy Egret Lane right turn movement to generate a delay result for the Flared approach condition.

Table 9 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Pole Bridge Road/Augustine Boulevard/ Snowy Egret Lane ^{9,10,11}				
2022 With development (Case 3)				
Eastbound Pole Bridge Road Left turn	A (7.4)	A (7.5)	A (7.5)	A (7.5)
Eastbound Pole Bridge Road Approach	A (1.5)	A (2.2)	A (1.5)	A (2.2)
Westbound Pole Bridge Road Left Turn	A (7.3)	A (7.5)	A (7.3)	A (7.5)
Westbound Pole Bridge Approach	A (0.0)	A (0.0)	A (0.0)	A (0.0)
Northbound Snowy Egret Lane Approach	B (10.4)	B (11.4)	B (10.2)	B (11.0)
Southbound Augustine Boulevard Approach	A (9.1)	A (9.1)	A (9.1)	A (9.1)

Table 10
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road/Thorntown Road (New Castle Road 418)				
2017 Existing (Case 1)				
Eastbound Port Penn Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Eastbound Port Penn Road Approach	A (3.1)	A (3.4)	A (3.1)	A (3.4)
Southbound Thorntown Road Approach	A (8.6)	A (8.7)	A (8.6)	A (8.7)
2022 Without development (Case 2)				
Eastbound Port Penn Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Eastbound Port Penn Road Approach	A (3.0)	A (3.4)	A (3.1)	A (3.2)
Southbound Thorntown Road Approach	A (8.6)	A (8.7)	A (8.6)	A (8.7)
2022 With development (Case 3)				
Eastbound Port Penn Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Eastbound Port Penn Road Approach	A (3.1)	A (3.4)	A (3.2)	A (3.3)
Southbound Thorntown Road Approach	A (8.6)	A (8.8)	A (8.6)	A (8.7)

Table 11
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Delaware Route 9/Thorntown Road				
2017 Existing (Case 1)				
Eastbound Thorntown Approach	A (9.0)	A (9.2)	A (9.0)	A (9.2)
Northbound Delaware Route 9 Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Northbound Delaware Route 9 Approach	A (0.4)	A (0.6)	A (0.4)	A (0.6)
2022 Without development (Case 2)				
Eastbound Thorntown Approach	A (9.0)	A (9.2)	A (9.0)	A (9.3)
Northbound Delaware Route 9 Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Northbound Delaware Route 9 Approach	A (0.3)	A (0.6)	A (0.3)	A (0.6)
2022 With development (Case 3)				
Eastbound Thorntown Approach	A (9.0)	A (9.2)	A (9.0)	A (9.3)
Northbound Delaware Route 9 Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Northbound Delaware Route 9 Approach	A (0.3)	A (0.6)	A (0.3)	A (0.6)

Table 12
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Warren Tract a.k.a Regency at Middletown
Report Dated: December 2017
Prepared by Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Port Penn Road/Delaware Route 9				
2017 Existing (Case 1) ¹²				
Eastbound Port Penn Road Left Turn	A (7.4)	A (7.4)	A (7.4)	A (7.4)
Eastbound Port Penn Road Approach	A (2.6)	A (4.7)	A (2.6)	A (4.7)
Southbound Delaware Route 9 Approach	A (9.0)	A (9.2)	A (9.0)	A (9.1)
2022 Without development (Case 2)				
Eastbound Port Penn Road Left Turn	A (7.4)	A (7.5)	A (7.4)	A (7.5)
Eastbound Port Penn Road Approach	A (2.7)	A (4.9)	A (2.5)	A (4.7)
Southbound Delaware Route 9 Approach	A (9.0)	A (9.2)	A (9.0)	A (9.2)
2022 With development (Case 3)				
Eastbound Port Penn Road Left Turn	A (7.4)	A (7.5)	A (7.4)	A (7.5)
Eastbound Port Penn Road Approach	A (2.6)	A (4.6)	A (2.4)	A (4.5)
Southbound Delaware Route 9 Approach	A (9.0)	A (9.2)	A (9.0)	A (9.2)

¹² During the AM peak hour, JMT utilized a heavy vehicle percentage consistent with the traffic count data along the Port Penn Road approach whereas the TIS did not.