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

NICOLE MAJESKI
SECRETARY

March 27, 2024

Troy Brestel, P.E.
Traffic Planning and Design, Inc.
131 Continental Drive, Suite 103
Newark, DE 19713

Dear Mr. Troy Brestel,

The enclosed Traffic Impact Study (TIS) review letter for the **Savannah Farm** (Tax Parcels: (Tax Parcel: 7-02-09304-01-0100-00001) residential 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 Group Project Engineer

AF:km
Enclosures
cc with enclosures: Joe LaRock, D. R. Horton Inc
Robert Rosenberg, Karins and Associates
Mike Kaszyski, Karins and Associates
Eric Kramer, Traffic Planning and Design, Inc.
Harold Scott Jr, Town of Camden
Michael Wooleyhand, Town of Wyoming
Roseann Lamar, Town of Wyoming
John Willard, Town of Wyoming
Kris Connelly, Kent County Planning and Zoning
Joanne M. Arellano, Johnson, Mirmiran, & Thompson, Inc.
Mir Wahed, Johnson, Mirmiran, & Thompson, Inc.
DelDOT Distribution

DelDOT

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Shanté Hastings, Deputy Secretary / Director, Transportation Solutions (DOTS)
Mark Luszcz, Deputy Director, DelDOT Traffic, DOTS
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Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Wendy Carpenter, Traffic Calming & Subdivision Relations Manager, DelDOT Traffic, DOTS
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Matthew Lichtenstein, Central District Engineer, Central District
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Jared Kaufman, Service Development Planner, Delaware Transit Corporation
Tremica Cherry, Service Development Planner, Delaware Transit Corporation
Pamela Steinebach, Director, Planning
Todd Sammons, Assistant Director, Development Coordination
Wendy Polasko, Subdivision Engineer, Development Coordination
Will Mobley, Acting Kent County Review Coordinator, Development Coordination
Joshua Schwartz, Subdivision Reviewer, Development Coordination
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Sireen Muhtaseb, TIS Group Manager, Development Coordination
Philip Lindsey, TIS Group Project Engineer, Development Coordination
Steve Bayer, Regional Transportation Planner, Statewide & Regional Planning

March 26, 2024

Ms. Annamaria Furmato
Project Engineer
Delaware Department of Transportation
Development Coordination, Division of Planning
800 Bay Road
Dover, DE 19901

RE: Agreement No. 1945F
Project Number T202369005/PO#652973
Traffic Impact Study Services
Task 17-2 – Savannah Farm TIS

Dear Ms. Furmato:

Johnson, Mirmiran, and Thompson (JMT) has completed a review of the Traffic Impact Study (TIS) for the Savannah Farm Development, which was prepared by Traffic Planning and Design, Inc. dated September 1, 2023. This review was assigned as Task Number 17-2. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual* and other Department standards.

The TIS evaluates the impacts of a proposed residential development in the Town of Wyoming and the Town of Camden, Kent County, Delaware. The proposed development would consist of 447 single-family detached houses, 78 single-family attached houses, and 580 multi-family units (low-rise) on an approximately 361.11-acre assemblage of parcels (Tax Parcels 7-20-09400-01-1000-00001, 7-02-09304-01-0100-00001, 7-02-09304-01-0200-00001, 7-02-09400-01-3300-00001, 7-02-09400-01-3400-00001, 7-02-09400-01-3500-00001, 7-02-09304-01-0300-00001, and 7-02-09400-01-2100-00001). The land for the proposed development is currently split-zoned as R-1 (Single-Family Residential) in the Town of Wyoming and R-3 (Multi-Family Residential) in the Town of Camden. The developer does not plan to rezone the land but is coordinating with the Town of Wyoming regarding the proposed senior-adult housing for compliance with the Town code.

The proposed site is located on the west side of Willow Grove Road (Kent Road 53), approximately 1,050 feet north of the intersection with Dundee Road / Moose Lodge Road (Kent Road 125), and on the east side of Moose Lodge Road, approximately 1,900 feet south of the intersection with Westville Road (Kent Road 152). Two full access points are proposed: one on Willow Grove Road directly opposite Boss Brown Lane and one on Moose Lodge Road approximately 2,800 feet south of Westville Road. Construction is expected to be completed in 2030.

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

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

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

The *HEP KC, US Route 13, Lochmeath Way to Puncheon Run Connector* (DelDOT Project No. T201500202) project aims to widen US Route 13 to three through lanes in each direction from Lochmeath Way to the Puncheon Run Connector. This segment of the US Route 13 corridor has repeatedly been cited for safety improvements first under the Highway Safety Improvement Program (HSIP) and later under the Hazard Elimination Program (HEP). Latest project updates indicate that design and right-of-way acquisition are underway. Construction is anticipated to begin in the Fall of 2025 when the *East Camden Bypass* (DelDOT Project No. T201709502) and the *West Camden Bypass* (DelDOT Project No. T201709503) are nearing completion. This project impacts the TIS study intersections of US Route 13 with Delaware Route 10 and Old North Road (Kent Road 193). More information regarding the project can be found at: https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201500202.

The *HRGX (Highway Rail-Grade Crossing) program* is a component of the HSIP, which aims to achieve a significant reduction in traffic fatalities and injuries at highway rail-grade crossings through the implementation of infrastructure-related highway safety improvements on state-maintained roads. The rail-grade crossing at the Railroad Avenue and Camden-Wyoming Avenue study intersection was included within the 2021 HRGX under Site 6. The study of the Railroad Avenue and Camden-Wyoming Avenue intersection within the 2021 HRGX included a crash evaluation, a traffic signal warrant analysis, and an all-way stop-control warrant analysis. The potential improvements contained in the study included signage and pavement marking improvements. The study also suggested the consideration of all-way stop control or signalized intersection with preemption which would involve coordination with the Town.

The *East Camden Bypass* is included in the *Camden Bypass Study* that was adopted into the Town of Camden's Comprehensive Plan and consists of the construction of a south bypass, which would relocate Delaware Route 10, beginning east of Rising Sun Road and ending at Willow Grove Road. This project aims to increase safety and reduce traffic congestion along Delaware Route 10 through the Town of Camden and improve traffic signal operations at the US Route 13 and Delaware Route 10 intersection. The latest project updates indicate that planning and design are underway. Construction is scheduled to begin in the Spring of 2024. This project impacts the TIS study intersections of US Route 13 with Old North Road, US Route 13 with Delaware Route 10, and Delaware Route 10 with Rising Sun Road. More information regarding the project can be found at: https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201709502.

The *West Camden Bypass* is included in the *Camden Bypass Study* that was adopted into the Town of Camden's Comprehensive Plan and consists of providing a new connection between Willow Grove Road and South Street. This project aims to increase safety and reduce traffic congestion along Delaware Route 10 through the Town of Camden and improve traffic signal operations at the US Route 13 and Delaware Route 10, and US Route 13 and Old North Road intersections. These intersections are used by vehicles to access schools located on Old North Road. The latest project updates indicate that planning and design are underway. Construction is scheduled to begin in the Summer of 2024. This project impacts the TIS study intersections of Upper King Road with S. Main Street (Kent Road 4) and the Willow Grove Road intersection with Caesar Rodney Avenue (Kent Road 53) and South Street. More information regarding the project can be found at: https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201709503.

There is a *Pavement and Rehabilitation (P&R)* project that proposes to improve highways surrounding the development site. The improvements will consist of pavement reclamation, pavement milling, asphalt mix overlay, and pavement markings. Two DelDOT contract numbers (DelDOT Project Numbers T202306202 and T202306204) have been assigned to projects in proximity to the development site. The limits of the improvements are Dundee Road from Main Street Woodside to Willow Grove Road (T202306202), Main Street Woodside from Steeles Ridge Road to Upper King Highway (T202306202), Caesar Rodney Avenue from Camden-Wyoming Avenue to Old North Road (T202306204), Southern Boulevard from Pine Street to Camden-Wyoming Avenue (T202306204), and Railroad Avenue from Westville Road to Hazlettville Road (T202306204). Design is underway for the T202306204 P&R project and its improvements impact the TIS study intersections of Main Street with Dundee Road, Dundee Road with Bison Road (Kent Road 234), Dundee Road with Saddlbrook Drive, and Willow Grove Road with Moose Lodge Road / Dundee Road. The T202306202 P&R project is expected to start construction in Spring 2024 and its improvements impact the TIS study intersections of Delaware Route 10 with S. Caesar Rodney Avenue as well as Railroad Avenue with Front Street, Camden-Wyoming Avenue, and Southern Boulevard. More information regarding the P&R projects can be found at: https://deldot.gov/projects/pavement-rehab/.

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

The following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements. The table below does not include any signalized intersections that exhibit LOS deficiencies that can be mitigated with signal timing optimization as optimization would not be the responsibility of the developer. The future analysis with or without the developments (Cases 2 and 3) considers the improvements proposed as part of the following DelDOT projects: *HEP KC, US Route 13, Lochmeath Way to Puncheon Run Connector, West Camden Bypass,* and *East Camden Bypass*.

| Intersection | LOS Deficiencies Occur | | Case |
|---|---|---|---|
| | AM | PM | |
| Willow Grove Road/S. Caesar Rodney Avenue (Kent Road 53) / South Street | - | X | Case 1 – Existing* |
| Upper King Road / S. Main Street (Kent Road 4) / South Street | X | X | Case 1 – Existing* |
| US Route 13 / Delaware Route 10 | - | X | Case 1 – Existing* |
| Delaware Route 10 / Rising Sun Road (Kent Road 29) | X | X | Case 1 – Existing* |
| Moose Lodge Road / Orchard Lane / Westville Road (Kent Road 52) | - | X | Case 3 – 2030 with development |
| Southern Boulevard (Kent Road 74) / S. Railroad Avenue (Kent Road 195) | - | X | Case 3 – 2030 with development |
| Camden-Wyoming Avenue (Kent Road 29) / S. Railroad Avenue | - | X | Case 3 – 2030 with development |
| S. Railroad Avenue / Front Street | - | X | Case 1 – Existing |
| | | | Case 2 – 2030 without development |
| | | | Case 3 – 2030 with development |
| Front Street (Kent Road 193) / N. Layton Avenue (Kent Road 190) | - | X | Case 1 – Existing |
| | | | Case 2 – 2030 without development |
| | | | Case 3 – 2030 with development |

*The improvements associated with the *HEP KC, US Route 13, Lochmeath Way to Puncheon Run Connector, West Camden Bypass,* and *East Camden Bypass* projects mitigate deficiencies under future conditions.

Willow Grove Road / S. Caesar Rodney Avenue (Kent Road 53) / South Street (Table 5, Page 34)

The unsignalized Willow Grove Road/S. Caesar Rodney Avenue (Kent Road 53) / South Street intersection would exhibit LOS deficiencies along the westbound South Street approach under Case 1 (Existing) conditions during the PM peak hour. The westbound South Street approach would operate at LOS F with a delay of 225.1 seconds per vehicle and a projected 95$^{th}$ percentile queue length of approximately 460 feet. However, as a result of traffic volume adjustments anticipated in the area due to the improvements associated with the *West Camden Bypass* DelDOT project, it is expected that the intersection will not experience capacity constraints during the future scenarios with or without the proposed development (Cases 2 and 3). Therefore, the developer should not implement any additional improvements at the intersection. However, it is recommended that the developer coordinate with DelDOT on the equitable cost sharing of the improvements proposed as part of the *West Camden Bypass* project.

Upper King Road / S. Main Street (Kent Road 4) / South Street (Table 6, Page 35)

The unsignalized Upper King Road/S. Main Street (Kent Road 4) / South Street intersection would exhibit LOS deficiencies along the eastbound South Street and westbound Driveway approaches under Case 1 (Existing) conditions during the AM and PM peak hours. During the PM peak hour, the eastbound South Street approach would operate at LOS F with a delay of 131.6 seconds per vehicle and a projected 95$^{th}$ percentile queue length of approximately 70 feet. The westbound Driveway approach would operate at LOS F with a delay of 407.0 seconds per vehicle and a projected 95$^{th}$ percentile queue length of approximately 30 feet. However, as a result of traffic

volume adjustments anticipated in the area due to the improvements associated with the *West Camden Bypass* DelDOT project which also includes the removal of the eastern leg of the intersection, it is expected that the intersection would not experience capacity constraints during the future scenarios with or without the proposed development (Cases 2 and 3). Therefore, the developer should not implement any additional improvements at the intersection. However, it is recommended that the developer coordinate with DelDOT on the equitable cost sharing of the improvements proposed as part of the *West Camden Bypass* project.

US Route 13 / Delaware Route 10 (Table 8, Page 37)

The signalized US Route 13 / Delaware Route 10 intersection exhibits LOS deficiencies under Case 1 (Existing) conditions during the PM peak hour. The signalized intersection operates at LOS E with a delay of 62.8 seconds per vehicle. However, with the proposed widening to provide additional through lanes along US Route 13 as part of the *HEP KC, US Route 13, Lochmeath Way to Puncheon Run Connector* DelDOT project, it is expected that the intersection would not experience capacity constraints during the future scenarios with or without the proposed development (Cases 2 and 3). Therefore, the developer should not implement any additional improvements at the intersection. However, it is recommended that the developer coordinate with DelDOT on the equitable cost sharing of the improvements proposed as part of the *HEP KC, US Route 13, Lochmeath Way to Puncheon Run Connector* project.

Delaware Route 10 / Rising Sun Road (Kent Road 29) (Table 9, Page 38)

The unsignalized Delaware Route 10 intersection with Rising Sun Road exhibits LOS deficiencies along the northbound Rising Sun Road approach under Case 1 (Existing) conditions during the AM and PM peak hours. During the AM peak hour, the northbound Rising Sun Road approach operates at LOS F with a delay of 134.7 seconds per vehicle and a projected 95$^{th}$ percentile queue length of approximately 435 feet. However, this intersection will be improved to be a roundabout as part of the *East Camden Bypass* DelDOT project. Therefore, the intersection would not experience capacity constraints during the future scenarios with or without the proposed development (Cases 2 and 3). The developer should not implement any additional improvements at the intersection. However, it is recommended that the developer coordinate with DelDOT on the equitable cost sharing of the improvements proposed as part of the East *Camden Bypass* project.

Moose Lodge Road / Orchard Lane / Westville Road (Kent Road 52) (Table 12, Page 42)

The unsignalized Westville Road intersection with Moose Lodge Road / Orchard Lane would exhibit LOS deficiencies along the northbound Moose Lodge Road approach under Case 3 (2030 with Development) during the PM peak hour. The northbound Moose Lodge Road approach would operate at LOS F with a delay of 141.0 seconds per vehicle and a projected 95$^{th}$ percentile queue length of approximately 325 feet.

The deficiencies could be mitigated with the conversion of the intersection to a single-lane roundabout or the installation of a traffic signal. However, DelDOT is amenable to the developer maintaining the intersection as unsignalized and installing auxiliary turn lanes. As such, an additional evaluation was conducted with the installation of a right turn lane on the northbound Moose Lodge Road approach and a left turn lane on the westbound Westville Road approach. The northbound right turn lane would operate at LOS C or better during the peak hours, and the

northbound shared left turn/through lane would operate at LOS F with a delay of 129.3 seconds during the PM peak hour with a calculated 95th percentile queue length of approximately 115 feet. As the provision of turn lanes would reduce delay and the projected 95th percentile queue lengths, it is recommended that the developer install a separate northbound right turn lane and a separate westbound left turn lane at the intersection.

Southern Boulevard (Kent Road 74) / S. Railroad Avenue (Kent Road 195) (Table 13, Page 47)
The unsignalized Southern Boulevard intersection with S. Railroad Avenue would exhibit LOS deficiencies along the Southern Boulevard approach under Case 3 (2030 with Development) conditions during the PM peak hour. The Southern Boulevard approach would operate at LOS F with a delay of 113.1 seconds per vehicle and a projected 95th percentile queue length of approximately 295 feet.

The deficiencies could be mitigated with the conversion of the intersection to a single-lane roundabout or a signalized intersection. In coordination with the Town of Wyoming, a signal is the preferred alternative at this unsignalized intersection. Based on a review of the signal warrants contained within the Delaware MUTCD (*Manual of Uniform Traffic Control Devices)*, this unsignalized intersection would satisfy two warrants for justifying traffic signal installation (Warrant 2: Four-Hour Vehicular Volume per 70% criterion and Warrant 9: Intersection Near a Grade Crossing). However, the installation of a signal may require additional traffic analysis of other nearby intersections not included as part of the scope of the TIS to determine the operational impacts of a signal. Furthermore, additional coordination would be needed with Norfolk Southern Corporation and the Town of Wyoming. As such, it is recommended that the developer enter into an agreement with DelDOT to contribute to the Traffic Signal Revolving Fund (TSRF) for a future traffic signal.

Camden-Wyoming Avenue (Kent Road 29) / S. Railroad Avenue (Table 14, Page 52)
The unsignalized Railroad Avenue intersection with Camden-Wyoming Avenue would exhibit LOS deficiencies along the westbound Camden-Wyoming Avenue approach under Case 3 (2030 with Development) conditions during the PM peak hour. The westbound Camden-Wyoming Avenue would operate at LOS E with a delay of 37.6 seconds per vehicle and a calculated 95th percentile queue length of approximately 125 feet.

The deficiencies could be mitigated with the installation of a separate right-turn lane for the westbound Camden-Wyoming Avenue approach. With a separate right turn lane, the westbound Camden-Wyoming Avenue approach would improve to operate at acceptable LOS C with a delay of 22.6 seconds per vehicle during the PM peak hour and a projected 95th percentile queue of 50 feet and the overall intersection deficiencies would be mitigated. However, the installation of a turn lane may not be feasible due to the presence of a side street (N. Railroad Avenue) within 70 feet of the westbound stop bar, the potential relocating of utility pole(s), and existing at-grade crossing signals. As such, it is recommended that the developer not be required to implement any improvements at the intersection.

S. Railroad Avenue / Front Street (Table 15, Page 57)
The unsignalized S. Railroad Avenue intersection with Front Street would exhibit LOS deficiencies along the westbound Front Street approach under existing and future conditions with

or without the proposed development (Case 1, 2, and 3) during the PM peak hour. Under Case 3 with the proposed development conditions, the westbound Front Street approach would operate at LOS F with a delay of 325.6 seconds per vehicle and a projected 95th percentile queue length of approximately 635 feet.

The deficiencies could be mitigated with the conversion of the intersection to a single-lane roundabout or a signalized intersection. In coordination with the Town of Wyoming, a signal is the preferred alternative at this–intersection. Based on a review of the traffic signal warrants contained within the Delaware MUTCD, this unsignalized intersection would satisfy two warrants for justifying traffic signal installation (Warrant 2: Four-Hour Vehicular Volume per 70% criterion and Warrant 9: Intersection Near a Grade Crossing). However, the installation of a signal may require additional traffic analysis of other nearby intersections not included as part of the scope of the TIS to determine the operational impacts of a signal. Furthermore, additional coordination would be needed with the Norfolk Southern Corporation and the Town of Wyoming. As such, it is recommended that the developer enter into an agreement with DelDOT to contribute to the Traffic Signal Revolving Fund (TSRF) for a future traffic signal.

Front Street (Kent Road 193) / N. Layton Avenue (Kent Road 190) (Table 16, Page 61)
The unsignalized Front Street intersection with N. Layton Avenue would exhibit LOS deficiencies along the southbound N. Layton Avenue approach under the existing and future scenarios (Cases 1, 2, and 3) during the PM peak hour. Under Case 3 with the proposed development conditions, the southbound N. Layton Avenue approach would operate at LOS F with a delay of 109.8 seconds per vehicle and a calculated 95th percentile queue length of approximately 575 feet.

The deficiencies could be mitigated with the installation of a channelized right-turn lane for the southbound N. Layton Avenue approach. With a separate right turn lane, the southbound N. Layton Avenue approach delay would be reduced to 36.6 seconds per vehicle with a calculated 95th percentile queue would be reduced to 275 feet and the overall intersection deficiencies would be mitigated. However, the installation of a channelized right-turn lane for the southbound approach may not be feasible due to the limited right-of-way.

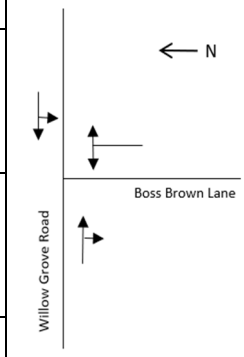
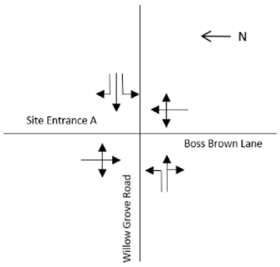
The deficiencies could also be mitigated with the conversion of the intersection to a single-lane roundabout or a signalized intersection. However, due to the limited right-of-way, a single-lane roundabout may not be feasible as well. Based on a review of the traffic signal warrants contained within the Delaware MUTCD, this intersection would satisfy one warrant for justifying traffic signal installation (Warrant 2: Four-Hour Vehicular Volume per 70% criterion). As the capacity constraints exist with or without the future development, it is recommended that the developer enter into an agreement with DelDOT to contribute to the Traffic Signal Revolving Fund (TSRF) for a future traffic signal.

Should the Town of Wyoming and the Town of Camden approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan, 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 Willow Grove Road (Kent Road 53) and Moose Lodge Road (Kent Road 125) 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.

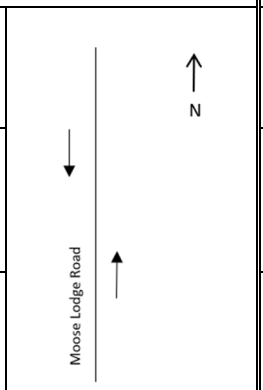
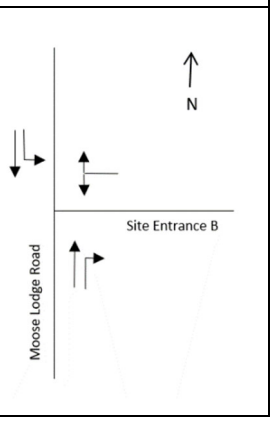
2. The developer should construct an unsignalized Site Entrance A full access for the proposed Savannah Farm Development along Willow Grove Road across from Boss Brown Lane. The intersection should be consistent with the lane configurations shown in the table below.

| Approach | Current Configuration | | Approach | Proposed Configuration | |
|---|---|---|---|---|---|
| Northbound Boss Brown Lane | One shared left turn/right turn lane |  | Northbound Boss Brown Lane | One shared left turn/ through/ right turn lane |  |
| Southbound Site Entrance A | Approach does not exist | | Southbound Site Entrance A | One shared left turn/ through/ right turn lane | |
| Eastbound Willow Grove Road | One shared through/ right turn lane | | Eastbound Willow Grove Road | One left turn lane and one shared through/ right turn lane | |
| Westbound Willow Grove Road | One shared left turn/ through lane | | Westbound Willow Grove Road | One left turn lane, one through lane, and one right turn lane | |

Based on DelDOT's *Development Coordination Manual*, the recommended minimum storage lengths are summarized in the table below. The projected queues from the HCS analysis can be accommodated within the recommended storage lengths (excluding tapers).

| Approach | Left Turn Lane | Right Turn Lane |
|---|---|---|
| Eastbound Willow Grove Road | 210 feet | N/A |
| Westbound Willow Grove Road | 85 feet | 290 feet |

3. The developer should construct an unsignalized Site Entrance B full access for the proposed Savannah Farm Development along Moose Lodge Road, approximately 2,800 feet south of the intersection with Westville Road. The intersection should be consistent with the lane configurations shown in the table below.

| Approach | Current Configuration | | Approach | Proposed Configuration | |
|---|---|---|---|---|---|
| Northbound Moose Lodge Road | One through lane |  | Northbound Moose Lodge Road | One through lane and one right turn lane |  |
| Southbound Moose Lodge Road | One through lane | | Southbound Moose Lodge Road | One left turn lane and one through lane | |
| Westbound Site Entrance B | Approach does not exist | | Westbound Site Entrance B | One shared left turn/right turn lane | |

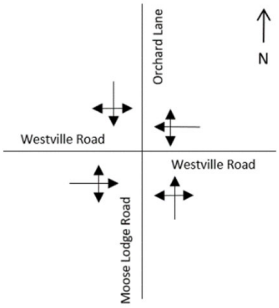
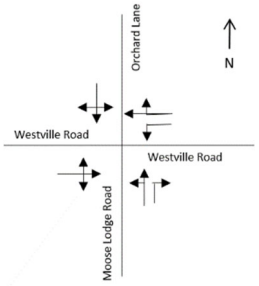
Based on DelDOT's *Development Coordination Manual*, the recommended minimum storage length (excluding taper) of the northbound right turn lane is 290 feet and the southbound left turn lane is 210 feet. The projected queues from the HCS analysis can be accommodated within the recommended storage lengths.

4. The developer should coordinate with DelDOT on the equitable cost sharing of the proposed improvements at the unsignalized intersections of Willow Grove Road / S. Caesar Rodney Avenue / South Street and Upper King Road / S. Main Street / South Street as part of the *West Camden Bypass*. The equitable contribution amount is $70,380.

5. The developer should coordinate with DelDOT on the equitable cost sharing of the proposed improvements at the signalized intersection of US Route 13 and Delaware Route 10 as part of the *HEP KC, US Route 13, Lochmeath Way to Puncheon Run Connector*. The equitable contribution amount is $44,770.

6. The developer should coordinate with DelDOT on the equitable cost sharing of the proposed improvements at the unsignalized intersection of Delaware Route 10 and Rising Sun Road as part of the *East Camden Bypass*. The equitable contribution amount is $95,060.

7. The developer should install a westbound left turn lane and a northbound right turn lane at the Westville Road (Kent Road 52) and Moose Lodge Road / Orchard Lane intersection. The intersection should be consistent with the lane configurations shown in the table below.

| Approach | Current Configuration | | Approach | Proposed Configuration | |
|---|---|---|---|---|---|
| Northbound Moose Lodge Road | One shared left turn/through/ right turn lane |  | Northbound Moose Lodge Road | One shared left turn/ through lane and one right turn lane |  |
| Southbound Orchard Lane | One shared left turn/through/ right turn lane | | Southbound Orchard Lane | No change | |
| Eastbound Westville Road | One shared left turn/through/ right turn lane | | Eastbound Westville Road | No change | |
| Westbound Westville Road | One shared left turn/through/ right turn lane | | Westbound Westville Road | One left turn lane and one shared through/right turn lane | |





Based on DelDOT's *Development Coordination Manual* and the results from the HCS analysis, the recommended minimum storage length (excluding taper) of the northbound right turn lane is 115 feet and the westbound left turn lane is 145 feet. The projected queues from the HCS analysis can be accommodated within the recommended storage lengths.

8. The developer should enter into an agreement with DelDOT to contribute to the Traffic Signal Revolving Fund (TSRF) for a future traffic signal at the unsignalized intersection of Southern Boulevard (Kent Road 74) and S. Railroad Avenue (Kent Road 195). The equitable contribution amount is $62,300.

9. The developer should enter into an agreement with DelDOT to contribute to the Traffic Signal Revolving Fund (TSRF) for a future traffic signal at the unsignalized intersection of S. Railroad Avenue and Front Street. The equitable contribution amount is $30,200.

10. The developer should enter into an agreement with DelDOT to contribute to the Traffic Signal Revolving Fund (TSRF) for a future traffic signal at the unsignalized intersection of Front Street (Kent Road 193) and N. Layton Avenue (Kent Road 190). The equitable contribution amount is $25,810.

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

    a. A minimum fifteen-foot-wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT along the Willow Grove Road (Delaware Route 10) and Moose Lodge Road (Delaware Route 15) site frontages. Within the easement, the developer should construct a ten-foot-wide shared use path (SUP). The SUP should be designed to meet current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of the pavement to the SUP. If feasible, the SUP should be placed behind utility poles and street trees should be provided within the buffer area. The developer should coordinate with DelDOT's Development Coordination Section during the plan review process to identify the exact location of the SUP.

    b. Internal connections from the SUP along both Willow Grove Road (Delaware Route 10) and Moose Lodge Road (Delaware Route 15) into the site are required.

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

    d. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lane and shoulder along the Willow Brook Road and Moose Lodge Road approaches to the site entrances.

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

12. The property has frontage along the rail line owned by the Norfolk Southern Corporation. The developer should coordinate with the DelDOT railroad program manager, Rich Sinegar (Richard.Sinegar@delaware.gov) regarding any requirements associated with the rail line during the plan review process.

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

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

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

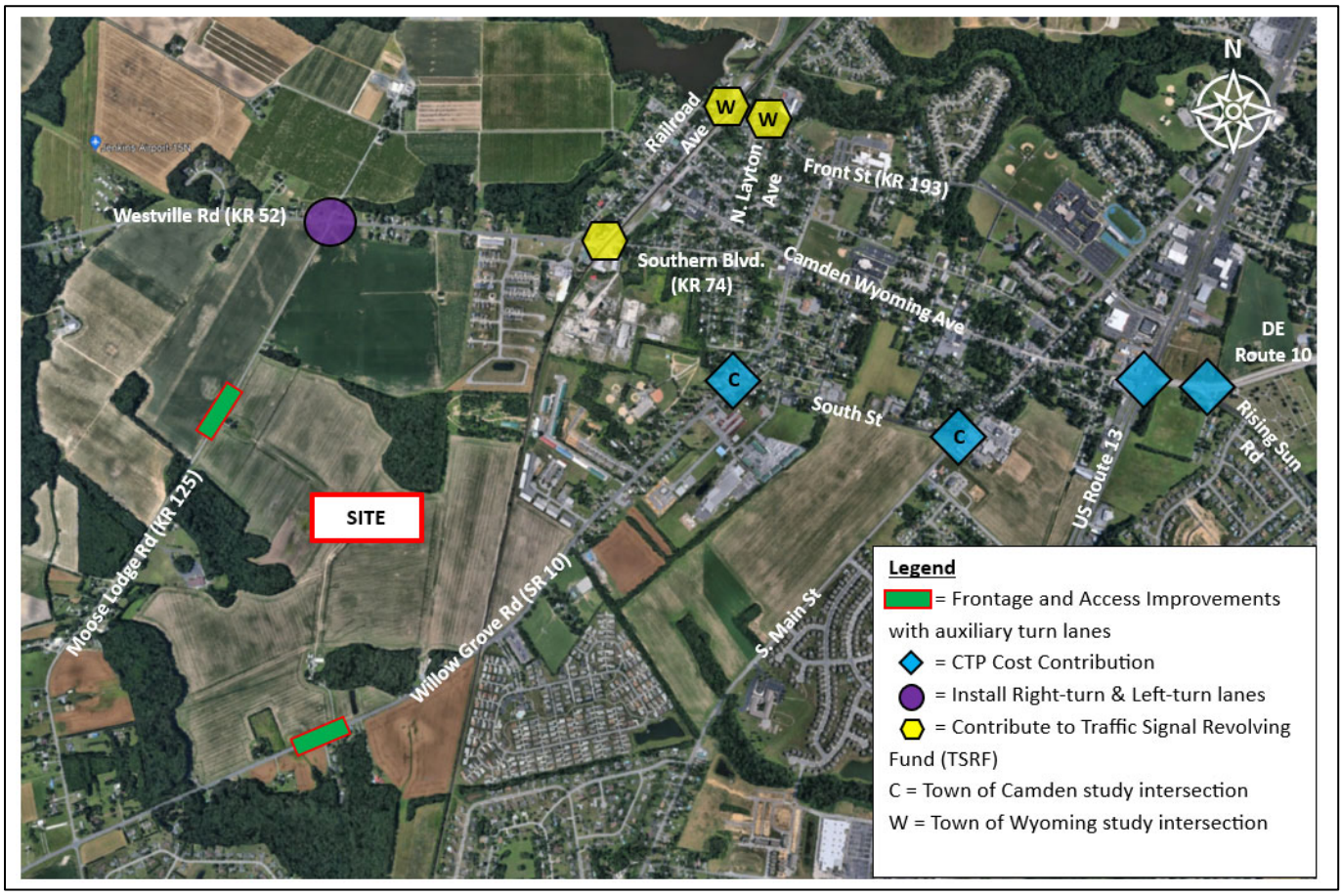
Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

Joanne M. Arellano, P.E., PTOE

cc: Mir Wahed, P.E., PTOE
Plaban Das

Enclosure

## Recommendations Map



## General Information

**Report date:** September 1, 2023
**Prepared by:** Traffic Planning and Design, Inc.
**Prepared for:** D.R. Horton
**Tax Parcels:**7-20-09400-01-1000-00001, 7-02-09304-01-0100-00001, 7-02-09304-01-0200-00001, 7-02-09400-01-3300-00001, 7-02-09400-01-3400-00001, 7-02-09400-01-3500-00001, 7-02-09304-01-0300-00001, and 7-02-09400-01-2100-00001.
**Generally consistent with DelDOT's Development Coordination Manual (DCM):** Yes

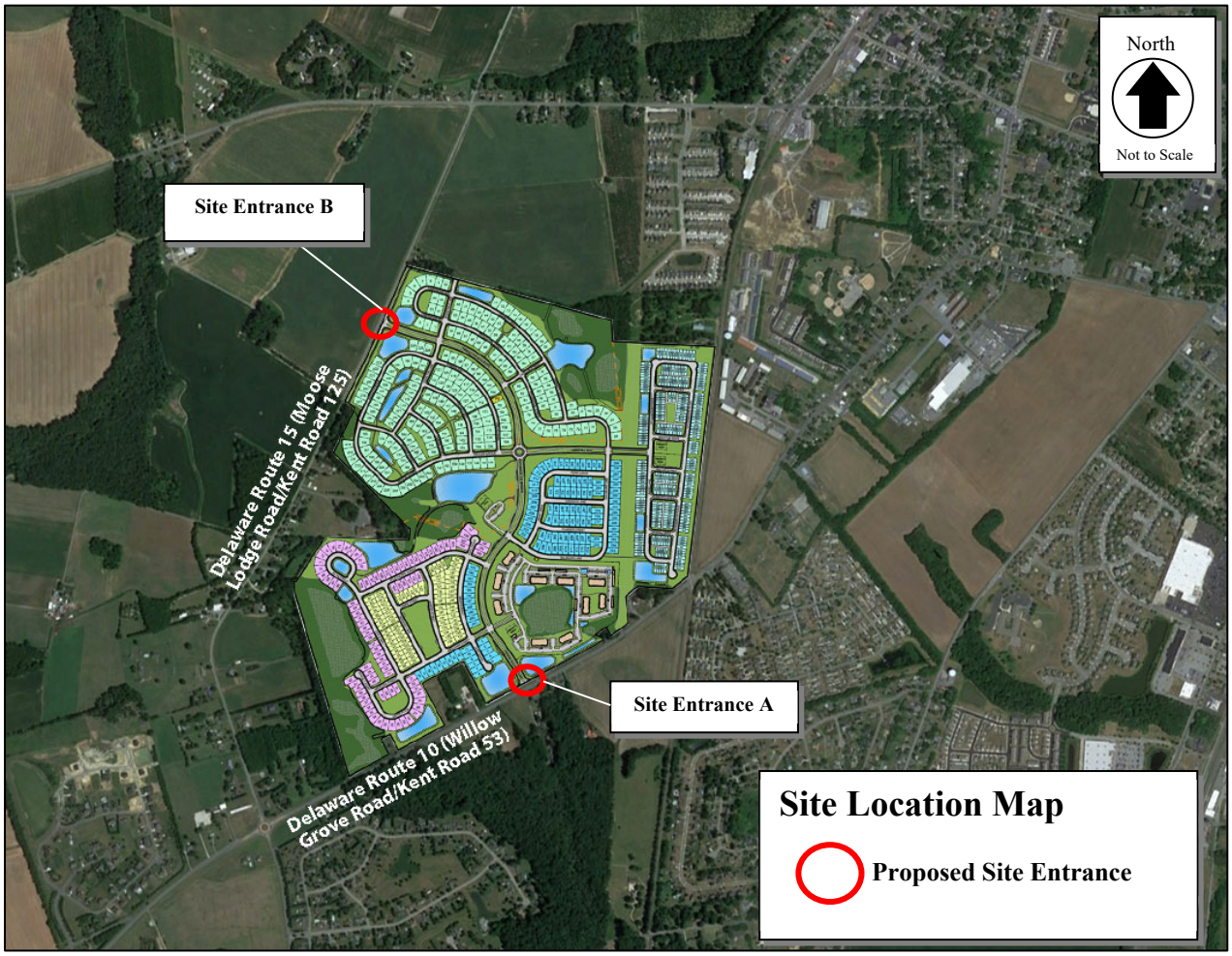
## Project Description and Background

**Description:** The proposed residential development consists of 447 single-family detached houses, 78 single-family attached houses, 580 units of multi-family (low-rise) housing.
**Location:** The land is located on the north side of Willow Grove Road (Kent Road 53), approximately 1,050 feet east of the intersection with Dundee Road / Moose Lodge Road (Kent Road 125), and southeast of Moose Lodge Road, approximately 1,900 feet south of the intersection with Westville Road (Kent Road 152).
**Amount of Land to be developed:** An approximately 361.11-acre assemblage of parcels.
**Land Use approval(s) needed:** Entrance Plan.
**Proposed completion date:** 2030.
**Proposed access locations:** Two full access points are proposed: one on Willow Grove Road directly opposite Boss Brown Lane and one on Moose Lodge Road.
**Daily Traffic Volumes:**

- 2023 Average Annual Daily Traffic on Willow Grove Road: 3,998 vehicles per day
- 2023 Average Annual Daily Traffic on Moose Lodge Road: 3,308 vehicles per day

*AADT is sourced from ATR data provided by the TIS report. Data taken from seven full days starting April 5th, 2023.

## Site Map




**Graphic is an approximation based on the Site Map from the TIS report dated September 1, 2023 prepared by Traffic Planning and Design, Inc.*

## Relevant and On-going Projects

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

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

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

The *HEP KC, US Route 13, Lochmeath Way to Puncheon Run Connector* (DelDOT Project No. T201500202) project aims to widen US Route 13 to three through lanes in each direction from Lochmeath Way to the Puncheon Run Connector. This segment of the US Route 13 corridor has repeatedly been cited for safety improvements first under the Highway Safety Improvement Program (HSIP) and later under the Hazard Elimination Program (HEP). Latest project updates indicate that design and right-of-way acquisition are underway. Construction is anticipated to begin in the Fall of 2025 when the *East Camden Bypass* (DelDOT Project No. T201709502) and the *West Camden Bypass* (DelDOT Project No. T201709503) are nearing completion. This project impacts the TIS study intersections of US Route 13 with Delaware Route 10 and Old North Road (Kent Road 193). More information regarding the project can be found at: https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201500202.

The *HRGX (Highway Rail-Grade Crossing) program* is a component of the HSIP, which aims to achieve a significant reduction in traffic fatalities and injuries at highway rail-grade crossings through the implementation of infrastructure-related highway safety improvements on state-maintained roads. The rail-grade crossing at the Railroad Avenue and Camden-Wyoming Avenue study intersection was included within the 2021 HRGX under Site 6. The study of the Railroad Avenue and Camden-Wyoming Avenue intersection within the 2021 HRGX included a crash evaluation, a traffic signal warrant analysis, and an all-way stop-control warrant analysis. The potential improvements contained in the study included signage and pavement marking improvements. The study also suggested the consideration of all-way stop control or signalized intersection with preemption which would involve coordination with the Town.

The *East Camden Bypass* is included in the *Camden Bypass Study* that was adopted into the Town of Camden's Comprehensive Plan and consists of the construction of a south bypass, which would relocate Delaware Route 10, beginning east of Rising Sun Road and ending at Willow Grove Road. This project aims to increase safety and reduce traffic congestion along Delaware Route 10 through the Town of Camden and improve traffic signal operations at the US Route 13 and Delaware Route 10 intersection. The latest project updates indicate that planning and design are underway. Construction is scheduled to begin in the Spring of 2024. This project impacts the TIS study intersections of US Route 13 with Old North Road, US Route 13 with Delaware Route 10, and Delaware Route 10 with Rising Sun Road. More information regarding the project can be found at: https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201709502.

The *West Camden Bypass* is included in the *Camden Bypass Study* that was adopted into the Town of Camden's Comprehensive Plan and consists of providing a new connection between Willow Grove Road and South Street. This project aims to increase safety and reduce traffic congestion along Delaware Route 10 through the Town of Camden and improve traffic signal operations at the US Route 13 and Delaware Route 10, and US Route 13 and Old North Road intersections. These intersections are used by vehicles to access schools located on Old North Road. The latest project updates indicate that planning and design are underway. Construction is scheduled to begin in the Summer of 2024. This project impacts the TIS study intersections of Upper King Road with

S. Main Street (Kent Road 4) and the Willow Grove Road intersection with Caesar Rodney Avenue (Kent Road 53) and South Street. More information regarding the project can be found at: https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T201709503.

There is a *Pavement and Rehabilitation (P&R)* project that proposes to improve highways surrounding the development site. The improvements will consist of pavement reclamation, pavement milling, asphalt mix overlay, and pavement markings. Two DelDOT contract numbers (DelDOT Project Numbers T202306202 and T202306204) have been assigned to projects in proximity to the development site. The limits of the improvements are Dundee Road from Main Street Woodside to Willow Grove Road (T202306202), Main Street Woodside from Steeles Ridge Road to Upper King Highway (T202306202), Caesar Rodney Avenue from Camden-Wyoming Avenue to Old North Road (T202306204), Southern Boulevard from Pine Street to Camden-Wyoming Avenue (T202306204), and Railroad Avenue from Westville Road to Hazlettville Road (T202306204). Design is underway for the T202306204 P&R project and its improvements impact the TIS study intersections of Main Street with Dundee Road, Dundee Road with Bison Road (Kent Road 234), Dundee Road with Saddlbrook Drive, and Willow Grove Road with Moose Lodge Road / Dundee Road. The T202306202 P&R project is expected to start construction in Spring 2024 and its improvements impact the TIS study intersections of Delaware Route 10 with S. Caesar Rodney Avenue as well as Railroad Avenue with Front Street, Camden-Wyoming Avenue, and Southern Boulevard. More information regarding the P&R projects can be found at: https://deldot.gov/projects/pavement-rehab/.

## Livable Delaware

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

**Location with respect to the Strategies for State Policies and Spending Map of Delaware:**
The proposed development is located within Investment Level 1, 2, and 3.

*Investment Level 1*

These areas are often municipalities, towns, or urban/urbanizing places in counties where density is generally higher than in surrounding areas. In Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote a variety of transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, and to promote well-designed and efficient new growth in Investment Level 1 Areas.

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

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

*Investment Level 2*

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

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

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

*Investment Level 3*

Investment Level 3 Areas generally fall into two categories. The first category covers lands that are in the long-term growth plans of counties or municipalities where development is not necessary to accommodate expected population growth during a five-year planning period (or longer). In these instances, development in Investment Level 3 may be least appropriate for new growth and development in the near term. The second category includes lands that are adjacent to or intermingled with fast-growing areas within counties or municipalities that are otherwise categorized as Investment Levels 1 or 2. Environmentally sensitive features, agricultural-preservation issues, or other infrastructure issues most often impact these lands. In these instances, development and growth may be appropriate in the near term, but the resources on the site and in the surrounding area should be carefully considered and accommodated by state agencies and local government with land-use authority. Investment Level 3 is further characterized by areas with new

development separated from existing development by a substantial amount of vacant land that is not contiguous with existing infrastructure, areas that are experiencing some development pressure, areas with existing but disconnected development, and possible lack of adequate infrastructure.

The state will consider investing in infrastructure within Investment Level 3 Areas once the Investment Level 1 and 2 Areas are substantially built out, or when the infrastructure or facilities are logical extensions of existing systems and deemed appropriate to serve a particular area. The priorities in the Level 3 Areas are for DelDOT to focus on regional movements between towns and other population centers. DelDOT also supports the development and implementation of Transportation Improvement Districts in Investment Level 3 areas. Local roadway improvements will be made by developers and property owners as development occurs. Lower priority is given to transportation system–capacity improvements and transit-system enhancements.

**Proposed Development's Compatibility with Livable Delaware:**
The proposed site is located within Investment Level 1, 2, and 3. In Investment Level 2, the priority is for creating and sustaining a variety of housing types. Investment Level 3 areas include areas adjacent to fast-growing areas with Investment Level 1 and 2. The proposed development includes three different types of housing. Therefore, the proposed development is generally consistent with the 2020 update of the *Livable Delaware Strategies for State Policies and Spending.*

**Comprehensive Plan**

*(Source: Town of Camden 2019 Comprehensive Plan Update)*

**Town of Camden Comprehensive Plan:**
Per the Future Land Use map, the portion of the development located within Camden is within an area designated for Mixed Use development. Per the Existing Zoning, 2017 map, the development is zoned R-3 (Multi-Family Residential).

**Proposed Development's Compatibility with the Town of Camden Comprehensive Plan:**
Per the comprehensive plan, R-3 (Multi-Family Residential) includes single-family detached dwellings, two-family dwellings, townhouses, and apartments. Additionally, mixed use development includes residential uses. As such, the proposed development is generally consistent with the Town of Camden 2019 Comprehensive Plan Update.

**Town of Wyoming Delaware 2022 Comprehensive Plan**
Per the Future Land Use map, the portion of the development located within Wyoming is within an area designated for Residential development.

**Proposed Development's Compatibility with the Town of Wyoming Delaware Comprehensive Plan**
The development is a residential use and therefore is consistent with the Town of Wyoming Delaware 2022 Comprehensive Plan.

**Trip Generation**

The trip generation for the proposed development was determined by using the comparable land use and rates/equations contained in the 11th Edition of the ITE *Trip Generation Manual*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 210 (Single-Family Detached Houses), ITE Land Use Code 215 (Single-Family Attached Houses) and ITE Land Use Code 220 (Multi-Family Housing Low-Rise). Trip generation was reviewed by DelDOT as part of the Preliminary TIS (PTIS) submission.

**Table 1**
Savannah Farm Trip Generation

| Land Use | ADT | Weekday AM Peak Hour | | | Weekday PM Peak Hour | | |
|---|---|---|---|---|---|---|---|
| | | In | Out | Total | In | Out | Total |
| 447 Units Single-Family Detached Houses (ITE – 210) | 4,001 | 73 | 218 | 291 | 256 | 150 | 406 |
| 78 Units Single-Family Attached Houses (ITE 215) | 544 | 9 | 26 | 35 | 25 | 18 | 43 |
| 580 Units Multi-Family Housing (Low-Rise) (ITE 220) | 3,793 | 49 | 154 | 203 | 170 | 100 | 270 |
| Total | 8,338 | 131 | 398 | 529 | 451 | 268 | 719 |

**Overview of TIS**

**Intersections examined:**

1. Site Entrance A / Willow Grove Road (Kent Road 53)
2. Site Entrance B / Moose Lodge Road (Kent Road 125)
3. Willow Grove Road/ Paynters Way
4. Willow Grove Road / S. Caesar Rodney Avenue (Kent Road 53) / South Street
5. Upper King Road / S. Main Street (Kent Road 4) / South Street
6. Delaware Route 10 / S. Main Street
7. US Route 13 / Delaware Route 10
8. Delaware Route 10 / Rising Sun Road (Kent Road 29)
9. US Route 13 / Old North Road (Kent Road 193)
10. Delaware Route 10 / S. Caesar Rodney Avenue
11. Moose Lodge Road / Orchard Lane / Westville Road (Kent Road 52)
12. Southern Boulevard (Kent Road 74) / S. Railroad Avenue (Kent Road 195)
13. Camden-Wyoming Avenue (Kent Road 29) / S. Railroad Avenue
14. S. Railroad Avenue / Front Street
15. Front Street (Kent Road 193) / North Layton Avenue (Kent Road 190)

16. New Burton Road (Kent Road 190) / Kent Recreation Center Entrance
17. Camden-Wyoming Avenue / Southern Boulevard
18. Willow Grove Road / Moose Lodge Road / Dundee Road (Kent Road 125)
19. Dundee Road / Saddlebrook Drive
20. Dundee Road / Bison Road (Kent Road 234)
21. Bison Road / Upper King Road
22. Main Street (Kent Road 54) / Dundee Road

**Conditions Examined:**

1. Case 1 – 2023 existing
2. Case 2 – 2030 without development
3. Case 3 – 2030 with development

**Committed Developments Considered:**

1. Brookfield Phase IV (90 unbuilt single-family detached houses)
2. Sunset Village (240 apartment units low-rise)
3. Wyoming Business Park (210,000 square feet of industrial space)
4. The Ponds at Willow Grove (133 single-family detached houses)
5. Cooper Property (144,000 square feet of retail and 156 townhouses)

* Committed development information provided supersedes the information provided by the January 27, 2023 DelDOT Scoping Meeting Memorandum.

**Peak Hours Evaluated:** Weekday AM and PM.

## Intersection Descriptions

**1. Site Entrance A / Willow Grove Road (Kent Road 53)**

**Type of Control:** Existing two-way stop-controlled intersection.

**Eastbound Approach:** (Willow Grove Road) Existing one shared through/right turn lane; proposed one left turn lane and one through/right turn lane.

**Westbound Approach:** (Willow Grove Road) Existing one shared left turn/through lane; proposed one left turn/through lane and one right turn lane.

**Northbound Approach:** (Boss Brown Lane) Existing one shared left turn/right turn lane, stop controlled.

**Southbound Approach:** (Site Entrance A) Proposed one shared left turn/right turn lane, stop controlled.

**2. Site Entrance B / Moose Lodge Road (Kent Road 125)**

**Type of Control:** Proposed two-way stop-controlled intersection.

**Eastbound Approach:** Existing one shared left/right turn lane; stop controlled.

**Northbound Approach:** (Moose Lodge Road) Existing one through/ right turn lane; proposed one through lane and one right turn lane.

**Southbound Approach:** (Moose Lodge Road) Existing one shared left/through lane; proposed one left turn lane and one through lane.

3. **Willow Grove Road / Paynters Way**
   **Type of Control:** Existing two-way stop-controlled intersection.
   **Eastbound Approach:** (Willow Grove Road) Existing one through lane and one right turn lane.
   **Westbound Approach:** (Willow Grove Road) Existing one left turn lane and one through lane.
   **Northbound Approach:** (Paynters Way) Existing one shared left turn lane/right turn lane, stop-controlled.

4. **Willow Grove Road / S. Caesar Rodney Avenue (Kent Road 53) / South Street**
   **Type of Control:** Existing two-way stop-controlled intersection.
   **Eastbound Approach:** (Willow Grove Road) Existing one shared through/ right turn lane.
   **Westbound Approach:** (Willow Grove Road) Existing one shared left turn/ through lane.
   **Northbound Approach:** (South Street) Existing one left turn lane and one right turn lane, stop-controlled.

5. **Upper King Road / S. Main Street (Kent Road 4) / South Street**
   **Type of Control:** Existing two-way stop-controlled intersection.
   **Eastbound Approach:** (South Street) Existing one left turn lane and one right turn lane, stop-controlled; proposed cul-de-sac.
   **Northbound Approach:** (Upper King Road Street) Existing one shared left turn/through lane; proposed one through lane.
   **Southbound Approach:** (S. Main Street) Existing one shared through/ right turn lane; proposed one through lane.

   ***** *This intersection will be modified as part of the West Camden Bypass DelDOT Project (DelDOT Contract NO. T201709503).*

6. **Delaware Route 10 / S. Main Street**
   **Type of Control:** Existing signalized intersection.
   **Eastbound Approach:** (Delaware Route 10) Existing one shared left turn/through/right turn lane.
   **Westbound Approach:** (Delaware Route 10) Existing one shared left turn/through/right turn lane.
   **Northbound Approach:** (S. Main Street) Existing one shared left turn/through/right turn lane.
   **Southbound Approach:** (S. Main Street) Existing one shared left turn/through/right turn lane.

**7. US Route 13 / Delaware Route 10**

**Type of Control:** Existing signalized intersection.

**Eastbound Approach:** (Delaware Route 10) Existing one left turn lane, two through lanes and one right turn lane.

**Westbound Approach:** (Delaware Route 10) Existing two left turn lanes, one through lane and one right turn lane.

**Northbound Approach:** (US Route 13) Existing one left turn lane, two through lanes and one right turn lane; proposed one left turn lane, three through lanes and one right turn lane.

**Southbound Approach:** (US Route 13) Existing two left turn lanes, two through lanes and one right turn lane; proposed one left turn lane, three through lanes and one right turn lane.

***** *This intersection will be modified as part of the HEP KC, US13, Lochmeath Way to Puncheon Run Connector DelDOT Project (DelDOT Contract NO. T201500202).*

**8. Delaware Route 10 / Rising Sun Road (Kent Road 29)**

**Type of Control:** Existing two-way stop-controlled intersection; proposed single-lane roundabout.

**Eastbound Approach:** (Delaware Route 10) Existing one left turn lane, two through lanes and one right turn lane; proposed one shared left turn/through/right turn lane

**Westbound Approach:** (Delaware Route 10) Existing one left turn lane and two through lanes; proposed one shared left turn/through/right turn lane

**Northbound Approach:** (Rising Sun Road) Existing one left turn lane and one right turn lane, stop-controlled; proposed one shared left turn/through/right turn lane

**Northbound Approach:** (S. East Camden Bypass) Proposed one shared left turn/through/right turn lane.

**Southbound Approach:** (N. East Camden Bypass) Proposed one shared left turn/through/right turn lane.

***** *This intersection will be modified as part of the East Camden Bypass DelDOT Project (DelDOT Contract NO. T201709502).*

**9. US Route 13 / Old North Road (Kent Road 193)**

**Type of Control:** Existing signalized intersection.

**Eastbound Approach:** (Old North Road) Existing two left turn lanes and one right turn lane; proposed two left turn lanes, one through lane, and one right turn lane

**Westbound Approach:** (Old North Road) Proposed two left turn lanes, one through lane, and one right turn lane.

**Northbound Approach:** (US Route 13) Existing one left turn lane and two through lanes; Proposed one left turn lane, three through lanes, and one right turn lane.

**Southbound Approach:** (US Route 13) Existing two through lanes and one right turn lane; proposed one left turn lane, three through lanes, and one right turn lane.

***** *This intersection will be modified as part of the HEP KC, US13, Lochmeath Way to Puncheon Run Connector DelDOT Project (DelDOT Contract NO. T201500202) and the East Camden Bypass DelDOT Project (DelDOT Contract NO. T201709502).*

**10. Delaware Route 10 / S. Caesar Rodney Avenue**

**Type of Control:** Existing signalized intersection.
**Eastbound Approach:** (Delaware Route 10) Existing one shared left/through/right turn lane .
**Westbound Approach:** (Delaware Route 10) Existing one left turn lane and one shared through/right lane..
**Northbound Approach:** (N. Caesar Rodney Avenue) Existing one shared left turn/through/right turn lane.
**Southbound Approach:** (S. Caesar Rodney Avenue) Existing one shared left turn/through/right turn lane.

**11. Moose Lodge Road / Orchard Lane / Westville Road (Kent Road 52)**

**Type of Control:** Existing two-way stop-controlled intersection.
**Eastbound Approach:** (Westville Road) Existing one shared left turn/through/right turn lane.
**Westbound Approach:** (Westville Road) Existing one shared left turn/through/right turn lane.
**Northbound Approach:** (Moose Lodge Road) Existing one shared left turn/through/right turn lane, stop-controlled.
**Southbound Approach:** (Moose Lodge Road) Existing one shared left turn/through/right turn lane, stop-controlled.

**12. Southern Boulevard (Kent Road 74) / S. Railroad Avenue (Kent Road 195)**

**Type of Control:** Existing two-way stop-controlled intersection.
**Eastbound Approach:** (Southern Boulevard) Existing one shared left/through lane.
**Westbound Approach:** (Southern Boulevard) Existing one shared through/right turn lane, stop-controlled.
**Southbound Approach:** (S. Railroad Avenue) Existing one shared left turn /through lane.

**13. Camden-Wyoming Avenue (Kent Road 29) / S. Railroad Avenue**

**Type of Control:** Existing two-way stop-controlled intersection.
**Westbound Approach:** (Camden Wyoming Avenue) Existing one shared left turn/right turn lane, stop controlled.

**Northbound Approach:** (S. Railroad Avenue) Existing one shared through/right lane.
**Southbound Approach:** (S. Railroad Avenue) Existing one shared left/through lane.

**14. S. Railroad Avenue / Front Street**
**Type of Control:** Existing two-way stop-controlled intersection.
**Westbound Approach:** (Front Street) Existing one shared left turn/right turn lane, stop-controlled.
**Northbound Approach:** (S. Railroad Avenue) Existing one shared through/right turn lane.
**Southbound Approach:** (S. Railroad Avenue) Existing one shared left turn/through lane.

**15. Front Street (Kent Road 193) / North Layton Avenue (Kent Road 190)**
**Type of Control:** Existing all-way stop-controlled intersection.
**Eastbound Approach:** (Front Street) Existing one shared left turn/through/right turn lane, stop-controlled.
**Westbound Approach:** (Front Street) Existing one shared left turn/through/right turn lane, stop-controlled.
**Northbound Approach:** (Layton Avenue) Existing one shared left turn/through/right turn lane, stop-controlled.
**Northbound Approach:** (Layton Avenue) Existing one shared left turn/through/right turn lane, stop-controlled.

**16. New Burton Road (Kent Road 190) / Kent Recreation Center Entrance**
**Type of Control:** Existing two-way stop-controlled intersection.
**Westbound Approach:** (Kent Recreation Center Entrance) Existing one shared left turn/right turn lane, stop-controlled.
**Northbound Approach:** (New Burton Road) Existing one through lane and one right turn lane.
**Southbound Approach:** (New Burton Road) Existing through lane and one bypass lane.

**17. Camden-Wyoming Avenue / Southern Boulevard**
**Type of Control:** Existing two-way stop-controlled intersection.
**Eastbound Approach:** (Camden Wyoming Avenue) Existing one shared left turn/through/right turn lane.
**Westbound Approach:** (Camden Wyoming Avenue) Existing one shared left turn/through/right lane.
**Northbound Approach:** (N. Railroad Avenue) Existing one shared left turn /through/right lane, stop-controlled.
**Southbound Approach:** (S. Railroad Avenue) Existing one shared left turn /through/right lane, stop-controlled.

**18. Willow Groove Road / Moose Lodge Road / Dundee Road (Kent Road 125)**

**Type of Control:** Existing single-lane roundabout.

**Eastbound Approach:** (Willow Grove Road) Existing one shared left turn/through/right turn lane.

**Westbound Approach:** (Willow Grove Road) Existing one shared left turn/through/right turn lane.

**Northbound Approach:** (Dundee Road) Existing one shared left turn/through/right turn lane.

**Southbound Approach:** (Moose Lodge Road) Existing one shared left turn/through/right turn lane.

**19. Dundee Road / Saddlebrook Drive**

**Type of Control:** Existing two-way stop-controlled intersection.

**Westbound Approach:** (SaddleBrook Drive) Existing one left turn lane and one right turn lane, stop-controlled.

**Northbound Approach:** (Dundee Road) Existing one shared through/right turn lane.

**Southbound Approach:** (Dundee Road) Existing one shared left turn/through lane.

**20. Dundee Road / Bison Road (Kent Road 234)**

**Type of Control:** Existing two-way stop-controlled intersection.

**Westbound Approach:** (Bison Road) Existing one shared left turn/right turn lane, stop controlled.

**Northbound Approach:** (Dundee Road) Existing one shared through/right lane.

**Southbound Approach:** (Dundee Road) Existing one shared left turn/through lane.

**21. Bison Road / Upper King Road**

**Type of Control:** Existing two-way stop-controlled intersection.

**Eastbound Approach:** (Bison Road) Existing one shared left turn/right turn lane, stop controlled.

**Northbound Approach:** (Upper King Road) Existing one shared left turn/through lane.

**Southbound Approach:** (Upper King Road) Existing one shared through/right turn lane.

**22. Main Street (Kent Road 54) / Dundee Road**

**Type of Control:** Existing one-way stop-controlled intersection.

**Eastbound Approach:** (Main Street) Existing one shared left turn/through lane.

**Westbound Approach:**(Main Street) Existing one shared through/right turn lane.

**Southbound Approach:** (Dundee Road) Existing one shared left turn/right turn lane, stop-controlled.

## Transit, Pedestrian, and Bicycle Facilities

**Existing transit service:** Per DelDOT Gateway, transit service exists within the study area. Within the study area, DART Route 104 runs along Main Street (traversing the Delaware Route 10 intersection), along Caesar Rodney Avenue (traversing the Delaware Route 10 and Willow Grove Road intersections), along South Street (traversing the Upper King Road / S. Main Street intersection), and along US Route 13 (traversing the Delaware Route 10 and Old North Road intersections). DART Route 303 runs along US Route 13 (traversing the Delaware Route 10 and Old North Road intersections), and Delaware Route 10 (traversing the Rising Sun Road intersection). There are no bus stops located at study intersections.

**Planned transit service:** Per the TIS report, TPD contacted Mr. Jared Kauffman, Fixed-Route Planner for DART, and he did not have any transit specific recommendations for the project.

**Existing bicycle and pedestrian facilities:** According to DelDOT's Kent County Bicycle Map, several study roadways are considered bicycle routes. A Statewide Bicycle Route exists along Wyoming Mill Road, turning west onto Westville Road, and then south onto Moose Lodge Road, crossing Delaware Route 10 onto Dundee Road. A Regional Bicycle Route exists along W. Lebanon Road, crossing US Route 13 onto Camden Wyoming Avenue and turning south onto Willow Grove Road. Connector Bicycle Routes exist along New Burton Road, Mill Road, Camden Wyoming Avenue, Upper King Road, US Route 13, and South Drive.

**Planned bicycle and pedestrian facilities:** Per email correspondence on September 18, 2023, from John Fiori, DelDOT's Bicycle Coordinator, the following recommendations were made:

- Page 9 under Bicycle and Pedestrian Facilities, it should be noted that SR15 between SR10 to Westville Road is classified as Bicycle Route 1, as per the Kent County Bicycle Map. Understand there are no existing bicycle facilities but this report should still note the existence of Bicycle Route 1 and bicyclists routinely use this road.
- This report should also note other non-motorized users which is the Amish Community who routinely use SR15 as they either reside along this section of SR15 or use SR15 as their route to the Camden Shopping Center. Fifer Farms uses SR15 throughout the year with their farming equipment, with higher volumes during the late summer early fall as they have multiple tractors transport corn and pumpkins from Camden to their distribution center along Upper King Road daily. Moose Lodge Road has a high volume a large truck traffic, specifically waste management trucks as private and municipal trucks use this section of SR15 as their route to transport waste to the Sandtown Land Fill.
- Referring to the State Strategies and Spending Map this site is within Level 2. Per the DelDOT SUP/Sidewalk Policy a non-motorized facility is required unless there is a physical impossibility. However since this site will generate over 8,000-trips, it shall be required that this site install a 10’ wide SUP along both property frontages.
- Moose Lodge Road has a posted speed limit of 50-mph. Since this site would be adding approximately 3,800-trips to a roadway that already has approximately 2,800-trips, a Speed Study for Moose Lodge Road should be conducted. Vehicles travel well over the posted, in addition to bicyclists and pedestrians using this road, there are potential sight distance concerns, where the posted speed limit needs to be lowered.

- If a right turn lane is warranted, then a separate 5' wide bike lane shall be provided along the limits of the right turn lane and follow the striping as per the DE MUTCD, Figure 9C-1E.
- At this time Active Transportation & Community Connections (ATCC) has no bicycle/pedestrian improvement projects within the area of this project.
- The site shall dedicate right-of-way per the roadway classification and establish a 15' wide permanent easement along all property roadway frontages.
- All entrance, roadway and/or intersection improvements required shall incorporate bicycle and pedestrian facilities. Per the DCM, if the right turn lane is warranted, then a separate bike lane shall be incorporated along the right turn lane; if a left turn lane is required any roadway improvements shall include a shoulder matching the roadway functional classification or existing conditions (minimum 5-feet).
- There could be additional and/or revised comments once project is discussed at a pre-submittal meeting and/or plans are submitted for LONO/ENT review/approval.

**Bicycle Level of Traffic Stress in Delaware:** Researchers with the Mineta Transportation Institute developed a framework to measure low-stress connectivity, which can be used to evaluate and guide bicycle network planning. Bicycle LTS analysis uses factors such as the speed of traffic, volume of traffic, and the number of lanes to rate each roadway segment on a scale of 1 to 4, where 1 is a low-stress place to ride and 4 is a high-stress place to ride. It analyzes the total connectivity of a network to evaluate how many destinations can be accessed using low-stress routes. Developed by planners at the Delaware Department of Transportation (DelDOT), the bicycle Level of Traffic Stress (LTS) model will be applied to bicycle system planning and evaluation throughout the state. The Bicycle LTS for the roadways under existing conditions along the site frontage are summarized below. The Bicycle LTS was determined utilizing the *Blueprint for a Bicycle-Friendly Delaware, a Statewide Policy Plan* (https://deldot.gov/Publications/plans/bikeandped/pdfs/DelDOTBikePlan043018FINAL.pdf).

- Willow Grove Road: 3
- Moose Lodge Road: 4

## Crash Evaluation

Per the crash data included in the TIS from January 1, 2020 to December 31, 2022, provided by the Delaware Department of Transportation (DelDOT), a total of 291 crashes were reported within the study area.

The Delaware Route 10 / US Route 13 intersection had 120 crashes reported including 74 front to rear, 20 sideswipe, 19 angle, three front to front, three not with another vehicle, and one rear to side.

The Old North Road / US Route 13 intersection had 65 crashes reported including 38 front to rear, 15 angle, seven sideswipe, three front to front, and two rear to rear. One fatal crash occurred due to disregarding the traffic signal which was related to alcohol.

The Rising Sun Road / Lebanon Road intersection had 16 crashes reported including five front to rear, four angle, four not with another vehicle, two front to front, and one sideswipe.

The remaining intersections each reported fifteen or less incidents within the three-year study period.

**Previous Comments**

Not all comments from the August 22, 2023 Preliminary TIS Review Letter were addressed in the Final TIS. As such, updated Case 2 and Case 3 volumes were utilized in this TIS review.

**Sight Distance Evaluation**

No sight distance constraints were noted at the proposed site entrance's locations per a field visit conducted on September 20, 2023.

**General HCS Analysis Comments**

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

1) The TIS and JMT used Synchro Version 11 to complete the analysis.

2) Per DelDOT's *Development Coordination Manual*, JMT utilized the future intersection PHF of 0.80 for roadways with less than 500 vph, 0.88 for roadways between 500 and 1,000 vph, and 0.92 for roadways with more than 1,000 vph, or used the existing PHF if higher, whereas the TIS utilized the existing PHF.

3) JMT utilized the existing heavy vehicle percentage for each movement greater than 100 vph in the Case 1 existing scenario while the TIS utilized the existing heavy vehicle percentage for each movement.

4) Per DelDOT's *Development Coordination Manual* and coordination with DelDOT Planning, JMT used a heavy vehicle percentage of 5% for each movement less than 100 vph along roadways in the analyses whereas the TIS utilized the existing heavy vehicle percentage.

5) Per DelDOT's *Development Coordination Manual*, JMT used a heavy vehicle percentage of 3% for each movement greater than 100 vph in Case 2 and Case 3 future scenario analysis, unless the existing heavy vehicle percentage was greater than 3% and there was no significant increase of vehicles along that movement, in which case the existing heavy vehicle percentage was used for the analysis of future scenarios, whereas the TIS used different values.

6) Per DelDOT's *Development Coordination Manual*, JMT utilized a heavy vehicle percentage of 3% for each movement reduced to less than 100 vph due to the diversion of traffic after the construction of DelDOT Bypass projects in Case 2 and Case 3 future scenario analysis.

7) JMT utilized pedestrian volumes in the Synchro analysis, whereas the TIS did not. Additionally, bicyclists on crosswalks were included as pedestrian volumes in JMT's Synchro analysis, whereas the TIS did not include them in the Synchro analysis.

8) The TIS utilized approach grades in the Synchro analysis, whereas JMT did not.

9) JMT utilized the DelDOT-approved signal timings for future conditions (Case 2 and Case 3), whereas the TIS did not.

Table 2
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Site Entrance A / Willow Grove Road (Kent Road 53)** [2] | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2030 with Development (Case 3) | | | | |
| Eastbound Willow Grove Road Left Turn | A (7.7) | A (8.9) | A (7.8) | A (9.1) |
| Eastbound Willow Grove Road Approach | - | - | A (9.4) | B (11.0) |
| Southbound Site Entrance A Approach | C (18.1) | C (20.0) | C (23.0) | D (26.0) |

[1] For signalized and unsignalized analysis, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.
[2] There is an existing northbound leg at this intersection that was not recorded during traffic counts. JMT included the leg with no volume in the Synchro analysis, whereas the TIS did not.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Site Entrance B / Moose Lodge Road (Kent Road 125)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2030 with Development (Case 3) | | | | |
| Southbound Moose Lodge Road Left Turn | A (8.1) | A (8.1) | A (8.2) | A (8.2) |
| Westbound Site Entrance B Left Turn | B (13.9) | B (19.6) | B (14.4) | C (21.0) |
| Westbound Site Entrance B Right Turn | B (11.5) | A (9.8) | B (11.8) | B (10.0) |

Table 4
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Willow Grove Road (Kent Road 53) / Paynters Way** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Westbound Willow Grove Road Left Turn | A (8.1) | A (7.7) | A (8.1) | A (7.7) |
| Northbound Paynters Way Approach | B (11.1) | B (10.2) | B (11.1) | B (10.2) |
| | | | | |
| 2030 without Development (Case 2) | | | | |
| Westbound Willow Grove Road Left Turn | A (8.2) | A (7.8) | A (8.2) | A (7.8) |
| Northbound Paynters Way Approach | B (11.7) | B (10.6) | B (11.7) | B (10.6) |
| | | | | |
| 2030 with Development (Case 3) | | | | |
| Westbound Willow Grove Road Left Turn | A (8.8) | A (8.1) | A (8.8) | A (8.2) |
| Northbound Paynters Way Approach | B (14.3) | B (12.4) | B (14.2) | B (12.4) |

Table 5
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Willow Grove Road / S. Caesar Rodney Avenue (Kent Road 53) / South Street** [3] | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Westbound South Street Approach | C (24.1) | F (187.3) | B (14.0) | F (225.1) |
| Westbound South Street Right Turn | B (12.8) | B (11.1) | - | - |
| Southbound S. Caesar Rodney Avenue Left Turn | - | - | A (8.9) | A (8.9) |
| | | | | |
| 2030 without Development (Case 2) [4] | | | | |
| Westbound South Street Approach | C (17.4) | E (43.6) | B (12.9) | C (17.5) |
| Westbound South Street Right Turn | B (12.1) | B (10.6) | - | - |
| Southbound S. Caesar Rodney Avenue Left Turn | A (8.0) | A (8.2) | A (8.1) | A (8.3) |
| | | | | |
| 2030 with Development (Case 3) [4] | | | | |
| Westbound South Street Approach | C (18.2) | F (50.1) | B (13.4) | C (20.0) |
| Westbound South Street Right Turn | B (12.6) | B (10.8) | - | - |
| Southbound S. Caesar Rodney Avenue Left Turn | A (8.1) | A (8.3) | A (8.2) | A (8.3) |

[3] The TIS modeled the South Street approach as one right turn and one left turn lane, whereas JMT modeled the approach as a through lane with a right turn channelization.
[4] Case 2 and Case 3 considers the redistributed traffic volumes as part of the *West Camden Bypass* project.

Table 6
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Upper King Road / S. Main Street (Kent Road 4) / South Street** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Eastbound South Street Approach | F (104.3) | F (124.7) | F (106.6) | F (131.6) |
| Eastbound South Street Right Turn | B (11.9) | D (30.1) | B (12.0) | D (30.4) |
| Westbound Driveway Approach | F (77.8) | F (407.0) | F (80.8) | F (407.0) |
| Westbound Driveway Right Turn | B (10.8) | A (9.9) | B (10.9) | B (10.0) |
| Northbound S. Main Street Left Turn | A (8.6) | B (10.2) | A (8.7) | B (10.2) |
| Southbound Upper King Road Left Turn | A (8.2) | A (7.8) | A (8.3) | A (7.9) |
| | | | | |
| 2030 without Development (Case 2) [5,6] | | | | |
| Westbound Driveway Approach | B (11.3) | B (10.3) | B (11.7) | B (10.5) |
| Southbound Upper King Road Left Turn | A (8.4) | A (8.0) | - | - |
| | | | | |
| 2030 with Development (Case 3) [5,6] | | | | |
| Westbound Driveway Approach | B (11.5) | B (10.4) | B (11.9) | B (10.6) |
| Southbound Upper King Road Left Turn | A (8.5) | A (8.0) | - | - |

[5] Case 2 and Case 3 implement a new geometry which include removing the eastbound leg as part of the *West Camden Bypass* project.
[6] The TIS models the intersection to include left turns, whereas JMT does not as a raised concrete median will be installed on Upper King Road as part of the *West Camden Bypass* project that will restrict left-turns from Upper King Road.

Table 7
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Signalized Intersection [1]** | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Delaware Route 10 / S. Main Street (Kent Road 4)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | B (10.8) | A (9.8) | B (14.1) | B (12.7) |
| | | | | |
| 2030 without Development (Case 2) | A (9.9) | A (9.9) | B (13.4) | B (13.2) |
| | | | | |
| 2030 with Development (Case 3) | B (10.2) | B (10.5) | B (12.3) | B (14.1) |

Table 8
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Signalized Intersection** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **US Route 13 / Delaware Route 10** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | D (43.5) | D (49.6) | D (38.5) | E (62.8) |
| | | | | |
| 2030 without Development (Case 2) [7] | C (27.0) | C (28.2) | C (31.1) | B (15.7) |
| | | | | |
| 2030 with Development (Case 3) [7] | C (32.6) | C (30.5) | C (33.6) | B (17.4) |

[7] Case 2 and Case 3 implement a new geometry which include the construction of an additional through lane on US Route 13 as part of the *HEP KC, US Route 13, Lochmeath Way to Puncheon Run Connector* project.

Table 9
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Delaware Route 10 / Rising Sun Road (Kent Road 29)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) [8] | | | | |
| Eastbound Delaware Route 10 U-Turn | B (10.3) | B (12.7) | B (10.3) | B (13.0) |
| Westbound Delaware Route 10 Left Turn | A (8.4) | A (8.5) | A (8.3) | A (8.6) |
| Northbound Rising Sun Road Approach | F (106.3) | F (53.0) | F (134.7) | F (62.0) |
| Northbound Rising Sun Road Right Turn | A (9.8) | A (9.8) | - | - |

[8] The TIS modeled the Rising Run Road approach as one right turn and one left turn lane, whereas JMT modeled the approach as a through lane with a right turn channelization.

Table 9 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Roundabout** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Delaware Route 10 / Rising Sun Road (Kent Road 29)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2030 without Development (Case 2) [9] | | | | |
| Eastbound Delaware Route 10 Approach | A (4.7) | B (10.9) | A (4.7) | B (11.2) |
| Northwest Rising Sun Road Approach | B (11.1) | A (8.3) | A (11.4) | A (8.5) |
| Northeast East Camden Bypass Approach | A (7.5) | B (10.7) | A (7.6) | B (10.7) |
| Southbound East Camden Bypass Approach | A (6.7) | B (10.7) | A (6.8) | B (10.8) |
| Overall Intersection | A (8.7) | B (10.2) | A (8.9) | B (10.3) |
| | | | | |
| 2030 with Development (Case 3) [9] | | | | |
| Eastbound Delaware Route 10 Approach | A (5.2) | B (13.4) | A (5.2) | B (12.5) |
| Northwest Rising Sun Road Approach | B (13.4) | A (9.8) | B (13.9) | A (9.9) |
| Northeast East Camden Bypass Approach | A (9.2) | B (12.8) | A (9.4) | B (12.7) |
| Southbound East Camden Bypass Approach | A (7.0) | B (13.2) | A (7.2) | B (12.0) |
| Overall Intersection | B (10.1) | B (12.3) | B (10.4) | B (11.8) |

[9] Case 2 and Case 3 implement a new geometry which include the construction of a roundabout as part of the *East Camden Bypass* project.

Table 10
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Signalized Intersection** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **US Route 13 / Old North Road (Kent Road 193)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | B (13.9) | B (15.4) | B (10.5) | B (15.5) |
| | | | | |
| 2030 without Development (Case 2) [10,11] | D (43.1) | C (24.6) | D (46.2) | D (37.8) |
| | | | | |
| 2030 with Development (Case 3) [10,11] | D (43.4) | C (24.4) | D (46.8) | D (37.9) |

[10] Case 2 and Case 3 implement a new geometry which include the construction of a westbound leg as part of the *East Camden Bypass* project.
[11] The TIS and JMT modeled the intersection utilizing side street split phasing for Case 2 and Case 3.

Table 11
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Signalized Intersection [1]** | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Delaware Route 10 / S. Caesar Rodney Avenue (Kent Road 53)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | B (15.3) | B (16.4) | C (21.7) | C (22.9) |
| | | | | |
| 2030 without Development (Case 2) | B (15.9) | C (20.8) | C (22.3) | C (27.2) |
| | | | | |
| 2030 with Development (Case 3) | B (18.2) | C (24.3) | C (24.5) | C (29.5) |

Table 12
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Moose Lodge Road (Kent Road 125) / Orchard Lane / Westville Road (Kent Road 52)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Eastbound Westville Road Left Turn | A (7.4) | A (7.7) | A (7.5) | A (7.8) |
| Westbound Westville Road Left Turn | A (8.2) | A (8.2) | A (8.2) | A (8.2) |
| Northbound Moose Lodge Road Approach | B (14.5) | C (21.2) | B (14.3) | C (20.8) |
| Southbound Orchard Lane Approach | B (13.8) | B (14.5) | B (14.9) | C (15.9) |
| | | | | |
| 2030 without Development (Case 2) | | | | |
| Eastbound Westville Road Left Turn | A (7.4) | A (7.7) | A (7.5) | A (7.8) |
| Westbound Westville Road Left Turn | A (8.3) | A (8.3) | A (8.3) | A (8.4) |
| Northbound Moose Lodge Road Approach | C (16.6) | D (27.8) | C (16.3) | D (26.9) |
| Southbound Orchard Lane Approach | C (15.0) | C (16.0) | C (16.3) | C (18.0) |
| | | | | |
| 2030 with Development (Case 3) | | | | |
| Eastbound Westville Road Left Turn | A (7.4) | A (7.7) | A (7.5) | A (7.8) |
| Westbound Westville Road Left Turn | A (8.5) | A (9.0) | A (8.5) | A (9.1) |
| Northbound Moose Lodge Road Approach | D (30.2) | F (151.7) | D (28.5) | F (141.0)[12] |
| Southbound Orchard Lane Approach | C (20.3) | C (23.2) | C (22.8) | D (28.0) |

[12] 95th percentile queue length is anticipated to be approximately 13 vehicles (325 feet) long.

Table 12 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Moose Lodge Road (Kent Road 125) / Orchard Lane / Westville Road (Kent Road 52)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2030 with Development (Case 3) *with Improvements I* [13] | | | | |
| Eastbound Westville Road Left Turn | A (7.4) | A (7.7) | A (7.5) | A (7.8) |
| Westbound Westville Road Left Turn | A (8.5) | A (9.0) | A (8.5) | A (9.1) |
| Northbound Moose Lodge Road Left Turn/Through | C (20.2) | F (160.5) | C (18.8) | F (149.0)[14] |
| Northbound Moose Lodge Road Right Turn | C (18.1) | B (10.9) | C (18.0) | B (10.9) |
| Southbound Orchard Lane Approach | C (20.3) | C (23.2) | C (22.8) | D (28.0) |
| 2030 with Development (Case 3) *with Improvements II* [15] | | | | |
| Eastbound Westville Road Left Turn | A (7.4) | A (7.7) | A (7.5) | A (7.8) |
| Westbound Westville Road Left Turn | A (8.5) | A (9.0) | A (8.5) | A (9.1) |
| Northbound Moose Lodge Road Left Turn/Through | C (20.6) | F (174.4) | C (18.7) | F (129.3)[16] |
| Northbound Moose Lodge Road Right Turn | C (18.1) | B (10.9) | C (18.0) | B (10.9) |
| Northbound Moose Lodge Road Approach | C (18.4) | F (55.2) | C (18.1) | E (43.0) |
| Southbound Orchard Lane Approach | C (20.4) | C (21.8) | C (22.8) | D (26.2) |

[13] The TIS and JMT modeled the intersection with shared lanes along the southbound, eastbound, and westbound approaches, and one shared left/through lane and one right turn lane along the northbound approach.
[14] 95th percentile queue length is anticipated to be approximately 5 vehicles (125 feet) long.
[15] Both TPD and JMT conducted an additional analysis and modeled the intersection with shared lanes along the southbound and eastbound approaches, one left turn lane and one shared through/right turn lane along the westbound approach, and one shared left/through lane and one right turn lane along the northbound approach. TPD analysis is from HCS whereas JMT is from Synchro.
[16] 95th percentile queue length is anticipated to be approximately 5 vehicles (113 feet) long.

Table 12 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection All-Way Stop Control** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Moose Lodge Road (Kent Road 125) / Orchard Lane / Westville Road (Kent Road 52)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2030 with Development (Case 3) [17] | | | | |
| Eastbound Westville Road Approach | - | - | C (16.9) | B (12.7) |
| Westbound Westville Road Approach | - | - | B (13.2) | F (64.9)[18] |
| Northbound Moose Lodge Road Approach | - | - | C (19.5) | B (14.8) |
| Southbound Orchard Lane Approach | - | - | A (9.8) | B (10.2) |
| Overall Intersection | - | - | C (17.2) | E (42.2) |

[17] JMT modeled the intersection as an all-way stop control intersection.
[18] 95th percentile queue length is anticipated to be approximately 17 vehicles (425 feet) long.

Table 12 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Roundabout** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Moose Lodge Road (Kent Road 125) / Orchard Lane / Westville Road (Kent Road 52)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2030 with Development (Case 3) [19] | | | | |
| Eastbound Westville Road Approach | - | - | A (6.2) | A (7.6) |
| Westbound Westville Road Approach | - | - | A (4.8) | A (9.3) |
| Northbound Moose Lodge Road Approach | - | - | A (9.8) | A (5.8) |
| Southbound Orchard Lane Approach | - | - | A (3.7) | A (6.0) |
| Overall Intersection | - | - | A (7.5) | A (8.1) |

[19] JMT modeled the intersection as a single lane roundabout.

Table 12 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Signalized Intersection** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Moose Lodge Road (Kent Road 125) / Orchard Lane / Westville Road (Kent Road 52)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2030 with Development (Case 3) [20] | - | - | B (14.0) | B (15.9) |

[20] JMT analyzed the intersection as an uncoordinated signal utilizing a cycle length of 120 seconds. The intersection was modeled with shared lanes along all approaches with permissive left turn phasing.

Table 13
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control [1]** | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Southern Boulevard (Kent Road 74) / S. Railroad Avenue (Kent Road 195) [21]** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Eastbound Southern Boulevard Left Turn | A (8.3) | A (8.0) | - | - |
| Westbound Southern Boulevard Left Turn | A (7.6) | A (7.5) | - | - |
| Northbound Business Driveway Approach | C (16.2) | C (15.6) | - | - |
| Southbound South Railroad Avenue Left Turn | B (10.5) | B (14.1) | - | - |
| | | | | |
| 2030 Without Development (Case 2) | | | | |
| Eastbound Southern Boulevard Left Turn | A (8.4) | A (8.1) | - | - |
| Westbound Southern Boulevard Left Turn | A (7.7) | A (7.6) | - | - |
| Northbound Business Driveway Approach | C (16.6) | C (17.6) | - | - |
| Southbound South Railroad Avenue Left Turn | C (18.0) | C (16.0) | - | - |
| | | | | |
| 2030 With Development (Case 3) | | | | |
| Eastbound Southern Boulevard Left Turn | A (8.8) | A (8.5) | - | - |
| Westbound Southern Boulevard Left Turn | A (7.8) | A (7.6) | - | - |
| Northbound Business Driveway Approach | C (24.1) | D (28.1) | - | - |
| Southbound South Railroad Avenue Left Turn | C (22.9) | D (25.7) | - | - |

[21] The TIS modeled the intersection with the southbound South Railroad Avenue approach as stop-controlled, rather than the eastbound Southern Boulevard approach, to generate results in HCM 6th Edition.

Table 13 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control [1]** | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Southern Boulevard (Kent Road 74) / S. Railroad Avenue (Kent Road 195) [22]** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Eastbound Business Driveway Approach | - | - | C (15.4) | B (13.7) |
| Westbound Southern Boulevard Approach | - | - | C (17.3) | C (23.8) |
| Northbound Southern Boulevard Left Turn | - | - | A (0.0) | A (0.0) |
| Southbound South Railroad Avenue Left Turn | - | - | A (8.9) | A (8.0) |
| | | | | |
| 2030 Without Development (Case 2) | | | | |
| Eastbound Business Driveway Approach | - | - | C (17.0) | B (14.5) |
| Westbound Southern Boulevard Approach | - | - | C (20.5) | D (32.1) |
| Northbound Southern Boulevard Left Turn | - | - | A (0.0) | A (0.0) |
| Southbound South Railroad Avenue Left Turn | - | - | A (9.1) | A (8.1) |
| | | | | |
| 2030 With Development (Case 3) | | | | |
| Eastbound Business Driveway Approach | - | - | C (20.1) | C (17.1) |
| Westbound Southern Boulevard Approach | - | - | D (28.8) | F (113.1) |
| Northbound Southern Boulevard Left Turn | - | - | A (0.0) | A (0.0) |
| Southbound South Railroad Avenue Left Turn | - | - | A (9.7) | A (8.3) |

[22] JMT analyzed intersection by switching the southbound and westbound legs of the intersection to allow for HCM 6th Edition analysis of the intersection. Results in the table reflect the adjusted leg configuration.

Table 13 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection All-Way Stop Control [1]** | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Southern Boulevard (Kent Road 74) / S. Railroad Avenue (Kent Road 195) [23]** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 With Development (Case 3) | | | | |
| Eastbound Business Driveway Approach | - | - | A (9.6) | B (10.5) |
| Westbound Southern Boulevard Approach | - | - | B (11.1) | C (17.2) |
| Northbound Southern Boulevard Approach | - | - | F (51.8) | C (19.3) |
| Southbound South Railroad Avenue Left Turn | - | - | A (9.9) | C (24.7) |
| Overall | - | - | E (41.2) | C (20.9) |

[23] JMT analyzed intersection by switching the southbound and westbound legs of the intersection to allow for HCM 6th Edition analysis of the intersection. Results in the table reflect the adjusted leg configuration. All-way stop control is not viable due to geometric constraints and proximity to the railroad crossing.

Table 13 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Roundabout** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Southern Boulevard (Kent Road 74) / S. Railroad Avenue (Kent Road 195)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 With Development (Case 3) [24] | | | | |
| Eastbound Business Driveway Approach | - | - | A (3.6) | A (6.0) |
| Westbound Southern Boulevard Approach | - | - | A (6.6) | A (6.2) |
| Northbound Southern Boulevard Approach | - | - | B (10.7) | A (6.0) |
| Southbound South Railroad Avenue Left Turn | - | - | A (4.3) | A (9.5) |
| Overall | - | - | A (9.3) | A (7.4) |

[24] JMT ran an additional analysis with the intersection as a one lane roundabout.

Table 13 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Signalized Intersection** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Southern Boulevard (Kent Road 74) / S. Railroad Avenue (Kent Road 195)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 With Development (Case 3) [25] | - | - | A (9.7) | B (9.9) |

[25] JMT utilized a cycle length of 60 seconds with permitted left turns for AM and PM peak hours. The private business driveway was omitted from the analysis of this intersection.

Table 14
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Camden-Wyoming Avenue (Kent Road 29) / S. Railroad Avenue** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Westbound Camden-Wyoming Avenue Approach | C (15.2) | C (19.7) | B (14.8) | C (18.1) |
| Southbound S. Railroad Avenue Left Turn | A (8.8) | A (8.2) | A (8.8) | A (8.2) |
| | | | | |
| 2030 Without Development (Case 2) | | | | |
| Westbound Camden-Wyoming Avenue Approach | C (16.4) | C (24.1) | C (16.0) | C (21.6) |
| Southbound S. Railroad Avenue Left Turn | A (9.0) | A (8.3) | A (9.0) | A (8.3) |
| | | | | |
| 2030 With Development (Case 3) | | | | |
| Westbound Camden-Wyoming Avenue Approach | C (20.0) | E (46.2) | C (18.7) | E (37.6)[26] |
| Southbound S. Railroad Avenue Left Turn | A (9.3) | A (8.5) | A (9.3) | A (8.5) |

[26] 95th percentile queue length is anticipated to be approximately 5 vehicles (125 feet) long.

Table 14 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Camden-Wyoming Avenue (Kent Road 29) / S. Railroad Avenue** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 With Development (Case 3) *With Improvements* [27] | | | | |
| Westbound Camden-Wyoming Avenue Approach | - | - | C (16.4) | C (22.6)[28] |
| Southbound S. Railroad Avenue Left Turn | - | - | A (9.3) | A (8.5) |

[27] JMT conducted additional analysis of the intersection, with the addition of westbound right turn lane.
[28] 95th percentile queue length is anticipated to be approximately 2 vehicles (50 feet) long.

Table 14 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection All-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Camden-Wyoming Avenue (Kent Road 29) / S. Railroad Avenue** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 With Development (Case 3) [29] | | | | |
| Westbound Camden-Wyoming Avenue Approach | - | - | B (11.2) | B (13.2) |
| Northbound S. Railroad Avenue Approach | - | - | C (24.1) | B (12.4) |
| Southbound S. Railroad Avenue Approach | - | - | B (13.2) | F (64.1)[30] |
| Overall | - | - | C (18.6) | E (42.9) |

[29] JMT conducted additional analysis at the intersection, with the intersection modeled as an all way stop-controlled intersection.
[30] 95th percentile queue length is anticipated to be approximately 18 vehicles (450 feet) long.

Table 14 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Roundabout** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Camden-Wyoming Avenue (Kent Road 29) / S. Railroad Avenue** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 With Development (Case 3) [31] | | | | |
| Westbound Camden-Wyoming Avenue Approach | - | - | A (7.9) | A (5.6) |
| Northbound S. Railroad Avenue Approach | - | - | A (9.0) | A (6.1) |
| Southbound S. Railroad Avenue Approach | - | - | A (4.9) | A (9.5) |
| Overall | - | - | A (7.6) | A (8.0) |

[31] JMT ran an additional analysis with the intersection as a one lane roundabout.

Table 14 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Signalized Intersection** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Camden-Wyoming Avenue (Kent Road 29) / S. Railroad Avenue** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 With Development (Case 3) [32] | - | - | A (9.4) | B (14.8) |

[32] JMT utilized a cycle length of 60 seconds with permitted left turns for AM and PM peak hours. A roundabout is not a viable option due to geometry constraints and proximity to the railroad crossing.

Table 15
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control [1]** | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **S. Railroad Avenue / Front Street** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Eastbound Mill Street Approach | D (28.0) | D (25.4) | D (25.0) | C (22.7) |
| Westbound Front Street Approach | C (21.4) | F (107.8) | C (21.6) | F (106.7) |
| Northbound South Railroad Avenue Left Turn | A (7.5) | A (8.2) | A (7.6) | A (8.3) |
| Southbound South Railroad Avenue Left Turn | A (9.2) | A (8.1) | A (9.2) | A (8.2) |
| | | | | |
| 2030 Without Development (Case 2) | | | | |
| Eastbound Mill Street Approach | D (30.2) | D (27.3) | D (27.0) | C (23.9) |
| Westbound Front Street Approach | D (27.8) | F (168.6) | D (28.2) | F (160.2) |
| Northbound South Railroad Avenue Left Turn | A (7.5) | A (8.2) | A (7.6) | A (8.3) |
| Southbound South Railroad Avenue Left Turn | A (9.3) | A (8.2) | A (9.4) | A (8.2) |
| | | | | |
| 2030 With Development (Case 3) | | | | |
| Eastbound Mill Street Approach | D (34.1) | D (30.8) | D (29.9) | D (26.6) |
| Westbound Front Street Approach | E (38.9) | F (341.8) | E (39.8) | F (325.6) |
| Northbound South Railroad Avenue Left Turn | A (7.5) | A (8.3) | A (7.6) | A (8.4) |
| Southbound South Railroad Avenue Left Turn | A (9.7) | A (8.3) | A (9.7) | A (8.4) |

Table 15 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection All-Way Stop Control** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **S. Railroad Avenue / Front Street** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 Without Development (Case 2) [33] | | | | |
| Eastbound Mill Street Approach | - | - | A (10.0) | B (10.9) |
| Westbound Front Street Approach | - | - | B (11.7) | C (20.1) |
| Northbound South Railroad Approach | - | - | D (28.1) | C (16.6) |
| Southbound South Railroad Approach | - | - | B (12.6) | E (41.0) |
| Overall | | | C (21.3) | D (28.4) |
| | | | | |
| 2030 With Development (Case 3) [33] | | | | |
| Eastbound Mill Street Approach | - | - | B (10.4) | B (11.7) |
| Westbound Front Street Approach | - | - | B (12.5) | D (27.7) |
| Northbound South Railroad Approach | - | - | E (45.2) | C (21.8) |
| Southbound South Railroad Approach | - | - | B (13.5) | F (74.2) |
| Overall | | | D (31.9) | E (45.9) |

[33] JMT conducted additional analysis at the intersection, with the intersection modeled as an all way stop-controlled intersection with a single-lane for each approach.

Table 15 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Signalized Intersection** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **S. Railroad Avenue / Front Street** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 Without Development (Case 2) [34] | - | - | A (8.6) | B (11.9) |
| | | | | |
| 2030 With Development (Case 3) [34] | - | - | A (8.7) | B (13.9) |

[34] JMT utilized a cycle length of 60 seconds with permitted left turns for AM and PM peak hours. The signal was modeled as actuated-uncoordinated, and splits were optimized.

Table 15 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Roundabout** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **S. Railroad Avenue / Front Street** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 Without Development (Case 2) [35] | | | | |
| Eastbound Mill Street Approach | - | - | A (3.9) | A (6.1) |
| Westbound Front Street Approach | - | - | A (6.1) | A (6.9) |
| Northbound South Railroad Approach | - | - | A (9.4) | A (5.6) |
| Southbound South Railroad Approach | - | - | A (5.0) | A (10.0) |
| Overall | | | A (7.7) | A (7.9) |
| | | | | |
| 2030 With Development (Case 3) [35] | | | | |
| Eastbound Mill Street Approach | - | - | A (4.0) | A (6.6) |
| Westbound Front Street Approach | - | - | A (6.6) | A (7.7) |
| Northbound South Railroad Approach | - | - | B (10.8) | A (6.0) |
| Southbound South Railroad Approach | - | - | A (5.2) | B (11.8) |
| Overall | | | A (8.7) | A (9.0) |

[35] JMT ran additional analysis on Case 2 and Case 3 with the intersection as a one lane roundabout.

Table 16
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection All-Way Stop Control [1]** | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Front Street (Kent Road 193) / North Layton Avenue (Kent Road 190)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Eastbound Front Street Approach | D (31.8) | B (13.8) | D (32.6) | B (14.1) |
| Westbound Front Street Approach | C (24.7) | C (16.4) | D (26.0) | C (16.9) |
| Northbound North Layton Avenue Approach | C (16.7) | B (11.1) | C (17.3) | B (11.3) |
| Southbound North Layton Avenue Approach | C (16.0) | F (61.2) | C (16.5) | F (63.0)[36] |
| Overall | C (24.2) | E (39.2) | D (25.1) | E (40.3) |
| | | | | |
| 2030 Without Development (Case 2) | | | | |
| Eastbound Front Street Approach | E (48.6) | B (14.6) | C (22.9) | B (14.6) |
| Westbound Front Street Approach | D (33.8) | C (17.2) | C (18.4) | C (17.0) |
| Northbound North Layton Avenue Approach | C (19.4) | B (11.4) | B (14.5) | B (11.4) |
| Southbound North Layton Avenue Approach | C (19.1) | F (77.6) | B (14.4) | F (71.6)[37] |
| Overall | D (33.7) | E (48.1) | C (18.5) | E (44.9) |
| | | | | |
| 2030 With Development (Case 3) | | | | |
| Eastbound Front Street Approach | F (82.3) | C (16.6) | D (32.8) | C (16.3) |
| Westbound Front Street Approach | E (40.9) | C (18.6) | C (22.2) | C (18.3) |
| Northbound North Layton Avenue Approach | C (21.0) | B (12.0) | C (15.9) | B (11.9) |
| Southbound North Layton Avenue Approach | C (21.7) | F (127.2) | C (16.1) | F (109.8)[38] |
| Overall | E (48.8) | F (75.7) | C (23.8) | F (66.3) |

[36] 95th percentile queue length is anticipated to be approximately 16 vehicles (400 feet) long.
[37] 95th percentile queue length is anticipated to be approximately 17 vehicles (425 feet) long.
[38] 95th percentile queue length is anticipated to be approximately 23 vehicles (575 feet) long.

Table 16 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection All-Way Stop Control** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Front Street (Kent Road 193) / North Layton Avenue (Kent Road 190)** [39] | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 Without Development *with southbound right turn lane* (Case 2) | | | | |
| Eastbound Front Street Approach | - | - | C (23.1) | B (13.9) |
| Westbound Front Street Approach | - | - | C (18.6) | C (16.1) |
| Northbound North Layton Avenue Approach | - | - | B (14.9) | B (11.3) |
| Southbound North Layton Avenue Approach | - | - | B (13.2) | D (29.9) |
| Overall | - | - | C (18.5) | C (22.7) |
| | | | | |
| 2030 With Development *with southbound right turn lane* (Case 3) | | | | |
| Eastbound Front Street Approach | - | - | D (31.4) | C (15.5) |
| Westbound Front Street Approach | - | - | C (21.4) | C (17.3) |
| Northbound North Layton Avenue Approach | - | - | C (16.1) | B (11.7) |
| Southbound North Layton Avenue Approach | - | - | B (13.9) | E (36.6)[40] |
| Overall | - | - | C (22.7) | D (26.9) |

[39] JMT ran additional analysis on this intersection adding a southbound right turn lane.
[40] 95th percentile queue length is anticipated to be approximately 11 vehicles (275 feet) long.

Table 16 (Continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Signalized Intersection** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Front Street (Kent Road 193) / North Layton Avenue (Kent Road 190)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| | | | | |
| 2030 Without Development (Case 2) [41] | - | - | A (8.8) | B (13.1) |
| | | | | |
| 2030 With Development (Case 3) [41] | - | - | A (9.3) | B (15.2) |

[41] JMT utilized a cycle length of 60 seconds with permitted left turns for AM and PM peak hours. The signal was modeled as actuated-uncoordinated, and splits were optimized.

Table 17
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **New Burton Road (Kent Road 190) / Kent Recreation Center Entrance** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Westbound Kent Recreation Center Entrance Approach | B (12.0) | B (14.4) | B (12.1) | B (14.7) |
| Southbound New Burton Road Left Turn | A (8.3) | A (8.0) | A (8.4) | A (8.1) |
| | | | | |
| 2030 Without Development (Case 2) | | | | |
| Westbound Kent Recreation Center Entrance Approach | B (12.3) | C (15.5) | B (12.4) | B (13.9) |
| Southbound New Burton Road Left Turn | A (8.4) | A (8.1) | A (8.5) | A (8.0) |
| | | | | |
| 2030 With Development (Case 3) | | | | |
| Westbound Kent Recreation Center Entrance Approach | B (13.0) | C (18.4) | B (13.1) | C (15.9) |
| Southbound New Burton Road Left Turn | A (8.6) | A (8.2) | A (8.7) | A (8.1) |

Table 18
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Camden-Wyoming Avenue / Southern Boulevard** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Westbound Camden-Wyoming Avenue Left Turn | A (8.0) | A (8.8) | A (7.9) | A (8.8) |
| Northbound Southern Boulevard Approach | B (10.8) | B (13.1) | B (10.7) | B (13.1) |
| | | | | |
| 2030 Without Development (Case 2) | | | | |
| Westbound Camden-Wyoming Avenue Left Turn | A (8.3) | A (9.0) | A (8.2) | A (9.1) |
| Northbound Southern Boulevard Approach | B (11.2) | B (14.8) | B (11.2) | B (14.7) |
| | | | | |
| 2030 With Development (Case 3) | | | | |
| Westbound Camden-Wyoming Avenue Left Turn | A (8.4) | A (9.2) | A (8.3) | A (9.3) |
| Northbound Southern Boulevard Approach | B (11.8) | C (15.7) | B (11.7) | C (15.6) |

Table 19
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Roundabout [1]** | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Willow Grove Road (Kent Road 53) / Moose Lodge Road / Dundee Road (Kent Road 125)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Eastbound Willow Grove Road Approach | A (7.7) | A (6.0) | A (8.0) | A (6.5) |
| Westbound Willow Grove Road Approach | A (4.9) | A (6.3) | A (5.2) | A (6.6) |
| Northbound Dundee Road Approach | A (7.0) | A (5.5) | A (7.5) | A (5.7) |
| Southbound Moose Lodge Road Approach | A (4.3) | A (7.4) | A (4.3) | A (7.5) |
| Overall | A (6.7) | A (6.3) | A (7.0) | A (6.6) |
| | | | | |
| 2030 without Development (Case 2) | | | | |
| Eastbound Willow Grove Road Approach | A (8.7) | A (6.9) | A (8.9) | A (7.5) |
| Westbound Willow Grove Road Approach | A (5.5) | A (7.3) | A (6.1) | A (7.7) |
| Northbound Dundee Road Approach | A (8.4) | A (6.2) | A (8.8) | A (6.5) |
| Southbound Moose Lodge Road Approach | A (4.6) | A (8.9) | A (4.6) | A (9.3) |
| Overall | A (7.6) | A (7.4) | A (7.9) | A (7.8) |
| | | | | |
| 2030 with Development (Case 3) | | | | |
| Eastbound Willow Grove Road Approach | A (10.0) | A (7.6) | B (10.2) | A (8.2) |
| Westbound Willow Grove Road Approach | A (6.0) | A (8.3) | A (6.7) | A (8.8) |
| Northbound Dundee Road Approach | A (9.0) | A (7.4) | A (9.3) | A (7.7) |
| Southbound Moose Lodge Road Approach | A (5.2) | A (10.0) | A (5.3) | B (10.4) |
| Overall | A (8.4) | A (8.3) | A (8.7) | A (8.8) |

Table 20
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Dundee Road (Kent Road 125) / Saddlebrook Drive** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Westbound Saddlebrook Road Approach | B (10.0) | B (10.6) | B (10.2) | B (10.8) |
| Southbound Dundee Road Left Turn | A (7.6) | A (7.8) | A (7.7) | A (7.8) |
| | | | | |
| 2030 without Development (Case 2) | | | | |
| Eastbound Pond Driveway Approach | - | - | B (12.5) | B (14.7) |
| Westbound Saddlebrook Road Approach | B (10.1) | B (10.8) | B (10.5) | B (11.6) |
| Northbound Dundee Road Left Turn | - | - | A (7.7) | A (7.9) |
| Southbound Dundee Road Left Turn | A (7.7) | A (7.8) | A (7.7) | A (7.8) |
| | | | | |
| 2030 with Development (Case 3) | | | | |
| Eastbound Pond Driveway Approach | - | - | B (13.8) | C (17.0) |
| Westbound Saddlebrook Road Approach | B (10.4) | B (11.7) | B (11.0) | B (12.9) |
| Northbound Dundee Road Left Turn | - | - | A (7.8) | A (8.1) |
| Southbound Dundee Road Left Turn | A (7.7) | A (8.0) | A (7.8) | A (8.0) |

Table 21
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Dundee Road (Kent Road 125) / Bison Road (Kent Road 234)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Westbound Bison Road Approach | A (9.3) | A (9.9) | A (9.4) | B (10.0) |
| Southbound Dundee Road Left Turn | A (7.7) | A (7.6) | A (7.8) | A (7.7) |
| | | | | |
| 2030 without Development (Case 2) | | | | |
| Westbound Bison Road Approach | A (9.4) | B (10.1) | A (9.5) | B (10.2) |
| Southbound Dundee Road Left Turn | A (7.8) | A (7.7) | A (7.8) | A (7.7) |
| | | | | |
| 2030 with Development (Case 3) | | | | |
| Westbound Bison Road Approach | A (9.5) | B (10.8) | A (9.7) | B (10.7) |
| Southbound Dundee Road Left Turn | A (7.8) | A (7.9) | A (7.9) | A (7.8) |

Table 22
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Bison Road (Kent Road 234) / Upper King Road** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Eastbound Bison Road Approach | B (14.8) | C (18.6) | B (14.6) | C (18.2) |
| Northbound Upper King Road Left Turn | A (7.6) | A (8.6) | A (7.7) | A (8.6) |
| | | | | |
| 2030 without Development (Case 2) | | | | |
| Eastbound Bison Road Approach | C (16.9) | C (22.6) | C (16.6) | C (22.0) |
| Northbound Upper King Road Left Turn | A (7.7) | A (8.8) | A (7.7) | A (8.9) |
| | | | | |
| 2030 with Development (Case 3) | | | | |
| Eastbound Bison Road Approach | C (18.3) | D (25.1) | C (17.9) | C (24.1) |
| Northbound Upper King Road Left Turn | A (7.7) | A (8.9) | A (7.8) | A (9.0) |

Table 23
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Savannah Farm Development
Report Dated: September 1, 2023
Prepared by: Traffic Planning and Design, Inc.

| **Unsignalized Intersection Two-Way Stop Control (T-Intersection)** [1] | **LOS per TIS** | | **LOS per JMT** | |
|---|---|---|---|---|
| **Main Street (Kent Road 54) / Dundee Road (Kent Road 125)** | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| 2023 Existing (Case 1) | | | | |
| Eastbound Main Street Left Turn | A (7.7) | A (7.9) | A (7.8) | A (8.0) |
| Southbound Dundee Road Approach | B (12.3) | B (13.7) | B (12.8) | B (14.4) |
| | | | | |
| 2030 without Development (Case 2) | | | | |
| Eastbound Main Street Left Turn | A (7.7) | A (8.0) | A (7.8) | A (8.1) |
| Southbound Dundee Road Approach | B (12.8) | B (14.4) | B (13.1) | C (15.3) |
| | | | | |
| 2030 with Development (Case 3) | | | | |
| Eastbound Main Street Left Turn | A (7.8) | A (8.1) | A (7.8) | A (8.2) |
| Southbound Dundee Road Approach | B (13.8) | C (15.7) | B (14.2) | C (16.9) |