



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

NICOLE MAJESKI  
SECRETARY

May 12, 2022

Mr. Michael Kaszyski, Jr.  
Verdantas  
5400 Limestone Road  
Wilmington, DE 19808

Dear Mr. Kaszyski:

The enclosed Traffic Operational Analysis (TOA) review letter for the proposed **Blue Diamond Park – Phase 2** (Tax Parcels: 10-045.00-007 and 10-050-006) 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 TOA 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,

A handwritten signature in cursive script, appearing to read "Claudy Joinville".

Claudy Joinville  
Project Engineer

CJ:km  
Enclosures  
cc with enclosures:

Mr. Keith Stoltz, Blue Diamond, LLC  
Mr. Jeff Bross, Verdantas  
Mr. Brian Clarke, Verdantas  
Mr. David L. Edgell, Office of State Planning Coordination  
Mr. Bradford Shockley, New Castle County Department of Land Use  
Mr. Owen C. Robatino, New Castle County Department of Land Use  
Mr. Andrew Parker, McCormick & Taylor, Inc.  
DelDOT Distribution

## DelDOT Distribution

Brad Eaby, Deputy Attorney General  
Shanté Hastings, Director, Deputy Secretary, Transportation Solutions (DOTS)  
Pamela Steinebach, Director, Planning  
Mark Luszcz, Deputy Director, DOTS  
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Brian Schilling, Canal District Engineer, Canal District  
Matthew Vincent, Chief of Project Development North, DOTS  
Todd Sammons, Assistant Director, Development Coordination  
T. William Brockenbrough, Jr., County Coordinator, Development Coordination  
Jared Kauffman, Service Development Planner, Delaware Transit Corporation  
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning  
Wendy Polasko, Subdivision Engineer, Development Coordination  
Susanne Laws, Expedited Review Team (ERT) Lead, Development Coordination  
Sireen Muhtaseb, New Castle Review Coordinator, Development Coordination  
Jun Xie, Subdivision Manager, Development Coordination  
Mark Galipo, Traffic Engineer, Traffic, DOTS  
Annamaria Fumato, Project Engineer, Development Coordination



May 12, 2022

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. 3A Subtask 07 – Blue Diamond Park Phase 2**

Dear Mr. Joinville:

McCormick Taylor has completed its review of the Traffic Operational Analysis (TOA) for the Blue Diamond Park Phase 2 development prepared by Verdantas (formerly Duffield Associates, LLC) dated April 2022. Verdantas prepared the report in a manner generally consistent with DelDOT's Development Coordination Manual.

The TOA evaluates the impacts of the proposed Blue Diamond Park Phase 2 development, bounded by Federal School Lane (New Castle Road 380) on the north, Hamburg Road (New Castle Road 381) on the south, River Road (New Castle Road 378) on the east, and US Route 13 on the west, in New Castle County, Delaware. The proposed development would consist of 911,400 square feet of warehousing space. Four unsignalized access points are proposed for this development: one rights-in/rights-out/lefts-in access on US Route 13 (an existing access to remain), one full access on Federal School Lane (an existing access to remain), one full access on Hamburg Road (an existing access to remain), and one full access on River Road (a new access). Construction is anticipated to be completed in 2022.

The subject land is located on an approximately 375-acre assemblage of parcels. The subject land is currently zoned EX (Extractive Use) in New Castle County. The developer does not plan to rezone the land.

Currently there are no active DelDOT projects within the study area. There are, however, a number of improvements being constructed within the study area as part of the Blue Diamond Park Phase 1 development. Those improvements include but are not limited to the addition of a separate right-turn lane on the westbound approach of Hamburg Road at US Route 13, a new bus stop pad on the north side of Hamburg Road across from the Delaware Transit Corporation (DTC) park and ride facility east of US Route 13, shared-use paths and/or concrete sidewalks along the frontages of US Route 13, Hamburg Road, and Federal School Lane, and bike lanes on Hamburg Road and Federal School Lane.

The proposed Blue Diamond Park Phase 2 development would meet the New Castle County Level of Service (LOS) Standards as stated in Section 40.11.210 of the Unified Development Code (UDC), for all intersections.



However, as shown in the table below, based on the criteria listed in Chapter 2 of DelDOT’s Development Coordination Manual, one intersection identified by DelDOT as being required for study may exhibit LOS deficiencies without the implementation of physical roadway and/or traffic control improvements. The potential LOS deficiencies are on the yield-controlled major-street northbound u-turn movement at one unsignalized intersection (northbound US Route 13 u-turn at Site Access A). The deficiencies pertain to that movement only, and the intersection is not subject to New Castle County’s concurrency requirements.

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
US Route 13 and Site Access A	Unsignalized	2021 existing PM (Case 1); 2022 without development PM (Case 2); 2022 with development PM (Case 3)

US Route 13 and Site Access A

The US Route 13 northbound u-turn movement would operate at LOS E during the PM peak hour in all scenarios. However, given the relatively low volume making the u-turn movement, which is not directly increased by the subject development, and the relatively short 95<sup>th</sup> percentile queue lengths of less than one vehicle, we do not recommend any improvements be implemented by the developer to mitigate this minor LOS deficiency.

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 shall improve the State-maintained road(s) on which they front (US Route 13, Hamburg Road, Federal School Lane, and River 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. It is noted that some or all of these roads are being improved to some extent as required of the Blue Diamond Park Phase 1 development, but DelDOT may require additional improvements especially on River Road since a new site access is being constructed there.

Typically, 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. It is noted that Site Access A on US Route 13, Site Access B on Hamburg Road, and Site Access C on Federal School Lane are existing site access intersections that will also serve Blue Diamond Park Phase 2. Each of these site accesses has been determined to be sufficient for use by Blue Diamond Park Phase 2 with no improvements needed at those

three intersections other than those improvements required of the Blue Diamond Park Phase 1 development. The developer should coordinate with DelDOT’s Development Coordination Section to confirm the status of all improvements required by Blue Diamond Park Phase 1 and, if any of those improvements are not expected to be complete soon, to determine responsibility for completing any required improvements prior to Blue Diamond Park Phase 2 opening.

- The developer should construct the full-movement Site Access D on River Road. The proposed configuration is shown in the table below.

Approach	Existing Configuration	Proposed Configuration
Eastbound Site Access D	Approach does not exist	One shared left/right-turn lane
Northbound River Road	One through lane	One left-turn lane and one through lane
Southbound River Road	One through lane	One 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.

Approach	Left-Turn Lane	Right-Turn Lane
Eastbound Site Access D	N/A	N/A
Northbound River Road	210 feet *	N/A
Southbound River Road	N/A	170 feet *

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

- On Hamburg Road between the existing park and ride facility on the south and the planned bus stop pad on the north (pad being constructed as part of Blue Diamond Park Phase 1 improvements), the developer should construct a crosswalk with median pedestrian refuge island and a Rectangular Rapid Flashing Beacon (RRFB). The developer should coordinate with DelDOT’s Development Coordination Section to determine details regarding design and construction of the crosswalk, median island, and RRFB.
- The developer should coordinate with DelDOT regarding the need for and accommodation of overnight parking for trucks with business at Blue Diamond Park, such that a parking plan agreeable to all parties can be established. To the extent feasible, DelDOT desires that

trucks with business at this facility not add to existing off-site overnight truck parking demand in the area.

6. The developer should coordinate with DelDOT's Development Coordination Section regarding the timing of the design and construction of the identified US Route 13/Hamburg Road intersection improvements (channelization, pedestrian facilities and signal equipment) associated with the westbound Hamburg Road right-turn lane addition which was required under the Blue Diamond Park Phase 1 approval.
7. In addition to the pedestrian/transit improvement described above in Item No. 4, the following bicycle and pedestrian improvements should be included:
  - a. The developer should coordinate with DelDOT's Development Coordination Section to confirm the status of bicycle, pedestrian and transit improvements required by Blue Diamond Park Phase 1 and, if any of those improvements are not expected to be complete soon, to determine responsibility for completing any required improvements prior to Blue Diamond Park Phase 2 opening.
  - b. Per the DelDOT Development Coordination Manual section 5.2.9.2, bicycle lanes are required where right turn lanes are being installed.
  - c. Appropriate bicycle symbols, directional arrows, pavement markings, and signing should be included along bicycle facilities and turn lanes within the project limits.
  - d. Utility covers should be made flush with the pavement.
  - 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 US Route 13, Hamburg Road, Federal School Lane, and River Road. It is noted that some or all of these easements may already be dedicated to DelDOT if required as part of the Blue Diamond Park Phase 1 development.
  - f. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
  - g. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the 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 pedestrian paths and/or sidewalks along US Route 13, Hamburg Road, and Federal School Lane.
  - h. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to prevent vehicular overhang onto the sidewalk.



Improvements in this TOA 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 TOA 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:** April 2022

**Prepared by:** Verdantas (formerly Duffield Associates, LLC)

**Prepared for:** Blue Diamond, LLC

**Tax parcel:** 10-045.00-007 and 10-050-006

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

## **Project Description and Background**

**Description:** The proposed Blue Diamond Park Phase 2 development would consist of 911,400 square feet of warehousing space.

**Location:** The site is bounded by Federal School Lane (New Castle Road 380) on the north, Hamburg Road (New Castle Road 381) on the south, River Road (New Castle Road 378) on the east, and US Route 13 on the west, in New Castle County, Delaware. A site location map is included on page 7.

**Amount of land to be developed:** approximately 375-acre assemblage of parcels

**Land use approval(s) needed:** Subdivision approval. The subject land is currently zoned EX (Extractive Use) in New Castle County. The developer does not plan to rezone the land.

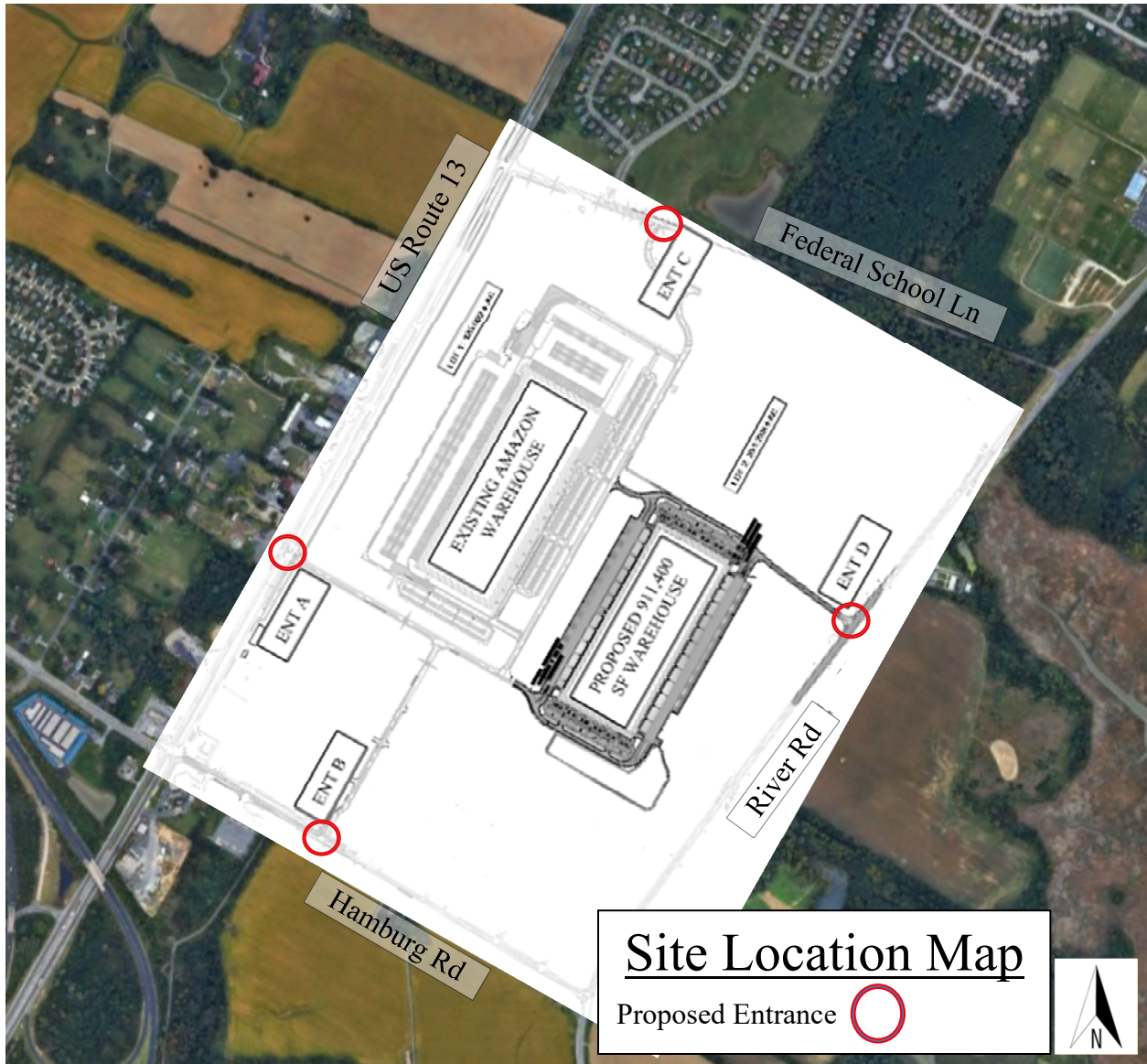
**Proposed completion year:** 2022

**Proposed access locations:** Four unsignalized access points are proposed for this development: one rights-in/rights-out/lefts-in access on US Route 13 (an existing access to remain), one full access on Federal School Lane (an existing access to remain), one full access on Hamburg Road (an existing access to remain), and one full access on River Road (a new access).

### **Daily Traffic Volumes (per DelDOT Traffic Summary 2019):**

- 2019 Average Annual Daily Traffic on US Route 13: 40,351 vehicles/day
- 2019 Average Annual Daily Traffic on Hamburg Road: 6,065 vehicles/day
- 2019 Average Annual Daily Traffic on Federal School Lane: 1,806 vehicles/day
- 2019 Average Annual Daily Traffic on River Road: 6,570 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 Blue Diamond Park Phase 2 development is located almost entirely within Investment Level 3.

#### *Investment Level 3*

Investment Level 3 Areas generally fall into two categories. The first category covers lands that are in the long-term growth plans of counties or municipalities where development is not necessary to accommodate expected population growth during this five-year planning period (or longer). In these instances, development in Investment Level 3 may be least appropriate for new growth and development in the near term.

The second category includes lands that are adjacent to or intermingled with fast-growing areas within counties or municipalities that are otherwise categorized as Investment Levels 1 or 2. Environmentally sensitive features, agricultural preservation issues, or other infrastructure issues most often impact these lands. In these instances, development and growth may be appropriate in the near term, but the resources on the site and in the surrounding area should be carefully considered and accommodated by state agencies and local governments with land-use authority.

Due to the limits of finite financial resources, state infrastructure spending on “hard” or “grey” infrastructure such as roads, sewer, water, and public facilities will generally be directed to Investment Level 1 and 2 Areas during this planning period. The State will consider investing in these types of infrastructure in Investment Level 3 Areas once the Investment Level 1 and 2 Areas are substantially built out, or when the infrastructure or facilities are logical extensions of existing systems and deemed appropriate to serve a particular area.

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

The proposed Blue Diamond Park Phase 2 development falls almost entirely within Investment Level 3 and is to be developed with 911,400 square feet of warehousing space. The proposed development is generally consistent with the character of Investment Level 3, given that the nearby Investment Level 1 and 2 areas are mostly built out. Additionally, there are similar uses already constructed in adjacent Investment Level 3 areas. It is therefore concluded that the proposed development appears to generally comply with the policies stated in the 2020 “Strategies for State Policies and Spending.”

## **Comprehensive Plan**

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

*(Source: New Castle County Comprehensive Plan, Updated June 2012)*

The New Castle County Comprehensive Plan 2012 Future Land Use Map indicates that the proposed development is located within the Office/Commercial/Industrial Development Area (OCI).

The New Castle County Comprehensive Plan indicates that a combination of Centralized Southern Growth and Northern New Castle County Redevelopment (which calls for directing more of the future growth into the infill and Office/Commercial/Industrial (OCI) Development Areas north of the canal) is the most cost-effective, environmentally prudent and infrastructurally efficient manner to meet the County's future growth needs.

**Proposed Development's Compatibility with Comprehensive Plan:** The proposed Blue Diamond Park Phase 2 project includes 911,400 square feet of warehousing space on an approximately 375-acre assemblage of parcels. The land is currently zoned EX (Extractive Use) in New Castle County. The developer does not plan to rezone the land. The purpose of EX zoning districts is for mining, or quarry type operations. However, recreation, high intensity and light industry uses may be permitted contemporaneous with or following the extractive use. The proposed warehousing space appears to be consistent with a light industrial use. The New Castle County Comprehensive Plan 2012 Future Land Use Map indicates that the proposed development is within the Office/Commercial/Industrial Development Area (OCI) Area. The proposed development appears to comply with the New Castle County's Comprehensive Plan 2012 as well as the EX zoning.

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

Currently there are no active DelDOT projects within the study area. There are, however, a number of improvements being constructed within the study area as part of the Blue Diamond Park Phase 1 development. Those improvements include but are not limited to the addition of a separate right-turn lane on the westbound approach of Hamburg Road at US Route 13, a new bus stop pad on the north side of Hamburg Road across from the Delaware Transit Corporation (DTC) park and ride facility east of US Route 13, shared-use paths and/or concrete sidewalks along the frontages of US Route 13, Hamburg Road, and Federal School Lane, and bike lanes on Hamburg Road and Federal School Lane.

### **Trip Generation**

Trip generation for the proposed development was computed using comparable land uses and equations contained in Trip Generation, Tenth 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:

- 911,400 square feet of warehousing (ITE Land Use Code 150)

**Table 1**  
**Blue Diamond Park Phase 2 Peak Hour Trip Generation**

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
911,400 sf warehouse	104	31	135	37	100	137
<b>TOTAL TRIPS</b>	<b>104</b>	<b>31</b>	<b>135</b>	<b>37</b>	<b>100</b>	<b>137</b>

## **Overview of TOA**

### **Intersections examined:**

- 1) US Route 13 & Site Access A
- 2) Hamburg Road & Site Access B
- 3) Federal School Lane & Site Access C
- 4) River Road & Site Access D
- 5) US Route 13 & Hamburg Road / Bear Tybouts Road
- 6) US Route 13 & Federal School Lane
- 7) Bear Tybouts Road & NB DE Route 1 Ramp / Reybold Drive
- 8) Hamburg Road & River Road
- 9) Federal School Lane & River Road

### **Conditions examined:**

- 1) 2021 Existing (Case 1)
- 2) 2022 without development (Case 2)
- 3) 2022 with development (Case 3)

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

### **Committed developments considered:**

- 1) Delaware Logistics Center: 833,224 sf industrial park (559 employees)
- 2) Peoples Industrial Park: 362,200 sf industrial park
- 3) Vistas at Red Lion North: 240 multi-family mid-rise residential units
- 4) Vistas at Red Lion South: 282 age-restricted detached residential units
- 5) SAFstor DuPont Highway: 103,650 sf self-storage facility
- 6) Arlon: 202,000 sf warehouse
- 7) Rising Sun Contractors: 11,000 sf contractor warehouse

## **Intersection Descriptions**

### **1) US Route 13 & Site Access A**

**Type of Control:** two-way stop controlled

**Eastbound Approach:** (private driveway) one shared through/left-turn lane and one right-turn lane, stop controlled

**Westbound Approach:** (Site Access A) one right-turn only lane, yield controlled

**Northbound Approach:** (US Route 13) one left-turn/u-turn lane, two through lanes and one right-turn lane

**Southbound Approach:** (US Route 13) one left-turn/u-turn lane, two through lanes and one right-turn lane

**2) Hamburg Road & Site Access B**

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

**Eastbound Approach:** (Hamburg Road) one left-turn lane and one through lane

**Westbound Approach:** (Hamburg Road) one shared through/right-turn lane

**Southbound Approach:** (Site Access B) one shared left/right-turn lane, stop controlled

**3) Federal School Lane & Site Access C**

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

**Eastbound Approach:** (Federal School Lane) one shared through/right-turn lane

**Westbound Approach:** (Federal School Lane) one shared through/left-turn lane

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

**4) River Road & Site Access D**

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

**Eastbound Approach:** (Site Access D) proposed one shared left/right-turn lane, stop controlled

**Northbound Approach:** (River Road) existing one through lane; proposed one left-turn lane and one through lane

**Southbound Approach:** (River Road) existing one through lane; proposed one through lane and one right-turn lane

**5) US Route 13 & Hamburg Road / Bear Tybouts Road**

**Type of Control:** signalized

**Eastbound Approach:** (Bear Tybouts Road) one left-turn lane, one through lane, one right-turn lane

**Westbound Approach:** (Hamburg Road) one left-turn lane and one shared through/right-turn lane

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

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

**Note:** the westbound Hamburg Road approach will soon be modified to include a separate right-turn lane, to be added as required of Blue Diamond Park Phase 1

**6) US Route 13 & Federal School Lane**

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

**Westbound Approach:** (Federal School Lane) one left-turn lane and one right-turn lane, stop-controlled

**Northbound Approach:** (US Route 13) one u-turn lane, two through lanes, and one right-turn lane

**Southbound Approach:** (US Route 13) one left-turn lane and two through lanes

**7) Bear Tybouts Road & NB DE Route 1 Ramp / Reybold Drive**

**Type of Control:** two-way stop controlled

**Eastbound Approach:** (Bear Tybouts Road) one shared left/through/right-turn lane, stop-controlled

**Westbound Approach:** (Bear Tybouts Road) one shared left/through/right-turn lane, stop-controlled

**Northbound Approach:** (no approach – ramp to DE Route 1) south leg is one-way southbound away from the intersection

**Southbound Approach:** (Reybold Drive) one shared left/through/right-turn lane, stop controlled

**8) Hamburg Road & River Road**

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

**Eastbound Approach:** (Hamburg Road) one shared left/right-turn lane (right turn is flared and yield controlled), stop-controlled

**Northbound Approach:** (River Road) one shared through/left-turn lane and one bypass lane

**Southbound Approach:** (River Road) one shared through/right-turn lane

**9) Federal School Lane & River Road**

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

**Eastbound Approach:** (Federal School Lane) one shared left/right-turn lane, stop-controlled

**Northbound Approach:** (River Road) one shared through/left-turn lane

**Southbound Approach:** (River Road) one shared through/right-turn lane

**Safety Evaluation**

**Crash Data:** Delaware Crash Analysis Reporting System (CARS) data was provided in the TOA for the three-year period from December 1, 2018, through December 1, 2021. A total of 159 crashes occurred throughout the study area during the three-year period. 48 of the crashes occurred at the intersection of US Route 13 & Hamburg Road / Bear Tybouts Road. There were 35 personal injury crashes and 4 fatalities. None of the crashes involved a bicyclist or pedestrian.

**Sight Distance:** The study area generally consists of relatively flat roadways and there are few visual obstructions. Sight distance appears adequate throughout the study area. Previous sight distance issues, if any, at site accesses A, B, and C would have been addressed by improvements made or being made as required of Blue Diamond Park Phase 1. 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 multiple fixed-route transit bus services in the area. Routes 25 and 47 run along US Route 13, including bus stops at the existing Amazon facility located on the overall Blue Diamond Park site and at the park and ride facility on Hamburg Road east of US Route 13.

**Planned transit service:** A new bus stop pad is to be constructed on westbound Hamburg Road, across from the entrance to the park and ride facility, as part of the Blue Diamond Park Phase 1 offsite improvements. DelDOT also desires a crosswalk, median pedestrian refuge island and Rectangular Rapid Flashing Beacon (RRFB) to be installed at this location in association with the new bus stop pad.

**Existing bicycle and pedestrian facilities:** According to DelDOT's New Castle County Bicycle Map, US Route 13 is classified as a High-Traffic Connector Bicycle Route with Bikeway. River Road is classified as a Statewide Bicycle Route with Bikeway. There are bike lanes, shoulders with bicycle markings, sidewalks and shared-use paths either in place or soon to be installed (as required of Blue Diamond Park Phase 1 improvements) along much of US Route 13, Hamburg Road, and Federal School Lane.

**Planned bicycle and pedestrian facilities:** As stated above, there are bike lanes, shoulders with bicycle markings, sidewalks and shared-use paths either in place or soon to be installed (as required of Blue Diamond Park Phase 1 improvements) along much of US Route 13, Hamburg Road, and Federal School Lane. A crosswalk is planned to connect the park and ride facility on the south side of Hamburg Road with a new bus stop pad on the north side. DelDOT would also like a median pedestrian refuge island and Rectangular Rapid Flashing Beacon (RRFB) to be installed in association with this pedestrian crossing.

## **Previous Comments**

In a review letter dated March 25, 2022, DelDOT indicated that the Preliminary TOA was acceptable as submitted.

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

## **General HCS Analysis Comments**

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

- 1) For two-way stop control intersections, the TOA and McCormick Taylor applied heavy vehicle factors (HV) by movement using existing data. For signalized intersections, the TOA and McCormick Taylor applied HV by lane group using existing data. The TOA and McCormick Taylor generally assumed future HV to be the same as existing HV at all

intersections other than site access. McCormick Taylor assumed HV for future movements to and from site access points based on future truck trip data provided in the TOA.

- 2) For existing conditions, the TOA and McCormick Taylor determined overall intersection peak hour factors (PHF) for each intersection based on the turning movement counts that were available. Future PHFs were determined as per the DelDOT Development Coordination Manual section 2.2.8.11.6.F where applicable.
- 3) For analyses of signalized intersections, McCormick Taylor used a base saturation flow rate of 1,900 pc/hr/ln per DelDOT's Development Coordination Manual.
- 4) For analyses of all intersections, McCormick Taylor and the TOA assumed 0% grade for all movements.
- 5) The TOA and McCormick Taylor used different signal timings when analyzing the signalized intersections in some cases.



Table 2  
Peak Hour Levels of Service (LOS)  
Based on Blue Diamond Park Phase 2 Traffic Operational Analysis – April 2022  
Prepared by Verdantas

Unsignalized Intersection <sup>1</sup> Two-Way Stop	LOS per TOA		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>US Route 13 &amp; Site Access A</b>				
2021 Existing (Case 1)				
Eastbound private driveway	N/A	N/A	N/A	N/A
Westbound Site Access A – Right	B (14.6)	B (12.2)	C (17.6)	B (12.3)
Northbound US Route 13 – Left/U-turn	B (14.1)	E (43.5)	C (15.2)	E (43.5)
Southbound US Route 13 – Left/U-turn	B (12.6)	C (16.9)	B (12.5)	B (10.5)
2022 No-Build Condition (Case 2)				
Eastbound private driveway	B (13.2)	C (22.3)	B (14.2)	D (27.4)
Westbound Site Access A – Right	B (14.8)	B (12.6)	C (18.0)	B (12.7)
Northbound US Route 13 – Left/U-turn	B (13.8)	E (40.8)	C (16.5)	E (40.8)
Southbound US Route 13 – Left/U-turn	B (12.8)	C (18.1)	B (12.7)	B (10.8)
2022 Build Condition (Case 3)				
Eastbound private driveway	B (13.4)	C (22.6)	B (14.6)	D (27.9)
Westbound Site Access A – Right	B (15.0-)	B (12.9)	C (18.2)	B (13.5)
Northbound US Route 13 – Left/U-turn	B (13.8)	E (40.8)	C (16.5)	E (40.8)
Southbound US Route 13 – Left/U-turn	B (13.3)	B (13.6)	B (13.0)	B (14.0)

<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 Blue Diamond Park Phase 2 Traffic Operational Analysis – April 2022  
Prepared by Verdantas

Unsignalized Intersection <sup>2</sup> One-Way Stop (T-intersection)	LOS per TOA		LOS per McCormick Taylor	
	Weekday AM	Weekday PM <sup>3</sup>	Weekday AM	Weekday PM <sup>3</sup>
<b>Hamburg Road &amp; Site Access B</b>				
2021 Existing (Case 1)				
Eastbound Hamburg Road – Left	A (8.0)	N/A	A (8.0)	N/A
Southbound Site Access B	B (10.3)	N/A	B (10.3)	N/A
2022 No-Build Condition (Case 2)				
Eastbound Hamburg Road – Left	A (8.0)	N/A	A (8.0)	N/A
Southbound Site Access B	B (10.3)	N/A	B (10.3)	N/A
2022 Build Condition (Case 3)				
Eastbound Hamburg Road – Left	A (8.1)	A (8.0)	A (8.1)	A (8.1)
Southbound Site Access B	B (10.4)	B (10.5)	B (10.4)	B (10.9)

<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.

<sup>3</sup> The Case 1 and Case 2 PM peak hour results are shown as “N/A” because there is zero volume on the eastbound left-turn movement and on the southbound approach during these scenarios in the PM peak hour.

Table 4  
Peak Hour Levels of Service (LOS)  
Based on Blue Diamond Park Phase 2 Traffic Operational Analysis – April 2022  
Prepared by Verdantas

Unsignalized Intersection <sup>4</sup> One-Way Stop (T-intersection)	LOS per TOA		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Federal School Lane &amp; Site Access C</b>				
2021 Existing (Case 1)				
Westbound Federal School Lane – Left	A (7.4)	A (7.3)	A (7.4)	A (7.3)
Northbound Site Access C	A (9.8)	A (9.3)	A (9.8)	A (9.5)
2022 No-Build Condition (Case 2)				
Westbound Federal School Lane – Left	A (7.4)	A (7.3)	A (7.4)	A (7.4)
Northbound Site Access C	A (9.8)	A (9.3)	A (9.8)	A (9.6)
2022 Build Condition (Case 3)				
Westbound Federal School Lane – Left	A (7.5)	A (7.3)	A (7.5)	A (7.4)
Northbound Site Access C	A (9.9)	A (9.4)	A (9.9)	A (9.7)

<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 5  
Peak Hour Levels of Service (LOS)  
Based on Blue Diamond Park Phase 2 Traffic Operational Analysis – April 2022  
Prepared by Verdantas

Unsignalized Intersection <sup>5</sup> One-Way Stop (T-intersection)	LOS per TOA		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>River Road &amp; Site Access D</b>				
2022 Build Condition (Case 3)				
Eastbound Site Access D	B (11.2)	B (13.9)	B (11.6)	C (16.8)
Northbound River Road – Left	A (7.8)	A (8.5)	A (8.2)	A (9.4)

<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.

Table 6  
Peak Hour Levels of Service (LOS)  
Based on Blue Diamond Park Phase 2 Traffic Operational Analysis – April 2022  
Prepared by Verdantas

Signalized Intersection <sup>6</sup>	LOS per TOA		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>US Route 13 &amp; Hamburg Road / Bear Tybouts Road</b> 2021 Existing (Case 1) <sup>7</sup>	C (22.9)	C (26.4)	C (33.9)	D (37.5)
2022 No Build Condition (Case 2)	C (23.4)	C (27.1)	C (31.6)	D (36.2)
2022 Build Condition (Case 3)	C (24.0)	C (29.3)	C (32.4)	D (38.7)

<sup>6</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. For ramp merge condition analyses, the numbers in parentheses following levels of service are the average density, measured in passenger cars per mile per lane.

<sup>7</sup> The TOA analyzed Case 1 with a separate right-turn lane on the westbound approach, but McCormick Taylor didn't include the separate right-turn lane until Cases 2 and 3 because it is not built yet.

Table 7  
Peak Hour Levels of Service (LOS)  
Based on Blue Diamond Park Phase 2 Traffic Operational Analysis – April 2022  
Prepared by Verdantas

Unsignalized Intersection <sup>8</sup> One-Way Stop (T-intersection)	LOS per TOA		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>US Route 13 &amp; Federal School Lane</b>				
2021 Existing (Case 1)				
Westbound Federal School Lane	D (26.2)	C (21.5)	D (26.1)	C (21.6)
Southbound US Route 13 – Left	C (15.3)	B (10.4)	B (14.7)	B (10.2)
2022 No-Build Condition (Case 2)				
Westbound Federal School Lane	D (28.6)	C (23.4)	D (28.5)	C (23.5)
Southbound US Route 13 – Left	C (15.6)	B (10.8)	C (15.1)	B (10.5)
2022 Build Condition (Case 3)				
Westbound Federal School Lane	D (28.9)	C (23.1)	D (28.8)	C (23.2)
Southbound US Route 13 – Left	C (16.1)	B (10.9)	C (15.5)	B (10.6)

<sup>8</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 8  
Peak Hour Levels of Service (LOS)  
Based on Blue Diamond Park Phase 2 Traffic Operational Analysis – April 2022  
Prepared by Verdantas

Unsignalized Intersection <sup>9</sup> Two-Way Stop	LOS per TOA		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Bear Tybouts Road &amp; NB DE Route 1 Ramp / Reybold Drive</b>				
2021 Existing (Case 1)				
Eastbound Bear Tybouts Road – Left	A (7.4)	A (7.7)	A (7.4)	A (7.7)
Westbound Bear Tybouts Road – Left	A (8.6)	A (8.6)	A (8.6)	A (8.6)
Southbound Reybold Drive	C (18.0)	C (16.7)	C (21.8)	C (20.7)
2022 No-Build Condition (Case 2)				
Eastbound Bear Tybouts Road – Left	A (7.4)	A (7.7)	A (7.4)	A (7.7)
Westbound Bear Tybouts Road – Left	A (8.6)	A (8.7)	A (8.6)	A (8.7)
Southbound Reybold Drive	C (18.4)	C (17.3)	C (22.4)	C (21.6)
2022 Build Condition (Case 3)				
Eastbound Bear Tybouts Road – Left	A (7.4)	A (7.7)	A (7.4)	A (7.7)
Westbound Bear Tybouts Road – Left	A (8.7)	A (8.9)	A (8.7)	A (8.9)
Southbound Reybold Drive	C (19.0)	C (18.9)	C (23.4)	C (24.4)

<sup>9</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 9  
Peak Hour Levels of Service (LOS)  
Based on Blue Diamond Park Phase 2 Traffic Operational Analysis – April 2022  
Prepared by Verdantas

Unsignalized Intersection <sup>10</sup> One-Way Stop (T-intersection)	LOS per TOA		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Hamburg Road &amp; River Road</b>				
2021 Existing (Case 1)				
Eastbound Hamburg Road	C (16.6)	D (25.0+)	C (16.9)	D (27.4)
Northbound River Road – Left	A (8.3)	A (8.7)	A (8.3)	A (8.7)
2022 No-Build Condition (Case 2)				
Eastbound Hamburg Road	C (17.0)	D (26.2)	C (17.3)	D (28.8)
Northbound River Road – Left	A (8.3)	A (8.8)	A (8.3)	A (8.7)
2022 Build Condition (Case 3)				
Eastbound Hamburg Road	C (18.6)	D (32.0)	C (19.0)	D (31.6)
Northbound River Road – Left	A (8.3)	A (8.8)	A (8.3)	A (8.8)

<sup>10</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 10  
Peak Hour Levels of Service (LOS)  
Based on Blue Diamond Park Phase 2 Traffic Operational Analysis – April 2022  
Prepared by Verdantas

Unsignalized Intersection <sup>11</sup> One-Way Stop (T-intersection)	LOS per TOA		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
<b>Federal School Lane &amp; River Road</b>				
2021 Existing (Case 1)				
Eastbound Federal School Lane	B (11.9)	C (17.9)	B (12.2)	C (18.3)
Northbound River Road – Left	A (7.8)	A (8.5)	A (7.9)	A (8.5)
2022 No-Build Condition (Case 2)				
Eastbound Federal School Lane	B (12.0)	C (18.5)	B (12.4)	C (19.0)
Northbound River Road – Left	A (7.9)	A (8.5)	A (7.9)	A (8.5)
2022 Build Condition (Case 3)				
Eastbound Federal School Lane	B (12.0)	C (18.9)	B (12.3)	C (19.4)
Northbound River Road – Left	A (7.9)	A (8.5)	A (7.9)	A (8.5)

<sup>11</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.