



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

NICOLE MAJESKI
SECRETARY

September 28, 2023

Mr. Brian Devine
Verdantas
5400 Limestone Road
Wilmington, DE 19808

Dear Mr. Devine:

The enclosed Traffic Operational Analysis (TOA) review letter for the proposed **Edgemoor Port Facility - Diamond State Port Corporation (DSPC)** (Tax Parcel: 0615300006) 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. This letter has been revised to reflect changes to the proposed land use and to incorporate updated analysis for additional truck routes. 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: Gene Bailey, River and Port Authority
Steve Gorski, Verdantas
Shawn Tucker, Barnes & Thornburg LLP
James Smith, Barnes & Thornburg LLP
David L. Edgell, Office of State Planning Coordination
Antoni Sekowski, New Castle County Department of Land Use
Bradford Shockley, New Castle County Department of Land Use
Owen C. Robatino, New Castle County Department of Land Use
Joanne M. Arellano, Johnson, Mirmiran, & Thompson, Inc.
Mir Wahed, Johnson, Mirmiran, & Thompson, Inc.
DelDOT Distribution

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Shanté Hastings, Director, Deputy Secretary, Transportation Solutions (DOTS)
Mark Luszcz, Deputy Director, Operations and Support, Traffic, DOTS
Matthew Vincent, Assistant Director, DOTS
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Wendy Carpenter, Traffic Calming & Subdivision Relations Manager, Traffic, DOTS
Sean Humphrey, Traffic Engineer, Traffic, DOTS
Brian Schilling, Canal District Engineer, Canal District
Nathan Draper, Canal District Public Works Engineer, Canal District
Jared Kauffmann, Service Development Planner, Delaware Transit Corporation
Tremica Cherry, Service Development Planner, Delaware Transit Corporation
Pamela Steinebach, Director, Planning
Todd Sammons, Assistant Director, Development Coordination, Planning
Wendy Polasko, Subdivision Engineer, Development Coordination, Planning
Susanne Laws, Expedited Review Coordinator, Development Coordination, Planning
Ryan Schroder, Expedited Subdivision Reviewer, Development Coordination, Planning
Sireen Muhtaseb, TIS Group Manager, Development Coordination, Planning
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning



September 26, 2023

Ms. Annamaria Furmato
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/PO#611882
Traffic Impact Study Services – Task 11-2A
Edgemoor Port Facility –Diamond State Port Corporation (DSPC)

Dear Ms. Furmato:

In June 2021, Century Engineering, Inc. completed the Traffic Operational Analysis (TOA) for the Edgemoor Port Facility – Diamond State Port Corporation (DSPC). The report was prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*. Since that analysis, the developer has proposed land use changes and provided updated analysis for additional truck routes. This letter summarizes the recommendations based on what is now planned and proposed. Additionally, the recommendations incorporate that trucks can utilize the 12th Street interchange and Hay Road, or the Edgemoor Road interchange to access the site. A copy of the June 15, 2021 TOA review letter is attached for reference.

The TOA evaluated the impacts of a proposed port facility in New Castle County, Delaware. The proposed development would be located to the east of the Edgemoor Road/Hay Road intersection and would be comprised of employee buildings and a container terminal with subsidiary supporting structures. The current plan removes one 15,000 square foot administrative employees building that was proposed on the west side of Hay Road south of the intersection with Edgemoor Road which was considered with the June 2021 review letter. The TOA considered the build out of the site occurring over three phases. For the purposes of this Addendum, only the full build out of the site (Phase III) was considered. In coordination with DelDOT, the TOA was performed with a 2024 build out year consistent with the scoping letter. Phase 1 Construction is anticipated to be complete in 2025 and the developer does not plan to seek rezoning.

Three access points were previously proposed: one on the east side of Lighthouse Road north of northbound I-495 Edgemoor Road Exit (Site Entrance A), one on the west side of Hay Road south of the intersection with Edgemoor Road (Site Entrance B), and one on the east side of Hay Road south of the proposed intersection with Site Entrance B (Site Entrance C). The developer has eliminated Site Entrance B and the site will consist of only the two access points of Site Entrance A and Site Entrance C. The trips associated with the removal of the 15,000 square foot administrative employees building which would be using Site Entrance B was removed from the analysis. The graphic below depicts the updated site plan and access points.



**Graphic is an approximation based on the Commercial Entrance Plans prepared by Verdantas dated January 25, 2023*

The traffic analysis contained within the June 2021 TOA assumed all truck traffic accessing the site from I-495 would be restricted from using the ramps at the Edgemoor Road interchange and would utilize the 12th Street interchange and Hay Road. This addendum evaluated an additional scenario assuming truck traffic is not restricted and all trucks would utilize the I-495 ramps at the Edgemoor Road interchange to access the site.

Within the study area, DelDOT has the relevant *Edgemoor Road Bicycle and Pedestrian Improvements, Governor Printz Boulevard to Hay Road* (DelDOT Contract No. T202201101) project. As part of this project, the deteriorating shared use path on the westbound side of Edgemoor Road will be reconstructed to provide a continuous pathway from Hay Road to Governor Printz Boulevard. The project will also provide ADA compliant pedestrian connections including pedestrian crosswalks at the Edgemoor Road and Governor Printz Boulevard intersection on the Governor Printz Boulevard north leg and Edgemoor Road west leg. The Edgemoor Road intersections with Governor Printz Boulevard and the I-495 Southbound On Ramp will also be reconfigured to improve traffic flow. These reconfigurations include restriping



the westbound Edgemoor Road approach to Governor Printz Boulevard to provide a left turn lane, a through lane, and a separate right turn lane as well as the eastbound Edgemoor Road approach to the I-495 Southbound On Ramp to provide one through lane and one separate right turn lane. The project is in the design and planning stage with construction anticipated to start in the Spring of 2024.

As the reconfigurations of the Edgemoor Road intersections as part of the DelDOT *Edgemoor Road Bicycle and Pedestrian Improvements, Governor Printz Boulevard to Hay Road* (DelDOT Contract No. T202201101) identified in 2022 were not known at the time of the June 2021 TOA, this Addendum conducted an analysis at those intersections with the proposed reconfigurations as part of the DelDOT project and the adjusted Case 3C volumes (Full-Build out of the site). From this analysis, the Edgemoor Road intersections with Governor Printz Boulevard and the I-495 Southbound On/Off Ramps were found to operate at acceptable LOS D or better and no additional improvements are needed at those intersections.

An additional traffic analysis was conducted as part of this Addendum assuming all truck traffic traveling to and from the site using I-495 would utilize the Edgemoor Road interchange instead of the 12th Street interchange. Based on the rerouting of truck traffic with this additional scenario, the only intersections identified to experience increases in traffic volumes were Edgemoor Road and the I-495 Ramps, Edgemoor Road and Hay Road/Lighthouse Road, and Hay Road and Site Entrance C. All other study intersections and merge/diverge locations along I-495 were projected to experience a decrease in traffic volumes or only minor increases in traffic volumes compared to the analysis conducted by the TOA. As such, only the Edgemoor Road and the I-495 Ramps, Edgemoor Road and Hay Road/Lighthouse Road, and Hay Road and Site Entrance C intersections were analyzed as part of this Addendum. From this additional traffic analysis, the intersections were all found to operate similar to the analysis conducted by the TOA and no additional improvements from what was recommended in the June 2021 TOA review letter were identified with the exception of turn lane provisions at Site Entrance C.

JMT conducted a supplemental assessment of the weaving movements between the NB I-495 on ramp south of the Edgemoor Road intersection and the NB I-495 off ramp onto Edgemoor Road, as well as between the NB I-495 off ramp north of Edgemoor Road and the Edgemoor Road/Lighthouse Road intersection. Based on the assessment, which did include a review of the SimTraffic microsimulation, the weaving movements were identified to operate with minimal delays.

Should New Castle County 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 and Design Deviations approved prior to entrance plan approval for the proposed development. The following items should be implemented at the same time as site construction once all agency approvals and permits are secured and completed in accordance with DelDOT's Standards and Specifications.



1. The developer shall improve the State-maintained road(s) on which they front (Hay Road and Lighthouse Road), within the limits of their frontage, to meet DelDOT's standards for their Functional Classification as found in Section 1.1 of the *Development Coordination Manual* and elsewhere therein. The improvements shall include both directions of travel, regardless of whether the developer's lands are on one or both sides of the road. Frontage is defined in Section 1 of the *Development Coordination Manual*, which states "This length includes the length of roadway perpendicular to lines created by the projection of the outside parcel corners to the roadway." The developer should coordinate with DelDOT's Development Coordination Section during the site plan review to determine the improvements.

In addition, per the March 1, 2023 Pre-Submittal Meeting, the developer is required to widen Hay Road and Lighthouse Road along their frontage to provide 11-foot travel lanes and 9 foot shoulders, and the shoulders should be built to accommodate semi-truck parking. The shoulder widths along certain segments may be decreased to a minimum of two feet if the developer formally identifies alternative truck parking that satisfies local stakeholders. The developer should coordinate with DelDOT's Development Coordination Section during the site plan review to determine the exact design.

2. The developer should improve DelDOT Railroad Crossing No. 91896E (Norfolk Southern) to meet current required standards. The DelDOT Railroad Coordinator, Mr. Richard Sinegar can be reached at 302-670-5545 (Cell), 302-760-4882, or by email at richard.sinegar@delaware.gov.
3. The developer should construct Site Entrance A as a full access, single lane roundabout entrance on Lighthouse Road along the west side of the property, approximately 1,500 feet north of the intersection with the Northbound I-495 Edgemoor Exit Ramp H. The design should also account for DART bus utilization. The developer should coordinate with DelDOT regarding the needed design for bus utilization.

It should be noted that it is assumed Site Entrance A will be accessed by Operations Employees, trucks utilizing the 12th Street Interchange versus the Edgemoor Road Interchange will not impact the recommendations at this location.

4. The developer should provide a bituminous concrete overlay to the Lighthouse Road existing travel lanes along the site frontage in the area affected by the Site Entrance A construction at DelDOT's discretion. DelDOT should analyze the existing pavement section and recommend an overlay thickness to the developer's engineer if necessary.
5. The developer should construct Site Entrance C as a full access entrance on Hay Road along the west side of the property, approximately 1,250 feet south of the intersection with



Edgemoor Road. The proposed lane configurations are recommended whether the truck traffic accessing the site to and from I-495 uses the 12th Street Interchange or the Edgemoor Road interchange. The proposed lane configuration is shown in the table below:

Approach	Current Configuration	Proposed Configuration
Northbound Hay Road	One through lane	No change
Southbound Hay Road	One through lane	One left turn lane and one through lane
Westbound Site Entrance C	One shared left-turn/right-turn lane	No change

Based on DelDOT's *Development Coordination Manual*, the recommended minimum storage length (excluding tapers) for the southbound Hay Road left turn lane is 135 feet. The projected queue lengths from the HCS analysis can be accommodated within the recommended storage lengths.

6. The developer should provide a bituminous concrete overlay to the Hay Road existing travel lanes along the site frontage in the area affected by the Site Entrance C construction at DelDOT's discretion. DelDOT should analyze the existing pavement section and recommend an overlay thickness to the developer's engineer if necessary.
7. Consistent with Section 5.2.5.6 of the current DelDOT *Development Coordination Manual*, Site Entrance C and any on-site aisles should be designed to accommodate the trucks expected to traverse the site. The developer should coordinate with DelDOT during the Entrance Plan review to confirm the design vehicle for the proposed Site Entrance C construction.
8. The developer should coordinate with DelDOT to ensure DelDOT considers to restripe and extend the existing 150 foot tapers to 300 foot tapers to meet AASHTO requirements at the Southbound I-495 Entrance Ramp A and Exit Ramp B to and from Edgemoor Road.
9. The following bicycle, pedestrian, and transit improvements should be included:
 - a. As part of the entrance plan approval process, the developer should coordinate with the Delaware Department of Natural Resources and Environmental Control (DNREC) and the Delaware Transit Corporation (DTC) to provide a bus



turnaround at Site Entrance A. DTC also requests a bus pull-off with pedestrian access to Site Entrance A be installed prior to the turnaround to allow bus drivers to layover. Additionally, amenities like bicycle racks and bathroom access for bus drivers should also be coordinated as the site plan is further developed.

- b. The developer should remove the existing deteriorated sidewalk on the northbound side of Lighthouse Road from Edgemoor Road to the Northbound I-495 Edgemoor Exit Ramp H and install a shared use path (SUP) within these limits. North of Site Entrance A, the shared-use-path should be continued to connect to Fox Point State Park.
- c. A minimum fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT along the Lighthouse Road and Hay Road site frontages. Within the easement, the developer should construct a ten-foot wide shared-use path (SUP) mentioned in Item 9b above and along the Hay Road frontage. The developer should coordinate with DelDOT's Development Coordination and Project Development sections during the plan review process to identify the exact location of the SUP.
- d. The developer should construct ADA compliant curb ramps at the intersection of Edgemoor Road and Hay Road. The sidewalk/SUP and barrier on the westbound side of Edgemoor Road at the intersection should be reconstructed with ADA compliant curb ramps. The developer should reconstruct the existing concrete channelizing island in the southwest and the existing pavement marked channelizing island in the northwest sections of the intersection as concrete channelizing islands large enough to accommodate ADA compliant curb ramps. Marked crosswalks should be provided on the Edgemoor Road west leg and the Hay Road north leg to safely cross pedestrians and bicycles. The developer should install DEMUTCD compliant pedestrian and bicycle pavement markings and signs at the intersection.
- e. DelDOT should provide bicycle facilities as identified in the Governor Printz Corridor Study, a copy of which can be located online at www.wilmapco.org/governorprintz. These improvements include the construction of concrete channelizing islands, ADA compliant curb ramps, marked pedestrian crosswalks on the Governor Printz Boulevard north leg and Edgemoor Road west leg, and provision of pedestrian signals to facilitate safer crossing. Bicycle pavement markings and any other bicycle facilities in accordance with current DE MUTCD are also to be included at this intersection



as included in the Governor Printz Corridor Study. The sidewalk/SUP and barrier on the westbound side of Edgemoor Road at the intersection shall be reconstructed with ADA compliant curb ramps.

- f. Where internal sidewalks are located alongside of parking spaces, a buffer, physical barrier or signage should be added to eliminate vehicular overhang onto the sidewalk.
- g. ADA compliant curb ramps and marked crosswalks should be provided along the Site Entrance A and Site Entrance C approaches to Hay Road and Lighthouse Road. The use of diagonal curb ramps is discouraged.
- h. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lane and shoulder along the Lighthouse Road approach to Site Entrance A.
- i. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks/shared-use paths or should be flush with the pavement.
- j. 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.

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 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 dark ink, appearing to read 'Joanne M. Arellano', is written over the printed name.

Joanne M. Arellano, P.E., PTOE

cc: Mir Wahed, P.E., PTOE
Nate Rahaim, P.E., PTOE, RSP1
Enclosure

General HCS Analysis Comments

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

- 1) Due to the closely spaced intersections and on and off ramps to/from I-495, JMT conducted the TOA Addendum using Synchro 11 software and the results reported are based on HCM 6th Edition. The June 2021 TOA analysis was conducted with HCS7 Version 7.9 software.
- 2) JMT used a minimum heavy vehicle percentage of 3% 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. A minimum heavy vehicle percentage of 5% was utilized at the proposed site entrances.
- 3) Per DelDOT's *Development Coordination Manual*, JMT utilized a 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 the existing PHF, whichever was higher.
- 4) The peak hour Level of Service results tables contain the intersections that had significant volume intersection modifications as part of the TOA Addendum.
- 5) The TOA analysis considered the implementation of three entrances to the development whereas JMT accounted for the removal of Site Entrance B. Traffic volumes previously utilizing Site Entrance B were removed from the analysis by JMT as these employees are expected to remain at the Port of Wilmington.

Table 1
Peak Hour Levels Of Service (LOS)
Based on Transportation Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: June 15, 2021
Prepared by: Century Engineering, Inc.

Roundabout ^{1,2}	LOS per June 2021 TOA		LOS per JMT TOA Addendum	
Site Entrance A/ Lighthouse Road	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2024 with Development Fully Built (Case 3C)	A (3.7)	A (3.5)	A (3.8)	A (3.5)

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

² Based on coordination with DelDOT, a single lane roundabout is the preferred layout at Site Entrance A and was modeled as such by both the TOA and JMT.

Table 2
Peak Hour Levels Of Service (LOS)
Based on Transportation Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: June 15, 2021
Prepared by: Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹ (T-Intersection)	LOS per June 2021 TOA		LOS per JMT TOA Addendum	
Site Entrance C / Hay Road ³	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2024 with Development Fully Built (Case 3C)				
Westbound Site Entrance C Approach	B (11.4)	B (12.4)	B (11.6)	B (12.3)
Southbound Hay Road Left Turn	A (7.4)	A (7.5)	A (8.4)	A (8.5)

³ The TOA analysis considered a truck restriction would be implemented at the Edgemoor Road interchange with I-495 and all trucks would utilize the 12th Street Interchange and make a right turn into the site from northbound Hay Road. Based on correspondence with DelDOT, JMT conducted the analysis without the truck restriction and assumed all trucks would utilize the Edgemoor Road interchange and make a left into the site from southbound Hay Road.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Transportation Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: June 15, 2021
Prepared by: Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹ (T-Intersection)	LOS per June 2021 TOA		LOS per JMT TOA Addendum	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Lighthouse Road / NB I-495 Edgemoor Road Exit Ramp H ^{3,4}				
2024 with Development Fully Built (Case 3C)				
Eastbound Ramp H Left	A (9.5)	B (10.1)	A (9.8)	B (10.0)

Table 4
Peak Hour Levels Of Service (LOS)
Based on Transportation Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: June 15, 2021
Prepared by: Century Engineering, Inc.

All-Way Stop ¹	LOS per June 2021 TOA		LOS per JMT TOA Addendum	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Hay Road/ Lighthouse Road / Edgemoor Road ^{3,4}				
2024 with Development Fully Built (Case 3C)	A (8.0)	A (7.7)	A (8.5)	A (8.7)

⁴ Based on field observations showing the southbound Lighthouse Road right turn operating as a free flow right turn lane due to low opposing volume on Hay Road under existing and future conditions, both the TOA and JMT analyses excluded the right turn volume from the traffic analysis.

Table 5
Peak Hour Levels Of Service (LOS)
Based on Transportation Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: June 15, 2021
Prepared by: Century Engineering, Inc.

Unsignalized Intersection Two-Way Stop Control ¹ (T-Intersection)	LOS per June 2021 TOA		LOS per JMT TOA Addendum	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Edgemoor Road / SB I-495 Edgemoor Road Ramps A and B ^{3,5}				
2024 with Development Fully Built (Case 3C)				
Westbound Edgemoor Road Left	C (15.0)	B (14.7)	A (8.0)	A (7.6)
Southbound I-495 Edgemoor Road Ramp Approach	B (14.6)	C (17.3)	A (9.3)	A (9.0)

⁵ The TOA analyzed the intersection matching the existing configuration whereas JMT analyzed the intersection with the eastbound Edgemoor Road reconfigured with a separate right turn lane and one through lane to match improvements identified by DelDOT's *Edgemoor Road Bicycle and Pedestrian Improvements, Governor Printz Boulevard to Hay Road* (DelDOT Contract No. T202201101) project.

Table 6
Peak Hour Levels Of Service (LOS)
Based on Transportation Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: June 15, 2021
Prepared by: Century Engineering, Inc.

Signalized Intersection ¹	LOS per June 2021 TOA		LOS per JMT TOA Addendum	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Governor Printz Boulevard / Edgemoor Road ^{3,6}				
2024 with Development Fully Built (Case 3C)	D (37.0)	D (46.3)	D (48.5)	D (50.4)

⁶ The TOA analyzed the intersection matching the existing configuration whereas JMT analyzed the intersection with the westbound Edgemoor Road reconfigured with a separate right turn lane, one through lane, and one left turn lane to match improvements identified by DelDOT's *Edgemoor Road Bicycle and Pedestrian Improvements, Governor Printz Boulevard to Hay Road* (DelDOT Contract No. T202201101) project. The TOA results excluded the unsignalized delay for right-turns whereas JMT's analysis included them.

June 2021 TOA Review Letter



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

NICOLE MAJESKI
SECRETARY

June 22, 2021

Mr. Eugene Bailey
Executive Director
Diamond State Port Corporation
1 Hausel Rd
Wilmington, DE 19801

Dear Mr. Bailey:

The enclosed Traffic Operational Analysis (TOA) review letter for the proposed **Edgemoor Port Facility - Gulftainer** (Tax Parcels: 06-153.00-003 and 06-153.00-006) 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) 760-2124.

Sincerely,

Claudy Joinville
Project Engineer

CJ:km

Enclosures

cc with enclosures: Mr. Eric Casey, GT USA Wilmington
Mr. Mike Kaszyski, Duffield Associates, Inc.
Mr. Brian J. Devine, Duffield Associates, Inc.
Mr. James Taylor, Duffield Associates, Inc.
Mr. David L. Edgell, Office of State Planning Coordination
Mr. Bradford Shockley, New Castle County Department of Land Use
Mr. Owen C. Robatino, New Castle County Department of Land Use
Mr. Shawn P. Tucker, Barnes & Thornburg LLP
Mr. James Satterfield, Century Engineering, Inc.
Ms. Brigitte Odum-Ewuakye, Century Engineering, Inc.
DelDOT Distribution

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Brad Eaby, Deputy Attorney General
Shanté Hastings, Deputy Secretary
J. Marc Coté, Director, Planning
Mark Luszcz, Deputy Director, DOTS
Pamela Steinebach, Chief, Project Development North, DOTS
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Peter Haag, Chief Traffic Engineer, Traffic, DOTS
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Sireen Muhtaseb, New Castle Review Coordinator, Development Coordination
Jun Xie, Subdivision Manager, Development Coordination
Mark Galipo, Traffic Engineer, Traffic, DOTS
Troy Brestel, Project Engineer, Development Coordination
Annamaria Fumato, Project Engineer, Development Coordination

June 15, 2021

Mr. Claudy Joinville
Project Engineer
Development Coordination
DelDOT Division of Planning
P O Box 778
Dover, DE 19903

RE: Edgemoor Port Facility - Gulftainer

Dear Mr. Joinville,

Century Engineering, Inc. (CEI) has completed the Traffic Operational Analysis (TOA) for the proposed Edgemoor Port Facility – Gulftainer on behalf of the Delaware Department of Transportation (DelDOT). The report is prepared in a manner generally consistent with DelDOT's current *Development Coordination Manual* (DCM).

The TOA evaluates the impacts of the proposed Gulftainer Development. GT USA Wilmington, LLC proposes to build a port facility comprised of two employee buildings and a container terminal. The proposed Gulftainer site is located on the east of I-495 (N60). The site is an approximately 127.12± acre assemblage, comprising Tax Parcel number 06-153.00-006 on the east side of Hay Road/Lighthouse Road and Tax Parcel number 06-153.00-003 in the southwest corner of the intersection of Hay Road and Edgemoor Road in New Castle County. The site is currently zoned as HI (Heavy Industrial) by New Castle County and the developer does not plan to seek rezoning. The project is proposed to be developed in three phases with construction anticipated to be completed in 2024.

Three site access points, Site Entrance A, B and C, all full access, are proposed. Site Entrance A will be located on the east side of Lighthouse Road (N507), north of the intersection with Northbound I-495 Edgemoor Exit Ramp H. Site Entrance B will be located on the west side of Hay Road (N501), south of the intersection with Edgemoor Road (N220). Site Entrance C will be located on the east side of Hay Road, south of the proposed intersection with Site Entrance B.

The TOA was performed using site data-based trip generation based on the projected operation of the proposed development. Site Average Daily Traffic (ADT) and peak hour volumes for each phase and category are as provided in the table that follows.

Development Phase	Proposed Site Traffic	
	ADT	Peak Hour
Operations Employees		
I	878	88
II	1,249	125
III	1,454	145
Administrative Employees		
I	0	0
II	0	0
III	168	17
Trucks		
I	990	50
II	1,855	93
III	2,400	145

Operations employees and trucks are expected to be accommodated incrementally during Phase I and Phase II. The maximum number of operations employees and trucks, plus all administrative employees, will be accommodated at Phase III full build out. For the purposes of this analysis, it was assumed that no trucks associated with the site will use the I-495 Edgemoor Road ramps and that all such trucks will be directed to use the I-495 Ramps at 12th Street. Our understanding is that that restriction is no longer contemplated and our recommendations regarding 12th Street and Hay Road reflect that change.

Based on the LOS evaluation criteria as provided in Chapter 2 of DelDOT's *Development Coordination Manual*, Level of Service (LOS) deficiencies are exhibited for movements/approaches for all intersection control types, and overall intersection for signal control at the following intersections.

Intersection	Situations for which LOS deficiencies Occur
Governor Printz Boulevard @ Edgemoor Road (Signalized Control)	2024 Weekday A.M. With Project Phase II (Case 3B)
	2024 Weekday A.M. With Project Phase III (Case 3C)
	2020 Weekday P.M. Existing (Case 1)
	2024 Weekday P.M. Without Project (Case 2)
	2024 Weekday P.M. With Project Phase I (Case 3A)
	2024 Weekday P.M. With Project Phase II (Case 3B)
	2024 Weekday P.M. With Project Phase III (Case 3B)
12Th Street @ NB I-495 Exit Ramp B (Two-Way Stop Control)	2024 Weekday A.M. With Project Phase I (Case 3A)
	2024 Weekday A.M. With Project Phase II (Case 3B)
	2024 Weekday A.M. With Project Phase III (Case 3C)

The existing offsite signalized intersection of Governor Printz Boulevard at Edgemoor Road exhibits LOS deficiencies for certain movements under existing and all future P.M. conditions and also for future A.M. cases with Phases II and III of the port developed. It should be noted that although Edgemoor Road,

Delaware Route 3, is a designated north/south roadway, for the purpose of this study Edgemoor Road is the east/west roadway.

Per the analysis, during the weekday A.M. peak hour under existing and all future conditions, all approaches and the overall intersection would operate at LOS D or better. The southbound Governor Printz Boulevard left-turn movement would, however, operate at LOS E with Phases II and III of the port developed. Corresponding 95th Percentile queue lengths would be approximately 16 vehicles (405 feet) which would exceed the existing southbound left-turn storage length of approximately 280 feet.

The analysis also shows that for the P.M. peak hour, all approaches with the exception of the southbound approach at the intersection of Governor Printz Boulevard and Edgemoor Road, and the overall intersection, would operate at LOS D or better under all scenarios. The southbound Governor Printz Boulevard left-turn movement operates at LOS E presently and would deteriorate to LOS F with full development of the port. The southbound approach would operate at LOS D for all conditions except that with full development of the port it would operate at LOS E. 95th Percentile queue length for the southbound left-turn would range from approximately 23 vehicles (575 feet) presently to approximately 25 vehicles (625 feet) with full development of the port, all of which exceed the existing southbound left-turn storage length of approximately 280 feet.

Optimizing the signal split timings at the intersection of Governor Printz Boulevard and Edgemoor Road did not improve the results for the southbound left-turn under A.M. peak hour conditions. For the P.M. peak hour, the southbound Governor Printz Boulevard left-turn movement would improve to LOS D for existing conditions and LOS E for full build. The southbound approach LOS would improve to LOS D under full build. For the P.M. peak hour, 95th Percentile queue length for the southbound left-turn would improve to approximately 20 vehicles (400 feet) for existing conditions and approximately 21 vehicles (425 feet) for full build, both of which still exceed the existing southbound left-turn storage length of approximately 280 feet. It should be noted that as a result of the signal at this intersection being part of a coordinated corridor, the cycle length, as provided by DelDOT Traffic Management Center (TMC) was maintained and not optimized. This is because the TMC typically runs all signals in a specified group in a coordinated signal system on the same cycle length.

The analysis results indicate that the storage available for Governor Printz Boulevard southbound left-turn lane is inadequate. Since the southbound left-turn lane is back to back with the northbound left turn lane at the adjacent upstream intersection of S. Stuyvesant Drive/SB I-495 Ramp Intersection with Governor Printz Boulevard, there is no room for extension. Due to constraints posed by the elevated location of this intersection by virtue of its proximity to the at-grade Amtrak / CSX / Norfolk Southern rail lines, physical geometric improvements like provision of an additional southbound left-turn lane is not a viable solution under this study.

Per the HCS7 capacity analysis, operational deficiencies would develop beginning under 2024 development Phase I conditions at the existing offsite intersection of 12th Street at NB I-495 Exit Ramp B. For the A.M peak hour, the NB I-495 Ramp B approach operates at LOS D presently and would continue to do so without development of the port. The northbound left/right lane for the ramp approach would operate at LOS E with development of Phase 1 of the port. With the development of Phases II and III, the LOS on the northbound ramp approach would be F. For the northbound ramp approach, A.M. peak hour 95th Percentile Queue lengths range from eight (8) vehicles (208 feet) for existing conditions to sixteen (16) vehicles (393 feet) with full development of the port. P.M. peak hour 95th Percentile Queue lengths range

from three (3) vehicles for existing conditions to five (5) vehicles with full development of the port. HCS7 analysis with an exclusive northbound right-turn lane shows the northbound approach would operate at LOS E or better with full development of the port.

East of the intersection of 12th Street with the NB I-495 ramps, 12th Street and Hay Road are substandard in ways that do not relate directly to LOS. Because it is now expected that most of the truck traffic would not use 12th Street or Hay Road south of Shellpot Creek, no improvements to those roads are presently recommended. If this changes, the need for improvements there should be revisited. It is recommended that:

- DelDOT repave Hay Road north of the reconstructed limits of Bridge 567A to tie into the south limits of construction for Site Entrance C (approximately 250 feet to 300 feet south of the intersection of Site Entrance C with Hay Road).

The Northbound I-495 12th Street Exit Ramp B currently has Advisory Exit 35 MPH speed sign (W13-3) posted. The speed limit resolution obtained from current ArcGIS mapping in the DelDOT Gateway for the ramp is 25 MPH, which is lower than the posted advisory speed. It is recommended that DelDOT resolve this discrepancy.

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

1. The developer shall improve the State-maintained road(s) on which they front (Hay Road and Lighthouse Road), within the limits of their frontage, to meet DelDOT's standards for their Functional Classification as found in Section 1.1 of the Development Coordination Manual and elsewhere therein. The improvements shall include both directions of travel, regardless of whether the developer's lands are on one or both sides of the road. Frontage is defined in Section 1 of the Development Coordination Manual, which states "This length includes the length of roadway perpendicular to lines created by the projection of the outside parcel corners to the roadway." Questions on or appeals of this requirement should be directed to the DelDOT Subdivision Review Coordinator in whose area the development is located.
2. The developer shall improve DelDOT Railroad Crossing No. 91896E (Norfolk Southern) to meet current required standards. The DelDOT Railroad Coordinator, Mr. Richard Sinegar can be reached at 302-670-5545 (Cell), 302-760-4882 or by email at richard.sinegar@delaware.gov.
3. The developer shall construct Site Entrance A on Lighthouse Road (N507) along the west side of the property, approximately 1,500 feet north of the intersection with Northbound I-495 Edgemoor Exit Ramp H, consistent with the proposed lane configurations shown in the table that follows:

Approach	Curent Configuration	Proposed Configuration
Northbound Lighthouse Road	One through lane	One through lane and one right-turn lane
Southbound Lighthouse Road	One through lane	One through lane
Westbound Site Entrance A	Approach does not exist	One shared left-turn/right-turn lane

Based on the current DelDOT *Development Coordination Manual* Auxiliary Lane Worksheet v2020.2, the recommended minimum storage length (excluding taper) for the proposed northbound Lighthouse Road right-turn lane is 110 feet. The recommended minimum taper length is 50 feet resulting in a minimum total length of 160 feet.

4. The developer shall provide a bituminous concrete overlay to Lighthouse Road existing travel lanes along the site frontage in the area affected by the Site Entrance A construction at DelDOT's discretion. DelDOT should analyze the existing pavement section and recommend an overlay thickness to the developer's engineer if necessary.
5. The developer shall construct Site Entrance B on Hay Road (N501) along the east side of the property, approximately 500 feet south of the intersection with Edgemoor Road (N220). Preliminarily, the design should be consistent with the proposed lane configurations shown in the table that follows. However, if truck traffic to the port will be using the Edgemoor Road interchange, the configuration should be re-evaluated at plan review using DelDOT's Auxiliary Lane Worksheet and the volumes known at that time.

Approach	Curent Configuration	Proposed Configuration
Northbound Hay Road	One through lane	One shared left-turn/through through lane
Southbound Hay Road	One through lane	One shared through/right-turn lane
Eastbound Site Entrance B	Approach does not exist	One shared left-turn/right-turn lane

6. The developer shall provide a bituminous concrete overlay to Hay Road existing travel lanes along the site frontage in the area affected by the Site Entrance B construction at DelDOT's discretion. DelDOT should analyze the existing pavement section and recommend an overlay thickness to the developer's engineer if necessary.
7. The developer shall construct Site Entrance C on Hay Road (N501) along the west side of the property, approximately 1,250 feet south of the intersection with Edgemoor Road (N220), consistent with the proposed lane configurations shown in the table that follows:

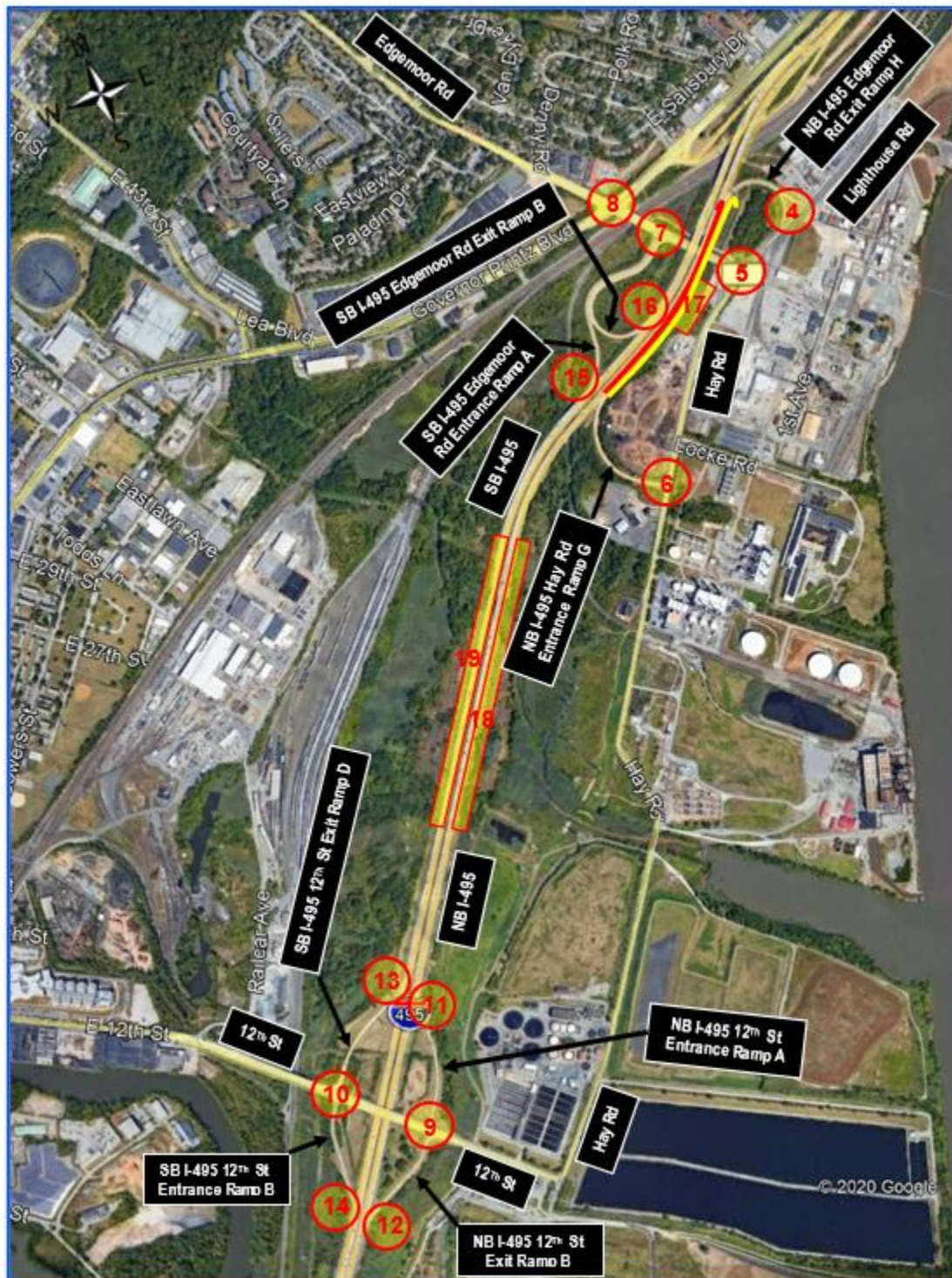
Approach	Curent Configuration	Proposed Configuration
Northbound Hay Road	One through lane	One through lane and one right-turn lane
Southbound Hay Road	One through lane	One through lane
Westbound Site Entrance C	One shared left-turn/right-turn lane	One shared left-turn/right-turn lane

Based on the current DelDOT *Development Coordination Manual* Auxiliary Lane Worksheet v2020.2, if the site is not developed beyond Phase I, the recommended minimum storage length (excluding taper) for the proposed northbound Lighthouse Road right-turn lane is 170 feet. The recommended minimum taper length is 50 feet resulting in a minimum total length of 220 feet.

If the site is developed beyond Phase I to Phase II or Phase III, the recommended minimum storage length (excluding taper) for the proposed northbound Lighthouse Road right-turn lane is 215 feet. The recommended minimum taper length is 50 feet resulting in a minimum total length of 265 feet.

8. The developer shall provide bituminous concrete overlay to Hay Road existing travel lanes along the site frontage in the area affected by the Site Entrance C construction at DelDOT's discretion. DelDOT should analyze the existing pavement section and recommend an overlay thickness to the developer's engineer if necessary.
9. Consistent with Section 5.2.5.6 of the current DelDOT *Development Coordination Manual*, Site Entrance C and any on-site aisles shall be designed to accommodate the trucks expected to traverse the site. The developer shall coordinate with DelDOT during the Entrance Plan review to confirm the design vehicle for the proposed Entrance C construction.

Existing Study Roads and Intersections



10. 12th Street and I-495 Ramps

- a. As mentioned above, the capacity analysis assumed that all of the site's truck traffic would use the 12th Street interchange. Consequently, it identified a need for a separate right turn lane where the northbound exit ramp intersects 12th Street (Location 9). If such a truck restriction is imposed, the need for the right turn lane should be revisited.
- b. Our review also identified several aspects of the interchange that do not meet current standards. They are not critical if truck traffic is permitted to use the Edgemoor interchange. Nonetheless, we recommend that the following aspects of the interchange be considered for attention in future capital DelDOT projects:
 - i. The existing channelizing islands at the intersection of 12th Street and NB I-495 Exit Ramp B (Location No. 9) could be reconstructed to provide better geometry and the existing guardrails at the intersection replaced to meet current standards.
 - ii. The existing channelizing islands at the intersection of 12th Street and SB I-495 Exit Ramp D (Location No. 10) could be reconstructed to provide better geometry and the existing guardrails at the intersection replaced to meet current standards.
 - iii. The existing 200-foot taper for the acceleration lane at the Northbound I-495 Entrance Ramp A (Location No. 11) from 12th Street and Hay Road could be restriped and extended to 300 feet.
 - iv. The existing 150-foot taper for the deceleration lane at the Northbound I-495 Exit Ramp B to 12th Street and Hay Road (Location No. 12) could be restriped and extended to 250 feet.
 - v. The existing 75-foot taper for the deceleration lane at the Southbound I-495 Exit Ramp D to 12th Street and Hay Road (Location No. 13) could be restriped and extended to 250 feet.
 - vi. The existing 250-foot taper for the acceleration lane at the Southbound I-495 Entrance Ramp C from 12th Street and Hay Road (Location No. 14) could be restriped and extended to 300 feet.

11. Southbound I-495 Edgemoor Ramps

- a. DelDOT should restripe and extend the existing 150-foot taper for the acceleration lane at the Southbound I-495 Entrance Ramp A (Location No. 15) from Edgemoor Road to 300 feet to meet AASHTO requirements.
- b. DelDOT should restripe and extend the existing 150-foot taper for the deceleration lane at the Southbound I-495 Exit Ramp B to Edgemoor Road (Location No. 16) to 300 feet to meet AASHTO requirements.

12. The following bicycle, pedestrian and transit improvements shall be included as follows:

- a. As part of the entrance plan approval process, the developer shall coordinate with the Delaware Department of Natural Resources and Environmental Control (DNREC) and the Delaware Transit Corporation, (DTC) to provide a bus turnaround at Site Entrance A. DTC also requests a bus pull-off with pedestrian access to Site entrance A be installed prior to the turnaround to

allow bus drivers to layover. Additionally, amenities like bicycle racks and bathroom access for bus drivers should also be coordinated as the site plan is further developed.

- b. The developer shall reconstruct the existing deteriorated sidewalk on the northbound side of Lighthouse Road from Edgemoor Road to the Northbound I-495 Edgemoor Exit Ramp H. The developer shall extend this sidewalk north to tie into Site Entrance A. North of Site Entrance A, the facility shall be continued, possibly as a Shared Use Path, to connect to Fox Point State Park.
- c. The developer shall construct a SUP along the site frontage on southbound Hay Road from Site Entrance B to Edgemoor Road. The SUP shall terminate in an ADA-compliant curb ramp at the intersection of Edgemoor Road and Hay Road.
- d. DelDOT should reconstruct the existing deteriorating SUP and substandard barrier on the westbound side of Edgemoor Road to form a continuous reconstructed pathway from the intersection of Edgemoor Road at Hay Road to the east, and Edgemoor Road at Governor Printz Boulevard to the west.
- e. The developer shall construct ADA compliant curb ramps at the intersection of Edgemoor Road and Hay Road. The sidewalk/SUP and barrier on the westbound side of Edgemoor Road at the intersection shall be reconstructed with ADA compliant curb ramps. The developer shall reconstruct existing concrete channelizing island in the southwest and the existing pavement marked channelizing island in the northwest sections of the intersection as concrete channelizing islands large enough to accommodate ADA Curb ramps. Marked crosswalk shall be provided on the Edgemoor Road west leg and Hay Road north leg to safely cross pedestrians and bicycles. The developer shall install DE MUTCD compliant pedestrian and bicycle pavement markings and signs at the intersection.
- f. DelDOT should provide bicycle facilities as identified in the Governor Printz Corridor Study, a copy of which can be located online at www.wilmapco.org/governorprintz. These improvements include the construction of concrete channelizing islands, ADA compliant curb ramps, marked pedestrian crosswalks on the Governor Printz Boulevard north leg and Edgemoor Road west leg, and provision of pedestrian signals to facilitate safer crossing. Bicycle pavement markings and any other bicycle facilities in accordance with current DE MUTCD are also to be included at this intersection as included in the Governor Printz Corridor Study. The sidewalk/SUP and barrier on the westbound side of Edgemoor Road at the intersection shall be reconstructed with ADA compliant curb ramps.

Please note that this TOA 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 DelDOT Traffic's Safety Programs Manager, Mr. Jeffrey Van Horn. Mr. Van Horn can be reached at (302) 659-4606, (302) 922-7279 or by email at Jeffrey.VanHorn@delaware.gov.

Additional details on the TOA are attached. Please contact me at boewuakye@centuryeng.com or (302) 734-9188 if you have any questions concerning this review.

Sincerely,
Century Engineering, Inc.

A handwritten signature in blue ink, appearing to read 'B. Odum-Ewuakye', with a long horizontal stroke extending to the right.

Brigitte A. Odum-Ewuakye
Engineer

Under Supervision of:

A handwritten signature in blue ink, appearing to read 'B. Martine', with a long horizontal stroke extending to the right.

Bret A. Martine, PE, PTOE

Cc: Jim Satterfield, PE
Alan K. Marteney, PE

Enclosure

GENERAL INFORMATION

Report Date: December 2020

Prepared by: Century Engineering, Inc.

Prepared for: Diamond State Port Corporation in partnership with Gulftainer USA and Port of Wilmington

Tax Parcels: 06-153.00-003 and 06-153.00-006

Generally Consistent with DelDOT's *Development Coordination Manual*: Yes

PROJECT DESCRIPTION AND BACKGROUND

Description: The developer seeks to develop one 44,000 square foot (SF) operational employees building, one 15,000 SF Administrative employees building, and a 250,000 SF container terminal with subsidiary supporting structures

Location: The main subject property is located on the east side of Hay Road/Lighthouse Road between Fox Point State Park and the Northbound I-495 Hay Road Entrance Ramp G. The property for the administrative building is located in the southwest corner of the intersection of Hay Road and Edgemoor Road in New Castle County.

Amount of Land to be developed: The subject property is on an approximately 127.12 acre assemblage of parcels.

Land Use approval(s) needed: Entrance Plan approval

Proposed completion date: The development is expected to be completed in 2024

Proposed access locations: Three full access points are proposed for the development. One access on the east side of Lighthouse Road (N507), one on the west side of Hay Road (N501) and one on the east side of Hay Road (N501). 2019 Average Annual Daily Traffic (AADT) for both Lighthouse Road and Hay Road at the entrance locations is 331 vehicles per day (vpd).

Site Location Map



Note: The figure is for approximate graphical presentation only. It was derived from Exploratory Minor Development Land Plan prepared by Duffield Associates dated March 12, 2020.

LIVABLE DELAWARE

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

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

Investment Level 1

Investment Level 1 Areas are often municipalities, towns, or urban/urbanizing places in counties. Density is generally higher than in the surrounding areas. There are a variety of transportation opportunities available. Buildings may have mixed uses, such as a business on the first floor and apartments above. 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 promote well-designed and efficient new growth in Investment Level 1 Areas. These areas contain downtowns and distressed neighborhoods where strong public-private partnerships are needed to facilitate community redevelopment and accelerate economic revitalization. Investment Level 1 is the priority for job creation and retention, main street and downtown community development, brownfields redevelopment, and Opportunity Zone projects. Resources include strategic funds, workforce training funds, community outreach, business supportive services, conduit tax-exempt bond program and strategic funds, and neighborhood assistance.

In Level 1 Areas, the State's first priority is to preserve existing facilities and make safety improvements. Level 1 Areas are also the highest priority for context-sensitive transportation system-capacity enhancements; transit-system enhancements; ADA accessibility; and closing gaps in the pedestrian system, including Safe Routes to School projects. Investment Level 1 Areas are ideal locations for Transportation Improvement Districts as well as Complete Community Enterprise Districts. Additionally, Level 1 areas are a first priority for planning projects and Investment Level 1 Areas are ideal locations for Transportation Improvement Districts as well as Complete Community Enterprise Districts. Additionally, Level 1 areas are a first priority for planning projects and studies, bicycle facilities, signal-system enhancements, and the promotion of interconnectivity of neighborhoods and public facilities. Street design and access should be compatible to the context of an area. Level 1 areas have highest priority for transit system investments, operating, and capital.

Proposed Development's Compatibility with Livable Delaware:

According to Livable Delaware, Investment Level 1 areas contain locations where strong public-private partnerships are needed to facilitate community redevelopment and accelerate economic revitalization. The proposed development is therefore generally consistent with the Livable Delaware *2020 Delaware Strategies for State Policies and Spending*.

COMPREHENSIVE PLANS

(Source: *New Castle County 2012 Comprehensive Plan Update*)

New Castle County Comprehensive Plan:

Per the *New Castle County Comprehensive Plan*, the existing and future land use of the subject property is Heavy Industrial.

Proposed Development's Compatibility with the New Castle County Comprehensive Plan:

Since the proposed development will consist of industrial use it appears to be generally compatible with the *New Castle County Comprehensive Plan*.

TRIP GENERATION

DelDOT approved site data-based trip generation derived from the projected operation of the proposed development was used in the analysis. Site Average Daily Traffic (ADT) for each phase and category is as provided in **Table 1**. Peak hour trips for all employees was given as 10% of employee ADT and peak hour trips for trucks as 5% of truck ADT. Peak hour trip generation based on these percentages were used in the TOA for the proposed development and are presented in **Table 2** and **Table 3** for A.M. and P.M. peak respectively.

Table 1: Gulftrainer ADT Trip Generation

Phase	Entering Traffic	Exiting Traffic	Total Traffic
Operations Employees			
I	439	439	878
II	624	624	1,249
III	727	727	1,454
Administrative Employees			
I	0	0	0
II	0	0	0
III	84	84	168
Trucks			
I	495	495	990
II	927	928	1,855
III	1,200	1,200	2,400

Table 2: Gulftrainer A.M. Peak Hour Trip Generation

Phase	Entering Traffic	Exiting Traffic	Total Traffic
Operations Employees			
I	66	22	88
II	94	31	125
III	109	36	145
Administrative Employees			
I	0	0	0
II	0	0	0
III	13	4	17
Trucks			
I	25	25	50
II	47	46	93
III	60	60	120

Table 3: Gulftrainer P.M. Peak Hour Trip Generation

Phase	Entering Traffic	Exiting Traffic	Total Traffic
Operations Employees			
I	22	66	88
II	31	94	125
III	36	109	145
Administrative Employees			
I	0	0	0
II	0	0	0
III	4	13	17
Trucks			
I	25	25	50
II	46	47	93
III	60	60	120

Analyzed intersections:

1. Lighthouse Road (N507) / Site Entrance A (Operations Staff Entrance)
2. Hay Road (N501) / Site Entrance B Administrative Staff Entrance)
3. Hay Road (N501) / Site Entrance C (Truck Entrance)
4. Lighthouse Road (S507) / NB I-495 Exit Ramp (Edgemoor Road Ramp H)
5. Edgemoor Road (N220) / Hay Road (N501)
6. Hay Road (N501) / NB I-495 Entrance Ramp (Hay Road Ramp G)
7. Edgemoor Road (N220) / SB I-495 Ramps (Edgemoor Road Ramps A and B)
8. Edgemoor Road (N220) / Governor Printz Boulevard (N50) – Signalized
9. 12th Street (N9) / NB I-495 Ramps (12th St Ramps A and B)
10. 12th Street (N9) / SB I-495 Ramps (12th St Ramps C and D)

A. At I-495 and 12th Street Interchange:

11. NB I-495 Entrance Ramp A (Merge) from Hay Road via 12th Street
12. NB I-495 Exit Ramp B (Diverge) to Hay Road via 12th Street
13. SB I-495 Entrance Ramp C (Merge) from 12th Street
14. SB I-495 Exit Ramp D (Diverge) to 12th Street

B. At I-495 and Edgemoor Road Interchange:

15. SB I-495 Entrance Ramp A (Merge) from Edgemoor Road
16. SB I-495 Exit Ramp B (Merge) to Edgemoor Road
17. NB I-495 Weave section between Entrance Ramp G (from Hay Road) to Exit Ramp H (Edgemoor Road)

C. I-495 Basic Freeway Segment:

18. NB I-495 between Entrance Ramp A from Hay Road via 12th Street and Entrance Ramp G (from Hay Road)

19. SB I-495 between Entrance Ramp A from Hay Road via 12th Street and Entrance Ramp G (from Hay Road)

Analyzed Scenarios:

1. Existing (2020) – Case 1
2. 2024 without development – Case 2
3. 2024 with development Phase I – Case 3A
4. 2024 with development Phase II – Case 3B
5. 2024 with development Phase III – Case 3C

Peak hours analyzed: Weekday morning (A.M.) and weekday evening (P.M.)

Committed developments considered:

No committed developments were approved for inclusion in this TOA.

INTERSECTION AND FACILITIES DESCRIPTION

1. Site Entrance A/Lighthouse Road

Type of Control: Proposed two-way stop-controlled intersection (T-intersection) with the possibility for roundabout if deemed feasible as part of the plan approval process

Northbound Approach: (Lighthouse Road) Existing one through lane, proposed one through lane and one right-turn lane; proposed one shared through/right-turn lane if roundabout deemed feasible

Southbound Approach: (Lighthouse Road) Existing one through lane, proposed one shared left/through lane

Eastbound Approach: (Site Entrance A) proposed one shared left/right lane

2. Site Entrance B/Hay Road

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

Northbound Approach: (Hay Road) Existing one through lane, proposed one left/through lane

Southbound Approach: (Hay Road) Existing one through lane, proposed one through/right lane

Eastbound Approach: (Site Entrance B) proposed one shared left/right lane

3. Site Entrance C/Hay Road

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

Northbound Approach: (Hay Road) Existing one through lane, proposed one through lane and one right-turn lane

Southbound Approach: (Lighthouse Road) Existing one through lane, proposed one shared left/through lane

Eastbound Approach: (Site Entrance C) proposed one shared left/right lane

4. Lighthouse Road/NB I-495 Edgemoor Road Exit Ramp H

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

Northbound Approach: (Lighthouse Road) Existing one through lane

Southbound Approach: (Lighthouse Road) Existing one through lane

Eastbound Approach: (NB I-495 Exit Ramp H) Existing one shared left/right lane with large radius right-turn yield control channelization

5. **Hay Road/Edgemoor Road¹**
Type of Control: Existing All-way stop-controlled intersection (four-leg intersection), proposed three-leg)
Northbound Approach: (Hay Road) Existing one shared left/through/right lane, proposed one shared left/through lane
Southbound Approach: (Hay Road) Existing one left/through lane and one yield controlled channelized right lane, proposed one through lane and one yield controlled channelized right lane
Eastbound Approach: (Edgemoor Road) Existing one shared left/through lane and one yield controlled channelized right lane, proposed one left lane and one yield controlled channelized right-turn lane
Westbound Approach: (Entrance) Existing one shared left/through/right lane, proposed elimination
6. **Hay Road/NB I-495 Hay Road Entrance Ramp G**
Type of Control: Existing two-way stop-controlled intersection (T-intersection)
Northbound Approach: (Hay Road) Existing one left/through lane
Southbound Approach: (Lighthouse Road) Existing one through/right lane
7. **Edgemoor Road¹/SB I-495 Edgemoor Road Ramps A and B**
Type of Control: Existing two-way stop-controlled intersection (T-intersection)
Northbound Approach: (SB I-495 Exit Ramps) Existing one through lane
Eastbound Approach: (Lighthouse Road) Existing one through lane and one shared through/right lane
Westbound Approach: (NB I-495 Exit Ramp H) Existing one channelized yield controlled right lane
8. **Governor Printz Boulevard/Edgemoor Road¹**
Type of Control: Existing signalized intersection (four-leg intersection)
Northbound Approach: (Governor Printz Boulevard) Existing one left-turn lane, two through lanes and on right-turn lane
Southbound Approach: (Governor Printz Boulevard) Existing one left-turn lane, two through lanes and on right-turn lane
Eastbound Approach: (Edgemoor Road) Existing one left-turn lane, one through lane and one shared through/right lane
Westbound Approach: (Edgemoor Road) Existing one left-turn lane, one through lane and one shared through/right lane
9. **12Th Street/NB I-495 12Th Street Ramps A and B**
Type of Control: Existing two-way stop-controlled intersection (T-intersection)
Northbound Approach: (NB I-495 Exit Ramps) Existing one shared left/right lane
Eastbound Approach: (12Th Street) Existing one left-turn lane and two through lanes
Westbound Approach: (12Th Street) Existing one through LANE and one shared through/right lane
10. **12Th Street/SB I-495 12Th Street Ramps C and D**
Type of Control: Existing two-way stop-controlled intersection (T-intersection)
Southbound Approach: (NB I-495 Exit Ramps) Existing one shared left/right lane
Eastbound Approach: (12Th Street) Existing one through lane and one shared through/right lane
Westbound Approach: (12Th Street) Existing one left-turn lane and two through lanes
11. **NB I-495/NB 12Th Street Entrance Ramp A**
Type of Control: Existing yield-controlled ramp-freeway merge intersection
Northbound: Existing three freeway lanes, one ramp lane and one acceleration lane
12. **NB I-495/NB 12Th Street Exit Ramp B**
Type of Control: Existing free ramp-freeway diverge intersection

¹ Although Edgemoor Road (Delaware Route 3) is a designated north/south roadway, it is designated east/west for the purposes of this TOA

Northbound: three freeway lanes, one ramp lane and one deceleration lane

13. **SB I-495/SB 12Th Street Exit Ramp D**

Type of Control: Existing free ramp-freeway diverge intersection

Southbound: Existing three freeway lanes, one ramp lane and one deceleration lane

14. **SB I-495/SB 12Th Street Entrance Ramp C**

Type of Control: Existing free ramp-freeway merge intersection

Southbound: Existing three freeway lanes, one ramp lane and one acceleration lane

15. **SB I-495/SB Edgemoor Road Entrance Ramp A**

Type of Control: Existing yield-controlled ramp-freeway merge intersection

Southbound: Existing three freeway lanes, one ramp lane and one acceleration lane

16. **SB I-495/SB Edgemoor Road Exit Ramp B**

Type of Control: Existing free ramp-freeway diverge intersection

Southbound: Existing three freeway lanes, one ramp lane and one deceleration lane

17. **NB I-495 Weave Segment between NB I-495 Hay Road Entrance Ramp G and NB I-495 Edgemoor Exit Ramp H**

Type of Control: free

Northbound: Existing three freeway lanes and one merge-diverge lane

18. **NB I-495 Freeway Segment between NB I-495 12Th Street Entrance Ramp A and NB I-495 Hay Road Entrance Ramp G**

Type of Control: free

Northbound: Existing three freeway lanes

19. **SB I-495 Freeway Segment between SB I-495 Edgemoor Road Entrance Ramp A and SB I-495 12Th Street Exit Ramp D**

Type of Control: free

Southbound: Existing three freeway lanes and one merge-diverge lane

PEDESTRIAN, BICYCLE AND TRANSIT FACILITIES

Existing pedestrian and bicycle facilities:

Within the study limits, an 8-foot sidewalk/shared use path (SUP) path exists on the westbound side of Edgemoor Road behind the concrete barrier separating Edgemoor Road from the I-495 bridge piers. Some portions of the sidewalk are poorly maintained allowing vegetation growth. Although the sidewalk/SUP continues on the west leg of Edgemoor Road at the intersection with Governor Printz Boulevard, no connecting marked pedestrian crosswalk exists. Curb ramps exist at the intersection; however, they are not Americans with Disability Act (ADA) compliant, and there is a horizontal gap as well as vertical elevation difference near the curb ramp on the east leg. On the east end of Edgemoor Road, the sidewalk has deteriorated and ends in an ADA non-compliant curb ramp at the intersection with Hay Road. Between the intersection of Edgemoor Road with Hay Road, and the intersection of Hay Road with the I-495 NB Exit Ramp H, deteriorated sidewalk exists along northbound Hay Road. No connecting marked pedestrian crosswalk exist at either of these intersections.

Governor Printz Boulevard is the only designated bicycle route roadway within the study limit per the New Castle County Bicycle Map. Through the intersection with Edgemoor Road, Governor Printz Boulevard is designated a Connector Bicycle Route. No exclusive marked bike lanes currently exist at the intersection through the right-turn lanes. On Governor Printz Boulevard, bicycle markings similar to that in Figure 9C-4C (*Example of Bicycle Treatment at a Right-Turn Only Lane with Shoulder*) of the current Delaware Manual on Uniform Traffic Control Devices (DE MUTCD) exists on the 10-foot shoulders in advance of the northbound and southbound right-turn lanes at the intersection. The shoulders of the road beyond the right-

turn lanes serve as the bikeway. A multiuse path/trail exists immediately north of Site Entrance A at Fox Point State Park. The pathway is part of the Northern Delaware Greenway.

Planned pedestrian and bicycle facilities:

The draft report of the **Governor Printz Boulevard Corridor Study** dated December 9, 2020 proposes a Shared Use Path (SUP) on the west side of Governor Printz Boulevard which extends through the study intersection of Governor Printz Boulevard and Edgemoor Road. At the intersection the study calls for concrete channelizing islands, ADA compliant curb ramps and signalized crosswalks across the west Edgemoor Road Leg and the north Governor Printz Boulevard leg. The latter crosswalk would connect the Governor Printz SUP to a proposed SUP reconstructed from the existing sidewalk on the north side of Edgemoor Road. The concepts developed for Fox Point Connection would link the proposed Edgemoor Road SUP to a proposed SUP reconstructed from the existing sidewalk on the east side of Lighthouse Road via a proposed crosswalk on the north leg of Lighthouse Road.

Two possible SUP alignments are proposed to connect path users from the intersection of Edgemoor and Lighthouse Road to the entrance to Fox Point State Park. One alignment would be a direct connection along the west side of Lighthouse Road from the intersection with Edgemoor Road and crossing over to the east side north of the NB I-495 Edgemoor Road Exit Ramp H. Since adequate space does not exist to allow widening of the existing roadway to accommodate an at grade path or separated bikeway and sidewalk, this alternative would have to be developed as an elevated structure to avoid conflict with the high traffic volume I-495 ramp, railroad right-of way, and truck traffic. A less direct at-grade option would connect Edgemoor Road path users to the path on the east side of Lighthouse Road via a crosswalk at the Edgemoor Road and Lighthouse Road intersection, then cross to the west side of Lighthouse Road immediately north of the NB I-495 Edgemoor Road Exit Ramp H and loop around along the back side of IKO Wilmington, a roofing materials manufacturing plant located in the west side of Lighthouse Road. This option would result in the need for two SUP-railroad at-grade crossings. Both of these options would tie into the existing path network in the Fox Point State Park. All the proposed Fox Point Connection pathways are within the vicinity of the Gulftainer site and fall within the Gulftainer study limits. The Governor Printz Corridor Study recommends it be ensured that a shared use path along the east side of Lighthouse be incorporated in the Gulftainer site plan. At the time of this report, the draft study report and information about the corridor study can be located online at www.wilmapco.org/governorprintz.

A need/desire for a connection along Lighthouse Road to Site Entrance A and Fox Point State Park, in line with the recommendations from the **Governor Printz Boulevard Corridor Study** was expressed by DelDOT's Bicycle/Pedestrian Coordinator. It was however acknowledged by the Bike/Ped coordinator that the proximity of existing buildings and existing rail lines along Lighthouse Road will make these connections difficult to accomplish. A slight relocation of the rail line is proposed with the site design that may allow for the desired connection to Site Entrance A and Fox Point State Park. This potential connection should be coordinated with DelDOT's Bicycle/Pedestrian Coordinator during the entrance plan approval process. The following improvements were also identified:

- i. Provision of a sidewalk/SUP along southbound Hay Road along the site frontage that terminates in an ADA compliant curb ramp at the intersection of Edgemoor Road and Hay Road.
- ii. The existing deteriorated sidewalk/SUP on the northbound side of Lighthouse Road and sidewalk/SUP and barrier on the westbound side of Edgemoor Road at the intersection of Edgemoor Road and Hay Road should be reconstructed with ADA compliant curb ramps. Both the existing concrete channelizing islands in the southwest and existing pavement marked channelizing island in the northwest sections of the intersection should be reconstructed as concrete channelizing islands large enough to accommodate ADA curb ramps. Marked crosswalks should be provided on the Edgemoor Road west leg and the Hay Road north leg to safely cross pedestrians and bicycles. All pedestrian and bicycle pavement markings and signs should be in accordance with the current DE MUTCD.

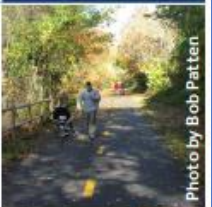
- iii. The poorly maintained sidewalk/SUP and substandard barrier on the westbound side of Edgemoor Road should be reconstructed to form a continuous reconstructed pathway from the intersection of Edgemoor Road at Hay Road to the east, and Edgemoor Road at Governor Printz Boulevard to the west.
- iv. Improvements at the intersection of Governor Printz Boulevard at Edgemoor Road should include the construction of concrete channelizing islands, ADA compliant curb ramps, marked pedestrian crosswalks on the Governor Printz Boulevard north leg and Edgemoor Road west leg, and provision of pedestrian signals to facilitate safer crossing. Bicycle pavement markings and any other bicycle facilities in accordance with current DE MUTCD should also be included at this intersection as directed by DelDOT's Bicycle/Pedestrian Coordinator and also as included in the **Governor Printz Corridor Study**. All pedestrian and bicycle pavement markings and signs should be in accordance with the current DE MUTCD

Bicycle Level of Traffic Stress:

Level of Stress (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. This explanation of LTS and the accompanying table describing the LTS levels were obtained from the *Blueprint for a Bicycle-Friendly Delaware: A Statewide Policy Plan*.

All LTS provided for roadways and intersections within the study limits were obtained from the Bicycle Network Model in the DelDOT ArcGIS mapping provided in the DelDOT Gateway. Currently Lighthouse Road and Hay Road north of Bridge 567A over Shellpot Creek are both shown as having LTS of 1. South of the bridge, the LTS for Hay Road is 2 and the LTS for 12th Street is 3. The LTS for Edgemoor Road is reported as 4. Governor Printz Boulevard also has a reported LTS of 4, and 12th Street a reported LTS of 3. The Level of Roadway Stress (LRS) for intersections was also available in the DelDOT Gateway as follows:

- i. Lighthouse Road at NB I-495 Edgemoor Road Exit Ramp H – LSR 1.
- ii. Hay Road at NB I-495 Edgemoor Road – LSR 2.
- iii. Hay Road at NB I-495 Edgemoor Road Entrance Ramp G – LSR 1.
- iv. Edgemoor Road at SB I-495 Entrance Ramp A / Exit Ramp B – LSR 2.
- v. Governor Printz Boulevard at Edgemoor Road – LSR 4.
- vi. 12th Street at SB I-495 Entrance Ramp C / Exit Ramp D – LSR 2.
- vii. No LSR is available for 12th Street at SB I-495 Entrance Ramp A / Exit Ramp B.

Level of Traffic Stress	Description	Example
1	Safe for children to use; Usually completely separated from auto traffic	 Photo by Bob Patten
2	Tolerated by most mainstream adult populations of cyclists; Roads with low volume and low speed auto traffic	
3	Tolerated by riders who are enthused and confident; Heavy traffic with separated bike facility	
4	Only tolerated by strong and fearless riders; cyclists must interact with high volumes or speeds of auto traffic.	

Existing transit service: Within the study limits, the Delaware Transit Corporation (DTC) provides existing service via Dart Bus Transit Route 4 (W 4th Street / Governor Printz Blvd). This service travels the south leg of Governor Printz Boulevard and the west leg of Edgemoor Road at the intersection. The bus has stops at the Merchant Square Shopping Center on Edgemoor Road, on the west leg of Edgemoor Road and on Rysing Drive in the Edgemoor Gardens Subdivision.

Planned transit service:

Discussions with DTC identified the need to provide transit service in as close a proximity to Site Entrance A as possible while not having to cross the railroad line. It was also requested that the possibility of a bus turnaround along Lighthouse Road and the site be investigated. Further coordination between the site design team and DTC revealed the potential for transit service at Site Entrance A and Fox Point State Park on condition that the number of trains and train arrivals and departures can be coordinated with employee shift times to minimize the potential for transit buses being delayed by arriving and departing trains north of the rail crossing. DTC's desire for a bus turnaround may be accomplished by installing a roundabout at Site Entrance A and at Fox Point State Park entrance so the roundabout can serve as the bus turnaround. Coordination between the site design team, the Delaware Department of Natural Resources and Environmental Control (DNREC) and continued coordination with the DTC is required as part of the entrance plan approval process for the implementation of this transit access. DTC also requested a bus pull-off be installed prior to the roundabout to allow bus drivers to layover. This pull off should also have pedestrian access to the Employee Entrance A. Amenities such as covered bike racks and bathroom access for bus drivers should also be coordinated as the site plan is further developed. In addition, DTC requests that the potential for a second roundabout be investigated within Fox Point State Park to provide better transit access to the park. The DTC also recommends a second bus pull-off at the entrance to the Fox Point State Park to better serve riders accessing the park.

PREVIOUS COMMENTS

None.

GENERAL ANALYSIS COMMENTS

(Specific comments are provided in the footnotes for each analysis results table)

1. HCS7 software (Version 7.9) was used for the analysis of all intersections and freeway facilities. Signalized and unsignalized intersection results were based on HCM 6th Edition methodology. For the signalized intersection, additional analysis was performed using Synchro plus SimTraffic 10 (Version 10.3, build 151)
2. Per the current *DelDOT Development Coordination Manual* (DCM), CEI calculated percentage of heavy vehicles separately for each turning movement for unsignalized intersections and separately for each lane group for signalized intersections from available traffic counts. For the intersections at which turning movement counts were derived from other traffic data, 3% heavy vehicle percentage was used for existing and future conditions. Since the Gulftainer development is a high heavy vehicle volume generator, heavy vehicle percentages were computed for each of Phase I, Phase II and Phase III future scenarios. Heavy vehicle percent of 9% was used for existing conditions on I-495 to conform with that for Traffic Group 1.
3. Per the current DCM, CEI used existing peak hour factors (PHF) for Case 1 for locations where turning movement counts were available. For all future scenarios, Case 2, 3A, 3B and 3C, and at locations at which turning movement counts were derived from other traffic data for Case 1, CEI utilized PHF of 0.80 at locations with total intersection volume of 500 vph. For a total intersection volume of 500 vph to 1,000 vph, a PHF of 0.88 was used. For a total intersection volume over 1,000 vph, a PHF of 0.92 was used.

4. Although Edgemoor Road (Delaware Route 3) is a designated north/south roadway, it is designated east/west for the purposes of this TOA.

Table 4
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: December 2020
Prepared by CEI

Site Entrance A/Lighthouse Road ² : Unsignalized Intersection Two-Way Stop Control HCS7 Analysis (T-Intersection)												
Movement/ Lane Group	A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
WB Entrance A LTR	9.5	A	9.7	A	9.8	A	9.9	A	10.2	B	10.3	B
WB Approach	9.5	A	9.7	A	9.8	A	9.9	A	10.2	B	10.3	B
SB Lighthouse Rd Left	7.5	A	7.6	A	7.6	A	7.4	A	7.4	A	7.4	A
SB Approach	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-

Site Entrance A/Lighthouse Road ⁶ : Single Lane Roundabout HCS7 Analysis												
Movement/ Lane Group	A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
WB Entrance A Approach	3.1	A	3.1	A	3.2	A	3.4	A	3.6	A	3.7	A
NB Lighthouse Rd Approach	3.6	A	3.8	A	3.9	A	3.1	A	3.2	A	3.2	A
SB Lighthouse Rd Approach	2.9	A	2.9	A	2.9	A	3.4	A	3.5	A	3.6	A
Intersection	3.5	A	3.6	A	3.7	A	3.3	A	3.4	A	3.5	A

² The westbound Site Entrance A approach was configured as one shared left/right lane. The northbound Lighthouse Road approach was configured as one through lane and one right-turn lane. The southbound Lighthouse Road approach was configured as one shared through/right lane.

³ 2024 Future with Project (FWP) Phase I

⁴ 2024 FWP Phase II

⁵ 2024 FWP Phase III

⁶ The intersection was modeled as a single lane roundabout

Table 5
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: December 2020
Prepared by CEI

Site Entrance B/Hay Road ⁷ : Unsignalized Intersection Two-Way Stop Control (T-Intersection)				
Movement/ Lane Group	A.M. Case 3C ⁵		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS
EB Entrance B LTR	9.1	A	9.5	A
EB Approach	9.1	A	9.5	A
NB Hay Rd Left	7.4	A	7.5	A
NB Approach	0.8	-	0.2	-

Table 6
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: December 2020
Prepared by CEI

Site Entrance C/Hay Road ⁸ : Unsignalized Intersection Two-Way Stop Control HCS7 Analysis (T-Intersection)												
Movement/ Lane Group	A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
WB Entrance C LTR	10.6	B	11.0	B	11.4	B	11.3	B	11.9	B	12.4	B
WB Approach	10.6	B	11.0	B	11.4	B	11.3	B	11.9	B	12.4	B
SB Hay Rd Left	7.3	A	7.4	A	7.4	A	7.4	A	7.4	A	7.5	A
SB Approach	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-	0.0	-

⁷ The eastbound Site Entrance B approach was configured as one shared left/right lane. The northbound Hay Road approach was configured as one shared left/through lane. The southbound Hay Road approach was configured as one shared through/right lane.

⁸ The westbound Site Entrance C approach was configured as one shared left/right lane. The northbound Hay Road approach was configured as one through lane and one right-turn lane. The southbound Hay Road approach was configured as one shared left/through lane.

³ 2024 Future with Project (FWP) Phase I

⁴ 2024 FWP Phase II

⁵ 2024 FWP Phase III

Table 7
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: December 2020
Prepared by CEI

Lighthouse Road/NB I-495 Edgemoor Road Exit Ramp H: Two-Way Stop Control HCS7 Analysis ⁹																				
Movement/ Lane Group	A.M. Case 1		A.M. Case 2		A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 1		P.M. Case 2		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
EB Ramp H Left	8.9	A	8.9	A	9.2	A	9.4	A	9.5	A	9.1	A	9.1	A	9.7	A	9.9	A	10.1	B
EB Approach	8.9	A	8.9	A	9.2	A	9.4	A	9.5	A	9.1	A	9.1	A	9.7	A	9.9	A	10.1	B

Table 8
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: December 2020
Prepared by CEI

Lighthouse Road/NB I-495 Edgemoor Road Entrance Ramp G: Two-Way Stop Control HCS7 Analysis ¹⁰																				
Movement/ Lane Group	A.M. Case 1		A.M. Case 2		A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 1		P.M. Case 2		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
NB Hay Rd Left	7.4	A	7.4	A	7.5	A	7.5	A	7.5	A	7.4	A	7.4	A	7.5	A	7.5	A	7.6	A

⁹ Under existing and future conditions, the eastbound ramp right-turn comprises almost all of the eastbound traffic volume and operates essentially as a free right due to the nearly exclusive receiving lane on Lighthouse Road. As a result, the right-turn volume was excluded from the HCS analysis.

¹⁰ The ramp leg is one-way outbound, so this intersection has no eastbound approach.

³ 2024 Future with Project (FWP) Phase I

⁴ 2024 FWP Phase II

⁵ 2024 FWP Phase III

Table 9
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – GulfTainer
Report Dated: December 2020
Prepared by CEI

Hay Road/Edgemoor Road: All-Way Stop Control HCS7 Analysis ¹¹																				
Movement/ Lane Group	A.M. Case 1		A.M. Case 2		A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 1		P.M. Case 2		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
EB Edgemoor Rd Left/Through	8.1	A	8.1	A	8.5	A	8.6	A	8.8	A	8.1	A	8.1	A	8.3	A	8.3	A	8.4	A
EB Edgemoor Rd Right	6.9	A	6.9	A	6.9	A	6.9	A	7.0	A	7.0	A	7.0	A	7.1	A	7.1	A	7.1	A
EB Approach	7.3	A	7.3	A	7.8	A	7.9	A	8.1	A	7.4	A	7.4	A	7.5	A	7.6	A	7.7	A
NB Hay Rd L/T/R	7.4	A	7.4	A	7.6	A	7.6	A	7.7	A	7.6	A	7.6	A	7.7	A	7.7	A	7.8	A
NB Approach	7.4	A	7.4	A	7.6	A	7.4	A	7.7	A	7.6	A	7.6	A	7.7	A	7.7	A	7.8	A
SB Hay Rd Left/Through	7.2	A	7.2	A	7.4	A	7.4	A	7.5	A	7.3	A	7.3	A	7.4	A	7.5	A	7.5	A
SB Approach	7.2	A	7.2	A	7.4	A	7.4	A	7.5	A	7.3	A	7.3	A	7.4	A	7.5	A	7.5	A
Intersection	7.3	A	7.3	A	7.7	A	7.9	A	8.0	A	7.4	A	7.4	A	7.5	A	7.6	A	7.7	A

¹¹ The southbound right-turn operates essentially as a free right due to low opposing volume on Hay Road under existing and future conditions. As a result, the right-turn volume was excluded from the HCS analysis.

³ 2024 Future with Project (FWP) Phase I

⁴ 2024 FWP Phase II

⁵ 2024 FWP Phase III

Table 10
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: December 2020
Prepared by CEI

Edgemoor Road/SB I-495 Edgemoor Road Ramps A and B Two-Way Stop Control HCS7 Analysis																				
Movement/ Lane Group	A.M. Case 1		A.M. Case 2		A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 1		P.M. Case 2		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
WB Edgemoor Rd Left	13.3	B	13.7	B	14.4	B	14.7	B	15.0	C	13.0	B	13.3	B	14.0	B	14.4	B	14.7	B
WB Approach	2.4	A	2.5	A	2.7	A	2.7	A	2.8	A	1.5	A	1.6	A	1.9	A	2.1	A	2.2	A
NB Ramp B Right	13.4	B	13.7	B	14.1	B	14.4	B	14.6	B	16.3	C	16.7	C	17.0	C	17.1	C	17.3	C
NB Approach	13.4	B	13.7	B	14.1	B	14.4	B	14.6	B	16.3	C	16.7	C	17.0	C	17.1	C	17.3	C

Table 11
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – GulfTainer
Report Dated: December 2020
Prepared by CEI

Governor Printz Boulevard/Edgemoor Road Signalized HCM 6 Analysis ¹²																				
Movement/ Lane Group	A.M. Case 1		A.M. Case 2		A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 1		P.M. Case 2		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
EB Edgemoor Rd Left	26.0	C	25.8	C	25.6	C	25.6	C	25.5	C	34.4	C	34.1	C	34.0	C	34.0	C	33.9	C
EB Edgemoor Rd Through	35.0	C	35.2	D	35.5	D	35.6	D	35.8	D	49.9	D	50.4	D	50.6	D	50.7	D	50.7	D
EB Approach	33.6	C	33.8	C	34.1	C	34.2	C	34.3	C	47.6	D	47.9	D	48.1	D	48.2	D	48.2	D
WB Edgemoor Rd Left	44.3	D	46.7	D	50.1	D	51.3	D	52.7	D	34.0	C	33.8	C	33.3	C	33.1	C	33.2	C
WB Edgemoor Rd Through	30.0	C	30.1	C	29.9	C	29.8	C	29.7	C	35.5	D	35.4	D	34.8	D	34.6	D	34.3	D
WB Approach	35.3	D	36.2	D	37.4	D	37.8	D	38.3	D	35.0	C	34.8	C	34.2	C	34.0	C	33.9	C
NB Governor Printz Blvd Left	46.5	D	46.4	D	46.4	D	46.4	D	46.4	D	62.6	E	62.9	E	62.9	E	62.9	E	62.9	E
NB Governor Printz Blvd Through	27.5	C	28.2	C	28.5	C	28.6	C	28.7	C	32.7	C	33.2	C	34.0	C	34.3	C	34.7	C
NB Approach	29.9	C	30.5	C	30.7	C	30.8	C	30.9	C	36.2	D	36.7	D	37.4	D	37.7	D	38.0	D
SB Governor Printz Blvd Left	50.3	D	51.5	D	54.5	D	55.4	E	56.4	E	72.8	E	79.4	E	80.4	F	81.0	F	81.5	F
SB Governor Printz Blvd Through	13.9	B	14.1	B	14.2	B	14.3	B	14.4	B	14.8	B	15.2	B	15.6	B	15.8	B	16.0	B
SB Approach	35.7	D	36.5	D	38.5	D	39.1	D	39.8	D	50.0	D	54.1	D	55.0	E	55.4	E	55.9	E
Intersection	34.4	C	35.1	D	36.2	D	36.6	D	37.0	D	44.1	D	45.8	D	46.1	D	46.2	D	46.3	D

¹² The HCM 6 analysis results were generated from Synchro. Unsignalized delay for right-turns are excluded from calculations of the approach and intersection delays.

³ 2024 Future with Project (FWP) Phase I

⁴ 2024 FWP Phase II

⁵ 2024 FWP Phase III

Table 11 (Continued)
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – GulfTainer
Report Dated: December 2020
Prepared by CEI

Governor Printz Boulevard/Edgemoor Road Signalized HCM 6 Analysis (Optimized) ¹³																				
Movement/ Lane Group	A.M. Case 1		A.M. Case 2		A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 1		P.M. Case 2		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
EB Edgemoor Rd Left	26.4	C	25.9	C	25.9	C	25.7	C	25.6	C	35.0	D	34.6	C	34.5	C	34.4	C	34.4	C
EB Edgemoor Rd Through	44.0	D	38.4	D	41.7	D	39.2	D	39.5	D	57.4	E	55.1	E	55.4	E	55.6	E	55.7	E
EB Approach	41.5	D	36.6	D	39.4	D	37.3	D	37.6	D	54.1	D	52.0	D	52.3	D	52.4	D	52.5	D
WB Edgemoor Rd Left	28.6	C	32.6	C	34..8	C	34.5	C	35.1	D	39.3	D	39.6	D	43.3	D	39.8	D	41.8	D
WB Edgemoor Rd Through	27.3	C	27.9	C	28.0	C	27.7	C	27.6	C	36.8	D	36.6	D	36.7	D	35.8	D	35.8	D
WB Approach	27.8	C	29.6	C	30.6	C	30.2	C	30.4	C	37.7	D	37.7	D	39.2	D	37.3	D	38.2	D
NB Governor Printz Blvd Left	46.5	D	46.4	D	46.4	D	46.4	D	46.4	D	62.6	E	62.9	E	62.9	E	62.9	E	62.9	E
NB Governor Printz Blvd Through	30.0	C	28.9	C	30.2	C	30.6	C	30.8	C	33.0	C	34.2	C	34.3	C	35.5	D	35.5	D
NB Approach	32.1	C	31.1	C	32.2	C	32.6	C	32.8	C	36.5	D	37.6	D	37.7	D	38.7	D	38.8	D
SB Governor Printz Blvd Left	50.3	D	64.0	E	54.5	D	55.4	E	56.4	E	53.2	D	54.9	D	55.0	D	55.0	D	55.0	E
SB Governor Printz Blvd Through	15.3	B	15.2	B	15.2	B	15.4	B	15.4	B	14.1	B	14.4	B	14.5	B	15.1	B	15.1	B
SB Approach	36.3	D	44.4	D	38.9	D	39.6	D	40.2	D	37.8	D	38.9	D	39..1	D	39.3	E	39.4	D
Intersection	34.4	C	36.6	D	35.7	D	35.4	D	35.8	D	41.5	D	41.6	D	42.1	D	41.9	D	42.2	D

¹³ The HCM 6 analysis results were generated from Optimized Synchro Analysis. Unsignalized delay for right-turns are excluded from calculations of the approach and intersection delays.

³ 2024 Future with Project (FWP) Phase I

⁴ 2024 FWP Phase II

⁵ 2024 FWP Phase III

Table 12
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – GulfTainer
Report Dated: December 2020
Prepared by CEI

12 Th Street/NB I-495 Exit Ramp B Two-Way Stop Control HCS7 Analysis ¹⁴																				
Movement/ Lane Group	A.M. Case 1		A.M. Case 2		A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 1		P.M. Case 2		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
EB Left	7.7	A	7.7	A	7.8	A	7.9	A	7.9	A	7.6	A	7.6	A	7.7	A	7.7	A	7.8	A
EB Approach	5.1	-	5.1	-	4.6	-	4.3	-	4.0	-	6.9	-	6.9	-	6.3	-	5.9	-	5.6	-
NB Left/Right	27.8	D	31.1	D	42.7	E	56.7	F	66.9	F	18.3	C	19.5	C	21.0	C	22.5	C	23.8	C
NB Approach	27.8	D	31.1	D	42.7	E	56.7	F	66.9	F	18.3	C	19.5	C	21.0	C	22.5	C	23.8	C

12 th Street/NB I-495 Exit Ramp B Two-Way Stop Control HCS7 Analysis ¹⁵												
Movement/ Lane Group	A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
EB Left	7.8	A	7.8	A	7.9	A	9.0	A	7.7	A	7.8	A
EB Approach	4.6	-	4.3	-	4.0	-	7.4	-	5.9	-	5.6	-
NB Left	31.6	D	38.3	E	42.8	E	20.7	C	22.6	C	23.8	C
NB Right	9.2	A	9.4	A	9.5	E	9.3	A	9.4	A	9.6	A
NB Approach	29.7	D	35.4	E	39.2	E	19.8	C	21.2	C	22.0	C

¹⁴ The northbound approach is configured as a shared left/right lane. The eastbound approach is configured as one left-turn lane and two through lanes. The westbound approach is configured as one through lane and one shared through/right lane.

¹⁵ The northbound approach is configured as one left-turn lane and one right-turn lane. The eastbound approach is configured as one left-turn lane and two through lanes. The westbound approach is configured as one through lane and one shared through/right lane.

³ 2024 Future with Project (FWP) Phase I

⁴ 2024 FWP Phase II

⁵ 2024 FWP Phase III

Table 13
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: December 2020
Prepared by CEI

12 th Street/SB I-495 Exit Ramp D Two-Way Stop Control HCS7 Analysis ¹⁶																				
Movement/ Lane Group	A.M. Case 1		A.M. Case 2		A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 1		P.M. Case 2		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS	Delay (sec)	LOS
WB Left	9.9	A	10.0	B	10.7	B	11.1	B	11.4	B	13.0	B	13.2	B	14.0	B	14.5	B	14.7	B
WB Approach	0.6	A	0.6	A	0.8	A	1.0	A	1.1	B	1.6	A	1.6	A	2.0	A	2.4	A	2.6	A
SB Left/Right	12.0	B	12.2	B	13.0	B	13.5	B	16.3	C	9.2	A	9.3	A	9.0	A	11.5	B	13.1	B
B Approach	12.0	B	12.2	B	13.0	B	13.5	B	16.3	C	9.2	A	9.3	A	9.0	A	11.5	B	13.1	B

¹⁶ The southbound approach is configured as a shared left/right lane. The eastbound approach is configured as one through lane and one shared through/right lane. The westbound approach is configured as one left-turn lane and two through lanes.

³ 2024 Future with Project (FWP) Phase I

⁴ 2024 FWP Phase II

⁵ 2024 FWP Phase III

Table 14
Peak Hour Levels of Service (LOS)
Based on Traffic Operational Analysis for Edgemoor Port Facility – Gulftainer
Report Dated: December 2020
Prepared by CEI

Ramps, Weave and Freeway Facilities HCS7 Analysis																				
Location	A.M. Case 1		A.M. Case 2		A.M. Case 3A ³		A.M. Case 3B ⁴		A.M. Case 3C ⁵		P.M. Case 1		P.M. Case 2		P.M. Case 3A ³		P.M. Case 3B ⁴		P.M. Case 3C ⁵	
	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS	Density	LOS
LOC 11 Merge ¹⁷	18.1	B	18.7	B	19.1	B	19.4	B	19.5	B	15.3	B	15.8	B	16.0	B	16.2	B	16.3	B
LOC 12 Diverge ¹⁸	19.5	B	20.2	C	20.4	C	20.6	C	20.7	C	14.6	B	15.2	B	15.3	B	15.4	B	15.5	B
LOC 13 Diverge ¹⁹	18.4	B	19.0	B	19.3	B	19.4	B	19.5	B	20.6	C	21.1	C	21.5	C	21.7	C	21.8	C
LOC 14 Merge ²⁰	18.7	B	19.4	B	19.6	B	19.7	B	19.8	B	23.6	C	24.4	C	24.7	C	24.8	C	25.0	C
LOC 15 Merge ²¹	19.2	B	19.8	B	20.0	B	20.2	B	20.3	C	22.7	C	23.2	C	23.6	C	23.8	C	24.0	C
LOC 16 Diverge ²²	10.1	B	10.4	B	10.7	B	10.8	B	11.0	B	13.3	B	13.7	B	13.8	B	14.0	B	14.1	B
LOC 17 Weave ²³	24.8	C	25.5	C	26.1	C	26.4	C	26.7	C	21.2	C	21.8	C	22.2	C	22.5	C	22.7	C
LOC 18 Segment ²⁴	20.1	C	20.8	C	21.1	C	21.3	C	21.5	C	16.9	B	17.3	B	17.5	B	17.6	B	17.8	B
LOC 19 Segment ²⁵	18.8	C	19.4	C	19.6	C	19.8	C	19.9	C	21.6	C	22.3	C	22.7	C	22.9	C	23.1	C

See the figure that follows for facility identification.

¹⁷ NB I-495 12Th Street Entrance Ramp A

¹⁸ NB I-495 12Th Street Exit Ramp B

¹⁹ SB I-495 12Th Street Exit Ramp D

²⁰ SB I-495 12Th Street Entrance Ramp C

²¹ SB I-495 Edgemoor Road Entrance Ramp A

²² SB I-495 Edgemoor Road Exit Ramp B

²³ NB I-495 Weave Segment between I-495 Hay Road Entrance Ramp G and I-495 Edgemoor Road Exit Ramp H

²⁴ SB I-495 Freeway Segment between Edgemoor Road Entrance Ramp A and 12Th Street Exit Ramp D

²⁵ NB I-495 Freeway Segment between 12Th Street Entrance Ramp A and Hay Road Entrance Ramp G

³ 2024 Future with Project (FWP) Phase I

⁴ 2024 FWP Phase II

⁵ 2024 FWP Phase III

Existing Study Roads and Intersections

