



February 4, 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 9A – Reserves at Nassau 2**

Dear Mr. Brestel,

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Reserves at Nassau 2 prepared by Davis, Bowen & Friedel, Inc. (DBF), dated November 2014. This review was assigned as Task Number 1 (Subtask 9A). DBF 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 Reserves at Nassau 2 age-restricted residential development, proposed to be located on the northbound side of Delaware Route 1 (Coastal Highway / Sussex Road 14), bounded by Tulip Drive to the south, the Penn Central Railroad line to the north, The Villages of Five Points and the Atlantic Concrete Plant to the east, and the Taramino Townhomes and the Reserves of Nassau development to the west, in Sussex County, Delaware. The proposed residential development would include 43 single-family detached houses, 46 duplex units, and 58 townhouses, all age-restricted by deed, on approximately 36.98 acres of land. Two intersections are treated as the site access. The intersection of Delaware Route 1 and Tulip Drive/Slipper Shell Way is treated as the site access because Tulip Drive is an existing subdivision street that would provide access to the site. A second intersection, proposed at an existing 90-degree bend in Tulip Drive, is also being treated as the site access. There, site access will be added as a north leg and the existing westbound Tulip Drive approach will be converted to a stop-controlled, minor street approach. Construction is anticipated to be complete by 2019.

The land is currently zoned AR-1 (Agricultural Residential) with a small portion zoned MR (Medium-Density Residential). The developer proposes rezoning to entirely MR with a Conditional Use for townhomes.

DelDOT currently has one relevant project in the study area, the SR 1 Pedestrian Improvements Project. The project, now under construction, will provide sidewalks along Delaware Route 1 from north of Five Points to the Lewes-Rehoboth Canal. Sidewalks will be provided along Delaware Route 1 along the church site frontage and towards the Nassau Bridge. This project is designed and funded, with construction planned to begin in the fall of 2014.



In addition, it is noted that there is another DelDOT project in the area of the site, the Georgetown to Lewes Trail, Phase I Design. The trail will be located on one side of the existing railroad tracks on the north side of the site, but the location has not been determined. In order to accommodate a potential trail along the site side of the railroad tracks, a 5-foot easement is proposed to be established for the trail providing 20 feet from the bottom of the bank of the rail line to the edge of the easement. The developer has agreed to provide a parking area near the potential trail location in an area also adjacent to The Villages of Five Points mixed-use development, as well as a trail connection from the parking area to the property line for the adjacent development.

Per the DelDOT TIS Scoping Meeting Minutes, a Traffic Signal Justification Study was required for the intersection of SR 1 and Tulip Drive/Slipper Shell Way as part of the TIS. The existing intersection currently has signal equipment, but operates in yellow flashing mode except during church services when the signal is manually controlled by a Delaware State Trooper. The signal justification study included in the TIS concluded that the traffic volumes at the intersection for both existing and proposed conditions do not meet the necessary warrants for converting the signal into full stop-and-go mode. McCormick Taylor conducted a separate signal warrant analysis based on the existing and projected volumes, and concurred that a fully operational traffic signal is not warranted at this location. McCormick Taylor also performed signalized HCS analysis on the intersection and found that it would operate at an acceptable level of service for all scenarios if it were to be converted to full stop-and-go mode.

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

The following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements:

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
Delaware Route 1 & Tulip Drive / Slipper Shell Way	Unsignalized	2014 Existing Summer Saturday (Case 1); 2019 Weekday PM and Summer Saturday without Reserves at Nassau 2 (Case 2); 2019 Weekday PM and Summer Saturday with Reserves at Nassau 2 (Case 3)

The westbound Tulip Drive approach exhibits LOS deficiencies during existing summer Saturday conditions and for future summer Saturday conditions without and with the proposed Reserves at Nassau 2 development. LOS deficiencies are also present during the weekday PM peak hour during future conditions without and with the Reserves at Nassau 2. The eastbound Slipper Shell Way right-out movement also experiences LOS deficiencies during the summer Saturday peak period for future conditions without and with the Reserves at Nassau 2.

Despite the minor street LOS deficiencies, we do not recommend that any further improvements be implemented by the developer at this intersection beyond those described below in Item No.

2. The anticipated LOS deficiencies would only occur for the relatively low-volume minor street movements. The 95<sup>th</sup> percentile queue length for the westbound left-turn movement from Tulip Drive is projected to be approximately 5 vehicles long during the summer Saturday peak hour, while the longest 95<sup>th</sup> percentile queue on the eastbound Slipper Shell Way is projected to be approximately 2 vehicles long, also during the summer Saturday peak period. The installation of a fully operational traffic signal would not be warranted based on the projected volumes, and the addition of a signal would cause more delays and queueing on Delaware Route 1. The only time that Tulip Drive experiences heavy volumes that would warrant a signal is during church services when the signal is manually controlled by a traffic officer. The other alternative would be to restrict the westbound left-turn movement from Tulip Drive to southbound Delaware Route 1. Restricting this movement, however, would create a potentially unsafe weave condition with traffic turning right out of Tulip Drive and quickly weaving over to the left turn lane of northbound Delaware Route 1 at Nassau Road (within a distance of approximately 600 feet) to make a u-turn onto southbound SR 1. Otherwise, motorists would be forced to take a lengthy diversion route across the Nassau Bridge to make a u-turn more than a half-mile further north on Delaware Route 1.

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 access at the existing 90-degree bend in Tulip Drive. The site access will be added as a north leg and the existing westbound Tulip Drive approach will be converted to a stop-controlled, minor street approach. An MUTCD compliant STOP sign (R1-1) should be installed on the westbound Tulip Drive approach. The proposed configuration is shown in the table below.

<b>Approach</b>	<b>Current Configuration</b>	<b>Proposed Configuration</b>
Northbound Tulip Drive	One through lane (bend in road)	One shared through/right-turn lane
Southbound Site Access	Approach does not exist	One shared through/left-turn lane
Westbound Tulip Drive	One through lane (bend in road)	One shared left/right-turn lane (stop-controlled)

2. The developer should improve the existing intersection / site entrance of Delaware Route 1 and Tulip Drive / Slipper Shell Way. The improvements at the intersection are limited to extending the Delaware Route 1 auxiliary lanes. Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DeIDOT's Subdivision Section to determine final turn-lane lengths during the site plan review process.

Approach	Left-Turn Lane(s)	Right-Turn Lane
Northbound Delaware Route 1	N/A	410 feet *
Southbound Delaware Route 1	185 feet **	230 feet ***

\* Existing length is approx. 120 feet (excluding taper). Proposed turn-lane length based on DelDOT's *Auxiliary Lane Worksheet*.

\*\* Existing length is approx. 110 feet (excluding taper). Proposed turn-lane length based on DelDOT's *Auxiliary Lane Worksheet*.

\*\*\* Existing turn lane length (excluding taper). No lengthening required.

3. The following bicycle, pedestrian, and transit improvements should be included:
  - a. Utility covers should be made flush with the pavement.
  - b. A minimum 5-foot wide easement from the edge of the railroad right-of-way should be dedicated to DelDOT to allow for a potential 10-foot wide shared use path and buffer as part of the Georgetown to Lewes Trail project.
  - c. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
  - d. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the development. These sidewalks should each be a minimum of five feet wide (with a minimum of a five-foot buffer from the roadway) and should meet current AASHTO and ADA standards. The proposed sidewalks should connect to the future trail along the railroad line, as well as to the Villages of Five Points pathway loop.
  - e. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to eliminate vehicular overhang onto the sidewalk.
  - f. The developer should coordinate with DelDOT regarding provision of a parking area for users of the future trail along the railroad line, which should also be near the Villages of Five Points development. Final details of the location, design and construction of this parking area are to be determined.

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](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](mailto: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 DeDOT'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](mailto:ajparker@mtmail.biz) if you have any questions concerning this review.

Sincerely,

**McCormick Taylor, Inc.**

A handwritten signature in black ink, appearing to read "Andrew J. Parker".

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

Enclosure

## **General Information**

**Report date:** November 2014

**Prepared by:** Davis, Bowen & Friedel, Inc. (DBF)

**Prepared for:** Ocean Atlantic

**Tax parcel:** 3-35-11.00-55.00, 56.00, 59.00, and 59.01

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

## **Project Description and Background**

**Description:** The proposed residential development would include 43 single-family detached houses, 46 duplex units and 58 townhouses, all age-restricted by deed.

**Location:** The Reserves at Nassau 2 development is proposed to be located on the northbound side of Delaware Route 1 (Coastal Highway / Sussex Road 14), bounded by Tulip Drive to the south, the Penn Central Railroad line to the north, The Villages of Five Points and the Atlantic Concrete Plant to the east, and the Taramino Townhomes and the Reserves of Nassau development to the west, in Sussex County, Delaware. A site location map is included on Page 7.

**Amount of land to be developed:** approximately 36.98 acres of land

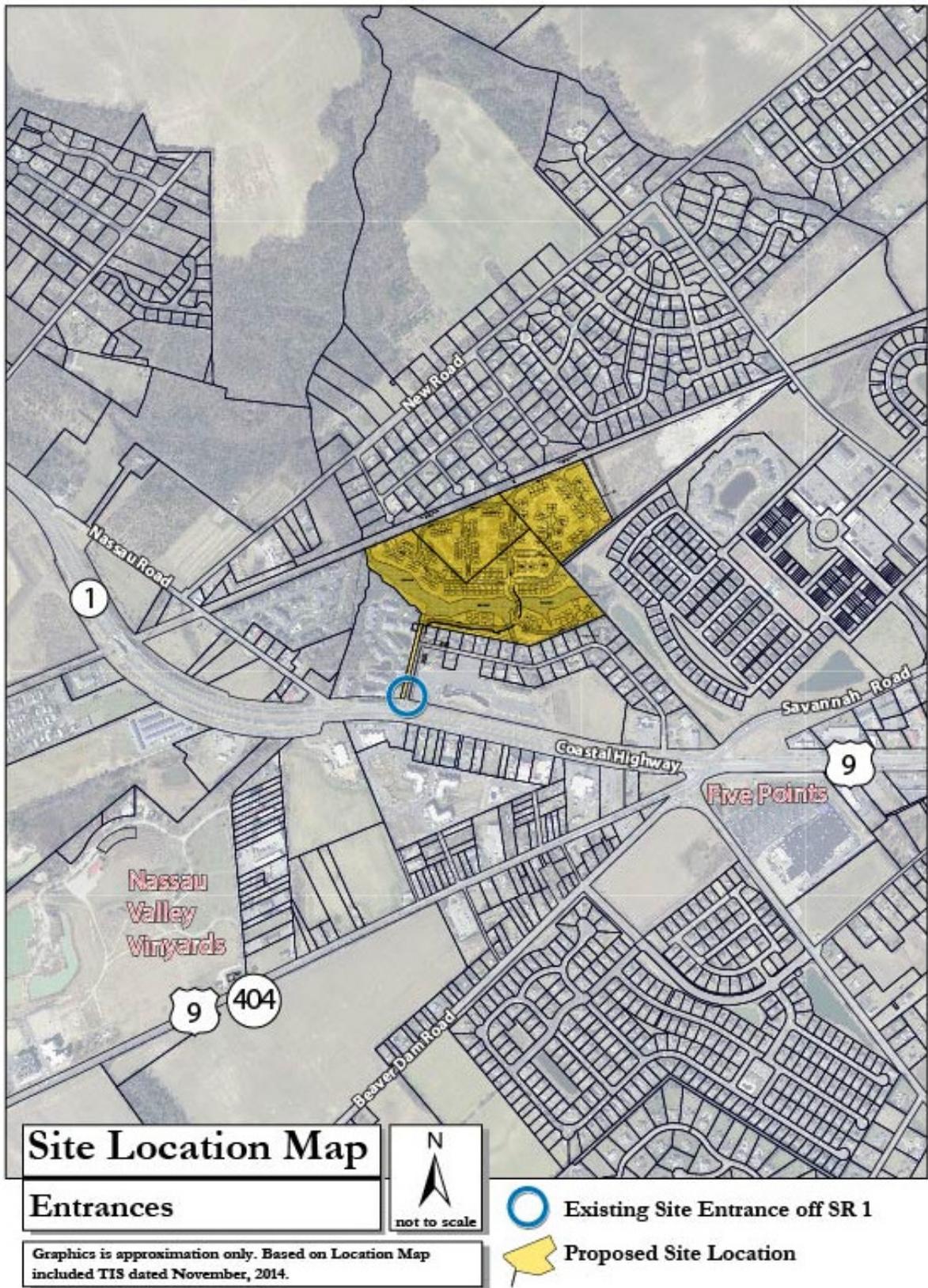
**Land use approval(s) needed:** Rezoning and Subdivision approval. The land is currently zoned AR-1 (Agricultural Residential) with a small portion zoned MR (Medium-Density Residential). The developer proposes rezoning to entirely MR with a Conditional Use for the townhomes.

**Proposed completion date:** 2019

**Proposed access locations:** DelDOT is treating the existing intersection of Delaware Route 1 and Tulip Drive / Slipper Shell Way as the site access for the proposed development because Tulip Drive is an existing subdivision street that would provide access to the site. A second intersection, proposed at an existing 90-degree bend in Tulip Drive, is also being treated as the site access. There, site access will be added as a north leg and the existing westbound Tulip Drive approach will be converted to a stop-controlled, minor street approach.

**Daily Traffic Volumes (per DelDOT Traffic Summary 2013):**

- 2013 Average Annual Daily Traffic on Delaware Route 1: 27,393 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 Reserves at Nassau 2 residential development is located within an 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 Reserves at Nassau 2 development is located within an Investment Level 1 area, and is to be developed as an age-restricted neighborhood including a mix of single family detached homes, duplex units and townhomes. This type of development is consistent with the character of Investment Level 1 areas. The proposed development is located along the developed corridor of Delaware Route 1 in the coastal resort area. The *Strategies* document generally encourages efficient new growth and redevelopment in Investment Level 1 areas, and the proposed development is consistent with those goals as it offers an alternative housing option for seniors. 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**

### **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 development parcel is in within the Environmentally Sensitive Developing Area (categorized as a Growth Area), with a small portion of the site overlapping a Highway Growth Area.

Growth Areas, including the Environmentally Sensitive Developing Area, are designed to accommodate concentrated levels of development. The Environmentally Sensitive Developing Area has been designated by Sussex County for large areas around Rehoboth Bay, Indian River Bay, and Little Assawoman Bay (the inland bays). This designation recognizes two characteristics of these areas. First, these regions are among the most desirable locations in Sussex County for new housing, as reflected in new construction data and real estate prices. Second, these regions contain ecologically important wetlands and other coastal lands that help

absorb floodwaters and provide extensive habitat for native flora and fauna. These areas also have great impacts upon the water quality of the bays and inlets and upon natural habitats.

The challenge in these regions is to safeguard genuine natural areas and mitigate roadway congestion without stifling the tourism and real estate markets that: a) provide many jobs; b) create business for local entrepreneurs; and c) help keep local tax rates reasonable. The County has major initiatives to extend public sewer service to replace failing on-site systems in many of these areas. Very careful control of stormwater runoff is an extremely important concern to keep sediment and other pollutants out of the inland bays.

The following major guidelines should apply to future growth in Environmentally Sensitive Developing Areas:

*Permitted Uses* – Environmentally Sensitive Developing Areas are areas that can accommodate development provided special environmental concerns are addressed. A range of housing types should be permitted in Environmentally Sensitive Areas, including single-family homes, townhouses and multi-family units. Retail and office uses are appropriate but larger shopping centers and office parks should be confined to selected locations with access to arterial roads. Careful mixtures of homes with light commercial and institutional uses can be appropriate to provide for convenient services and to allow people to work close to home. Major new industrial uses are not proposed in these areas. Industrial zones are regulated by the Delaware Coastal Zone Act, which restrict heavy industry and bulk transfer.

*Densities* – The Environmentally Sensitive Developing Areas function as an “overlay” area to several underlying zoning districts. It may be advisable for legal reasons to convert this overlay area into regular zoning districts, while maintaining the current standards. Most of the Environmental Sensitive Developing Areas should continue to allow 2 homes per acre. The option should exist to go up to 4 units per acre if the developer uses optional density bonuses. Smaller lots and flexibility in dimensional standards should be allowed if the developer uses a cluster option that results in permanent preservation of a substantial percentage of the tract.

The County may also consider an additional layer of protection in the Environmentally Sensitive Developing Areas. Tidal wetland area could be subtracted from the total tract size so that “net” tract size is used as the basis for calculating how much development is allowed.

All applicants for developments of a minimum size (as specified in zoning) should continue to be required to provide information that analyzes the development’s potential environmental impacts, including effects on stormwater runoff, nitrogen and phosphorous loading, wetlands, woodlands, wastewater treatment, water systems, and other matters that affect the ecological sensitivity of the inland bays.

*Infrastructure* – Central water and sewer facilities are strongly encouraged. If central utilities are not possible, permitted densities should be limited to 2 units per acre.

As for the Highway Commercial Area designation, those areas include concentrations of retail and service uses that are mainly located along highways. As opposed to small, traditional

downtown areas that are often historic and pedestrian-friendly, Highway Commercial Areas include highway commercial corridors, shopping centers and other large commercial vicinities geared towards vehicular traffic. In addition to primary shopping destinations, this area would also be the appropriate place to locate hotels, motels, car washes, auto dealerships, lumberyards and other larger scale commercial uses not primarily targeted to the residents of immediately adjacent residential areas.

**Proposed Development's Compatibility with Comprehensive Plan:** The proposed Reserves at Nassau 2 residential development is planned to be developed as a mix of single family detached homes, duplex homes and townhouses, all age-restricted by deed.

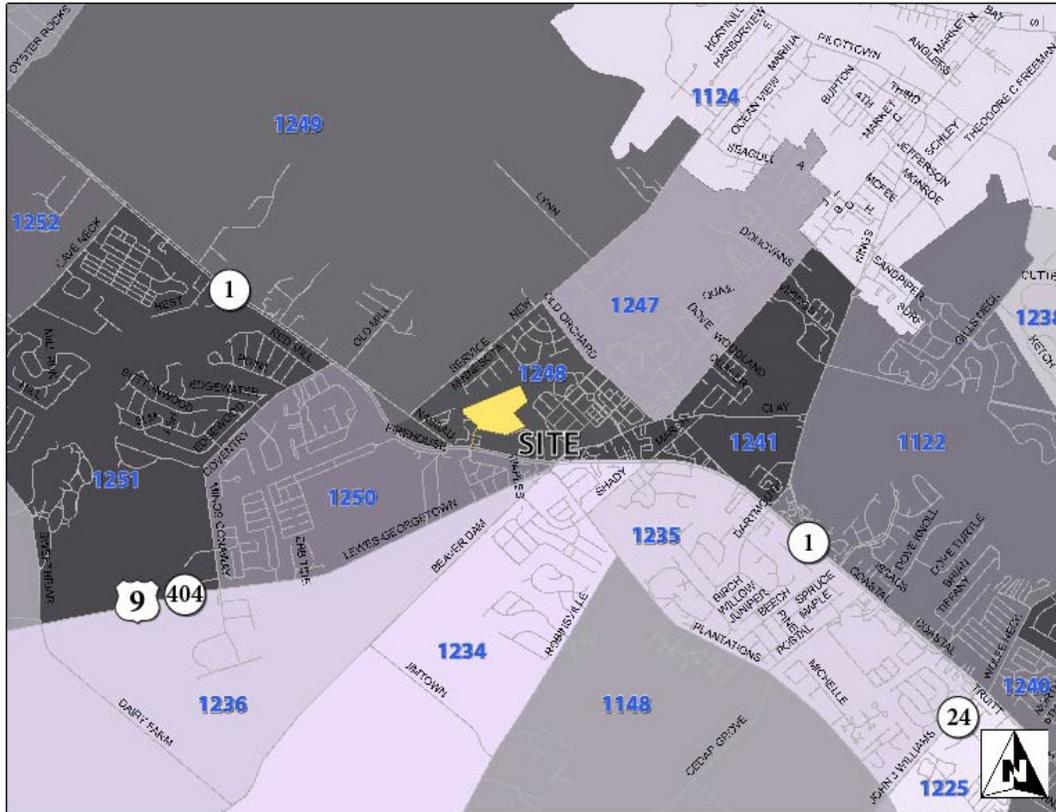
The site is currently zoned AR-1 (Agricultural Residential District), with a small portion zoned MR (Medium-Density Residential District). The developer seeks to rezone the land entirely to MR in Sussex County. The purpose of the Medium-Density Residential District is to provide for medium-density residential development in areas which are or which are expected to become generally urban in character, but where sanitary sewers and public water supplies may or may not be available at the time of construction, together with such churches, recreational facilities and accessory uses as may be necessary or are normally compatible with residential surroundings. The district is located to protect existing development of this character and contains vacant land considered appropriate for such development in the future. Permitted uses include detached single family dwellings but not manufactured homes. Multifamily dwelling structures and townhomes may be permitted as conditional uses, pending approval through the Sussex County site plan review process. It is noted that in 2005 the Sussex County Council previously approved a Conditional Use for this property to permit 152 multi-family units with no age restrictions while keeping it zoned AR-1. The latest plan drops the number of units to 147 and applies an age restriction, while rezoning to MR with the Conditional Use for townhomes. Compared to the previous plan for the site, the latest plan should result in lower traffic volumes and lessened impacts.

The proposed development appears to comply with the characteristics of Growth Areas in general as well as the *Permitted Uses* for the Environmentally Sensitive Developing Area, although it appears to be at the high end of the maximum density guidelines for housing. The proposed land use is appropriate for the proposed MR zoning, as long as the Conditional Use for townhomes is approved. As such, if the Conditional Use is approved, the proposed development appears to be compatible with the Sussex County Comprehensive Plan.

## Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 1248

TAZ Boundaries:



**Current employment estimate for TAZ:** 95 jobs in 2005

**Future employment estimate for TAZ:** 123 jobs in 2030

**Current population estimate for TAZ:** 217 people in 2005

**Future population estimate for TAZ:** 410 people in 2030

**Current household estimate for TAZ:** 105 houses in 2005

**Future household estimate for TAZ:** 200 houses in 2030

**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:** Yes

**Relevant Projects in the DelDOT Capital Transportation Program**

DelDOT currently has one relevant project in the study area, the SR 1 Pedestrian Improvements Project. The project, now under construction, will provide sidewalks along Delaware Route 1 from north of Five Points to the Lewes-Rehoboth Canal. Sidewalks will be provided along Delaware Route 1 along the church site frontage and towards the Nassau Bridge. This project is designed and funded, with construction planned to begin in the fall of 2014.

In addition, it is noted that there is another DelDOT project in the area of the site, the Georgetown to Lewes Trail, Phase I Design. The trail will be located on one side of the existing railroad tracks on the north side of the site, but the location has not been determined. In order to accommodate a potential trail along the site side of the railroad tracks, a 5-foot easement is proposed to be established for the trail providing 20 feet from the bottom of the bank of the rail line to the edge of the easement. The developer has agreed to provide a parking area near the potential trail location in an area also adjacent to The Villages of Five Points mixed-use development, as well as a trail connection from the parking area to the property line for the adjacent development.

**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:

- 147 Senior Adult - Detached (ITE Land Use Code 251)

Table 1  
RESERVES AT NASSAU 2 PEAK HOUR TRIP GENERATION

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour			SAT Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
147 Senior Adult - Detached	19	36	55	37	23	60	16	18	34

Table 2  
RESERVES AT NASSAU 2 DAILY TRIP GENERATION

Land Use	Weekday Daily			Saturday Daily		
	In	Out	Total	In	Out	Total
147 Senior Adult – Detached	333	333	666	201	201	402

## **Overview of TIS**

### **Intersections examined:**

- 1) Tulip Drive & Site Access (Tulip Drive Extension)
- 2) Delaware Route 1 & Tulip Drive / Slipper Shell Way (Sandbar Village Site Access)

### **Conditions examined:**

- 1) 2014 existing conditions (Case 1)
- 2) 2019 without Reserves at Nassau 2 (Case 2)
- 3) 2019 with Reserves at Nassau 2 (Case 3)

**Peak hours evaluated:** Weekday morning and evening and Saturday mid-day peak hours

### **Committed developments considered:**

- 1) Sandbar Village (177 condominiums; 93 unbuilt/unoccupied)
- 2) Vineyards of Nassau Valley (170 condominiums, 23,500 square feet of general office, 150,000 square feet of shopping center and 20,000 square feet high turnover sit-down restaurant)
- 3) Lewes Crossing (f.k.a. Deep Valley Farm) (192 single-family detached homes)
- 4) The Arbors of Cottegedale Apartments (216 apartment units)

## **Intersection Descriptions**

- 1) Tulip Drive & Site Access (Tulip Drive Extension)**  
**Type of Control:** proposed two-way stop-controlled (unrestricted T-intersection)  
**Northbound approach:** (Tulip Drive) existing one right-turn lane; proposed one shared through/right-turn lane  
**Southbound approach:** (Site Access) proposed one shared through/left-turn lane  
**Westbound approach:** (Tulip Drive) existing one left-turn lane, uncontrolled; proposed one shared left/right-turn lane, stop-controlled
- 2) Delaware Route 1 & Tulip Drive / Slipper Shell Way (Sandbar Village Site Access)**  
**Type of Control:** existing two-way stop-controlled (flashing signal)  
**Northbound approach:** (Delaware Route 1) existing two through lanes and one right-turn lane  
**Southbound approach:** (Delaware Route 1) existing one left-turn lane, two through lanes, and one right-turn lane  
**Eastbound approach:** (Slipper Shell Way) existing one right-turn lane, stop-controlled  
**Westbound approach:** (Tulip Drive) existing one right-turn lane and one left-turn lane, stop-controlled

## **Safety Evaluation**

**Crash Data:** Crash data was obtained for July 21, 2011 through July 21, 2014 for the study intersection of Delaware Route 1 and Tulip Drive / Slipper Shell Way. The crash data included a total of 24 crashes within 250 feet of the intersection. There was one crash involving a pedestrian with injury and no reported fatalities. It was reported that eight crashes resulted in personal injuries, and three crashes were alcohol-related. All but one of the crashes occurred along the Delaware Route 1 legs of the intersection, and the lone crash on the Tulip Drive leg of the intersection is listed with the unusual Manner of Impact as a “rear to side” collision. The data indicates that the largest frequency of crashes occurred on Sundays with eight crashes, possibly indicating that the activation of the traffic signal during the church services was a contributing factor. The crashes appear to be evenly distributed throughout mostly daylight hours, and the surface, lighting, or weather conditions were contributing factors in relatively few crashes. The data does not indicate any major crash trends and no additional safety improvements are recommended at this time as a result of the crash data analysis.

**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) does not currently operate a DART bus route that serves the site. DART Route 206 (Georgetown Lewes Rehoboth) is the closest route to the development, traveling along Savannah Road with stops in the Villages of Five Points community. Additionally, seasonal Route 204 (Lewes) and seasonal Route 205 (Late Night / Local) travel along Savannah Road and stop in the Villages of Five Points, as well. The seasonal Beach Connection Route 306 connects riders from Wilmington to Rehoboth Beach during the summer and passes by Tulip Drive on SR 1, however no bus stop or shelter is provided in the area.

**Planned transit service:** DBF contacted the DTC regarding existing and planned service in the area. Ms. Tremica Cherry, a Fixed Route Scheduler at the DTC, responded that DTC had no comment for the proposed development. With no plans for expanded transit service, transit accommodations will not be required and school bus stops do not need to be considered due to the age restrictions of the proposed housing development.

**Existing bicycle and pedestrian facilities:** According to DelDOT’s Sussex County Bicycle Map, Delaware Route 1 is not designated as a Bicycle Route in the area of the proposed development. It appears from the Bicycle Map that the intersection of Savannah Road with Delaware Route 1 is the northern limit of the bicycle routes in the Delaware Beach Resorts area; a Regional Bicycle Route exists along Savannah Road, a Statewide Bicycle Route exists along Plantations Road and Beaver Dam Road, and a Connector Bicycle Route exists along Delaware Route 1 to the south of Savannah Road. According to the bicycle level of service (BLOS) calculator developed by the *League of Illinois Bicyclists*, the Delaware Route 1 corridor operates

at BLOS A. However, due to the lack of bike lanes at the intersection with Tulip Drive / Slipper Shell Way, Delaware Route 1 operates at BLOS D within the intersection due to the turn lanes.

The only existing pedestrian facilities within the study area are an approximate 400 foot segment of 5' wide sidewalk on the south side of Delaware Route 1 to the west of Slipper Shell Way and the associated marked crosswalk with pedestrian refuge island at the rights-in-rights-out entrance. There are no existing pedestrian facilities along Tulip Drive or the north side of Delaware Route 1.

**Planned bicycle and pedestrian facilities:** DBF contacted Marco Boyce with DelDOT's Bicycle and Pedestrian Facilities Team via email on July 16, 2014 regarding planned or requested bicycle and pedestrian facilities in the area of this proposed development. Mr. Boyce provided comments via email on August 1, 2014. He discussed the proposed Georgetown to Lewes Rail with Trail project, which will construct a shared-use path parallel to the rail line on either the north or south side of the tracks. He requested that the project should plan to allow sufficient room for the trail, assuming that the trail would be on the project's southern side of the tracks. The developer agrees and has proposed the dedication of an additional 5 feet of Right-of-Way to the State of Delaware for the proposed trail project, to be finalized as part of the DelDOT Subdivision Entrance Approval Process. Mr. Boyce also requested that the project provide direct connections between the proposed development, the proposed Georgetown to Lewes Rail with Trail, and the Village of Five Points pathway loop to connect the systems. Lastly, Mr. Boyce requested a buffered sidewalk connection from the proposed development out to SR 1 along Tulip Drive. DBF asked for confirmation via email on September 19, 2014 regarding not requiring bike lanes as part of the turn lane improvements on SR 1, and Mr. Boyce confirmed the request via email on September 23, 2014. As part of the same email exchange, DBF presented that the developer proposes a parking area with access to the trail and the adjacent Villages of Five Points, and the following emails detailed the design and placement of the parking facility, which should be finalized as part of the DelDOT Subdivision Entrance Approval Process.

As part of the DelDOT's SR 1 Pedestrian Improvements Project, new sidewalk will be installed along both sides Delaware Route 1 including curb ramps and marked crosswalks for the side streets at the study intersection with Tulip Drive / Slipper Shell Way but not for a marked crossing of Delaware Route 1. DBF has identified multiple constraints that do not allow for the buffered sidewalk connection between the project site and Delaware Route 1, including: insufficient space, fencing, curbing, limited right-of-way, drainage inlets, a large drainage structure, access points, and trees. Further coordination will be required with the DelDOT Subdivision section to consider the waiver for the sidewalk requirement.

## **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 McCormick Taylor applied heavy vehicle factors (HV) by movement using existing data. For the signalized analysis of SR 1 and Tulip Drive / Slipper Shell Way, McCormick Taylor applied HV by lane group using existing data. The TIS did not perform signalized analysis for the intersection of SR 1 and Tulip Drive / Slipper Shell Way. For future conditions, the TIS and McCormick Taylor assumed future HV equal to existing HV for the intersection of SR 1 & Tulip Drive / Slipper Shell Way and assumed 3% HV for the proposed site access at Tulip Drive.
- 2) For existing conditions, the TIS and McCormick Taylor determined, for each intersection, overall intersection peak hour factors (PHF). For future conditions, the TIS and McCormick Taylor assumed existing PHF for the intersection of SR 1 & Tulip Drive/Slipper Shell Way. The TIS and McCormick Taylor assumed PHF of 0.80 for the proposed site access at Tulip Drive.
- 3) For the signalized analysis of SR 1 and Tulip Drive / Slipper Shell Way, McCormick Taylor used a base saturation flow rate of 1,900 pcphpl for the SR 1 approaches and 1,750 pcphpl for the side streets.

Table 3  
PEAK HOUR LEVELS OF SERVICE (LOS)  
based on Traffic Impact Study for Reserves at Nassau 2  
Report dated November 2014  
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection <sup>1</sup> Two-Way Stop Control (T-intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
Tulip Drive & Site Access						
2019 with Reserves at Nassau 2 (Case 3)						
Southbound Site Access – Left	A (7.3)	A (7.3)	A (7.3)	A (7.3)	A (7.3)	A (7.3)
Westbound Tulip Drive	A (8.9)	A (9.0)	A (8.8)	A (8.9)	A (9.0)	A (8.8)

<sup>1</sup> The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 4A  
PEAK HOUR LEVELS OF SERVICE (LOS)  
based on Traffic Impact Study for Reserves at Nassau 2  
Report dated November 2014  
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection <sup>2</sup> Two-Way Stop Control (T-intersection)	LOS per TIS			LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
<b>Delaware Route 1 &amp; Tulip Drive / Slipper Shell Way</b>						
2013/2014 Existing (Case 1)						
Eastbound Slipper Shell Way – Right	B (12.3)	B (12.1)	D (29.7)	B (12.3)	B (12.1)	D (29.7)
Westbound Tulip Drive	B (15.0)	D (32.2)	F (99.6)	C (15.0)	D (32.2)	F (99.6)
Southbound SR 1 – Left	A (9.0)	B (12.3)	C (17.3)	A (8.9)	B (12.3)	C (17.3)
2013/2014 Existing (Case 1) <sup>3</sup>						
Eastbound Slipper Shell Way – Right	B (12.9)	N/A	C (23.7)	B (12.6)	N/A	C (23.7)
Westbound Tulip Drive	C (17.6)	N/A	F (60.6)	C (17.6)	N/A	F (60.6)
Southbound SR 1 – Left	A (9.0)	N/A	C (17.5)	A (9.0)	N/A	C (17.5)
2019 without Reserves at Nassau 2 (Case 2)						
Eastbound Slipper Shell Way – Right	B (13.8)	B (13.4)	E (39.2)	B (13.8)	B (13.3)	E (38.8)
Westbound Tulip Drive	C (17.4)	E (42.5)	F (159.5)	C (17.6)	E (42.5)	F (159.5)
Southbound SR 1 – Left	A (9.4)	B (13.6)	C (19.8)	A (9.3)	B (13.6)	C (19.8)
2019 without Reserves at Nassau 2 (Case 2) <sup>3</sup>						
Eastbound Slipper Shell Way – Right	B (14.5)	N/A	D (29.1)	B (14.2)	N/A	D (29.1)
Westbound Tulip Drive	C (21.8)	N/A	F (96.2)	C (21.3)	N/A	F (92.0)
Southbound SR 1 – Left	A (9.5)	N/A	C (20.8)	A (9.4)	N/A	C (20.1)
2019 with Reserves at Nassau 2 (Case 3)						
Eastbound Slipper Shell Way – Right	B (13.8)	B (13.4)	E (39.2)	B (13.8)	B (13.4)	E (39.2)
Westbound Tulip Drive	C (22.4)	F (59.4)	F (281.0)	C (21.9)	F (59.4)	F (281.0) <sup>4</sup>
Southbound SR 1 – Left	A (9.5)	B (14.4)	C (20.9)	A (9.4)	B (14.4)	C (20.9)
2019 with Reserves at Nassau 2 (Case 3) <sup>3</sup>						
Eastbound Slipper Shell Way – Right	B (14.5)	N/A	D (29.1)	B (14.2)	N/A	D (29.1)
Westbound Tulip Drive	D (27.5)	N/A	F (178.6)	D (26.7)	N/A	F (162.7)
Southbound SR 1 – Left	A (9.6)	N/A	C (21.2)	A (9.5)	N/A	C (20.4)

<sup>2</sup> The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>3</sup> Analysis is for the Tulip Drive peak hour (different from the overall intersection peak hour).

<sup>4</sup> The longest 95<sup>th</sup> percentile queue is 5 vehicles long and occurs during Case 3 – Saturday.

Table 4B  
PEAK HOUR LEVELS OF SERVICE (LOS)  
based on Traffic Impact Study for Reserves at Nassau 2  
Report dated November 2014  
Prepared by Davis, Bowen & Friedel, Inc.

Signalized Intersection <sup>5</sup>	LOS per McCormick Taylor		
	Weekday AM	Weekday PM	Saturday Mid-Day
<b>Delaware Route 1 &amp; Tulip Drive / Slipper Shell Way</b>			
2013/2014 Existing (Case 1)	A (9.4)	B (11.0)	C (20.8)
2013/2014 Existing (Case 1) <sup>6</sup>	A (9.8)	N/A	B (14.3)
2019 without Reserves at Nassau 2 (Case 2)	B (11.4)	B (13.2)	D (36.9)
2019 without Reserves at Nassau 2 (Case 2) <sup>6</sup>	B (13.4)	N/A	C (20.1)
2019 with Reserves at Nassau 2 (Case 3)	B (11.6)	B (11.3)	D (37.0)
2019 with Reserves at Nassau 2 (Case 3) <sup>6</sup>	B (12.7)	N/A	C (20.3)

<sup>5</sup> The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

<sup>6</sup> Analysis is for the Tulip Drive peak hour (different from the overall intersection peak hour).