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

NICOLE MAJESKI
SECRETARY

May 2, 2023

Mr. Ted Williams, PE
Landmark Science & Engineering
200 Continental Drive, Suite 400
Newark, Delaware 19713

Dear Mr. Williams:

The enclosed Traffic Operational Analysis (TOA) review letter for the proposed **Lincoln Center** (Tax Parcel: 10-033.00-040) mixed-use 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
TIS Group Project Engineer

CJ:km
Enclosures
cc with enclosures: Mr. Jerome Heisler, Jr., Reybold Venture Group VII
Mr. Andrew Hayes, ForeSite Associates, Inc.
Mr. David L. Edgell, Office of State Planning Coordination
Mr. George Haggerty, New Castle County Department of Land Use
Mr. Bradford Shockley, New Castle County Department of Land Use
Mr. Mark Wolanski, New Castle County Department of Land Use
Mr. Owen C. Robatino, New Castle County Department of Land Use
Ms. Joanne M. Arellano, Johnson, Mirmiran, & Thompson, Inc.
Mr. Mir Wahed, Johnson, Mirmiran, & Thompson, Inc.
DelDOT Distribution

DelDOT Distribution

Brad Eaby, Deputy Attorney General
Shanté Hastings, Director, Deputy Secretary, Transportation Solutions (DOTS)
Pamela Steinebach, Director, Planning
Mark Luszcz, Deputy Director, DOTS
Peter Haag, Chief Traffic Engineer, Traffic, DOTS
Matthew Vincent, Chief of Project Development North, DOTS
Wendy Carpenter, Traffic Calming & Subdivision Relations Manager, Traffic, DOTS
Sean Humphrey, Traffic Engineer, Traffic, DOTS
Todd Sammons, Assistant Director, Development Coordination, Planning
Wendy Polasko, Subdivision Engineer, Development Coordination, Planning
John Pietrobono, New Castle Review Coordinator, Development Coordination, Planning
Sireen Muhtaseb, TIS Group Manager, Development Coordination, Planning
Annamaria Furmato, TIS Group Project Engineer, Development Coordination, Planning
Philip Lindsey, TIS Group Project Engineer, Development Coordination, Planning
Ryan Schroder, New Castle County Subdivision Reviewer, Development Coordination, Planning
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
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning

May 1, 2023

Mr. Claudy Joinville
Project Engineer
Delaware Department of Transportation
Development Coordination, Division of Planning
800 Bay Road
Dover, DE 19901

RE: Agreement No. 1945F
Project Number – T202069012/PO#611882
Traffic Operational Analysis Services
Task 11-5A – Lincoln Center TOA

Dear Mr. Joinville:

Johnson, Mirmiran, and Thompson (JMT) has completed a review of the Traffic Operational Analysis (TOA) for the Lincoln Center development, which was prepared by Landmark Science & Engineering, dated April 2022, last revised September 2022. This review was assigned as Task Number 11-5A. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

Per Plan Note 13 on the subject site's Record Plan, with DelDOT's Letter of No Objection to Recordation (LONOR) dated May 3, 2019, a Traffic Impact Study (TIS) waiver was granted for the proposed development as it was located within and consistent with the US Route 40 Corridor Study. The TIS waiver was based in part on the execution of a Traffic Mitigation Agreement (TMA) as described in Plan Note 40 on the Record Plan. On April 24, 2012, the developer entered into the TMA, I.N.20120425-0022899, with DelDOT in which the developer committed to address traffic and transportation issues presented by the proposed development by using Traffic Demand Management (TDM) strategies to reduce vehicular traffic associated with the development.

It has been determined that since the TMA was executed, the effectiveness of the mitigation measures identified have become more difficult to quantify and that it may be beneficial to the developer and DelDOT to remove the note (Plan Note 40) and end the agreement. The purpose of this TOA is to provide support for removing the note and, thus, for the developer to be released from the TMA, by showing that the intersections that made it necessary no longer need the mitigation the agreement would have provided. As such, the TOA was conducted to identify any needed improvements and determine appropriate mitigation measures.

The TOA evaluates the impacts of a proposed mixed-use development consisting of 508 units of mid-rise multi-family housing, a 230-room full-service hotel, a 10,000 square-foot daycare, 181,470 square feet of shopping center space, 10,000 square feet of high-turnover sit-down restaurant space, and 499,863 square feet of general office space in New Castle County, Delaware. The site is located on the east side of Delaware Route 7, approximately 550 feet south of Newton Road (New Castle Road 58). The subject property is on an approximately 56.05-acre parcel that is currently zoned as CR (Commercial Regional), and the developer does not plan to rezone the

land. Two access points are proposed on Delaware Route 7: one full access opposite Freedom Road and another by way of a connection with E. Songsmith Drive.

DelDOT has relevant and on-going improvement projects within the study area. The *SR 1 Widening, Road A to US 40* (DelDOT Contract No. T202011001) project, which was originally part of the *SR1 Widening, SR273 to the Roth Bridge* project (DelDOT Contract No. T200511001), proposes to identify and prioritize cost-effective short, mid, and long-term transportation infrastructure improvements to reduce congestion, reduce travel times, and improve safety, all while minimizing environmental impacts. This project affects the Delaware Route 1 and Delaware Route 273 intersection as well as the Delaware Route 273 and Delaware Route 7 intersection, just north of the study area for the Lincoln Center TOA. This project is currently in the design and planning phase, with several public workshops already being held. At the January 2022 public workshop, a preferred alternative depicting a single point urban interchange (SPUI) at the Delaware Route 1 and Delaware Route 273 interchange was presented. Additionally, ramps from Delaware Route 1 are proposed to connect to the Delaware Route 7 and Newtown Road intersection. Construction dates have not yet been determined at this stage. More information regarding the project can be found at the following websites:
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T200511001;
https://deldot.gov/projects/index.shtml?dc=details&projectNumber=T202011001.

The *Route 40 Corridor Improvements Project* was initiated by the Delaware Department of Transportation in partnership with New Castle County and WILMAPCO in September 1998 and created the community-supported 20-year transportation plan previously known as the *Route 40 Corridor 20-Year Transportation Plan*. The Plan addresses the conditions that are expected to result from projected growth in housing, employment, and traffic over 20 years. The Plan contains projects that address the projected transportation problems. An annual Corridor Monitoring and Triggering Report is generated by DelDOT, WILMAPCO, New Castle County, and DART to determine the need for further evaluation of transportation, safety, and transit improvements based on land development, traffic, corridor preservation, highway safety, transit service, and projects in the area. More information regarding the study can be found at the following website: https://deldot.gov/projects/index.shtml?dc=corridor&name=us-40

The US Route 40 intersection with Delaware Route 7 is reviewed as part of the Corridor Monitoring associated with the *Route 40 Corridor Improvements Project.* As a result of the monitoring, DelDOT has developed the *US 40 and SR 7 Intersection Improvements* project (DelDOT Contract No. T202304101), which aims to improve safety and operations through geometric improvements, with a potential for a grade-separated interchange. Per the FY23 to FY28 Capital Transportation Program Spend Plan, Preliminary engineering is scheduled as part of Fiscal Year 2023.

Based on our review of the Traffic Operational Analysis, we have the following comments and recommendations:

The following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements. Additionally, the table below does not include any signalized intersections that exhibit LOS deficiencies which can be mitigated with

signal timing optimization as the developer would not be recommended to implement any additional improvements at those intersections.

Intersection	LOS Deficiencies Occur		Case
	AM	PM	
Delaware Route 7 / Site Entrance A / Freedom Road		X	Case 2 – 2022 without Development
	X	X	Case 3 – 2022 with Development

The unsignalized Delaware Route 7/Site Entrance A/Freedom Road intersection exhibits LOS deficiencies along the eastbound Freedom Road approach during the PM peak hour under future conditions without the development (Case 2) and during all peak hours under future conditions with the development (Case 3). Additionally, the intersection exhibits LOS deficiencies along the westbound Site Entrance A approach during all peak hours under future conditions with the development (Case 3). During the weekday PM peak hour under future conditions without the development, the eastbound Freedom Road approach operates at LOS F with a delay of 54.1 seconds per vehicle. During the weekday PM peak hour under future conditions with the development, the eastbound Freedom Road and westbound Site Entrance approaches operate at LOS F with delays of over 1,000 seconds per vehicle.

Future analysis at this intersection was performed modeling the intersection as signalized. With a signal, the intersection would not exhibit LOS deficiencies with or without the proposed development (Case 2 and Case 3) under the weekday AM and PM peak hours. A Traffic Signal Justification Study (TSJS) prepared by Landmark Engineering dated July 2012 found that the projected volumes at the intersection would meet Warrants 1 (8-hour), 2 (4-hour) and 3 (peak hour). The July 2012 TSJS does not have a significant volume difference compared to volumes from Case 3 of the TOA. As such, the intersection would continue to meet the volume signal warrants and it is recommended that the developer construct one signalized access along Delaware Route 7 at the intersection with Site Entrance A and Freedom Road.

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

1. The developer shall improve Delaware Route 7 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 should construct a signalized full access site entrance on Delaware Route 7, at the intersection with Freedom Road. The access should be located directly across from the existing Freedom Road approach. The intersection should be consistent with the lane configurations shown in the table below. However, the lane configurations may be impacted through coordination with DelDOT Traffic.

Approach	Current Configuration	Proposed Configuration
Eastbound Freedom Road	One left turn lane and one right turn lane	One shared left turn/through lane and one right turn lane
Westbound Site Entrance A	One shared left turn/through/right turn lane	One shared left turn/through lane and one right turn lane
Northbound Delaware Route 7	One left turn lane, two through lanes, and one right turn lane	No Change
Southbound Delaware Route 7	One left turn lane, two through lanes, and one right turn lane	No Change

Based on DelDOT's *Development Coordination Manual* and the HCS analysis results, the recommended minimum storage lengths (excluding taper) of the separate left turn and right turn lanes along Delaware Route 7 are listed below. The calculated queue lengths from the HCS analysis can be accommodated within the recommended storage lengths.

Approach	Left Turn Lane	Right Turn Lane
Northbound Delaware Route 7	170 feet*	290 feet**
Southbound Delaware Route 7	320 feet*	290 feet**

*Storage length matches the existing storage length per field conditions and should be maintained
**Storage length does not match the existing storage length and requires lengthening

3. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Delaware Route 7/Freedom Road/Site Entrance A.

4. The developer should enter into an agreement with DelDOT to fund an equitable portion of future improvements to the intersection of Delaware Route 7 and US Route 40 as proposed as part of the *US 40 and SR 7 Intersection Improvements* project (DelDOT Contract No. T202304101). These future improvements may include the addition of turn lanes, reconfiguring the intersection approaches, and updating the signal phasing. At DelDOT's discretion, the developer may contribute to the Traffic Signal Revolving Fund in lieu of the agreement. The Traffic Signal Revolving Fund contribution is $19,616.

5. The developer should enter into an agreement with DelDOT to fund an equitable portion of the improvements proposed as part of the *SR 1 Widening, Road A to US 40* project (DelDOT Contract No. T202011001). The developer should coordinate with DelDOT on the implementation and equitable cost sharing of these improvements. The cost contribution is $760,000.

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

    a. A minimum of fifteen-foot wide permanent easement from the edge of the right-of-way should be dedicated to DelDOT along the Delaware Route 7 site frontage. Within the easement, the developer should construct a new 5-foot wide sidewalk with an angled termination into the shoulder where the shoulder/bike lane is at least five feet wide. The sidewalk should be designed to meet current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of the pavement to the sidewalk. If feasible, the sidewalk should be placed behind utility poles and street trees should be provided within the buffer area. The developer should coordinate with DelDOT's Development Coordination Section during the plan review process to identify the exact location of the sidewalk.

    b. An internal connection from the SUP into the site is required.

    c. ADA compliant curb ramps and marked crosswalks should be provided along the Site Entrance.

    d. The minimum five-foot wide bicycle lanes should be maintained in the right turn lane and shoulder along the Delaware Route 7 approach to the Site Entrance.

    e. Internal bicycle racks should be provided.

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

    g. The existing DART bus stop along the Delaware Route 7 site frontage should be maintained and should continue to be ADA compliant.

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

Improvements in this TOA may be considered "significant" under DelDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT's website at https://www.deldot.gov//Publications/manuals/de_mutcd/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction, please contact Mr. Jeff VanHorn, Assistant Director for Traffic Operations and Management. Mr. VanHorn can be reached at (302) 659-4606 or by email at Jeffrey.VanHorn@delaware.gov.

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

Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

Joanne M. Arellano, P.E., PTOE

cc: Mir Wahed, P.E., PTOE
Tanner Chiamprasert, E.I.T.

Enclosure

General Information

Report date: Dated April 2022, Last revised September 2022
Prepared by: Landmark Science & Engineering
Prepared for: Reybold Venture Group VII
Tax Parcel: 10-033.00-040
Generally consistent with DelDOT's *Development Coordination Manual (DCM)*: Yes

Project Description and Background

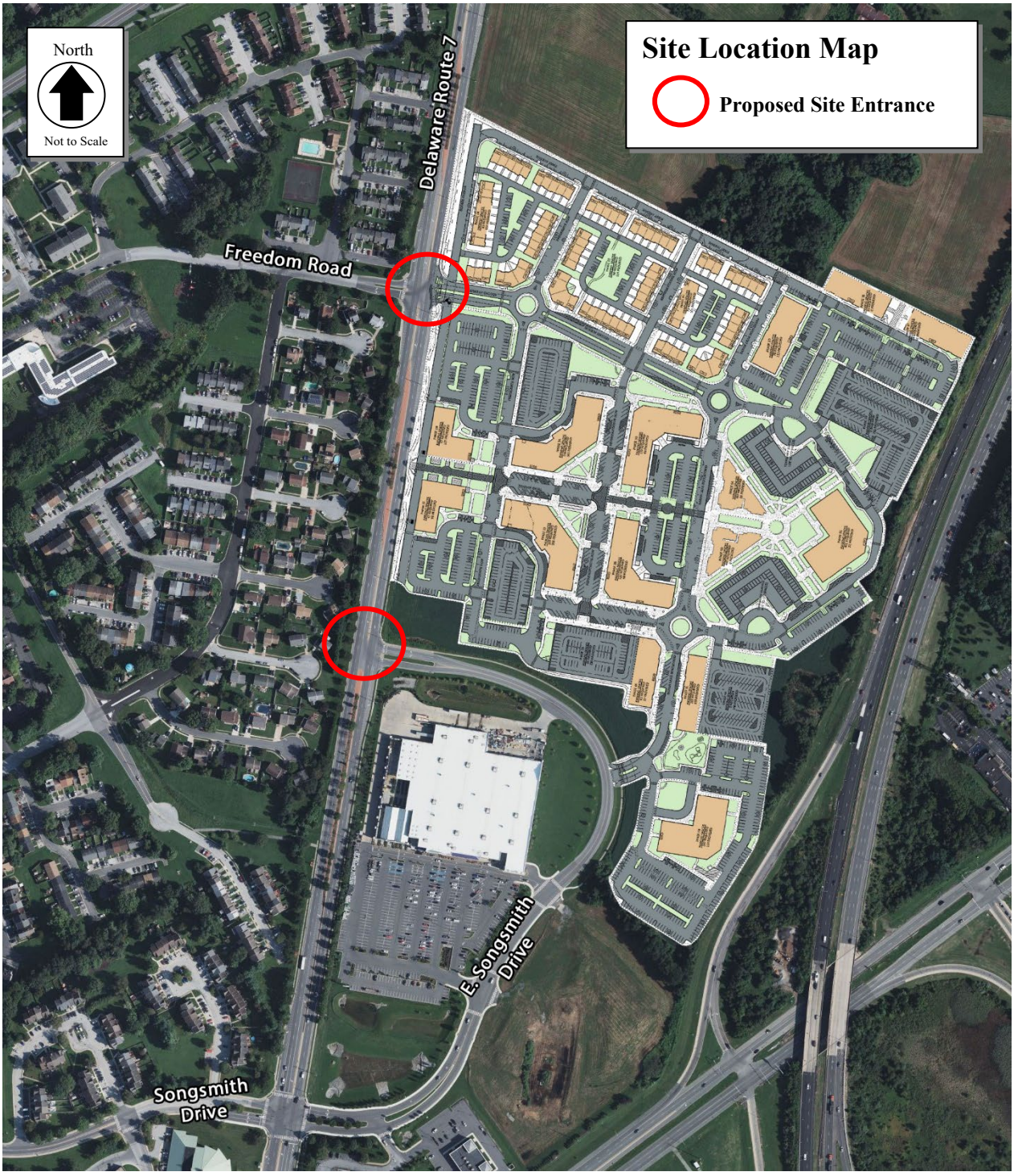
Description: Reybold Venture Group VII seeks to develop a mixed-use development consisting of 508 units of mid-rise multi-family housing, a 230-room full-service hotel, a 10,000 square-foot daycare, 181,470 square feet of shopping center space, 10,000 square feet of high-turnover sit-down restaurant space, and 499,863 square feet of general office space.
Location: The land is located on the east side of Delaware Route 7, approximately 550 feet south of Newtown Road (New Castle Road 58).
Amount of Land to be developed: An approximately 56.05-acre parcel.
Land Use approval(s) needed: Entrance Plan.
Proposed completion date: 2022.
Proposed access locations: Two full access points are proposed on Delaware Route 7: one full access point opposite Freedom Road and another by way of a connection with E. Songsmith Drive.

Daily Traffic Volumes:

- 2021 Average Annual Daily Traffic on Delaware Route 7: 16,289

*AADT is sourced from data provided by DelDOT Gateway.

Site Map



**Graphic is an approximation based on the Record Resubdivision Plan prepared by Foresite Associates, Inc. dated May 5, 2017, last revised September 17, 2019.*

Relevant and On-going Projects

DelDOT has relevant and on-going improvement projects within the study area. The *SR 1 Widening, Road A to US 40* (DelDOT Contract No. T202011001) project, which was originally part of the *SR1 Widening, SR273 to the Roth Bridge* project (DelDOT Contract No. T200511001), proposes to identify and prioritize cost-effective short, mid, and long-term transportation infrastructure improvements to reduce congestion, reduce travel times, and improve safety, all while minimizing environmental impacts. This project affects the Delaware Route 1 and Delaware Route 273 intersection as well as the Delaware Route 273 and Delaware Route 7 intersection, just north of the study area for the Lincoln Center TOA. This project is currently in the design and planning phase, with several public workshops already being held. At the January 2022 public workshop, a preferred alternative depicting a single point urban interchange (SPUI) at the Delaware Route 1 and Delaware Route 273 interchange was presented. Additionally, ramps from Delaware Route 1 are proposed to connect to the Delaware Route 7 and Newtown Road intersection. Construction dates have not yet been determined at this stage. More information regarding the project can be found at the following websites:
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The US Route 40 intersection with Delaware Route 7 is reviewed as part of the Corridor Monitoring associated with the *Route 40 Corridor Improvements Project.* As a result of the monitoring, DelDOT has developed the *US 40 and SR 7 Intersection Improvements* project (DelDOT Contract No. T202304101), which aims to improve safety and operations through geometric improvements, with a potential for a grade-separated interchange. Per the FY23 to FY28 Capital Transportation Program Spend Plan, Preliminary engineering is scheduled as part of Fiscal Year 2023.

Livable Delaware

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

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

Investment Level 1

These areas are often municipalities, towns, or urban/urbanizing places in counties where density is generally higher than in surrounding areas. In Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote a variety of transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, and to promote well-designed and efficient new growth in Investment Level 1 Areas. In Level 1 Areas, the state's first priority will be for preserving existing facilities and making safety improvements. Level 1 areas will also be the highest priority for context sensitive transportation system capacity enhancements, transit-system enhancements, ADA accessibility, and for closing gaps in the pedestrian system, including the Safe Routes to School projects. Investment Level 1 Areas are ideal locations for Transportation Improvement Districts as well as Complete Community Enterprise Districts. Further, Level 1 areas are the priority for planning projects and studies, bicycle facilities, signal-system enhancements, and the promotion of interconnectivity of neighborhoods and public facilities.

Investment Level 2

These areas can be composed of less developed areas within municipalities, rapidly growing areas in the counties that have or will have public water and wastewater services and utilities, areas that are generally adjacent to or near Investment Level 1 Areas, smaller towns and rural villages that should grow consistently with their historic character, and suburban areas with public water, wastewater, and utility services. They serve as transition areas between Level 1 and the state's more open, less populated areas. They generally contain a limited variety of housing types, predominantly detached single-family dwellings. In Investment Level 2 Areas, like Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Investments should encourage departure from the typical single-family-dwelling developments and promote a broader mix of housing types and commercial sites encouraging compact, mixed-use development where applicable. Overall, the State's intent is to use its spending and management tools to promote well-designed development in these areas. Such development provides for a variety of housing types, user-friendly transportation systems, essential open spaces and recreational facilities, other public facilities, and services to promote a sense of community.

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

Proposed Development's Compatibility with Livable Delaware:
The proposed development is located within Investment Level 1 and Investment Level 2. Investment Levels 1 and 2 are the priority for job creation and retention. The proposed development consists of an office space, a restaurant, a hotel, a daycare, and shopping center space, which would create jobs. Therefore, the proposed development is generally consistent with the *2020 Delaware Strategies for State Policies and Spending*.

Comprehensive Plan

(Source: New Castle County Comprehensive Plan, 2050)

New Castle County Comprehensive Plan:
Per the *New Castle County Comprehensive Plan Current Zoning Map,* the proposed development is zoned as Office Regional. Per the *New Castle County Comprehensive Plan Future Land Use Map 2022,* the proposed development is designated as a Type 1 – Commercial Corridor Development.

Proposed Development's Compatibility with the New Castle County Comprehensive Plan
The *New Castle County Comprehensive Plan* states that the future land use plan needs to provide adequate flexibility for vibrant economic activity bringing good jobs to the area as well as address housing needs for New Castle County residents. Therefore, the proposed development is generally consistent with the *New Castle County Comprehensive Plan*.

Trip Generation

The trip generation for the proposed development was determined by using the comparable land use and rates/equations contained in the *Trip Generation, 10th Edition: An ITE Informational Report*, published by the Institute of Transportation Engineers (ITE) for ITE Land Use Code 710 (General Office), ITE Land Use Code 932 (High-Turnover Sit-Down Restaurant), ITE Land Use Code 820 (Shopping Center), ITE Land Use Code 565 (Day Care Center), ITE Land Use Code 310 (Hotel), and ITE Land Use Code 221 (Multifamily Housing Mid-Rise). Trip generation was reviewed by DelDOT as part of the Preliminary TOA (PTOA) submission.

Table 1
Lincoln Center Trip Generation

Land Use	ADT	Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
499,863 SF Office Space	5,054	427	69	496	84	441	525
10,000 SF High-Turnover Sit-Down Restaurant	1,122	54	45	99	61	37	98
181,470 SF Shopping Center	9,016	151	92	243	406	439	845
10,000 SF Daycare Center	476	58	52	110	52	59	111
230 Room Hotel	2,170	65	45	110	74	72	146
508 Units Mid-Rise Multifamily Housing	2,767	44	124	168	129	82	211
Total Trips	**20,605**	**799**	**427**	**1,226**	**806**	**1,130**	**1,936**
Internal Capture (Retail)		-33	-29	-62	-89	-99	-188
Internal Capture (Residential)		-4	-14	-18	-71	-48	-119
Internal Capture (Restaurant)		-38	-23	-61	-31	-26	-57
Internal Capture (Office)		-47	-31	-78	-13	-38	-51
Internal Capture (Hotel)		-1	-22	-23	-18	-11	-29
Total Internal Capture		**-123**	**-119**	**-242**	**-222**	**-222**	**-444**
Pass-by Trips		0	0	0	121	121	242
Total External Trips		**676**	**308**	**984**	**464**	**787**	**1,251**
Total New Trips	**20,605**	**676**	**308**	**984**	**584**	**908**	**1,492**

Overview of TOA

Intersections examined:

1. Delaware Route 7 / Site Entrance A / Freedom Road
2. Delaware Route 7 / Songsmith Drive / E. Songsmith Drive / Site Entrance B
3. Delaware Route 7 / Newton Road (New Castle Road 68) / Bank One
4. Delaware Route 7 / Rivers End Road / St. Elizabeth Ann Seton Roman Catholic Church
5. Delaware Route 7 / Springwood Road / Christiana Meadows
6. Delaware Route 7 / US Route 40

Conditions examined:

1. Case 1 – 2021 existing.
2. Case 2 – 2022 without development.
3. Case 3 – 2022 with development.

Committed Developments considered:

1. Governors Square Commercial (Unbuilt 96,936 square feet of retail)
2. Dasher Farm (48 single-family detached houses)

*Committed development information provided in the Final TOA supersedes the information provided by the April 1, 2022, DelDOT Scoping Meeting Memorandum.

Peak hours evaluated: Weekday AM and Weekday PM

Intersection Descriptions

1. **Delaware Route 7 / Site Entrance A / Freedom Road**
   Type of Control: Existing two-way stop-controlled intersection (T-intersection) Proposed signalized intersection (four-legged).
   Eastbound Approach: (Freedom Road) Existing one left turn lane and one right turn lane; proposed one shared left turn/through lane and one right turn lane.
   Westbound Approach: (Site Entrance A) Existing one shared left turn/through/right turn lane. Proposed one shared left turn/through lane and one right turn lane.
   Northbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one right turn lane.
   Southbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one right turn lane.

2. **Delaware Route 7 / Songsmith Drive / E. Songsmith Drive / Site Entrance B)**
   Type of Control: Existing signalized intersection (four-legged).

Eastbound Approach: (Songsmith Drive) Existing one left turn lane, one shared left turn/through lane, and one right turn lane.
Westbound Approach: (E. Songsmith Drive / Site Entrance B) Existing one left turn lane, one shared left turn/through lane, and one right turn lane.
Northbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one right turn lane.
Southbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one right turn lane.

3. **Delaware Route 7 / Newton Road (New Castle Road 68) / Bank One**
Type of Control: Existing signalized intersection (four-legged).
Eastbound Approach: (Newton Road) Existing one shared left turn/through lane and one channelized right turn lane, yield controlled.
Westbound Approach: (Bank One) Existing one shared left turn/through lane and one right turn lane.
Northbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled.
Southbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled.

4. **Delaware Route 7 / Rivers End Road / St. Elizabeth Ann Seton Roman Catholic Church**
Type of Control: Existing signalized intersection (four-legged).
Eastbound Approach: (Rivers End Road) Existing one left turn lane, one shared left turn/through lane, and one channelized right turn lane, yield controlled.
Westbound Approach: (St. Elizabeth Ann Seton Roman Catholic Church) Existing one shared left turn/through lane and one right turn lane.
Northbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled.
Southbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled.

5. **Delaware Route 7 / Springwood Road / Christiana Meadows**
Type of Control: Existing signalized intersection (four-legged).
Eastbound Approach: (Springwood Road) Existing one shared left turn/through lane and one right turn lane.
Westbound Approach: (Christiana Meadows) Existing one shared left turn/through lane and one right turn lane.
Northbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one right turn lane.
Southbound Approach: (Delaware Route 7) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled.

6. Delaware Route 7 / US Route 40

Type of Control: Existing signalized intersection (four-legged).

Eastbound Approach: (US Route 40) Existing two left turn lanes, three through lanes, and one channelized right turn lane, yield controlled.

Westbound Approach: (US Route 40) Existing two left turn lanes, three through lanes, and one channelized right turn lane, yield controlled.

Northbound Approach: (Delaware Route 7) Existing one left turn lane, one through lane, and two right turn lanes.

Southbound Approach: (Delaware Route 7) Existing two left turn lanes, two through lanes, and one channelized right turn lane, yield controlled.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Per DelDOT Gateway, there are three DART Routes that run through the project area, 40, 54, and 64. DART Route 40 runs along US Route 40, passing through the study area at the intersection of US Route 40 and Delaware Route 7. Route 40 provides 35 round trips from 4:35 AM to 11:50 PM on weekdays and 16 round trips from 6:19 AM to 11:20 PM on Saturdays. DART Route 54 runs along US Route 40, passing through the study area at the intersection of US Route 40 and Delaware Route 7. DART Route 54 also runs along Rivers End Road and Delaware Route 7, turning at the intersection of these two roads. Route 54 runs along Delaware Route 7 from Rivers End Road past Christiana Meadows / Springwood Road. Route 54 provides 22 round trips from 5:20 AM to 10:35 PM on weekdays and provides 9 round trips from 7:10 AM to 9:05 PM on Saturdays. DART Route 64 runs along Delaware Route 7 in the study area between Songsmith Drive and Christiana Meadows / Springwood Road and along US Route 40 at the intersection of US Route 40 and Delaware Route 7. Route 64 provides 21 round trips from 5:15 AM to 11:22 PM on weekdays and 16 round trips from 6:08 AM to 10:51 PM on Saturdays.

Planned transit service: Per email correspondence on October 7, 2022, with Mr. Jared Kauffman, Fixed-Route Planner for DART, the Delaware Transit Corporation requested that the existing stop on Delaware Route 7 (ID 2562) should still be constructed to ADA standard.

Existing bicycle and pedestrian facilities: According to DelDOT's New Castle County Delaware Bicycle Map, several study roadways are considered bicycle routes. Delaware Route 7 is considered a regional bicycle route. US Route 40 is considered a connector bicycle route. Newton Road has an adjacent off-road bicycle trail that runs from Delaware Route 7 to Smalleys Dam Road.

Planned bicycle and pedestrian facilities: Email correspondence was sent on September 26, 2022 to Mr. Anthony Aglio, DelDOT's Bicycle and Pedestrian Coordinator and on November 1, 2022, to Mr. John Fiori, DelDOT's Bicycle Coordinator, and Ms. Linda Osiecki, DelDOT's Pedestrian Coordinator. A response has not yet been received.

Bicycle Level of Traffic Stress in Delaware: Researchers with the Mineta Transportation Institute developed a framework to measure low-stress connectivity, which can be used to evaluate and guide bicycle network planning. Bicycle LTS analysis uses factors such as the speed of traffic, volume of traffic, and the number of lanes to rate each roadway segment on a scale of 1 to 4, where 1 is a low-stress place to ride and 4 is a high-stress place to ride. It analyzes the total connectivity of a network to evaluate how many destinations can be accessed using low-stress routes. Developed by planners at the Delaware Department of Transportation (DelDOT), the bicycle Level of Traffic Stress (LTS) model will be applied to bicycle system planning and evaluation throughout the state. The Bicycle LTS for the roadways under existing conditions along the site frontage are summarized below. The Bicycle LTS was determined utilizing the Bicycle On-Road Network Level of Traffic Stress map from the April 2018 Blueprint for a Bicycle-Friendly Delaware document which can be found on the following website: https://deldot.gov/Publications/plans/bikeandped/pdfs/DelDOTBikePlan043018FINAL.pdf

- Delaware Route 7 LTS: 3-4

Signal Warrant Evaluation

The TOA conducted a Signal Warrant Analysis dated July 2012 at the Delaware Route 7 and Freedom Road intersection. The evaluation was conducted using traffic volume data and geometric conditions in accordance with the Delaware Manual on Uniform Traffic Control Devices, 2011 Edition (DE MUTCD). As the study intersection has a posted speed limit of 45 mph along Delaware Route 7, the DE MUTCD's reduced volume criteria was applied. Based on the evaluation from the TOA, volumes warrant 1, 2, and 3 are met. The crash warrant (based on both the MUTCD and the IA-19.3 - Alternative Signal Warrant 7) was deemed to have not been met. Additionally, warrants 6 and 8 were deemed to have been met by the TOA. The remaining warrants were not met. There is not a significant difference between the volumes in the Signal Warrant Analysis performed in 2012 and those from Case 3 in the TOA; as such, the signal is warranted at the Delaware Route 7 and Freedom Road intersection.

Crash Evaluation

Crash data was not provided by the TOA.

Previous Comments

Comments from the PTOA were not addressed in the Final TOA. JMT utilized updated Case 2 and Case 3 volumes.

Sight Distance Evaluation

No sight distance constraints were noted at the future site entrance location per a field visit conducted on October 21, 2022.

General HCS Analysis Comments

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

1) The TOA used version 2022 of HCS, whereas JMT used version 7.9.6 of HCS7 to complete the analysis.

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

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

4) Per DelDOT's *Development Coordination Manual,* JMT utilized the existing PHF for the Case 1 scenario and a future PHF for Case 2 and 3 scenarios of 0.80 for roadways with less than 500 vph, 0.88 for roadways between 500 and 1,000 vph, and 0.92 for roadways with more than 1,000 vph or the existing PHF, whichever was higher. The TOA utilized the existing PHF for all cases.

5) Per DelDOT's *Development Coordination Manual*, JMT included coordinated signals in one HCS file for each case, while the TOA created separate analysis files for each intersection.

6) JMT utilized the revised volumes from the PTOA, whereas the TOA did not.

7) JMT included bicycles and pedestrians counted during the traffic data collection in the analysis, whereas the TOA did not.

8) Both JMT and the TOA modeled the signalized intersections with a saturation flow rate of 1,900 veh/hr/lane.

9) JMT incorporated right turn on red volumes in analysis, whereas the TOA did not.

10) For signalized analysis, JMT utilize cycle lengths consistent with the DelDOT signal timings for the intersections, whereas the TOA utilized various cycle lengths.

11) For signal optimization scenarios, JMT optimized green split times while maintaining the existing signal cycle lengths and offsets.

12) The TOA did not include analysis for Case 1 – 2021 Existing.

Table 2
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Operational Analysis for Lincoln Center
Report Dated: September 2022
Prepared by: Landmark Science and Engineering

Unsignalized Intersection Two-Way Stop Control [1]	**LOS per TOA**		**LOS per JMT**	
Delaware Route 7 / Site Entrance A / Freedom Road	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)				
Eastbound Freedom Road Approach	-	-	B (14.1)	C (23.2)
Westbound Site Entrance A Approach	-	-	A (9.5)	A (9.7)
Northbound Delaware Route 7 Left	-	-	A (8.1)	A (9.2)
Southbound Delaware Route 7 Left	-	-	A (8.2)	A (8.7)
2022 Without Development (Case 2)				
Eastbound Freedom Road Approach	-	-	C (18.5)	F (54.1)
Westbound Site Entrance A Approach	-	-	A (9.9)	B (10.7)
Northbound Delaware Route 7 Left	-	-	A (8.4)	B (10.1)
Southbound Delaware Route 7 Left	-	-	A (8.4)	A (9.1)
2022 With Development (Case 3)				
Eastbound Freedom Road Approach	-	-	F (397.0)	F (*)
Westbound Site Entrance A Approach	-	-	F (284.2)	F (*)
Northbound Delaware Route 7 Left	-	-	A (8.8)	B (10.1)
Southbound Delaware Route 7 Left	-	-	B (10.2)	B (11.6)

*Indicates delay greater than 1,000 seconds per vehicle

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

Table 2 (continued)
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Operational Analysis for Lincoln Center
Report Dated: September 2022
Prepared by: Landmark Science and Engineering

Signalized Intersection [1]	**LOS per TOA**		**LOS per JMT**	
Delaware Route 7 / Site Entrance A / Freedom Road	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2022 without Development (Case 2)[2]	-	-	A (8.8)	A (4.8)
2022 with Development (Case 3)[2]	B (18.3)	C (28.2)	B (18.8)	C (32.4)

[2] JMT modeled the intersection as part of the signalized Delaware Route 7 corridor and assumed an offset of 50 seconds for the AM and PM peak hours.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Operational Analysis for Lincoln Center
Report Dated: September 2022
Prepared by: Landmark Science and Engineering

Signalized Intersection [1]	**LOS per TOA**		**LOS per JMT**	
Delaware Route 7 / Songsmith Drive / E. Songsmith Drive / Site Entrance B	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)	-	-	C (23.3)	C (28.6)
2021 Existing (Case 1) *with signal optimization*	-	-	B (14.0)	C (21.4)
2022 without Development (Case 2) *with signal optimization*	B (17.4)	C (22.9)	B (14.8)	C (20.7)
2022 with Development (Case 3) *with signal optimization*	B (18.3)	C (32.7)	B (14.8)	C (24.3)

Table 4
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Operational Analysis for Lincoln Center
Report Dated: September 2022
Prepared by: Landmark Science and Engineering

Signalized Intersection [1]	**LOS per TOA**		**LOS per JMT**	
Delaware Route 7 / Newton Road (New Castle Road 68) / Bank One	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)	-	-	B (19.9)	C (21.5)
2021 Existing (Case 1) *with signal optimization*	-	-	B (17.4)	B (16.7)
2022 without Development (Case 2) *with signal optimization*	C (20.1)	A (9.2)	B (16.8)	B (16.9)
2022 with Development (Case 3) *with signal optimization*	B (16.1)	A (8.0)	B (15.3)	B (18.1)

Table 5
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Operational Analysis for Lincoln Center
Report Dated: September 2022
Prepared by: Landmark Science and Engineering

Signalized Intersection [1]	**LOS per TOA**		**LOS per JMT**	
Delaware Route 7 / Rivers End Road / St. Elizabeth Ann Seton Roman Catholic Church	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)	-	-	C (22.7)	C (16.4)
2021 Existing (Case 1) *with signal optimization*	-	-	C (24.5)	B (11.8)
2022 without Development (Case 2) *with signal optimization*	C (27.4)	C (29.4)	C (24.4)	B (10.2)
2022 with Development (Case 3) *with signal optimization*	C (28.7)	C (38.6)	C (24.9)	B (10.4)

Table 6
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Operational Analysis for Lincoln Center
Report Dated: September 2022
Prepared by: Landmark Science and Engineering

Signalized Intersection [1]	**LOS per TOA**		**LOS per JMT**	
Delaware Route 7 / Springwood Drive / Christiana Meadows	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)	-	-	C (24.9)	C (28.8)
2021 Existing (Case 1) *with signal optimization*	-	-	A (9.2)	B (10.2)
2022 without Development (Case 2) *with signal optimization*	C (27.0)	C (29.0)	A (9.7)	B (11.1)
2022 with Development (Case 3) *with signal optimization*	C (29.0)	D (36.9)	B (10.1)	B (13.1)

Table 7
Peak Hour Levels Of Service (LOS)
Based on Final Traffic Operational Analysis for Lincoln Center
Report Dated: September 2022
Prepared by: Landmark Science and Engineering

Signalized Intersection[1]	**LOS per TOA**		**LOS per JMT**	
Delaware Route 7 / US Route 40[3, 4, 5,6]	Weekday AM	Weekday PM	Weekday AM	Weekday PM
2021 Existing (Case 1)	-	-	D (42.2)	D (44.1)
2021 Existing (Case 1) *with signal optimization*	-	-	D (35.4)	D (40.7)
2022 without Development (Case 2) *with signal optimization*	C (31.1)	C (40.1)	D (41.0)	D (46.6)
2022 with Development (Case 3) *with signal optimization*	E (61.7)	E (61.8)	D (44.8)	D (54.1)

[3] JMT modeled the intersection with a 150 second cycle length per existing conditions, whereas the TOA modeled the intersection with a 120 second cycle length.
[4] JMT modeled the intersection with one shared left turn/through lane, one through lane, and two right turn lanes along the northbound approach per existing conditions, whereas the TOA modeled the approach with one left turn lane, one through lane, and two right turn lanes. Additionally, JMT modeled the intersection with split phasing along the northbound and southbound approaches, whereas the TOA modeled the approaches with concurrent phasing and protected-only left turns.
[5] JMT modeled the intersection with two left turn lanes along the eastbound US Route 40 approach per existing conditions, whereas the TOA modeled the approach with one left turn lane.
[6] JMT modeled the intersection with yellow, red, and passage times per the DelDOT signal timing plans, whereas the TOA did not.