



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

JENNIFER COHAN
SECRETARY

October 6, 2020

Ms. Brigitte Odum-Ewuakye
Century Engineering, Inc.
550 Bay Road
Dover, Delaware 19901

Dear Ms. Odum-Ewuakye:

The enclosed Traffic Operational Analysis (TOA) review letter for the proposed **Knight Crossing (f.k.a. Marina Del – Phase 1)** (Protocol Tax Parcel 330-7.00-35.00) 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 TOA to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

A handwritten signature in black ink that reads "Troy Brestel".

Troy Brestel
Project Engineer

TEB:km

Enclosures

cc with enclosures: Mr. Stephen Gorski, Duffield Associates, Inc.
Ms. Constance C. Holland, Office of State Planning Coordination
Mr. Rob Pierce, City of Milford
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, Inc.
Ms. Joanne Arellano, Johnson, Mirmiran & Thompson, Inc.
DelDOT Distribution

DelDOT Distribution

Brad Eaby, Deputy Attorney General

J. Marc Coté, Director, Planning

Shanté Hastings, Director, Transportation Solutions (DOTS)

Mark Luszcz, Deputy Director, DOTS

Michael Simmons, Assistant Director, Project Development South, DOTS

Todd Sammons, Assistant Director, Development Coordination

T. William Brockenbrough, Jr., County Coordinator, Development Coordination

Chris Sylvester, Traffic Studies Manager, Traffic, DOTS

Alistair Probert, South District Engineer, South District

Gemez Norwood, South District Public Works Manager, South District

Jared Kauffmann, Service Development Planner, Delaware Transit Corporation

Tremica Cherry, Service Development Planner, Delaware Transit Corporation

Susanne Laws, Sussex Review Coordinator, Development Coordination

Anthony Aglio, Planning Supervisor, Statewide & Regional Planning

Derek Sapp, Subdivision Manager, Development Coordination

Mark Galipo, Traffic Engineer, Traffic, DOTS

Claudy Joinville, Project Engineer, Development Coordination



June 25, 2020

Mr. Troy Brestel
Project Engineer
Development Coordination
DelDOT Division of Planning
800 Bay Road
P O Box 778
Dover, DE 19903

RE: Agreement No. 1945F
Project Number T202069012
Traffic Impact Study Services
Task 7A-Marina Del Phase 1 TOA

Dear Mr. Brestel:

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Operational Analysis (TOA) for Marina Del Phase 1, prepared by Century Engineering dated January 2020. This task was assigned as Task Number 7A. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TOA evaluates the impacts of a proposed residential development in the City of Milford, Sussex County, Delaware. The development would be comprised of 101 single-family detached houses and 30 multifamily (low-rise) homes. Construction is anticipated to be complete in 2022.

The site is located on the southeast corner of the intersection of Beaver Dam Road (Sussex Road 209) and Cedar Beach Road (Sussex Road 36). This TOA review is based on Phase 1 of the development, which will have site frontage only along Beaver Dam Road.

Two full access points are proposed along Beaver Dam Road, one opposite the proposed Windward on the River entrance and one opposite the south end of Beaver Dam Drive. The subject property is on an approximately 41.00-acre assemblage of parcels that is split-zoned as R3 (Garden Apartments/Townhouses) and C3 (Highway Commercial). The developer does not plan to see a change to the base zoning but may seek a Planned Unit Development (PUD) overlay.

The developer has elected to pay the Area-Wide Study Fee of \$10.00 per daily trip in lieu of performing a TIS. For the subject development, the fee would be in the amount of \$12,350.00.

Additionally, the proposed site is located adjacent to the Southeast Milford Transportation Improvement District (TID) which was established as part of the Southeast Neighborhood Master Plan. The Southeast Milford TID is bordered by the Norfolk Southern Indian River Secondary line in the west, Cedar Beach Road (Sussex Road 36) in the north, Sharps Road (Sussex Road 200) in the east, and Fleatown Road (Sussex Road 224) in the south. An existing conditions report for the TID was completed in September 2018 and the TID agreement was established on May 16, 2019.



The TID is currently under development and scheduled to be finalized and in operation by early 2021.

Based on our review of the traffic operational analysis, we have the following comments and recommendations:

Based on the LOS evaluation criteria as stated in DelDOT’s *Development Coordination Manual*, none of the study intersections exhibit LOS deficiencies.

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

1. The developer should reconstruct Beaver Dam Road from approximately 800 feet from the southwest point of tangency at the Beaver Dam Road/Cedar Beach Road intersection to the southwest point of tangency at the Beaver Dam Road/Beaver Dam Drive intersection to provide eleven-foot travel lanes and five-foot shoulders consistent with DelDOT’s typical section for local roads. Within the same limits, the developer should provide a bituminous concrete overlay to the existing travel lanes at DelDOT’s discretion. DelDOT should analyze the existing lanes’ pavement section and recommend an overlay thickness to the developer’s engineer, if necessary.

2. The developer should construct a full access site entrance for the proposed Marina Del Phase 1 development on Beaver Dam Road, approximately 900 feet north of the northwest point of tangency of the intersection with the southern end of Beaver Dam Drive and opposite the proposed entrance to the Windward on the River site, to be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Windward on the River Site Entrance	Approach does not exist	One shared left turn/through/right turn lane
Westbound Site Entrance A	Approach does not exist	One shared left turn/through/right turn lane
Northbound Beaver Dam Road	One through lane	One shared left turn/through/right turn lane
Southbound Beaver Dam Road	One through lane	One left turn lane, one through lane, and one right turn lane

Based on DelDOT’s *Development Coordination Manual*, the recommended minimum storage length is 110 feet (excluding taper) for the southbound Beaver Dam Road right turn



lane and 95 feet (excluding taper) for the southbound Beaver Dam Road left turn lane. It should be noted that the Windward on the River Entrance Plans by DBF, last revised September 13, 2019 depicted a storage length of 100 feet (excluding taper) for the southbound Beaver Dam Road right turn lane and the April 1, 2019 TIS review letter by McCormick Taylor stated a shorter length as acceptable due to the nearby existing residential driveway.

The calculated queue lengths from the HCS analysis can be accommodated within the 100-foot and 95-foot storage lengths. The developer should submit a plan to DelDOT’s Development Coordination section depicting the design along the site frontage. The final design of the site entrance should be determined during the Entrance Plan review process.

3. The developer should construct a full access site entrance for the proposed Marina Del Phase 1 development on Beaver Dam Road, across from the southern end of Beaver Dam Drive to be consistent with the lane configurations shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Beaver Dam Drive	One shared left turn/right turn lane	One shared left turn/through/right turn lane
Westbound Site Entrance B	Approach does not exist	One shared left turn/through/right turn lane
Northbound Beaver Dam Road	One shared left turn/through lane	One shared left turn/through/right turn lane
Southbound Beaver Dam Road	One shared through/right turn lane	One shared left turn/through/right turn lane

The developer should submit a plan to DelDOT’s Development Coordination section depicting the design along the site frontage. The final design of the site entrance should be determined during the Entrance Plan review process.

4. 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 Beaver Dam Road site frontage. Within the easement, the developer should construct a ten-foot-wide shared use path (SUP) that meets current AASHTO and ADA standards. If feasible, the SUP should be placed behind utility poles and street trees should be provided within the buffer area. The developer shall acquire an easement from Parcel 37.01 to install the SUP and determine if the 10-foot-wide SUP can be installed within the existing right-of-way. If not, the developer should determine if the SUP can be installed at a narrower width (minimum



8 foot). If this is not feasible, the developer shall tie the SUP into the shoulder on each side of Parcel 37.01. The developer should coordinate with DelDOT's Development Coordination section during the plan review process to identify the exact location of the SUP.

- b. ADA compliant curb ramps and marked crosswalks should be provided along the Site Entrance A and B approaches to Beaver Dam Road. The use of diagonal curb ramps is discouraged. The curb ramps should be designed to accommodate the SUP.
- c. An internal connection should be provided from the shared use path along Beaver Dam Road into the T-turnaround at the end of Knight Court.

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

Improvements in this TOA may be considered "significant" under DelDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT's website at https://www.deldot.gov/Publications/manuals/de_mutcd/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Don Weber, Assistant Director for Traffic Operations and Management. Mr. Weber can be reached at (302) 659-4651 or by email at Don.Weber@delaware.gov.

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

Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

A handwritten signature in black ink, appearing to read 'Joanne M. Arellano', is written in a cursive style.

Joanne M. Arellano, P.E., PTOE

cc: Mir Wahed, P.E., PTOE
Enclosure

General Information

Report date: January 2020

Prepared by: Century Engineering

Prepared for: Limitless Development Company, LLC.

Tax Parcels: 330-7.00-35.00, 36.00, and 37.00

Generally consistent with DelDOT's *Development Coordination Manual (DCM)*: Yes

Project Description and Background

Description: The developer proposes to develop 101 single-family detached houses and 30 multifamily (low-rise) homes.

Location: The subject site is located on the southeast corner of the intersection of Beaver Dam Road (Sussex Road 209) and Cedar Beach Road (Sussex Road 36), in the City of Milford, Sussex County, Delaware.

Amount of Land to be developed: An approximately 41.00-acre assemblage of parcels.

Land Use approval(s) needed: Entrance Plan.

Proposed completion date: 2022.

Proposed access location: Two access points are proposed along Beaver Dam Road, one opposite the proposed Windward on the River entrance and one opposite the east end of Beaver Dam Drive.

Daily Traffic Volumes:

- 2019 Average Annual Daily Traffic on Beaver Dam Road (Sussex Road 209): 490 vehicles per day

Site Map



**Graphic is an approximation based on the Preliminary Major Record Plat prepared by Duffield Associates, Inc. last revised July 1, 2019.*

Relevant and On-going Projects

The proposed site is located adjacent to the Southeast Milford Transportation Improvement District (TID) which was established as part of the Southeast Neighborhood Master Plan. The Southeast Milford TID is bordered by the Norfolk Southern Indian River Secondary line in the west, Cedar Beach Road (Sussex Road 36) in the north, Sharps Road (Sussex Road 200) in the east, and Fleatown Road (Sussex Road 224) in the south. An existing conditions report for the TID was completed in September 2018 and the TID agreement was established on May 16, 2019. The TID is currently under development and scheduled to be finalized and in operation by early 2021.

Livable Delaware

(Source: Delaware Strategies for State Policies and Spending, 2015)

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

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

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 other 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, to promote well-designed and efficient new growth, and to facilitate redevelopment 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. Further, Level 1 areas are the first priority for planning projects and studies, bicycle facilities, signal-system enhancements, and the promotion of interconnectivity between 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. 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. Other priorities for Level 2 Areas include: Corridor Capacity Preservation, off-alignment multi-use paths, interconnectivity of neighborhoods and public facilities, and signal-system enhancements.

Proposed Development's Compatibility with Livable Delaware:

The proposed development is located in Investment Level 1 and 2 areas. According to Livable Delaware, Level 1 and 2 areas promote the development of a broad mix of housing options. The proposed project is a residential development comprised of single family and multi-family houses.

Therefore, the proposed development is generally consistent with the 2015 update of the Livable Delaware “Strategies for State Policies and Spending.”

Comprehensive Plans

(Source: 2018 Update to the 2008 City of Milford Comprehensive Plan)

City of Milford Comprehensive Plan:

The subject property is split-zoned as R3 (Garden Apartments/Townhouses) and C3 (Highway Commercial) and the developer does not plan to rezone the land. Per the *2018 Update to the 2008 City of Milford Future Land Use Map*, the proposed development is in an area designated for Commercial and Moderate Density Residential uses.

Proposed Development’s Compatibility with the City of Milford Comprehensive Plan:

Per the *2018 Update to the 2008 City of Milford Comprehensive Plan Future Land Use Map*, the proposed development is in an area designated for Commercial and Moderate Density Residential uses. The proposed development is a residential development. Therefore, the proposed development is generally consistent with the *2018 Update to the 2008 City of Milford Comprehensive Plan*.

Trip Generation

The trip generation for the proposed development was determined by using the comparable land use and rates/equations contained in the *Trip Generation, 10th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 210 (Single-Family Detached Housing) and Land Use Code 220 (Multifamily Housing (Low-Rise)).

Table 1
Marina Del Phase 1 Trip Generation

Land Use	ADT	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
101 Single-Family Detached Houses (ITE Code 210)	1,049	19	58	77	65	38	103
30 Multifamily Houses (Low-Rise) (ITE Code 220)	186	3	12	15	13	7	20
Total New Trips	1,235	22	70	92	78	45	123

Overview of TOA

Intersections examined:

1. Beaver Dam Road (Sussex Road 209)/Site Entrance A/Proposed Windward on the River Site Entrance
2. Beaver Dam Road/Site Entrance B/Beaver Dam Drive (east end)
3. Beaver Dam Road/Cedar Beach Road (Sussex Road 36)
4. Cedar Beach Road/Brown Street

Conditions examined:

1. Case 1 – Existing (2019)
2. Case 2 – 2022 without development
3. Case 3a – 2022 with development and without the realignment of Beaver Dam Road with Brown Street
4. Case 3b – 2022 with development and with the realignment of Beaver Dam Road with Brown Street

Committed Developments considered:

1. Windward on the River (f.k.a. Swain Property): 264 multifamily low-rise houses, 8,400 square feet of general office space, 17,600 square feet of shopping center space, and two high-turnover sit-down restaurants totaling 13,300 square feet.

Peak hours evaluated: Weekday morning and evening peak hours.

Intersection Descriptions

1. Beaver Dam Road (Sussex Road 209)/Site Entrance A/Proposed Windward on the River Site Entrance

Type of Control: Proposed two-way stop-controlled intersection (four-legged intersection)

Eastbound Approach: (Windward on the River Site Entrance) Proposed one shared left turn/through/right turn lane, stop-controlled

Westbound Approach: (Site Entrance A) Proposed one shared left turn/through/right turn lane, stop-controlled

Northbound Approach: (Beaver Dam Road) Existing one through lane; proposed one shared left turn/through/right turn lane

Southbound Approach: (Beaver Dam Road) Existing one through lane; proposed one left turn lane, one through lane, one right turn lane

2. Beaver Dam Road/Site Entrance B/Beaver Dam Drive (east end)

Type of Control: Existing two-way stop-controlled intersection (T-intersection); proposed two-way stop-controlled intersection (four-legged intersection)

Eastbound Approach: (Beaver Dam Drive) Existing one shared left turn/right turn lane, stop-controlled; proposed one shared left turn/through/right turn lane, stop-controlled

Westbound Approach: (Site Entrance B) Proposed one shared left turn/through/right turn lane, stop-controlled

Northbound Approach: (Beaver Dam Road) Existing one shared left turn/through lane; proposed one shared left turn/through/right turn lane

Southbound Approach: (Beaver Dam Road) Existing one shared through/right turn lane; proposed one shared left turn/through/right turn lane

3. Beaver Dam Road/Cedar Beach Road (Sussex Road 36)

Type of Control: Existing two-way stop-controlled intersection (T-intersection)

Eastbound Approach: (Cedar Beach Road) Existing one shared through/right turn lane

Westbound Approach: (Cedar Beach Road) Existing one shared left turn/through lane

Northbound Approach: (Beaver Dam Road) Existing one shared left turn/right turn lane, stop-controlled

4. Cedar Beach Road/Brown Street

Type of Control: Existing two-way stop-controlled intersection (T-intersection)

Eastbound Approach: (Cedar Beach Road) Existing one shared left turn/through lane

Westbound Approach: (Cedar Beach Road) Existing one shared through/right turn lane

Southbound Approach: (Brown Street) Existing one shared left turn/right turn lane, stop-controlled

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Per DelDOT Gateway, Delaware Transit Corporation (DTC) currently does not provide existing services within the study area.

Planned transit service: Per email correspondence on April 1, 2020 from Ms. Tremica Cherry-Wall, Planner at DTC, no transit improvements are requested in this area.

Existing bicycle and pedestrian facilities: According to DelDOT's *Sussex County Bicycle Map*, a Regional Bicycle Route exists within the study area. The Regional Bicycle Route travels along Cedar Beach Road and traverses through two of the study intersections (Beaver Dam Road and Brown Street). Pedestrian facilities currently do not exist at any of the study intersections.

Planned bicycle and pedestrian facilities: Per email correspondence on April 1, 2020 from Mr. John Fiori, DelDOT's Bicycle Coordinator, the following improvements were recommended:

- The site shall install a 10-foot-wide shared-use path (SUP) along the entire property frontage, unless a physical impossibility exists. The developer shall acquire an easement from Parcel 37.01 to install the SUP and determine if the 10-foot-wide SUP can be installed within the existing right-of-way. If not, the developer should determine if the SUP can be installed at a narrower width (minimum 8 foot). If this is not feasible, the developer shall tie the SUP into the shoulder on each side of Parcel 37.01.
- An internal connection is required from the SUP facility along Beaver Dam Road into the T-turnaround at the end of Knight Court.
- Per the DCM, the site shall dedicate right-of-way per the roadway classification and establish a 15-foot wide permanent easement along the property frontage.
- 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 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 classification or existing conditions.

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 map on the DelDOT Gateway.

- Beaver Dam Road – LTS: 3

Crash Evaluation

A crash analysis was not included in the TOA.

Previous Comments

All comments from the PTOA have been addressed in the Final TOA.

General HCS Analysis Comments

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

1. Both the TOA and JMT used HCS version 7.8.5.
2. Per DelDOT's *Development Coordination Manual*, JMT and the TOA used a heavy vehicle percentage of 3% for each movement greater than 100 vph in the Case 2 and Case 3 future scenario analyses, 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 analysis of future scenarios.
3. Per DelDOT's *Development Coordination Manual* and coordination with DelDOT Planning, JMT used a heavy vehicle percentage of 5% for each movement less than 100 vph along existing roadways, whereas the TOA did not.
4. Per DelDOT's *Development Coordination Manual*, JMT and the TOA used a heavy vehicle percentage of 3% for movements along site entrances.
5. Per DelDOT's *Development Coordination Manual*, both the TOA and JMT utilized the existing PHF for the Case 1 scenario and a future PHF for Cases 2 and 3 scenarios 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 the existing PHF, whichever was higher.

Table 2
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Marina Del Phase 1
Report Dated: January 2020
Prepared by Century Engineering

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TOA		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Beaver Dam Road (Sussex Road 209)/Site Entrance A/Proposed Windward on the River Site Entrance				
2022 without Development (Case 2) ^{2,3}				
Eastbound Windward on the River Entrance Approach	-	-	A (8.9)	A (8.9)
Northbound Beaver Dam Road Left Turn	-	-	A (7.3)	A (7.4)
2022 with Development (Case 3a) ^{4,5}				
Eastbound Windward on the River Entrance Approach	A (9.6)	B (10.2)	A (9.6)	B (10.2)
Westbound Site Entrance A Approach	A (9.1)	A (9.0)	A (9.1)	A (9.0)
Northbound Beaver Dam Road Left Turn	A (7.3)	A (7.5)	A (7.3)	A (7.5)
Southbound Beaver Dam Road Left Turn	A (7.4)	A (7.4)	A (7.4)	A (7.4)

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

² The TOA did not include an analysis for Case 2.

³ JMT configured the eastbound Windward on the River Entrance approach as one shared left turn/right turn lane, the northbound Beaver Dam Road approach as one shared left turn/through lane, and the southbound Beaver Dam Road approach as one through lane and one right turn lane.

⁴ Both the TOA and JMT configured the eastbound, westbound, and northbound approaches as a shared left turn/through/right turn lane and the southbound Beaver Dam Road approach as one left turn lane, one through lane, and one right turn lane.

⁵ Only Case 3a results are presented for this intersection, as the volumes at this intersection would not be expected to change as a result of the realignment of Beaver Dam Road.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Traffic Operational Analysis for Marina Del Phase 1
Report Dated: January 2020
Prepared by Century Engineering

Unsignalized Intersection Two-Way Stop Control	LOS per TOA		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Beaver Dam Road/Site Entrance B/ Beaver Dam Drive				
2019 Existing (Case 1)				
Eastbound Beaver Dam Drive Entrance Approach	A (8.6)	A (8.7)	A (8.6)	A (8.7)
Northbound Beaver Dam Road Left Turn	A (7.3)	A (7.3)	A (7.3)	A (7.3)
2022 without Development (Case 2)				
Eastbound Beaver Dam Drive Entrance Approach	A (8.7)	A (8.7)	A (8.7)	A (8.7)
Northbound Beaver Dam Road Left Turn	A (7.3)	A (7.3)	A (7.3)	A (7.3)
2022 with Development (Case 3a) ^{5, 6}				
Eastbound Beaver Dam Drive Entrance Approach	A (9.0)	A (9.1)	A (9.0)	A (9.0)
Westbound Site Entrance B Approach	A (8.8)	A (8.8)	A (8.8)	A (8.7)
Northbound Beaver Dam Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)
Southbound Beaver Dam Road Left Turn	A (7.3)	A (7.4)	A (7.3)	A (7.4)

⁶ Both JMT and the TOA configured the Site Entrance B approach as a shared left turn/through/right turn lane.

Table 4
Peak Hour Levels Of Service (LOS)
Based on Traffic Operational Analysis for Marina Del Phase 1
Report Dated: January 2020
Prepared by Century Engineering

Unsignalized Intersection Two-Way Stop Control	LOS per TOA		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Beaver Dam Road/Cedar Beach Road (Sussex Road 36)				
2019 Existing (Case 1)				
Westbound Cedar Beach Road Left Turn	A (7.6)	A (7.7)	A (7.6)	A (7.7)
Northbound Beaver Dam Road Approach	A (10.0)	B (10.4)	A (10.0)	B (10.4)
2022 without Development (Case 2)				
Westbound Cedar Beach Road Left Turn	A (7.6)	A (7.7)	A (7.6)	A (7.7)
Northbound Beaver Dam Road Approach	B (10.2)	B (10.5)	B (10.2)	B (10.5)
2022 with Development (Case 3a)				
Westbound Cedar Beach Road Left Turn	A (7.7)	A (7.9)	A (7.7)	A (7.9)
Northbound Beaver Dam Road Approach	B (11.3)	B (12.0)	B (11.3)	B (12.0)

Table 5
Peak Hour Levels Of Service (LOS)
Based on Traffic Operational Analysis for Marina Del Phase 1
Report Dated: January 2020
Prepared by Century Engineering

Unsignalized Intersection Two-Way Stop Control	LOS per TOA		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Cedar Beach Road/Brown Street				
2019 Existing (Case 1)				
Eastbound Cedar Beach Road Left Turn	A (7.6)	A (7.7)	A (7.6)	A (7.7)
Southbound Brown Street Approach	A (9.8)	A (9.4)	A (9.8)	A (9.4)
2022 Without Development (Case 2)				
Eastbound Cedar Beach Road Left Turn	A (7.6)	A (7.8)	A (7.6)	A (7.8)
Southbound Brown Street Approach	B (10.0)	A (9.5)	B (10.0)	A (9.5)
2022 With Development (Case 3a)				
Eastbound Cedar Beach Road Left Turn	A (7.6)	A (7.8)	A (7.6)	A (7.8)
Southbound Brown Street Approach	B (10.2)	A (9.7)	B (10.2)	A (9.7)

Table 5 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Operational Analysis for Marina Del Phase 1
Report Dated: January 2020
Prepared by Century Engineering

Unsignalized Intersection Two-Way Stop Control	LOS per TOA		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Cedar Beach Road/Beaver Dam Road/Brown Street				
2022 With Development and Beaver Dam Road realignment (Case 3b) ⁷				
Eastbound Cedar Beach Road Left Turn	A (7.6)	A (7.7)	A (7.6)	A (7.7)
Westbound Cedar Beach Road Left Turn	A (7.7)	A (7.8)	A (7.7)	A (7.9)
Northbound Beaver Dam Road Approach	B (12.2)	B (12.5)	B (12.2)	B (12.6)
Southbound Brown Street Approach	B (11.2)	B (14.3)	B (11.2)	B (14.3)

⁷ JMT and the TOA modeled the intersection with shared left turn/through/right turn lanes along all approaches.