



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

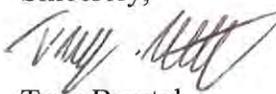
January 16, 2014

SHAILEN P. BHATT  
SECRETARY

Mr. D.J. Hughes  
Davis, Bowen & Friedel, Inc.  
23 North Walnut Street  
Milford, DE 19963

Dear Mr. Hughes:

The enclosed Traffic Impact Study (TIS) review letter for the **Lighthouse Lakes (f.k.a. Lynch Farm)** residential development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Standards and Regulations for Subdivision Streets and State Highway Access and other accepted practices and procedures for such studies. DelDOT accepts this review letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,  
  
Troy Brestel  
Project Engineer

TEB:km  
Enclosures

cc with enclosures: Ms. Constance C. Holland, Office of State Planning Coordination  
Mr. Lawrence Lank, Director, Sussex County Planning and Zoning  
Mr. Andrew Parker, McCormick Taylor, Inc.  
DelDOT Distribution

## DelDOT Distribution

Frederick H. Schranck, Deputy Attorney General  
Robert McCleary, Director, Transportation Solutions (DOTS)  
Drew Boyce, Director, Planning  
Mark Luszcz, Acting Chief Traffic Engineer, Traffic, DOTS  
J. Marc Coté, Assistant Director, Development Coordination  
T. William Brockenbrough, Jr., County Coordinator, Development Coordination  
Thomas E. Meyer, Traffic Studies Manager, Traffic, DOTS  
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Jeff Reed, South District Engineer, Central District  
Marvin Roberts, South District Public Works Supervisor, Central District  
Lisa Collins, Service Development Planner, Delaware Transit Corporation  
Steve Sisson, Sussex County Subdivision Coordinator, Development Coordination  
John Fiori, Subdivision Manager, Development Coordination  
Marco Boyce, Planning Supervisor, Statewide & Regional Planning  
Claudy Joinville, Project Engineer, Development Coordination

January 16, 2014

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

RE: Agreement No. 1529  
 Traffic Impact Study Services  
**Task No. 19A Subtask 8A – Lighthouse Lakes**

Dear Mr. Brestel:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Lighthouse Lakes development prepared by Davis, Bowen & Friedel, Inc. (DBF), dated November 2013. This review was assigned as Task Number 19A (Subtask 8A). 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 impacts of the Lighthouse Lakes residential development, proposed to be located along the south side of Delaware Route 54 (Sussex Road 58), east of Hudson Road (Sussex Road 387) and west of Johnson Road (Sussex Road 390), just outside of the Town of Selbyville in Sussex County, Delaware. The proposed development would consist of 254 single-family detached homes and 50 residential townhomes for a total of 304 dwelling units on approximately 138.5 acres of land. One full site access point is proposed for Lighthouse Lakes along Delaware Route 54, approximately 3,000 feet west of Johnson Road. Construction is anticipated to be complete by 2020.

The land is currently zoned as R-4 (Residential) within the Town of Selbyville, and the developer does not propose to change the zoning. The site is proposed to have a Residential Planned Community (RPC) overlay.

DelDOT currently has no projects within the study area.

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 54 and South Main Street (Sussex Road 398)	Unsignalized	2020 AM and PM with Lighthouse Lakes

The intersection of Delaware Route 54 and South Main Street exhibits LOS deficiencies under future conditions. However, we do not recommend any improvements be implemented by the developer at this intersection. The LOS E condition would only occur on the northbound South Main Street approach, and the expected 95<sup>th</sup> percentile queue length on that approach is less than 100 feet.

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

1. The developer should improve Delaware Route 54 along the site frontage as needed in order to meet DelDOT's major collector road standards. These standards include but are not limited to twelve-foot travel lanes and eight-foot shoulders. The developer should provide a bituminous concrete overlay to the existing travel lanes, at DelDOT's discretion. DelDOT should analyze the existing lanes' pavement section and recommend an overlay thickness to the developer's engineer if necessary.
2. The developer should construct the site entrance on Delaware Route 54. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Northbound Site Entrance	Approach does not exist	One shared left/right-turn lane
Eastbound Delaware Route 54	One through lane	One through lane and one right-turn lane
Westbound Delaware Route 54	One through lane	One left-turn lane and one through 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 Delaware Route 54	N/A	290 feet*
Westbound Delaware Route 54	210 feet*	N/A

\* turn-lane length based on DelDOT's *Auxiliary Lane Worksheet*

3. The following bicycle and pedestrian improvements should be included:
  - a. A right-turn yield to bikes sign (MUTCD R4-4) should be added at the start of the right-turn lane added to eastbound Delaware Route 54 at the site entrance.
  - b. Adjacent to the right-turn lane added to eastbound Delaware Route 54 at the site entrance, a minimum of a five-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.
  - c. 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.
  - d. Utility covers should be made flush with the pavement.
  - e. A 15-foot wide easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along Delaware Route 54. Within this easement, a minimum of a ten-foot wide shared-use path that meets current AASHTO and ADA standards should be constructed along the site frontage. The shared-use path should have a minimum of a five-foot buffer from the roadway, which would be satisfied if the path is constructed behind the existing utility poles at the right-of-way line. At all property boundaries, the shared-use path should connect to the shoulder of Delaware Route 54 in accordance with DelDOT's *Shared Use Path and/or Sidewalk Termination Policy* dated September 16, 2013. The developer should coordinate with DelDOT to determine design details, implementation, and/or contribution towards the construction of this shared-use path. If it is physically impossible to construct one or more portions of the path, DelDOT will discuss alternatives with the developer.
  - 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, on both sides of the street, along all streets 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. These internal sidewalks should connect the residential areas to the frontage shared-use path along Delaware Route 54.
  - h. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to eliminate vehicular overhang onto the sidewalk.

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 DelDOT's subdivision review process.

Additional details on our review of this TIS are attached. Please contact me at (302) 738-0203 or through e-mail at [ajparker@mtmail.biz](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 2013

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

**Prepared for:** Bunting Construction Company

**Tax parcels:** 5-33-18.00-34.00, 5-33-18.00-35.00, and 5-33-18.00-40.00

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

## **Project Description and Background**

**Description:** As analyzed in the TIS, the proposed development would consist of 254 single-family detached homes and 50 residential townhomes for a total of 304 dwelling units.

**Location:** Lighthouse Lakes is proposed to be located along the south side of Delaware Route 54 (Sussex Road 58), east of Hudson Road (Sussex Road 387) and west of Johnson Road (Sussex Road 390), just outside of the Town of Selbyville in Sussex County, Delaware. A site location map is included on Page 6.

**Amount of land to be developed:** Approximately 138.5 acres

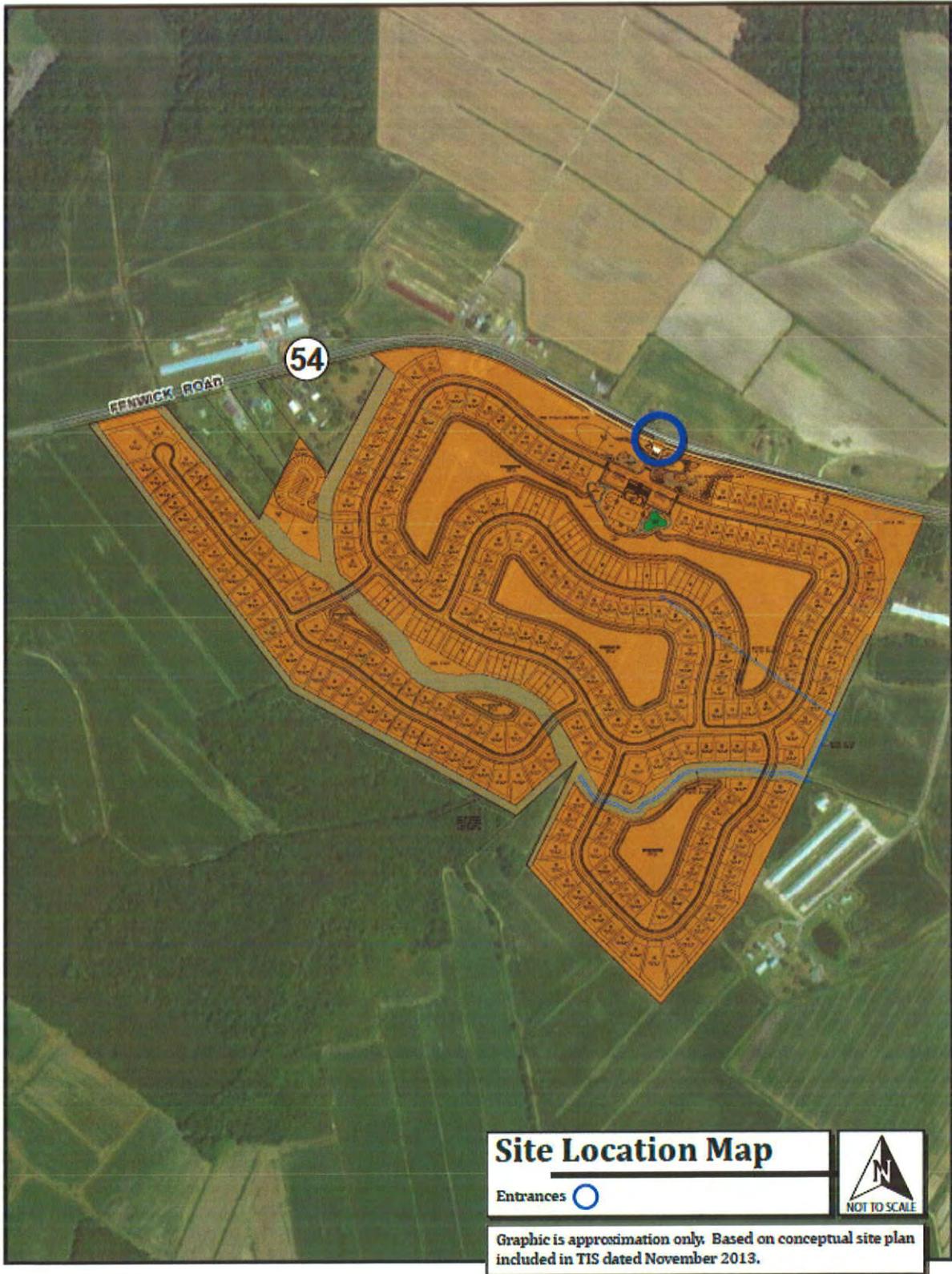
**Land use approval(s) needed:** Subdivision approval. The land is currently zoned as R-4 (Residential) within the Town of Selbyville, and the developer does not propose to change the zoning. The property is proposed to have a Residential Planned Community (RPC) overlay.

**Proposed completion date:** 2020

**Proposed access locations:** One full site access point is proposed along Delaware Route 54, approximately 3,000 feet west of Johnson Road.

**Daily Traffic Volumes (per DelDOT Traffic Summary 2012):**

- 2012 Average Annual Daily Traffic on Delaware Route 54: 3,687 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 Lighthouse Lakes development is located within Investment Level 2.

### *Investment Level 2*

Investment Level 2 Areas are areas 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 2 Areas serve as transition areas between Level 1 and the state's more open, less populated areas.

### **Proposed Development's Compatibility with Strategies for State Policies and Spending:**

The proposed Lighthouse Lakes development is located within Investment Level 2 and is to be developed with residential units. The *Strategies* document generally encourages development in Investment Level 2 areas, and the proposed development does not conflict with the character of those areas. 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 Lighthouse Lakes development is in a Low Density Area. However, in 2013 the property was annexed into the Town of Selbyville, a municipality. Sussex County strongly favors directing development to municipalities that desire it. The specific permitted uses and densities governing new construction within an incorporated municipality will continue to be governed by that municipality's zoning ordinance, its public water and sewer capacities, and its comprehensive planning policies.

### **Town of Selbyville Comprehensive Plan:**

*(Source: Town of Selbyville Comprehensive Plan, September 2007)*

In the 2007 Comprehensive Plan, the Lighthouse Lakes property was not within the boundaries of the Town of Selbyville, so the area was not discussed in detail in the Comprehensive Plan. It was however within the Potential Annexation Boundary and was identified as an area that would be Mixed Residential/Commercial. It has since been annexed into the Town of Selbyville and is zoned as R-4 (Residential) with a proposed Residential Planned Community (RPC) overlay. The R-4 Residential zoning district provides for low-density residential development of detached single-family dwellings, with a maximum of 2.2 units per acre (based upon gross land area). The RPC overlay allows for the inclusion of a limited number of townhouses that meet specific criteria, but the maximum density remains set at 2.2 units per acre.

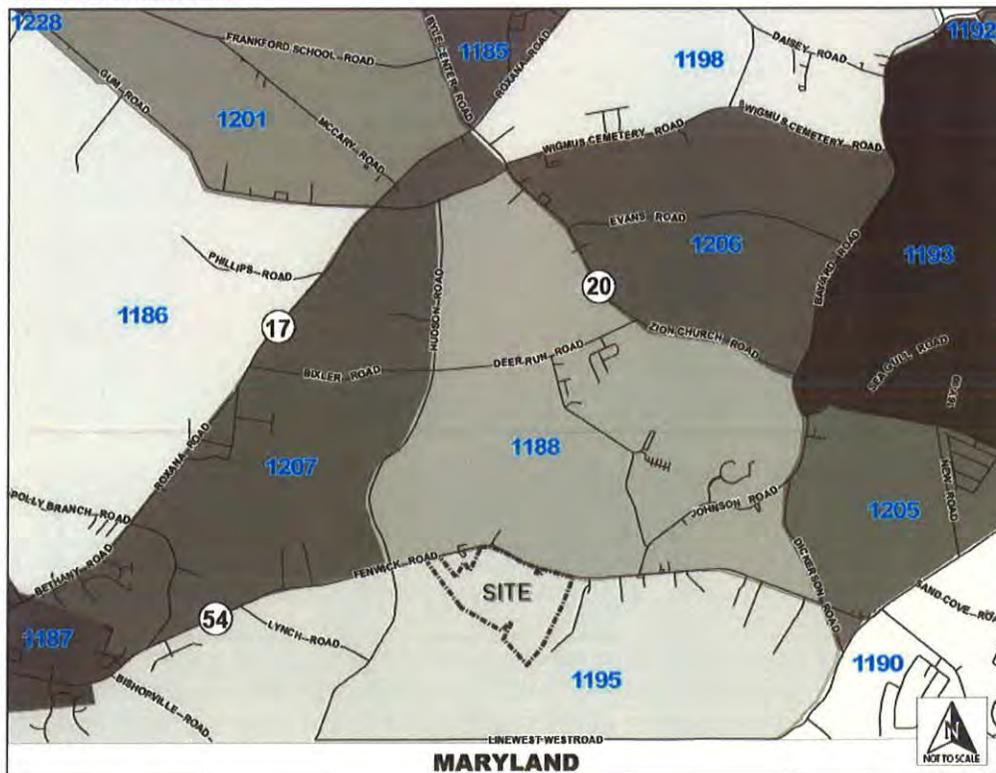
**Proposed Development's Compatibility with Comprehensive Plans:**

The proposed residential development is currently zoned as R-4 (Residential) in the Town of Selbyville, with a proposed Residential Planned Community (RPC) overlay. The development is proposed as 254 single-family detached houses and 50 townhouses, for a total of 304 units on approximately 138.5 acres, which comes in just below the maximum allowable density of 2.2 units per acre. As such, the proposed development appears to be compatible with the Sussex County Comprehensive Plan and the Town of Selbyville Comprehensive Plan.

**Transportation Analysis Zones (TAZ)**

**Transportation Analysis Zones (TAZ) where development would be located: 1195**

**TAZ Boundaries:**



**Current employment estimate for TAZ: 1,260 jobs in 2005**

**Future employment estimate for TAZ: 1,516 jobs in 2030**

**Current population estimate for TAZ: 354 people in 2005**

**Future population estimate for TAZ: 475 people in 2030**

**Current household estimate for TAZ: 158 houses in 2005**

**Future household estimate for TAZ: 214 houses in 2030**

**Relevant committed developments in TAZ: Selbyville Town Village**

**Would the addition of committed developments to current estimates exceed future projections: Yes**

**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 (FY 2014 – FY 2019)**

DelDOT 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:

- 254 single family detached homes (ITE Land Use Code 210)
- 50 townhomes/condos (ITE Land Use Code 230)

Table 1  
LIGHTHOUSE LAKES PEAK HOUR TRIP GENERATION

Land Use	AM Peak Hour			PM Peak Hour		
	In	Out	Total	In	Out	Total
254 single family homes	47	141	188	153	90	243
50 townhomes/condos	5	25	30	23	11	34
<b>TOTAL NEW TRIPS</b>	<b>52</b>	<b>166</b>	<b>218</b>	<b>176</b>	<b>101</b>	<b>277</b>

Table 2  
LIGHTHOUSE LAKES DAILY TRIP GENERATION

Land Use	Weekday ADT		
	In	Out	Total
254 single family homes	1,238	1,238	2,476
50 townhomes/condos	176	176	352
<b>TOTAL TRIPS</b>	<b>1,414</b>	<b>1,414</b>	<b>2,828</b>

## **Overview of TIS**

### **Intersections examined:**

- 1) Delaware Route 54 & Proposed Site Entrance
- 2) Delaware Route 54 & Johnson Road
- 3) Delaware Route 54 & South Main Street (Sussex Road 398)

### **Conditions examined:**

- 1) 2013 existing conditions (Case 1)
- 2) 2020 without Lighthouse Lakes (Case 2)
- 3) 2020 with Lighthouse Lakes (Case 3)

**Peak hours evaluated:** Weekday morning and evening peak hours

### **Committed developments considered:**

- 1) Office Park of PMP Associates (20,000 square feet of general office space and 60,000 square feet of medical/dental office space)
- 2) Selbyville Towne Village (133 single-family detached homes)

## **Intersection Descriptions**

### **1) Delaware Route 54 & Proposed Site Entrance**

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

**Northbound approach:** (Site Access) proposed one shared left/right-turn lane; stop-controlled

**Eastbound approach:** (Delaware Route 54) existing one through lane; proposed one through lane and one right-turn lane

**Westbound approach:** (Delaware Route 54) existing one through lane; proposed one through lane and one left-turn lane

### **2) Delaware Route 54 & Johnson Road**

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

**Southbound approach:** (Johnson Road) one shared left/right-turn lane; stop-controlled

**Eastbound approach:** (Delaware Route 54) one shared through/left-turn lane

**Westbound approach:** (Delaware Route 54) one shared through/right-turn lane

### **3) Delaware Route 54 & South Main Street**

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

**Northbound approach:** (South Main Street) one shared through/right-turn lane; stop-controlled

**Southbound approach:** (South Main Street / Delaware Route 54) one shared through/left-turn lane; free-flow

**Westbound approach:** (Delaware Route 54) one shared left/right-turn lane; stop-controlled

## **Safety Evaluation**

**Crash Data:** Crash data was obtained for November 2010 through November 2013 for the intersections and roadway segments within the study area. The crash data request returned a total of seven crashes, one at the intersection of Delaware Route 54 and South Main Street, one along the site frontage, and five along Delaware Route 54 just west of Johnson Road. Two of the seven crashes resulted in personal injury and there were no fatalities. One crash was alcohol related.

- Delaware Route 54 & South Main Street
  - One reported crash (single vehicle collision with fixed object; dark and rainy weather)
- Delaware Route 54 & Proposed Site Access
  - No crashes reported
- Delaware Route 54 & Johnson Road
  - No crashes reported
- Delaware Route 54
  - One crash reported along the site frontage, on curve west of the site access (single vehicle collision with fixed object)
  - Five crashes reported just west of Johnson Road (two crashes involving an animal and three crashes involving a ditch)

**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:** According to the Delaware Transit Corporation (DTC) website, there is no transit service available in the study area or in this portion of Sussex County.

**Planned transit service:** DART was contacted by DBF, and Wayne Henderson, a Service Development Planner for the DTC, replied by email on October 24, 2013 to confirm that transit routes are not planned in the study area in the near future. Accordingly, no transit accommodations are proposed.

**Existing bicycle and pedestrian facilities:** According to the bicycle level of service (BLOS) calculator developed by the *League of Illinois Bicyclists*, Delaware Route 54 operates at BLOS A in the area of the site frontage. There are currently 8 foot shoulders along eastbound and westbound Delaware Route 54 for use by bicyclists. There are no existing sidewalks along Delaware Route 54 in the area of the proposed development, and there are no pedestrian facilities at the intersection of Delaware Route 54 and Johnson Road. The intersection of Delaware Route 54 and South Main Street has sidewalks for pedestrian use. During the traffic counts, only 3 pedestrians/bicyclists were recorded, all at the intersection of Delaware Route 54 and South Main Street.

**Planned bicycle and pedestrian facilities:** DBF contacted Marco Boyce with DeIDOT's Bicycle and Pedestrian Facilities Team via email on August 1, 2013 regarding planned or requested bicycle and pedestrian facilities in the area of this proposed development. Mr. Boyce provided comments via email on August 2, 2013. If the development does occur, Mr. Boyce requests that a shared-use path be constructed along the entire site frontage, tied in to the shoulders at all property boundaries. The shared-use path should be located in a permanent easement behind the existing utility poles, and should be integrated with future landscaping in a safe and attractive manner. If it is physically impossible to construct one or more portions of the shared-use path, DeIDOT will discuss alternatives with the developer. Along eastbound Delaware Route 54 at the proposed site entrance, a bike lane should be striped between the through lane and the right-turn lane.

### **Previous Comments**

All comments from DeIDOT'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 future conditions, the TIS generally assumed a future HV equal to existing HV, but assumed 3% for movements where existing HV is less than 3% and significant changes in volumes are expected. McCormick Taylor assumed future HV to be the same as existing HV, and assumed 3% HV for future movements to and from the proposed site entrance on Delaware Route 54.
- 2) For existing conditions, the TIS and McCormick Taylor determined, for each intersection, overall intersection peak hour factors (PHF). For future conditions, the TIS assumed future PHF of either existing PHF or adjusted to 0.80, 0.88, or 0.92 (depending on intersection volume), whichever was greater, for all intersections. McCormick Taylor assumed future PHF equal to existing PHF.

Table 3  
PEAK HOUR LEVELS OF SERVICE (LOS)  
based on Traffic Impact Study for Lighthouse Lakes  
Report dated November 2013  
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	Weekday AM	Weekday PM
Delaware Route 54 & Proposed Site Access				
2020 with Lighthouse Lakes (Case 3)				
Northbound Site Access	C (18.3)	C (19.5)	C (18.3)	C (19.5)
Westbound Delaware Route 54 - Left	A (8.2)	A (8.6)	A (8.2)	A (8.6)

<sup>1</sup> 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 4  
PEAK HOUR LEVELS OF SERVICE (LOS)  
based on Traffic Impact Study for Lighthouse Lakes  
Report dated November 2013  
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	Weekday AM	Weekday PM
<b>Delaware Route 54 &amp; Johnson Road</b>				
2013 Existing (Case 1)				
Southbound Johnson Road	B (10.9)	B (11.1)	B (10.9)	B (11.1)
Eastbound Delaware Route 54 - Left	A (7.8)	A (8.0)	A (7.8)	A (8.0)
2020 without Lighthouse Lakes (Case 2)				
Southbound Johnson Road	B (10.9)	B (11.6)	B (11.5)	B (11.5)
Eastbound Delaware Route 54 - Left	A (7.9)	A (8.2)	A (8.0)	A (8.1)
2020 with Lighthouse Lakes (Case 3)				
Southbound Johnson Road	B (11.3)	B (12.5)	B (12.1)	B (12.4)
Eastbound Delaware Route 54 - Left	A (8.0)	A (8.4)	A (8.1)	A (8.3)

<sup>2</sup> 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 Lighthouse Lakes  
Report dated November 2013  
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection <sup>3</sup> Two-Way Stop Control (T-intersection)	LOS per TIS <sup>4</sup>		LOS per McCormick Taylor <sup>4</sup>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Delaware Route 54 &amp; South Main Street</b>				
2013 Existing (Case 1)				
Northbound South Main Street	N/A	N/A	C (20.0)	C (17.6)
Southbound South Main Street – Left	A (8.0)	A (7.7)	A (7.6)	A (7.5)
Westbound Delaware Route 54	B (12.3)	B (10.9)	B (11.2)	B (10.4)
2020 without Lighthouse Lakes (Case 2)				
Northbound South Main Street	N/A	N/A	D (26.9)	C (22.8)
Southbound South Main Street – Left	A (8.0)	A (7.9)	A (7.7)	A (7.5)
Westbound Delaware Route 54	B (12.2)	B (12.3)	B (12.1)	B (11.5)
2020 with Lighthouse Lakes (Case 3)				
Northbound South Main Street	N/A	N/A	E (41.5) <sup>5</sup>	E (35.3) <sup>6</sup>
Southbound South Main Street – Left	A (8.1)	A (8.0)	A (7.7)	A (7.7)
Westbound Delaware Route 54	B (13.5)	B (14.1)	B (13.6)	B (12.9)

<sup>3</sup> 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.

<sup>4</sup> This intersection has three approaches (northbound, southbound, and westbound); two are controlled by a stop-sign (northbound and westbound) and one is a free-flow approach (southbound). HCS can be used to analyze either: 1) all approaches as stop-controlled or 2) opposing approaches as stop-controlled with other approaches free-flow, but can't be used to analyze the exact configuration that exists at this intersection. The TIS analyzed this intersection in HCS by assuming a stop sign on the westbound approach only (northbound and southbound free-flow), but this yields misleading results since it allows the stop-controlled northbound approach to operate as free-flow. McCormick Taylor analyzed the intersection in HCS by coding the northbound approach as an "eastbound" approach and making the "eastbound" and westbound approaches stop-controlled. The actual northbound through and right-turn movements were coded as "eastbound" left-turn and through movements, the southbound through movement was coded as a southbound right-turn movement, and the westbound left-turn movement was coded as a westbound through movement.

<sup>5</sup> The 95<sup>th</sup> percentile queue length for the northbound approach during the Case 3 AM peak hour is approximately 4 vehicles.

<sup>6</sup> The 95<sup>th</sup> percentile queue length for the northbound approach during the Case 3 PM peak hour is approximately 3 vehicles.

Table 5 (continued)  
PEAK HOUR LEVELS OF SERVICE (LOS)  
based on Traffic Impact Study for Lighthouse Lakes  
Report dated November 2013  
Prepared by Davis, Bowen & Friedel, Inc.

Unsignalized Intersection <sup>7</sup> All-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor <sup>8</sup>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Delaware Route 54 &amp; South Main Street</b>				
2020 with Lighthouse Lakes (Case 3)				
Northbound South Main Street	N/A	N/A	A (10.0-)	A (9.2)
Southbound South Main Street – Left	N/A	N/A	B (13.3)	B (13.4)
Westbound Delaware Route 54	N/A	N/A	B (12.7)	B (11.1)
Overall Intersection	N/A	N/A	B (12.4)	B (11.9)

<sup>7</sup> 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.

<sup>8</sup> Due to analysis of the unimproved intersection that showed LOS E on the northbound approach for Case 3 conditions, McCormick Taylor evaluated an all-way stop-controlled configuration for this location.