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

JENNIFER COHAN
SECRETARY

August 14, 2018

Ms. Betty Tustin
The Traffic Group, Inc.
104 Kenwood Court
Berlin, Maryland 21811

Dear Ms. Tustin:

The enclosed Traffic Impact Study (TIS) review letter for the proposed **Anchors Run (f.k.a. Insight at Lewes Run)** (Tax Parcels (234-6.00-19.00 & 20.01) 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 review letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel
Project Engineer

TEB:km
Enclosures
cc with enclosures: Mr. Brock Parker, Parker and Associates, Inc.
Ms. Constance C. Holland, Office of State Planning Coordination
Ms. Janelle Cornwell, Sussex County Planning and Zoning
Mr. Andrew Parker, McCormick Taylor, Inc.
DelDOT Distribution

DelDOT

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Robert McCleary, Director, Transportation Solutions (DOTS)
Drew Boyce, Director, Planning
Mark Luszcz, Chief Traffic Engineer, Traffic, DOTS
Michael Simmons, Assistant Director, Project Development South, DOTS
J. Marc Coté, Assistant Director, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Peter Haag, Traffic Studies Manager, Traffic, DOTS
Alastair Probert, South District Engineer, South District
Gemez Norwood, South District Public Works Manager, South District
Jay Sammons, South District Permit Supervisor, South District
Steve Sisson, Sussex Subdivision Review Coordinator, Development Coordination
David Dooley, Service Development Planner, Delaware Transit Corporation
Mark Galipo, Traffic Engineer, Traffic, DOTS
Sarah Coakley, Principal Planner, Statewide & Regional Planning
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Susanne Laws, Sussex County Subdivision Reviewer, Development Coordination
Claudy Joinville, Project Engineer, Development Coordination

August 14, 2018

Mr. Troy E. Brestel
Project Engineer
DelDOT Division of Planning
P.O. Box 778
Dover, DE 19903

RE: Agreement No. 1773
Traffic Impact Study Services
Task No. 1A Subtask 6A – Anchors Run (fka Insight at Lewes Run)

Dear Mr. Brestel:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the Anchors Run residential development (formerly known as Insight at Lewes Run) prepared by The Traffic Group, Inc. dated September 28, 2017. The Traffic Group prepared the report in a manner generally consistent with DelDOT's *Development Coordination Manual* (formerly *Standards and Regulations for Subdivision Streets*).

The TIS evaluates the impacts of the Anchors Run residential development, proposed to be located on the east side of Delaware Route 23 (Beaver Dam Road / Sussex Road 285), between Hopkins Road (Sussex Road 286) and Stockley Road (Sussex Road 280) in Sussex County, Delaware. The proposed development would consist of 263 single-family detached homes on a 68.6 acre portion of a 131.67 acre assemblage of parcels. One full access driveway is proposed on Beaver Dam Road (approximately half way between Hopkins Road and Butcher Lane). Construction is anticipated to be complete by 2024.

It is noted that during the TIS review and upon subsequent coordination between DelDOT and the developer, it was determined that the proposed development would have two site access points on Beaver Dam Road. Both of these would be full-movement single-lane roundabouts. The northern access intersection would be a three-leg roundabout. The southern access intersection would be a four-leg roundabout that would serve not only the site but also include realigned Stockley Road as the fourth leg. The developer presented concepts for both of the site access roundabouts and DelDOT agreed that they could proceed into design with those concepts.

The land is currently zoned AR-1 (agricultural residential) within Sussex County, and the developer does not intend to modify the existing zoning.

Currently, there are no DelDOT capital projects within the area of study. It is noted, however, that the proposed development is located within the boundary of the Henlopen Transportation Improvement District (TID) as presently contemplated by Sussex County and DelDOT. The TID is a planning concept that seeks to proactively align transportation infrastructure spending and improvements with land use projections and future development within the designated district. When intersection improvements are identified as part of the Henlopen TID,

contributions would be required from the developer of Anchors Run. Presently, DelDOT and the County are still working toward establishing the TID but when and if that is done, it may be appropriate for the developer to exchange some of the obligations addressed in this letter for an obligation to contribute to the TID.

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

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

Intersection	***Existing Traffic Control***	***Situations for which deficiencies occur***
Beaver Dam Road and Proposed Site Access	Does not exist; Proposed one-way stop (T-intersection)	2024 PM with Anchors Run (case 3)
Beaver Dam Road and Stockley Road	One-way stop (T-intersection)	2024 AM with Anchors Run (case 3)
Beaver Dam Road and Hollymount Road (Sussex Road 48)	All-way stop	2024 PM without Anchors Run (case 2); 2024 PM with Anchors Run (case 3)
Delaware Route 5 and Hollyville Road / Hollymount Road	All-way stop (flashing red signal)	2024 PM with Anchors Run (case 3)

The unsignalized intersection of Beaver Dam Road and Proposed Site Access exhibits LOS deficiencies during future conditions with the proposed development. The westbound site egress movement is expected to operate at LOS E with an expected 95th percentile queue length of approximately two vehicles. The westbound approach is proposed to have separate left-turn and right-turn lanes, and turn lanes for entering traffic from Beaver Dam Road are also proposed. LOS deficiencies are contained to the site egress with acceptable 95th percentile queue lengths. Subsequent to the TIS submission, it was determined that this site access intersection will be designed and constructed as a three-leg single-lane roundabout.

The unsignalized intersection of Beaver Dam Road and Stockley Road exhibits LOS deficiencies during future conditions with the proposed development. The eastbound Stockley Road approach is expected to operate at LOS E in the AM peak hour with 95th percentile queue lengths of approximately three vehicles. The TIS assumed a flared minor street approach in their capacity analysis, which resulted in no LOS deficiency; however, based on the existing intersection geometry and field observations, we determined that it is more accurate to analyze this intersection without coding the flared approach. As such, the minor street approach was found to have the aforementioned LOS deficiencies, and a separate eastbound right-turn lane was to be recommended. However, subsequent to the TIS submission, it was determined that this intersection will be designed and constructed as a single-lane roundabout and it will include a

second site access driveway, opposite the realigned Stockley Road approach, as the fourth leg of the roundabout.

The all-way stop-controlled intersection of Beaver Dam Road and Hollymount Road exhibits LOS deficiencies during future conditions without and with the proposed development. With construction of Anchors Run, the overall intersection is anticipated to operate at LOS F during the PM peak hour, with the southbound approach having particularly significant delays and queue lengths. The developer proposes to mitigate these LOS deficiencies by constructing a southbound right-turn lane. If this turn lane is added, we recommend that it be constructed as a channelized turn with yield control; this configuration should allow drivers to more easily identify who has the right-of-way at the intersection at any given time. Additionally if the turn lane is added, a minimum of a five-foot bicycle lane should be dedicated and striped with appropriate markings for bicyclists through the turn lane.

While the developer-proposed improvement for the intersection of Beaver Dam Road and Hollymount Road described immediately above would mitigate the LOS deficiencies, we also investigated the alternative of converting the intersection to a single-lane roundabout. Based on the analysis, it is anticipated that a roundabout would operate well at this location, with all approaches expected to operate at LOS A during the weekday AM, weekday PM, and Saturday mid-day peak hours. This represents an improvement over the expected operations of the configuration proposed in the TIS. In addition, the crash data indicates that 15 angle crashes occurred at this intersection over a three-year period. A single-lane roundabout would greatly reduce the likelihood of angle crashes at this intersection and may be easier to navigate than an all-way stop with multiple lanes on the southbound approach. It is noted that either a southbound right-turn lane or a roundabout may impact an existing fire hydrant, utility box, and irrigation system on the northwest corner of the intersection.

While both mitigation alternatives described above were evaluated for the intersection of Beaver Dam Road and Hollymount Road, as noted below in Item No. 4 the decision on which improvement to implement (a southbound right-turn lane or a single-lane roundabout) will be based on an upcoming recommendation from the Henlopen TID study. Whichever improvement is ultimately recommended, the developer would make an equitable share contribution toward implementation of the selected improvement.

The all-way stop-controlled intersection of Delaware Route 5 and Hollyville Road / Hollymount Road exhibits LOS deficiencies during future conditions with the proposed development. With construction of Anchors Run, the overall intersection is anticipated to operate at LOS F during the PM peak hour, with LOS F conditions and lengthy queues on the westbound and southbound approaches. The applicant proposes to mitigate these LOS deficiencies by converting the existing flashing traffic signal at the intersection (currently flashes red on all approaches) to a fully operational (non-flashing) traffic signal. This improvement should be pursued.

Should the County choose to approve the proposed development, the following items should be incorporated into the site design and reflected on the record plan by note or illustration. All

applicable agreements (i.e. letter agreements for off-site improvements and traffic signal agreements) should be executed prior to entrance plan approval for the proposed development.

1. The developer should improve Beaver Dam Road, from the southern limit of where improvements will be needed for construction of the proposed southern site access roundabout to the Hopkins Road intersection just north of the site, in a manner to be determined by DelDOT. The developer should coordinate with DelDOT's Development Coordination Section during the site plan review process regarding details for these roadway improvements.

2. The developer should construct the northern site access on Beaver Dam Road as a three-leg single-lane roundabout. The developer should coordinate with DelDOT's Development Coordination Section during the site plan review process regarding details for the design and implementation of this roundabout.

3. The developer should construct the southern site access on Beaver Dam Road as a four-leg single-lane roundabout that includes realigned Stockley Road as the fourth leg. The developer should coordinate with DelDOT's Development Coordination Section during the site plan review process regarding details for the design and implementation of this roundabout and the realigned portion of Stockley Road.

4. For the intersection of Beaver Dam Road and Hollymount Road, the developer should coordinate with DelDOT regarding an equitable share contribution toward improvements at this intersection. The specific improvements are still to be determined, but will consist of either a separate right-turn lane on the southbound Beaver Dam Road approach or converting the intersection to a single-lane roundabout. The decision on which improvement to implement will be based on an upcoming recommendation from the Henlopen TID study. If the recommendation is for a southbound right-turn lane, the initial recommended minimum turn-lane length is 125 feet (excluding taper). The developer should coordinate with DelDOT's Development Coordination Section during the site plan review process regarding the future improvement for this intersection, including type and timing of mitigation, design details, and amount of the contribution.

5. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Delaware Route 5 and Hollyville Road / Hollymount Road to convert the existing flashing traffic signal to a fully operational signal. The traffic signal agreement should provide for equipment upgrades and activation of the fully operational signal at DelDOT's discretion. The developer should coordinate with DelDOT regarding an equitable share contribution toward the cost of implementing this change to the signal.

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

    a. Appropriate accommodations for bicyclists must be provided along Beaver Dam Road, including through the two proposed roundabouts. The developer should

coordinate with DelDOT's Development Coordination Section during the site plan review process to determine specific design requirements.

b. Appropriate bicycle symbols, directional arrows, pavement markings, and signing should be included along bicycle facilities and turn lanes within the project limits.
c. Utility covers should be made flush with the pavement.
d. If a clubhouse or other community facility is constructed as shown on the conceptual site plan, bike parking should be provided near the building entrances. Where the building architecture provides for an awning or other overhang, the bike parking should be covered.
e. A minimum 15-foot wide easement from the edge of the right-of-way should be dedicated to DelDOT within the site frontage along Beaver Dam Road.
f. Within the easement along Beaver Dam Road, a minimum of a ten-foot wide shared-use path that meets current AASHTO and ADA standards should be constructed along the site frontage. The shared-use path should have a minimum of a five-foot buffer from the roadway. The shared-use path should connect to the shoulder of Beaver Dam Road in accordance with DelDOT's *Shared Use Path and/or Sidewalk Termination Policy* dated June 19, 2014. The developer should coordinate with DelDOT's Development Coordination Section to determine exact locations and details of the shared-use path connections at the property boundaries.
g. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings within the development. Type 3 curb ramps are discouraged.
h. Internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the development. These sidewalks should each be a minimum of five feet wide (with a minimum of a five-foot buffer from the roadway) and should meet current AASHTO and ADA standards. These internal sidewalks should connect to the frontage shared-use path.
i. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to prevent vehicular overhang onto the sidewalk.
j. A shared-use path should be constructed to connect the proposed Anchors Run development to the existing Oakwood residential development located to the east. There appears to be a viable location to construct this interconnection path where it would tie in to the existing sidewalk along the west side of North Acorn Way in Oakwood.

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

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

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

Sincerely,

McCormick Taylor, Inc.

Andrew J. Parker, P.E., PTOE
Project Manager

Enclosure

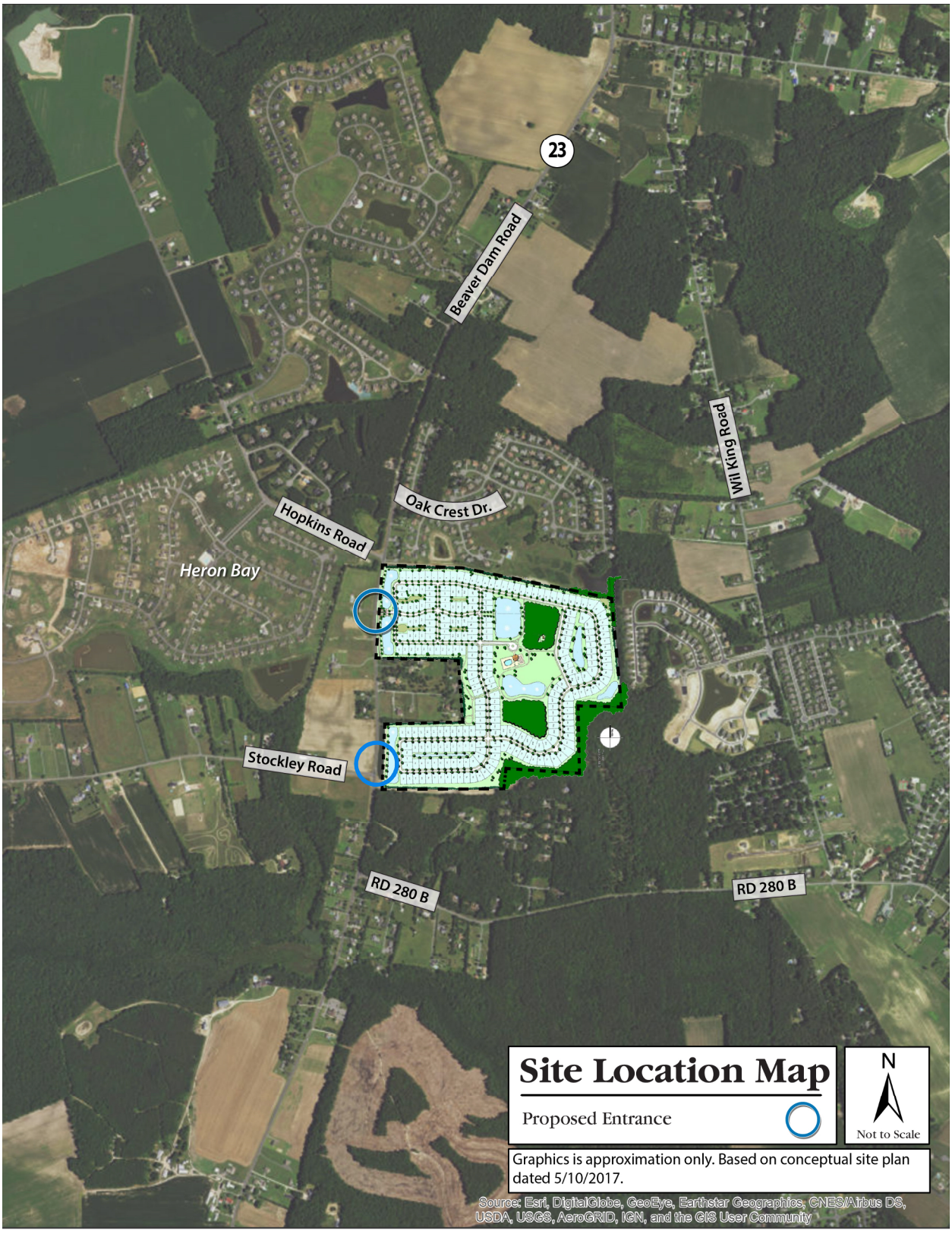
General Information

Report date: September 28, 2017
Prepared by: The Traffic Group, Inc.
Prepared for: Insight Land Company, LLC
Tax parcel: 234-6.00-19.00 and 20.01
Generally consistent with DelDOT's *Development Coordination Manual*: Yes

Project Description and Background

Description: The proposed residential development would include 263 single-family detached homes.
Location: The Anchors Run residential development is proposed to be located on the east side of Delaware Route 23 (Beaver Dam Road / Sussex Road 285), between Hopkins Road (Sussex Road 286) and Stockley Road (Sussex Road 280) in Sussex County, Delaware. A site location map is included on page 8.
Amount of land to be developed: approximately 68.6 acres of a 131.67 acre assemblage of parcels
Land use approval(s) needed: Subdivision approval. The land is currently zoned AR-1 (agricultural residential) within Sussex County, and the developer does not intend to modify the existing zoning.
Proposed completion date: 2024
Proposed access locations: One full access driveway is proposed on Beaver Dam Road (approximately half way between Hopkins Road and Butcher Lane).
Daily Traffic Volumes (per DelDOT Traffic Summary 2016):

- 2016 Average Annual Daily Traffic on Beaver Dam Road: 4,920 vpd


23
Beaver Dam Road
Wil King Road
Oak Crest Dr.
Hopkins Road
Heron Bay
Stockley Road
RD 280 B
RD 280 B
Site Location Map
Proposed Entrance
N
Not to Scale
Graphics is approximation only. Based on conceptual site plan dated 5/10/2017.
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

2015 Delaware Strategies for State Policies and Spending

Location with respect to the Strategies for State Policies and Spending Map of Delaware: The proposed Anchors Run development is located within an Investment Level 4 area.

Investment Level 4

Investment Level 4 areas are predominantly rural or agricultural and contain much of Delaware's open space and natural areas. These areas are home to agribusiness activities, farm complexes, and small settlements/unincorporated communities that are often found at historic crossroads. Investment Level 4 areas may also have scattered single-family detached residential homes. Existing transportation facilities and services will be maintained by the state while they continue to manage the transportation system in a manner that will support the preservation of the natural environment and agricultural business. Construction of new homes is discouraged; housing policies will focus on maintenance and rehabilitation of existing homes and communities. In addition, the Department of Education does not support the construction of new educational facilities in Investment Level 4 areas. The educational needs of Investment Level 4 areas would likely need to be met through facilities located in Investment Level 1-3 areas.

In general, the state will limit its investments in public infrastructure systems; investments should address existing public health, safety, or environmental risks, preserve rural character and natural resources, and discourage further development that is unrelated to the area's needs.

Proposed Development's Compatibility with Strategies for State Policies and Spending:
The proposed Anchors Run residential development is comprised of 263 single-family detached homes and is located within an Investment Level 4 area. New housing developments are discouraged in such areas. The state would be responsible for providing many public services to the residents of the development, such as school construction and transportation, police and fire/EMS services, and additional maintenance of the transportation system. Given the location of the development in an Investment Level 4 area, the state generally does not intend to make these significant investments. Rather, the state intends to support agricultural activities and protect the rural and natural character of these areas. Based on the *2015 Delaware Strategies for State Polices and Spending* document, the proposed development does not appear to be compatible with an Investment Level 4 area and additional discussion is required.

Comprehensive Plan

Sussex County Comprehensive Plan:
(Source: Sussex County Comprehensive Plan Update, June 2008)

The Sussex County Comprehensive Plan Future Land Use Map indicates that the proposed development parcels are within a "low density area" (categorized as a "rural area"). In these areas, the county expects farming to co-exist with certain types of residential uses. Similar to all other lands designated as low density areas in Sussex County, the site of the proposed development is zoned AR-1 (agricultural residential). This zoning designation allows for single-family detached homes at two homes per acre on lots containing a minimum of ½ acre if the

development connects to central sewers. Otherwise, single-family detached homes are permitted on minimum ¾ acre lots. Two homes per acre are also allowed where a cluster-style plan is used and 30% of the tract is preserved in permanent open space. Sussex County also requires landscaped buffers to physically separate new housing developments from the surrounding natural environment.

Based on the Sussex County Comprehensive Plan, the following major guidelines should apply to future growth in low density areas:

Permitted uses – The primary land uses should be agricultural activities and single-family detached homes. Business or industrial uses should only be permitted to support or address the needs of these two uses.

Densities – The minimum lot size should be ½ acre for lots with central sewer service and ¾ acre for lots with on-site septic systems. A cluster-style plan should permit overall site densities of two homes per acre, provided significant open space is preserved and the development connects to a central sewer.

Infrastructure – Developments where lots are smaller than ¾ acre should require connection to a central sewer.

Proposed Development's Compatibility with Comprehensive Plan: The Anchors Run residential development would consist of 263 single-family detached homes on a 68.6-acre portion of a 131.67-acre assemblage of parcels. It appears that a cluster style development is proposed, significant open space is preserved, and the tract connects to public utility sewers. Therefore, the comprehensive plan allows for a maximum overall site density of two homes per acre. The construction of 263 single-family homes on 131.67 acres results in an overall site density of just under two homes per acre. The site is currently zoned AR-1 (agricultural residential) within Sussex County, and no rezoning is proposed. The purpose of this zoning district is to protect agricultural lands and activities and other valuable natural resources. Low-density housing is permitted along with churches, recreational facilities, and accessory uses as may be necessary or is normally compatible with residential surroundings. While there are issues relating to the use and size of the proposed development in this rural area that require further discussion, based on the elements described above it appears the proposed development may be compatible with the current version of the Sussex County Comprehensive Plan.

Relevant Projects in the DelDOT Capital Transportation Program

Currently, there are no DelDOT capital projects within the area of study. It is noted, however, that the proposed development is located within the boundary of the Henlopen Transportation Improvement District (TID) as presently contemplated by Sussex County and DelDOT. The TID is a planning concept that seeks to proactively align transportation infrastructure spending and improvements with land use projections and future development within the designated district. When intersection improvements are identified as part of the Henlopen TID, contributions would be required from the developer of Anchors Run. Presently, DelDOT and the County are still working toward establishing the TID but when and if that is done, it may be appropriate for the

developer to exchange some of the obligations addressed in this letter for an obligation to contribute to the TID.

Trip Generation

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

- 263 Single-Family Detached Homes (ITE Land Use Code 210)

Table 1
ANCHORS RUN PEAK HOUR TRIP GENERATION

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour			SAT Peak Hour		
	In	Out	Total	In	Out	Total	In	Out	Total
263 single-family detached homes	48	146	194	158	93	251	131	112	243
TOTAL TRIPS	**48**	**146**	**194**	**158**	**93**	**251**	**131**	**112**	**243**

Table 2
ANCHORS RUN DAILY TRIP GENERATION

Land Use	Weekday Daily			Saturday Daily		
	In	Out	Total	In	Out	Total
263 single-family detached homes	1278	1278	2556	1248	1248	2495
TOTAL TRIPS	**1278**	**1278**	**2556**	**1248**	**1248**	**2495**

Overview of TIS

Intersections examined:

1) Beaver Dam Road & Proposed Site Access
2) Beaver Dam Road & Hopkins Road
3) Beaver Dam Road & Stockley Road
4) Beaver Dam Road & Hollymount Road
5) Delaware Route 5 & Hollyville Road / Hollymount Road

Conditions examined:

1) 2017 existing conditions (case 1)
2) 2024 without Anchors Run residential development (case 2)
3) 2024 with Anchors Run residential development (case 3)

Peak hours evaluated: Weekday morning and evening and Saturday mid-day peak hours

Committed developments considered:

1) Dellwood (100 single-family detached homes)
2) Coastal Club (260 additional single-family detached homes & 163 additional townhomes)
3) Pelican Point (332 additional single-family detached homes)
4) Independence (198 additional single family homes)
5) Vineyards at Nassau Valley (TIS states that this development has no impact on the study intersections)
6) Lewes Crossing (82 additional single-family detached homes)
7) Woodbridge (188 single-family detached homes)
8) The Woods at Burton Pond (165 single-family detached homes)
9) Heron Bay (64 additional single-family detached homes)

Intersection Descriptions

1) Beaver Dam Road & Proposed Site Access

Type of Control: no existing intersection; proposed one-way stop (T-intersection)
Northbound approach: (Beaver Dam Road) existing one thru lane; proposed one thru lane and one right-turn lane
Southbound approach: (Beaver Dam Road) existing one thru lane; proposed one left-turn lane and one thru lane
Westbound approach: (Proposed Site Access) proposed one left-turn lane and one right-turn lane, stop-controlled

2) Beaver Dam Road & Hopkins Road

Type of Control: one-way stop (T-intersection)
Northbound approach: (Beaver Dam Road) one shared left-turn/thru lane
Southbound approach: (Beaver Dam Road) one shared thru/right-turn lane
Eastbound approach: (Hopkins Road) one shared left-turn/right-turn lane, stop-controlled

3) Beaver Dam Road & Stockley Road

Type of Control: one-way stop (T-intersection)
Northbound approach: (Beaver Dam Road) one shared left-turn/thru lane
Southbound approach: (Beaver Dam Road) one shared thru/right-turn lane
Eastbound approach: (Stockley Road) one shared left-turn/right-turn lane, stop-controlled

4) Beaver Dam Road & Hollymount Road
Type of Control: all-way stop (four-leg intersection)
Northbound approach: (Beaver Dam Road) one shared left-turn/thru/right-turn lane, stop-controlled
Southbound approach: (Beaver Dam Road) existing one shared left-turn/thru/right-turn lane, stop-controlled; proposed one shared left-turn/thru lane and one right-turn lane, stop-controlled
Eastbound approach: (Hollymount Road) one shared left-turn/thru/right-turn lane, stop-controlled
Westbound approach: (Hollymount Road) one shared left-turn/thru/right-turn lane, stop-controlled

5) Delaware Route 5 & Hollyville Road / Hollymount Road
Type of Control: existing all-way stop / flashing red signal (four-leg intersection); proposed fully operational traffic signal (four-leg intersection)
Northbound approach: (Delaware Route 5) one shared left-turn/thru/right-turn lane (right-turn is channelized with yield control at the intersection)
Southbound approach: (Delaware Route 5) one shared left-turn/thru/right-turn lane (right-turn is channelized with yield control at the intersection)
Eastbound approach: (Hollyville Road) one shared left-turn/thru/right-turn lane
Westbound approach: (Hollymount Road) one shared left-turn/thru/right-turn lane

Safety Evaluation

Crash Data: McCormick Taylor reviewed the Delaware Crash Analysis Reporting System (CARS) data that was provided in Appendix B of the TIS. The data includes reportable crashes that occurred within a one-tenth mile radius of the study intersections from August 15, 2014 through August 15, 2017.

Of particular concern for safety evaluations are fatal crashes and crashes involving pedestrians or pedalcyclists. During the study period, no fatal crashes were reported. One crash involved a pedalcyclist, and one crash involved a pedestrian. A breakdown of all crashes by intersection is provided below.

1. Beaver Dam Road & Proposed Site Access

Since this intersection does not currently exist, it was not included in the crash data analysis.

2. Beaver Dam Road & Hopkins Road

At the intersection of Beaver Dam Road & Hopkins Road there was a total of four crashes. Of the four crashes, three (75%) resulted in personal injury. One of the personal injury crashes involved a pedestrian. There were no alcohol related crashes. The types of crashes were not a collision between two vehicles (50%), rear-end (25%), and other (25%). The crashes occurred during daylight (75%) or dark-not lighted (25%) hours with dry (100%) surface conditions. The primary contributing circumstances included failed to yield right of way (25%), driver

inattention, distraction, or fatigue (25%), and deer in roadway (25%). There appears to be a coding error in the CARS data for the primary contributing circumstance associated with one of the crashes.

3. Beaver Dam Road & Stockley Road

At the intersection of Beaver Dam Road & Stockley Road there was a total of five crashes. Of the five crashes, three (60%) resulted in personal injury. One personal injury crash was alcohol-related, and a separate personal injury crash involved a pedalcyclist. The types of crashes were not a collision between two vehicles (60%) and sideswipe, same direction (40%). The crashes occurred during dark-not lighted (60%) and daylight (40%) hours with dry (60%) or wet (40%) surface conditions. The primary contributing circumstances included failed to yield right of way (40%), driving under the influence (20%), driver inattention, distraction, or fatigue (20%), and deer in the roadway (20%).

4. Beaver Dam Road & Hollymount Road

At the intersection of Beaver Dam Road & Hollymount Road there was a total of 23 crashes. Of the 23 crashes, nine (39%) resulted in personal injury. None of the crashes involved a pedestrian or a pedalcyclist. Two of the personal injury crashes were alcohol related. The types of crashes were angle (65%), rear-end (17%), not a collision between two vehicles (13%), and sideswipe, opposite direction (4%). The crashes occurred during daylight (78%), dark-lighted (17%), or dark-not lighted (4%) hours. The crashes occurred on a variety of surface conditions, including dry (70%), wet (13%), ice/frost (9%), snow (4%), and slush (4%). The most common primary contributing circumstances included passed stop sign (22%), driver inattention, distraction, or fatigue (17%), and disregard traffic signal (13%). Since this intersection is an all-way stop, it is likely that crashes coded as “disregard traffic signal” involved a driver passing a stop sign.

5. Delaware Route 5 & Hollyville Road / Hollymount Road

At the intersection of Delaware Route 5 & Hollyville Road / Hollymount Road there was a total of 17 crashes. Of the 17 crashes, one (6%) resulted in personal injury. None of the crashes involved a pedestrian or a pedalcyclist, and there were no alcohol related crashes. The types of crashes were angle (59%), not a collision between two vehicles (18%), other (18%), and sideswipe, same direction (6%). The crashes occurred during daylight (82%), dawn (12%), or dark-not lighted (6%) hours. The crashes occurred on a variety of surface conditions, including dry (59%), snow (18%), wet (12%), ice/frost (6%), and slush (6%). The most common primary contributing circumstances included failed to yield right of way (29%), passed stop sign (18%), and driving in a careless or reckless manner (18%).

Sight Distance: There is a slight horizontal curve on Beaver Dam Road at the approximate location of the proposed site driveway. The impacts of this horizontal curve on available sight distance should be analyzed as part of the site plan review process to confirm that adequate sight distance will be available for all proposed movements at this intersection.

Otherwise, the study area generally consists of straight and flat roadways and there are few potential visual obstructions. Sight distance appears adequate throughout the study area (other than perhaps at the proposed site driveway due to the issue described above). No problematic sight distance issues have been reported or indicated by crash data, and no major problems were noted during field observations.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: The Traffic Group and McCormick Taylor both contacted representatives of the Delaware Transit Corporation (DTC) to determine existing and planned transit services near the proposed development. The nearest existing transit service runs along Delaware Route 24 (John J Williams Highway) and includes DART routes 207 and 215. The nearest existing transit stops are located on Delaware Route 24 at Peddlers Village (approximately 2.3 miles from the proposed residential development).

Planned transit service: Based on coordination with DTC representatives, there are currently no plans to provide transit service along Beaver Dam Road near the proposed development.

Existing bicycle and pedestrian facilities: According to the Sussex County bicycle map, Beaver Dam Road is classified as a "high traffic connector bicycle route with a bikeway." Hollymount Road (between Beaver Dam Road and Delaware Route 5) and Hollyville Road are both classified as "connector bicycle routes without a bikeway. Delaware Route 5 is classified as a "regional bicycle route with bikeway." Marked bicycle lanes are provided along both sides of Hopkins Road between Beaver Dam Road and Oak Crest Pond Drive.

There are few existing pedestrian facilities throughout the study area. There are no marked crosswalks, curb ramps, or pedestrian signals at the study intersections. There are no sidewalks along any of the roadways in the study area. One mid-block crosswalk is provided across Beaver Dam Road just south of Ritter Lane that connects St. George's Chapel and cemetery.

Planned bicycle and pedestrian facilities: The Traffic Group contacted a representative of DelDOT's Local Systems Planning Section to determine pedestrian and bicycle accommodations for the proposed development. Anthony Aglio requested roadway improvements along the site frontage on Beaver Dam Road to meet the current functional class standard, with bicycle lanes provided through any proposed right-turn lanes. Bicycle lanes were requested if any intersection improvements are warranted and shoulders exist on the roadway prior to the intersection. He indicated that easements would be required along the site frontages. He also requested an interconnection to the existing Oakwood residential development to the east for either all travel modes or non-motorized travel only.

The developer plans to construct the intersection of Beaver Dam Road & Proposed Site Access. The improvements would include a southbound left-turn lane, a northbound right-turn lane, and a northbound bicycle lane along the right-turn lane.

The developer plans to improve the intersection of Beaver Dam Road & Hollymount Road by constructing a southbound right-turn lane. Based on the applicant's correspondence with

DelDOT, it appears that a southbound bicycle lane should be provided along the proposed right-turn lane.

Based on DelDOT's *Development Coordination Manual* (section 3.5.4.2), it appears that a shared-use path and/or sidewalk will be required along the site frontage and that sidewalks will be required along at least one side of the internal street network. John Fiori, DelDOT Bicycle Coordinator, also provided input and stated that a 10' shared-use path will be required along the property frontage.

Previous Comments

All comments from DelDOT's scoping letter, traffic count review, preliminary TIS (PTIS) review and other correspondence appear to be addressed in the final TIS submission.

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

1) For unsignalized intersections, the TIS and McCormick Taylor applied heavy vehicle factors (HV) by movement using existing data. For signalized intersections, the TIS and McCormick Taylor applied HV by lane group using existing data. The TIS and McCormick Taylor generally assumed future HV to be the same as existing HV at all intersections. Both the TIS and McCormick Taylor assumed 3% HV for future movements to and from the proposed site access point (as per DelDOT's Development Coordination Manual).

2) For existing conditions, the TIS and McCormick Taylor determined, for each intersection, overall intersection peak hour factors (PHF). For future conditions, the TIS and McCormick Taylor assumed existing PHF for all intersections other than the proposed site entrance. At that location, both the TIS and McCormick Taylor assumed a PHF of 0.92 (as per DelDOT's Development Coordination Manual).

3) For analyses of all signalized intersections, the TIS and McCormick Taylor used a base saturation flow rate of 1,750 pcphpl per DelDOT's Development Coordination Manual.

4) The TIS and McCormick Taylor used different signal timings when analyzing the proposed traffic signal at Delaware Route 5 & Hollyville Road/Hollymount Road.

Table 3
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Anchors Run (fka Insight at Lewes Run)
Report dated September 28, 2017
Prepared by The Traffic Group, Inc.

Proposed Unsignalized Intersection [1] **One-Way Stop Control (T-Intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
1) Beaver Dam Road & Proposed Site Access	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
2024 with Anchors Run (case 3)						
Westbound Site Access [2]	E (36.8)	F (50.9)	D (33.9)	D (27.3) [3]	E (35.1) [3]	D (26.0) [3]
Southbound Beaver Dam Road - Left	A (9.0)	A (9.0)	A (8.7)	A (9.0)	A (9.0)	A (8.9)

[1] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[2] The HCS reports in the TIS indicate that the critical headway for this movement is 7.13 seconds. However, McCormick Taylor's HCS results indicate that this critical headway is 6.43 seconds. McCormick Taylor confirmed the critical headway value of 6.43 seconds via hand calculation.
[3] The 95th percentile queue length is expected to be approximately two vehicles (50-feet) long.

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Anchors Run (fka Insight at Lewes Run)
Report dated September 28, 2017
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [4] **One-Way Stop Control (T-Intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
2) Beaver Dam Road & Hopkins Road [5,6,7]	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
2017 existing (case 1)						
Eastbound Hopkins Road	A (9.2)	B (10.3)	A (9.0)	B (12.1)	B (14.1)	B (12.0)
Northbound Beaver Dam Road – Left	A (7.7)	A (8.5)	A (7.9)	A (7.9)	A (8.5)	A (7.9)
2024 without Anchors Run (case 2)						
Eastbound Hopkins Road	B (10.9)	B (14.2)	B (11.3)	C (15.5)	C (20.7)	C (16.0)
Northbound Beaver Dam Road – Left	A (8.1)	A (9.2)	A (8.4)	A (8.3)	A (9.2)	A (8.4)
2024 with Anchors Run (case 3)						
Eastbound Hopkins Road	B (11.5)	B (13.1)	B (11.0)	C (16.5)	C (23.3)	C (16.9)
Northbound Beaver Dam Road – Left	A (8.2)	A (9.4)	A (8.5)	A (8.4)	A (9.4)	A (8.5)

[4] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[5] It appears that the TIS coded a flared minor-street approach with storage for one vehicle. This coding allows eastbound right-turns from Hopkins Road to be made while a maximum of one vehicle waits for a gap to complete a left-turn. While the geometry of this intersection may allow for this operation depending on where left-turning drivers position their vehicle, McCormick Taylor did not code the flared minor-street approach to produce a conservative estimate of the minor-street delay.
[6] McCormick Taylor utilized a field measured roadway grade of -1% on eastbound Hopkins Road; the TIS coded a roadway grade of 0%.
[7] The northbound left percentage of heavy vehicles coded in the TIS (1%) does not appear to match the turning movement counts (14%). McCormick Taylor coded 14% to match the turning movement counts.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Anchors Run (fka Insight at Lewes Run)
Report dated September 28, 2017
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [8] **One-Way Stop Control (T-intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
3) Beaver Dam Road & Stockley Road [9]	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
2017 existing (case 1)						
Eastbound Stockley Road	B (13.7)	B (10.2)	B (10.5)	C (16.2)	B (14.7)	B (12.8)
Northbound Beaver Dam Road – Left	A (7.9)	A (8.5)	A (7.9)	A (7.9)	A (8.5)	A (7.9)
2024 without Anchors Run (case 2)						
Eastbound Stockley Road	C (23.8)	C (15.9)	B (15.0)	D (26.4)	C (23.2)	C (18.3)
Northbound Beaver Dam Road – Left	A (8.4)	A (9.1)	A (8.4)	A (8.4)	A (9.1)	A (8.4)
2024 with Anchors Run (case 3)						
Eastbound Stockley Road	D (33.1)	D (28.5)	C (20.4)	E (37.2) [10]	D (34.8)	C (24.5)
Northbound Beaver Dam Road – Left	A (8.7)	A (9.4)	A (8.6)	A (8.7)	A (9.4)	A (8.6)
2024 with Anchors Run (case 3) *with Improvement Option 1* [11]						
Eastbound Stockley Road	-	-	-	D (31.9) [12]	D (28.3) [12]	C (22.5)
Northbound Beaver Dam Road – Left	-	-	-	A (8.7)	A (9.4)	A (8.6)

[8] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[9] It appears that the TIS coded a flared minor-street approach with storage for one vehicle. This coding allows eastbound right-turns from Stockley Road to be made while a maximum of one vehicle waits for a gap to complete a left-turn. However, based on field observations, McCormick Taylor found that the geometry of this intersection would not allow for this type of operation on a regular basis. Therefore, McCormick Taylor did not code the flared minor-street approach.
[10] The 95th percentile queue length is expected to be approximately three vehicles (75-feet) long.
[11] Improvement Option 1 includes construction of an eastbound right-turn lane.
[12] The 95th percentile queue length is expected to be approximately two vehicles (50-feet) long.

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Anchors Run (fka Insight at Lewes Run)
Report dated September 28, 2017
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [13] **All-Way Stop Control (Four-Leg Intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
4) Beaver Dam Road & Hollymount Road	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
2017 existing (case 1)						
Eastbound Hollymount Road	B (14.4)	B (12.0)	A (10.0-)	B (14.4)	B (12.0)	B (10.0+)
Westbound Hollymount Road	B (10.1)	A (10.0)	A (8.9)	B (10.1)	B (10.0)	A (8.9)
Northbound Beaver Dam Road	B (10.9)	B (10.1)	A (9.4)	B (10.9)	B (10.1)	A (9.4)
Southbound Beaver Dam Road	B (11.2)	C (16.9)	B (10.8)	B (11.2)	C (16.9)	B (10.8)
Overall Intersection	B (12.2)	B (14.2)	B (10.1)	B (12.2)	B (14.2)	B (10.1)
2024 without Anchors Run (case 2)						
Eastbound Hollymount Road	D (25.7)	C (20.5)	B (13.8)	D (25.7)	C (20.4)	B (13.8)
Westbound Hollymount Road	B (12.8)	B (12.2)	B (10.4)	B (12.8)	B (12.2)	B (10.4)
Northbound Beaver Dam Road	C (16.0)	B (14.4)	B (12.6)	C (16.0)	B (14.4)	B (12.6)
Southbound Beaver Dam Road	C (23.1)	F (80.1)	C (19.5)	C (23.1)	F (79.8)	C (19.5)
Overall Intersection	C (21.3)	E (49.1)	C (15.9)	C (23.1)	E (49.0)	C (15.9)
2024 with Anchors Run (case 3)						
Eastbound Hollymount Road	E (35.5)	D (27.9)	C (17.0)	E (35.5) [14]	D (27.7)	C (17.0)
Westbound Hollymount Road	B (14.3)	B (12.7)	B (11.2)	B (14.3)	B (12.7)	B (11.2)
Northbound Beaver Dam Road	C (18.5)	C (15.9)	B (14.3)	C (18.5)	C (15.9)	B (14.3)
Southbound Beaver Dam Road	E (41.7)	F (130.7)	D (29.1)	E (41.7) [15]	F (130.3) [16]	D (29.1)
Overall Intersection	D (32.2)	F (75.9)	C (21.5)	D (32.2)	F (75.7)	C (21.5)

[13] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[14] The 95th percentile queue length is expected to be approximately 8 vehicles (200-feet) long.
[15] The 95th percentile queue length is expected to be approximately 10 vehicles (250-feet) long.
[16] The 95th percentile queue length is expected to be approximately 26 vehicles (650-feet) long.

Table 6 (continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Anchors Run (fka Insight at Lewes Run)
Report dated September 28, 2017
Prepared by The Traffic Group, Inc.

Unsignalized Intersection [17] **All-Way Stop Control (Four-Leg Intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
4) Beaver Dam Road & Hollymount Road	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
2024 with Anchors Run (case 3) *with Improvement Option 1* [18]						
Eastbound Hollymount Road	D (28.6)	D (26.2)	C (15.7)	D (28.8)	D (26.0)	C (15.7)
Westbound Hollymount Road	B (13.0)	B (12.4)	B (10.7)	B (13.1)	B (12.4)	B (10.7)
Northbound Beaver Dam Road	C (17.1)	C (16.0)	B (13.8)	C (17.1)	C (16.0)	B (13.8)
Southbound Beaver Dam Road	C (15.2)	C (21.0)	B (13.8)	C (15.6)	C (20.9)	B (13.8)
Overall Intersection	C (19.6)	C (21.0)	B (14.1)	C (19.8)	C (20.9)	B (14.1)

Unsignalized Intersection [17] **Roundabout Analysis**	**LOS per TIS**			**LOS per McCormick Taylor**		
4) Beaver Dam Road & Hollymount Road	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
2024 with Anchors Run (case 3) *with Improvement Option 2* [19]						
Eastbound Hollymount Road	-	-	-	A (7.7)	A (8.7)	A (6.7)
Westbound Hollymount Road	-	-	-	A (7.6)	A (6.0)	A (5.5)
Northbound Beaver Dam Road	-	-	-	A (7.8)	A (7.0)	A (6.3)
Southbound Beaver Dam Road	-	-	-	A (7.6)	A (9.9)	A (7.0)
Overall Intersection				A (7.7)	A (8.8)	A (6.7)

[17] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[18] Improvement Option 1 includes construction of a southbound right-turn lane.
[19] Improvement Option 2 includes conversion of the intersection to a single-lane roundabout.

Table 7
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Anchors Run (fka Insight at Lewes Run)
Report dated September 28, 2017
Prepared by The Traffic Group, Inc.

Existing Unsignalized Intersection [20] **Existing All-Way Stop Control Proposed Signalized Intersection (Four-Leg Intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
5) Delaware Route 5 & Hollyville Road / Hollymount Road [21]	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
2017 existing (case 1)						
Eastbound Hollyville Road	B (10.9)	B (10.9)	A (9.8)	B (10.9)	B (10.9)	A (9.8)
Westbound Hollymount Road	A (9.5)	C (15.1)	A (10.0)	A (9.5)	C (15.1)	B (10.0)
Northbound Delaware Route 5	B (10.1)	B (11.6)	A (10.0)	B (10.1)	B (11.6)	A (10.0)
Southbound Delaware Route 5	B (10.7)	B (14.2)	B (11.1)	B (10.7)	B (14.2)	B (11.1)
Overall Intersection	B (10.4)	B (13.5)	B (10.4)	B (10.4)	B (13.5)	B (10.4)
2024 without Anchors Run (case 2)						
Eastbound Hollyville Road	B (14.3)	C (20.2)	B (13.9)	B (14.3)	C (20.2)	B (13.9)
Westbound Hollymount Road	B (13.1)	E (41.3)	B (14.3)	B (13.1)	E (41.3)	B (14.3)
Northbound Delaware Route 5	B (13.4)	C (22.2)	B (14.4)	B (13.4)	C (22.2)	B (14.4)
Southbound Delaware Route 5	B (14.5)	E (38.3)	C (17.8)	B (14.5)	E (38.3)	C (17.8)
Overall Intersection	B (13.9)	D (32.6)	C (15.4)	B (13.9)	D (32.6)	C (15.4)
2024 with Anchors Run (case 3)						
Eastbound Hollyville Road	C (16.0)	D (29.6)	C (16.6)	C (16.0)	D (29.6)	C (16.6)
Westbound Hollymount Road	C (15.8)	F (78.6)	C (17.2)	C (15.8)	F (78.6) [22]	C (17.2)
Northbound Delaware Route 5	B (14.5)	D (27.2)	C (16.1)	B (14.5)	D (27.2)	C (16.1)
Southbound Delaware Route 5	C (15.9)	F (55.9)	C (21.2)	C (15.9)	F (55.9) [23]	C (21.2)
Overall Intersection	C (15.6)	F (52.2)	C (18.0)	C (15.6)	F (52.2)	C (18.0)

[20] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[21] Both the TIS and McCormick Taylor coded the northbound and southbound approaches of Delaware Route 5 as single lane approaches (shared left-turn/thru/right-turn lanes). This coding differs from the field conditions, as these approaches have channelized, yield-controlled right-turns, but no full-width right-turn lanes are provided. Therefore, the HCS coding used provides a conservative estimate of intersection delay. It is noted that the northbound and southbound right-turn volumes are very low (less than 10 vph) in all cases.
[22] The 95th percentile queue length is expected to be approximately 14 vehicles (350-feet) long.
[23] The 95th percentile queue length is expected to be approximately 11 vehicles (275-feet) long.

Table 7 (continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study for Anchors Run (fka Insight at Lewes Run)
Report dated September 28, 2017
Prepared by The Traffic Group, Inc.

Existing Unsignalized Intersection [24] **Existing All-Way Stop Control Proposed Signalized Intersection (Four-Leg Intersection)**	**LOS per TIS**			**LOS per McCormick Taylor**		
5) Delaware Route 5 & Hollyville Road / Hollymount Road [25]	Weekday AM	Weekday PM	Saturday Mid-Day	Weekday AM	Weekday PM	Saturday Mid-Day
2024 with Anchors Run (case 3) *Proposed Signalized Intersection* [26]	A (9.1)	C (22.4)	A (9.8)	B (15.6)	B (15.8)	B (14.9)

[24] For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.
[25] Each approach was coded as a shared left/through/right-turn lane.
[26] The signalized analysis in the TIS assumed short and atypical cycle lengths for the weekday AM peak hour (28.0 seconds) and Saturday peak hour (31.4 seconds). McCormick Taylor assumed a minimum cycle length of 60 seconds and a maximum cycle length of 90 seconds, and optimized the cycle lengths and splits within these limits.