



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

JENNIFER COHAN
SECRETARY

June 23, 2017

Mr. Michael Kaszyski
Duffield Associates, Inc.
5400 Limestone Road
Wilmington, DE 19808

Dear Mr. Kaszyski

The enclosed Traffic Impact Study (TIS) review letter for the **SSN Hotel and Commercial** (Tax Parcels 18-046.00-026 & 111) redevelopment has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this review letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel
Project Engineer

TEB:km

Enclosures

cc with enclosures: Mr. Steve Gorski, Duffield Associates, Inc.
Ms. Constance C. Holland, Office of State Planning Coordination
Ms. Carol Houck, City of Newark
Mr. Andrew Parker, McCormick Taylor, Inc.
DelDOT Distribution

DelDOT Distribution

Annie Cordo, Deputy Attorney General
Robert McCleary, Director, Transportation Solutions (DOTS)
Drew Boyce, Director, Planning
Mark Luszczyk, Chief Traffic Engineer, Traffic, DOTS
Mark Tudor, Assistant Director, Project Development North, DOTS
J. Marc Coté, Assistant Director, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Peter Haag, Traffic Studies Manager, Traffic, DOTS
Kevin Canning, Canal District Engineer, North District
Matthew Lichtenstein, Canal District Public Works Engineer, Canal District
David Dooley, Service Development Planner, Delaware Transit Corporation
Breanna Kovach, Project Manager, Project Development North, DOTS
Pao Lin, New Castle Subdivision Manager, Development Coordination
Mark Galipo, Traffic Engineer, Traffic, DOTS
Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
Claudy Joinville, Project Engineer, Development Coordination



June 23, 2017

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

RE: Agreement No. 1773
Traffic Impact Study Services
Task No. 1 Subtask 1A – SSN Hotel & Commercial

Dear Mr. Brestel:

McCormick Taylor has completed its review of the Traffic Impact Study (TIS) for the SSN Hotel & Commercial mixed-use development prepared by Duffield Associates, dated December 2016. Duffield Associates prepared the report in a manner generally consistent with DelDOT's *Development Coordination Manual* [formerly *Standards and Regulations for Subdivision Streets*, incorporated by reference into the New Castle County Unified Development Code 40.11.130].

The TIS evaluates the impacts of SSN Hotel & Commercial mixed-use development, proposed to be located on the east side of Delaware Route 896 (New Castle Road 387 / South College Avenue), south of Welsh Tract Road (New Castle Road 367 / 357B) within the City of Newark in New Castle County, Delaware. The proposed development would include a 46,400 square-foot four-story all-suites hotel (with 98 suites) and a 5,100 square-foot convenience store with gasoline pumps (12 vehicle fueling positions). The proposed development would replace an existing 130-room Red Roof Inn hotel.

As proposed in the TIS, four access points are proposed, and each one is an existing access that would remain. Of these, one full access point is proposed on Welsh Tract Road (shared with Candlewood Suites Hotel) and three access points are proposed along Delaware Route 896. Of the Delaware Route 896 access points, the south driveway, which would directly serve the convenience store, is proposed as right-in/right-out/left-in, the middle driveway is proposed as right-in/right-out only (shared with an existing Friendly's restaurant), and the north driveway is proposed as right-in/right-out only (shared with a vacant business). All proposed access points along Delaware Route 896 are located at existing driveways and would have the same permitted movements as existing conditions. However, based on coordination with DelDOT and further review subsequent to the TIS submission, the south driveway on Delaware Route 896 would be right-in/right-out only. The proposed southbound left-in movement at that access would not be permitted due to operational and safety concerns. Construction is anticipated to be complete in 2018.

The land is currently zoned as BC (General Business) within the City of Newark, and the developer proposes to maintain the current zoning.



Currently, there are no DelDOT capital projects within the area of study. New traffic signal equipment was recently installed at the intersection of Delaware Route 896 and Welsh Tract Road. The south and middle proposed access points along the east side of Delaware Route 896 were also recently reconstructed as part of the Candlewood Suites Hotel development, located adjacent to the proposed SSN Hotel & Commercial development.

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

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

<i>Intersection</i>	<i>Existing Traffic Control</i>	<i>Situations for which deficiencies occur</i>
Delaware Route 896 & South Site Driveway (Existing Red Roof Inn)	Unsignalized	2016 Existing AM (Case 1); 2018 without development AM (Case 2)

The LOS deficiencies at this intersection are limited to LOS E for the southbound left-turn/u-turn lane during the AM peak hour, for the existing and without development scenarios. In these scenarios, there are more southbound u-turns than left turns. The analysis indicates that LOS is acceptable for all lane groups in the 2018 with development scenario. The lower delay in the with development scenario, compared to the existing and without development scenarios, is due to an increased number of southbound left turns into the proposed site (as evaluated with the originally proposed access scenario allowing the southbound left-in movement), which is a movement with lower delay than the southbound u-turn movement. However, based on coordination with DelDOT and further review subsequent to the TIS submission, the proposed southbound left-in movement at that access will not be permitted due to operational and safety concerns. The southbound u-turn movement at that median opening (an existing movement) will continue to be permitted.

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

1. The developer should improve the intersection of Delaware Route 896 and South Site Driveway to prohibit the left-in movement from southbound Delaware Route 896. The proposed configuration is shown in the table below.

Approach	Current Configuration	Proposed Configuration
Northbound Delaware Route 896	Two through lanes and one right-turn lane	Two through lanes and one right-turn lane
Southbound Delaware Route 896	Two through lanes and one left-turn/u-turn lane	Two through lanes and one u-turn-only lane
Westbound South Site Driveway	One right-turn-only lane	One right-turn-only lane

To reinforce that southbound left turns into the site are prohibited, appropriate signing and/or pavement markings should be installed and oriented toward traffic in the u-turn lane on southbound Delaware Route 896. The developer should coordinate with DelDOT’s Development Coordination Section during the site plan review process to determine design details pertaining to the signing and/or pavement markings associated with the southbound u-turn lane.

Furthermore, a concrete channelization island should be constructed at the south site entrance to prevent the southbound left-in movement (limiting movements at this driveway to northbound rights in and westbound rights out). On that site entrance island, a “Do Not Enter” sign (MUTCD R5-1) and a “One-Way” sign (MUTCD R6-1) should be installed and oriented toward u-turn traffic proceeding through the median opening. The developer should coordinate with DelDOT’s Development Coordination Section to determine final design details for this site entrance during the site plan review process.

2. The developer should extend the existing right-turn lane on northbound Delaware Route 896 at the south site driveway. The recommended minimum length for the northbound Delaware Route 896 right-turn lane (excluding taper) is 240 feet, however it appears that distance is not feasible due to proximity to the I-95 exit ramp acceleration lane onto northbound Delaware Route 896. The developer should coordinate with DelDOT’s Development Coordination Section to determine the final turn-lane length and/or possible relocation of this site driveway, especially considering the proximity to the aforementioned upstream acceleration lane.
3. The developer should coordinate with DelDOT’s Development Coordination Section to determine and install signage that will ensure visibility of the proposed site’s south site

driveway for motorists on northbound Delaware Route 896. The existing sign for the Red Roof Inn hotel is obstructed by trees and brush that limit the view of motorists on northbound Delaware Route 896 until just prior to the existing south site driveway, and it appears the sign for the proposed site would be in the same general location. This situation can potentially lead to motorists making sudden lane changes and/or sudden braking to make a northbound right turn into the south site driveway once they are able to see the proposed development.

4. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Delaware Route 896 and Welsh Tract Road. The agreement will cover signal adjustments that may be required by potential physical improvements (to be determined in coordination with DelDOT). The agreement should include pedestrian signals, crosswalks, interconnection, and ITS equipment such as CCTV cameras at DelDOT's discretion. One or more other developers may enter into a traffic signal agreement for this intersection as well. The developer should coordinate with DelDOT on the design and implementation of improvements and equitable cost sharing of the traffic signal.
5. The following bicycle, pedestrian, and transit improvements should be included:
 - a. Bike parking should be provided near the building entrances within this development. If the building architecture provides for an awning or other overhang, the bike parking should be covered.
 - b. Utility covers should be made flush with the pavement.
 - c. The existing sidewalk within the site frontage along northbound Delaware Route 896 should be reconstructed as needed to provide a minimum of a five-foot wide sidewalk that meets current AASHTO and ADA standards. The sidewalk path should have a minimum of a five-foot buffer from the roadway. At the property boundaries, the sidewalk should connect to pedestrian facilities on the adjacent properties or to the shoulder of Delaware Route 896 in accordance with DelDOT's *Shared Use Path and/or Sidewalk Termination Policy* dated June 19, 2014. The developer should coordinate with DelDOT's Development Coordination Section to determine exact locations and details of the sidewalk connections at the property boundaries.
 - d. ADA compliant curb ramps and crosswalks should be provided at all pedestrian crossings, including all site entrances. Type 3 curb ramps are discouraged.
 - e. In addition to the site frontage sidewalks described above, internal sidewalks for pedestrian safety and to promote walking as a viable transportation alternative should be constructed within the development. These sidewalks should meet current DelDOT, AASHTO and ADA standards. These internal sidewalks should connect the building entrances to the frontage sidewalk and pedestrian connections to adjacent properties.
 - f. Where internal sidewalks are located alongside of parking spaces, a buffer should be added to eliminate vehicular overhang onto the sidewalk.



- g. The developer should coordinate with the Delaware Transit Corporation (DTC) regarding possible modifications to existing bus stops. Modifications may include adding amenities such as a shelter, trash receptacle and lighting, and/or relocation the existing bus stops. Internal sidewalks should be connected to any transit facilities and parking facilities for bicyclists should be included. The developer should coordinate with the DTC regarding the details and implementation of the transit-related improvements.

Improvements in this TIS may be considered “significant” under DelDOT’s *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT’s website at http://www.deldot.gov/information/pubs_forms/manuals/de_muted/index.shtml. For any additional information regarding the work zone impact and mitigation procedures during construction please contact Mr. Adam Weiser of DelDOT’s Traffic Section. Mr. Weiser can be reached at (302) 659-4073 or by email at Adam.Weiser@state.de.us.

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

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

Sincerely,
McCormick Taylor, Inc.

A handwritten signature in black ink, appearing to read "Andrew J. Parker".

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

Enclosure

General Information

Report date: December 2016

Prepared by: Duffield Associates

Prepared for: Shri Swami Narayan, LLC

Tax parcel: 18-046.00-026 & 18-046.00-111

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

Project Description and Background

Description: The proposed development would include a 46,400 square-foot four-story all-suites hotel (with 98 suites) and a 5,100 square-foot convenience store with gasoline pumps (12 vehicle fueling positions). The proposed development would replace an existing 130-room Red Roof Inn hotel.

Location: The SSN Hotel & Commercial development is proposed to be located on the east side of Delaware Route 896 (New Castle Road 387 / South College Avenue), south of Welsh Tract Road (New Castle Road 367 / 357B) within the City of Newark in New Castle County, Delaware. A site location map is included on Page 7.

Amount of land to be developed: approximately 4.65 acres of land (based on combined size of tax parcels 18-046.00-026 and 18-046.00-111)

Land use approval(s) needed: Subdivision approval. The land is currently zoned as BC (General Business) within the City of Newark and the developer proposes to maintain the current zoning.

Proposed completion date: 2018

Proposed access locations: Four access points are proposed, and each one is an existing access that would remain. Of these, one full access point is proposed on Welsh Tract Road (shared with Candlewood Suites Hotel) and three access points are proposed along Delaware Route 896. Of the Delaware Route 896 access points, the south driveway, which would directly serve the convenience store, is proposed as right-in/right-out/left-in, the middle driveway is proposed as right-in/right-out only (shared with an existing Friendly's restaurant), and the north driveway is proposed as right-in/right-out only (shared with a vacant business). All proposed access points along Delaware Route 896 are located at existing driveways and would have the same permitted movements as existing conditions.

Average Annual Daily Traffic Volumes (per DelDOT Traffic Summary 2015):

- Delaware Route 896: 42,819
- Welsh Tract Road (east of Delaware Route 896): 6,727
- Welsh Tract Road (west of Delaware Route 896): 6,531



2015 Delaware Strategies for State Policies and Spending

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

The proposed SSN Hotel & Commercial development is located within an Investment Level 1 area.

Investment Level 1

Areas of the state designated as Investment Level 1 are most prepared for growth and are where the state can make cost-effective infrastructure investments in schools, roads, and public safety. In these 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. Investment Level 1 areas are often municipalities, towns, or urban/urbanizing places. Density is generally higher than in the surrounding areas. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas.

Proposed Development's Compatibility with Strategies for State Policies and Spending:

The proposed SSN Hotel & Commercial development is located within an Investment Level 1 area; the proposed development would replace an existing 130 room motel with a 98 room, all suites hotel and a convenience store with gasoline pumps. Nearby land uses along the Delaware Route 896 corridor primarily include hotels/motels, motor vehicle services (ex. gasoline stations and car washes), and fast-food/casual restaurants. Residential and industrial developments are also located in the immediate area.

The proposed development is generally consistent with neighboring land uses and the character of Investment Level 1 areas. The *Strategies for State Policies and Spending* document encourages making use of existing infrastructure through infill development and redevelopment of underutilized tracts in Level 1 areas. The proposed development is consistent with the land uses that Investment Level 1 areas encourage. The proposed development appears to generally comply with the policies stated in the 2015 "Strategies for State Policies and Spending."

Comprehensive Plan

City of Newark Comprehensive Plan:

(Source: City of Newark Comprehensive Development Plan V, September 2016)

At the time of this TIS review, the City of Newark website lists the current comprehensive plan as *Comprehensive Development Plan IV, October 2008*. However, *Comprehensive Development Plan V* (Bill 16-08) was approved by City Council on September 26, 2016.

Comprehensive Development Plan V indicates that the proposed development is within Planning Section "F" – South Newark. The parcels included in the proposed development are designated as "commercial" in both existing and future conditions. The document defines commercial land use as "a parcel with retail, restaurant, office, services, gas stations, and similar uses, excluding

utilities and government facilities such as post offices and libraries and large manufacturing sites.” The parcels included in the proposed development are zoned BC – General Business.

Proposed Development’s Compatibility with Comprehensive Plan: The proposed development of an all-suites hotel and convenience store with gasoline pumps at this location appears to be generally compatible with the City of Newark’s *Comprehensive Development Plan V*. The proposed use of the land aligns with the “commercial” designation in the comprehensive plan. The development also aligns with the City’s land-development principal of encouraging appropriate infill and redevelopment to promote efficient and sustainable uses of land to preserve and protect resources and limit the need for new infrastructure.

The following information is based on the City of Newark Code of Ordinances, Chapter 32 – Zoning. Hotels are allowed on parcels zoned BC – General Business; however, this uses requires a special use permit and is subject to special regulations regarding building height. Likewise, automobile service stations are allowed on parcels zoned BC – General Business but also require a special use permit and are subject to several specific site design requirements. While the types of uses proposed for this site appear to be permitted in this location, there are specific regulations that must be followed. As such, it appears this development will require additional discussion and approval by the City of Newark in order to proceed to construction.

Relevant Projects in the DelDOT Capital Transportation Program

Currently, there are no DelDOT capital projects within the area of study.

Currently, there are no DelDOT capital projects within the area of study. New traffic signal equipment was recently installed at the intersection of Delaware Route 896 and Welsh Tract Road. The south and middle proposed access points along the east side of Delaware Route 896 were also recently reconstructed as part of the Candlewood Suites Hotel development, located adjacent to the proposed SSN Hotel & Commercial development.

Trip Generation

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

- Proposed 98 room, all suites hotel: ITE Land Use Code 311
- Proposed 5,100 SF convenience store with gasoline pumps: ITE Land Use Code 853
- Existing 130 room hotel (to be removed): ITE Land Use Code 310

Table 1
SSN HOTEL & COMMERCIAL PEAK HOUR TRIP GENERATION

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	Out	Total	In	Out	Total
98 room, all suites hotel (LU #311)	21	17	38	18	22	40
5,100 SF convenience store with gasoline pumps (LU #853)	105	105	210	130	130	260
<i>Pass-By Trips</i>	-66	-66	-132	-86	-86	-172
130 room hotel to be removed (LU #310)	-41	-28	-69	-40	-38	-78
TOTAL TRIPS	19	28	47	22	28	50

Table 2
SSN HOTEL & COMMERCIAL TOTAL DAILY TRIP GENERATION

Land Use	Weekday ADT		
	In	Out	Total
98 room, all suites hotel (LU #311)	240	240	480
5,100 SF convenience store with gasoline pumps (LU #853)	2157	2157	4314
130 room hotel to be removed (LU #310)	-395	-395	-790
TOTAL TRIPS	2002	2002	4004

Overview of TIS

Intersections examined:

- 1) Delaware Route 896 & south site driveway (existing Red Roof Inn)
- 2) Delaware Route 896 & middle site driveway (existing Friendly's)
- 3) Delaware Route 896 & north site driveway (existing Friendly's)
- 4) Welsh Tract Road & site driveway (existing driveway)
- 5) Delaware Route 896 & Welsh Tract Road

Conditions examined:

- 1) 2016 existing conditions
- 2) 2018 without SSN Hotel & Commercial development
- 3) 2018 with SSN Hotel & Commercial development

Peak hours evaluated: Weekday morning and evening peak hours

Committed developments considered:

- 1) Candlewood Suites (101 room, all suites hotel)

Intersection Descriptions

- 1) **Delaware Route 896 & south site driveway (existing Red Roof Inn)**
Type of Control: two-way stop-control (T-intersection)
Northbound approach: (Delaware Route 896) two through lanes and one right-turn lane
Southbound approach: (Delaware Route 896) two through lanes and one yield-controlled left-turn/u-turn lane
Westbound approach: (existing Red Roof Inn) one right-turn lane, stop-controlled

- 2) **Delaware Route 896 & middle site driveway (existing Friendly's)**
Type of Control: two-way stop control (T-intersection)
Northbound approach: (Delaware Route 896) two through lanes and one wide shoulder serves as de facto right-turn lane
Southbound Approach: (Delaware Route 896) two through lanes separated from northbound lanes by concrete median
Westbound approach: (existing Friendly's) one right-turn lane, stop-controlled

- 3) **Delaware Route 896 & north site driveway (existing Friendly's)**
Type of Control: two-way stop control (T-intersection)
Northbound approach: (Delaware Route 896) two through lanes and one right-turn lane
Southbound Approach: (Delaware Route 896) two through lanes separated from northbound lanes by concrete median
Westbound approach: (existing Friendly's) one right-turn lane, stop controlled

- 4) **Welsh Tract Road & site driveway (existing driveway)**
Type of Control: two-way stop control (four-leg intersection)
Northbound approach: (existing driveway) one shared left-turn/right-turn lane, stop controlled
Southbound approach: (truck turn around) traffic flow is one-way (away from intersection)
Eastbound approach: (Welsh Tract Road) one shared left-turn/through lane and one shared through/right-turn lane
Westbound approach: (Welsh Tract Road) one left-turn lane, one through lane (shared with left-turn lane for downstream intersection), one bicycle lane, and one right-turn lane for downstream intersection

- 5) **Delaware Route 896 & Welsh Tract Road**
Type of Control: signalized four-leg intersection
Northbound approach: (Delaware Route 896) one left-turn lane, two through lanes, one channelized right-turn lane
Southbound approach: (Delaware Route 896) one left-turn lane, two through lanes, one right-turn lane
Eastbound approach: (Welsh Tract Road) one shared left-turn/through lane and one right-turn lane

Westbound approach: (Welsh Tract Road) one left-turn lane, one shared left-turn/through lane, one bicycle lane (terminates at intersection), and one channelized right-turn lane

Safety Evaluation

Crash Data: Crash data for the study area was obtained through the Delaware Crash Analysis Reporting System (CARS) in two over-lapping data sets. The first set of data includes crashes within one-tenth mile of Delaware Route 896 & Welsh Tract Road from October 5, 2013 to October 5, 2016. The second set of data covers Delaware Route 896 from Welsh Tract Road to the Interstate 95 southbound ramps from October 11, 2013 to October 11, 2016. McCormick Taylor determined there were 90 unique, reportable crashes in these two data sets. Sixty-three (63) crashes occurred within one-tenth mile of Delaware Route 896 and Welsh Tract Road; the remaining 27 crashes occurred outside this radius, approximately between the middle site driveway (existing Friendly's) and the Interstate 95 southbound ramps.

Of the 90 total crashes, 33 crashes resulted in personal injury and 57 crashes resulted in property damage only. There were zero (0) fatal crashes reported during the study period.

A majority of the crashes (64) occurred between dawn and dusk, while 25 crashes occurred under dark-lighted conditions. Most crashes (78) occurred under clear or cloudy conditions. Ten crashes occurred during rainfall, and one crash occurred during snowfall. With regards to roadway surface conditions, the majority of crashes (72) occurred on dry pavement, and 17 crashes occurred on wet pavement. One crash was reported with unknown lighting, weather, and surface conditions.

During the study period, there was one crash involving a pedestrian and two crashes related to driving under the influence.

The crashes had a wide variety of primary contributing circumstances. The most common primary contributing circumstances include: failed to yield right of way (18), driver inattention, distraction, or fatigue (17), following too close (15), improper lane change (7), driving in a careless or reckless manner (7), and disregard traffic signal (3). Nine crashes had an unknown primary contributing circumstance. The remaining categories of primary contributing circumstances involved in two or less crashes.

The majority of crashes were front to rear (42), while 25 crashes were angle collisions, 12 were sideswipe (same direction), 7 were not a collision between two vehicles, 3 were front to front, and 1 crash had an "other" manner of impact.

Sight Distance: The study area generally consists of straight and flat roadways, and there are few potential sight distance obstructions. Sight distance appears adequate throughout the study area.

One item noted during the field investigation is that trees and brush conceal the existing Red Roof Inn from the view of northbound traffic on Delaware Route 896 until just before reaching

the existing south site driveway. This situation can potentially lead to drivers making sudden lane or speed changes to make a northbound right turn into the south site driveway once they are able to see the proposed development. Signage to make the south site driveway more conspicuous to approaching traffic should be considered. This may require the relocation of existing signs to reduce sign clutter.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Several fixed-route buses operate in the study area. DART Routes 16 (Newark Express), 46 (Newark Glasgow), and C4 (Cecil Transit Route #4) run along Delaware Route 896 past the proposed development. DART Route 302 (Intercounty Dover-Newark) also operates on Delaware Route 896 in the study area.

There are existing DART stops on both sides of Delaware Route 896 approximately 340' south of Welsh Tract Road. All routes listed above (except route C4) serve these stops. Neither bus stop has a waiting pad, bench, shelter, or other amenities. The existing placement of the transit stops may encourage transit riders to cross Delaware Route 896 outside of an established pedestrian crossing. In addition, due to the layout of existing crosswalks at Delaware Route 896 and Welsh Tract Road, crossing the southern leg of Delaware Route 896 in the study area requires pedestrians to cross the other three legs of the intersection. During our field investigation, at least one pedestrian was seen running across Delaware Route 896 (in the area of the mid-block transit stops) after alighting from a DART bus.

Route 16 (Newark Express) connects the downtown areas of Wilmington and Newark and runs on weekdays during the morning and evening peak commuting hours.

Route 46 (Newark Glasgow) connects the downtown area of Newark with Peoples Plaza in Glasgow and runs throughout the day, Monday-Saturday.

Route 302 connects the Newark train station to the Dover transit center and runs on weekdays during the morning and evening peak commuting hours.

The nearest stop for Route C4 is the Newark Park and Ride facility near the intersection of Delaware Route 896 and Delaware Route 4. This service connects with points throughout New Castle County, Delaware and Cecil County, Maryland and runs throughout the day, Monday-Friday.

Planned transit service: There are no known planned changes to transit service in the study area.

Existing bicycle and pedestrian facilities: There is one marked bicycle lane in the study area on westbound Welsh Tract Road between Old Coochs Bridge Road and Delaware Route 896; this bicycle lane is approximately 270' long. None of the study area roadways are designated as bicycle routes on the New Castle County, Delaware Bicycle Map. Delaware state law allows for bicycles to be operated on sidewalks, unless prohibited by official traffic control devices. It is

likely that a substantial percentage of cyclists traveling along Delaware Route 896 in the study area would use the existing sidewalks.

There are existing sidewalks along both sides of Delaware Route 896 and Welsh Tract Road within the study area. However, sidewalks along Welsh Tract Road terminate just west of Delaware Route 896, and sidewalks along Delaware Route 896 terminate at the southern end of the proposed site. Pedestrian facilities (curb ramps, pedestrian signal heads, pushbuttons, and crosswalks) at the signalized intersection of Delaware Route 896 and Welsh Tract road were upgraded recently and appear to meet current design standards. No crosswalk is provided to cross the southern leg of the signalized intersection; this requires pedestrians to complete three crossings to cross from the southeast corner to the southwest corner and vice versa. Combined with the placement of DART bus stops approximately 340' south of the intersection, this may lead to pedestrians attempting to cross Delaware Route 896 outside of established pedestrian crosswalks.

Bicycle and pedestrian trips may be generated by the proposed development (especially to/from the proposed convenience store). These trips may originate from the adjacent residential developments or from other nearby commercial/hotel developments.

Planned bicycle and pedestrian facilities: The TIS did not include any correspondence with DelDOT's Statewide and Regional Planning Section regarding planned or requested bicycle and pedestrian facilities in the area of this proposed development.

Previous Comments

Several items from the TIS scoping meeting (06/09/2016) do not appear to be fully addressed in the final TIS submission. First, the Highway Capacity Software reports included in the TIS suggest outdated versions of the software were utilized for analysis. Second, traffic counts at the existing Friendly's driveways do not appear to include separate counts of pedestrians or heavy vehicles and do not include calculations of the peak hour factor (PHF). Further detail on these issues are included in the following section of this report. Third, no evidence of coordination regarding transit, bicycle, and pedestrian facilities with DTC or DelDOT's Statewide and Regional Planning Section is included in the TIS.

General HCS Analysis Comments

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

- 1) Per the minutes of the TIS scoping meeting (06/09/2016), Duffield Associates was required to use the most recent version of the Highway Capacity Software (HCS) that implements the 2010 Highway Capacity Manual (HCM). For this TIS, that was HCS 2010. However, the stop-controlled intersection analysis reports included in the TIS are from HCS+, Version 5.6. This software is out of date and does not implement the 2010 Highway Capacity Manual. In addition, the signalized intersection analysis reports are labeled as HCS 2010 Streets, Version 6.65. This version was released in October 2014; there have been three updated versions released since that time. McCormick Taylor generated all analysis reports using the most recent update of HCS 2010 (Version 6.90, released October 2016).

- 2) For unsignalized intersections, the TIS and McCormick Taylor applied heavy vehicle factors (HV) by movement using existing data. For signalized intersections, the TIS and McCormick Taylor applied HV by lane group using existing data. The TIS and McCormick Taylor generally assumed future HV to be the same as existing HV at all intersections. Heavy vehicle traffic accessing this site is expected to increase, especially to the convenience store with gasoline pumps. Therefore, McCormick Taylor assumed 3% HV for future movements to and from all proposed site access driveways (except northbound right egress at the Welsh Tract Road driveway)
- 3) McCormick Taylor applied the overall intersection peak hour factors (PHF) shown on the manual turning movement count sheets to all movements at each study intersection. Since no PHF calculations were included in the TIS for the middle and north site driveways, McCormick Taylor utilized the PHF calculated for the south site driveway for these intersections. The TIS does not appear to have utilized the PHFs calculated from the manual turning movement counts for existing or future analyses. The TIS used PHF of 0.92 throughout all analyses and used PHF of 1.00 for some movements in the stop-controlled analyses.
- 4) For analyses of the signalized intersections, the TIS and McCormick Taylor used a base saturation flow rate of 1,900 pchpl.
- 5) The HCS analyses included in the TIS did not always reflect the lane widths observed in the field by McCormick Taylor. McCormick Taylor's HCS analyses incorporated our field-measured lane widths.
- 6) The TIS and McCormick Taylor used different signal timings when analyzing the signalized intersections in some cases.

Table 3
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study Report for SSN Hotel & Commercial
Report dated December 2016
Prepared by Duffield Associates

Unsignalized Intersection ¹ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Delaware Route 896 & South Site Driveway (Red Roof Inn)²				
2016 Existing				
Southbound DE 896 – Left ³	B (14.4)	C (16.3)	E (35.2)	D (29.4)
Westbound Site Driveway - Right	B (14.9)	C (16.1)	C (16.1)	C (16.7)
2018 without Development				
Southbound DE 896 – Left ³	B (14.8)	C (16.8)	E (37.5)	D (31.2)
Westbound Site Driveway - Right	C (15.3)	C (16.4)	C (16.5)	C (17.2)
2018 with Development				
Southbound DE 896 – Left ³	C (15.9)	C (18.8)	C (20.6)	C (24.5)
Westbound Site Driveway - Right	C (16.4)	C (18.3)	C (18.3)	C (19.8)

¹ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

² The TIS includes a small volume of southbound to northbound U-turns at this intersection in the existing and without development scenarios. However, there is no volume for this movement in the build scenarios. It is unclear why these U-turns were removed from the analyses submitted in the TIS. McCormick Taylor used the same traffic volumes as the TIS since these were previously approved by DelDOT.

³ The TIS appears to include southbound to northbound U-turns being combined with the southbound left turn volumes used in HCS analysis. This may be due to limitations of the software version utilized by Duffield. McCormick Taylor entered the southbound U-turns and left turns separately in HCS analysis. Exhibit 17 and 18 in the TIS show zero southbound U-turns in the build condition during both the AM and PM peak hours. However, it appears that the U-turns present in the existing and no-build conditions are still present, but these volumes were moved to the southbound left turn volumes. Again, McCormick Taylor entered the southbound U-turn volumes separately in HCS analyses (6 in AM and 8 in PM as shown on Exhibit 6 and 7 in the TIS for the no build condition).

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study Report for SSN Hotel & Commercial
Report dated December 2016
Prepared by Duffield Associates

Unsignalized Intersection ⁴ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Delaware Route 896 & Middle Site Driveway (Friendly's)⁵				
2016 Existing				
Westbound Site Driveway - Right	B (15.0)	C (16.3)	C (15.9)	C (16.7)
2018 without Development				
Westbound Site Driveway - Right	C (15.3)	C (16.7)	C (16.3)	C (17.1)
2018 with Development				
Westbound Site Driveway - Right	C (15.4)	C (16.8)	C (16.6)	C (17.5)

⁴ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

⁵ Both the TIS and McCormick Taylor included a northbound right turn lane in the analyses. A wide right shoulder serves as a de facto right turn lane to this driveway.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study Report for SSN Hotel & Commercial
Report dated December 2016
Prepared by Duffield Associates

Unsignalized Intersection ⁶ Two-Way Stop Control (T-intersection)	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Delaware Route 896 & North Site Driveway (Friendly's)				
2016 Existing				
Westbound Site Driveway - Right	B (14.8)	C (16.0)	C (15.6)	C (16.4)
2018 without Development				
Westbound Site Driveway - Right	C (15.1)	C (16.5)	C (16.0)	C (16.9)
2018 with Development				
Westbound Site Driveway - Right	C (15.2)	C (16.6)	C (16.1)	C (17.0)

⁶ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study Report for SSN Hotel & Commercial
Report dated December 2016
Prepared by Duffield Associates

Unsignalized Intersection Two-Way Stop Control	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Welsh Tract Road & Existing Site Driveway ⁸				
2016 Existing				
Eastbound Welsh Tract Road – Left	A (7.5)	A (7.7)	A (8.9)	A (9.1)
Westbound Welsh Tract Road - Left	A (7.7)	A (7.5)	A (7.8)	A (7.5)
Northbound Site Driveway – Left	B (11.1)	B (10.9)	B (10.5)	A (5.0)
Northbound Site Driveway - Right	A (9.6)	A (8.9)		
2018 without Development				
Eastbound Welsh Tract Road – Left	A (7.5)	A (7.7)	A (8.9)	A (9.2)
Westbound Welsh Tract Road - Left	A (7.8)	A (7.5)	A (7.8)	A (7.5)
Northbound Site Driveway – Left	B (11.2)	B (11.1)	B (10.6)	B (10.2)
Northbound Site Driveway - Right	A (9.6)	A (9.0)		
2018 with Development				
Eastbound Welsh Tract Road – Left	A (7.5)	A (7.7)	A (8.9)	A (9.1)
Westbound Welsh Tract Road - Left	A (7.8)	A (7.5)	A (7.8)	A (7.6)
Northbound Site Driveway – Left	B (11.9)	B (11.9)	B (11.4)	B (11.0)
Northbound Site Driveway - Right	A (9.6)	A (9.0)		

⁷ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

⁸ McCormick Taylor and the TIS used different lane configurations in analyses of this intersection. Where the TIS coded an eastbound right-turn lane, McCormick Taylor coded a shared through/right-turn lane since traffic may also continue straight at this intersection to make a right to southbound Old Coochs Bridge Road. The TIS coded separate westbound left-turn, through, and right-turn lanes. For this approach, McCormick Taylor coded a shared left-turn/through lane, an exclusive through lane, and a shared through/right-turn lane because traffic in the outer lanes may either turn at this intersection or go straight through to the intersection of Delaware Route 896 and Welsh Tract Road. The TIS coded separate northbound left-turn and right-turn lanes. McCormick Taylor noted that the northbound approach is not marked for two separate lanes and coded one shared left-turn/right-turn lane.

Table 7
PEAK HOUR LEVELS OF SERVICE (LOS)
based on Traffic Impact Study Report for SSN Hotel & Commercial
Report dated December 2016
Prepared by Duffield Associates

Signalized Intersection ⁹	LOS per TIS		LOS per McCormick Taylor	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Delaware Route 896 & Welsh Tract Road ¹⁰				
2016 Existing	C (23.0)	C (21.8)	C (22.2)	C (22.5)
2018 without Development	C (24.3)	C (23.7)	C (23.3)	C (24.2)
2018 with Development	C (28.1)	C (28.5)	C (28.5)	C (31.0)
2018 with Development with Revised Site Access ¹¹	--	--	C (28.6)	C (30.4)

⁹ For both unsignalized and signalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds. For signalized analyses, LOS analysis results are given for only the overall intersection delay.

¹⁰ McCormick Taylor and the TIS both coded right turn overlaps to better model right turns on red and channelized, yield controlled right turns.

¹¹ Southbound left-turn and through volumes were adjusted to account for the scenario in which southbound left-turns into the site at the southern site driveway on Delaware Route 896 are not permitted.