



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

NICOLE MAJESKI  
SECRETARY

May 5, 2023

Mr. Joseph J. Caloggero, Jr.  
The Traffic Group, Inc.  
9900 Franklin Square Drive  
Suite H  
Baltimore, MD 21236

Dear Mr. Caloggero:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Abbey Creek (R Acres – East)** (Tax Parcel: 14-011.00-007) 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 Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2124.

Sincerely,

Claudy Joinville  
TIS Group Project Engineer

CJ:svf

Enclosures

cc with enclosures: Mr. Mark McGonigal, McKee Group  
Mr. David L. Edgell, Office of State Planning Coordination  
Mr. Morris Deputy, Town of Middletown  
Mr. George Haggerty, New Castle County Department of Land Use  
Mr. Bradford Shockley, New Castle County Department of Land Use  
Mr. Owen C. Robatino, New Castle County Department of Land Use  
Mr. Andrew J. Parker, McCormick Taylor, Inc.  
Mr. Tucker Smith, McCormick Taylor, Inc.  
DelDOT Distribution

## DelDOT Distribution

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Wendy Polasko, Subdivision Engineer, Development Coordination, Planning  
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Pao Lin, New Castle County Subdivision Reviewer, Development Coordination, Planning  
Brian Schilling, Canal District Engineer, Canal District  
Nathan Draper, Canal District Public Works Engineer, Canal District  
Jared Kauffmann, Service Development Planner, Delaware Transit Corporation  
Tremica Cherry, Service Development Planner, Delaware Transit Corporation  
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning



May 4, 2023

Mr. Claudy Joinville  
Project Engineer  
DelDOT Division of Planning  
P.O. Box 778  
Dover, DE 19903

RE: Agreement No. 1946F  
Traffic Impact Study Services  
**Task No. 4A Subtask 04 – Abbey Creek (R Acres – East)**

Dear Mr. Joinville:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Abbey Creek (R Acres – East) development prepared by The Traffic Group, Inc., dated September 15, 2022. The Traffic Group prepared the report in a manner generally consistent with DelDOT's Development Coordination Manual.

The TIS evaluates the impacts of the proposed Abbey Creek residential development, to be located on the south side of Green Giant Road (New Castle Road 458) and east of Grears Corner Road (New Castle Road 459), approximately 550 feet west of the intersection of Green Giant Road and Wiggins Mill Road (New Castle Road 446), in New Castle County. The proposed development would consist of 269 senior-adult single-family detached houses and 216 units of senior-adult multi-family housing (townhomes). Two full-movement unsignalized access points are proposed for this development on Green Giant Road. Construction is anticipated to be complete by 2029.

The subject land is located on a portion of a 345.16-acre parcel. The subject land is currently zoned SR (Suburban Reserve) in New Castle County. The developer is seeking to annex the land into the Town of Middletown under R-3 (Multi-Family Residential) zoning.

Currently there are no active DelDOT projects within the study area. However, two of the study intersections for this TIS are included in the Westtown Transportation Improvement District (TID): the roundabout controlled intersections of St. Annes Church Road and Wallasey Drive/Levels Road, and St. Annes Church Road and Wiggins Mill Road/Tywyn Drive. The Westtown Circulation Concept Plan Update, January 2015, identified the intersection of St. Annes Church Road and Wallasey Drive/Levels Road as potentially needing improvement to maintain acceptable level-of-service with future traffic volumes. The Circulation Concept Plan recommended adding a right-turn bypass lane on the eastbound Levels Road approach. The Circulation Concept Plan is currently being updated.



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

The following intersection exhibits 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>
St. Annes Church Road and Wallasey Drive/Levels Road	Roundabout	2029 without development (Case 2) 2029 with development (Case 3)

St. Annes Church Road and Wallasey Drive/Levels Road

This unsignalized intersection with roundabout would operate at LOS F on all approaches, except the southbound approach, in the PM peak hour without development. The highest delay, 120.7 seconds, is expected on the eastbound approach. Based on the recommended improvement identified in the Westown Circulation Concept Plan Update, January 2015, the deficiencies can be mitigated by the installation of a right-turn bypass lane on the eastbound Levels Road approach. Because the right-turn bypass is anticipated to be implemented as part of the Westown TID, the developer is not required to make any improvements at this intersection.

Should the Town of Middletown 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 shall improve the State-maintained road(s) on which they front (Green Giant Road), within the limits of their frontage, to meet DelDOT’s standards for their Functional Classification as found in Section 1.1 of the Development Coordination Manual and elsewhere therein. The improvements shall include both directions of travel, regardless of whether the developer’s lands are on one or both sides of the road. Frontage is defined in Section 1 of the Development Coordination Manual, which states “This length includes the length of roadway perpendicular to lines created by the projection of the outside parcel corners to the roadway.” Questions on or appeals of this requirement should be directed to the DelDOT Subdivision Review Coordinator in whose area the development is located.

2. The developer should construct the full-movement Site Entrance A (eastern access) on Green Giant Road. The proposed configuration is shown in the table below.

<b>Approach</b>	<b>Existing Configuration</b>	<b>Proposed Configuration</b>
Eastbound Green Giant Road	One through lane	One shared through/right-turn lane
Westbound Green Giant Road	One through lane	One left-turn lane and one through lane
Northbound Site Entrance A	Approach does not exist	One shared left/right-turn lane

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT’s Development Coordination Section to determine final turn-lane lengths and other design details during the site plan review.

<b>Approach</b>	<b>Left-Turn Lane</b>	<b>Right-Turn Lane</b>
Eastbound Green Giant Road	N/A	N/A
Westbound Green Giant Road	135 feet *	N/A
Northbound Site Entrance A	N/A	N/A

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

3. The developer should construct the full-movement Site Entrance B (western access) on Green Giant Road. The proposed configuration is shown in the table below.

<b>Approach</b>	<b>Existing Configuration</b>	<b>Proposed Configuration</b>
Eastbound Green Giant Road	One through/left-turn lane and one bypass lane	One through/left-turn lane and one right-turn lane
Westbound Green Giant Road	One through lane and one right-turn lane	One left-turn lane, one through lane, and one right-turn lane
Northbound Site Entrance B	Approach does not exist	One shared left/through/right-turn lane
Southbound St. Annes Boulevard	One left-turn lane and one right-turn lane	One shared left-turn/through lane and one right-turn lane

Initial recommended minimum turn-lane lengths (excluding tapers) of the separate turn lanes are listed below. The developer should coordinate with DelDOT’s Development Coordination Section to determine final turn-lane lengths and other design details during the site plan review.

<b>Approach</b>	<b>Left-Turn Lane</b>	<b>Right-Turn Lane</b>
Eastbound Green Giant Road	N/A	110 feet *
Westbound Green Giant Road	135 feet *	190 feet **
Northbound Site Entrance B	N/A	N/A
Southbound St. Annes Boulevard	N/A	125 feet **

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

\*\* Measured existing turn-lane length, which is sufficient to remain

4. The following bicycle, pedestrian and transit improvements should be included:
  - a. Per the DelDOT Development Coordination Manual section 5.2.9.2, bicycle lanes are required where right turn lanes are being installed.
  - b. Appropriate bicycle symbols, directional arrows, pavement markings, and signing should be included along bicycle facilities and turn lanes within the project limits.
  - c. Utility covers should be made flush with the pavement.
  - d. If clubhouses or other community facilities are constructed within the site, bicycle parking should be provided near building entrances. Where building architecture provides for an awning, other overhang, or indoor parking, the bicycle parking should be covered.
  - e. A minimum 15-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along Green Giant Road.
  - f. Within the easement along the Green Giant Road site frontage, a minimum of a 10-foot wide shared-use path that meets current AASHTO and ADA standards should be constructed. The shared-use path should meet AASHTO and ADA standards and should have a minimum of a five-foot buffer from the roadway. At the property boundaries, the shared-use path should connect to the adjacent property or to the shoulder in accordance with DelDOT’s *Shared-Use Path and/or Sidewalk Termination Reference Guide* dated August 1, 2018. The developer shall coordinate with DelDOT’s

- Development Coordination Section through the plan review process to determine the details of the shared-use path design and connections/terminations at or before both boundaries of the property.
- g. The shared use path described in Item 4.f. should be continuous along Green Giant Road, extending from the eastern property boundary of the proposed Abbey Creek development to the eastern extent of the adjacent development, currently known as Chapel Creek f.k.a. Academy Green.
  - h. The developer should coordinate with DelDOT's Development Coordination Section regarding a possible shared use path interconnection to the adjacent development, currently known as Chapel Creek f.k.a. Academy Green. The shared use path interconnection would connect the southwestern section of the Abbey Creek development to the northeastern section of the adjacent development to provide interconnection for bicycles and pedestrians.
  - i. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
  - j. The developer should install a crosswalk across Green Giant Road. Location of the crossing should be determined through coordination with DelDOT's Development Coordination Section and Traffic Section. The crosswalk may be installed at the existing intersection of Green Giant Road and St. Annes Boulevard, or it may be installed at a different location.
  - k. The developer should coordinate with DelDOT's Development Coordination Section and Traffic Section regarding design of the crosswalk on Green Giant Road described in Item 5.j. In doing so, if requested by DelDOT, the developer will need to conduct an analysis to determine what type of crossing treatment would be appropriate and should assume that the minimum pedestrian crossing volume threshold is met. The analysis must be based on guidance and worksheets found in NCHRP Report 562. Preliminarily, it is anticipated that a median refuge island and active or enhanced treatments, such as Rectangular Rapid Flashing Beacon (RRFB), may be feasible and desired by DelDOT.
  - l. 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. Internal sidewalks in the development should connect to the proposed shared-use path along Green Giant Road.
  - m. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to prevent 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://deldot.gov/Publications/manuals/de\\_mutcd/index.shtml](http://deldot.gov/Publications/manuals/de_mutcd/index.shtml).

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 site plan review process.

Additional details on our review of this TIS are attached. Please contact me at (610) 640-3500 or through e-mail at [ajparker@mccormicktaylor.com](mailto:ajparker@mccormicktaylor.com) 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, PE, PTOE  
Project Manager

Enclosure



## **General Information**

**Report date:** September 15, 2022

**Prepared by:** The Traffic Group, Inc.

**Prepared for:** The McKee Group

**Tax parcel:** 14-011.00-007

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

## **Project Description and Background**

**Description:** The proposed Abbey Creek development would consist of 269 senior-adult single-family detached houses and 216 units of senior-adult multi-family housing (townhomes).

**Location:** The site is located on the south side of Green Giant Road (New Castle Road 458) and east of Grears Corner Road (New Castle Road 459), approximately 550 feet west of the intersection of Green Giant Road and Wiggins Mill Road (New Castle Road 446), in New Castle County. A site location map is included on page 8.

**Amount of land to be developed:** a portion of a 345.16-acre parcel.

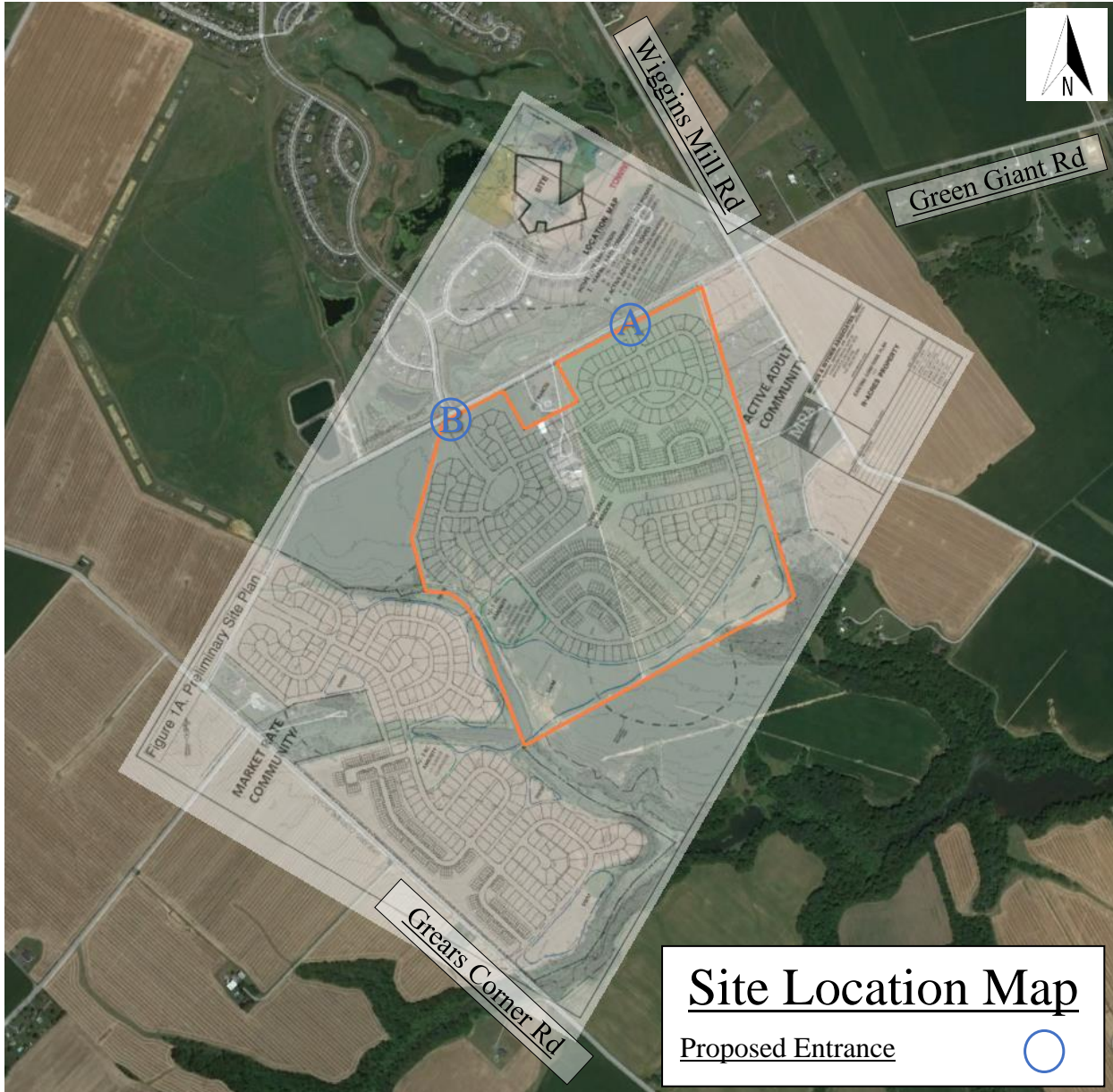
**Land use approval(s) needed:** Subdivision approval. The subject land is currently zoned SR (Suburban Reserve) in New Castle County. The developer is seeking to annex the land into the Town of Middletown under R-3 (Multi-Family Residential) zoning.

**Proposed completion year:** 2029

**Proposed access locations:** Two full-movement unsignalized access points are proposed for this development on Green Giant Road.

### **Average Daily Traffic Volumes (per DelDOT Traffic Summary 2021):**

- Green Giant Road: 223 vehicles/day
- Grears Corner Road: 1,868 vehicles/day
- Wiggins Mill Road: 1,237 vehicles/day
- Levels Road: 4,304 vehicles/day



## **2020 Delaware Strategies for State Policies and Spending**

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

The proposed Abbey Creek development is located mostly within Investment Level 4.

#### *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 (for example, unincorporated areas like Clarksville in Sussex County and Port Penn in New Castle County).

Investment Level 4 Areas also boast undeveloped natural areas, such as forestlands, and large recreational uses, such as state and county parks and fish and wildlife preserves. Level 4 Areas may include natural habitats that are important for providing "ecosystem services" such as improving water quality and reducing flood risk. Sometimes, private recreational facilities, such as campgrounds or golf courses (often with associated residential developments), are also situated in Investment Level 4 Areas.

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

The proposed Abbey Creek development falls within Investment Level 4, and is to be developed with of 269 senior-adult single-family detached houses and 216 units of senior-adult multi-family housing (townhomes). Investment Level 4 should emphasize only development that is compatible with and enhances agriculture, agribusiness, appropriate visitor activities, and similar economic activities. New housing developments are generally discouraged in such areas. Based on the *2020 Delaware Strategies for State Policies and Spending* document, the proposed development does not appear to be compatible with Investment Level 4. As such, additional discussion is required.

## **Comprehensive Plan**

### **New Castle County Comprehensive Plan:**

*(Source: New Castle County Comprehensive Plan 2050, July 2022)*

The New Castle County Comprehensive Plan's Future Land Use Map 2022, indicates that the proposed development is located within a Resource Preservation area. The Comprehensive Plan also indicates that the land for the proposed development is currently zoned for Suburban Reserve.

**Proposed Development's Compatibility with Comprehensive Plan:** The proposed Abbey Creek development includes 269 senior-adult single-family detached houses and 216 units of senior-adult multi-family housing (townhomes) on an approximately 148-acre portion of a 345.16-acre parcel. The land is currently zoned for Suburban Reserve in New Castle County. The developer is seeking to annex the land into the Town of Middletown under R-3 (Multi-Family Residential) zoning. As such, the proposed development appears to comply with New Castle County's Comprehensive Plan 2050.

**Town of Middletown Comprehensive Plan:**

(Source: 2022 Comprehensive Plan, Town of Middletown. Draft, June 2022. Approved by Town Council on October 3, 2022. Awaiting certification by the Governor)

The updated comprehensive plan for the Town of Middletown includes a map showing proposed annexations. A portion of the proposed Abbey Creek development is included in an “area of concern” which indicates that the Town has identified this land as a potential area of annexation, however, is not interested in annexing at this time. The northern part of the parcel, closest to Green Giant Road, is identified as proposed industrial annexation.

**Proposed Development’s Compatibility with Comprehensive Plan:** The proposed Abbey Creek residential development appears to align with the Town’s expected growth to the south. The comprehensive plan does not include zoning for the subject parcel, as it has not been annexed. However, the proposed residential land use aligns with and complements the adjacent single family and multi-family residential zoning. As such, the proposed development appears to comply with The Town of Middletown’s 2022 Comprehensive Plan.

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

Currently there are no active DelDOT projects within the study area.

**Trip Generation**

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

- 269 senior-adult single-family detached houses (ITE Land Use Code 251)
- 216 senior-adult attached multi-family housing (townhomes) (ITE Land Use Code 252)

**Table 1  
Abbey Creek Peak Hour Trip Generation**

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
269 senior-adult single-family detached houses	27	55	82	59	37	96
216 senior-adult attached multi-family housing (townhomes)	14	28	42	30	24	54
<b>TOTAL TRIPS</b>	<b>41</b>	<b>83</b>	<b>124</b>	<b>89</b>	<b>61</b>	<b>150</b>

## **Overview of TIS**

### **Intersections examined:**

- 1) Green Giant Road & Site Entrance A
- 2) Green Giant Rd & St. Annes Boulevard/Site Entrance B
- 3) Green Giant Road & Wiggins Mill Road
- 4) St. Annes Church Road & Tywyn Drive/Wiggins Mill Road
- 5) St. Annes Church Road & Wallasey Drive/Levels Road

### **Conditions examined:**

- 1) 2022 existing (Case 1)
- 2) 2029 without development (Case 2)
- 3) 2029 with development (Case 3)

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

### **Committed developments considered:**

- 1) Middletown Village (f.k.a. Ramunno Property): 280,000 square feet of retail space and a Convenience Market with 20-vehicle fueling positions
- 2) 301 SRV Commercial (f.k.a. Southridge): 559 dwelling units and 239,000 square feet of retail space
- 3) Auto Mall Commercial: 268,000 square feet of retail space
- 4) Kohl North Employment: 100,000 square feet of retail space
- 5) Kohl South Commercial: 58,600 square feet of retail space
- 6) Kohl South Capano: 120 units of multi-family housing
- 7) Rocks & Reading Industrial (f.k.a. Westown Development): 200 acres of an industrial park
- 8) Levels Business Park: 89,000 square feet of retail space and 175,000 square feet of industrial park space
- 9) The Preserve: 251 single-family detached homes and 108 multi-family units
- 10) Chapel Creek f.k.a. Academy Green: 236 single-family detached homes and 176 townhouses

## **Intersection Descriptions**

### **1) Green Giant Road (New Castle Road 458) & Site Entrance A**

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

**Eastbound Approach:** (Green Giant Road) one shared through/right-turn lane

**Westbound Approach:** (Green Giant Road) one left-turn lane and one through lane

**Northbound Approach:** (Site Entrance A) one shared left/right-turn lane, stop controlled

- 2) **Green Giant Rd & St. Annes Boulevard/Site Entrance B**  
**Type of Control:** proposed two-way stop controlled  
**Eastbound Approach:** (Green Giant Road) one through lane, and one right-turn lane  
**Westbound Approach:** (Green Giant Road) one left-turn lane, one through lane, and one right-turn lane  
**Northbound Approach:** (Site Entrance B): one shared left/through/right-turn lane, stop controlled  
**Southbound Approach:** (St. Annes Boulevard) one shared left/through-turn lane and one right-turn lane, stop controlled
  
- 3) **Green Giant Road & Wiggins Mill Road (New Castle Road 446)**  
**Type of Control:** all way stop controlled  
**Eastbound Approach:** (Green Giant Road) one shared left/through/right-turn lane  
**Westbound Approach:** (Green Giant Road) one shared left/through/right-turn lane  
**Northbound Approach:** (Wiggins Mill Road) one shared left/through/right-turn lane  
**Southbound Approach:** (Wiggins Mill Road) one shared left/through/right-turn lane
  
- 4) **St. Annes Church Road (New Castle Road 447) & Tywyn Drive/Wiggins Mill Road**  
**Type of Control:** roundabout  
**Eastbound Approach:** (St. Annes Church Road) one shared left/through/right-turn lane  
**Westbound Approach:** (St. Annes Church Road) one shared left/through/right-turn lane  
**Northbound Approach:** (Tywyn Drive) one shared left/through/right-turn lane  
**Southbound Approach:** (Wiggins Mill Road) one shared left/through/right-turn lane
  
- 5) **St. Annes Church Road & Wallasey Drive/Levels Road (New Castle Road 10)**  
**Type of Control:** roundabout  
**Eastbound Approach:** (St. Annes Church Road) one shared left/through/right-turn lane  
**Westbound Approach:** (St. Annes Church Road) one shared left/through/right-turn lane  
**Northbound Approach:** (Wallasey Drive) one shared left/through/right-turn lane  
**Southbound Approach:** (Levels Road) one shared left/through/right-turn lane

### **Safety Evaluation**

**Crash Data:** Delaware Crash Analysis Reporting System (CARS) data was provided in the TIS for the three-year period from August 19, 2019, through August 19, 2022. For the entire study area there was a total of 17 reportable crashes. Of those 17 crashes, 7 occurred at the intersection of Wiggins Mill Road and St. Annes Church Road, 7 occurred at the intersection of St. Annes Church Road and Wallasey Drive/Levels Road, and 3 occurred at the intersection of St. Annes Church Road and Tywyn Drive/Wiggins Mill Road. The most common crash type in the study area was classified as “not a collision between two vehicles”, accounting for 35 percent of reported crashes. Three of these crashes involved a vehicle hitting the curb within a roundabout and the other three crashes involved a vehicle impacting a utility pole or other post. The second most common type of crash was Angle crashes.

**Sight Distance:** The study area generally consists of relatively flat roadways. Along Green Giant Road there is a horizontal curve located to the west of the proposed Site Entrance B. Other than that, sight distance generally appears adequate throughout the study area. No problematic sight distance issues have been reported or indicated by crash data. As always adequacy of available sight distance should be confirmed during the site plan review process for all proposed movements at the site accesses.

### **Transit, Pedestrian, and Bicycle Facilities**

**Existing transit service:** Based on the current DART Bus Stop Map, the Delaware Transit Corporation (DTC) currently operates one bus route in the study area. Bus route 302 travels along Levels Road, St. Annes Church Road, and Summit Bridge Road providing service between Newark and Dover; however, there are currently no bus stops within 2 miles of the proposed development.

**Planned transit service:** Through email correspondence with DTC, there are not any planned expansions to transit service around the proposed development.

**Existing bicycle and pedestrian facilities:** According to DelDOT's New Castle County Bicycle Map, Green Giant Road (east of Wiggins Mill Road) and Wiggins Mill Road (south of Green Giant Road) are classified as Statewide Bicycle Routes without Bikeway. This route continues from the proposed development, north along Summit Bridge Road to Middletown and south along Wiggins Mill Road to Townsend. There are existing sidewalks along both sides of St. Annes Boulevard that terminate at a pedestrian crosswalk on the north side of Green Giant Road. These sidewalks extend north throughout the residential development and connect to shared use paths that lead to the Charles E. Price Memorial Park. There are also existing shared use paths along St. Annes Church Road, between Levels Road and Wiggins Mill Road.

**Planned bicycle and pedestrian facilities:** A shared use path should be added along site frontages, and DelDOT has requested that these paths be continuous between the eastern extent of the Abbey Creek Development and the southern extent of the Chapel Creek f.k.a. Academy Green development. It is also recommended that the developer include a shared use path for interconnection between Abbey Creek and Chapel Creek f.k.a. Academy Green. DelDOT has also requested that a pedestrian crossing be constructed across Green Giant Road to provide connectivity to bicycle and pedestrian facilities to the north.

### **Previous Comments**

In a review letter dated July 6, 2022, DelDOT requested that ATR data from Green Giant Road be submitted with future TIS submissions.

In a second review letter dated August 18, 2022, DelDOT indicated that the Preliminary TIS was acceptable as submitted.

It appears that all substantive comments from DelDOT's TIS Scoping Memorandum, Traffic Count Review, Revised Traffic County Review, Preliminary TIS Review, and other correspondence were addressed in the Final TIS submission.

**General HCS Analysis Comments**

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

- 1) For the intersection analyses, both the TIS and McCormick Taylor used Highway Capacity Software (HCS) version 2022.
- 2) Per DelDOT's *Development Coordination Manual, section 2.2.8.11.6.F*, the TIS and McCormick Taylor utilized the existing peak hour factors (PHF) for the Case 1 scenario and a future PHF for Case 2 and 3 scenarios of 0.80 for intersections with less than 500 vph, 0.88 for intersections between 500 and 1,000 vph and 0.92 for intersections with more than 1,000 vph or the existing PHF, whichever is higher.
- 3) Per DelDOT's *Development Coordination Manual, section 2.2.8.11.6.H*, McCormick Taylor used a heavy vehicle percentage (HV%) of 3% for each movement or lane group in Case 2 and Case 3 future scenarios, where there was a significant increase of vehicles. For Case 1 existing scenarios, and Case 2 and Case 3 future scenarios where there is no significant increase of vehicles, the HV% from the traffic count data was used. Where a turning movement had few vehicles and a high HV%, in the existing conditions, 5% was applied in some cases. The TIS used existing HV% in most Case 1, 2, and 3 models.
- 4) For analyses of all intersections, McCormick Taylor and the TIS assumed 0% grade for all movements.



Table 2  
Peak Hour Levels of Service (LOS)  
Based on Abbey Creek Traffic Impact Study – September 2022  
Prepared by The Traffic Group

Unsignalized Intersection <sup>1</sup> One-Way Stop (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>1 - Green Giant Road &amp; Site Entrance A</b>				
2029 Build Condition (Case 3)				
Westbound Green Giant Road – Left	A (7.7)	A (7.6)	A (7.7)	A (7.6)
Northbound Site Entrance A	A (9.7)	A (9.4)	A (9.7)	A (9.4)

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

Table 3  
Peak Hour Levels of Service (LOS)  
Based on Abbey Creek Traffic Impact Study – September 2022  
Prepared by The Traffic Group

Unsignalized Intersection <sup>2</sup> Two-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>2 - Green Giant Rd &amp; St. Annes Boulevard/Site Entrance B</b>				
2022 Existing (Case 1)				
Eastbound Green Giant Road – Left	A (7.5)	A (7.4)	A (7.5)	A (7.4)
Southbound St. Annes Boulevard	A (8.9)	A (8.8)	A (8.9)	A (8.8)
2029 No-Build Condition (Case 2)				
Eastbound Green Giant Road – Left	A (7.5)	A (7.6)	A (7.5)	A (7.6)
Southbound St. Annes Boulevard	A (9.4)	A (9.4)	A (9.4)	A (9.4)
2029 Build Condition (Case 3)				
Eastbound Green Giant Road – Left	A (7.5)	A (7.6)	A (7.5)	A (7.6)
Westbound Green Giant Road – Left	A (7.4)	A (7.4)	A (7.4)	A (7.4)
Northbound Site Entrance B	A (9.2)	A (9.2)	A (9.2)	A (9.3)
Southbound St. Annes Boulevard	A (9.9)	B (10.1)	B (9.9)	B (10.1)

<sup>2</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service 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 Abbey Creek Traffic Impact Study – September 2022  
Prepared by The Traffic Group

Unsignalized Intersection <sup>3</sup> All-Way Stop	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>3 - Green Giant Road &amp; Wiggins Mill Road</b>				
2022 Existing (Case 1)				
Eastbound Green Giant Road	A (8.1)	A (8.8)	A (8.1)	A (8.8)
Westbound Green Giant Road	A (8.4)	B (10.8)	A (8.4)	B (10.8)
Northbound Wiggins Mill Road	A (8.2)	A (8.8)	A (8.2)	A (8.8)
Southbound Wiggins Mill Road	A (8.7)	B (11.7)	A (8.7)	B (11.7)
Overall Intersection	A (8.4)	B (10.8)	A (8.4)	B (10.8)
2029 No Build Condition (Case 2)				
Eastbound Green Giant Road	A (9.3)	B (10.1)	A (9.3)	B (10.1)
Westbound Green Giant Road	A (9.7)	B (12.9)	A (9.7)	B (12.9)
Northbound Wiggins Mill Road	A (9.5)	B (10.4)	A (9.5)	B (10.4)
Southbound Wiggins Mill Road	A (9.6)	C (15.3)	A (9.6)	C (15.3)
Overall Intersection	A (9.6)	B (13.2)	A (9.6)	B (13.2)
2029 Build Condition (Case 3)				
Eastbound Green Giant Road	B (10.7)	B (11.3)	B (10.7)	B (11.8)
Westbound Green Giant Road	B (10.5)	B (14.4)	B (10.5)	C (15.7)
Northbound Wiggins Mill Road	B (10.2)	B (11.1)	B (10.2)	B (11.6)
Southbound Wiggins Mill Road	B (10.3)	B (17.7)	B (10.3)	C (19.9)
Overall Intersection	B (10.5)	B (14.8)	B (10.5)	C (16.2)

<sup>3</sup> For both unsignalized and signalized analyses, the numbers in parentheses following levels of service 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 Abbey Creek Traffic Impact Study – September 2022  
Prepared by The Traffic Group

Unsignalized Intersection <sup>4</sup> Roundabout	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>4 – St. Annes Church Road &amp; Tywyn Drive/Wiggins Mill Road</b>				
2022 Existing (Case 1)				
Eastbound St. Annes Church Road	A (4.6)	A (6.7)	A (4.6)	A (6.6)
Westbound St. Annes Church Road	A (5.5)	A (5.8)	A (5.5)	A (5.8)
Northbound Wiggins Mill Road	C (5.0)	A (6.4)	C (5.0)	A (6.4)
Southbound Tywyn Drive	B (4.9)	A (5.0)	B (4.9)	A (5.0)
Overall Intersection	A (5.0)	A (6.3)	A (5.0)	A (6.3)
2029 No Build Condition (Case 2)				
Eastbound St. Annes Church Road	A (6.1)	B (14.1)	A (6.1)	B (14.0)
Westbound St. Annes Church Road	A (9.8)	B (10.4)	A (9.8)	B (10.4)
Northbound Wiggins Mill Road	A (7.1)	B (12.2)	A (7.1)	B (12.2)
Southbound Tywyn Drive	A (8.8)	A (7.5)	A (8.8)	A (7.4)
Overall Intersection	A (8.0)	B (12.4)	A (8.0)	B (12.4)
2029 Build Condition (Case 3)				
Eastbound St. Annes Church Road	A (6.4)	C (17.2)	A (6.4)	C (15.7)
Westbound St. Annes Church Road	B (10.6)	B (11.8)	B (10.6)	B (11.1)
Northbound Wiggins Mill Road	A (7.7)	B (14.3)	A (7.7)	B (13.3)
Southbound Tywyn Drive	A (9.2)	A (8.1)	A (9.2)	A (7.8)
Overall Intersection	A (8.5)	B (14.7)	A (8.5)	B (13.6)

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

Table 6  
Peak Hour Levels of Service (LOS)  
Based on Abbey Creek Traffic Impact Study – September 2022  
Prepared by The Traffic Group

Unsignalized Intersection <sup>5</sup> Roundabout	LOS per TIS		LOS per McCormick Taylor <sup>6</sup>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>5 – St. Annes Church Road &amp; Wallasey Drive/Levels Road</b>				
2022 Existing (Case 1)				
Eastbound Levels Road	A (6.0)	B (10.6)	A (6.0)	B (10.6)
Westbound St. Annes Church Road	A (9.4)	A (8.9)	A (9.4)	A (8.9)
Northbound Levels Road	A (6.7)	A (9.5)	A (6.7)	A (9.5)
Southbound Wallasey Drive	A (7.6)	A (6.1)	A (7.6)	A (6.1)
Overall Intersection	A (7.5)	A (9.8)	A (7.5)	A (9.8)
2029 No Build Condition (Case 2)				
Eastbound Levels Road	A (8.6)	F (111.7)	A (7.6)	F (120.7)
Westbound St. Annes Church Road	E (43.1)	E (47.5)	E (44.5)	F (56.0)
Northbound Levels Road	B (11.4)	F (74.4)	B (11.0)	F (88.5)
Southbound Wallasey Drive	C (21.7)	B (13.0)	C (22.7)	B (13.4)
Overall Intersection	C (23.5)	F (85.0)	C (23.7)	F (94.2)
2029 Build Condition (Case 3)				
Eastbound Levels Road	A (8.8)	F (122.0)	A (7.8)	F (131.1)
Westbound St. Annes Church Road	F (51.3)	F (54.5)	F (53.4)	F (64.1)
Northbound Levels Road	B (11.8)	F (85.1)	B (11.3)	F (100.8)
Southbound Wallasey Drive	C (23.0)	B (13.4)	C (24.2)	B (13.8)
Overall Intersection	D (27.1)	F (94.1)	D (27.6)	F (103.9)

<sup>5</sup> For both unsignalized and signalized analyses the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

<sup>6</sup> McCormick Taylor used 3% HV for all movements in both AM and PM peak hours. The TIS used existing HV%.

Table 6 (continued)  
Peak Hour Levels of Service (LOS)  
Based on Abbey Creek Traffic Impact Study – September 2022  
Prepared by The Traffic Group

Unsignalized Intersection <sup>7</sup> Roundabout with Bypass Lane	LOS per TIS		LOS per McCormick Taylor <sup>8</sup>	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>5 – St. Annes Church Road &amp; Wallasey Drive/Levels Road</b>				
2029 No Build Condition (Case 2) w/ Improvements (Bypass Lane)				
Eastbound Levels Road	A (3.8)	B (12.7)	A (3.4)	B (13.7)
Westbound St. Annes Church Road	E (43.1)	E (47.5)	E (44.5)	F (56.0)
Northbound Levels Road	B (11.4)	F (74.4)	B (11.0)	F (88.5)
Southbound Wallasey Drive	C (21.7)	B (13.0)	C (22.7)	B (13.4)
Overall Intersection	C (22.2)	D (31.1)	C (22.6)	E (36.0)
2029 Build Condition (Case 3) w/ Improvements (Bypass Lane)				
Eastbound Levels Road	A (3.9)	B (14.1)	A (3.5)	C (15.4)
Westbound St. Annes Church Road	F (51.3)	F (54.5)	F (53.4)	F (64.1)
Northbound Levels Road	B (11.8)	F (85.1)	B (11.3)	F (100.8)
Southbound Wallasey Drive	C (23.0)	B (13.4)	C (24.2)	B (13.8)
Overall Intersection	D (25.7)	E (35.2)	D (26.4)	E (40.8)

<sup>7</sup> For both unsignalized and signalized analyses the numbers in parentheses following levels of service 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> McCormick Taylor used 3% HV for all movements in both AM and PM peak hours. The TIS used existing HV%.