STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
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DOVER, DELAWARE 19903

SHANTÉ A. HASTINGS
SECRETARY

May 1, 2025

Ms. Nicole Kline-Elsier, PE, PTOE
Bowman Consulting Group, Ltd.
835 Springdale Drive, suite 200
Exton, PA 19341

Dear Ms. Kline-Elsier,

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Joseph's Farm** (Tax Parcel: 334-12.00-47.00, 334-12.00-46.00) commercial 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 Annamaria.Furmato@delaware.gov.

Sincerely,

Annamaria Furmato
TIS Review Engineer

AF:km
Enclosures
cc with enclosures: Benjamin Hoskins, Southside Investment Partners, LLC
David Kuklish, Bohler Engineering
Braden Garrison, McMahon Associates, Inc.
David L. Edgell, Office of State Planning Coordination
Jamie Whitehouse, Sussex County Planning & Zoning
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Todd Sammons, Assistant Director, Development Coordination
Wendy Polasko, Subdivision Engineer, Development Coordination
John Pietrobono, Acting Sussex Review Coordinator, Development Coordination
Kevin Hickman, Sussex Review Engineer, Development Coordination
Sireen Muhtaseb, TIS Engineer, Development Coordination
Ben Fisher, TIS Review Engineer, Development Coordination
Tijah Jones, TIS Review Engineer, Development Coordination

April 30, 2025

Ms. Sireen Muhtaseb, PE
TIS Engineer
DelDOT Division of Planning
P.O. Box 778
Dover, DE 19903

RE: Agreement No. 1946F
Traffic Impact Study Services
Task No. 5A Subtask 10A – Joseph's Farm

Dear Ms. Muhtaseb:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Joseph's Farm development prepared by Bowman Consulting Group, Ltd., dated May 15, 2024, and revised August 26, 2024. Bowman prepared the report in a manner generally consistent with DelDOT's Development Coordination Manual.

The TIS evaluates the impacts of the proposed Joseph's Farm development to be located along the north side of John J Williams Highway (Delaware Route 24) between Mulberry Knoll Road (Sussex Road 284) and Plantation Road (Sussex Road 275) in Sussex County, Delaware. The proposed development would consist of 520,000 sf of general retail space and a 175,000 sf discount club with gas station. Access to the site is proposed to be provided along Delaware Route 24 via one full-movement signalized entrance and two right-in/right-out entrances, along Mulberry Knoll Road via one full-movement signalized entrance, one right-in/right-out entrance, and one truck right-in entrance, and along Plantation Road via one shared access with an adjacent land development. Analysis was initially completed for 2045 conditions (analysis Cases 2 and 3) as that is the horizon year for the Henlopen Transportation Improvement District (TID) within which the proposed development is located. Analysis was also completed for 2028 conditions (analysis Cases 4 and 5) as that is the opening year for the proposed Joseph's Farm development project.

The subject land is located on an approximately 75-acre assemblage of parcels. The subject land is currently zoned AR-1 (Agricultural Residential), and the developer proposes to rezone the land to C-4 (Planned Commercial).

The TIS evaluated two access scenarios. The first scenario matches the DelDOT Scoping Memorandum and includes four site accesses. The second scenario, referred to as the "Applicant Access Scenario", includes seven site accesses. The Applicant Access Scenario was introduced by the developer after the TIS scoping meeting, was coordinated with DelDOT during the Preliminary TIS phase, and was found to be acceptable for inclusion as an analysis scenario in the Final TIS. Compared to the DelDOT scoping scenario, the Applicant Access Scenario distributes site trips over three additional right-in/right-out entrances, it has one fewer full-movement access on Mulberry Knoll Road, and it provides a right-in truck entrance on Mulberry Knoll Road.

DelDOT does not support the right-in truck entrance on Mulberry Knoll Road included in the Applicant Access Scenario. The intersection, identified as Site Entrance 1B in the following sections of the letter, creates challenges for enforcing the truck-only designation and the site plan presented in the TIS shows that this entrance would connect to the main parking area, making it an attractive entrance for northbound traffic.

Relevant and On-Going Projects and Studies

Currently, DelDOT has several relevant and ongoing projects within the area of study.

The *SR 24, Love Creek to Mulberry Knoll* (State Contract No. T201212201) project will improve safety and increase capacity on Delaware Route 24 from Love Creek to Mulberry Knoll Road. Dual lanes along Delaware Route 24 will extend from Delaware Route 1 to west of the school entrances located west of Mulberry Knoll Road. The dualized portion of the project will include a 12-foot center-left-turn lane along with two 11-foot travel lanes in each direction, an 8-foot shoulder eastbound and a 5-foot shoulder/bike lane westbound. Improvements at the intersection of Delaware Route 24 and Mulberry Knoll Road will include signalization, changing the Delaware Route 24 approaches so they each have one left-turn lane, two through lanes, and one right-turn lane, along with widening the Mulberry Knoll Road approaches so they each have one left-turn lane and one shared through/right turn lane. Construction is expected to be completed in 2024. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201212201.

The *Plantation Road Improvements, Robinsonville Road to US 9 (Phase 1)* (State Contract No. T202011201) project proposes a multi-lane roundabout at the intersection of Plantation Road / Belltown Road / Delaware Route 23 and an additional southbound through lane on Plantation Road. Bicycle and pedestrian facilities will be upgraded throughout the corridor. Construction is expected to be complete in 2024. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T202011201.

The *Plantation Road Improvements, SR 24 to Robinsonville Road (Phase 2)* (State Contract No. T202011201) project consists of operational improvements including turn lanes and other intersection modifications, median turn lanes for residential entrances, and bicycle and pedestrian facilities throughout the corridor. Phase 2 of this project begins near the intersection of Plantation Road and Shady Road / Salt Marsh Boulevard and ends north of the intersection of Plantation Road and Delaware Route 24. A single lane roundabout with a southbound bypass lane is proposed at the intersection of Plantation Road and Robinsonville Road. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201911201.

The *Airport Road Extension, Old Landing Road to SR 24* (State Contract No. T202204307) project includes intersection improvements and extension of Airport Road to Delaware Route 24 to provide additional connectivity through a crowded segment and an additional north / south route

from Delaware Route 24. The project is currently in the Preliminary Engineering phase and is expected to reach completion at some point during 2028. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T202204307.

The *Old Landing Road and Warrington Road Intersection Improvement* (State Contract No. T202204306) project proposes a roundabout to be installed at the subject intersection. The project is currently in the Design and Planning phase and is on hold until the Airport Road Extension is operational. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T202204306.

The *Shady Road from Plantation Road to SR 1 Improvements* project proposes roadway improvements including turn lanes, sidewalk, and shoulders. The project is programmed for Preliminary Engineering in FY 2028. As of July 2024, a contract number has not been assigned to this project. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis.

The *Mulberry Knoll Road Extension from Cedar Grove Road to US 9 at Old Vine* Road project proposes a new two-lane roadway extending from Mulberry Knoll Road to US Route 9. It is programmed for Preliminary Engineering in FY 2028. As of July 2024, a contract number has not been assigned to this project. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis.

The proposed development is located within the boundary of the operational Henlopen Transportation Improvement District (TID). The TID is a planning concept that seeks to proactively align transportation infrastructure spending and improvements with land use projections and future development within the designated district. The intersections in the study area of the proposed development are within the TID boundary.

Although the proposed development is within the Henlopen TID, the proposed plan for the development is inconsistent with the Land Use and Transportation Plan (LUTP) that was developed for the TID. For developments that are consistent with the LUTP, the developer is required to pay a fee in lieu of performing a TIS. However, as the proposed development is inconsistent with the LUTP, a TIS was required to determine if the TID improvements are still adequate given the additional trips associated with this development. The TID buildout year is 2045 and the minimum acceptable Level of Service (LOS) is LOS D.

Summary of Analysis Results

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

The following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements:

Intersection	***Existing Traffic Control***	***Situations for which deficiencies occur***
1a. Site Entrance 1A / Mulberry Knoll Road	Unsignalized	2045 with development SAT (Case 3)
2. Site Entrance 2 / Mulberry Knoll Road	Unsignalized	2045 with development SAT (Case 3)
4. Site Entrance 4 / Dot Sparrow Road / Plantation Road	Unsignalized	2045 without development SAT (Case 2) 2045 with development PM and SAT (Case 3) 2028 without development PM and SAT (Case 4) 2028 with development PM and SAT (Case 5)
5. Mulberry Knoll Road / Cedar Grove Road	Unsignalized	2045 with development SAT (Case 3) 2028 without development PM and SAT (Case 4) 2028 with development AM, PM, and SAT (Case 5)
6. Cedar Grove Road / Robinsonville Road	Unsignalized	2028 with development SAT (Case 5)
7. Robinsonville Road / Kendale Road	Unsignalized	2028 without development AM, PM, and SAT (Case 4) 2028 with development AM, PM, and SAT (Case 5)
8. Cedar Grove Road / Plantation Road / Postal Lane	Signalized	2045 without development SAT (Case 2) 2045 with development SAT (Case 3) 2028 with development SAT (Case 5)
9. Plantation Road / Pennsylvania Avenue / Plantations Boulevard	Unsignalized	2045 without development SAT (Case 2) 2045 with development SAT (Case 3)
10. Plantation Road / Robinsonville Road	Unsignalized	2023 Existing SAT (Case 1) 2028 without development AM, PM, and SAT (Case 4) 2028 with development AM, PM, and SAT (Case 5)
11. Plantation Road / Shady Road	Signalized	2023 Existing PM and SAT (Case 1) 2028 without development PM and SAT (Case 4) 2028 with development PM and SAT (Case 5)
12. Postal Lane / Melson Road / SR 1	Signalized	2023 Existing SAT (Case 1) 2045 without development SAT (Case 2) 2045 with development SAT (Case 3)
13. SR 1 / Bay Crossing Boulevard	Unsignalized	2023 Existing AM, PM, and SAT (Case 1) 2045 without development AM, PM, and SAT (Case 2) 2045 with development AM, PM, and SAT (Case 3)
14. SR 1 / Kings Highway	Unsignalized	2045 with development PM and SAT (Case 3)

15. Mulberry Knoll Road/ SR 24	Signalized	2045 without development PM and SAT (Case 2) 2045 with development PM and SAT (Case 3)
17. SR 24 / Spencer Lane / Williams Way	Unsignalized	2023 Existing AM, PM, and SAT (Case 1) 2045 without development AM, PM, and SAT (Case 2) 2045 with development AM, PM, and SAT (Case 3)
18. SR 24 / Camp Arrowhead Road	Signalized	2028 without development PM and SAT (Case 4) 2028 with development AM, PM, and SAT (Case 5)
19. SR 24 / Jolyns Way	Unsignalized	2028 without development PM and SAT (Case 4) 2028 with development AM, PM, and SAT (Case 5)
21. SR 24 / Plantation Road / Warrington Road	Signalized	2028 with development PM and SAT (Case 5)
22. Warrington Road & Old Landing Road	Unsignalized	2023 Existing AM and SAT (Case 1) 2028 without development AM, PM, and SAT (Case 4) 2028 with development AM, PM, and SAT (Case 5)
23. Airport Road / Old Landing Road	Unsignalized	2028 without development PM and SAT (Case 4) 2028 with development PM and SAT (Case 5)
26. SR 1 / SR 24	Signalized	2023 Existing SAT (Case 1) 2045 without development SAT (Case 2) 2045 with development SAT (Case 3)
27. SR 1 / Midway Outlet	Signalized	2023 Existing SAT (Case 1) 2045 without development SAT (Case 2) 2045 with development SAT (Case 3)
28. SR1 / Wolfe Neck Road	Unsignalized	2023 Existing AM, PM, and SAT (Case 1) 2045 without development AM, PM, and SAT (Case 2) 2045 with development AM, PM, and SAT (Case 3)

1a. Site Entrance 1A / Mulberry Knoll Road (See Recommendations 2 and 10 & Table 2, Page 40)

This unsignalized site entrance intersection experiences LOS deficiencies in 2045 Case 3 and 2028 Case 5 when modeled with stop control on the westbound site entrance approach. The developer proposes a traffic signal at this site entrance and Bowman completed a Traffic Signal Justification Study (TSJS), which demonstrates that warrants for a traffic signal are met with 2045 Build (Case 3) volumes. However, a roundabout is recommended based on the proven safety benefits compared to a traffic signal, expected roundabout operations that are acceptable to DelDOT, proximity to nearby intersections, DelDOT's preference to have a full-movement intersection at nearby Site Entrance 2 on Mulberry Knoll Road (instead of a right-in/right-out as proposed by the developer), and DelDOT's desire to have a raised median along the Mulberry Knoll Road site frontage (whereby roundabouts instead of signals are better to facilitate U-turns). McCormick Taylor evaluated this site entrance as a roundabout, which the analysis indicates would operate at LOS A and C during the AM and PM peaks of Case 3. During the Case 3 Saturday peak, the analysis indicates a roundabout would experience LOS deficiencies (LOS F with 64 seconds of delay), but the 95th percentile queues on the northbound approach are not expected to extend back to Delaware Route 24. In the 2028 Opening Year Build conditions (Case 5), the roundabout is expected to

operate at LOS B or better in all peak hours. As such, it is recommended that the developer design and construct a single lane roundabout at the Site Entrance 1A intersection.

2. Site Entrance 2 / Mulberry Knoll Road (See Recommendations 3 and 10 & Table 3, Page 41)
The developer proposes right-in/right-out access at this site entrance, which would operate at LOS C or better in all peak hours in Case 3 and Case 5. McCormick Taylor also evaluated this site entrance as a roundabout, which the analysis indicates would operate at LOS A and C during the AM and PM peaks of 2045 Build Case 3. During the Case 3 Saturday peak, the analysis indicates a roundabout would experience LOS deficiencies (LOS F with 66 seconds of delay), but the 95th percentile queues on the northbound approach are not expected to extend back to Site Entrance 1A. In the 2028 Opening Year Build conditions (Case 5), the roundabout is expected to operate at LOS C or better in all peak hours. Due to expected roundabout operations that are acceptable to DelDOT, proximity to nearby intersections, DelDOT's preference to have a full-movement intersection at Site Entrance 2 on Mulberry Knoll Road (to serve traffic traveling between Mulberry Knoll Road and Plantation Road at the rear of the Joseph's Farm property), DelDOT's desires to have a raised median along the Mulberry Knoll Road site frontage and consistent intersection types throughout the Mulberry Knoll Road corridor, and the proven safety benefits of roundabouts, it is recommended that the developer design and construct a single lane roundabout at the Site Entrance 2 intersection.

4. Site Entrance 4 / Dot Sparrow Road / Plantation Road (See Recommendation 8 & Table 7, Pages 45-46)
When modeled as a two-way stop-controlled intersection as proposed by the developer, this unsignalized intersection would experience LOS deficiencies during the PM and Saturday peaks in 2028 Cases 4 and 5 as well as in 2045 Cases 2 and 3. In Case 4, during the Saturday peak, the eastbound approach is expected to operate at LOS F with 215 seconds of delay. With the addition of Joseph's Farm site trips in Case 5, the eastbound approach is expected to operate at LOS F with over 8,000 seconds of delay during the Saturday peak. McCormick Taylor evaluated this site entrance with a traffic signal, and we prepared a Traffic Signal Justification Study (TSJS) which demonstrates that warrants for a traffic signal are met with Case 3 volumes. The analysis indicates the signalized intersection would operate at LOS C or better during all peak hours in the 2045 Build Case 3 scenario, which assumes Plantation Road would be widened to two lanes in each direction by 2045 as proposed by the Henlopen TID. We also evaluated a single lane roundabout in Case 3 and 5 (without any future widening of Plantation Road), which is expected to operate at LOS A and LOS C in the AM and PM peaks of both Case 3 and Case 5. During the Saturday peak hour, the single lane roundabout is expected to operate at LOS F in both Case 3 and Case 5, but the 95th percentile queues on the northbound approach are not expected to extend back to Delaware Route 24. Due to expected weekday roundabout operations in Case 3 and Case 5 that are acceptable to DelDOT, uncertainty regarding potential future widening of Plantation Road, the expected reduction in volume on Plantation Road with the completion of the Mulberry Knoll Road Extension, several existing and potential future roundabouts on the corridor, and the proven safety benefits of roundabouts compared to traffic signals, it is recommended that the developer design a single lane roundabout and construct it as a modification to the existing intersection at the Site Entrance 4 intersection.

5. Mulberry Knoll Road / Cedar Grove Road (See Recommendation 12 & Table 8, Page 47)
This unsignalized stop-controlled intersection experiences LOS deficiencies during the PM and Saturday peaks in Case 4 and the AM, PM, and Saturday peaks in Case 5. In Case 5 during the Saturday peak, the northbound Mulberry Knoll Road approach is expected to operate at LOS F with 19,000 seconds of delay. The Henlopen TID proposes a roundabout at this intersection. With a roundabout, in Case 3 and Case 5 the intersection is expected to operate at LOS C or better in both the AM and PM peaks. For the Saturday peak hour, the roundabout is expected to operate at LOS F with 91 seconds of delay in Case 5 and 104 seconds of delay in Case 3. Therefore, it is recommended that the developer design and construct a single lane roundabout at this intersection. As a TID improvement, the developer would be credited for design and construction of this improvement from their TID fee. Should the developer's total design and construction costs for all required off-site improvements that were identified in the TID exceed the applicant's TID fee, the Department will issue a credit to the developer.

6. Cedar Grove Road / Robinsonville Road (See Recommendation 15 & Table 9, Page 48)
This unsignalized intersection experiences LOS deficiencies during the Saturday peak in Case 5, for which the eastbound Robinsonville Road approach is expected to operate at LOS F with 65 seconds of delay. The Henlopen TID proposes a roundabout at this intersection. With a roundabout, the intersection is expected to operate at LOS A during all three peak periods in Cases 3 and 5. As such, the developer should pay the Henlopen TID fee due to the LOS deficiency at this intersection.

7. Robinsonville Road / Kendale Road (See Recommendation 13 & Table 10, Page 49)
This unsignalized intersection experiences LOS deficiencies during the AM, PM, and Saturday peaks in Case 4 and Case 5. In Case 5 during the Saturday peak, the southbound Kendale Road approach is expected to operate at LOS F with 600 seconds of delay. The Henlopen TID proposes a signal and DelDOT Traffic is investigating the potential of all-way stop-control at this intersection. With a signal, the intersection is expected to operate at LOS B or better during all three peak periods in Cases 3 and 5. Therefore, it is recommended that the developer prepare and submit a Traffic Signal Justification Study (TSJS) to DelDOT to determine when the signal will be warranted. Should a traffic signal be confirmed to be warranted, the developer will not be required to construct the traffic signal as the TID fee paid by the developer funds the future improvements at the intersection.

8. Cedar Grove Road / Plantation Road / Postal Lane (See Recommendation 15 & Table 11, Page 50)
This signalized intersection experiences LOS deficiencies during the Saturday peak in Cases 2, 3, and 5. In Case 5 during the Saturday peak, the intersection is expected to operate at LOS F with 98 seconds of delay. The Henlopen TID proposes a second through lane in both directions along Plantation Road through this intersection, so Cases 2 and 3 are modeled with this configuration. As such, the developer should pay the Henlopen TID fee due to the LOS deficiency at this intersection.

9. Plantation Road / Pennsylvania Avenue / Plantations Boulevard (See Recommendation 15 & Table 12, Page 51)

This unsignalized intersection experiences LOS deficiencies during the Saturday peak in Cases 2 and 3. In Case 2 during the Saturday peak the westbound approach is expected to operate at LOS E with 35 seconds of delay. With the addition of Joseph's Farm site trips in Case 3 the westbound approach is expected to operate at LOS F with 181 seconds of delay. The Henlopen TID proposes a second through lane in both directions along Plantation Road through this intersection so Cases 2 and 3 are modeled with this configuration. As such, the developer should pay the Henlopen TID fee due to the LOS deficiency at this intersection.

10. Plantation Road / Robinsonville Road (See Recommendation 14 & Table 13, Page 52)

This unsignalized intersection experiences LOS deficiencies during the Saturday peak in Case 1, and during all three peaks in Case 4 and Case 5. In Case 5 during the Saturday peak, the eastbound stop-controlled approach is expected to operate at LOS F with 2,018 seconds of delay. The Henlopen TID proposes a signal at this intersection and the *Plantation Road Improvements, SR 24 to Robinsonville Road (Phase 2) (State Contract No. T202011201)* project proposes a single lane roundabout with a southbound bypass lane. Evaluating the intersection with a signal in Case 5, it is expected to operate at LOS D in the Saturday peak hour and at LOS A in the AM and PM peaks. With a roundabout in Case 5, the intersection is expected to operate at LOS A and C during the AM and PM peaks, respectively. During the Saturday peak in Case 5 with a roundabout the intersection is expected to operate at LOS F with 116.9 seconds of delay. Due to expected weekday roundabout operations in Case 3 and Case 5 that are acceptable to DelDOT, uncertainty regarding potential future widening of Plantation Road, and the proven safety benefits of roundabouts compared to traffic signals, it is recommended that the developer design and construct a single lane roundabout at this intersection. As an improvement that is already planned as part of a DelDOT project that was generated in part by the TID, the developer would be credited for design and construction of this improvement from their TID fee. Should the developer's total design and construction costs for all required off-site improvements that were identified in the TID exceed the applicant's TID fee, the Department will issue a credit to the developer.

11. Plantation Road / Shady Road (See Recommendation 15 & Table 14, Page 53)

This signalized intersection experiences LOS deficiencies during the PM and Saturday peaks in Case 1, Case 4, and Case 5. In Case 4 during the Saturday peak, the intersection is expected to operate at LOS F with 168 seconds of delay. With the addition of Joseph's Farm site trips in Case 5, the intersection is expected to operate at LOS F with 332 seconds of delay. The Henlopen TID proposes additional turn lanes on Shady Road and a second through lane along Plantation Road in both directions. With these improvements the intersection is expected to operate at LOS C or better in all three peak periods in Case 2 and Case 3. As such, the developer should pay the Henlopen TID fee due to the LOS deficiency at this intersection.

12. Postal Lane / Melson Road / SR 1 (See Table 14, Page 54)

This signalized intersection experiences LOS deficiencies during the Saturday peak in Cases 1, 2, and 3. In Case 2 during the Saturday peak the intersection is expected to operate at LOS F with

134 seconds of delay. In Case 3 during the Saturday peak, the intersection is expected to operate at LOS F with 150 seconds of delay. This intersection is outside the Henlopen TID boundary.

13. SR 1 / Bay Crossing Boulevard (See Table 15, Page 55)

This unsignalized intersection experiences LOS deficiencies during all three peaks in Cases 1, 2, and 3. In Case 2 during the PM peak, the southbound left turn is expected to operate at LOS F with 420 seconds of delay. In Case 3 during the PM peak, the southbound left turn is expected to operate at LOS F with 536 seconds of delay. This intersection is outside the Henlopen TID boundary.

14. SR 1 / Kings Highway (See Table 16, Page 56)

This unsignalized intersection experiences LOS deficiencies during the PM and Saturday peaks in Case 3. In Case 3 during the PM peak, the stop-controlled westbound Kings Highway approach is expected to operate at LOS E with 50 seconds of delay. This intersection is outside the Henlopen TID boundary.

15. Mulberry Knoll Road / SR 24 (See Recommendations 9, 10, and 11 & Table 18, Page 57)

This signalized intersection experiences LOS deficiencies during the Saturday peak in Case 3, for which the intersection is expected to operate at LOS F with 94 seconds of delay. On the southbound approach in this case, southbound left queues are expected to be nearly 1,130 feet long. The *SR 24, Love Creek to Mulberry Knoll* (State Contract No. T201212201) project will add a second through lane and right-turn lanes along Delaware Route 24 and add dedicated left-turn lanes on both Mulberry Knoll Road approaches. Additionally, the Henlopen TID proposes dedicated right-turn lanes on both Mulberry Knoll Road approaches, so Cases 2 and 3 are modeled with this configuration. Furthermore, with the addition of a second southbound left-turn lane, the intersection is expected to operate at LOS D or better during all three peaks in Cases 3 and 5, with Saturday queues on the southbound approach reduced to 500 feet long. As such, it is recommended that the developer design and construct a second southbound left-turn lane on Mulberry Knoll Road approaching Delaware Route 24.

17. SR 24 / Spencer Lane / Williams Way (See Table 20, Page 59)

This unsignalized intersection experiences LOS deficiencies during the AM, PM, and Saturday peak periods in all three cases except Case 1 AM. In Case 2 during the PM peak, the southbound approach is expected to operate at LOS F with 295 seconds of delay. In Case 3 during the PM peak, the southbound approach is expected to operate at LOS F with 487 seconds of delay. The Henlopen TID proposes to widen Delaware Route 24 to include two through lanes in each direction at this intersection so Cases 2 and 3 are modeled with this configuration. It should be noted that the delay is only experienced on the minor street approaches, which are private roads.

18. SR 24 / Camp Arrowhead Road (See Recommendation 15 & Table 21, Page 60)

This signalized intersection experiences LOS deficiencies during the PM and Saturday peaks in Case 4 and during the AM, PM, and Saturday peaks in Case 5. In Case 5 during the Saturday peak, the intersection is expected to operate at LOS F with 165 seconds of delay. The Henlopen TID proposes to add a second through lane in each direction on Delaware Route 24 through this intersection. In Case 3 with the TID improvements, the intersection is expected to operate at LOS

D during the PM and Saturday peaks and at LOS B during the AM peak. As such, the developer should pay the Henlopen TID fee due to the LOS deficiency at this intersection.

19. SR 24 / Jolyns Way (See Recommendation 15 & Table 22, Page 61)

This unsignalized intersection experiences LOS deficiencies during the PM and Saturday peaks in Case 4 and during the AM, PM, and Saturday peaks in Case 5. In Case 5 during the Saturday peak, the northbound stop-controlled approach is expected to operate at LOS F with 125 seconds of delay. The Henlopen TID proposes to signalize this intersection with one left-turn lane, two through lanes, and one right-turn lane on both Delaware Route 24 approaches. The northbound Jolyns Way approach would have a shared left-turn/through lane and one right turn. In Case 3 with the TID improvements and signalization, the intersection is expected to operate at LOS A during all three peaks. As such, the developer should pay the Henlopen TID fee due to the LOS deficiency at this intersection.

21. SR 24 / Plantation Road / Warrington Road (See Recommendations 15 and 11 & Table 24, Page 63)

This signalized intersection experiences LOS deficiencies during the PM and Saturday peaks in Case 5. In Case 5 during the Saturday peak, the intersection is expected to operate at LOS E with 68 seconds of delay. The Henlopen TID proposes to reconfigure the minor street approaches to include two left-turn lanes, two through lanes, and one right-turn lane on both Warrington Road and Plantation Road approaches. In Case 3 with the TID improvements, the intersection is expected to operate at LOS C in the AM peak and LOS D in the PM and Saturday peaks. In Case 5, if the TID proposed improvements were constructed, the intersection would operate at LOS E with 70 seconds of delay. As such, the developer should pay the Henlopen TID fee due to the LOS deficiency at this intersection.

22. Warrington Road / Old Landing Road (See Recommendation 15 & Table 25, Page 64)

This unsignalized intersection experiences LOS deficiencies during the AM and Saturday peaks in Case 1. In Case 1 during the Saturday peak, the southbound Warrington Road approach is expected to operate at LOS F with 94 seconds of delay. The Henlopen TID and the *Old Landing Road and Warrington Road Intersection Improvement* (State Contract No. T202204306) project propose to install a roundabout at this intersection. With the roundabout, there is no longer an LOS deficiency at this intersection. The project is not expected to be complete in Case 4 or 5 (2028). In these cases, the intersection is expected to operate with an LOS deficiency during all three peak periods. In Case 5 during the Saturday peak, the southbound Warrington Road approach is expected to operate at LOS F with 299 seconds of delay. As such, the developer should pay the Henlopen TID fee due to the LOS deficiency at this intersection.

23. Airport Road / Old Landing Road (See Recommendation 15 & Table 26, Page 65)

This unsignalized intersection experiences LOS deficiencies during the PM and Saturday peaks in Case 4 and Case 5. In Case 5 during the Saturday peak, the northbound Airport Road approach is expected to operate at LOS F with 292 seconds of delay. The Henlopen TID and the *Airport Road Extension, Old Landing Road to SR 24* (State Contract No. T202204307) project propose to signalize the intersection and the extension of Airport Road to SR 24. With these improvements,

there is no longer an LOS deficiency at this intersection. As such, the developer should pay the Henlopen TID fee due to the LOS deficiency at this intersection.

26. SR 1 / SR 24 (See Table 29, Page 68)
This signalized intersection experiences LOS deficiencies during the Saturday peak in Cases 1, 2, and 3. In Case 2 during the Saturday peak, the intersection is expected to operate at LOS F with 147 seconds of delay. In Case 3 during the Saturday peak, the intersection is expected to operate at LOS F with 16 seconds of delay. This intersection is outside the Henlopen TID boundary.

27. SR 1 / Midway Outlet (See Table 30, Page 69)
This signalized intersection experiences LOS deficiencies during the Saturday peak in Cases 1, 2, and 3. In Case 2 during the Saturday peak, the intersection is expected to operate at LOS F with 107 seconds of delay. In Case 3 during the Saturday peak, the intersection is expected to operate at LOS F with 111 seconds of delay. This intersection is outside the Henlopen TID boundary.

28. SR1 / Wolfe Neck Road (See Table 31, Page 70)
This unsignalized intersection experiences LOS deficiencies during all three peaks in Cases 1, 2, and 3. In Case 2 during the PM peak, the stop-controlled westbound approach is expected to operate at LOS F with 420 seconds of delay. In Case 3 during the PM peak, the westbound approach is expected to operate at LOS F with 536 seconds of delay. This intersection is outside the Henlopen TID boundary.

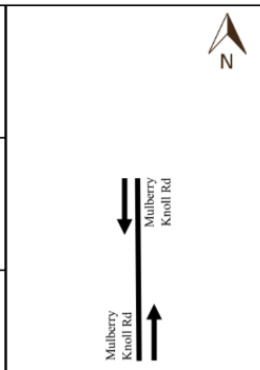
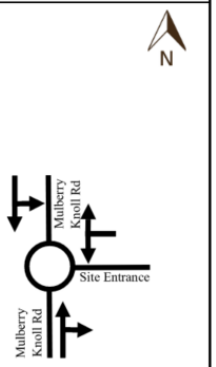
Development Improvements

Should Sussex County approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan by note or illustration, unless a Design Deviation is requested and approved by the Department. 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. The following items should be implemented at the same time as site construction once all agency approvals and permits are secured and completed in accordance with DelDOT's Standards and Specifications.

1. The developer shall improve the State-maintained Roads on which they front (Delaware Route 24 and Mulberry Knoll Road), within the limits of their frontage. 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" means the length along the state right-of-way of a single property tract where an entrance is proposed or required. If a single property tract has frontage along multiple roadways, any segment of roadway including an entrance shall be improved to meet DelDOT's Functional Classification criteria as found in Section 1.1 of the Development Coordination Manual and elsewhere therein, and/or improvements established in the Traffic Operational Analysis and/or Traffic Impact Study. "Secondary Frontage" means the length along the state right-of-way of a single property tract where no entrance is proposed or required. The segment of roadway may be upgraded by improving the pavement condition of the existing roadway width. The Pavement Management Section

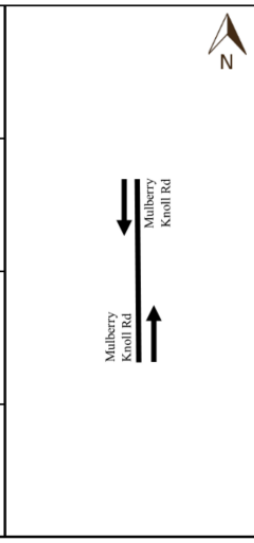
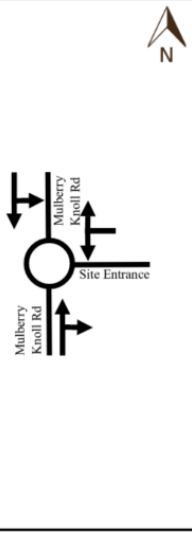
and Subdivision Section will determine the requirements to improve the pavement condition.

2. The developer should construct the roundabout Site Entrance 1A on Mulberry Knoll Road. The proposed configuration is shown in the table below.

Approach	Current Configuration		Approach	Proposed Configuration	
Eastbound	Approach does not exist.		Eastbound	Approach does not exist.	
Westbound	Approach does not exist.		Westbound Site Entrance	Single lane approach to roundabout	
Northbound Mulberry Knoll Rd	One through lane.		Northbound Mulberry Knoll Rd	Single lane approach to roundabout	
Southbound Mulberry Knoll Rd	One through lane.		Southbound Mulberry Knoll Rd	Single lane approach to roundabout	

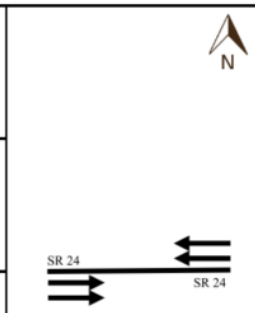
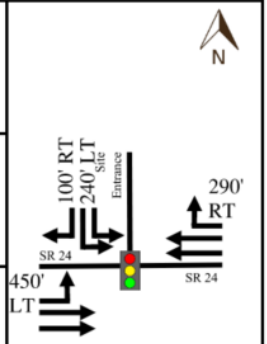
At the proposed Site Entrance 1A intersection, the developer should design and construct a single lane roundabout. The developer should coordinate with DelDOT's Development Coordination Section to determine other design details during the site plan review.

3. The developer should construct the roundabout Site Entrance 2 on Mulberry Knoll Road. The proposed configuration is shown in the table below.

Approach	Current Configuration		Approach	Proposed Configuration	
Eastbound	Approach does not exist.		Eastbound	Approach does not exist.	
Westbound	Approach does not exist.		Westbound Site Entrance	Single lane approach to roundabout	
Northbound Mulberry Knoll Rd	One through lane.		Northbound Mulberry Knoll Rd	Single lane approach to roundabout	
Southbound Mulberry Knoll Rd	One through lane.		Southbound Mulberry Knoll Rd	Single lane approach to roundabout	

At the proposed Site Entrance 2 intersection, the developer should design and construct a single lane roundabout. The developer should coordinate with DelDOT's Development Coordination Section to determine other design details during the site plan review.

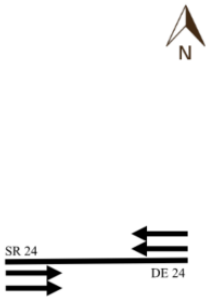
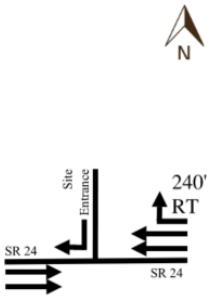
4. The developer should construct the full-movement Site Entrance 3A on Delaware Route 24. The proposed configuration is shown in the table below.

Approach	Current Configuration		Approach	Proposed Configuration	
Eastbound SR 24	Two through lanes.		Eastbound SR 24	One left turn lane and two through lanes.	
Westbound SR 24	Two through lanes.		Westbound SR 24	Two through lanes and one right turn lane.	
Northbound	Approach does not exist.		Northbound	Approach does not exist.	
Southbound	Approach does not exist.		Southbound Site Entrance	Two left turn lanes and one right turn lane.	

At the proposed Site Entrance 3A intersection, a westbound right-turn lane is warranted on Delaware Route 24 based on DelDOT's Auxiliary Lane Worksheet, Figure 5.2.9.1-b. Initial recommended minimum turn lane length (excluding taper) is a 290-foot right-turn lane on westbound Delaware Route 24. The eastbound left-turn lane should be designed to accommodate the 95th percentile queues. Initial recommended minimum turn lane length (excluding taper) is a 450-foot left-turn lane on eastbound Delaware Route 24. Dual 240-foot southbound left-turn lanes and a 100-foot southbound right-turn lane are recommended on the site entrance approach to accommodate the 95th percentile queues. The developer should coordinate with DelDOT's Development Coordination Section to determine final turn lane lengths and other design details during the site plan review.

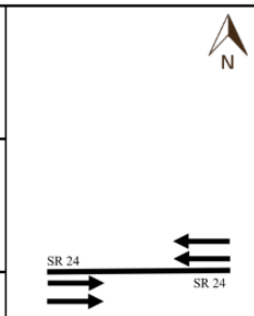
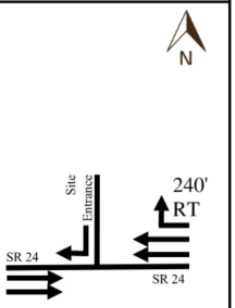
5. The developer should enter into a traffic signal agreement to design and construct a traffic signal with pedestrian crossings at the intersection of Site Entrance 3A at Delaware Route 24. Bowman completed a TSJS for this intersection and it has been reviewed by DelDOT. Intersection geometry and minimum recommended turn lane lengths are presented in Recommendation 4 above. At the signalized intersection the developer should also construct signalized pedestrian crossings on the western leg of Delaware Route 24 and the northern leg (Site Entrance 3A), along with channelized right turns for each right turn lane. The developer should coordinate with DelDOT's Development Coordination Section to determine final turn lane lengths and other design details during the site plan review.

6. The developer should construct the right-in/right-out Site Entrance 3B on Delaware Route 24. The proposed configuration is shown in the table below.

Approach	Current Configuration		Approach	Proposed Configuration	
Eastbound SR 24	Two through lanes.		Eastbound SR 24	Two through lanes.	
Westbound SR 24	Two through lanes.		Westbound SR 24	Two through lanes and one right turn lane.	
Northbound	Approach does not exist.		Northbound	Approach does not exist.	
Southbound	Approach does not exist.		Southbound Site Entrance	One right turn lane. Stop or yield control.	

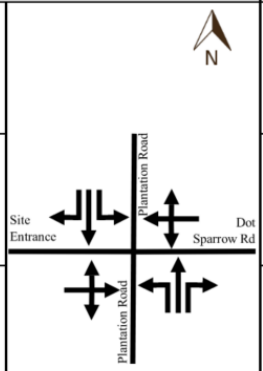
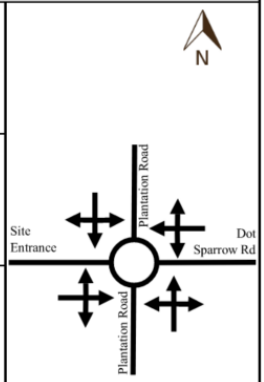
At the proposed Site Entrance 3B intersection, a westbound right-turn lane is warranted on Delaware Route 24 based on DelDOT's Auxiliary Lane Worksheet. Initial recommended minimum turn lane length (excluding taper) is a 240-foot right-turn lane on westbound Delaware Route 24. The developer should add regulatory signs and physical barriers to prevent left turns in and out of this access. The developer should coordinate with DelDOT's Development Coordination Section to determine final turn lane lengths and other design details during the site plan review.

7. The developer should construct the right-in/right-out Site Entrance 3C on Delaware Route 24. The proposed configuration is shown in the table below.

Approach	Current Configuration		Approach	Proposed Configuration	
Eastbound SR 24	Two through lanes.		Eastbound SR 24	Two through lanes.	
Westbound SR 24	Two through lanes.		Westbound SR 24	Two through lanes and one right turn lane.	
Northbound	Approach does not exist.		Northbound	Approach does not exist.	
Southbound	Approach does not exist.		Southbound Site Entrance	One right turn lane. Stop or yield control.	

At the proposed Site Entrance 3C intersection, a westbound right-turn lane is warranted on Delaware Route 24 based on DelDOT's Auxiliary Lane Worksheet. Initial recommended minimum turn lane length (excluding taper) is a 240-foot right-turn lane on westbound Delaware Route 24. The developer should add regulatory signs and physical barriers to prevent left turns in and out of this access. The developer should coordinate with DelDOT's Development Coordination Section to determine final turn lane lengths and other design details during the site plan review.

8. The developer should improve the existing intersection of Plantation Road at Dot Sparrow Road, also referred to as Site Entrance 4 via cross-access easement. The proposed configuration is shown in the table below.

Approach	Current Configuration		Approach	Proposed Configuration	
Eastbound Site Entrance	One shared left turn/through/ right turn lane.		Eastbound Site Entrance	Single lane approach to roundabout	
Westbound Dot Sparrow Rd	One shared left turn/through/ right turn lane.		Westbound Dot Sparrow Rd	Single lane approach to roundabout	
Northbound Plantation Rd	One left turn lane, one through lane, and one right turn lane.		Northbound Plantation Rd	Single lane approach to roundabout	
Southbound Plantation Rd	One left turn lane, one through lane, and one right turn lane.		Southbound Plantation Rd	Single lane approach to roundabout	

At the proposed Site Entrance 4 via cross-access easement intersection, the developer should design and construct a single lane roundabout. The developer should coordinate with DelDOT's Development Coordination Section to determine other design details during the site plan review.

9. The developer should enter into a traffic signal agreement to design and construct improvements at the intersection of Delaware Route 24 at Mulberry Knoll Road that include and are in addition to the improvements proposed by the Henlopen TID. The developer improvements should include a second left turn lane on southbound Mulberry Knoll Road and two new signalized pedestrian crossings. One crossing should be on the northern Mulberry Knoll Road leg and one crossing should be on the eastern Delaware Route 24 leg. The signalized pedestrian crossing, and associated ADA compliant curb ramps, should connect to the shared-use path along the proposed site frontages along Delaware Route 24, Mulberry Knoll Road, and the existing sidewalks along the north side of Delaware Route 24 west of Mulberry Knoll Road. The dual southbound left-turn lanes should be designed to accommodate the 95th percentile queues. Initial recommended minimum turn lane lengths (excluding taper) are 450-feet each. However, the length should be maximized with consideration of the roundabout at Site Entrance 1A. These recommended improvements are in addition to the improvements included in the Henlopen TID concept. The developer's TID fee covers the improvements specifically included in the TID concept, such as the proposed northbound and southbound right-turn lanes at this intersection, but it does not cover additional recommended improvements that were not

part of the TID concept. The developer is expected to design and construct improvements that mitigate LOS deficiencies and queuing concerns caused by the development that are not mitigated by the TID concept by adding the second southbound left-turn lane. The developer should coordinate with DelDOT's Development Coordination Section to determine final design details during the site plan review.

10. The developer should design and construct a raised median along Mulberry Knoll Road between Delaware Route 24 and Site Entrance 2 where necessary based on intersection turn lanes and the site entrance roundabout design. The median design should consider maintaining full-movement access to existing driveways on the western side of Mulberry Knoll Road where reasonable. The developer should coordinate with DelDOT's Development Coordination Section to determine final design details during the site plan review.

11. The developer should design and construct decorative fencing along the Delaware Route 24 property frontage to direct pedestrians towards the signalized pedestrian crossings. The fence should be at least four feet tall and located outside of the clear zone. The developer should coordinate with DelDOT's Development Coordination Section to determine final design details during the site plan review.

12. The developer should design and construct a single lane roundabout at the intersection of Mulberry Knoll Road / Cedar Grove Road, as proposed by the Henlopen TID. The roundabout should be designed to accommodate the future Mulberry Knoll Road Extension as a future fourth leg. The developer should coordinate with DelDOT's Development Coordination Section to determine final design details during the site plan review. As a TID improvement, the developer would be credited for design and construction of this improvement from their TID fee. Should the developer's total design and construction costs for all required off-site improvements that were identified in the TID exceed the applicant's TID fee, the Department will issue a credit to the developer.

13. The developer should prepare and submit to DelDOT a Traffic Signal Justification Study (TSJS) for the intersection of Robinsonville Road and Kendale Road. The study shall include evaluation of other forms of intersection control, including but not necessarily limited to a single-lane roundabout and all-way stop-control. The study will be reviewed by DelDOT and used to help determine the appropriate mitigation at this intersection and the developer's responsibility toward that. Should a traffic signal be confirmed to be warranted, the developer will not be required to construct the traffic signal as the TID fee paid by the developer funds the future improvements at the intersection. As a TID improvement, the developer would be credited for the TSJS preparation cost from their TID fee.

14. The developer should design and construct a single lane roundabout with a southbound bypass lane at the intersection of Plantation Road and Robinsonville Road, as proposed by the *Plantation Road Improvements, SR 24 to Robinsonville Road (Phase 2) (State Contract*

No. T202011201) project. The developer should coordinate with DelDOT's Development Coordination Section to determine final design details during the site plan review. As an improvement that is already planned as part of a DelDOT project that was generated in part by the TID, the developer would be credited for design and construction of this improvement from their TID fee. Should the developer's total design and construction costs for all required off-site improvements that were identified in the TID exceed the applicant's TID fee, the Department will issue a credit to the developer.

15. The developer shall pay the Henlopen TID fee. The developer should coordinate with DelDOT regarding the TID fee amount and payment terms. Should the cost of off-site improvements that were identified in the TID, as recommended herein, exceed the development's total TID fee, then the developer will either (1) not be required to construct improvements beyond the TID fee or (2) be refunded the difference between developer's cost to construct the off-site improvements and the development's TID fee. This will be established during the record and entrance plan approval process.

16. The following bicycle and pedestrian improvements should be included:

    a. Per the DelDOT Development Coordination Manual section 5.2.9.2, bicycle lanes are required where right-turn lanes are being installed.

    b. Appropriate bicycle symbols, directional arrows, pavement markings, and signing should be included along bicycle facilities and turn lanes within the project limits.

    c. Utility covers should be made flush with the pavement.

    d. A minimum 15-foot-wide permanent easement from the edge of the final determined right-of-way should be dedicated to DelDOT within the site frontages along Delaware Route 24 and Mulberry Knoll Road. Along the frontages, a minimum of a 10-foot wide shared-use path should be constructed. The shared-use path should meet AASHTO and ADA standards and should have a minimum of a five-foot buffer from the roadway. At the property boundaries, the shared-use path should connect to the adjacent property or to the shoulder in accordance with DelDOT's Development Coordination Manual. The developer shall coordinate with DelDOT's Development Coordination Section through the plan review process to determine the details of the shared-use path design and connections/terminations at or before the boundaries of the property.

    e. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.

    f. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the development. These sidewalks should each be a minimum of five-feet wide (with a minimum of a five-foot buffer from the roadway) and should meet current AASHTO and ADA standards.

Internal sidewalks in the development should connect to the proposed shared-use path along the site frontages.

g. Construct two new Type 2 (5'x8') bus stop pads on Delaware Route 24, just east of Mulberry Knoll Road, with one pad on either side of Delaware Route 24. Bus stop pads should connect to shared use paths and sidewalks. Location, size, and type of bus pad will be determined through coordination with the Delaware Transit Corporation (DTC).

h. Construct two new Type 2 (17'x8') bus stop pads on Delaware Route 24, adjacent to proposed Site Entrance 3A, with one pad on either side of Delaware Route 24. Bus stop pads should connect to shared use paths and sidewalks. Location, size, and type of bus pad will be determined through coordination with the Delaware Transit Corporation (DTC).

Improvements in this TIS may be considered "significant" under DelDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT's website at http://deldot.gov/Publications/manuals/de_mutcd/index.shtml.

Please note that this review generally focuses on capacity and level of service issues; additional safety and operational issues will be further addressed through DelDOT's site plan review process.

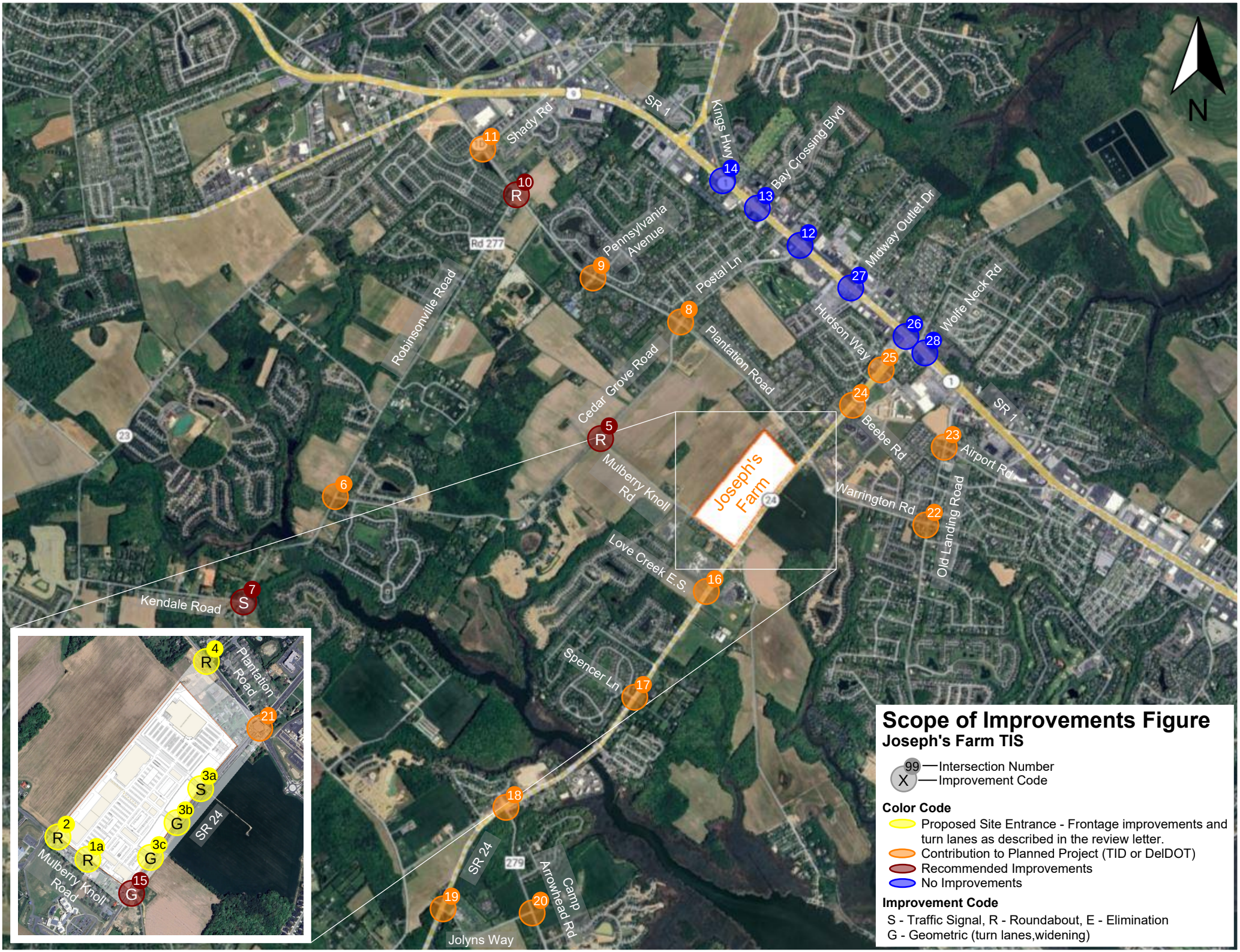
Additional details on our review of this TIS are attached. Please contact me at (610) 640-3500 or through e-mail at ajparker@mccormicktaylor.com if you have any questions concerning this review.

Sincerely,

McCormick Taylor, Inc.

Andrew J. Parker, PE, PTOE
Project Manager

Enclosure


N
SR 1
Kings Hwy
Bay Crossing Blvd
Midway Outlet Dr
Wolfe Neck Rd
Shady Rd
Rd 277
Pennsylvania Avenue
Postal Ln
Robinsonville Road
Plantation Road
Hudson Way
Cedar Grove Road
Mulberry Knoll Rd
Beebe Rd
Airport Rd
Warrington Rd
Old Landing Road
Joseph's Farm
Love Creek E.S.
Kendale Road
Spencer Ln
SR 24
279
Camp Arrowhead Rd
Jolyns Way
Plantation Road
SR 24
Mulberry Knoll Road
Scope of Improvements Figure
Joseph's Farm TIS
99 — Intersection Number
X — Improvement Code
Color Code
Proposed Site Entrance - Frontage improvements and turn lanes as described in the review letter.
Contribution to Planned Project (TID or DelDOT)
Recommended Improvements
No Improvements
Improvement Code
S - Traffic Signal, R - Roundabout, E - Elimination
G - Geometric (turn lanes,widening)

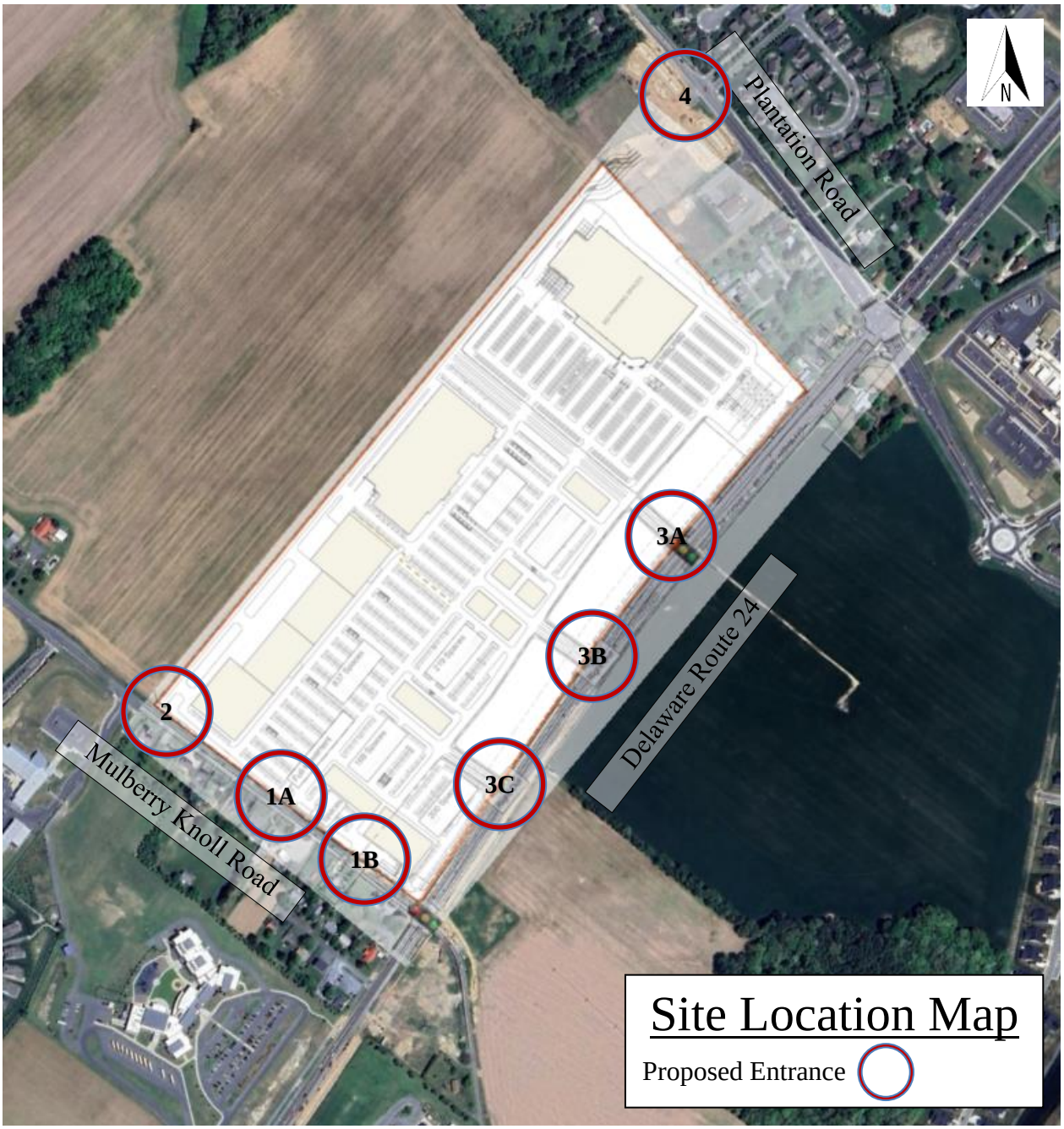
General Information

Report date: May 15, 2024. Revised August 26, 2024.
Prepared by: Bowman Consulting Group, Ltd.
Prepared for: Southside Investment Partners, LLC
Tax parcel: 334-12.00-46 and 334-12.00-47
Generally consistent with DelDOT's Development Coordination Manual: Yes

Project Description and Background

Description: The proposed Joseph's Farm development consists of 520,000 sq ft of general retail space and a 175,000 sq ft discount club with gas station.
Location: The site is located along the north side of John J Williams Highway (Delaware Route 24) between Mulberry Knoll Road (Sussex Road 284) and Plantation Road (Sussex Road 275), in Sussex County, Delaware. A site location map is included on page 23.
Amount of land to be developed: an approximately 75-acre assemblage of parcels.
Land use approval(s) needed: The subject land is currently zoned AR-1 (Agricultural Residential), and the developer proposes to rezone the land to C-4 (Planned Commercial).
Proposed completion year: 2028
Proposed access locations: Access to the site is proposed to be provided along Delaware Route 24 via one full-movement signalized entrance and two right-in/right-out entrances, Mulberry Knoll Road via one full-movement entrance, one right-in/right-out entrance, one truck right-in entrance, and one entrance to Plantation Road via shared access with an adjacent land development. The access configuration and traffic control vary from what is proposed in the TIS.
Average Daily Traffic Volumes (per DelDOT Traffic Summary 2023):

- Delaware Route 24: 15,461 vehicles/day
- Mulberry Knoll Road: 2,148 vehicles/day


4
Plantation Road
N
3A
3B
Delaware Route 24
2
Mulberry Knoll Road
1A
1B
3C
Site Location Map
Proposed Entrance

2020 Delaware Strategies for State Policies and Spending

Location with respect to the Strategies for State Policies and Spending Map of Delaware:
The proposed Joseph's Farm development is located within Investment Level 2.

Investment Level 2
This investment level has many diverse characteristics. 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. These areas have been shown to be the most active portion of Delaware's developed landscape. They serve as transition areas between Level 1 and the more open, less populated areas. They generally contain a limited variety of housing types, predominantly detached single-family dwellings.

In Investment Level 2, 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 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, and provides essential open spaces and recreational facilities, other public facilities, and services to promote a sense of community. Investment Level 2 areas are prime locations for designating "pre-permitted areas."

Proposed Development's Compatibility with Strategies for State Policies and Spending:
The proposed Joseph's Farm development falls within Investment Level 2 and is to be developed as 520,000 sq ft of general retail space and a 175,000 sq ft discount club with gas station. The proposed development is consistent with the character of Investment Level 2. It is therefore concluded that the proposed development appears to generally comply with the policies stated in the 2020 "Strategies for State Policies and Spending."

Comprehensive Plan

Sussex County Comprehensive Plan:
(Source: Sussex County Comprehensive Plan, March 2019)

The Sussex County Comprehensive Plan Future Land Use Map indicates that the proposed Joseph's Farm site is planned for "Commercial" land use. It would appear that the proposed Joseph's Farm development generally fits within the intended land use for this location.

Proposed Development's Compatibility with Comprehensive Plan:
The proposed development appears to comply with the Sussex County Comprehensive Plan. The Joseph's Farm development is proposed on land that is planned for Commercial use. The land is currently zoned AR-1 (Agricultural Residential), and the developer proposes to rezone the land to C-4 (Planned Commercial). The proposed development generally aligns with both the Future Land Use Map and the proposed zoning.

Relevant Projects in the DelDOT Capital Transportation Program

Currently, DelDOT has several relevant and ongoing projects within the area of study.

The *SR 24, Love Creek to Mulberry Knoll* (State Contract No. T201212201) project will improve safety and increase capacity on Delaware Route 24 from Love Creek to Mulberry Knoll Road. Dual lanes along Delaware Route 24 will extend from Delaware Route 1 to west of the school entrances located west of Mulberry Knoll Road. The dualized portion of the project will include a 12-foot center-left-turn lane along with two 11-foot travel lanes in each direction, an 8-foot shoulder eastbound and a 5-foot shoulder/bike lane westbound. Improvements at the intersection of Delaware Route 24 and Mulberry Knoll Road will include signalization, changing the Delaware Route 24 approaches so they each have one left-turn lane, two through lanes, and one right-turn lane, along with widening the Mulberry Knoll Road approaches so they each have one left-turn lane and one shared through/right turn lane. Construction is expected to be completed in 2024. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201212201.

The *Plantation Road Improvements, Robinsonville Road to US 9 (Phase 1)* (State Contract No. T202011201) project proposes a multi-lane roundabout at the intersection of Plantation Road / Belltown Road / Delaware Route 23 and an additional southbound through lane on Plantation Road. Bicycle and pedestrian facilities will be upgraded throughout the corridor. Construction is expected to be complete in 2024. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T202011201.

The *Plantation Road Improvements, SR 24 to Robinsonville Road (Phase 2)* (State Contract No. T202011201) project consists of operational improvements including turn lanes and other intersection modifications, median turn lanes for residential entrances, and bicycle and pedestrian facilities throughout the corridor. Phase 2 of this project begins near the intersection of Plantation Road and Shady Road / Salt Marsh Boulevard and ends north of the intersection of Plantation Road and Delaware Route 24. A single lane roundabout with a southbound bypass lane is proposed at the intersection of Plantation Road and Robinsonville Road. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201911201.

The *Airport Road Extension, Old Landing Road to SR 24* (State Contract No. T202204307) project includes intersection improvements and extension of Airport Road to Delaware Route 24 to provide additional connectivity through a crowded segment and an additional north / south route from Delaware Route 24. The project is currently in the Preliminary Engineering phase and is expected to reach completion at some point during 2028. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T202204307.

The *Old Landing Road and Warrington Road Intersection Improvement* (State Contract No. T202204306) project proposes a roundabout to be installed at the subject intersection. The project is currently in the Design and Planning phase and is on hold until the Airport Road Extension is operational. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis. More information is available at the following link:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T202204306.

The *Shady Road from Plantation Road to SR 1 Improvements* project proposes roadway improvements including turn lanes, sidewalk, and shoulders. The project is programmed for Preliminary Engineering in FY 2028. As of July 2024, a contract number has not been assigned to this project. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis.

The *Mulberry Knoll Road Extension from Cedar Grove Road to US 9 at Old Vine* Road project proposes a new two-lane roadway extending from Mulberry Knoll Road to US Route 9. It is programmed for Preliminary Engineering in FY 2028. As of July 2024, a contract number has not been assigned to this project. This project was assumed to not be complete in the 2028 analysis, but was included in the 2045 analysis.

The proposed development is located within the boundary of the operational Henlopen Transportation Improvement District (TID). The TID is a planning concept that seeks to proactively align transportation infrastructure spending and improvements with land use projections and future development within the designated district. The intersections in the study area of the proposed development are within the TID boundary.

Although the proposed development is within the Henlopen TID, the proposed plan for the development is inconsistent with the Land Use and Transportation Plan (LUTP) that was developed for the TID. For developments that are consistent with the LUTP, the developer is required to pay a fee in lieu of performing a TIS. However, as the proposed development is inconsistent with the LUTP, a TIS was required to determine if the TID improvements are still adequate given the additional trips associated with this development. The TID buildout year is 2045 and the minimum acceptable LOS is LOS D.

Trip Generation

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

- 520,000 sq ft General Retail Space (ITE Land Use Code 820)
- 175,000 sq ft Discount Club with Gas (ITE Land Use Code 857)

Table 1
Peak Hour Trip Generation

ITE Land Use Code	Trip Type	Daily	Weekday AM Peak Hour			Weekday PM Peak Hour			Saturday Peak Hour		
			In	Out	Total	In	Out	Total	In	Out	Total
820	Gross	19,441	273	167	440	888	962	1,850	1,211	1,117	2,328
	Pass-by	-352	-0	-0	-0	-169	-183	-352	-230	-212	-442
857	Gross	7,431	85	55	140	367	366	733	546	569	1,115
	Pass-by	-249	-0	-0	-0	-125	-124	-249	-137	-142	-279
Total Trips		**26,271**	**358**	**222**	**580**	**961**	**1,021**	**1,982**	**1,390**	**1,332**	**2,722**

Overview of TIS

Intersections examined:

1a) Site Entrance 1A / Mulberry Knoll Road (Sussex Road 284) *
1b) Site Entrance 1B (Truck Entrance) / Mulberry Knoll Road
2) Site Entrance 2 / Mulberry Knoll Road *
3a) Site Entrance 3A / Delaware Route 24 (John J. Williams Highway – Sussex Road 24) *
3b) Site Entrance 3B (East RI/RO) / Delaware Route 24 *
3c) Site Entrance 3C (West RI/RO) / Delaware Route 24 *
4) Site Entrance 4 / Dot Sparrow Road / Plantation Road *
5) Mulberry Knoll Road / Cedar Grove Road (Sussex Road 283) *
6) Cedar Grove Road / Robinsonville Road (Sussex Road 277) *
7) Robinsonville Road / Kendale Road (Sussex Road 287) *
8) Cedar Grove Road / Plantation Road (Sussex Road 275) / Postal Lane (Sussex Road 283)*
9) Plantation Road / Pennsylvania Avenue / Plantations Boulevard
10) Plantation Road / Robinsonville Road *
11) Plantation Road / Shady Road (Sussex Road 276) *
12) Postal Lane / Melson Road / Delaware Route 1 (Coastal Highway)
13) Delaware Route 1 / Bay Crossing Boulevard
14) Delaware Route 1 / Kings Highway (Sussex Road 268)
15) Mulberry Knoll Road / Delaware Route 24 *
16) Delaware Route 24 / Love Creek Elementary School / Beacon Middle School
17) Delaware Route 24 / Spencer Lane / Williams Way
18) Delaware Route 24 / Camp Arrowhead Road (Sussex Road 279) *
19) Delaware Route 24 / Jolyns Way (Sussex Road 289) *
20) Camp Arrowhead Road / Jolyns Way *
21) Delaware Route 24 / Plantation Road / Warrington Road (Sussex Road 275) *
22) Warrington Road / Strawberry Way / Old Landing Road (Sussex Road 274) *
23) Old Landing Road / Airport Road (Sussex Road 275A) *
24) Delaware Route 24 / Beebe Road (Lexus Lane)
25) Delaware Route 24 / Hudson Way (Walmart)
26) Delaware Route 24 / Delaware Route 1
27) Delaware Route 1 / Midway Outlet Drive
28) Delaware Route 1 / Wolfe Neck Road (Sussex Road 270)

Note: Intersections with an asterisk (*) were included in the 2028 analysis.

Conditions examined:

1) 2023 Existing (Case 1)
2) 2045 without development (Case 2)
3) 2045 with development (Case 3)
4) 2028 without development (Case 4)
5) 2028 with development (Case 5)

Peak hours evaluated: Weekday morning, evening, and summer Saturday peak hours

Committed developments considered:

1) Belle Terre (269 single-family detached homes)
2) Arbor-Lyn (142 single-family detached houses)
3) Plantations Square (29,740 square-foot shopping center)
4) V&M, LLC (5,000 square-foot super convenience store with gas pumps and a 12,000 square-foot office)
5) Beebe Health Care (100-employee hospital)
6) Seaglass f.k.a. Herola Property (216 apartment units)
7) Osprey Point (217 single-family detached houses)
8) Delaware State Police Toop 7 (25,270 square-foot administrative facility and 10,115 square-foot maintenance facility)
9) Welshes Pond f.k.a. Fieldstone (247 single-family detached houses)
10) Wellesley (132 single-family detached houses)
11) Centre at Love Creek f.k.a. Pelican Landing (84,576 square-foot shopping center)
12) Rehoboth Point Yacht Club f.k.a. Love Creek Marina (180 apartment units, 5,000 square-foot quality restaurant, and 500 square-foot retail facility)
13) Henlopen Meadows f.k.a. Windswept at Lewes (201 single-family detached homes and 178 townhouses)
14) Marsh Island (139 single-family detached houses)
15) Acadia Landing f.k.a. Insight at Lewis Point (238 single-family detached homes)
16) Chase Oaks f.k.a. Charter Oak (249 single-family detached houses)
17) Brentwood f.k.a. Coral Lakes (198 single-family detached houses)
18) Tanager Woods f.k.a. Street Property (173 single-family detached houses)
19) Middle Creek Preserve (313 single-family detached houses)
20) Hailey's Glen f.k.a. Kielbasa Property (68 single-family detached houses)
21) Beachtree Preserve (155 single-family detached houses)
22) Southern DE Medical Center (32,960 square-foot medical office building)
23) Howeth Property (84 multi-family detached homes)
24) Ocean Meadows (133 single-family detached homes)
25) Cardinal Grove (98 single-family detached homes)
26) Scenic Manor f.k.a. Estates at Mulberry Knoll (328 single-family detached houses)
27) Royal Farms #501 (Convenience market with 16 vehicle fueling positions)
28) Belle Meade (480 multi-family residential units and 125,000 square-foot shopping center)
29) Northstar (689 single-family detached homes, 1,142 multi-family detached homes, super gas station with 20 vehicle fueling positions, 120,000 square-foot medical office building, 200-room business hotel, and 110,000 square-foot shopping center.
30) Anchor's Run (353 single-family homes)

Intersection Descriptions

1a) Site Entrance 1A & Mulberry Knoll Road

Type of Control: Proposed roundabout (three-leg intersection)
Westbound Approach: (Site Entrance 1A) proposed single lane approach to roundabout.
Northbound Approach: (Mulberry Knoll Road) one existing through lane; proposed single lane approach to roundabout.
Southbound Approach: (Mulberry Knoll Road) one existing through lane; proposed single lane approach to roundabout.

1b) Site Entrance 1B & Mulberry Knoll Road

Type of Control: Right-In only (Truck Access)
Westbound Approach: (Site Entrance 1B) proposed one-way access to the site with one lane.
Northbound Approach: (Mulberry Knoll Road) one existing through lane; proposed one shared through/right-turn lane.
Southbound Approach: (Mulberry Knoll Road) one existing through lane; proposed one left-turn lane for Intersection 15 (SR 24 at Mulberry Knoll Road) and one through lane.
Note: Due to this being a one-way entrance in the northbound direction only there is no analysis presented in the following sections of the letter.

2) Site Entrance 2 & Mulberry Knoll Road

Type of Control: Proposed roundabout (three-leg intersection)
Westbound Approach: (Site Entrance 2) proposed single lane approach to roundabout.
Northbound Approach: (Mulberry Knoll Road) one existing through lane; proposed single lane approach to roundabout.
Southbound Approach: (Mulberry Knoll Road) one existing through lane; proposed single lane approach to roundabout.

3a) Site Entrance 3A & Delaware Route 24

Type of Control: Proposed signal (three-leg intersection)
Eastbound Approach: (SR 24) two existing through lanes; proposed one left-turn lane and two through lanes.
Westbound Approach: (SR 24) two existing through lanes; proposed two through lanes and one right-turn lane.
Southbound Approach: (Site Entrance 3A) proposed two left-turn lanes and one right-turn lane.

3b) Site Entrance 3B & Delaware Route 24

Type of Control: Proposed Right-in/Right-Out, stop-controlled
Eastbound Approach: (SR 24) two through lanes.
Westbound Approach: (SR 24) existing two through lanes; proposed two through lanes and one right-turn lane.
Southbound Approach: (Site Entrance 3B) proposed one right-turn lane; stop controlled.

3c) Site Entrance 3C & Delaware Route 24
Type of Control: Proposed Right-in/Right-Out, stop-controlled
Eastbound Approach: (SR 24) two through lanes.
Westbound Approach: (SR 24) existing two through lanes; proposed two through lanes and one right-turn lane.
Southbound Approach: (Site Entrance 3C) proposed one right-turn lane; stop controlled.

4) Site Entrance 4 / Dot Sparrow Drive & Plantation Road
Type of Control: Currently two-way stop control, proposed roundabout
Eastbound Approach: (Site Entrance 4) existing one shared left-through-right lane; proposed single lane approach to roundabout.
Westbound Approach: (Dot Sparrow Drive) one shared left/through/right-turn lane; proposed single lane approach to roundabout.
Northbound Approach: (Plantation Road) one left-turn lane, one through lane, and one right-turn lane; proposed single lane approach to roundabout.
Southbound Approach: (Plantation Road) one left-turn lane, one through lane, and one right-turn lane; proposed single lane approach to roundabout.

5) Cedar Grove Road & Mulberry Knoll Road
Type of Control: Stop-controlled three-leg intersection.
Eastbound Approach: (Cedar Grove Road) one shared through/right-turn lane.
Westbound Approach: (Cedar Grove Road) one shared left-turn/through lane.
Northbound Approach: (Mulberry Knoll Road) stop-controlled; one shared left/right-turn lane.

6) Cedar Grove Road & Robinsonville Road
Type of Control: All-way stop-controlled three-leg intersection.
Eastbound Approach: (Robinsonville Road) stop-controlled; one shared through/right lane.
Westbound Approach: (Robinsonville Road) stop-controlled; one shared left/through lane.
Northbound Approach: (Cedar Grove Road) stop-controlled; one shared left/right-turn lane.

7) Kendale Road & Robinsonville Road
Type of Control: Stop-controlled three-leg intersection.
Eastbound Approach: (Robinsonville Road) one shared left-through lane.
Westbound Approach: (Robinsonville Road) one shared through-right lane.
Southbound Approach: (Kendale Road) stop-controlled; one shared left-right lane.

8) **Cedar Grove Road / Postal Lane & Plantation Road**
Type of Control: Signalized four-leg intersection.
Eastbound Approach: (Cedar Grove Road) one left-turn lane, one through lane, and one right-turn lane.
Westbound Approach: (Postal Lane) one left-turn lane, one through lane, and one right-turn lane.
Northbound Approach: (Plantation Road) one left-turn lane, one through lane, and one right-turn lane.
Southbound Approach: (Plantation Road) one left-turn lane, one through lane, and one right-turn lane.

9) **Pennsylvania Avenue / Plantations Boulevard & Plantation Road**
Type of Control: Stop-controlled four-leg intersection.
Eastbound Approach: (Pennsylvania Avenue) stop-controlled; one shared left-through lane and one right-turn lane.
Westbound Approach: (Plantations Boulevard) stop-controlled; one shared left-through lane and one right-turn lane.
Northbound Approach: (Plantation Road) one shared left-through lane and one right-turn lane.
Southbound Approach: (Plantation Road) one shared left-through lane and one right-turn lane.

10) **Robinsonville Road & Plantation Road**
Type of Control: Stop-controlled three-leg intersection.
Eastbound Approach: (Robinsonville Road) stop-controlled; one shared left-right lane.
Northbound Approach: (Plantation Road) one shared left-through lane.
Southbound Approach: (Plantation Road) one through lane and one right-turn lane.

11) **Shady Road / Salt Marsh Boulevard & Plantation Road**
Type of Control: signalized four-leg intersection.
Eastbound Approach: (Salt Marsh Boulevard) one shared left-through lane and one right-turn lane.
Westbound Approach: (Shady Road) one shared left-through lane and one right-turn lane.
Northbound Approach: (Plantation Road) one left-turn lane, one through lane, and one right-turn lane.
Southbound Approach: (Plantation Road) one left-turn lane, one through lane, and one right-turn lane.

12) **Postal Lane / Melson Road & Delaware Route 1**
Type of Control: Signalized four-leg intersection.
Eastbound Approach: (Postal Lane) two left-turn lanes, one through lane, and one right-turn lane.
Westbound Approach: (Melson Road) two left-turn lanes, one through lane, and one right-turn lane.
Northbound Approach: (SR 1) two left-turn lanes, three through lanes, and one right-turn lane.
Southbound Approach: (SR 1) one left-turn lane, three through lanes, and one right-turn lane.

13) **Bay Crossings Boulevard & Delaware Route 1**
Type of Control: Stop-controlled four-leg intersection.
Eastbound Approach: (Bay Crossing Boulevard) stop-controlled; one right-turn lane.
Westbound Approach: (Bay Crossing Boulevard) stop-controlled; one right-turn lane.
Northbound Approach: (SR 1) one left-turn lane, three through lanes, and one right-turn lane.
Southbound Approach: (SR 1) one left-turn lane, three through lanes, and one right-turn lane.

14) **Kings Highway & Delaware Route 1**
Type of Control: Stop-controlled three-leg intersection.
Westbound Approach: (Kings Highway) stop-controlled; one right-turn lane.
Northbound Approach: (SR 1) three through lanes and one right-turn lane.
Southbound Approach: (SR Route 1) three through lanes.

15) **Delaware Route 24 & Mulberry Knoll Road**
Type of Control: signalized four-leg intersection.
Eastbound Approach: (SR 24) one left-turn lane and one shared through/right-turn lane.
Westbound Approach: (SR 24) one left-turn lane, one through lane, and one right-turn lane.
Northbound Approach: (Mulberry Knoll Road) one left-turn lane and one shared through/right-turn lane.
Southbound Approach: (Mulberry Knoll Road) one shared left/through/right-turn lane.

16) **Delaware Route 24 & Love Creek Elementary School / Beacon Middle School**
Type of Control: signalized four-leg intersection.
Eastbound Approach: (SR 24) one left-turn lane, one through lane, and one right-turn lane.
Westbound Approach: (SR 24) one left-turn lane, one through lane, and one right-turn lane.
Northbound Approach: (Beacon Middle School) one shared left/through lane and one right-turn lane.
Southbound Approach: (Love Creek Elementary School) one shared left/through lane and one right-turn lane.

17) **Delaware Route 24 & Spencer Lane / Williams Way**
Type of Control: Stop-controlled four-leg intersection.
Eastbound Approach: (SR 24) one left-turn lane and one shared through/right-turn lane.
Westbound Approach: (SR 24) one left-turn lane, one through lane, and one right-turn lane.
Northbound Approach: (Williams Way) stop-controlled; one shared left/through/right-turn lane.
Southbound Approach: (Spencer Lane) stop-controlled; one shared left/through lane and one right-turn lane.

18) **Delaware Route 24 / Camp Arrowhead Road**
Type of Control: signalized four-leg intersection.
Eastbound Approach: (SR 24) one left-turn lane, one through lane, and one right-turn lane.
Westbound Approach: (SR 24) one left-turn lane, one through lane, and one right-turn lane.
Northbound Approach: (Camp Arrowhead Road) one left-turn lane, one through lane, and one right-turn lane.
Southbound Approach: (Fairfield Road) one left-turn lane and one shared through/right-turn lane.

19) **Delaware Route 24 & Jolyns Way**
Type of Control: Stop-controlled three-leg intersection.
Eastbound Approach: (SR 24) one shared through/right-turn lane.
Westbound Approach: (SR 24) one shared left-turn/through lane.
Northbound Approach: (Jolyns Way) stop-controlled; one shared left/right-turn lane.

20) **Jolyns Way & Camp Arrowhead Road**
Type of Control: Stop-controlled three-leg intersection.
Eastbound Approach: (Jolyns Way) stop-controlled; one shared left/right-turn lane.
Northbound Approach: (Camp Arrowhead Road) one shared left/through lane.
Southbound Approach: (Camp Arrowhead Road) one shared through/right-turn lane.

21) **Delaware Route 24 & Plantation Road / Warrington Road**
Type of Control: signalized four-leg intersection.
Eastbound Approach: (SR 24) one left-turn lane, two through lanes, and one right-turn lane.
Westbound Approach: (SR 24) one left-turn lane, two through lanes, and one right-turn lane.
Northbound Approach: (Warrington Road) one left-turn lane, one shared left/through lane, one through lane, and one right-turn lane.
Southbound Approach: (Plantation Road) one left-turn lane, one shared left/through lane, one through lane, and one right-turn lane.

22) Warrington Road / Strawberry Way & Old Landing Road

Type of Control: Stop-controlled four-leg intersection.
Eastbound Approach: (Old Landing Road) stop-controlled; one shared left/through/right-turn lane.
Westbound Approach: (Old Landing Road) stop-controlled; one shared left/through/right-turn lane.
Northbound Approach: (Strawberry Road) stop-controlled; one shared left/through/right-turn lane.
Southbound Approach: (Warrington Road) stop-controlled; one left-turn lane and one shared through/right-turn lane.

23) Old Landing Road & Airport Road

Type of Control: Stop-controlled three-leg intersection.
Eastbound Approach: (Old Landing Road) one shared through/right-turn lane.
Westbound Approach: (Old Landing Road) one shared left/through lane.
Northbound Approach: (Airport Road) one shared left/right-turn lane.

24) Delaware Route 24 & Beebe Road

Type of Control: signalized four-leg intersection.
Eastbound Approach: (SR 24) one left-turn lane, two through lanes, and one right-turn lane.
Westbound Approach: (SR 24) one left-turn lane, two through lanes, and one right-turn lane.
Northbound Approach: (Beebe Road) one shared left/through lane and one right-turn lane.
Southbound Approach: (Entrance to Residence Inn) one shared left/through lane and one right turn lane.

25) Delaware Route 24 & Hudson Way

Type of Control: signalized four-leg intersection.
Eastbound Approach: (SR 24) one left-turn lane, two through lanes, and one right-turn lane.
Westbound Approach: (SR 24) one left-turn lane, two through lanes, and one right-turn lane.
Northbound Approach: (Hudson Way) one shared left-through lane and one right turn lane.
Southbound Approach: (Hudson Way) one shared left-through lane and one right turn lane.

26) Delaware Route 1 & Delaware Route 24

Type of Control: signalized three-leg intersection.
Eastbound Approach: (SR 24) three left-turn lanes and two right-turn lanes.
Northbound Approach: (SR 1) two left-turn lanes and three through lanes.
Southbound Approach: (SR 1) one U-turn lane, three through lanes, and one right turn lane.

27) **Delaware Route 1 & Midway Outlet Drive / Midway Galleria**
Type of Control: signalized four-leg intersection.
Eastbound Approach: (Midway Outlet Drive) one left-turn lane, one through lane, and one right-turn lane.
Westbound Approach: (Midway Galleria) one left-turn lane, one through lane, and one right-turn lane.
Northbound Approach: (SR 1) two left-turn lanes, three through lanes, and one right-turn lane.
Southbound Approach: (SR 1) one left-turn lane, three through lanes, and one right turn lane.

28) **Delaware Route 1 & Wolfe Neck Road**
Type of Control: Stop-controlled three-leg intersection.
Westbound Approach: (Wolfe Neck Road) stop-controlled; one right-turn lane.
Northbound Approach: (SR 1) three left-turn lanes, three through lanes and one right-turn lane.
Southbound Approach: (SR 1) three through lanes.

Safety Evaluation

Crash Data: Delaware Crash Analysis Reporting System (CARS) data was provided in the TIS for the three-year period from August 29, 2020, through August 29, 2023. The intersection with the most reported crashes during this period was SR 1 & Melson Rd / Postal Lane, with 97 crashes. The most common crash at the studied intersections was front-to-rear, with 245 total crashes, or 46% of all crashes. It should be noted that the site accesses and SR 24 & Bay Crossing Blvd were not analyzed, and the analysis was modified to distinguish between private property crashes and/or crashes at nearby intersections.

Sight Distance: The study area generally consists of relatively flat roadways and there are few visual obstructions. As always, the adequacy of available sight distance should be confirmed during the site plan review process for all proposed movements at the site accesses.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Based on the current DART Bus Stop Map, the Delaware Transit Corporation (DTC) currently operates five fixed-route transit routes in the area of the proposed Joseph's Farm development. Route 215 Millsboro / Rehoboth runs along SR 24 and turns southbound on SR 1. Routes 201 Lewes Park & Ride - Rehoboth Boardwalk, 204 Lewes Park & Ride - Cape May-Lewes Ferry, 208 Lewes Park & Ride - Ocean City, and 307 Lewes Transit Center / Milford / Dover run along SR 1.

Planned transit service: Delaware Transit Corporation (DTC) has requested that the developer construct bus stop pads on both sides of SR 24 at the intersection of SR 24 & Mulberry Knoll Road and at the signalized intersection of SR 24 & Site Entrance 3A. The location, size, and type of bus pad will be determined through coordination with DTC.

Existing bicycle and pedestrian facilities: According to DelDOT's Sussex County Bicycle Map, SR 24 is designated as a High-Traffic Regional Bicycle Route with a Bikeway. Plantation Road is designated as a High-Traffic Statewide Bicycle Route with a Bikeway. Kings Highway is designated as a High-Traffic Connector Bicycle Route Suggestion with a Bikeway. Camp Arrowhead Road is designated as a suggested Connector Bicycle Route without a Bikeway. Old Landing Road is designated as a High-Traffic Statewide Bicycle Route with a Bikeway. Airport Road is designated as a High-Traffic Statewide Bicycle Route without a Bikeway. Recent DelDOT projects along SR 24 have or are in the process of adding bicycle lanes along SR 24 between Love Creek and SR 1. The same projects have also added sidewalks or shared use paths along the same segment of SR 24, except for the segment between Mulberry Knoll Road and Plantation Road / Warrington Road.

Planned bicycle and pedestrian facilities: The developer should construct shared use paths along their frontages, provide pedestrian crossings at all unsignalized site entrances, construct signalized pedestrian crossings as recommended in this letter, construct bus stop pads at locations along SR 24 as recommended in this letter, and provide connection to pedestrian and bicycle facilities within the proposed development.

Previous Comments

The initial scoping memorandum between the developer and DelDOT was dated August 25, 2023.

In a review letter dated October 18, 2023, DelDOT commented on the traffic counts and seasonally adjusted traffic volumes. The developer was asked to modify traffic count data collected while construction detours were active. DelDOT directed the developer to revise the volume figures and resubmit the traffic counts and seasonally adjusted volumes.

In a second review letter dated November 6, 2023, DelDOT made additional comments on the traffic counts and seasonally adjusted traffic volumes. DelDOT directed the developer to revise the volume figures and resubmit the traffic counts and seasonally adjusted volumes.

In a third review letter dated November 21, 2023, DelDOT provided updates on committed developments and provided growth factors. The developer was directed to proceed with the Preliminary TIS.

In a fourth review letter dated January 12, 2024, DelDOT commented on the Preliminary TIS. DelDOT stated that "the approved number of site accesses is four (4). Proceed with the distribution provided in the scoping memo for trip distribution and site access. Any figures associated with the 'applicant proposal' scenario were not reviewed and are not approved at this time." The Review letter also acknowledged a change in the proposed land use which was approved with no change in Scope of Work. DelDOT also provided comments on committed developments. The developer was directed to address the comments and resubmit the Preliminary TIS.

In a fifth review letter dated February 8, 2024, DelDOT commented on the Preliminary TIS. The developer was reminded again that the "approved number of site accesses for the proposed site is four (4). Proceed with the distribution provided in the scoping memo." The developer was asked to address additional comments and then resubmit the Preliminary TIS.

In a sixth review letter dated March 8, 2024, DelDOT acknowledged that the "addition of the Applicant Access Scenario was acceptable to be reviewed." DelDOT provided additional comments on volume and distribution figures, and requested that the developer include separate Case 3 scenarios for the "DelDOT Scoping" and "Applicant Access" scenarios. The developer was asked to address these comments and then resubmit the Preliminary TIS.

A seventh review letter dated April 10, 2024, which was not included in the TIS, commented on the Preliminary TIS. DelDOT reiterated comments not addressed from previous review letters and provided additional comments. The developer was directed to address the comments and proceed with the Final TIS.

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

General HCM (Synchro) Analysis Comments
(see table footnotes on the following pages for specific comments)

1) Both the TIS and McCormick Taylor utilized Synchro to complete the traffic analyses.

2) The TIS and McCormick Taylor generally used heavy vehicle percentages (HV%) from turning movement counts for existing and future conditions (as per DelDOT's Development Coordination Manual section 2.2.8.11.6.H). McCormick Taylor and the TIS assumed 3% HV for future movements and at the proposed site entrance.

3) The TIS and McCormick Taylor determined overall intersection peak hour factors (PHF) for each intersection based on the turning movement counts. Future PHFs were determined as per the DelDOT Development Coordination Manual section 2.2.8.11.6.F where applicable. The application of future PHFs in the TIS was inconsistent between intersections and volume scenarios.

4) For analyses of all intersections, McCormick Taylor and the TIS assumed 0% grade for all movements.

Table 2
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [1]	**LOS per TIS**			**LOS per McCormick Taylor**		
1A. Site Entrance 1A / Mulberry Knoll Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2045 Build (Case 3) – Signal						
Overall	A (8.1)	B (15.8)	C (24.8)	A (6.9)	B (14.3)	C (25.8)
2045 Build (Case 3) – Roundabout [2]						
Westbound Site Entrance 1A	--	--	--	A (4.3) (0*)	B (11.8) (50*)	B (14.3) (100*)
Northbound Mulberry Knoll Road	--	--	--	A (5.3) (25*)	B (13.0) (150*)	C (16.3) (175*)
Southbound Mulberry Knoll Road	--	--	--	A (7.0) (50*)	C (19.0) (250*)	F (109.4) [3] (950*)
Overall	--	--	--	A (6.2)	C (15.6)	F (64.2)
2028 Build (Case 5) – Signal						
Overall	A (8.1)	B (14.0)	B (17.6)	A (7.6)	B (14.1)	C (20.2)
2028 Build (Case 5) – Roundabout [2]						
Westbound Site Entrance 1A	--	--	--	A (4.0) (0*)	A (8.1) (50*)	B (10.3) (75*)
Northbound Mulberry Knoll Road	--	--	--	A (4.8) (25*)	A (8.4) (75*)	B (11.0) (100*)
Southbound Mulberry Knoll Road	--	--	--	A (5.8) (25*)	A (8.5) (75*)	C (18.8) (225*)
Overall	--	--	--	A (5.3)	A (8.4)	B (14.4)

**95th percentile queue (ft)*

[1] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[2] Site trips presented in the TIS were redistributed to represent expected driver behavior with proposed roundabouts at intersections 1a and 2. At intersection 1a, 50% of the southbound lefts in and 40% of the westbound lefts out were shifted to intersection 2.
[3] The significant increase in delay in Case 3 on the southbound approach is due the proposed Mulberry Knoll Road Extension project assumed to be complete by 2045, which will increase southbound volumes.

Table 3
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [4] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
2. Site Entrance 2 / Mulberry Knoll Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2045 Build (Case 3)						
Westbound Site Entrance 2	B (10.2)	C (17.8)	C (19.0)	B (10.2)	C (17.8)	C (19.0)
2045 Build (Case 3) – Roundabout [5]						
Westbound Site Entrance 2	--	--	--	A (4.2) (0*)	B (11.1) (50*)	B (13.0) (75*)
Northbound Mulberry Knoll Road	--	--	--	A (5.2) (25*)	B (13.6) (150*)	C (16.7) (200*)
Southbound Mulberry Knoll Road	--	--	--	A (7.2) (50*)	C (18.5) (250*)	F (106.7) [6] (1000*)
Overall	--	--	--	A (6.4)	C (15.7)	F (66.1)
2028 Build (Case 5)						
Westbound Site Entrance 2	A (9.7)	B (13.3)	B (14.9)	A (9.8)	B (13.3)	B (14.9)
2028 Build (Case 5) – Roundabout [5]						
Westbound Site Entrance 2	--	--	--	A (4.0) (0*)	A (7.8) (25*)	A (9.8) (50*)
Northbound Mulberry Knoll Road	--	--	--	A (4.7) (25*)	A (8.6) (75*)	B (11.2) (100*)
Southbound Mulberry Knoll Road	--	--	--	A (6.0) (50*)	A (8.5) (75*)	C (19.2) (250*)
Overall	--	--	--	A (5.4)	A (8.5)	C (15.0)

**95th percentile queue (ft)*

[4] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[5] Site trips presented in the TIS were redistributed to represent expected driver behavior with proposed roundabouts at intersections 1a and 2. At intersection 1a, 50% of the southbound lefts in and 40% of the westbound lefts out were shifted to intersection 2.
[6] The significant increase in delay in Case 3 on the southbound approach is due the proposed Mulberry Knoll Road Extension project assumed to be complete by 2045, which will increase southbound volumes.

Table 4
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [7]	**LOS per TIS**			**LOS per McCormick Taylor**		
3A. Site Entrance 3 / SR 24	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2045 Build (Case 3)						
Overall	A (3.0)	A (7.7)	B (10.8)	A (8.4)	B (19.4)	B (14.5)
2028 Build (Case 5)						
Overall	A (7.6)	A (8.1)	B (18.3)	A (5.6)	C (20.1)	B (15.4)

[7] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 5
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [8] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
3B. East RI/RO Access / SR 24	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2045 Build (Case 3)						
Southbound East RI/RO Access	B (11.2)	C (24.0)	C (16.9)	B (11.2)	C (24.0)	C (16.9)
2028 Build (Case 5)						
Southbound East RI/RO Access	B (11.4)	C (22.1)	C (16.8)	B (11.4)	C (22.0)	C (16.8)

[8] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 6
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [9] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
3C. West RI/RO Access / SR 24	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2045 Build (Case 3)						
Southbound West RI/RO Access	B (11.2)	C (23.8)	C (17.0)	B (11.2)	C (23.8)	C (17.0)
2028 Build (Case 5)						
Southbound West RI/RO Access	B (11.4)	C (24.8)	C (17.5)	B (11.4)	C (24.9)	C (17.6)

[9] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 7
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [10] Two-Way Stop-Control	**LOS per TIS**			**LOS per McCormick Taylor**		
4. Site Entrance 4 / Dot Sparrow Road / Plantation Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Westbound Dot Sparrow Drive	B (13.5)	B (13.4)	C (23.4)	B (14.7)	B (14.3)	D (28.6)
Southbound Plantation Road – Left	A (8.1)	A (8.4)	A (9.0)	A (8.1)	A (8.4)	A (9.0)
2045 No Build (Case 2)[11]						
Eastbound Site Entrance 4	B (14.0)	D (25.0)	F (55.5)	B (14.2)	C (23.4)	E (48.9)
Westbound Dot Sparrow Drive	C (15.0)	C (15.8)	D (27.6)	C (15.8)	C (15.2)	D (26.5)
Northbound Plantation Road – Left	A (8.3)	A (8.9)	A (9.8)	A (8.3)	A (8.9)	A (9.8)
Southbound Plantation Road – Left	A (8.5)	A (8.8)	A (9.3)	A (8.5)	A (8.8)	A (9.3)
2045 Build (Case 3)[11]						
Eastbound Site Entrance 4	C (16.1)	F (911.1)	F (5445.6)	C (19.1)	F (880.1)	F (4064.9)
Westbound Dot Sparrow Drive	C (15.1)	D (26.1)	F (426.5)	C (19.3)	D (28.8)	F (299.1)
Northbound Plantation Road – Left	A (8.6)	B (10.6)	C (15.2)	A (8.7)	B (10.6)	B (15.2)
Southbound Plantation Road – Left	A (8.1)	A (8.2)	A (8.5)	A (8.6)	A (8.8)	A (9.2)
2045 Build (Case 3)[11,12] With Improvements – Signal						
Overall	--	--	--	A (9.2)	B (14.3)	C (20.7)
2045 Build (Case 3) – Roundabout						
Eastbound Site Entrance 4	--	--	--	A (5.7) (0*)	C (15.8) (100*)	F (65.1) (375*)
Westbound Dot Sparrow Drive	--	--	--	A (5.9) (0*)	A (8.3) (0*)	B (12.7) (0*)
Northbound Plantation Road	--	--	--	A (7.1) (50*)	C (17.6) (200*)	F (68.7) (600*)
Southbound Plantation Road	--	--	--	A (7.7) (50*)	C (16.2) (175*)	F (90.6) (725*)
Overall	--	--	--	A (7.2)	C (16.5)	F (75.6)

[10] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[11] Henlopen TID proposes two through lanes in each direction on Plantation Road. This geometry is modeled in Case 3 analysis, except for roundabouts.
[12] Improvements include traffic signal and dedicated eastbound and southbound right-turn lanes.

Table 7 (continued)
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [13] Two-Way Stop-Control	**LOS per TIS**			**LOS per McCormick Taylor**		
4. Site Entrance 4 / Dot Sparrow Road / Plantation Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2028 No Build (Case 4) [14]						
Eastbound Site Entrance 4	--	--	--	C (19.7)	F (53.8)	F (214.9)
Westbound Dot Sparrow Drive	C (17.1)	C (18.0)	D (31.8)	C (22.9)	C (24.5)	F (70.3)
Northbound Plantation Road – Left	--	--	--	A (0.4)	A (0.6)	A (0.7)
Southbound Plantation Road – Left	A (8.5)	A (9.0)	A (9.5)	A (0.3)	A (0.5)	A (0.3)
2028 Build (Case 5) – TWSC						
Eastbound Site Entrance 4	D (28.0)	F (2035.6)	F (10055.6)	D (31.7)	F (1930.8)	F (8470.0)
Westbound Dot Sparrow Drive	D (26.9)	F (84.3)	F (3545.8)	D (31.9)	F (122.6)	F (5163.8)
Northbound Plantation Road – Left	A (8.9)	B (11.3)	C (16.8)	A (9.0)	B (11.3)	C (16.8)
Southbound Plantation Road – Left	A (8.5)	A (8.9)	A (9.3)	A (8.6)	A (8.9)	A (9.4)
2028 Build (Case 5) – Roundabout						
Eastbound Site Entrance 4	--	--	--	A (6.2) (0*)	C (20.3) (150*)	F (100.9) (475*)
Westbound Dot Sparrow Drive	--	--	--	A (6.2) (0*)	A (8.9) (0*)	B (13.3) (0*)
Northbound Plantation Road	--	--	--	A (7.4) (50*)	C (21.0) (225*)	F (81.0) (675*)
Southbound Plantation Road	--	--	--	A (8.7) (75*)	C (22.2) (250*)	F (129.9) (975*)
Overall	--	--	--	A (7.8)	C (21.1)	F (104.1)

**95th percentile queue (ft)*

[13] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[14] The TIS analysis in Case 4 did not include an eastbound approach at this intersection.

Table 8
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [15] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
5. Mulberry Knoll Road / Cedar Grove Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1) – OWSC						
Westbound Cedar Grove Road – Left	A (8.1)	A (7.5)	A (9.9)	A (8.1)	A (7.5)	A (9.9)
Northbound Mulberry Knoll Road	B (11.0)	B (10.4)	C (20.5)	B (11.0)	B (10.4)	C (20.6)
2045 No Build (Case 2)[16] – Roundabout						
Eastbound Cedar Grove Road	B (13.2)	A (8.3)	E (37.1)	B (13.2)	A (8.3)	E (40.8)
Westbound Cedar Grove Road	A (5.4)	B (10.4)	A (9.7)	A (5.4)	B (10.4)	A (10.0)
Northbound Mulberry Knoll Road	B (11.1)	A (8.0)	B (14.2)	B (11.1)	A (8.0)	B (14.5)
Southbound Mulberry Knoll Road	A (6.6)	B (12.5)	B (11.3)	A (6.6)	B (12.5)	B (11.6)
Overall	A (10.0)	A (9.9)	C (20.9)	B (10.0)	A (9.9)	C (22.4)
2045 Build (Case 3)[16] – Roundabout						
Eastbound Cedar Grove Road	C (16.6)	B (13.5)	F (207.0)	C (16.6)	B (13.5)	F (222.8)
Westbound Cedar Grove Road	A (6.0)	C (20.0)	D (25.1)	A (6.0)	C (20.0)	D (27.0)
Northbound Mulberry Knoll Road	B (12.9)	B (14.0)	F (74.9)	B (12.9)	B (14.0)	F (81.7)
Southbound Mulberry Knoll Road	A (7.6)	D (26.9)	E (37.4)	A (7.6)	D (26.9)	E (40.3)
Overall	B (11.9)	C (18.7)	F (96.0)	B (11.9)	C (18.7)	F (103.9)
2028 No Build (Case 4) – OWSC [17]						
Westbound Cedar Grove Road – Left	A (9.2)	A (8.3)	F (257.1)	A (9.0)	A (8.3)	F (852.7)
Northbound Mulberry Knoll Road	D (25.7)	E (45.6)	D (28.7)	C (23.0)	E (45.4)	B (12.6)
2028 Build (Case 5) – OWSC [17]						
Westbound Cedar Grove Road – Left	A (9.7)	A (9.4)	F (822.4)	A (9.5)	A (9.4)	C (24.8)
Northbound Mulberry Knoll Road	F (61.1)	F (809.0)	F (338.9)	E (45.8)	F (813.2)	F (19358.8)
2028 Build (Case 5)[16] – Roundabout						
Eastbound Cedar Grove Road	--	--	--	A (9.4)	A (9.6)	F (181.1)
Westbound Cedar Grove Road	--	--	--	A (5.1)	B (13.9)	C (23.4)
Northbound Mulberry Knoll Road	--	--	--	A (8.3)	A (8.8)	D (32.9)
Overall	--	--	--	A (8.2)	B (11.1)	F (91.0)

[15] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[16]Henlopen TID proposes a roundabout at this intersection.
[17] TIS and McCormick Taylor modeled the intersection with the same geometry and volume.

Table 9
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection[18] All-Way Stop-Control	**LOS per TIS**			**LOS per McCormick Taylor**		
6. Cedar Grove Road / Robinsonville Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)[19]						
Eastbound Robinsonville Road	--	--	--	A (10.0)	A (8.1)	A (9.0)
Westbound Robinsonville Road	A (8.2)	A (7.6)	A (7.9)	A (8.0)	A (8.6)	A (8.3)
Northbound Cedar Grove Road	B (11.1)	B (11.6)	B (11.5)	A (8.6)	B (9.5)	B (8.9)
2045 No Build (Case 2)[20] – Roundabout						
Eastbound Robinsonville Road	A (7.9)	A (5.0)	A (6.5)	A (7.9)	A (5.0)	A (6.5)
Westbound Robinsonville Road	A (4.2)	A (6.3)	A (5.1)	A (4.2)	A (6.3)	A (5.1)
Northbound Cedar Grove Road	B (5.1)	A (5.8)	A (5,4)	B (5.1)	A (5.8)	A (5,4)
Overall	A (7.0)	A (5.6)	A (5.9)	A (7.0)	A (5.6)	A (5.9)
2045 Build (Case 3)[20] – Roundabout						
Eastbound Robinsonville Road	A (8.2)	A (5.4)	A (7.4)	A (8.2)	A (5.4)	A (7.4)
Westbound Robinsonville Road	A (4.3)	A (7.0)	A (5.7)	A (4.3)	A (7.0)	A (5.7)
Northbound Cedar Grove Road	A (5.3)	A (6.4)	A (6.3)	A (5.3)	A (6.3)	A (6.3)
Overall	A (7.2)	A (6.2)	A (6.8)	A (7.2)	A (6.1)	A (6.8)
2028 No Build (Case 4)[19]						
Eastbound Robinsonville Road	--	--	--	C (17.4)	B (12.0)	C (15.9)
Westbound Robinsonville Road	A (8.8)	A (8.0)	A (8.5)	A (9.0)	B (11.1)	B (10.3)
Northbound Cedar Grove Road	C (15.3)	C (21.2)	C (19.1)	B (10.9)	C (15.4)	B (12.8)
2028 Build (Case 5)[19]						
Eastbound Robinsonville Road	--	--	--	C (21.8)	B (14.4)	F (65.2)
Westbound Robinsonville Road	A (8.9)	A (8.4)	A (9.1)	A (9.4)	B (12.9)	B (13.7)
Northbound Cedar Grove Road	C (17.4)	F (67.8)	F (98.4)	B (12.0)	D (27.8)	D (30.6)
2028 Build (Case 5) [20] – Roundabout						
Overall	--	--	--	A (7.3)	A (6.7)	A (7.8)

[18] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[19] TIS modeled as a TWSC. MT modeled as AWSC.
[20] Henlopen TID proposes a roundabout at this intersection.

Table 10
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [21] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
7. Robinsonville Road / Kendale Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1) – OWSC						
Eastbound Robinsonville Road – Left	A (7.5)	A (8.0)	A (7.9)	A (7.5)	A (8.0)	A (7.9)
Southbound Kendale Road	B (13.4)	B (12.0)	C (19.0)	B (13.4)	B (12.0)	C (19.0)
2045 No Build (Case 2)[22] – Signal						
Overall	B (10.2)	A (8.9)	B (10.3)	B (10.2)	A (8.9)	B (10.2)
2045 Build (Case 3)[22] – Signal						
Overall	B (10.5)	A (9.5)	B (11.4)	B (10.5)	A (9.5)	B (11.4)
2028 No Build (Case 4) – OWSC						
Eastbound Robinsonville Road – Left	A (8.0)	A (8.9)	A (8.7)	A (8.0)	A (8.9)	A (8.7)
Southbound Kendale Road	F (81.0)	F (71.1)	F (244.5)	F (89.0)	F (71.2)	F (243.4)
2028 Build (Case 5) – OWSC						
Eastbound Robinsonville Road – Left	A (8.1)	A (9.4)	A (9.3)	A (8.1)	A (9.4)	A (9.3)
Southbound Kendale Road	F (132.0)	F (237.5)	F (607.8)	F (143.4)	F (236.6)	F (605.1)
2028 Build (Case 5)[22] – Signal						
Overall	--	--	--	B (10.7)	B (10.3)	B (12.8)

[21] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[22] Henlopen TID proposes to signalize this intersection with a shared left-turn/through lane on eastbound Robinsonville Road, a through lane and a right-turn lane on westbound Robinsonville Road, and dedicated left-turn and right-turn lanes on the southbound Kendale Road.

Table 11
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [23]	**LOS per TIS**			**LOS per McCormick Taylor**		
8. Cedar Grove Road / Plantation Road / Postal Lane	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	B (17.3)	B (17.0)	D (40.0)	B (17.3)	B (17.0)	D (40.0)
2045 No Build (Case 2)[24]						
Overall	B (17.5)	B (18.2)	E (65.2)	B (18.1)	B (18.8)	F (82.0)
2045 Build (Case 3)[24]						
Overall	B (17.9)	C (20.2)	F (91.8)	B (18.8)	C (21.9)	F (111.1)
2028 No Build (Case 4)						
Overall	C (20.4)	C (22.3)	E (55.5)	C (24.0)	D (41.7)	D (42.4)
2028 Build (Case 5)						
Overall	C (21.4)	C (31.3)	F (127.9)	C (22.6)	C (34.0)	F (97.7)

[23] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[24] Henlopen TID proposes one left-turn lane, two through lanes, and one right-turn lane on both Plantation Road approaches at this intersection.

Table 12
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [25] Two-Way Stop-Control	**LOS per TIS**			**LOS per McCormick Taylor**		
9. Plantation Road / Pennsylvania Avenue / Plantations Boulevard	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Eastbound Pennsylvania Avenue	B (11.7)	B (11.6)	D (28.3)	B (11.7)	B (11.5)	D (28.0)
Westbound Plantations Boulevard	B (13.2)	C (15.6)	D (33.8)	B (13.1)	C (15.5)	D (33.3)
Northbound Plantation Road – Left	A (8.1)	A (8.0)	B (10.4)	A (8.1)	A (8.0)	B (10.4)
Southbound Plantation Road – Left	A (7.7)	A (8.0)	A (8.1)	A (7.7)	A (8.0)	A (8.1)
2045 No Build (Case 2)[26]						
Eastbound Pennsylvania Avenue	B (10.6)	B (10.7)	E (41.1)	B (10.2)	A (9.3)	E (39.3)
Westbound Plantations Boulevard	B (14.7)	C (18.6)	E (36.1)	B (15.5)	C (18.3)	E (34.5)
Northbound Plantation Road – Left	A (8.6)	A (8.8)	B (12.9)	A (8.6)	A (8.8)	B (12.9)
Southbound Plantation Road – Left	A (8.3)	A (8.5)	A (8.6)	A (8.3)	A (8.5)	A (8.6)
2045 Build (Case 3)[26]						
Eastbound Pennsylvania Avenue	B (10.8)	B (11.6)	F (73.0)	A (9.9)	B (10.1)	E (46.3)
Westbound Plantations Boulevard	C (16.5)	D (33.0)	F (190.7)	C (16.5)	D (32.3)	F (180.9)
Northbound Plantation Road – Left	A (8.7)	A (9.3)	B (14.7)	A (8.7)	A (9.3)	B (14.7)
Southbound Plantation Road – Left	A (8.3)	A (9.0)	A (9.2)	A (8.4)	A (9.0)	A (9.2)

[25] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[26] Henlopen TID proposes one left-turn lane, two through lanes, and one right-turn lane on both Plantation Road approaches.

Table 13
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [27] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
10. Plantation Road / Robinsonville Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1) – TWSC						
Eastbound Robinsonville Road	C (22.2)	C (24.8)	F (106.0)	C (21.0)	C (22.2)	F (84.8)
Northbound Plantation Road – Left	A (8.3)	A (8.9)	B (11.1)	A (8.3)	A (8.9)	B (11.1)
2045 No Build (Case 2) – Signal[28]						
Overall	A (9.0)	A (5.3)	A (5.3)	A (6.6)	A (5.2)	A (6.1)
2045 Build (Case 3) – Signal[28]						
Overall	A (8.8)	A (5.3)	A (5.4)	A (6.6)	A (5.5)	A (6.2)
2045 Build (Case 3) – Roundabout [29]						
Overall	--	--	--	A (7.0)	A (9.7)	F (60.5)
2028 No Build (Case 4) – TWSC						
Eastbound Robinsonville Road	F (117.3)	F (173.1)	F (812.4)	F (117.3)	F (170.1)	F (801.1)
Northbound Plantation Road – Left	A (8.9)	B (11.2)	C (15.1)	A (8.9)	B (11.2)	C (15.4)
2028 Build (Case 5) – TWSC						
Eastbound Robinsonville Road	F (173.5)	F (458.7)	F (1996.4)	F (173.0)	F (466.9)	F (2017.4)
Northbound Plantation Road – Left	A (9.2)	B (12.5)	C (18.6)	A (9.2)	B (12.5)	C (18.9)
2028 Build (Case 5) – Roundabout [29]						
Overall	--	--	--	A (9.3)	C (15.7)	F (116.9)
2028 Build (Case 5) – Signal [30]						
Overall	--	--	--	A (9.6)	A (8.3)	D (47.1)

[27] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[28] Henlopen TID proposes to signalize this intersection with one left-turn lane and one right-turn lane on the Robinsonville Road approach, one left-turn lane and two through lanes on the northbound Plantation Road approach, and two through lanes and one right-turn lane on the southbound Plantation Road approach.
[29] The *Plantation Road Improvements, SR 24 to Robinsonville Road (Phase 2) (State Contract No. T202011201)* project proposes a single lane roundabout with a southbound bypass lane.
[30] Traffic signal modeled in Case 5 at this intersection with one left-turn lane and one right-turn lane on the Robinsonville Road approach, one left-turn lane and one through lanes on the northbound Plantation Road approach, and one through lanes and one right-turn lane on the southbound Plantation Road approach.

Table 14
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [31]	**LOS per TIS**			**LOS per McCormick Taylor**		
11. Plantation Road / Shady Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	B (11.9)	B (17.0)	C (29.5)	B (13.6)	E (67.9)	F (167.4)
2045 No Build (Case 2)[32]						
Overall	B (11.0)	B (15.8)	B (18.1)	B (13.2)	B (14.3)	B (18.7)
2045 Build (Case 3)[32]						
Overall	B (11.4)	B (17.1)	C (20.6)	B (13.5)	B (14.4)	C (21.8)
2028 No Build (Case 4)						
Overall	C (30.5)	F (97.5)	F (109.8)	C (32.6)	F (106.9)	F (168.3)
2028 Build (Case 5)						
Overall	D (36.0)	F (187.0)	F (160.0)	C (34.2)	F (199.0)	F (332.1)

[31] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay. The LOS by TIS results appear to use optimized signal timing for existing conditions.
[32] Henlopen TID proposes one left-turn lane, two through lanes, and one right-turn lane on both Plantation Road approaches, and one left-turn lane, one through lane, and one right-turn lane on the westbound Shady Road approach.

Table 15
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [33]	**LOS per TIS**			**LOS per McCormick Taylor**		
12. Postal Lane / Melson Road / SR 1	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	D (36.9)	C (27.8)	E (79.1)	D (39.3)	C (30.8)	F (97.4)
2045 No Build (Case 2)						
Overall	D (40.2)	D (51.2)	F (102.1)	D (43.4)	D (46.6)	F (134.3)
2045 Build (Case 3)						
Overall	D (40.5)	D (54.1)	F (128.7)	C (29.6)	D (38.2)	F (149.9)

[33] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 16
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [34] Two-Way Stop-Control	**LOS per TIS**			**LOS per McCormick Taylor**		
13. SR 1 / Bay Crossing Boulevard	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday [35]
2023 Existing (Case 1)						
Eastbound Access	E (46.0)	D (28.1)	A (0.0)	E (46.0)	D (28.6)	A (0.0)
Westbound Bay Crossing Boulevard	C (24.5)	E (42.4)	F (55.2)	C (24.6)	E (42.4)	F (55.1)
Northbound Delaware 1 – Left	F (50.4)	F (78.6)	F (98.4)	F (50.5)	F (77.8)	F (97.7)
Southbound Delaware 1 – Left	E (49.5)	F (122.2)	F (320.6)	E (49.2)	F (120.4)	F (318.1)
2045 No Build (Case 2)						
Eastbound Access	F (60.3)	E (42.8)	A (0.0)	F (60.5)	E (42.7)	A (0.0)
Westbound Bay Crossing Boulevard	D (33.2)	F (70.4)	F (110.5)	D (34.2)	F (70.1)	F (110.5)
Northbound Delaware 1 – Left	F (80.6)	F (284.5)	F (316.6)	F (85.9)	F (280.6)	F (316.6)
Southbound Delaware 1 – Left	F (117.0)	F (416.3)	F (1045.2)	F (116.6)	F (419.8)	F (1045.2)
2045 Build (Case 3)						
Eastbound Access	F (63.1)	E (47.2)	A (0.0)	F (63.2)	E (47.1)	A (0.0)
Westbound Bay Crossing Boulevard	D (34.1)	F (83.9)	F (143.1)	D (34.9)	F (84.3)	F (143.8)
Northbound Delaware 1 – Left	F (87.1)	F (369.4)	F (449.7)	F (93.3)	F (370.0)	F (458.6)
Southbound Delaware 1 – Left	F (125.3)	F (543.3)	F (1369.0)	F (125.2)	F (535.7)	F (1390.6)

[34] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[35] There is 0.0 seconds of delay during the Saturday peak hour due to no vehicles exiting the Access Road.

Table 17
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [36] One-Way Stop (T-intersection)	**LOS per TIS**			**LOS per McCormick Taylor**		
14. SR 1 / Kings Highway	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Westbound Kings Highway	C (15.7)	D (29.4)	D (25.2)	C (15.7)	D (29.4)	D (25.2)
2045 No Build (Case 2)						
Westbound Kings Highway	C (18.5)	D (42.9)	D (33.8)	C (18.7)	D (43.1)	D (33.8)
2045 Build (Case 3)						
Westbound Kings Highway	C (18.8)	E (49.6)	E (38.7)	C (19.0)	E (49.5)	E (38.9)

[36] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 18
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [37]	**LOS per TIS**			**LOS per McCormick Taylor**		
15. Mulberry Knoll Road / SR 24	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	A (9.7)	B (17.5)	C (33.7)	B (12.1)	B (17.0)	D (36.9)
2045 No Build (Case 2)[38]						
Overall	B (19.7)	D (37.2)	D (48.9)	B (12.3)	C (26.4)	D (51.4)
2045 Build (Case 3)[38]						
Overall	C (20.4)	E (62.1)	E (59.8)	B (12.9)	D (46.5)	F (94.1)
2045 Build (Case 3) With Improvements[39]						
Overall	--	--	--	B (11.5)	D (54.8)	D (53.5)
2028 No Build (Case 4)						
Overall	C (28.0)	C (28.0)	E (70.3)	C (25.1)	C (26.2)	C (34.0)
2028 Build (Case 5)						
Overall	C (32.4)	C (34.4)	E (59.2)	C (28.9)	D (49.3)	D (49.2)

[37] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[38] Henlopen TID proposes one left-turn lane, two through lanes, and one right-turn lane on both Delaware Route 24 approaches at this intersection. On Mulberry Knoll Road the Henlopen TID proposes one left-turn lane, one through lane, and one right-turn lane on both approaches.
[39] Recommended improvements include second southbound left-turn lane on Mulberry Knoll Road.

Table 19
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [40]	**LOS per TIS**			**LOS per McCormick Taylor**		
16. SR 24 / Love Creek Elementary School / Beacon Middle School	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	B (18.3)	C (30.3)	A (4.6)	B (18.4)	D (46.9)	A (4.6)
2045 No Build (Case 2)[41]						
Overall	C (25.2)	C (21.8)	A (4.9)	C (24.7)	C (21.2)	A (4.1)
2045 Build (Case 3)[41]						
Overall	C (25.2)	C (20.7)	A (5.9)	C (24.8)	B (18.8)	A (5.2)

[40] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[41] Henlopen TID proposes one left-turn lane, two through lanes, and one right-turn lane on both Delaware Route 24 approaches at this intersection.

Table 20
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [42] Two-Way Stop-Control	**LOS per TIS**			**LOS per McCormick Taylor**		
17. SR 24 / Spencer Lane / Williams Way	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Eastbound Delaware 24 – Left	A (8.7)	B (10.8)	A (8.6)	A (8.7)	B (10.8)	A (8.6)
Westbound Delaware 24 – Left	A (0.0)	A (9.1)	B (10.0)	A (0.0)	A (9.1)	B (10.0)
Northbound Williams Way	D (27.3)	F (67.8)	D (30.9)	D (27.5)	F (68.2)	D (31.1)
Southbound Spencer Lane	D (28.0)	F (55.6)	E (40.1)	D (28.1)	F (54.9)	E (40.7)
2045 No Build (Case 2)[43]						
Eastbound Delaware 24 – Left	B (11.2)	C (16.1)	B (11.3)	B (11.2)	C (16.1)	B (11.3)
Westbound Delaware 24 – Left	A (0.0)	B (12.4)	B (14.3)	A (0.0)	B (12.4)	B (14.3)
Northbound Williams Way	F (60.0)	F (189.0)	F (94.8)	F (59.9)	F (185.1)	F (94.8)
Southbound Spencer Lane	E (48.9)	F (298.2)	F (134.8)	E (49.0)	F (295.1)	F (134.8)
2045 Build (Case 3)[43]						
Eastbound Delaware 24 – Left	B (11.6)	C (19.8)	B (14.0)	B (11.7)	C (16.1)	B (11.4)
Westbound Delaware 24 – Left	A (0.0)	B (14.4)	C (18.2)	A (0.0)	B (12.4)	B (14.3)
Northbound Williams Way	F (74.8)	F (420.5)	F (273.0)	F (75.8)	F (185.1)	F (97.5)
Southbound Spencer Lane	F (73.4)	F (1438.6)	F (1074.3)	F (108.3)	F (487.0)	F (188.7)

[42] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[43] Henlopen TID proposes one left-turn lane, two through lanes, and one right-turn lane on both Delaware Route 24 approaches at this intersection.

Table 21
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [44]	**LOS per TIS**			**LOS per McCormick Taylor**		
18. SR 24 / Camp Arrowhead Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	B (16.8)	C (20.4)	C (20.9)	B (16.8)	C (20.4)	C (20.9)
2045 No Build (Case 2)[45]						
Overall	B (14.1)	C (23.3)	B (19.6)	B (15.0)	C (23.9)	C (21.7)
2045 Build (Case 3)[45]						
Overall	B (14.4)	D (41.1)	C (33.9)	B (15.7)	D (36.1)	D (36.2)
2028 No Build (Case 4)[45]						
Overall	C (25.0)	E (67.4)	E (69.5)	C (34.3)	F (85.4)	F (82.0)
2028 Build (Case 5)[45]						
Overall	D (35.4)	F (185.6)	F (147.2)	E (56.5)	F (166.0)	F (164.8)

[44] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[45] Henlopen TID proposes one left-turn lane, two through lanes, and one right-turn lane on both Delaware Route 24 approaches at this intersection. These improvements are modeled in 2045 and not 2028.

Table 22
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [46] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
19. SR 24 / Jolyns Way	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)[47] – TWSC						
Westbound Delaware 24 – Left	A (8.9)	A (8.4)	A (9.1)	A (8.9)	A (8.4)	A (9.1)
Northbound Jolyns Way	C (17.1)	C (16.8)	C (20.8)	C (17.2)	C (16.8)	C (20.8)
2045 No Build (Case 2)[48] – Signal						
Westbound Delaware 24 – Left	B (10.2)	B (10.2)	B (11.4)	-	-	-
Northbound Jolyns Way	C (24.2)	D (25.3)	E (42.0)	-	-	-
Overall	-	-	-	A (6.6)	A (6.7)	A (6.7)
2045 Build (Case 3)[48] – Signal						
Westbound Delaware 24 – Left	B (10.5)	B (11.1)	B (13.2)	-	-	-
Northbound Jolyns Way	D (26.9)	E (35.8)	F (76.8)	-	-	-
Overall	-	-	-	A (6.6)	A (7.2)	A (7.4)
2028 No Build (Case 4)[48] – TWSC						
Westbound Delaware 24 – Left	A (9.9)	A (9.9)	B (11.0)	B (10.2)	A (9.9)	B (11.0)
Northbound Jolyns Way	D (30.1)	E (38.9)	F (56.0)	D (34.9)	E (38.7)	F (55.8)
2028 Build (Case 5)[48] – TWSC						
Westbound Delaware 24 – Left	B (10.2)	B (10.8)	B (12.6)	B (10.6)	B (10.8)	B (12.6)
Northbound Jolyns Way	D (34.3)	F (66.0)	F (125.6)	E (40.5)	F (65.0)	F (125.1)

[46] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[47] TIS modeled all cases as a one-way stop control (T-intersection). MT modeled Case 2 and 3 a signalized intersection.
[48] Henlopen TID proposes to signalize this intersection with one left-turn lane, two through lanes, and one right-turn lane on both Delaware Route 24 approaches. Henlopen TID also proposed to extend Jolyns Way between Delaware Route 24 and Robinsonville Road. Both Jolyns Way approaches would have shared left-turn/through lane and one right turn. These improvements are modeled in 2045 and not 2028.

Table 23
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [49] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
20. Jolyns Way / Camp Arrowhead Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Eastbound Jolyns Way	A (9.7)	A (9.9)	B (11)	A (9.7)	A (9.9)	B (11)
Northbound Camp Arrowhead Road – Left	A (7.5)	A (7.7)	A (7.7)	A (7.6)	A (7.7)	A (7.7)
2045 No Build (Case 2)[50]						
Eastbound Jolyns Way	B (10.4)	B (11)	B (13.1)	B (10.2)	B (11)	B (13.2)
Northbound Camp Arrowhead Road – Left	A (7.6)	A (7.9)	A (8)	A (7.6)	A (7.9)	A (8)
2045 Build (Case 3)[50]						
Eastbound Jolyns Way	B (10.5)	B (11.7)	C (15.3)	B (10.5)	B (11.7)	C (15.3)
Northbound Camp Arrowhead Road – Left	A (7.7)	A (8.1)	A (8.2)	A (7.7)	A (8.1)	A (8.2)
2028 No Build (Case 4)[50]						
Eastbound Jolyns Way	B (10.4)	B (10.9)	B (13.0)	B (10.2)	B (10.9)	B (13.0)
Northbound Camp Arrowhead Road – Left	A (7.6)	A (7.9)	A (8.0)	A (7.6)	A (7.9)	A (8.0)
2028 Build (Case 5)[50]						
Eastbound Jolyns Way	B (10.6)	B (11.6)	C (15.0)	B (10.5)	B (11.6)	C (15.1)
Northbound Camp Arrowhead Road – Left	A (7.7)	A (8.1)	A (8.2)	A (7.7)	A (8.1)	A (8.2)

[49] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[50] Henlopen TID proposes one left-turn lane and one through lane on northbound Camp Arrowhead Road and one through lane and one right-turn lane on southbound Camp Arrowhead Road. These improvements are modeled in 2045 and not 2028.

Table 24
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [51]	**LOS per TIS**			**LOS per McCormick Taylor**		
21. SR 24 / Plantation Road / Warrington Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	C (24.6)	D (42.9)	D (45.5)	D (35.1)	D (42.7)	D (53.4)
2045 No Build (Case 2)[52]						
Overall	C (24.5)	C (28.6)	D (37.4)	C (34.6)	C (32.4)	D (47.2)
2045 Build (Case 3)[52]						
Overall	B (18.1)	C (26.1)	D (40.4)	C (29.9)	D (43.6)	D (47.1)
2028 No Build (Case 4)[52]						
Overall	C (27.2)	D (52.1)	D (52.6)	D (36.9)	D (51.8)	D (53.0)
2028 Build (Case 5)[52]						
Overall	C (34.7)	E (60.2)	E (72.0)	D (37.7)	E (64.1)	E (68.0)
2028 Build w/ TID Improvements (Case 5)[52]						
Overall	--	--	--	C (33.0)	E (69.6)	D (54.9)

[51] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[52] Henlopen TID proposes two left-turn lanes, two through lanes, and one right-turn lane on both Warrington Road and Plantation Road approaches at this intersection. These improvements are modeled in 2045 and not 2028.

Table 25
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [53] All-Way Stop-Control	**LOS per TIS**			**LOS per McCormick Taylor**		
22. Warrington Road / Old Landing Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1) – AWSC						
Eastbound Old Landing Road	C (15.5)	B (13.1)	C (22)	C (15.5)	B (13.1)	C (22)
Westbound Old Landing Road	B (12.6)	C (22)	D (26.9)	B (12.5)	C (22)	D (26.8)
Northbound Warrington Road	A (9.7)	A (9.9)	B (11.7)	A (9.7)	A (9.9)	B (11.7)
Southbound Warrington Road	D (30.6)	C (21.9)	F (94.7)	E (31.5)	C (21.9)	F (93.7)
2045 No Build (Case 2)[54] – Roundabout						
Eastbound Old Landing Road	B (12.4)	A (8.7)	C (17.8)	B (12.4)	A (8.7)	C (17.8)
Westbound Old Landing Road	A (6.3)	B (10.0)	A (9.2)	A (5.7)	B (10.0)	A (9.2)
Northbound Warrington Road	A (7.6)	A (6.4)	A (10.0)	A (7.6)	A (6.4)	A (10.0)
Southbound Warrington Road	B (11.8)	B (12.4)	C (17.8)	B (11.7)	B (12.4)	C (17.8)
Overall	B (10.7)	B (10.7)	B (14.9)	B (10.5)	B (10.7)	B (14.9)
2045 Build (Case 3)[54] – Roundabout						
Eastbound Old Landing Road	B (13.1)	B (10.5)	D (28.0)	B (13.2)	B (10.5)	D (28.0)
Westbound Old Landing Road	A (6.7)	B (12.4)	B (12.3)	A (6.0)	B (12.4)	B (12.3)
Northbound Warrington Road	A (8.1)	A (7.5)	B (12.8)	A (8.1)	A (7.5)	B (12.8)
Southbound Warrington Road	B (12.4)	C (16.1)	D (29.4)	B (12.4)	C (16.2)	D (29.4)
Overall	B (11.2)	B (13.5)	C (23.3)	B (11.1)	B (13.5)	C (23.3)
2028 No Build (Case 4)[54] – AWSC						
Eastbound Old Landing Road	C (21.3)	C (19.8)	E (41.9)	C (21.3)	C (19.8)	E (41.9)
Westbound Old Landing Road	C (15.9)	F (95.9)	F (80.8)	C (15.9)	F (95.9)	F (80.8)
Northbound Warrington Road	B (11.1)	B (12.7)	B (14.6)	B (11.1)	B (12.7)	B (14.6)
Southbound Warrington Road	F (84.3)	F (54.6)	F (208.5)	F (84.3)	F (54.6)	F (208.5)
2028 Build (Case 5)[54] – AWSC						
Eastbound Old Landing Road	C (23.7)	C (24.4)	F (65.8)	C (23.6)	C (24.4)	F (65.8)
Westbound Old Landing Road	C (17.1)	F (141.3)	F (152.8)	C (17.1)	F (141.3)	F (152.8)
Northbound Warrington Road	B (11.5)	B (14.2)	C (17.3)	B (11.5)	B (14.2)	C (17.3)
Southbound Warrington Road	F (98.9)	F (98.0)	F (298.8)	F (99.0)	F (98.0)	F (298.8)

[53] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[54] The *Old Landing Road and Warrington Road Intersection Improvement* (State Contract No. T202204306) project proposes a roundabout to be installed at the subject intersection. The proposed roundabout is also included in the Henlopen TID list of improvements. These improvements are modeled in 2045 and not 2028.

Table 26
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [55] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
23. Airport Road / Old Landing Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Westbound Old Landing Road– Left	A (9.5)	A (8.6)	A (9.6)	A (9.5)	A (8.6)	A (9.6)
Northbound Airport Rd	C (17.1)	C (24.7)	D (30.6)	C (17.1)	C (24.7)	D (30.8)
2045 No Build (Case 2)[56]						
Overall	B (13.8)	B (13.8)	B (15.8)	B (14.7)	B (13.6)	B (18.9)
2045 Build (Case 3)[56]						
Overall	B (14.0)	B (14.4)	B (17.4)	B (14.6)	B (14.2)	B (20.5)
2028 No Build (Case 4)[56]						
Westbound Old Landing Road– Left	A (9.8)	A (9.0)	B (10.2)	A (9.6)	A (9.0)	B (10.5)
Northbound Airport Rd	C (19.9)	F (54.4)	F (76.9)	C (19.3)	F (54.5)	F (113.5)
2028 Build (Case 5)[56]						
Westbound Old Landing Road– Left	A (9.8)	A (9.8)	B (10.6)	A (9.8)	A (9.2)	B (11.0)
Northbound Airport Rd	C (21.3)	F (100.6)	F (199.9)	C (21.3)	F (100.5)	F (292.2)

[55] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

[56] The *Airport Road Extension, Old Landing Road to SR 24* (State Contract No. T202204307) project proposes to signalize this intersection with one left-turn lane, one through lane, and one right-turn lane on both approaches of Old Landing Road. The proposed configuration for both Airport Road approaches is one left-turn lane and one shared through/right-turn lane. These improvements are modeled in 2045 and not 2028.

Table 27
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [57]	**LOS per TIS**			**LOS per McCormick Taylor**		
24. SR 24 / Beebe Rd	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	A (1.5)	A (4.8)	A (2.1)	A (1.7)	A (5.3)	A (2.2)
2045 No Build (Case 2)[58]						
Overall	B (19.8)	B (19.3)	B (16.1)	B (10.5)	B (17.5)	B (11.3)
2045 Build (Case 3)[58]						
Overall	B (19.2)	B (16.8)	B (13.5)	B (12.2)	B (15.6)	C (28.4)

[57] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[58] Henlopen TID proposes one shared left-turn/through lane and one right-turn lane on both Beebe Road approaches at this intersection.

Table 28
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [59]	**LOS per TIS**			**LOS per McCormick Taylor**		
25. SR 24 / Hudson Way	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	A (4.1)	C (20.8)	C (21.0)	A (4.4)	B (18.2)	C (20.9)
2045 No Build (Case 2)						
Overall	A (3.7)	A (7.5)	A (8.0)	A (4.0)	B (18.8)	B (15.0)
2045 Build (Case 3)						
Overall	A (3.8)	A (7.0)	A (7.1)	A (4.0)	C (20.3)	B (15.2)

[59] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 29
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [60]	**LOS per TIS**			**LOS per McCormick Taylor**		
26. SR 1 / SR 24	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	C (32.9)	C (20.8)	F (109.9)	C (33.0)	C (20.9)	F (110.5)
2045 No Build (Case 2)						
Overall	B (15.8)	C (22.4)	F (109.9)	D (35.3)	C (22.3)	F (146.4)
2045 Build (Case 3)						
Overall	B (16.7)	C (33.2)	F (127.6)	C (27.0)	C (22.4)	F (168.8)

[60] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 30
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Signalized Intersection [61]	**LOS per TIS**			**LOS per McCormick Taylor**		
27. SR 1 / Midway Outlet	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Overall	A (5.4)	A (7.6)	F (88.7)	B (15.3)	A (7.6)	F (105.3)
2045 No Build (Case 2)						
Overall	A (3.3)	B (17.7)	F (102.1)	B (12.6)	B (15.7)	F (106.9)
2045 Build (Case 3)						
Overall	A (3.3)	B (12.5)	F (114.4)	A (5.2)	A (7.6)	F (111.4)

[61] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 31
Peak Hour Levels of Service (LOS)
Based on Joseph's Farm Traffic Impact Study – August 2024
Prepared by Bowman Consulting Group, Ltd.

Unsignalized Intersection [62] **One-Way Stop (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
28. SR 1 / Wolfe Neck Road	Weekday AM	Weekday PM	Summer Saturday	Weekday AM	Weekday PM	Summer Saturday
2023 Existing (Case 1)						
Westbound Wolfe Neck Rd	D (31.7)	F (72.0)	F (112.6)	D (32.4)	F (171.6)	F (142.3)
2045 No Build (Case 2)						
Westbound Wolfe Neck Rd	E (40.4)	F (336.7)	F (257.5)	E (40.3)	F (342.1)	F (364.6)
2045 Build (Case 3)						
Westbound Wolfe Neck Rd	E (45.8)	F (469.2)	F (430.0)	E (45.6)	F (471.9)	F (580.0)

[62] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.