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

NICOLE MAJESKI
SECRETARY

September 30, 2022

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

Dear Mr. Kaszyski,

The enclosed Traffic Impact Study (TIS) review letter for the **JJ's Learning Experience (a.k.a. 756 S. Little Creek Road)** (Tax Parcel: 2-05-077.00-01-030.000-000) 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. Zahid Aslam, Empire Medical, LLC
Mr. James Taylor, Verdantas
Mr. Brian Clarke, Verdantas
Mr. Matt Harline, City of Dover
Ms. Dawn Melson-Williams, City of Dover
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, Inc.
Ms. Joanne Arellano, 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
Todd Sammons, Assistant Director, Development Coordination
Sireen Muhtaseb, TIS Group Manager, Development Coordination
Wendy Polasko, Subdivision Engineer, Development Coordination
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Matthew Lichtenstein, Central District Engineer, Central District
Steve McCabe, Central District Public Works Manager, Central District
Jared Kauffman, Service Development Planner, Delaware Transit Corporation
Tremica Cherry, 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 Furmato, Project Engineer, Development Coordination

September 30, 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 5-17A – JJ's Learning Experience TIS

Dear Mr. Joinville:

Johnson, Mirmiran, and Thompson (JMT) has completed a review of the Traffic Impact Study (TIS) for the JJ's Learning Experience (a.k.a. 756 S. Little Creek Road) development dated July 2022, which was prepared by Verdantas (formerly Duffield Associates, LLC). This review was assigned as Task Number 5-17A. 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 the City of Dover in Kent County, Delaware. The development would be comprised of a 2,500 square-foot supermarket, a 10,111 square-foot daycare, and a 20,619 square-foot multi-purpose facility in a single building. The proposed development would be located on the south side of S. Little Creek Road (Kent Road 67), approximately 400 feet east of the intersection of Bay Road (Kent Road 7) and S. Little Creek Road. The subject property is on an approximately 2.39-acre parcel. The land is currently zoned as C4 (Highway Commercial), and the developer does not plan to rezone the land. Construction for the development is anticipated to be completed in 2022.

The following two access scenarios were evaluated as part of the TIS:

- Case 3a - Ingress-only opposite Babb Drive and egress-only east of Babb Drive on S. Little Creek Road
- Case 3b - Full access opposite Babb Drive and full access east of Babb Drive on S. Little Creek Road

DelDOT has relevant and ongoing improvement projects within the study area, including a pavement and rehabilitation project proposed along S. Little Creek Road from Bay Road to Delaware Route 9 (DelDOT Contract No. T202006202). The project is in the design phase and is expected to be ready for advertisement in early 2023.

The HEP (Hazard Elimination Program) program is a component of the HSIP (Highway Safety Improvement Program), which aims to achieve a significant reduction in traffic fatalities and injuries through the implementation of infrastructure-related highway safety improvements on

state-maintained roads. The Bay Road/S. Little Creek Road/Martin Luther King, Jr. Boulevard intersection is part of the 2019 HEP and is denoted as Site E/S-4. The results of the Task I evaluation from the 2019 HEP identified the need to develop alternatives to reduce eastbound Martin Luther King Jr. Boulevard right-turn rear end crashes and left-turn angle crashes as well as westbound S. Little Creek Road left-turn angle crashes.

The Task II evaluation for Site E/S-4 from the 2019 HEP developed alternatives to address the results from the Task I evaluation and proposed improvements to the Bay Road/S. Little Creek Road/Martin Luther King, Jr. Boulevard intersection. The improvements will be implemented as a future DelDOT project.

The future DelDOT project incorporating the recommendations from the Task II evaluation includes widening the eastbound approach to provide a signalized dual right-turn lane, modifying the eastbound approach lane configurations to have 1 left turn lane, 1 shared left turn/through lane, and 2 right turn lanes, realigning the signalized pedestrian crossing on the south leg to provide a two-stage crossing and reduce the existing crossing distance, rebuilding the existing traffic signal using mast arms, changing eastbound/westbound signal phasing to split phase, and changing the westbound approach to have 1 shared left turn/through lane, 1 through lane, and 1 right lane. The project will also incorporate the *US 13 Dover Pedestrian Safety Audit* recommendations which include installing pedestrian accommodations on the north leg of Bay Road, installing an ADA compliant pedestrian facility along the Frontage Road adjacent to northbound US Route 13 between Loockerman Street and Bay Road, and installing pedestrian median fencing along the median of US Route 13 adjacent to the sidewalk on southbound US Route 13 between Loockerman Street and Bay Road. The project is expected to start preliminary engineering in Fiscal Year 2024.

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.

Intersection	**LOS Deficiencies Occur**		**Case**
	AM	**PM**	
Site Entrance A / S. Little Creek Road (Kent Road 67) / Babb Drive		X	Case 3a – 2022 with Development
		X	Case 3b – 2022 with Development

The unsignalized Site Entrance A / S. Little Creek Road (Kent Road 67) / Babb Drive intersection exhibits LOS deficiencies during the PM peak hour under future conditions with the proposed development. Specifically, during the weekday PM peak hour under Case 3a conditions, the southbound Babb Drive approach would operate at LOS E (37.7 seconds of delay per vehicle) with a projected 95th percentile queue of approximately 100 feet. During the weekday PM peak hour under Case 3b conditions, the northbound Site Entrance A approach would operate at LOS F (164.2 seconds of delay per vehicle) with a projected 95th percentile queue of approximately 125 feet.

Both a roundabout and a traffic signal would mitigate the deficiencies at this intersection. However, per the Traffic Signal Justification Study prepared by Verdantas (formerly Duffield Associates, LLC) dated July 13, 2022, a traffic signal is not warranted at this location. Additionally, a roundabout is not recommended at this location due to the proximity of the adjacent signalized intersection.

As part of the TIS, two access scenarios were considered: one scenario with an ingress-only access at Site Entrance A and an egress-only access at Site Entrance B (Case 3a) and one scenario with a full access at both site entrances. As discussed above, Site Entrance A exhibits LOS deficiencies under future conditions with the proposed development during both access scenarios. However, under Case 3a conditions the intersection would operate at acceptable LOS along the S. Little Creek Road left turn movements, and with less delay along the minor street approaches. Additionally, the southbound Babb Drive approach delay and queue lengths may be shorter than projected due to the ability for trips to be diverted to the north on Babb Drive, east onto Lady Bug Road, south onto JH Brown Blvd, and then east onto S. Little Creek Road instead of turning left from Babb Drive onto S. Little Creek Road. As such, it is recommended that the developer construct Site Entrance A opposite Babb Drive as an unsignalized ingress-only access, and Site Entrance B as an unsignalized egress-only access.

Should the City of Dover 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 S. Little Creek 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, ingress-only access for the proposed JJ's Learning Experience development along S. Little Creek Road opposite Babb Drive. The intersection should be consistent with the lane configurations shown in the table below.

Approach	Current Configuration	Proposed Configuration
Eastbound S. Little Creek Road	One left turn lane and one shared through/right turn lane	One left turn lane, one through lane, and one right turn lane
Westbound S. Little Creek Road	One shared left turn/through/right turn lane	One left turn lane and one shared through/right turn lane
Northbound Site Entrance A	One shared left turn/through/right turn lane	One receiving lane
Southbound Babb Drive	One left turn lane and one right turn lane	One shared left turn/through lane and one right turn lane

The developer should align the Site Entrance A approach to intersect S. Little Creek Road directly across from the Babb Drive approach to allow for through movements. Based on DelDOT's *Development Coordination Manual,* the recommended minimum storage length (excluding taper) of the separate left turn lanes along eastbound and westbound S. Little Creek Road are 120 feet. Due to the proximity of the proposed site entrance to the entrance for the adjacent gas station, the recommended storage length (excluding taper) for the eastbound right turn lane is 100 feet. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths.

3. The developer should construct an unsignalized, egress-only access for the proposed JJ's Learning Experience development along S. Little Creek Road approximately 250 feet east of Babb Drive. The intersection should be consistent with the lane configurations shown in the table below.

Approach	Current Configuration	Proposed Configuration
Eastbound S. Little Creek Road	One shared left turn/through/right turn lane	One shared left turn/through lane*
Westbound S. Little Creek Road	One shared left turn/through/right turn lane	One shared through/right turn lane*
Northbound Site Entrance B	One shared left turn/right turn lane	One left turn lane and one right turn lane

*The northerly leg is a private driveway that has access via left turn movements from eastbound S. Little Creek Road and right turn movements from westbound S. Little Creek Road.

The entrance should be designed to minimize the skewed angle of the Site Entrance B approach to S. Little Creek Road.

4. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Bay Road (Kent Road 7) and S. Little Creek Road. The traffic signal agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT's discretion. At DelDOT's discretion, the developer may contribute to the Traffic Signal Revolving Fund in lieu of a traffic signal agreement.

5. The developer should enter into a traffic signal agreement with DelDOT for the intersection of S. Little Creek Road (Kent Road 67) and Babb Drive/Site Entrance A for the installation of a traffic signal. The traffic signal agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT's discretion. At DelDOT's discretion, the developer may contribute to the Traffic Signal Revolving Fund in lieu of a traffic signal agreement.

6. The developer should provide a cross access easement to the adjacent lot to the west (Tax Parcel 2-05-07700-01-0500-00001). The developer should coordinate with DelDOT's Development Coordination Section to determine the location and feasibility of the interconnection.

7. 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 S. Little Creek Road site frontage. Within the easement, the developer should construct a new ten-foot wide shared-use path (SUP). The SUP 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 SUP. If feasible, the SUP 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 SUP.

    b. At least one internal connection of a sidewalk or SUP in the vicinity of the site entrance from the SUP along S. Little Creek Road should be provided.

    c. If a pedestrian crossing is provided across S. Little Creek Road, a pedestrian study based on NCHRP 562 should be performed to determine if additional improvements are warranted.

    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 S. Little Creek Road approaches to Site Entrance A.

f. 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
Janna Brown, E.I.T.

Enclosure

General Information

Report date: July 2022
Prepared by: Verdantas (formerly Duffield Associates, LLC)
Prepared for: Empire Medical, LLC
Tax Parcel: 2-05-077.00-01-030.000-000
Generally consistent with DelDOT's *Development Coordination Manual (DCM)*: Yes

Project Description and Background

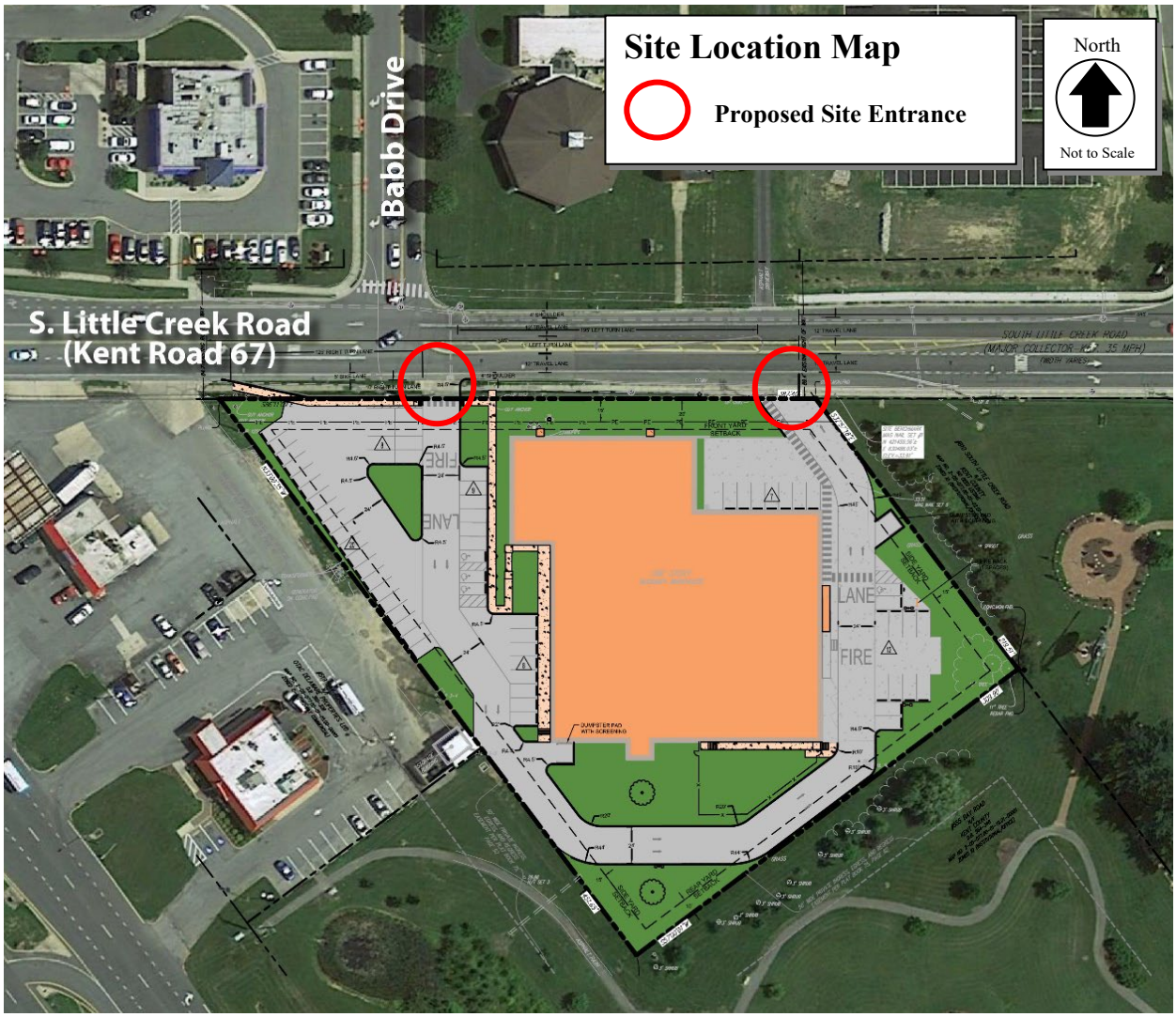
Description: The proposed development includes a 2,500 square-foot supermarket, a 10,111 square-foot daycare, and a 20,619 square-foot multi-purpose facility, which will replace an existing development of a 4,000 square-foot medical-dental office, a 10,111 square-foot warehousing facility, a 14,162 square-foot furniture store, and a 4,870 square-foot tire store.
Location: The land is located on the south side of South Little Creek Road (Kent Road 67), approximately 400 feet east of the intersection of Bay Road (Kent Road 7) and South Little Creek Road, in the City of Dover, Kent County, Delaware.
Amount of Land to be developed: An approximately 2.39-acre parcel.
Land Use approval(s) needed: Entrance Plan.
Proposed completion date: 2022.
Proposed access locations: Two access points are proposed on South Little Creek Road. One access scenario involves two full access points on South Little Creek Road. Another access scenario involves an ingress-only access point and an egress-only access point to the east of the ingress-only access point, with both access points on South Little Creek Road.

Daily Traffic Volumes:

- 2021 Average Annual Daily Traffic on South Little Creek Road: 9,148

*AADT is sourced from ATR data provided by the TIS report. Data taken from seven full days starting March 17, 2022.

Site Map



**Graphic is an approximation based on the DelDOT Record Plan prepared by Duffield Associates, LLC, dated December 9, 2021*

Relevant and On-going Projects

DelDOT has relevant and ongoing improvement projects within the study area, including a pavement and rehabilitation project proposed along S. Little Creek Road from Bay Road to Delaware Route 9 (DelDOT Contract No. T202006202). The project is in the design phase and is expected to be ready for advertisement in early 2023.

The HEP (Hazard Elimination Program) program is a component of the HSIP (Highway Safety Improvement Program), which aims to achieve a significant reduction in traffic fatalities and injuries through the implementation of infrastructure-related highway safety improvements on state-maintained roads. The Bay Road/S. Little Creek Road/Martin Luther King, Jr. Boulevard intersection is part of the 2019 HEP and is denoted as Site E/S-4. The results of the Task I evaluation from the 2019 HEP identified the need to develop alternatives to reduce eastbound

Martin Luther King Jr. Boulevard right-turn rear end crashes and left-turn angle crashes as well as westbound S. Little Creek Road left-turn angle crashes.

The Task II evaluation for Site E/S-4 from the 2019 HEP developed alternatives to address the results from the Task I evaluation and proposed improvements to the Bay Road/S. Little Creek Road/Martin Luther King, Jr. Boulevard intersection. The improvements will be implemented as a future DelDOT project.

The future DelDOT project incorporating the recommendations from the Task II evaluation includes widening the eastbound approach to provide a signalized dual right-turn lane, modifying the eastbound approach lane configurations to have 1 left turn lane, 1 shared left turn/through lane, and 2 right turn lanes, realigning the signalized pedestrian crossing on the south leg to provide a two-stage crossing and reduce the existing crossing distance, rebuilding the existing traffic signal using mast arms, changing eastbound/westbound signal phasing to split phase, and changing the westbound approach to have 1 shared left turn/through lane, 1 through lane, and 1 right lane. The project will also incorporate the *US 13 Dover Pedestrian Safety Audit* recommendations which include installing pedestrian accommodations on the north leg of Bay Road, installing an ADA compliant pedestrian facility along the Frontage Road adjacent to northbound US Route 13 between Loockerman Street and Bay Road, and installing pedestrian median fencing along the median of US Route 13 adjacent to the sidewalk on southbound US Route 13 between Loockerman Street and Bay Road. The project is expected to start preliminary engineering in Fiscal Year 2024.

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

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

The proposed development is located within Investment Level 1.

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.

Proposed Development's Compatibility with Livable Delaware:

The proposed site is located within Investment Level 1. Investment Level 1 is the most favorable location for new development and redevelopment. Additionally, Investment Level 1 is the priority for job creation. Therefore, the proposed development is consistent with the *2020 Delaware Strategies for State Policies and Spending*.

Comprehensive Plan
(Source: City of Dover 2019 Comprehensive Plan)

Dover Comprehensive Plan:
Per the *City of Dover 2019 Comprehensive Plan Existing Land Use Plan,* the proposed development appears to be currently zoned as Commercial. Per the *City of Dover 2019 Comprehensive Plan Land Development Plan,* the proposed development is in an area designated as Commercial – High Intensity.

Proposed Development's Compatibility with the Dover Comprehensive Plan:

The *City of Dover 2019 Comprehensive Plan* encourages the renovation and adaptive reuse of older structures. Therefore, the proposed development is generally consistent with the *City of Dover 2019 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 850 (Supermarket), ITE Land Use Code 565 (Daycare Center), and ITE Land Use Code 435 (Multi-purpose Recreational Facility). Trip generation was reviewed by DelDOT as part of the Preliminary TIS (PTIS) submission.

Table 1
JJ's Learning Experience Trip Generation

Land Use	Size	ADT	Weekday AM Peak Hour			Weekday PM Peak Hour		
			In	Out	Total	In	Out	Total
Supermarket	2,500 SF	267	6	4	10	12	11	23
Daycare Center	10,111 SF	481	59	52	111	52	60	112
Multi-purpose Rec. Facility	20,619 SF	740*	0	0	0	41	33	74
Total		1,488	65	56	121	105	104	209

*ITE Trip Generation Manual does not publish ADT information for this land use code. As such, the ADT is estimated by applying a k-factor of 10 to the PM peak hour total.

Overview of TIS

Intersections examined:

1. S. Little Creek Road (Kent Road 67) / Babb Drive / Site Entrance A
2. S. Little Creek Road / Site Entrance B (East of Babb Drive)
3. S. Little Creek Road / JH Brown Boulevard / Levy Court Lane
4. Bay Road (Kent Road 7) / S. Little Creek Road

Conditions examined:

1. Case 1 – 2022 existing
2. Case 2 – 2022 without development
3. Case 3 – 2022 with development
    a. Ingress-only opposite Babb Drive and egress-only east of Babb Drive on Little Creek Road
    b. Full access at Babb Drive and full access east of Babb Drive on Little Creek Road

Committed Developments considered:

1. Bay Road Commercial (19,186 square feet of general office space, 10,600 square feet of high-turnover sit-down restaurant)
2. Bay Road Office Park Phase II (30,406 square feet of general office space)

*Note: Committed development information provided in the Final TIS supersedes the information provided in the February 18, 2022, DelDOT Scoping Meeting Memorandum.

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

Intersection Descriptions

1. **Site Entrance A / S. Little Creek Road (Kent Road 67) / Babb Drive**
   Type of Control: Two-way stop-controlled intersection.
   Eastbound Approach: (S. Little Creek Road) Existing one left turn lane and one through/right turn lane. Proposed one left turn lane, one through lane, and one right turn lane.
   Westbound Approach: (S. Little Creek Road) Existing one shared left turn/through/right turn lane. Proposed one left turn lane and one shared through/right turn lane.
   Northbound Approach: (Site Entrance A) Existing one shared left turn/through/right turn lane, stop-controlled.
   Southbound Approach: (Babb Drive) Existing one left turn lane and one right turn lane, stop-controlled. Proposed one shared left turn/through lane and one right turn lane, stop-controlled.

2. **Site Entrance B / S. Little Creek Road**
   Type of Control: Two-way stop-controlled intersection (T-intersection).
   Eastbound Approach: (S. Little Creek Road) Existing one shared left turn/through/right turn lane. Proposed one left turn/through lane.
   Westbound Approach: (S. Little Creek Road) Existing one shared left turn/through/right turn lane. Proposed one through/right turn lane.
   Northbound Approach: (Site Entrance B) Existing one shared left turn/through/right turn lane, stop-controlled.

   *A private driveway is located at the southbound leg of the intersection.

3. **S. Little Creek Road / JH Brown Boulevard / Levy Court Lane**
   Type of Control: Two-way stop-controlled intersection.
   Eastbound Approach: (S. Little Creek Road) Existing one left turn lane, one through lane, and one right turn lane.

Westbound Approach: (S. Little Creek Road) Existing one left turn lane, one through lane, and one right turn lane.
Northbound Approach: (Levy Court Lane) Existing one shared left turn/through/right turn lane, stop-controlled.
Southbound Approach: (JH Brown Boulevard) Existing one shared left turn/through/right turn lane, stop-controlled.

4. **Bay Road (Kent Road 7) / S. Little Creek Road**
Type of Control: Existing signalized intersection (four-legged).
Eastbound Approach: (S. Little Creek Road) Existing one left turn lane, one through lane, and one channelized right turn lane, yield controlled.
Westbound Approach: (S. Little Creek Road) Existing one left turn lane, one through lane, and one right turn lane.
Northbound Approach: (Bay Road) Existing two left turn lanes, two through lanes, and one channelized right turn lane, yield controlled.
Southbound Approach: (Bay Road) Existing two left turn lanes, two through lanes, and one channelized right turn lane.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Per DelDOT Gateway, DART Route 107 runs along S. Little Creek Road through the study area, DART Route 301 runs along Bay Road through the study area, and DART Route 303 runs along Bay Road through the study area. Route 107 provides 16 round trips from 5:57 AM to 9:56 PM on weekdays. Route 301 provides 18 round trips from 4:10 AM to 8:56 PM on weekdays and 5 round trips from 7:00 AM to 7:47 PM on Saturdays. Route 303 provides 8 round trips from 4:46 AM to 8:57 PM on weekdays.

Planned transit service: Per email correspondence on August 2, 2022, with Mr. Jared Kauffman, Fixed-Route Planner for DART, the Delaware Transit Corporation (DTC) does not have any transit specific comments for the project.

Existing bicycle and pedestrian facilities: According to DelDOT's Kent County Bicycle Map, S. Little Creek Road and Bay Road are considered connector bicycle routes. Crosswalks are located at the S. Little Creek Road/Bay Road intersection, the Babb Rd/S. Little Creek Road intersection, and the S. Little Creek Road / JH Brown Boulevard intersection.

Planned bicycle and pedestrian facilities: Email correspondence was sent to Anthony Aglio, DelDOT's Bicycle and Pedestrian Coordinator, on July 18, 2022, and to Mr. John Fiori, DelDOT's Bicycle Coordinator and Ms. Linda Osiecki, DelDOT's Pedestrian Coordinator, on August 23, 2022. A response has not yet been received.

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

- S. Little Creek Road: 2 and 4

Signal Warrant Evaluation

The TIS conducted a signal warrant evaluation for the proposed Babb Drive/Site Entrance A intersection with S. Little Creek Road. The evaluation was conducted using traffic volume data and geometric conditions in accordance with the Delaware Manual on Uniform Traffic Control Devices (DE MUTCD). As the study intersection has a posted speed limit of 35 mph and lies in a community with a population of greater than 10,000, the DE MUTCD's reduced volume criteria was not applied. Based on the evaluation from the TIS, no volume warrants are met under 2022 conditions with the development. For case 3a, the evaluation is based on the provision of one left turn lane, one through lane, and one right turn lane for the eastbound approach, one left turn lane and one shared through/right turn lane for the westbound approach, and one left turn/through lane and one right turn lane for the southbound approach. For case 3b, the evaluation is based on the provision of one left turn lane, one through lane, and one right turn lane for the eastbound approach, one left turn lane and one shared through/right turn lane for the westbound approach, one shared left turn/through/right turn lane for the northbound approach, and one shared left turn/through lane and one right turn lane for the southbound approach. The crash warrant (based on both the MUTCD and the IA-19.3 - Alternative Signal Warrant 7) is not met. Additionally, the remaining warrants are not met.

Crash Evaluation

Per the crash data included in the TIS from March 7, 2019, to March 7, 2022, and provided by the Delaware Department of Transportation (DelDOT), a total of 110 crashes were reported within the study area. Of the 110 crashes reported, no fatalities occurred.

The study area covers S. Little Creek Road from approximately 300 feet west of Bay Road to approximately 300 feet east of JH Brown Boulevard. Of the 110 crashes, 62 of them were rear end incidents, 5 were head-on incidents, 24 were angle incidents, 7 were sideswipe, same direction incidents, 1 was a rear-to-rear incident, 7 did not involve a collision between two vehicles, and 4 were either unknown or other incidents. Only one crash involved a bicyclist.

Previous Comments

There were no comments from DelDOT.

Sight Distance Evaluation

No sight distance constraints were noted at the site entrances per a field visit conducted on August 3, 2022.

General HCS Analysis Comments

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

1) The TIS and JMT used version 7.9.5 of HCS7 to complete the analysis.

2) Per DelDOT's *Development Coordination Manual*, JMT and the TIS utilized the existing heavy vehicle percentage in Case 1 for each movement greater than 100 vph.

3) 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.

4) 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.

5) Both JMT and the TIS modeled the signalized intersections with a saturation flow rate of 1,750 veh/hr/lane.

6) JMT included bicycles and pedestrians counted during the traffic data collection in the analysis, whereas the TIS did not.

Table 2
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for JJ's Learning Experience
(a.k.a 756 S. Little Creek Road)
Report Dated: July 2022
Prepared by: Verdantas (formerly Duffield Associates, LLC)

Unsignalized Intersection All-Way Stop Control[1]	**LOS per TIS**		**LOS per JMT**	
Site Entrance A / S. Little Creek Road (Kent Road 67) / Babb Drive	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2022 Existing (Case 1)[2, 3]				
Eastbound S. Little Creek Road Left Turn	A (8.6)	A (8.9)	A (8.6)	A (8.9)
Westbound S. Little Creek Road Left Turn	A (7.9)	A (8.1)	A (7.9)	A (8.1)
Northbound Site Entrance A Approach	D (25.2)	-	D (25.4)	B (10.5)
Southbound Babb Drive Approach	C (18.2)	C (23.4)	C (18.4)	C (23.9)
2022 Without Development (Case 2)[2, 3]				
Eastbound S. Little Creek Road Left Turn	A (8.6)	A (8.9)	A (8.6)	A (8.9)
Westbound S. Little Creek Road Left Turn	A (7.9)	A (8.1)	A (7.9)	A (8.1)
Northbound Site Entrance A Approach	D (25.5)	-	D (25.7)	B (10.5)
Southbound Babb Drive Approach	C (18.5)	C (23.6)	C (18.5)	C (24.2)

[1] For signalized and unsignalized analysis, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[2] The TIS modeled the eastbound approach as having one left turn lane, one through lane, and one right turn lane, whereas JMT modeled the eastbound approach as having one left turn lane and one shared through/right turn lane. The TIS modeled the southbound approach as one left turn lane and one shared through/right turn lane, whereas JMT modeled the southbound approach as one left turn lane and one right turn lane.
[3] To generate HCS results along the northbound approach during the PM peak hour, JMT included one right turning vehicle along the approach, whereas the TIS did not.

Table 2 (continued)
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for JJ's Learning Experience
(a.k.a 756 S. Little Creek Road)
Report Dated: July 2022
Prepared by: Verdantas (formerly Duffield Associates, LLC)

Unsignalized Intersection All-Way Stop Control [1]	**LOS per TIS**		**LOS per JMT**	
Site Entrance A / S. Little Creek Road (Kent Road 67) / Babb Drive	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2022 With Development (Case 3a)[4]				
Eastbound S. Little Creek Road Left Turn	A (8.8)	A (9.3)	A (8.8)	A (9.3)
Westbound S. Little Creek Road Left Turn	A (8.1)	A (8.4)	A (8.1)	A (8.4)
Northbound Site Entrance A Approach[5]	D (29.0)	-	-	-
Southbound Babb Drive Approach	C (22.0)	E (36.8)	C (22.2)	E (37.7)
2022 With Development (Case 3b) [4]				
Eastbound S. Little Creek Road Left Turn	A (8.6)	A (9.0)	A (8.7)	A (9.0)
Westbound S. Little Creek Road Left Turn	A (8.1)	A (8.3)	A (8.1)	A (8.3)
Northbound Site Entrance A Approach	D (32.9)	F (163.1)	D (33.0)	F (164.2)
Southbound Babb Drive Approach	C (19.8)	D (27.9)	C (20.0)	D (28.8)

[4] The TIS modeled the intersection with one shared left turn/through/right turn lane along the westbound approach, whereas JMT modeled the intersection with one left turn lane and one shared through/right turn lane along the westbound approach.

[5] The TIS modeled the northbound approach as an ingress and egress site entrance, whereas JMT modeled the northbound approach as an ingress-only site entrance.

Table 2 (continued)
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for JJ's Learning Experience
(a.k.a 756 S. Little Creek Road)
Report Dated: July 2022
Prepared by: Verdantas (formerly Duffield Associates, LLC)

Signalized Intersection[1]	**LOS per TIS**		**LOS per JMT**	
Site Entrance A / S. Little Creek Road (Kent Road 67) / Babb Drive[6,7]	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2022 With Development (Case 3a)	B (13.2)	B (15.3)	B (13.6)	C (15.0)
2028 With Development (Case 3b)	B (15.7)	C (21.3)	C (20.8)	C (27.7)

Roundabout[1]	**LOS per TIS**		**LOS per JMT**	
Site Entrance A / S. Little Creek Road (Kent Road 67) / Babb Drive	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2022 With Development (Case 3a)				
Eastbound S. Little Creek Road Approach	-	-	A (5.5)	A (6.9)
Westbound S. Little Creek Road Approach	-	-	A (6.7)	A (8.0)
Northbound Site Entrance A Approach	-	-	-	-
Southbound Babb Drive Approach	-	-	A (5.0)	A (6.0)
Overall LOS	-	-	A (6.0)	A (7.2)
2022 With Development (Case 3b)				
Eastbound S. Little Creek Road Approach	-	-	A (5.5)	A (6.8)
Westbound S. Little Creek Road Approach	-	-	A (6.8)	A (8.0)
Northbound Site Entrance A Approach	-	-	A (5.0)	A (6.6)
Southbound Babb Drive Approach	-	-	A (4.9)	A (6.0)
Overall LOS	-	-	A (5.9)	A (7.0)

[6] Due to anticipated platooning along S. Little Creek Road, JMT modeled the intersection with arrival type 4 along the eastbound approach and the default arrival type 3 along all other approaches. The TIS modeled the intersection with the default arrival type 3 along all approaches.
[7] Both the TIS and JMT modeled the eastbound approach as one left turn lane, one through lane, and one right turn lane, the westbound approach as one left turn lane and one shared through/right turn lane, and the southbound approach as one shared left turn/through lane and one right turn lane.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for JJ's Learning Experience
(a.k.a 756 S. Little Creek Road)
Report Dated: July 2022
Prepared by: Verdantas (formerly Duffield Associates, LLC)

Unsignalized Intersection All-Way Stop Control [1]	**LOS per TIS**		**LOS per JMT**	
S. Little Creek Road (Kent Road 67) / Site Entrance B	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2022 Existing (Case 1)[2]				
Westbound S. Little Creek Road Left Turn	A (8.1)	A (8.4)	A (8.1)	A (8.4)
Northbound Site Entrance B Approach	B (10.5)	-	B (10.6)	B (11.3)
2022 Without Development (Case 2)[2]				
Westbound S. Little Creek Road Left Turn	A (8.1)	A (8.4)	A (8.1)	A (8.4)
Northbound Site Entrance B Approach	B (10.5)	-	B (10.5)	B (11.3)
2022 With Development (Case 3a)[8]				
Westbound S. Little Creek Road Left Turn	A (8.1)	A (8.4)	-	-
Northbound Site Entrance B Approach	C (16.9)	C (24.6)	C (16.4)	C (22.8)
2022 With Development (Case 3b)				
Westbound S. Little Creek Road Left Turn	A (8.2)	A (8.5)	A (8.1)	A (8.5)
Northbound Site Entrance B Approach	B (12.3)	B (14.4)	B (12.2)	B (14.0)

[8] The TIS modeled the northbound approach as a full movement approach, whereas JMT modeled the northbound approach as an egress-only approach.

Table 4
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for JJ's Learning Experience
(a.k.a 756 S. Little Creek Road)
Report Dated: July 2022
Prepared by: Verdantas (formerly Duffield Associates, LLC)

Unsignalized Intersection All-Way Stop Control [1]	**LOS per TIS**		**LOS per JMT**	
S. Little Creek Road / JH Brown Boulevard / Levy Court Lane	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2022 Existing (Case 1)				
Eastbound S. Little Creek Road Left Turn	A (8.2)	A (8.3)	A (8.4)	A (8.3)
Westbound S. Little Creek Road Left Turn	A (8.1)	A (8.3)	A (8.2)	A (8.4)
Northbound Levy Court Lane Approach	C (15.0)	C (23.2)	C (15.7)	C (23.8)
Southbound JH Brown Blvd Approach	C (18.8)	C (19.6)	C (19.8)	C (19.8)
2022 Without Development (Case 2)				
Eastbound S. Little Creek Road Left Turn	A (8.3)	A (8.3)	A (8.4)	A (8.3)
Westbound S. Little Creek Road Left Turn	A (8.1)	A (8.3)	A (8.2)	A (8.3)
Northbound Levy Court Lane Approach	C (15.1)	C (23.5)	C (15.7)	C (23.8)
Southbound JH Brown Blvd Approach	C (19.0)	C (19.7)	C (19.8)	C (19.9)
2022 With Development (Case 3a)				
Eastbound S. Little Creek Road Left Turn	A (8.3)	A (8.3)	A (8.4)	A (8.4)
Westbound S. Little Creek Road Left Turn	A (8.1)	A (8.3)	A (8.2)	A (8.4)
Northbound Levy Court Lane Approach	C (15.5)	D (25.0)	C (16.1)	D (25.4)
Southbound JH Brown Blvd Approach	C (19.7)	C (20.8)	C (20.5)	C (21.0)
2022 With Development (Case 3b)				
Eastbound S. Little Creek Road Left Turn	A (8.3)	A (8.3)	A (8.4)	A (8.4)
Westbound S. Little Creek Road Left Turn	A (8.1)	A (8.3)	A (8.2)	A (8.4)
Northbound Levy Court Lane Approach	C (15.5)	D (25.0)	C (16.1)	D (25.4)
Southbound JH Brown Blvd Approach	C (19.7)	C (20.8)	C (20.5)	C (21.0)

Table 5
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Impact Study for JJ's Learning Experience
(a.k.a 756 S. Little Creek Road)
Report Dated: July 2022
Prepared by: Verdantas (formerly Duffield Associates, LLC)

Signalized Intersection [1]	**LOS per TIS**		**LOS per JMT**	
S. Little Creek Road / Bay Road [9,10,11]	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2022 Existing (Case 1)	C (25.4)	C (29.7)	D (39.3)	D (41.4)
2022 Without Development (Case 2)	C (25.4)	C (30.4)	D (39.5)	D (42.6)
2022 With Development (Case 3a)	C (26.4)	C (32.5)	D (40.0)	D (43.7)
2022 With Development (Case 3b)	C (26.4)	C (32.5)	D (40.0)	D (43.8)

[9] JMT modeled the intersection per the DelDOT signal timing plans which denote a cycle length of 150 seconds during the AM and PM peak hours, whereas the TIS modeled the intersection with a 120 second cycle length. Additionally, JMT modeled the intersection with green split times per the DelDOT signal timing plans, whereas the TIS utilized optimized split timings.

[10] Due to platooning along S. Little Creek Road, JMT modeled the intersection with arrival type 4 along the eastbound approach and the default arrival type 3 along all other approaches. The TIS modeled the intersection with the default arrival type 3 along all approaches.

[11] JMT modeled the northbound approach with two left turn lanes per existing conditions, whereas the TIS modeled the approach with one left turn lane. The TIS modeled the eastbound right movement as an unsignalized movement, whereas JMT modeled the eastbound right movement as signalized with a right-turn overlap to account for right turn on red movements.