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

NICOLE MAJESKI
SECRETARY

November 10, 2022

Ms. Nicole Kline-Elsier, PE, PTOE
McMahon Associates, Inc.
835 Springdale Drive, Suite 200
Exton, PA 19341

Dear Ms. Kline-Elsier,

The enclosed Traffic Impact Study (TIS) review letter for the **Midstate Road Commercial Development f.k.a DSM Felton** (Tax Parcels: 8-00-13900-01-4200-00001 and 8-00-13905-01-3500-00001) 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
cc with enclosures: Mr. Fred Wittig, Diamond State Management
Mr. Steven Fortunato, Bohler Engineering
Mr. David Edgell, Office of State Planning Coordination
Mr. Jason Berry, Kent County Department of Planning Services
Ms. Joanne Arellano, Johnson, Mirmiran & Thompson, Inc.
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, 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
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Todd Sammons, Assistant Director, Development Coordination
Wendy Polasko, Subdivision Engineer, Development Coordination
Sireen Muhtaseb, TIS Group Manager, Development Coordination
Matthew Lichtenstein, Central District Engineer, Central District
Steve McCabe, Central District Public Works Manager, Central District
Jared Kauffman, 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
Joshua Schwartz, Subdivision Manager, Development Coordination
Annamaria Furmato, Project Engineer, Development Coordination

November 10, 2022

Mr. Claudy Joinville
Project Engineer
Delaware Department of Transportation
Development Coordination, Division of Planning
800 Bay Road
Dover, DE 19901

RE: Agreement No. 1945F
Project Number T202069012
Traffic Impact Study Services
Task 5-13A – Midstate Road Commercial Development f.k.a DSM Felton TIS

Dear Mr. Joinville:

Johnson, Mirmiran, and Thompson (JMT) has completed a review of the Traffic Impact Study (TIS) for the Midstate Road Commercial Development f.k.a DSM Felton, which was prepared by McMahon Associates, Inc., dated May 5, 2022. This review was assigned as Task Number 5-13A. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TIS evaluates the impacts of a proposed commercial development in Kent County, Delaware. The proposed development would consist of a 5,585 square foot convenience store, 9,100 square feet of retail space, and 24,000 square feet of flex space. The site is located on the southeast corner of US Route 13 and Midstate Road (Delaware Route 12/Kent Road 34). The subject property is on an approximately 11.00-acre assemblage of parcels. The land is currently split-zoned as BG (General Business) and RS1 (Residential). The developer plans to rezone the RS1 portion to BG. One full access point is proposed on Midstate Road and one rights-in/rights-out access is proposed along US Route 13 approximately 575 feet south of Midstate Road. Construction for the development is anticipated to be completed in 2024.

DelDOT has relevant and ongoing improvement projects within the study area including the *Corridor Capacity Preservation Program* (CCPP), which aims to maintain the regional importance and preserve the intended function and capacity of existing designated transportation routes within the Program. The main objectives of the program are listed below:

- Prevent the need to build an entirely new road
- Minimize the transportation impacts of increased economic growth
- Maintain an existing road's ability to handle traffic efficiently and safely
- Preserve the ability to make future improvements
- Sort local and through traffic

US Route 13 is one of the highways included in the CCPP. More information regarding the CCPP can be found at https://deldot.gov/Programs/corr_cap/index.shtml.

The *HEP KC, SR12 & SR15 Intersection Improvements* project (DelDOT Contract No. T202104202) will be converting the existing Midstate Road (Delaware Route 12) and Delaware Route 15 all-way-stop intersection to a single-lane roundabout. DelDOT Traffic Section completed a Traffic Engineering Study in December 2019 to address safety concerns at the intersection. The study determined that there have been a high frequency of angle type crashes and there is a trend of drivers failing to observe traffic control devices. As such, the geometric improvement of a roundabout was recommended. The project is in the conceptual layout stage with construction funded for Fiscal Year (FY) 2025.

The *Canterbury Road – SR 12 to US 13* DelDOT project is also listed in the FY 2023 to FY 2028 Capital Transportation Program (CTP) Final Project Implementation list. This project will widen Canterbury Road to provide shoulders, bike lanes, and sidewalks. Funding for Preliminary Engineering starts in FY 2025 and the project is currently on hold.

There are pavement and rehabilitation projects proposed along US Route 13 from Walnut Shade Road to Tower Hill Road and along Paradise Alley Road from US Route 13 to Delaware Route 14 (DelDOT Contract No. T202006201). The US Route 13 project is scheduled to begin June 2022 and end in Fall 2022. The Paradise Alley Road project is under design and expected to be advertised for construction in Fall 2022.

Section 5.3.k.2 of the Kent County Adequate Public Facilities Ordinance (APFO) states: "The specific traffic mitigation measures shall be chosen based on their ability to reduce the impact of traffic generated by the proposed subdivision or land development, in order to achieve and maintain the Level of Service standards for a minimum of two (2) years for roadway segments and intersections within the area of influence." Based on an April 14, 2008, meeting between DelDOT and Kent County Planning regarding the interpretation of the APFO, JMT has been instructed to perform the future two-year Level of Service maintenance analysis, for a date two years from when the construction of the development is anticipated to be complete. The two-year Level of Service maintenance analysis results (referred to as Case 4) are contained in this TIS review letter.

As part of the TIS review, the following future scenarios were evaluated:

- Case 2 – 2024 without development
- Case 3 – 2024 with development
- Case 4 – 2026 with development

Based on our review of the TIS, 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. Additionally, the table below does not include any signalized intersections that exhibit LOS deficiencies which can be mitigated with signal timing optimization as the developer would not be recommended to do any additional improvements at those intersections.

Intersection	LOS Deficiencies Occur		Case
	AM	PM	
Midstate Road (Kent Road 34) / Delaware Route 15		X	Case 2 – 2024 without Development
		X	Case 3 – 2024 with Development
		X	Case 4 – 2026 with Development

The unsignalized Midstate Road intersection with Delaware Route 15 exhibits LOS deficiencies during the PM peak hour under future conditions, with or without the development. Specifically, the all-way stop controlled intersection would operate at overall LOS F with a delay of 64.4 seconds per vehicle during the PM peak hour under future conditions with the development (Case 4). DelDOT's *HEP KC, SR 12 & SR 15 Intersection Improvements* project (Contract No. T202104202), which plans to install a single lane roundabout at the intersection, would mitigate the capacity constraints at the intersection. As such, it is recommended that the developer coordinate with DelDOT on the implementation and equitable cost sharing of the roundabout installation.

At the Midstate Road intersection with US Route 13, DelDOT requested that crosswalks be implemented along the remaining legs of the intersection. Although no LOS deficiencies were identified at this location with the existing geometry and signal splits to accommodate pedestrian crossings, additional scenarios were analyzed assuming the westbound Midstate Road approach was reconfigured with a separate left turn lane, through lane, and right turn lane. We recommend the developer enter into a traffic signal agreement at this location to provide the necessary pedestrian facilities. Despite no LOS deficiencies being identified, it is also recommended for the developer to construct the additional westbound turn lane and convert the side street signal phasing to concurrent, protected-permissive left turns.

It should be noted that weaving issues are not anticipated between the signalized intersection of US Route 13 and Midstate Road and the proposed right-in/right-out access along US Route 13 due to the low volumes expected to exit the site from the right-out movement and perform a left turn or U-turn at the northbound left turn lane. In addition, the proposed right-in/right-out access would be located approximately 575 feet south of the signalized intersection and the northbound queues along US Route 13 are projected to only reach approximately 490 feet.

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

1. The developer shall improve US Route 13 and Midstate 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 an unsignalized full access for the proposed Midstate Road Commercial development along Midstate Road, approximately 375 feet east of the intersection with US Route 13, opposite Sanford Street. The intersection should be consistent with the lane configurations shown in the table below.

Approach	Current Configuration	Proposed Configuration
Eastbound Midstate Road	One shared through/left turn lane	One left turn lane, one through lane, and one right turn lane
Westbound Midstate Road	One shared through/right turn lane	One left turn lane and one shared through/right turn lane
Northbound Site Entrance A	Approach does not exist	One shared left turn/through/right turn lane
Southbound Sanford Street	One shared left turn/right turn lane	One shared left turn/through/right turn lane

Based on DelDOT's *Development Coordination Manual,* the recommended minimum storage length (excluding taper) of the separate left turn and right turn lanes along Midstate Road are summarized in the table below. The projected queues from the HCS analysis can be accommodated within the recommended storage lengths.

Approach	Left Turn Lane	Right Turn Lane
Eastbound Midstate Road	95 feet	145 feet
Westbound Midstate Road	120 feet	N/A

3. The developer should construct an unsignalized rights-in/rights-out access for the proposed Midstate Road Commercial development along US Route 13, approximately 575 feet south of the intersection with Midstate Road. The intersection should be consistent with the lane configurations shown in the table below.

Approach	Current Configuration	Proposed Configuration
Westbound Site Entrance B	Approach does not exist	One right turn lane
Northbound US Route 13	Two through lanes	Two through lanes and one right turn lane
Southbound US Route 13	Two through lanes	No change

Based on DelDOT's *Development Coordination Manual,* the recommended minimum storage length (excluding taper) of the northbound US Route 13 right turn lane is 290 feet. The projected queues from the HCS analysis can be accommodated within the recommended storage lengths.

4. The developer should construct a left turn lane along the westbound Midstate Road approach to US Route 13. The US Route 13 and Midstate Road intersection should be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Main Street	One left turn lane, one through lane, and one right turn lane	No change
Westbound Midstate Road	One shared through/left turn lane and one right turn lane	One left turn lane, one through lane, and one right turn lane
Northbound US Route 13	One left turn lane, two through lanes, and one right turn lane	No change
Southbound US Route 13	One left turn lane, two through lanes, and one right turn lane	No change

Based on DelDOT's *Development Coordination Manual* and the queue results from the HCS analysis, the recommended minimum storage length (excluding taper) of the westbound Midstate Road left turn lane is 150 feet. The storage lengths of the existing auxiliary turn lanes along each approach should be maintained. The projected queues from the HCS analysis can be accommodated within the recommended storage lengths.

Prior to Entrance Plan approval, the developer should submit a plan to DelDOT Development Coordination Section to confirm the design of the intersection. The design should incorporate the provision of pedestrian and bicycle facilities and also provide concurrent, protected-permissive left turns along the eastbound and westbound approaches.

5. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Midstate Road with US Route 13. The traffic signal agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT's discretion. Due to the westbound left turn lane that will be constructed at the intersection, payment into the Traffic Revolving Fund is not applicable.

6. The developer should enter into an agreement with DelDOT to fund an equitable portion of the improvements planned at the Midstate Road intersection with Delaware Route 15 as part of DelDOT's *HEP KC, SR 12 & SR 15 Intersection Improvements* project (Contract No. T202104202). The equitable contribution amount is $5,988. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of these improvements.

7. The developer should close the median along US Route 13 approximately 1,050 feet south of the US Route 13 intersection with Midstate Road. The developer should coordinate with DelDOT Development Coordination section regarding the implementation of this improvement.

8. The following bicycle, pedestrian, and transit improvements should be included:

    a. A minimum of fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT along the US Route 13 and Midstate Road site frontages. Within the easement, the developer should construct a new 5-foot wide sidewalk. The sidewalk should be designed to meet current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of the pavement to the sidewalk. If feasible, the sidewalk should be placed behind utility poles and street trees should be provided within the buffer area. The developer should coordinate with DelDOT's Development Coordination Section during the plan review process to identify the exact location of the sidewalk.

    b. The existing bus stop located along northbound US Route 13 approximately 260 feet south of Midstate Road (Bus Stop ID 3742, DART Route 117) should be improved to a Type 2 (5'x8') stop pad. Sidewalk connectivity should be provided between the bus stop and the sidewalk along the Midstate Road site frontage.

    c. At least one internal connection of a sidewalk in the vicinity of the site entrances from the sidewalk along US Route 13 and Midstate Road should be provided.

    d. ADA compliant curb ramps and marked crosswalks should be provided along the site entrances.

    e. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lane and shoulder along the US Route 13 and Midstate Road approaches to Site Entrance A and Site Entrance B.

f. Where internal sidewalks are located alongside of parking spaces, a buffer, physical barrier, or signage should be added to eliminate vehicular overhang onto the sidewalk.

g. Internal bicycle racks should be provided.

h. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks/SUP or should be flush with the pavement.

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 Plan Review process.

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 https://www.deldot.gov//Publications/manuals/de_mutcd/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction, please contact Mr. Jeff VanHorn, Assistant Director for Traffic Operations and Management. Mr. VanHorn can be reached at (302) 659-4606 or by email at Jeffrey.VanHorn@delaware.gov.

Additional details on our review of the TIS are attached. Please contact me at (302) 266-9600 if you have any questions concerning this review.

Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

Joanne M. Arellano, P.E., PTOE

cc: Mir Wahed, P.E., PTOE
Nate Rahaim, P.E., PTOE

Enclosure

General Information

Report date: May 5, 2022
Prepared by: McMahon Associates, Inc.
Prepared for: DSM Commercial
Tax Parcels: 8-00-13900-01-4200-00001 and 8-00-13905-01-3500-00001
Generally consistent with DelDOT's *Development Coordination Manual (DCM)*: Yes

Project Description and Background

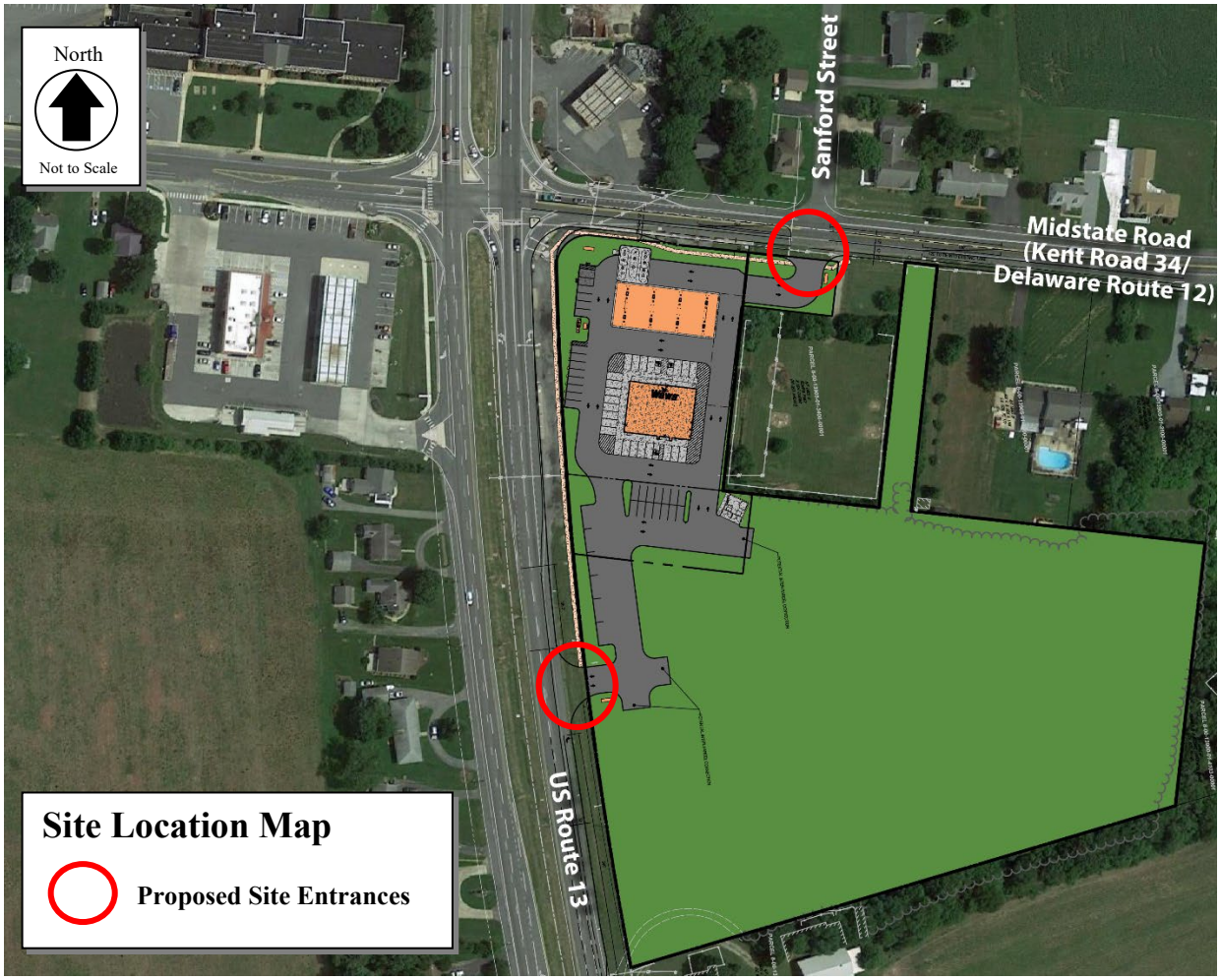
Description: The proposed development consists of a 5,585 square foot super convenience store, 9,100 square feet retail space and 24,000 square feet of flex space.
Location: The land is located at the southeast corner of the intersection of US Route 13 and Midstate Road (Kent Road 34)/Main Street, in Kent County, Delaware.
Amount of Land to be developed: An approximately 11.00-acre assemblage of parcels.
Land Use approval(s) needed: Entrance Plan and Rezoning.
Proposed completion date: 2024.
Proposed access locations: Two access points are proposed: one full access point on Midstate Road and one rights-in/rights-out access on US Route 13.

Daily Traffic Volumes:

- 2021 Average Annual Daily Traffic on US Route 13 South: 24,813
- 2021 Average Annual Daily Traffic on Midstate Road: 3,854

*AADT is sourced from data provided by DelDOT Gateway

Site Map



**Graphic is an approximation based on the Road Improvement Exhibit B (Rev. 4) prepared by Bohler dated May 4, 2022.*

Relevant and On-going Projects

DelDOT has relevant and ongoing improvement projects within the study area including the *Corridor Capacity Preservation Program* (CCPP), which aims to maintain the regional importance and preserve the intended function and capacity of existing designated transportation routes within the Program. The main objectives of the program are listed below:

- Prevent the need to build an entirely new road
- Minimize the transportation impacts of increased economic growth
- Maintain an existing road's ability to handle traffic efficiently and safely
- Preserve the ability to make future improvements
- Sort local and through traffic

US Route 13 is one of the highways included in the CCPP. More information regarding the CCPP can be found at https://deldot.gov/Programs/corr_cap/index.shtml.

The *HEP KC, SR12 & SR15 Intersection Improvements* project (DelDOT Contract No. T202104202) will be converting the existing Midstate Road (Delaware Route 12) and Delaware Route 15 all-way-stop intersection to a single-lane roundabout. DelDOT Traffic Section completed a Traffic Engineering Study in December 2019 to address safety concerns at the intersection. The study determined that there have been a high frequency of angle type crashes and there is a trend of drivers failing to observe traffic control devices. As such, the geometric improvement of a roundabout was recommended. The project is in the conceptual layout stage with construction funded for Fiscal Year (FY) 2025.

The *Canterbury Road – SR 12 to US 13* DelDOT project is also listed in the FY 2023 to FY 2028 Capital Transportation Program (CTP) Final Project Implementation list. This project will widen Canterbury Road to provide shoulders, bike lanes, and sidewalks. Funding for Preliminary Engineering starts in FY 2025 and the project is currently on hold.

There are pavement and rehabilitation projects proposed along US Route 13 from Walnut Shade Road to Tower Hill Road and along Paradise Alley Road from US Route 13 to Delaware Route 14 (DelDOT Contract No. T202006201). The US Route 13 project is scheduled to begin June 2022 and end in Fall 2022. The Paradise Alley Road project is under design and expected to be advertised for construction in Fall 2022.

Livable Delaware
(Source: Delaware Strategies for State Policies and Spending, 2020)

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

The proposed development is located within Investment Level 1 and Level 2.

Investment Level 1

These areas are often municipalities, towns, or urban/urbanizing places in counties where density is generally higher than in surrounding areas. 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, and to promote well-designed and efficient new growth in Investment Level 1 Areas.

In Level 1 Areas the state's first priority will be for preserving existing facilities and making safety improvements. Level 1 areas will also be the highest priority for context sensitive transportation system capacity enhancements, transit-system enhancements, ADA accessibility, and for closing gaps in the pedestrian system, including the Safe Routes to School projects. Investment Level 1 Areas are ideal locations for Transportation Improvement Districts as well as Complete Community Enterprise Districts. Further, Level 1 areas are the priority for planning

projects and studies, bicycle facilities, signal-system enhancements, and the promotion of interconnectivity of neighborhoods and public facilities.

Investment Level 2

These areas can be composed of less developed areas within municipalities, rapidly growing areas in the counties that have or will have public water and wastewater services and utilities, areas that are generally adjacent to or near Investment Level 1 Areas, smaller towns and rural villages that should grow consistently with their historic character, and suburban areas with public water, wastewater, and utility services. They serve as transition areas between Level 1 and the state's more open, less populated areas. They generally contain a limited variety of housing types, predominantly detached single-family dwellings.

In Investment Level 2 Areas, like Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Investments should encourage departure from the typical single-family-dwelling developments and promote a broader mix of housing types and commercial sites encouraging compact, mixed-use development where applicable. Overall, the State's intent is to use its spending and management tools to promote well-designed development in these areas. Such development provides for a variety of housing types, user-friendly transportation systems, essential open spaces and recreational facilities, other public facilities, and services to promote a sense of community.

Level 2 Areas share similar priorities as with the Level 1 Areas where the aim remains to: make context sensitive transportation system capacity enhancements, preserve existing facilities, make safety enhancements, make transportation system capacity improvements, create transit system enhancements, ensure ADA accessibility, and close gaps in the pedestrian system, including the Safe Routes to School projects. Investment Level 2 Areas are ideal locations for Transportation Improvement Districts and Complete Community Enterprise Districts. Other priorities for Level 2 Areas include: Corridor Capacity Preservation, off-alignment multi-use paths, interconnectivity of neighborhoods and public facilities, and signal-system enhancements.

Proposed Development's Compatibility with Livable Delaware:

The proposed site is located within Investment Level 1 and Level 2. Investment Levels 1 and 2 areas are the most favorable location of new development and redevelopment. Additionally, Investment Levels 1 and 2 is the priority for job creation. Therefore, the proposed development is consistent with the 2020 update of the Livable Delaware "Strategies for State Policies and Spending."

Comprehensive Plan

(Source: Kent County Comprehensive Plan, 2018)

Kent County Comprehensive Plan:

Per the *Kent County Comprehensive Plan Existing Land Uses Map,* the proposed development appears to be currently zoned as Agricultural Land and Open Space, Mixed Urban and Built Lands, and Forests. Per the *Kent County Comprehensive Plan Future Land Use Map,* the proposed development is in an area designated as a Highway Commercial.

Proposed Development's Compatibility with the Kent County Comprehensive Plan:

The *Kent County Comprehensive Plan* states that Highway Commercial is permitted for a broad range of commercial activities and a variety of large retail stores and related activities occupying prime retail land and serving a regional community. Therefore, the development is generally consistent with the *Kent County Comprehensive Plan*.

Trip Generation

The trip generation for the proposed development was determined by using the comparable land use and rates/equations contained in the *Trip Generation, 10th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 960 (Super Convenience Market with Gas), ITE Land Use Code 814 (Variety Store), and ITE Land Use Code 710 (General Office). Trip generation was reviewed by DelDOT as part of the Preliminary TIS (PTIS) submission.

Table 1
Proposed Development Trip Generation

Entrance	Land Use	ADT	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
Super Convenience Store with Fueling	5,585 SF	4,674	251	251	502	193	194	387
Variety Store	9,100 SF	578	16	13	29	32	30	62
General Office (Flex Space)	24,000 SF	266	42	7	49	4	25	29
Total		5,518	309	271	580	229	249	478
Pass-by		0	-191	-191	-382	-158	-157	-315
New		5,518	118	80	198	71	92	163

Overview of TIS

Intersections examined:

1. Site Entrance A/Midstate Road (Kent Road 34/Delaware Route 12)/Sanford Street
2. Site Entrance B/US Route 13 (Rights-in / rights-out)
3. US Route 13/Midstate Road (Kent Road 34)/Main Street (Kent Road 57)
4. US Route 13/Andrews Lake Road (Kent Road 385)/Peach Basket Road (Kent Road 241)
5. US Route 13/Plymouth Road (Kent Road 371)/Plymouth Road (Kent Road 239)
6. Midstate Road (Kent Road 34) / Chimney Hill Road (Kent Road 385)
7. Midstate Road (Kent Road 34) / Delaware Route 15
8. US Route 13/Killens Pond Road/Reeves Crossing Road (Kent Road 286)
9. US Route 13/Paradise Alley Road (Kent Road 426)/Paradise Alley Road (Kent Road 287)
10. US Route 13/Winkler Road (Kent Road 428)/Hopkins Cemetery Road (Kent Road 289)

Conditions examined:

1. Case 1 – 2021 existing
2. Case 2 – 2024 without development
3. Case 3 – 2024 with development

Committed Developments considered:

1. Satterfield (301 single family homes, 77 units remain unbuilt)
2. Weatherstone Crossing (199 single family homes, 61 units remain unbuilt)
3. Twin Farms (unbuilt 208 single family homes)
4. Roseville Estates (Section 1 & Section 2) (458 single family homes, 395 units remain unbuilt)
5. Fork Landing West (127 single family homes, 113 units remain unbuilt)
6. Pond View Estates (Unbuilt 142 single family homes)
7. Waterside Phase B (91 single family homes, 70 units remain unbuilt)
8. Breakwater Estates (f.k.a. Spring Creek Estates) (unbuilt 132 single family homes)
9. Courtney's Point (210 single family homes, 42 units remain unbuilt)
10. Carpenters Bridge Crossing (Unbuilt 193 single family homes)

*Note: Committed development information provided in the Final TIS supersedes the information provided in the April 19, 2021, DelDOT Scoping Meeting Memorandum.
** Note: All Committed Development data is relevant as of May 26, 2021.

Peak hours evaluated: Weekday morning and weekday evening peak periods.

Intersection Descriptions

1. **Site Entrance A/Midstate Road (Kent Road 34/Delaware Route 12)/Sanford Street**
   Type of Control: Proposed two-way stop-controlled intersection.
   Eastbound Approach: (Midstate Road) Existing one left turn/through lane; proposed one shared left turn/through lane, and one right turn lane.
   Westbound Approach: (Midstate Road) Existing one through/right turn lane; proposed one left turn lane and one through/right turn lane.
   Northbound Approach: (Site Entrance A) Proposed one left turn/right turn lane, stop-controlled.

2. **Site Entrance B/US Route 13 (Rights-in / rights-out)**
   Type of Control: Proposed two-way stop-controlled intersection.
   Westbound Approach: (Site Entrance B) Proposed one right turn lane, stop controlled.
   Northbound Approach: (US Route 13) Existing two through lanes; proposed two through lanes and one right turn lane.

3. **US Route 13/Midstate Road (Kent Road 34)/Main Street (Kent Road 57)**
   Type of Control: Existing signalized intersection (four-legged).
   Eastbound Approach: (Main Street) Existing one left turn lane, one through lane, and one channelized right turn lane, yield controlled.
   Westbound Approach: (Midstate Road) Existing one shared left turn/through lane and one channelized right turn lane, yield controlled.
   Northbound Approach: (US Route 13) Existing one channelized left turn lane, two though lanes, and one channelized right turn lane, yield controlled.
   Southbound Approach: (US Route 13) Existing one channelized left turn lane, two though lanes, and one channelized right turn lane, yield controlled.

4. **US Route 13/Andrews Lake Road (Kent Road 385)/Peach Basket Road (Kent Road 241)**
   Type of Control: Two-way stop-controlled intersection.
   Eastbound Approach: (Peach Basket Road) Existing one left turn/right turn lane, stop-controlled.
   Westbound Approach: (Andrews Lake Road) Existing one left turn lane and one channelized right turn lane, stop-controlled.
   Northbound Approach: (US Route 13) Existing two through lanes and one right turn lane.
   Southbound Approach: (US Route 13) Existing two through lanes and one right turn lane.

5. **US Route 13/Plymouth Road (Kent Road 371)/Plymouth Road (Kent Road 239)**
   Type of Control: Two-way stop-controlled intersection.
   Eastbound Approach: (Plymouth Road) Existing one channelized right turn lane, stop-controlled.
   Westbound Approach: (Plymouth Road) Existing one channelized right turn lane, stop-controlled.
   Northbound Approach: (US Route 13) Existing one left turn lane, two through lanes and one right turn lane.
   Southbound Approach: (US Route 13) Existing one left turn lane, two through lanes, and one right turn lane.

6. **Midstate Road (Kent Road 34)/Chimney Hill Road (Kent Road 385)**
   Type of Control: Two-way stop-controlled intersection.
   Eastbound Approach: (Midstate Road) Existing one shared left turn/through/right turn lane.
   Westbound Approach: (Midstate Road) Existing one shared left turn/through/right turn lane.
   Northbound Approach: (Chimney Hill Road) Existing one shared left turn/through/right turn lane, stop-controlled.
   Southbound Approach: (Chimney Hill Road) Existing one shared left turn/through/right turn lane, stop-controlled.

7. **Midstate Road (Kent Road 34)/Delaware Route 15**
   Type of Control: All-way stop-controlled intersection.
   Eastbound Approach: (Midstate Road) Existing one shared left turn/through/right turn lane, stop-controlled.
   Westbound Approach: (Midstate Road) Existing one shared left turn/through/right turn lane, stop-controlled.
   Northbound Approach: (Delaware Route 15) Existing one shared left turn/through/right turn lane, stop-controlled.
   Southbound Approach: (Delaware Route 15) Existing one shared left turn/through/right turn lane, stop-controlled.

8. **US Route 13/Killens Pond Road/Reeves Crossing Road (Kent Road 286)**
   Type of Control: Existing signalized intersection (four-legged).
   Eastbound Approach: (Reeves Crossing Road) Existing one shared left turn/through/right turn lane.
   Westbound Approach: (Killens Pond Road) Existing one shared left turn/through lane and one channelized right turn lane, yield controlled.

Northbound Approach: (US Route 13) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled.
Southbound Approach: (US Route 13) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled.

9. **US Route 13/Paradise Alley Road (Kent Road 426)/Paradise Alley Road (Kent Road 287)**
Type of Control: Two-way stop-controlled intersection.
Eastbound Approach: (Paradise Alley Road) Existing one left turn/through/right turn lane, stop-controlled.
Westbound Approach: (Paradise Alley Road) Existing one left turn/through/right turn lane, stop-controlled.
Northbound Approach: (US Route 13) Existing one left turn lane, two through lanes, and one right turn lane.
Southbound Approach: (US Route 13) Existing one left turn lane, two through lanes, and one right turn lane.

10. **US Route 13/Winkler Road (Kent Road 428)/Hopkins Cemetery Road (Kent Road 289)**
Type of Control: Two-way stop-controlled intersection.
Eastbound Approach: (Hopkins Cemetery Road) Existing one left turn/through/right turn lane, stop-controlled.
Westbound Approach: (Winkler Road) Existing one left turn/through/right turn lane, stop-controlled.
Northbound Approach: (US Route 13) Existing one left turn lane, one through lane, and one shared through/right turn lane.
Southbound Approach: (US Route 13) Existing one left turn lane, two through lanes, and one right turn lane.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Per DelDOT Gateway, DART Route 117 runs along US Route 13 through the study area and has stops within the study area. Specifically, bus stops for DART Route 117 exist at the US Route 13 intersections with Killens Pond Road/Reeves Crossing Road, Midstate Road/Main Street, and Plymouth Road. Route 117 provides 9 round trips from 5:45 AM to 10:22 PM on weekdays.

Planned transit service: Per email correspondence on May 26, 2022, with Mr. Jared Kauffman, Planner for DART, the Delaware Transit Corporation, the existing stop (Bus Stop ID 3742) which is along northbound US Route 13 at the Midstate Road intersection needs to be improved to a Type 2 5’x8’ bus pad.

Existing bicycle and pedestrian facilities: According to DelDOT's Kent County Bicycle Map, several study roadways are considered bicycle routes. Killens Pond Road and Reeves Crossing Road are considered statewide bicycle routes. Midstate Road and Main Street are considered regional bicycle routes. US Route 13, Delaware Route 15, and Hopkins Cemetery Road west of Little Mastens Corner Road are considered connector bicycle routes. Sidewalks are located at the US Route 13/Midstate Road intersection and the US Route 13/Killens Pond Road intersection. A crosswalk is located at the US Route 13/Midstate Road intersection.

Planned bicycle and pedestrian facilities: Per email correspondence on June 15, 2022, with Ms. Linda Osiecki, DelDOT's Pedestrian Coordinator, and John Fiore, DelDOT's Bicycle Coordinator, the following improvements were recommended:

- Referring to the State Strategies and Spending Map this site is within Level 1. Per the DelDOT SUP/Sidewalk Policy a non-motorized facility is required unless a physical impossibility exists. Since within the Town limits, it is recommended to install a 5' wide sidewalk along the property frontage of US Route 13 and Delaware Route 12.
- US Route 13/Midstate Road/Main Street (Kent Road 57) –Improve this intersection to add a pedestrian crossing across US Route 13 to connect to the facilities on southbound US Route 13; install a pedestrian facility across Delaware Route 12 to connect to the existing sidewalk at the Goose Creek site; install bike lanes through the intersection; and improve bus stops on both sides of US Route 13 with continuous pedestrian facilities to the intersection
- An internal connection from the sidewalk at the entrances shall be required.
- The US13 entrance shall require a concrete island.
- Internal bicycle rack for the convenience store highly recommended.
- At this time Local Systems Improvements has no bicycle/pedestrian improvement projects within the area of this project.
- Per the *Development Coordination Manual* (DCM) the site shall dedicate right-of-way per the roadway classification and establish a 15' wide permanent easement along all property roadway frontages.
- All entrance, roadway and/or intersection improvements required shall incorporate bicycle and pedestrian facilities.
- Per the DCM, if the right turn lane is warranted, then a separate bike lane shall be incorporated along the right turn lane; if a left turn lane is required any roadway improvements shall include a shoulder matching the roadway functional classification or existing conditions (minimum 5-feet).
- There could be additional and/or revised comments once project is discussed at a pre-submittal meeting and/or plans are submitted for LONO/ENT review/approval.

Bicycle Level of Traffic Stress in Delaware: Researchers with the Mineta Transportation Institute developed a framework to measure low-stress connectivity, which can be used to evaluate and guide bicycle network planning. Bicycle LTS analysis uses factors such as the speed of traffic, volume of traffic, and the number of lanes to rate each roadway segment on a scale of 1 to 4, where 1 is a low-stress place to ride and 4 is a high-stress place to ride. It analyzes the total connectivity

of a network to evaluate how many destinations can be accessed using low-stress routes. Developed by planners at the Delaware Department of Transportation (DelDOT), the bicycle Level of Traffic Stress (LTS) model will be applied to bicycle system planning and evaluation throughout the state. The Bicycle LTS for the roadways under existing conditions along the site frontage are summarized below. The Bicycle LTS was determined utilizing the Bicycle On-Road Network Level of Traffic Stress map from the April 2018 Blueprint for a Bicycle-Friendly Delaware document which can be found on the following website:
https://deldot.gov/Publications/plans/bikeandped/pdfs/DelDOTBikePlan043018FINAL.pdf

- US Route 13: 4
- Midstate Road: 2

Crash Evaluation

Per the crash data included in the TIS from July 2, 2018, to July 2, 2021, and provided by the Delaware Department of Transportation (DelDOT), 137 crashes were reported within the study area. Of the 137 crashes reported, 103 involved property damage only, 33 involved injury and there was 1 fatality. The one fatality occurred at the intersection of Midstate Road (Delaware Route 12) and Delaware Route 15 due to a driver passing through the stop sign.

A total of 19 crashes were reported at the US Route 13 and Peach Basket Road/Andrews Lake Road intersection with 5 angle incidents. A total of 29 crashes were reported at the US Route 13 and E. Main Street/Midstate Road (DE 12) intersection with 14 rear-end incidents. A total of 32 crashes were reported at the US Route 13 and Reeves Crossing Road intersection with 8 angle incidents. A total of 18 crashes were reported at the US Route 13 and Paradise Alley Road intersection, with 6 angle incidents.

Previous Comments

All comments from the PTIS have been addressed in the Final TIS.

Sight Distance Evaluation

No sight distance constraints were noted at the site entrances per a field visit conducted on May 25, 2022.

General HCS Analysis Comments

(See table footnotes on the following pages for specific comments)

1) The TIS used version 7.6 of HCS7, whereas JMT used version 7.9.6 of HCS7 to complete the analysis.

2) Per DelDOT's *Development Coordination Manual*, JMT used a heavy vehicle percentage of 3% for each movement greater than 100 vph in the Case 2 and Case 3 future scenario analysis, unless the existing heavy vehicle percentage was greater than 3% and there was no significant increase of vehicles along that movement, in which case the existing heavy vehicle percentage was used for the analysis of future scenarios, whereas the TIS did not. JMT utilized the existing heavy vehicle percentage for each movement greater than 100 vph in the Case 1 Existing scenario.

3) Per DelDOT's *Development Coordination Manual* and coordination with DelDOT Planning, JMT used a heavy vehicle percentage of 5% for each movement less than 100 vph along roadways in the analyses, whereas the TIS did not.

4) JMT included bicycles and pedestrians counted during the traffic data collection in the analysis.

5) JMT included analysis of a Case 4 – 2026 with Development traffic condition (two years following development) per the Kent County Adequate Public Facilities Ordinance (APFO) whereas the TIS did not.

6) The TIS applied adjustments to the critical headway factors within the traffic models, whereas JMT models used the default HCS critical headway factors.

Table 2
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control[1] (T-Intersection in Case 1 & 2)	**LOS per TIS**		**LOS per JMT**	
Site Entrance A / Midstate Road (Kent Road 34)/Sanford Street	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing Conditions (Case 1)				
Eastbound Midstate Road Left Turn	A (7.6)	A (7.8)	A (7.6)	A (7.8)
Southbound Sanford Street Approach	B (10.8)	B (11.4)	B (10.9)	B (11.4)
2024 without Development (Case 2)				
Eastbound Midstate Road Left Turn	A (7.8)	A (7.9)	A (7.9)	A (8.1)
Southbound Sanford Street Approach	B (11.9)	B (13.2)	B (12.0)	B (13.5)
2024 with Development (Case 3)				
Eastbound Valley Road Left Turn	A (7.8)	A (7.9)	A (7.8)	A (7.9)
Westbound Valley Road Left Turn	A (8.0)	A (8.1)	A (8.0)	A (8.1)
Northbound Site Entrance A Approach	C (15.6)	C (18.9)	C (15.6)	C (18.9)
Southbound Sanford Steet Approach	B (14.6)	C (16.3)	B (14.8)	C (16.3)
2026 with Development (Case 4)				
Eastbound Valley Road Left Turn	-	-	A (7.8)	A (8.0)
Westbound Valley Road Left Turn	-	-	A (8.0)	A (8.1)
Northbound Site Entrance A Approach	-	-	C (15.8)	C (19.4)
Southbound Sanford Street Approach	-	-	B (15.0)	C (16.6)

[1] For signalized and unsignalized analysis, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (T intersection) [1]	**LOS per TIS**		**LOS per JMT**	
Site Entrance B / US Route 13 (Rights-in / rights-out)	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2024 with Development (Case 3)				
Westbound Site Entrance B Right Turn	B (12.7)	B (12.9)	B (12.9)	B (13.2)
2026 with Development (Case 4)				
Westbound Site Entrance B Right Turn	-	-	B (13.0)	B (13.4)

Table 4
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Signalized Intersection [1]	**LOS per TIS**		**LOS per JMT**	
US Route 13 / Midstate Road / Main Street (Kent Road 57)	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1) *with DelDOT timings*[2]	-	-	D (43.3)	D (44.3)
2021 Existing (Case 1) *with optimized signal timing*[3]	C (24.8)	C (25.5)	C (31.8)	C (32.4)
2024 without Development (Case 2) *with optimized signal timing*	C (31.6)	C (33.4)	D (38.6)	D (39.9)
2024 with Development (Case 3) *with optimized signal timing*[3, 4]	D (48.0)	D (45.6)	D (48.0)	D (49.6)
2026 with Development (Case 4) *with optimized signal timing*[4]	-	-	D (50.8)	D (50.5)
2024 with Development (Case 3) *with geometric improvements, existing phasing*[4,5]	C (33.9)	C (34.2)	D (40.1)	D (41.7)
2024 with Development (Case 3) *with geometric improvements, concurrent phasing*[4,6]	C (22.4)	C (22.4)	C (33.4)	C (34.1)
2026 with Development (Case 4) *with geometric improvements, existing phasing* [4,5]	-	-	D (41.9)	D (42.9)
2026 with Development (Case 4) *with geometric improvements, concurrent phasing*[4,6]	-	-	C (34.9)	D (35.1)

[2] DelDOT Timing scenario includes utilizing the green split times consistent with DelDOT MAX 1 green times. The TIS did not conduct this additional analysis.
[3] The TIS modeled the intersection utilizing a cycle length of 72 seconds, whereas JMT modeled the intersection utilizing a cycle length of 120 seconds.
[4] Based on correspondence with DelDOT, JMT analyzed the intersection with enough green time allocated to each signal phase to allow for muti-stage pedestrian crossings.
[5] Geometric improvements include the addition of a westbound left turn lane. The existing split phase signal phasing along the side streets was maintained.
[6] This scenario includes converting the existing signal phasing from split phase operations to protected-permissive, concurrent left turn signal phasing along the side streets.

Table 5
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (Restricted eastbound and westbound through movement)[1]	**LOS per TIS**		**LOS per JMT**	
US Route 13 / Andrews Lake Road (Kent Road 385) / Peach Basket Road (Kent Road 241)[7, 8]	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)				
Eastbound Peach Basket Road Approach	C (21.0)	C (24.3)	C (16.7)	C (24.1)
Westbound Andrews Road Approach	C (18.4)	C (16.2)	B (10.7)	B (10.3)
Northbound US 13 Left Turn	A (8.8)	B (10.6)	-	-
Southbound US 13 Left Turn	B (10.1)	A (9.9)	-	-
2024 without Development (Case 2)				
Eastbound Peach Basket Road Approach	C (21.9)	D (25.5)	C (17.1)	D (25.3)
Westbound Andrews Road Approach	C (19.2)	C (16.7)	B (10.9)	B (10.5)
Northbound US 13 Left Turn	A (8.8)	B (10.8)	-	-
Southbound US 13 Left Turn	B (10.2)	B (10.0)	-	-
2024 with Development (Case 3)				
Eastbound Peach Basket Road Approach	C (23.3)	D (26.6)	C (18.1)	D (26.2)
Westbound Andrews Road Approach	C (20.8)	C (17.6)	B (11.1)	B (11.2)
Northbound US 13 Left Turn	A (9.0)	B (10.9)	-	-
Southbound US 13 Left Turn	B (10.4)	B (10.2)	-	-

[7] To account for the geometry of the intersection, which includes a merge lane for eastbound and westbound left-turn traffic, JMT modeled the eastbound and westbound left-turn as through movements crossing a one-way roadway.
[8] The TIS modeled a northbound and southbound left turn lane whereas JMT did not, consistent with existing conditions (northbound and southbound left turn movement restricted at the intersection).

Table 5 (continued)
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (Restricted eastbound and westbound through movement)[1]	**LOS per TIS**		**LOS per JMT**	
US Route 13 / Andrews Lake Road (Kent Road 385) / Peach Basket Road (Kent Road 241)[7]	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2026 with Development (Case 4)				
Eastbound Peach Basket Road Approach	-	-	C (18.6)	D (27.3)
Westbound Andrews Road Approach	-	-	B (11.2)	B (11.3)

Table 6
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control (RCUT Intersection)[1]	**LOS per TIS**		**LOS per JMT**	
US Route 13 / Plymouth Road (Kent Road 371) / Plymouth Road (Kent Road 239)	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)				
Eastbound Plymouth Road Right Turn	B (10.4)	B (12.5)	B (10.4)	B (12.7)
Westbound Plymouth Road Right Turn	B (13.2)	B (11.5)	B (13.5)	B (11.6)
Northbound US 13 Left Turn	A (8.9)	B (12.3)	A (8.8)	B (11.1)
Southbound US 13 Left Turn	B (11.1)	B (10.1)	B (11.4)	B (10.1)
2024 without Development (Case 2)				
Eastbound Plymouth Road Right Turn	B (10.5)	B (12.7)	B (10.5)	B (12.9)
Westbound Plymouth Road Right Turn	B (13.5)	B (11.6)	B (13.7)	B (11.8)
Northbound US 13 Left Turn	A (8.9)	B (12.6)	A (8.9)	B (11.3)
Southbound US 13 Left Turn	B (11.3)	B (10.3)	B (11.6)	B (10.3)
2024 with Development (Case 3)				
Eastbound Plymouth Road Right Turn	B (10.7)	B (12.9)	B (10.7)	B (13.1)
Westbound Plymouth Road Right Turn	B (13.8)	B (11.8)	B (14.0)	B (11.9)
Northbound US 13 Left Turn	A (9.1)	B (12.7)	A (9.0)	B (11.4)
Southbound US 13 Left Turn	B (11.4)	B (10.4)	B (11.7)	B (10.4)
2026 with Development (Case 4)				
Eastbound Plymouth Road Right Turn	-	-	B (10.7)	B (13.2)
Westbound Plymouth Road Right Turn	-	-	B (14.2)	B (12.0)
Northbound US 13 Left Turn	-	-	A (9.1)	B (11.6)
Southbound US 13 Left Turn	-	-	B (11.9)	B (10.5)

Table 7
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control[1]	**LOS per TIS**		**LOS per JMT**	
Midstate Road / Chimney Hill Road (Kent Road 385)	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)				
Eastbound Midstate Road Left Turn	A (8.2)	A (7.9)	A (7.5)	A (7.9)
Westbound Midstate Road Left Turn	A (7.8)	A (7.5)	A (7.7)	A (7.6)
Northbound Chimney Hill Road Approach	B (12.5)	B (12.9)	B (12.5)	B (12.8)
Southbound Chimney Hill Road Approach	B (11.6)	B (12.0)	B (11.6)	B (12.1)
2024 without Development (Case 2)				
Eastbound Midstate Road Left Turn	A (8.5)	A (8.1)	A (7.7)	A (8.1)
Westbound Midstate Road Left Turn	A (7.9)	A (7.7)	A (7.8)	A (7.8)
Northbound Chimney Hill Road Approach	B (14.6)	C (16.3)	B (14.6)	C (16.2)
Southbound Chimney Hill Road Approach	B (14.0)	C (15.1)	B (14.1)	C (15.4)
2024 with Development (Case 3)				
Eastbound Midstate Road Left Turn	A (8.6)	A (8.2)	A (7.8)	A (8.2)
Westbound Midstate Road Left Turn	A (7.9)	A (7.7)	A (7.8)	A (7.8)
Northbound Chimney Hill Road Approach	C (15.4)	C (16.9)	C (15.4)	C (16.8)
Southbound Chimney Hill Road Approach	B (14.5)	C (15.5)	B (14.6)	C (15.7)
2026 with Development (Case 4)				
Eastbound Midstate Road Left Turn	-	-	A (7.8)	A (8.2)
Westbound Midstate Road Left Turn	-	-	A (7.8)	A (7.8)
Northbound Chimney Hill Road Approach	-	-	C (15.6)	C (17.1)
Southbound Chimney Hill Road Approach	-	-	B (14.8)	C (15.9)

Table 8
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection All-Way Stop Control [1]	**LOS per TIS**		**LOS per JMT**	
Midstate Road / Delaware Route 15	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)				
Eastbound Midstate Road Approach	B (11.3)	B (12.1)	B (11.3)	B (12.1)
Westtbound Midstate Road Approach	B (10.8)	B (12.1)	B (10.8)	B (12.1)
Northbound Delaware Route 15 Approach	B (12.5)	C (19.3)	B (12.5)	C (19.3)
Southbound Delaware Route 15 Approach	B (13.3)	B (13.6)	B (13.3)	B (13.6)
Overall Intersection	B (12.2)	C (15.4)	B (12.2)	C (15.4)
2024 without Development (Case 2)				
Eastbound Midstate Road Approach	C (17.1)	D (25.5)	C (17.0)	D (25.3)
Westtbound Midstate Road Approach	C (15.3)	C (21.3)	C (15.2)	C (21.1)
Northbound Delaware Route 15 Approach	D (25.7)	F (102.2)	D (25.2)	F (100.1)
Southbound Delaware Route 15 Approach	C (21.2)	E (36.9)	C (21.0)	E (36.5)
Overall Intersection	C (20.8)	F (55.7)	C (20.5)	F (54.7)
2024 with Development (Case 3)				
Eastbound Midstate Road Approach	C (18.0)	D (26.7)	C (17.9)	D (26.8)
Westtbound Midstate Road Approach	C (16.0)	C (21.9)	C (15.9)	C (21.9)
Northbound Delaware Route 15 Approach	D (27.5)	F (107.6)	D (27.0)	F (108.9)
Southbound Delaware Route 15 Approach	C (22.3)	E (38.1)	C (22.1)	E (38.4)
Overall Intersection	C (21.9)	F (58.1)	C (21.7)	F (58.7)

Table 8 (continued)
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection All-Way Stop Control [1]	**LOS per TIS**		**LOS per JMT**	
Midstate Road / Delaware Route 15	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2026 with Development (Case 4)				
Eastbound Midstate Road Approach	-	-	C (18.9)	D (28.0)
Westtbound Midstate Road Approach	-	-	C (16.6)	C (22.6)
Northbound Delaware Route 15 Approach	-	-	D (29.8)	F (121.5)
Southbound Delaware Route 15 Approach	-	-	C (23.9)	E (41.4)
Overall Intersection	-	-	C (23.5)	F (64.4)

Table 8 (continued)
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Roundabout Control [1, 9]	**LOS per TIS**		**LOS per JMT**	
Midstate Road / Delaware Route 15	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2024 without Development (Case 2)				
Eastbound Midstate Road Approach	-	-	A (7.1)	A (7.9)
Westbound Midstate Road Approach	-	-	A (6.6)	A (8.5)
Northbound Delaware Route 15 Approach	-	-	A (7.0)	A (9.5)
Southbound Delaware Route 15 Approach	-	-	A (6.9)	A (8.5)
Overall Intersection	-	-	A (6.9)	A (8.7)
2024 with Development (Case 3)				
Eastbound Midstate Road Approach	-	-	A (7.2)	A (8.0)
Westbound Midstate Road Approach	-	-	A (6.7)	A (8.5)
Northbound Delaware Route 15 Approach	-	-	A (7.0)	A (9.6)
Southbound Delaware Route 15 Approach	-	-	A (7.0)	A (8.5)
Overall Intersection	-	-	A (7.0)	A (8.8)
2026 with Development (Case 4)				
Eastbound Midstate Road Approach	-	-	A (7.3)	A (8.2)
Westbound Midstate Road Approach	-	-	A (6.8)	A (8.8)
Northbound Delaware Route 15 Approach	-	-	A (7.2)	A (9.8)
Southbound Delaware Route 15 Approach	-	-	A (7.1)	A (8.7)
Overall Intersection	-	-	A (7.1)	A (9.0)

[9] JMT conducted an additional analysis of the intersection as a single lane roundabout consistent with DelDOT's *HEP KC, SR 12 & SR 15 Intersection Improvements* project (Contract No. T202104202)

Table 9
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Signalized Intersection [1]	**LOS per TIS**		**LOS per JMT**	
US Route 13 / Killens Pond Road / Reeves Crossing Road (Kent Road 286)	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1) *with DelDOT signal timings*[2]	-	-	D (51.8)	E (57.5)
2021 Existing (Case 1) *with optimized signal timing*	B (14.1)	B (12.5)	B (14.0)	B (13.6)
2024 without Development (Case 2) *with optimized signal timing* [10]	B (14.2)	B (12.7)	B (14.2)	B (13.8)
2024 with Development (Case 3) *with optimized signal timing*	B (14.5)	B (12.9)	B (14.5)	B (13.9)
2026 with Development (Case 4) *with optimized signal timing* [9]	-	-	B (14.5)	B (14.0)

[10] The TIS modeled the intersection utilizing a cycle length of 102 seconds, whereas JMT modeled the intersection utilizing a cycle length of 120 seconds.

Table 10
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control[1]	**LOS per TIS**		**LOS per JMT**	
US Route 13 / Paradise Alley Road (Kent Road 426) / Paradise Alley Road (Kent Road 287)	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)				
Eastbound Paradise Alley Road Approach	C (17.4)	C (20.7)	C (16.7)	C (21.3)
Westbound Paradise Alley Road Approach	B (15.0)	C (18.7)	B (14.6)	C (19.2)
US Route 13 Northbound Left Turn	A (8.8)	A (9.7)	A (8.5)	A (9.9)
US Route 13 Southbound Left Turn	B (10.2)	A (9.6)	A (9.5)	A (9.6)
2024 without Development (Case 2)				
Eastbound Paradise Alley Road Approach	C (18.3)	C (22.2)	C (17.6)	C (22.8)
Westbound Paradise Alley Road Approach	C (15.5)	C (19.9)	C (15.1)	C (20.5)
US Route 13 Northbound Left Turn	A (9.0)	A (9.9)	A (8.6)	B (10.1)
US Route 13 Southbound Left Turn	B (10.4)	A (9.9)	A (9.6)	A (9.9)
2024 with Development (Case 3)				
Eastbound Paradise Alley Road Approach	C (18.6)	C (22.5)	C (17.9)	C (23.2)
Westbound Paradise Alley Road Approach	C (15.5)	C (20.2)	C (15.0)	C (20.8)
US Route 13 Northbound Left Turn	A (9.0)	A (9.9)	A (8.7)	B (10.2)
US Route 13 Southbound Left Turn	B (10.4)	A (9.9)	A (9.7)	A (9.9)
2026 with Development (Case 4)				
Eastbound Paradise Alley Road Approach	-	-	C (18.2)	C (23.7)
Westbound Paradise Alley Road Approach	-	-	C (15.2)	C (21.2)
US Route 13 Northbound Left Turn	-	-	A (8.7)	B (10.2)
US Route 13 Southbound Left Turn	-	-	A (9.8)	A (10.0)

Table 11
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for the Midstate Road Commercial Development
Report Dated: May 5, 2022
Prepared by: McMahon Associates, Inc.

Unsignalized Intersection Two-Way Stop Control[1]	**LOS per TIS**		**LOS per JMT**	
US Route 13 / Winkler Road (Kent Road 428) / Hopkins Cemetery Road (Kent Road 289)	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)				
Eastbound Hopkins Cemetery Road Approach	C (16.0)	C (17.5)	C (16.0)	C (17.5)
Westbound Hopkins Cemetery Road Approach	B (14.4)	C (20.7)	B (14.6)	C (21.3)
US Route 13 Northbound Left Turn	A (8.9)	B (10.1)	A (8.7)	B (10.1)
US Route 13 Southbound Left Turn	A (9.3)	A (9.6)	A (9.4)	A (9.4)
2024 without Development (Case 2)				
Eastbound Hopkins Cemetery Road Approach	C (16.9)	C (18.4)	C (17.0)	C (18.5)
Westbound Hopkins Cemetery Road Approach	B (14.9)	C (22.1)	C (15.2)	C (22.8)
US Route 13 Northbound Left Turn	A (9.1)	B (10.4)	A (8.9)	B (10.4)
US Route 13 Southbound Left Turn	A (9.4)	A (9.9)	A (9.6)	A (9.7)
2024 with Development (Case 3)				
Eastbound Hopkins Cemetery Road Approach	C (17.4)	C (18.9)	C (17.5)	C (19.0)
Westbound Hopkins Cemetery Road Approach	C (15.0)	C (22.4)	C (15.3)	C (23.1)
US Route 13 Northbound Left Turn	A (9.1)	B (10.4)	A (9.0)	B (10.5)
US Route 13 Southbound Left Turn	A (9.5)	A (10.0)	A (9.6)	A (9.7)
2026 with Development (Case 4)				
Eastbound Hopkins Cemetery Road Approach	-	-	C (17.8)	C (19.4)
Westbound Hopkins Cemetery Road Approach	-	-	C (15.5)	C (23.7)
US Route 13 Northbound Left Turn	-	-	A (9.0)	B (10.6)
US Route 13 Southbound Left Turn	-	-	A (9.7)	A (9.8)