



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

NICOLE MAJESKI
SECRETARY

February 2, 2022

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

Dear Mr. Kaszyski:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Royal Farms #436 Dover** (Tax Parcel 2-05-06700-02-5100-00001) 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
Project Engineer

CJ:km

Enclosures

cc with enclosures: Mr. Jeff Bainbridge, Two Farms, Inc.
Mr. James Taylor, Verdantas
Mr. Brian Clarke, Verdantas
Mr. David Edgell, Office of State Planning Coordination
Ms. Sharon Duca, City of Dover Public Works
Ms. Dawn Melson-Williams, City of Dover Planning
Mr. Andrew Parker, McCormick & Taylor, Inc.
DelDOT Distribution

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Shanté Hastings, Deputy Secretary / Director, Transportation Solutions (DOTS)
Pamela Steinebach, Director, Planning
Mark Luszcz, Deputy Director, DOTS
Todd Sammons, Assistant Director, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Wendy Polasko, Subdivision Engineer, Development Coordination
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Matthew Lichtenstein, Central District Engineer, Central District
Erin Osborne, Central District Public Works Manager, Central District
Jared Kaufmann, Service Development Planner, Delaware Transit Corporation
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Olayiwola Okesola, Kent County Review Coordinator, Development Coordination
Mark Galipo, Traffic Engineer, Traffic, DOTS
Ryan Schroder, Subdivision Manager, Development Coordination
Annamaria Fumato, Project Engineer, Development Coordination



February 1, 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. 2A Subtask 06A – Royal Farms No. 436 Dover

Dear Mr. Joinville:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Royal Farms Store 436 – Dover development prepared by Duffield Associates LLC, dated November 1, 2021. Duffield Associates prepared the report in a manner generally consistent with DelDOT’s Development Coordination Manual.

The TIS evaluates the impacts of the proposed Royal Farms Store No. 436 – Dover development, proposed to be located at the northeast corner of the intersection of McKee Road/DE Route 15 (Kent Road 156) and College Road (Kent Road 99), in the City of Dover, Kent County, Delaware. The proposed development would consist of a 5,154 square-foot super-convenience store with gas pumps. Two unsignalized access points are proposed: one right-in/right-out/left-in on McKee Road and one right-in/right-out on College Road. Construction is anticipated to be complete by 2022.

The subject land is located on an approximately 3.36-acre parcel. The subject land had been zoned C2-A (Limited Central Commercial) with a COZ-1 (Corridor Overlay Zone 1) overlay, and the developer does not plan to rezone the land.

Currently, there are no active DelDOT 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>
McKee Road and College Road	Signalized	2022 without development weekday PM (Case 2); 2022 with development weekday PM (Case 3)
McKee Road and Gemstone Boulevard	Unsignalized	2021 Existing weekday AM and PM (Case 1); 2022 without development weekday AM and PM (Case 2); 2022 with development weekday AM and PM (Case 3)

McKee Road and College Road

This signalized intersection experiences LOS deficiencies in the PM peak hour for 2022 conditions without and with the proposed development. Given that the intersection is already signalized and has separate left-turn lanes on every approach, the only realistic improvement is to add a right-turn lane on the westbound approach, as described below in Item No. 4. While this improvement will not completely resolve the projected LOS deficiencies, it will reduce delays at the intersection. The major improvements required to fully correct the LOS deficiencies at this intersection (i.e., widening McKee Road to provide two through lanes in both directions) are not considered a reasonable developer improvement project.

McKee Road and Gemstone Boulevard

If this intersection remains unsignalized it experiences LOS deficiencies in the weekday AM and PM peak hours for 2022 conditions without and with the proposed development. LOS F would occur on the Gemstone Boulevard approach. The projected LOS deficiencies would be resolved by installing a signal at this intersection when warranted. Signal warrants are satisfied at full build-out of the proposed McKee Apartments development. That development will add a fourth leg to the intersection as a site access and it is currently scheduled for construction by 2025. Because an improvement has been identified (a traffic signal in conjunction with adding a fourth leg), which is the responsibility of another developer (McKee Apartments), we do not recommend any improvements be implemented by the Royal Farms developer at this intersection.

Should the City of Dover 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 roads on which they front (McKee Road and College 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 a right-in/right-out/left-in Site Access A on the east side of McKee Road approximately 300’ north of the intersection of McKee Road and College Road. The proposed configuration is shown in the table below.

Approach	Existing Configuration	Proposed Configuration
Westbound Site Access A	Approach does not exist	One right-turn only lane
Northbound McKee Road	One through lane	One through lane and one right-turn lane
Southbound McKee Road	A two-way left-turn lane transitioning into dedicated left-turn lane for downstream signal, and one through lane	Extend two-way left-turn lane to the site access (leading directly into dedicated left-turn lane for downstream signal), 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 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
Westbound Site Access A	N/A	N/A
Northbound McKee Road	N/A	290 feet *
Southbound McKee Road	N/A **	N/A

* Initial turn-lane length based on DelDOT’s *Auxiliary Lane Worksheet*, however length will be limited by proximity to upstream intersection at College Road. Right-turn lane on northbound McKee Road should be constructed to maximum length possible between College Road and the site access.

** Existing two-way left-turn lane should be extended to the site access driveway

While the existing two-way left-turn lane on McKee Road should be extended south to the site access, thereby technically shortening the length of dedicated left-turn lane for the downstream signal at College Road, no median or pavement markings should be installed on southbound McKee Road to separate the two-way left-turn lane from the dedicated left-turn lane. Essentially, the two-way left-turn lane will transition directly into the dedicated left-turn lane as it does today, but the point where that transition occurs will shift south to the proposed site access.

The developer should also construct a concrete channelization island within the Site Access A driveway to physically restrict the prohibited lefts-out movement. The developer should also erect a “No Left Turn” sign (MUTCD R3-2) on the westbound site egress approach.

- The developer should construct the right-in/right-out Site Access B on the north side of College Road. The proposed configuration is shown in the table below.

Approach	Existing Configuration	Proposed Configuration
Southbound Site Access B	Approach does not exist	One right-turn only lane
Westbound College Road	One through lane	One through lane and one right-turn lane
Eastbound College Road	One through lane	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 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
Southbound Site Access B	N/A	N/A
Westbound College Road	N/A	190 feet *
Eastbound College Road	N/A	N/A

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

The developer should also construct a concrete channelization island within the Site Access B driveway to physically restrict the prohibited lefts-in and lefts-out movements. The developer should also erect “No Left Turn” signs (MUTCD R3-2) on the westbound College Road approach and the southbound site egress approach.

- The developer should improve the signalized intersection of McKee Road and College Road by adding a separate right-turn lane on the westbound College Road approach. This westbound right-turn lane is initially recommended to be 175 feet in length (excluding taper), although DelDOT’s Development Coordination Section will determine final turn-lane length and design details. Note that the addition of a right-turn lane on the westbound College Road approach will require modification/relocation of the existing light pole, pedestrian signal pole, and ADA curb ramp on the northeast corner of the intersection.

The developer’s improvements at this intersection should also include addition of a crosswalk on the north leg, along with ped signals and ped pushbuttons for that crossing.

5. The developer should enter into a traffic signal agreement with DelDOT for the intersection of McKee Road and College Road. The agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT's discretion.
6. The developer should provide cross-access easements along their property boundaries on both McKee Road and College Road to allow for potential future interconnections to be made by the owners of the adjacent properties.
7. 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. Exceptions can be considered through the design deviation process.
 - b. Appropriate bicycle symbols, directional arrows, pavement markings, and signing should be included along bicycle facilities within the project limits.
 - c. Utility covers should be made flush with the pavement.
 - d. A minimum 15-foot wide easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontages along McKee Road and College Road
 - e. Within the easements along the McKee Road and College Road site frontages, a minimum of a ten-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 should coordinate with DelDOT's Development Coordination Section to determine the details of the shared-use path connection at the property boundaries.
 - 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 shared-use paths along McKee Road and College Road, and to the signalized intersection of McKee Road & College Road.



- 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 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.

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 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: November 1, 2021

Prepared by: Duffield Associates, LLC

Prepared for: Royal Farms

Tax parcel: 2-05-06700-02-5100-00001

Generally consistent with DelDOT's Development Coordination Manual: Yes

Project Description and Background

Description: The proposed Royal Farms development consists of a 5,154 square-foot super-convenience store with gas.

Location: The site is located at the northeast corner of the intersection of McKee Road/DE Route 15 (Kent Road 156) and College Road (Kent Road 99), in the City of Dover, Kent County, Delaware. A site location map is included on page 8.

Amount of land to be developed: approximately 3.36 acre parcel

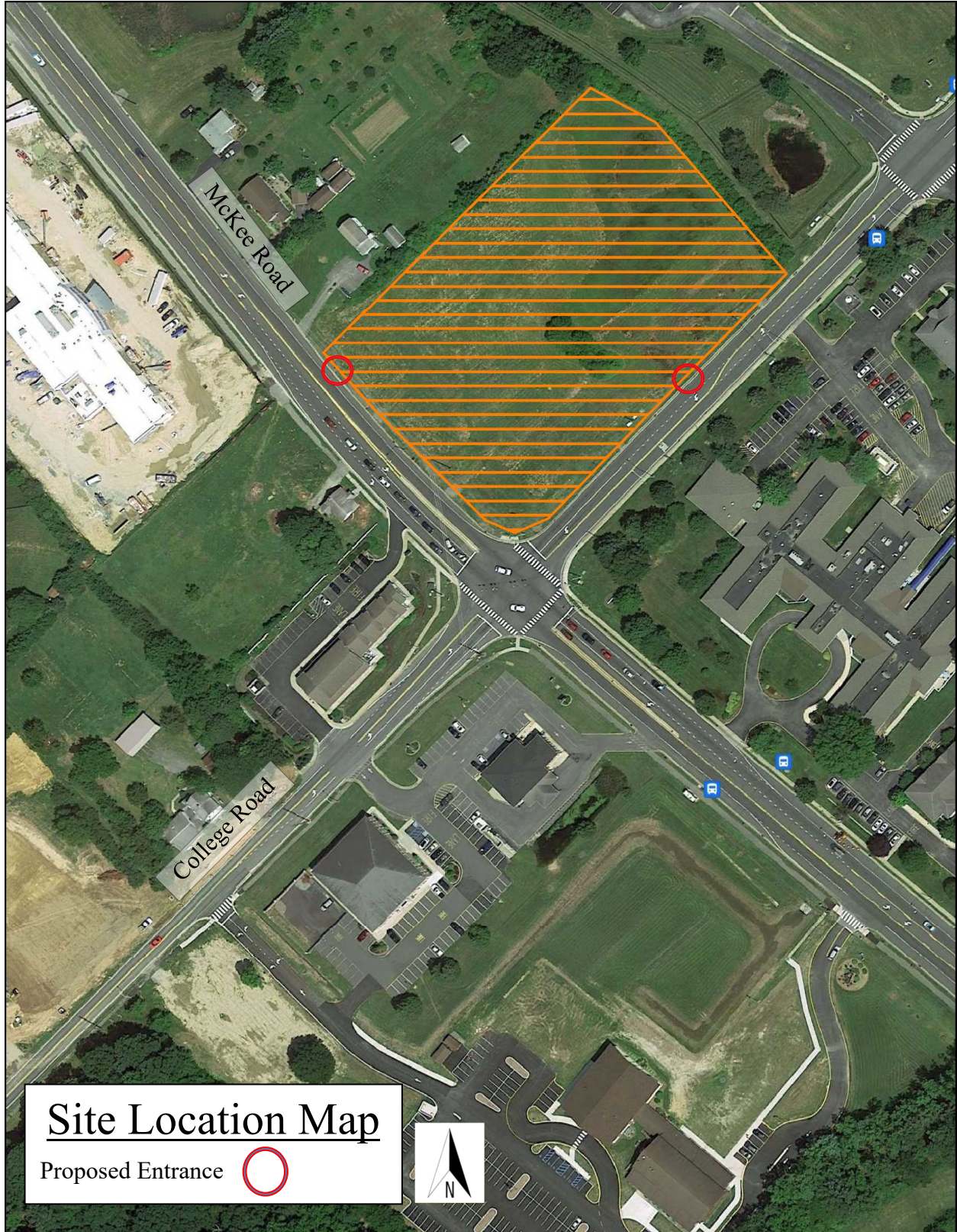
Land use approval(s) needed: Subdivision approval. The subject land is zoned C2-A (Limited Central Commercial) with a COZ-1 (Corridor Overlay Zone 1) overlay, and the developer does not plan to rezone the land.

Proposed completion year: 2022

Proposed access locations: Two access points are proposed: one right-in / right-out / left-in on McKee Road and one right-in / right-out on College Road.

Daily Traffic Volumes (per DelDOT Traffic Summary 2019):

- 2019 Average Annual Daily Traffic on McKee Road: 21,638 vehicles/day
- 2019 Average Annual Daily Traffic on College Road: 10,636 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 Royal Farms Store development is located within Investment Level 1.

Investment Level 1

Investment Level 1 Areas are often municipalities, towns, or urban/urbanizing places in counties. Density is generally higher than in the surrounding areas. There are a variety of transportation opportunities available. Buildings may have mixed uses, such as a business on the first floor and apartments above.

In Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote a variety of transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Overall, it is the State's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas. These areas would be a prime location for designating "pre-permitted areas" to help steer development where the local government and citizens are most prepared to accept it.

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

The proposed Royal Farms Store development falls within Investment Level 1 and is to be developed as super-convenience store with gas pumps. The proposed development is consistent with the character of Investment Level 1. 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

City of Dover Comprehensive Plan:

(Source: City of Dover 2019 Comprehensive Plan, adopted January 2020)

The City of Dover's Comprehensive Plan Future Land Use Map indicates that the proposed Royal Farms Store site is planned for "Commercial – Low Intensity" land use. It would appear that the proposed Royal Farms Store building fits within the intended land use for this location.

Proposed Development's Compatibility with Comprehensive Plan:

The proposed development appears to comply with the City of Dover's Comprehensive Plan. The Royal Farms Store is proposed on land that is planned for Commercial - Low Intensity use, and the land is zoned as C2-A (Limited Central Commercial) with a COZ-1 (Corridor Overlay Zone 1) overlay; and the developer does not plan to rezone the land. The proposed facility generally aligns with both the Future Land Use Map and the current zoning.

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, 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:

- 5,514 square-foot Super C-Store with Gas (ITE Land Use Code 960)

**Table 1
Royal Farms Peak Hour Trip Generation**

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
5,514 SF Super C-Store w/ Gas	221	222	443	178	179	357
Pass-By Trips	-167	-168	-335	-135	-136	-271
TOTAL TRIPS	54	54	108	43	43	86

Overview of TIS

Intersections examined:

- 1) Site Entrance A & McKee Road
- 2) Site Entrance B & College Road
- 3) College Road & N. Dover Elementary School Entrance / Westminster Village Entrance
- 4) College Road & Westminster Drive (*no analysis*)
- 5) McKee Road & College Road
- 6) McKee Road & Gemstone Boulevard

Conditions examined:

- 1) 2021 Existing (Case 1)
- 2) 2022 without Royal Farms development (Case 2)
- 3) 2022 with Royal Farms development
 - a. Full access on both McKee Road and College Road (Case 3A)
 - b. Right-in/right-out/left-in on McKee, right-in/right-out on College (Case 3B)
 - c. Right-in/right-out/left-in on McKee, right-in/right-out/left-out on College (Case 3C)
 - d. Right-in/right-out on McKee, full access on College (Case 3D)

Peak hours evaluated: Weekday morning and evening peak hours

Committed developments considered:

- 1) 1436 New Burton Road (635,000 square-foot business park)
- 2) Eden Hill (192 Single Family Detached, 464 Multi-Family Low-Rise, 155,380 square feet of Retail Space, 149,600 square feet of Medical / Dental Office Space)
- 3) Stonebrook East Subdivision (255 Multi-Family Mid-Rise)
- 4) Stonebrook West Subdivision (89 Single Family Detached Units and 110 Multi-family Mid-Rise Housing Units)
- 5) The Arbors (48 Multi-Family Mid-Rise)
- 6) Post Acute Medical Center (43,522 square-foot Medical Hospital)

Intersection Descriptions

1) Site Entrance A & McKee Road

Type of Control: proposed unsignalized right-in/right-out/left-in intersection

Westbound Approach: (Site Entrance) proposed one right-turn-only lane, stop-controlled

Northbound Approach: (McKee Road) existing one through lane; proposed one through lane and one right turn lane

Southbound Approach: (McKee Road) existing two-way-left-turn-lane leading into a dedicated left-turn lane at the downstream signal at College Road and one through lane. Developer proposes median bump out with dedicated left turn lane into proposed site.

2) Site Entrance B & College Road

Type of Control: proposed unsignalized right-in/right-out intersection

Eastbound Approach: (College Road) existing one through lane; proposed one through lane

Westbound Approach: (College Road) existing one through lane; proposed one through lane and one right-turn lane

Southbound Approach: (Site Entrance) proposed one right-turn-only lane, stop-controlled

3) College Road & N. Dover Elementary School Entrance / Westminster Village Entrance

Type of Control: existing two-way stop intersection

Eastbound Approach: (College Road) one left-turn lane and one shared through/right-turn lane

Westbound Approach: (College Road) one left-turn lane, one through lane, and one right-turn lane

Northbound Approach: (Westminster Village Driveway) one shared left/through/right-turn lane, stop-controlled

Southbound Approach: (School Driveway) one shared through/left-turn lane and one right-turn lane, stop-controlled

4) McKee Road & College Road

Type of Control: existing signalized intersection

Eastbound Approach: (College Road) one left-turn lane, one through lane, and one right-turn lane

Westbound Approach: (College Road) one left-turn lane and one through lane

Northbound Approach: (McKee Road) one left-turn lane, one through lane, and one right-turn lane

Southbound Approach: (McKee Road) one left-turn lane, one through lane, and one right-turn lane

5) McKee Road & Gemstone Boulevard

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

Eastbound Approach: (Gemstone Blvd) one shared left-turn/right-turn lane, stop controlled

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

Southbound Approach: (McKee Road) one through lane and one 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 May 17, 2018, through May 17, 2021. The data includes crashes along College Road from a point 500 feet west of McKee Road to a point 500 feet east of North Dover Elementary School Driveway and along McKee Road from 500 feet south of College Road to 500 feet north of Gemstone Boulevard.

A total of 74 crashes occurred within the study area during the three-year period, with just over half (38) of those occurring at the intersection of McKee Road & College Road. Of the 70 crashes involving two vehicles, 39 were rear-end crashes, 20 were angle collisions, seven were sideswipes, three were front to front (head on), and one was other/unknown. Zero fatalities occurred, while 28 crashes resulted in injuries. Three of the crashes were alcohol related. None of the crashes involved pedestrians or bicyclists.

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. 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) does currently operate several fixed-route transit bus services in the area of the proposed Royal Farms development. Route 302 runs along McKee Road with stops #2879 and #2874 as the closest stops located to the south of the proposed site. Additionally, Bus Route 112

services College Road, with nearest stops #2,860 and #2,861 located on the north and south sides of College Road, just east of the proposed site.

Planned transit service: Based on coordination with DTC representative Jared Kaufmann, no planned changes to nearby transit routes were indicated. Emphasis is placed on the need for pedestrian accessways from both McKee Road and College Road into the site from the shared-use path that will be built along the site's frontage.

Existing bicycle and pedestrian facilities: The following study area roadways are identified as "Bicycling Routes" on the *Kent County Bicycle Map* published by DelDOT:

- McKee Road:
 - Statewide Bicycle Route with bikeway
 - Over 5,000 vehicles daily
- College Road:
 - Connector Bicycle Route with bikeway
 - Over 5,000 vehicles daily

In the vicinity of the site, there are existing sidewalks and exclusive pedestrian facilities on the west side of McKee Road, the south side of College Road, and just to the east of the site along the north side of College Road. There are crosswalks, ped signals and ped pushbuttons on all but the north leg of the McKee Road & College Road intersection. There are no bicycle lanes in the immediate vicinity of the site.

Planned bicycle and pedestrian facilities: This project will provide a Shared Use Path along the entire site frontage, making a continuous connection along College Road which allows pedestrians to cross at the signalized crossing and continue north on the existing SUP on west side of McKee Road. A SUP will also be provided along the side frontage on McKee Road, terminating at the property line for a future connection. College Road is classified as Connector Bicycle Suggestions with bikeway (high traffic) within the study area. Bicycles along this section of College Road will be accommodated by the proposed SUP.

Previous Comments

In a review letter dated August 11, 2021, DelDOT indicated that the revised Preliminary TIS was acceptable as submitted, with one change which was made when submitting the Final TIS.

It appears that all substantive comments from DelDOT's TIS Scoping Memorandum, Traffic Count Review, Preliminary TIS Review, Revised 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) Both Duffield Associates LLC and McCormick Taylor utilized Highway Capacity Software (HCS) version 7.9.5 to complete the traffic analyses.
- 2) The TIS and McCormick Taylor applied heavy vehicle factors (HV) by lane group using existing data. The TIS and McCormick Taylor generally assumed future HV to be the same as existing HV at all intersections. Both the TIS and McCormick Taylor assumed 3% HV for future movements to and from the proposed site access points as per the DelDOT Development Coordination Manual section 2.2.8.11.6.H.
- 3) For existing conditions, McCormick Taylor determined overall intersection peak hour factors (PHF) for each intersection based on the turning movement counts. The TIS appeared to apply PHFs from the intersection of McKee Rod & College Road to all intersections except College Road & Westminster Driveway where they assumed 0.92. For the site accesses, McCormick Taylor determined future PHFs based on total intersection volume per the DelDOT Development Coordination Manual section 2.2.8.11.6.F.
- 4) For analyses of all intersections, the TIS and McCormick Taylor assumed 0% grade for all movements.
- 5) The TIS 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 Royal Farms Store Traffic Impact Study – November 2021
Prepared by Duffield Associates LLC

Case	Type of Control ¹	Movement	Case 3A	Case 3B	Case 3C	Case 3D					
			LOS / Delay in seconds								
Site Entrance A & McKee Road											
Per TIS	2022 Build	One Way Stop (T-intersection)		AM	PM	AM	PM	AM	PM	AM	PM
			SB McKee – Left	B / 10.5	B / 12.7	B / 10.7	B / 13.0	B / 10.7	B / 13.0	N/A	N/A
			WB Driveway	D / 34.9	E / 37.2	C / 17.7	D / 28.8	C / 17.7	D / 28.8	C / 17.7	D / 28.8
Per McCormick Taylor	2022 Build	One Way Stop (T-intersection)		AM	PM	AM	PM	AM	PM	AM	PM
			SB McKee – Left	B / 10.7	B / 13.4	B / 11.0	B / 13.7	B / 11.0	B / 13.7	N/A	N/A
			WB Driveway	E / 40.0	E / 43.4	C / 18.6	D / 32.8	C / 18.6	D / 32.8	C / 18.6	D / 32.8

¹ 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 Royal Farms Store Traffic Impact Study – November 2021
Prepared by Duffield Associates LLC

Case	Type of Control ²	Movement	Case 3A	Case 3B	Case 3C	Case 3D					
			LOS / Delay in seconds								
Site Entrance B & College Road											
Per TIS	2022 Build	One Way Stop (T-intersection)	AM	PM	AM	PM	AM	PM	AM	PM	
			EB College – Left	A / 7.9	A / 7.9	N/A	N/A	N/A	N/A	A / 8.1	A / 9.4
			AM	PM	AM	PM	AM	PM	AM	PM	
			EB College – Left	A / 8.0	A / 9.3	N/A	N/A	N/A	N/A	A / 8.1	A / 9.6
			SB Driveway	B / 13.6	C / 18.6	B / 10.5	C / 15.5	B / 11.7	C / 16.5	C / 15.3	C / 21.2
Per McCormick Taylor	2022 Build	One Way Stop (T-intersection)	AM	PM	AM	PM	AM	PM	AM	PM	
			EB College – Left	A / 8.0	A / 9.3	N/A	N/A	N/A	N/A	A / 8.1	A / 9.6
			SB Driveway	B / 14.7	C / 20.0	B / 10.8	C / 16.4	B / 12.3	C / 17.5	C / 16.1	C / 23.4

² 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 Royal Farms Store Traffic Impact Study – November 2021
Prepared by Duffield Associates LLC

Case	Type of Control ³	Movement	LOS / Delay in seconds		
College Road & N. Dover Elementary School Entrance / Westminster Village Entrance					
Per TIS	2021 Existing (Case 1)	Two Way Stop		AM	PM
			EB College – Left	A / 7.8	A / 8.9
			WB College – Left	A / 8.1	A / 8.0
			NB Westminster	C / 22.8	D / 25.2
		SB School Driveway	B / 11.2	C / 15.7	
	2022 No Build (Case 2)	Two Way Stop		AM	PM
			EB College – Left	A / 8.0	A / 9.1
			WB College – Left	A / 8.2	A / 8.1
			NB Westminster	D / 25.9	D / 28.5
		SB School Driveway	B / 11.9	C / 16.8	
	2022 Build (Case 3)	Two Way Stop		AM	PM
			EB College – Left	A / 8.0	A / 9.1
WB College – Left			A / 8.2	A / 8.2	
NB Westminster			D / 25.9	D / 29.2	
	SB School Driveway	B / 11.9	C / 17.0		
Per McCormick Taylor	2021 Existing (Case 1)	Two Way Stop		AM	PM
			EB College – Left	A / 8.0	A / 9.0
			WB College – Left	A / 8.3	A / 8.1
			NB Westminster	D / 27.8	D / 25.5
		SB School Driveway	B / 12.0	C / 15.8	
	2022 No Build (Case 2)	Two Way Stop		AM	PM
			EB College – Left	A / 8.1	A / 9.1
			WB College – Left	A / 8.4	A / 8.2
			NB Westminster	D / 31.4	D / 28.9
		SB School Driveway	B / 12.8	C / 17.0	
	2022 Build (Case 3)	Two Way Stop		AM	PM
			EB College – Left	A / 8.1	A / 9.2
WB College – Left			A / 8.4	A / 8.2	
NB Westminster			D / 32.5	D / 29.6	
	SB School Driveway	B / 13.1	C / 17.2		

³ 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 Royal Farms Store Traffic Impact Study – November 2021
Prepared by Duffield Associates LLC

Case	Type of Control ⁴	Movement	LOS / Delay in seconds								
McKee Road & College Road											
Per TIS	2021 Existing (Case 1)	Signal	Overall	AM				PM			
				C / 24.1				D / 41.4			
	2022 No Build (Case 2)	Signal		AM				PM			
				C / 31.5				E / 64.8			
	2022 Build (Case 3)	Signal		AM				PM			
				3A	3B	3C	3D	3A	3B	3C	3D
		C / 34.9	D / 40.0	D / 35.7	C / 34.6	E / 67.4	E / 72.8	E / 70.7	E / 73.4		
Per McCormick Taylor	2021 Existing (Case 1)	Signal	Overall	AM				PM			
				C / 29.3				D / 47.9			
	2022 No Build (Case 2)	Signal		AM				PM			
				D / 37.1				E / 63.8			
	2022 Build (Case 3)	Signal		AM				PM			
				3A	3B	3C	3D	3A	3B	3C	3D
				D / 39.7	D / 45.9	D / 43.0	D / 40.7	E / 65.8	E / 78.4	E / 72.9	E / 70.9
2022 Build (Case 3) With Added WB Right-Turn Lane	Signal	-	D / 43.2	-	-	-	E / 60.8	-	-		

⁴ 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 Royal Farms Store Traffic Impact Study – November 2021
Prepared by Duffield Associates LLC

	Case	Type of Control ⁵	Movement	LOS / Delay in seconds	
McKee Road & Gemstone Boulevard					
Per TIS	2021 Existing (Case 1)	Two Way Stop		AM	PM
			NB McKee – Left	B / 10.5	B / 10.1
			EB Gemstone	E / 37.9	E / 39.9
	2022 No Build (Case 2)	Two Way Stop		AM	PM
			NB McKee – Left	B / 11.2	B / 10.7
			EB Gemstone	F / 55.9	F / 63.9
	2022 Build (Case 3)	Two Way Stop		AM	PM
			NB McKee – Left	B / 11.3	B / 10.8
			EB Gemstone	F / 59.2	F / 67.0
Per McCormick Taylor	2021 Existing (Case 1)	Two Way Stop		AM	PM
			NB McKee – Left	B / 10.7	B / 10.3
			EB Gemstone	E / 44.5	E / 48.7
	2022 No Build (Case 2)	Two Way Stop		AM	PM
			NB McKee – Left	B / 11.5	B / 11.1
			EB Gemstone	F / 69.8	F / 85.3
	2022 Build (Case 3)	Two Way Stop		AM	PM
			NB McKee – Left	B / 11.6	B / 11.1
			EB Gemstone	F / 74.7	F / 90.2

⁵ 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.