



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

800 BAY ROAD
P.O. Box 778
DOVER, DELAWARE 19903

CAROLANN WICKS, P.E.
SECRETARY

August 4, 2010

Mr. John Shatzschneider
City Manager
City of Harrington
106 Dorman Street
Harrington, DE 19952

Dear Mr. Shatzschneider:

The attached Traffic Impact Study (TIS) review letter for the **Royal Farms at Harrington** development has been completed under the responsible charge of a registered professional engineer whose firm is authorized to work in the State of Delaware. They have found the TIS to conform to DelDOT's Rules and Regulations for Subdivision Streets and other accepted practices and procedures for such studies. DelDOT accepts this TIS review and concurs with the recommendations. We are providing it to you for your information in your review of the plans for the subject development. If you have any questions concerning this letter or the attached review letter, please contact me at (302) 760-2134.

Sincerely,

Todd Sammons
Project Engineer

TS:tsm

Enclosures

cc with enclosures: DelDOT Distribution
Ms. Constance C. Holland, Office of State Planning Coordination
Mr. Derrick Kennedy, Orth-Rodgers & Associates
Mr. Dennis Hughes, Davis, Bowen & Friedel, Inc.
Mr. Mir Wahed, Johnson, Mirmiran, & Thompson
Mr. Andrew Parker, McCormick Taylor
Mr. Brad Herb, Johnson, Mirmiran & Thompson

DelDOT Distribution

Frederick H. Schranck, Deputy Attorney General
Brett Taylor, Chief of Community Relations, Public Relations
Natalie Barnhart, Director, Transportation Solutions (DOTS)
Ralph A. Reeb, Director, Division of Planning
Michael H. Simmons, Assistant Director, Project Development South, DOTS
Donald D. Weber, Chief Traffic Engineer, Traffic, DOTS
Mark Luszczyk, Assistant Chief Traffic Engineer, Traffic, DOTS
Thomas E. Meyer, Traffic Studies Manager, Traffic, DOTS
Theodore G. Bishop, Assistant Director, Development Coordination
Thomas Greve, District Engineer, Central District
Jennifer Pinkerton, Deputy Principal Assistant, Pavement Management
William J. Dryden, Transportation Planner, Project Development South, DOTS
Lisa Collins, Service Development Planner, Delaware Transit Corporation
Marc Côté, Subdivision Engineer, Development Coordination
T. William Brockenbrough, Jr., County Coordinator, Development Coordination
Diane Calloway, Subdivision Manager, Development Coordination
Anthony Aglio, Bicycle Coordinator, Statewide & Regional Planning
Richard Sinegar, Pedestrian Coordinator, Statewide & Regional Planning
Troy Brestel, Project Engineer, Development Coordination



August 2, 2010

Mr. Todd Sammons
Project Engineer
DelDOT Division of Planning
P O Box 778
Dover, DE 19903

RE: Agreement No. 1406
Traffic Impact Study Services–TIS Review
Task 219A- Royal Farms-Harrington

Dear Mr. Sammons,

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Impact Study for Royal Farms development, prepared by Orth-Rodgers and Associates dated May 5, 2009. This review was assigned Task Number 219A. Orth-Rodgers and Associates prepared the report in a manner generally consistent with DelDOT's *Standards and Regulations for Subdivision Streets and State Highway Access*.

The TIS evaluates the impacts of the Royal Farms development, which is proposed on the north side of Delaware Route 14 (Clark Street/Milford-Harrington Highway/Kent Road 36) situated between the northbound and southbound approaches of US Route 13 (DuPont Highway/Kent Road 5) in the City of Harrington, Kent County. The development would consist of a 5,000 square foot convenience market with gasoline pumps on a 1.67-acre assemblage of parcels. The parcels, which are currently zoned C-3 (Service Commercial), will be redeveloped under the same zoning. The developer initially proposed three access points, one existing full access driveway along Delaware Route 14, and two existing left-turn only access driveways along US Route 13 northbound and southbound. However, due to additional meetings and coordination regarding entrance design and potential off-site improvements along Delaware Route 14 a right-in/right-out access driveway is proposed instead of a full access driveway along Delaware Route 14. Construction is anticipated to be completed by 2011.

DelDOT currently has one relevant ongoing project in the study area. US Route 13 is subject to DelDOT's Corridor Capacity Preservation Program (CCPP). The CCPP is a statewide program intended to sustain the capacity of adopted highway corridors by various means such as limiting access points and using service roads for local vehicle trips. The general purpose of the program is to ensure that the existing principal arterial highways, such as US Route 13, are able to efficiently carry regional traffic without impedance from the effects of local development. The CCPP includes the "Harrington Plan (North)", which is a conceptual improvement plan. It includes recommendations for improvements to the signal timing and turning radii for the intersections of northbound and southbound US Route 13 with Delaware Route 14. However these plans are not included in the Capital Transportation Program (CTP) and have no funding allocation or timelines for construction at this time.



Also, as part of the CCPP, in August 2008, DelDOT completed the Harrington Truck Route (Project No. 21-045-01). The project included the development of an alternative route for truck traffic which would route the truck traffic around the City of Harrington and effectively remove it from the historic district of the town. The improvements consisted of upgrading Farmington Road (Kent Road 314) and Tower Hill Road (Kent Road 315), creating a designated truck route widening of the through-lane, addition of shoulders, closure of median breaks, addition of acceleration lanes, upgrade of railroad crossings, and minor intersection improvements along the existing route through the town. In the Royal Farms development area, it included PCC curb work on the northwest corner of the intersection of southbound US Route 13 and Delaware Route 14 as well as signal upgrades at the intersection, including relocation of signal poles and signal heads and the installation of loop detectors for the through and left-turn movements on the main street as well as the side street.

DelDOT recently had two planned pavement rehabilitation and resurfacing projects that included the intersections of northbound and southbound US Route 13 with Delaware Route 14. State Contract No.29-062-04 covered the roadway section along northbound and southbound US Route 13 from Delaware Route 12 (Kent Road 34) to Delaware Route 14. State Contract No. 29-062-05 covered the roadway section along northbound and southbound US Route 13 from Delaware Route 14 to Tower Hill Road. Both of these pavement and rehabilitation contracts were completed by fall of 2009.

Additionally, two locations on US Route 13 and Delaware Route 14 were evaluated under DelDOT's 2009 Hazard Elimination Program (HEP). Site D of the 2009 HEP extended along US Route 13, starting from its intersection with Delaware Route 14 to 0.29 miles north of Delaware Route 14. Site O of the 2009 HEP extended along Delaware Route 14, starting from its intersection with southbound US Route 13 to 0.23 miles east of US Route 13. The improvements suggested in the HEP report are the installation of continuous left-turn lanes along Delaware Route 14 between northbound and southbound US Route 13, converting the proposed Delaware Route 14 Royal Farms site entrance to a right-in/right-out only access and restriping southbound US Route 13 from Gordon Street to Delaware Route 14 to include a continuous right-turn lane. In addition, installation of a concrete median along Delaware Route 14 between northbound and southbound US Route 13 was also suggested. As part of the improvement the potential realignment of westbound Delaware Route 14 approaching northbound US Route 13 and the potential realignment of eastbound Delaware Route 14 approaching southbound US Route 13 may be needed.

The City of Harrington had expressed concerns regarding the cut-through traffic from East Liberty Street (Kent Road 80) using the existing US Route 13 site driveways onto northbound US Route 13 bypassing the two signals on US Route 13 at Delaware Route 14. To address this issue, the City of Harrington required that East Liberty Street be physically restricted to a right-in/right-out only movement at the intersection with southbound US Route 13 by constructing a raised concrete island. This upgrade was agreed to be performed as a part of this Royal Farms development project.



Based on our review, all the intersections analyzed for this TIS operate with Level of Service “D” or better with or without the Royal Farms development. The requested improvements mentioned in items 1 to 5 are related to road network improvements and are not based on any Level of Service requirement.

The intersection of southbound US Route 13 and Delaware Route 14 operates with acceptable level of service in both the AM and PM peak hours. However, the 95th percentile queues on the westbound through approach (275 feet and 375 feet in the AM and PM peak hours, respectively) and those on the westbound left-turn (200 feet and 275 feet in the AM and PM peak hours, respectively) for 2011 Build conditions cause operational issues at this intersection. While these queues are not caused by the mid block Royal Farms site access, it is important to note that these queues currently extend past the site entrance. Also, due to the proposed change in the left-turn storage lanes with the potential construction of a concrete median along Delaware Route 14 and, the existence of two other site entrances that facilitate the traffic movements in and out of the site, we recommend a right-in/right-out only entrance on Delaware Route 14.

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

1. The developer should reconfigure the existing site entrance on Delaware Route 14 as a right-in/right-out only operation and construct a channelized right-turn lane from the westbound Delaware Route 14 approach. Based on DelDOT’s *Standards and Regulations for Subdivision Streets and State Highway Access*, the recommended turn-lane length for the westbound right-turn lane is 150 feet (including taper); however, due to physical constraints DelDOT’s Subdivision Section may determine that a shorter turn lane is acceptable. This will also include the construction of a concrete island with appropriate signage at the site entrance to prevent left-turns in and out movements from the site.
2. The developer should improve the existing left-in/left-out only site entrances on southbound US Route 13 and northbound US Route 13. These include restriping the site entrances and installing appropriate signage at the site entrances to prevent illegal movements.
3. The developer should modify the intersection of East Liberty Street and southbound US Route 13 to form a right-in/right-out only intersection. This will include the construction of a concrete island with appropriate signage on the eastbound East Liberty Street approach to channelize right-turn movements and to prevent cut through traffic coming in and out of East Liberty Street using the Royal Farm site entrances on US Route 13.
4. The developer should relocate the curb line far enough back along the site frontage on Delaware Route 14 to accommodate the proposed improvement between southbound US Route 13 and northbound US Route 13 to be consistent with the recommendations

provided by the HEP. The improvements include removing the back to back left-turn lanes and installing continuous side by side eastbound and westbound left-turn lanes along Delaware Route 14 between southbound and northbound US Route 13. The improvements also include installation of a 4-foot wide concrete median between the eastbound and westbound approaches of Delaware Route 14. In addition, the two existing median islands on Delaware Route 14, one to the west of southbound US Route 13 and the other to the east of northbound US Route 13, will need to be adjusted. The Delaware Route 14 conceptual improvement plan is shown as Figure 1 on page 6. These improvements will require the widening of Delaware Route 14 and may require additional right-of-way from the Royal Farms property frontage along Delaware Route 14. The developer should coordinate with DelDOT's Subdivision Section to determine the right-of-way dedication.

5. The developer should enter into a traffic signal agreement with DelDOT for the intersections of southbound US Route 13 and Delaware Route 14 and northbound US Route 13 and Delaware Route 14. The agreement will cover the signal head adjustments required due to the pedestrian improvements discussed below. The agreement should include relocation of any signal equipment at DelDOT's discretion. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of the traffic signals.
6. The following bicycle, pedestrian, and transit improvements should be included:
 - a. A recommended seven-foot wide sidewalk (with a minimum three-foot buffer from the edge of roadway) that meets current AASHTO and ADA standards should be included along the property frontages on US Route 13 and Delaware Route 14.
 - b. Where right-turn lanes are added on westbound Delaware Route 14 a bicycle lane should also be provided through the right-turn lane. A Right-Turn Yield to Bikes sign (MUTCD R4-4) should be added at the start of each right-turn lane.
 - c. Internal sidewalks should be connected to the frontage sidewalk where applicable. Sidewalks should also connect to existing driveways and pedestrian facilities on properties adjoin the site.
 - d. ADA compliant curb ramps should be provided at all site entrances. Type 3 curb ramps are discouraged.
 - e. Pedestrian crosswalk should be provided at the intersection of southbound US Route 13 and Delaware Route 14 crossing the north leg of southbound US Route 13 and the east leg of Delaware Route 14.
 - 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. Share the Road (MUTCD W16-1) and appropriate bicycle warning signs should be installed.
 - h. Covered bike parking racks should be provided near the commercial business entrances.



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.

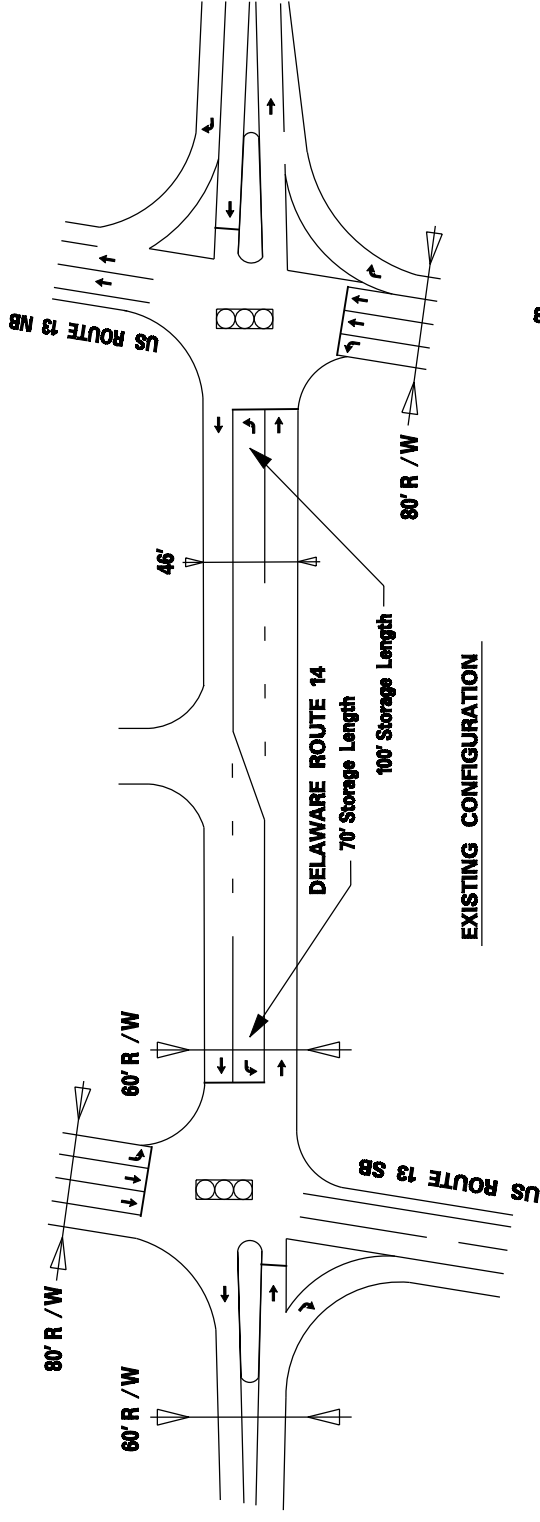
Improvements in this TIS may be considered "significant" under DelDOT's *Work Zone Safety and Mobility Procedures and Guidelines*. These guidelines are available on DelDOT's website at http://www.deldot.gov/information/pubs_forms/manuals/de_mutcd/index.shtml. For any additional information regarding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

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

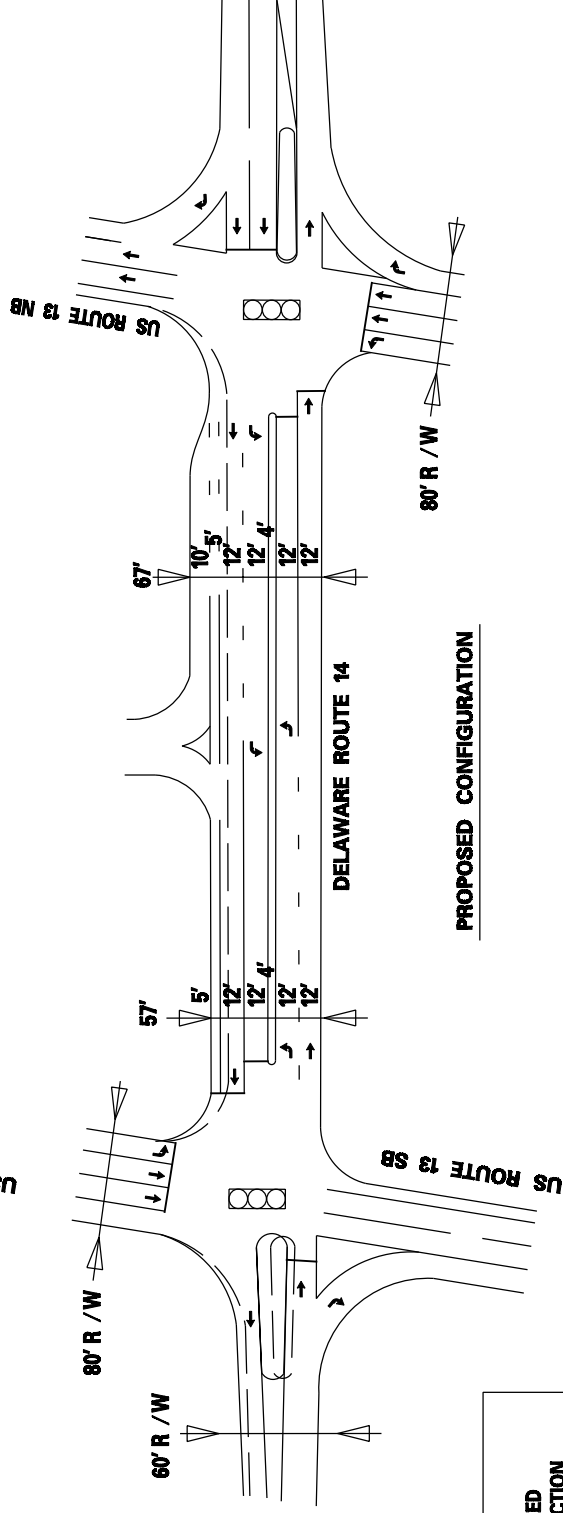
Sincerely,
Johnson, Mirmiran, and Thompson, Inc.

David DuPlessis, P.E.
cc: Mir Wahed, P.E., PTOE

Enclosure



EXISTING CONFIGURATION



PROPOSED CONFIGURATION

LEGEND

 SIGNALIZED INTERSECTION

JMT
JOHNSON, MIRMIRAN & THOMPSON
Engineering A Brighter Future

ROYAL FARMS AT HARRINGTON
TRAFFIC IMPACT STUDY
KENT COUNTY, DELAWARE

General Information

Report date: May 10, 2009.

Prepared by: Orth-Rodgers and Associates.

Prepared for: Royal Farms LP.

Tax Parcels: MN-09-171.00-01-83.00, 84.00, 86.00, 87.00.

Generally consistent with DelDOT's Rules and Regulations for Subdivision Streets: Yes.

Project Description and Background

Description: 5,000 square foot convenience market with gas pumps.

Location: The project is proposed on the north side of Delaware Route 14 (Milford-Harrington Highway/Kent Road 36) situated between the northbound and southbound approaches of US Route 13 (S. DuPont Highway/ Kent Road 5) in the City of Harrington, Kent County.

Amount of Land to be developed: Approximately 1.67 acres of land.

Land Use approval(s) needed: Commercial Entrance Approval.

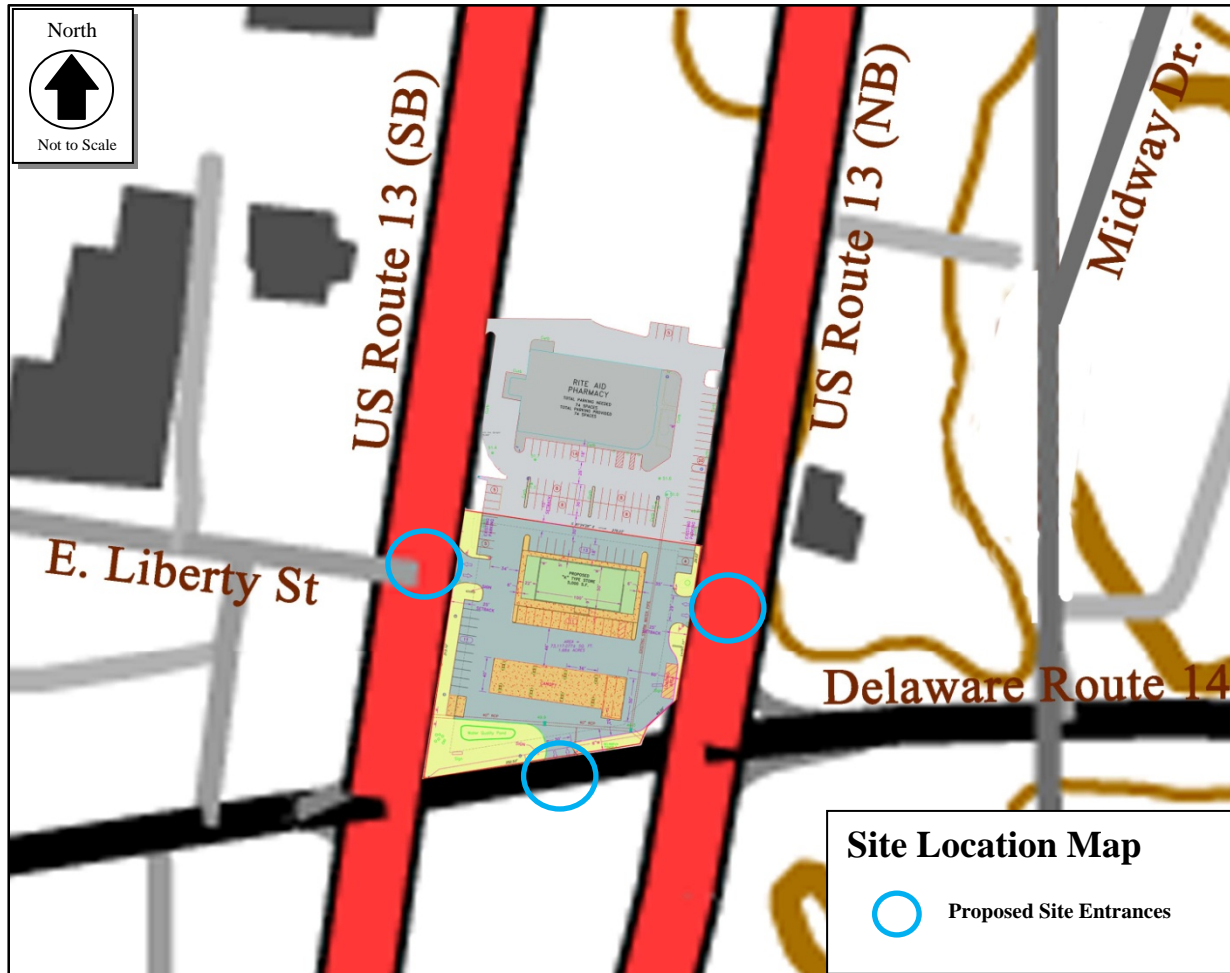
Proposed completion date: 2011.

Proposed access location: Three access points are proposed: one right-in/right-out access driveway along Delaware Route 14, and two left-in, left-out only access driveways along US Route 13.

Daily Traffic Volumes:

- 2007 Average Annual Daily Traffic on S. DuPont Highway: 21916 vehicles per day
- 2007 Average Annual Daily Traffic on Delaware Route 14: 8302 vehicles per day

Site Map



**Graphic is an approximation based on the site plan included in TIS dated January 15, 2009*

Relevant and On-going Projects

DelDOT currently has one relevant ongoing project in the study area. US Route 13 is subject to DelDOT's Corridor Capacity Preservation Program (CCPP). The CCPP is a statewide program intended to sustain the capacity of adopted highway corridors by various means such as limiting access points and using service roads for local vehicle trips. The general purpose of the program is to ensure that the existing principal arterial highways, such as US Route 13, are able to efficiently carry regional traffic without impedance from the effects of local development. The CCPP includes the "Harrington Plan (North)", which is a conceptual improvement plan. It includes recommendations for improvements to the signal timing and turning radii for northbound and southbound US Route 13. However these plans are not included in the CTP and have no funding allocations or timelines for construction at this time.

Also, as part of the CCPP, in August 2008, DelDOT completed the Harrington Truck Route (Project No. 21-045-01). The project included the development of an alternative route for truck traffic which would route the truck traffic around the Town of Harrington and effectively remove

Royal Farms

August 2, 2010

Page 8

it from the historic district of the town. The improvements consisted of upgrading Farmington Road (Kent Road 314) and Tower Hill Road (Kent Road 315), creating a designated truck route through lane widening, addition of shoulders, closure of median breaks, addition of acceleration lanes, upgrade of railroad crossings, and minor intersection improvements along the existing route through the town. In the Royal Farms development area, it included PCC curb work on the northwest corner of the intersection of southbound US Route 13 and Delaware Route 14 as well as signal upgrades at the intersection, including relocating the signal pole and signal heads and installation of loop detectors for the through and left-turn movements on the main street as well as side street.

DelDOT recently had two planned pavement rehabilitation and resurfacing projects that included the intersections of northbound and southbound US Route 13 with Delaware Route 14. State Contract No.29-062-04 covered the roadway section along northbound and southbound US Route 13 from Delaware Route 12 (Kent Road 34) to Delaware Route 14. State Contract No. 29-062-05 covered the roadway section along northbound and southbound US Route 13 from Delaware Route 14 to Tower Hill Road. Both of these pavement and rehabilitation contracts were completed by fall of 2009.

Additionally, two locations on US Route 13 and Delaware Route 14 were evaluated under DelDOT's 2009 Hazard Elimination Program (HEP). Site D of the 2009 HEP extended along US Route 13, starting from its intersection with Delaware Route 14 to 0.29 miles north of Delaware Route 14. Site O of the 2009 HEP extended along Delaware Route 14, starting from its intersection with southbound US Route 13 to 0.23 miles east of US Route 13. The improvements suggested in the HEP report are the installation of continuous left-turn lanes along Delaware Route 14 between northbound and southbound US Route 13, converting the proposed Delaware Route 14 Royal Farms site entrance to a right-in/right-out only access and restriping southbound US Route 13 from Gordon Street to Delaware Route 14 to include a continuous right-turn lane. In addition, installation of a concrete median along Delaware Route 14 between northbound and southbound US Route 13 was also suggested. As part of the improvement the potential realignment of westbound Delaware Route 14 approaching northbound US Route 13 and the potential realignment of eastbound Delaware Route 14 approaching southbound US Route 13 may be needed.

Livable Delaware

(Source: Delaware Strategies for State Policies and Spending, July 2004)

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

These areas are often municipalities or urban/urbanizing places where density is generally higher than in surrounding areas. Areas classified as Investment Level 1 are population centers built around a traditional central business district, which offers a wide range of opportunities for employment, shopping and recreation. Investment Level 1 Areas are considered to drive Delaware's economy and therefore reinvestment and redevelopment are encouraged.

In Investment Level 1 Areas, state investments and policies 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. Typical transportation projects included new or expanded facilities and services for all modes of transportation, including public transportation facilities and services. Projects will also include those that manage traffic flow and congestion, support economic development and redevelopment efforts, and encourage connections between communities and the use of local streets for local trips.

Proposed Development's Compatibility with Livable Delaware:

The proposed development falls within Investment Level 1 Area. The development consists of redevelopment of an existing commercial property and is proposed to be redeveloped within the existing zoning. According to Livable Delaware, reinvestment and redevelopment within these areas is encouraged. It is therefore concluded that the proposed development generally adheres to the policies stated in the 2004 update of the Livable Delaware "Strategies for State Policies and Spending."

Comprehensive Plans

City Of Harrington Comprehensive Plan:

The proposed development was situated within the City of Harrington. These parcels are classified as Service Commercial, C-3 which includes activities such as dry cleaning, storage and warehousing, funeral homes, animal hospitals and motor vehicle sales and service.

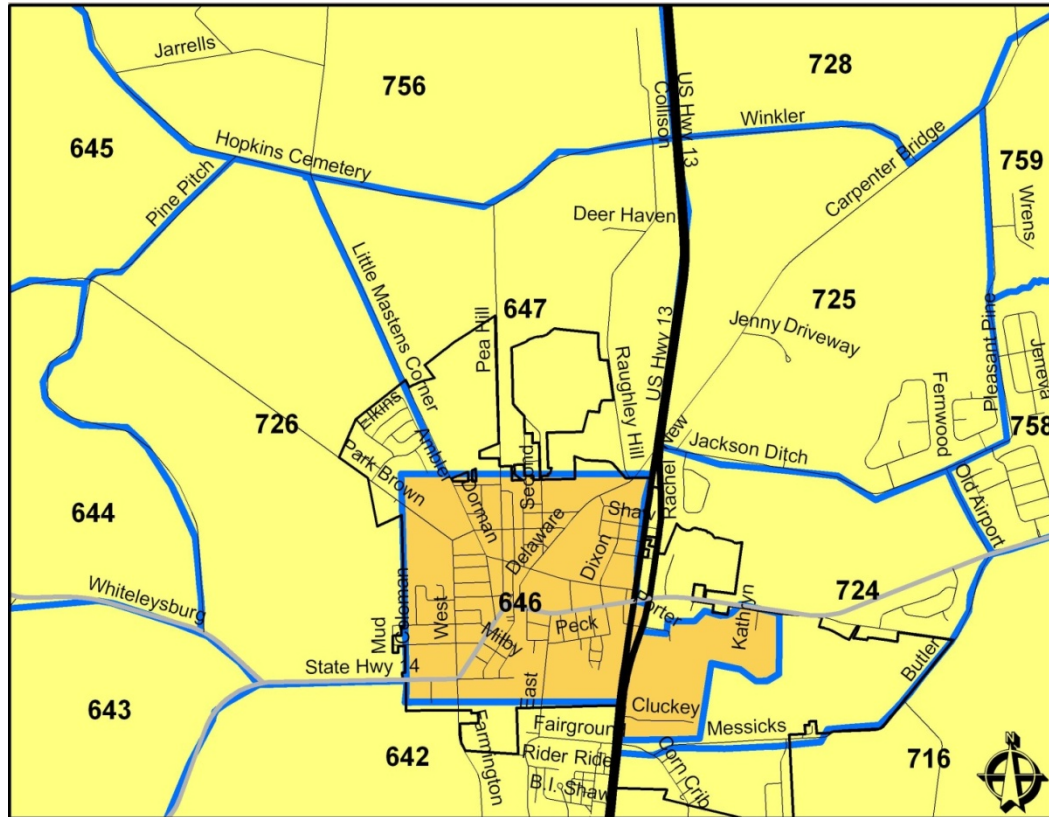
The Comprehensive plan addresses the commercial uses that are desired through the maintenance and implementation of the land use plan and zoning code. It also states that the City will assist and encourage property owners to redevelop existing or underutilized properties.

Proposed Development's Compatibility with the City Comprehensive Plan: The proposed Royal Farms development maintains the same zoning and redevelops the existing commercial and is generally compatible with the City's Comprehensive plan.

Transportation Analysis Zones (TAZ)

Transportation Analysis Zones (TAZ) where development would be located: 724

TAZ Boundaries:



Current employment estimate for TAZ: 302 in 2005

Future employment estimate for TAZ: 382 in 2030

Current Population estimate for TAZ: 559 in 2005

Future Population estimate for TAZ: 980 in 2030

Current household estimate for TAZ: 212 in 2005

Future household estimate for TAZ: 387 in 2030

Relevant committed developments in the TAZ: Cabot Cove, Burgess Property, and Midway Park Center

Would the addition of committed developments to current estimates exceed future projections: Yes

Would the addition of committed developments and the proposed development to current estimates exceed future projections: Yes

Trip Generation

Trip generation for the proposed development was computed using “*Trip Generation Characteristics for Convenience Stores*” published in the August 2001 Institute of Transportation Engineers (ITE) Journal. This was used to calculate the site traffic volumes and proposed pass-by percentages for this land use.

- Convenience market with gas pumps - (ITE Land Use code 853)

The peak period trip generation for Royal Farms development is included in Table 1.

Table 1
ROYAL FARMS DEVELOPMENT TRIP GENERATION

Land Use	ADT*	AM Peak Hour			PM Peak Hour		
		In	Out	Total	In	Out	Total
5,000 square foot Convenience market with gas pumps		133	132	265	120	120	240
Internal Capture		0	0	0	0	0	0
Sub-Total (External Trips)		133	132	265	120	120	240
Pass-By Trips		101	100	201	91	91	182
Total New Trips	823	32	32	64	29	29	58

**Site new ADT trip is calculated based on a factor applied to the PM peak trips. This factor was calculated based on the rates contained in the ITE Trip Generation, Eight Edition, for weekday PM peak hour trips.*

Overview of TIS

Intersections examined:

1. Southbound US Route 13 and Delaware Route 14
2. Northbound US Route 13 and Delaware Route 14
3. Southbound US Route 13 and Site Access
4. Northbound US Route 13 and Site Access
5. Delaware Route 14 and Site Access
6. Southbound US Route 13 and East Liberty Street

Conditions examined:

1. Case 1 - Existing 2009 conditions
2. Case 2- 2011 No Build conditions without Royal Farms development
3. Case 3- 2011 Build with Royal Farms development
 - With full access on Delaware Route 14
 - With rights-in/rights-out only on Delaware Route 14
 - With rights-in/rights-out/left-in only on Delaware Route 14

JMT also analyzed Case3 -2011 Build with Royal Farms development with a right-in only access on Delaware Route 14.

Peak hours evaluated: Weekday morning and evening peak hours

Committed Developments considered:

- Cabot Cove (173 residential units)

- Cypress Creek Garden Apartments (296 residential apartments)
- Burgess Property (36 townhouses & 9,480 SF office space)
- Walgreens (14,727 SF Pharmacy)
- Midway Park Center (60 residential apartments)

Intersection Descriptions

1. Southbound US Route 13 and Clark Street/Delaware Route 14

Type of Control: signalized four- legged intersection

Eastbound Approach: (Delaware Route 14) one through lane and one channelized right-turn lane

Westbound Approach: (Delaware Route 14) one through lane and one left-turn lane

Southbound Approach: (Southbound US Route 13) two through lanes, one right-turn lane, and one left-turn lane

2. Northbound US Route 13 and Delaware Route 14

Type of Control: signalized four- legged intersection

Eastbound Approach: (Delaware Route 14) one through lane and one left-turn lane

Westbound Approach: (Delaware Route 14) one through lane and one channelized right-turn lane

Northbound Approach: (Northbound US Route 13) two through lanes, one right-turn lane, and one left-turn lane

3. Southbound US Route 13 and Site Access

Type of Control: existing stop-controlled intersection (T-Intersection)

Westbound Approach: (Site Access Road) existing one left-turn only lane

Southbound Approach: (Southbound US Route 13) two through lanes and one left-turn lane

Note: As the site is a redevelopment of the former Bennies Junction Steakhouse, the site driveway currently exists. The westbound site approach is currently also being used for illegal cut-through movements to E. Liberty Street across from this intersection

4. Northbound US Route 13 and Site Access

Type of Control: existing stop-controlled intersection (T-Intersection)

Eastbound Approach: (Site Access Road) existing left-turn only lane

Northbound Approach: (Northbound US Route 13) two through lanes

Note: As the site is a redevelopment of the former Bennies Junction Steakhouse, the site driveway currently exists

5. Delaware Route 14 and Site Access Road

Type of Control: existing stop-controlled intersection (T-Intersection)

Eastbound Approach: (Delaware Route 14) existing one through lane, one back to back left-turn lane; proposed one through lane and one left-turn lane

Westbound Approach: (Delaware Route 14) existing one shared though/right-turn lane; proposed one through lane and one-right-turn lane.

Southbound Approach: (Site Access) existing one left-turn and one right-turn lane, proposed one right-in lane only

Note: As the site is a redevelopment of the former Bennies Junction Steakhouse, the site driveway currently exists. With the restriping proposed for Midway Park Center development to the west of this site, the eastbound left-turn lane is to be extended through the site driveway up to the intersection with Northbound US Route 13

6. Southbound US Route 13 and East Liberty Street

Type of Control: existing stop-controlled intersection (T-Intersection)

Eastbound Approach: (East Liberty Street) one right-turn only lane

Southbound Approach: (Southbound US Route 13) existing two through lanes, one right-turn lane, one left-turn lane

Note: The eastbound approach currently is also being used by cut-through traffic from East Liberty Street for illegal through movements through the site driveways onto northbound US Route 13.

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: DART currently operates the Harrington-Dover shuttle, which can be used to connect to DART Route 104 in Dover at Mifflin Meadows near Camden. The shuttle operates from 6 am to 10 pm daily. This shuttle has a bus stop to the south of the site on US Route 13 at the Holiday Inn Express and a bus stop west of the site on Clark Street at Thomas Street.

Planned transit service: Orth-Rodgers and Associates contacted Lisa Collins, Service Development Planner of DTC and she noted that while each shuttle trip passes the proposed site location as it enters into downtown Harrington along the Clark Street/Delaware Route 14 side of the project, a bus stop is not recommended at this location due to possible conflicts in traffic movements.

Existing bicycle and pedestrian facilities: According to DelDOT's *Delaware Bicycle Facility Master Plan* (October 2005), US Route 13 is designated as a Recreational Connector. Also, Delaware Route 14 is designated as a Regional Route K-6 that provides a cross Delaware route and links Milford and Harrington. Statewide Bicycle Route 3 that begins in Kent County, runs south along Little Mastens Corner Road (Kent Road 284) is in proximity of the site and runs further south of the site is in the site vicinity. This route eventually crosses US Route 13 and continues southeast.

The *Delaware Bicycle Touring Map* designates US Route 13 as having average cycling conditions with high traffic volumes (greater than 10,000 vehicles per day). To the east of its intersection with US Route 13, Delaware Route 14 has above average cycling conditions but with moderate traffic volumes (between 2,000 and 10,000 vehicles per day). To the west of its intersection with US Route 13, Clark Street/ Delaware Route 14 has average cycling conditions but with moderate traffic volumes (between 2,000 and 10,000 vehicles per day). E. Liberty Street has above average cycling conditions with low traffic volumes (less than 2,000 vehicles per day).

Planned bicycle and pedestrian facilities: JMT contacted Mr. Anthony Aglio, DelDOT's Bicycle and Pedestrian Coordinator. He noted that the site is located on a Regional Bicycle Route and Connector Bicycle Route and in close proximity of other Bicycle routes. He also noted that the area includes a significant amount of commercial use and existing residential development and requested the following pedestrian and bicycle improvements:

- An ADA compliant sidewalk should be constructed along all property frontages with a five-foot buffer from the edge of pavement.
- Internal sidewalks should connect to the frontage sidewalk and include crosswalks through the driveways. Sidewalks should also connect to existing driveways and pedestrian facilities on properties adjoin the site
- ADA compliant curb ramps should be provided at all site entrances.
- Pedestrian crossings should be provided at southbound US Route 13 at the intersection of Southbound US Route 13 and Delaware Route 14 in the southbound and westbound directions.
- 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
- Covered bike parking racks should be provided near the site entrances.
- The developer of this project should contact DART regarding the addition of transit service and transit facilities at this location, including the installation of a covered bus stop. The internal sidewalks should connect to this stop. This bus stop should include parking facilities for bicyclists.

Previous Comments

Orth-Rodgers and Associates, Inc. has addressed and incorporated all previous comments made on the TIS based on the correspondence dated March 26, 2008 from Delaware Department of Transportation included in the Appendices.

General HCS/Synchro Analysis Comments

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

- 1) The TIS analysis sometimes used incorrect peak hour factors. JMT applied the peak hour factor as per lane groups for existing conditions per customary DelDOT TIS Review methodology.
- 2) The TIS analysis sometimes used heavy vehicle percentages based on traffic movements, rather than lane group. JMT applied the heavy vehicle percentages by lane group as per customary DelDOT TIS Review methodology.
- 3) The TIS sometimes used a peak hour factor of 0.88 for future condition analysis. JMT applied a peak hour factor of 0.92 as customary to DelDOT TIS Review methodology for a development in an urban area.

- 4) The TIS analysis sometimes used peak hour factors of 0.88 for future conditions even if volumes remain unchanged. JMT used existing peak hour factors if volumes remained unchanged.

Table 2
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Royal Farms development
Report dated May, 2009
Prepared by Orth-Rodgers and Associates

Signalized Intersection (HCS Analysis)^{1,2,3}	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 SB & Delaware Route 14				
2009 Existing Conditions (Case 1)	C (23.9)	C (29.8)	C (24.1)	C (27.9)
2011 without Royal Farms development (Case 2)	C (27.2)	C (30.7)	C (25.8)	C (29.7)
2011 with Royal Farms development (Case 3 with full access on Delaware Route 14)	C (28.1)	C (31.4)	C (25.8)	C (29.4)
2011 with Royal Farms development (Case 3 with right-in/right-out only on Delaware Route 14)	C (28.1)	C (31.4)	C (25.8)	C (29.5)
2011 with Royal Farms development (Case 3 with right-in/right-out/left-in on Delaware Route 14)	C (28.1)	C (31.4)	C (25.8)	C (29.5)
2011 with Royal Farms development (Case 3 with right-in only access on Delaware Route 14) ⁴	-	-	C (25.9)	C (29.6)

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

² TIS did not include the eastbound channelized right-turn movement and assumed it to be free. JMT included this movement in the signalized analyses as per field observation.

³ Both JMT and the TIS used a 120 second cycle length for AM and PM peak hours.

⁴ JMT performed additional analyses for Build conditions with right-in only site access permitted onto Delaware Route 14. Volumes from this access were redistributed to the other two site driveways and carried through the other intersections.

Table 3
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Royal Farms development
Report dated May, 2009
Prepared by Orth-Rodgers and Associates.

Signalized Intersection (HCS Analysis)^{5,6}	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 NB & Delaware Route 14				
2009 Existing Conditions (Case 1)	C (24.3)	C (26.7)	C (25.7)	C (24.8)
2011 without Royal Farms development (Case 2)	C (24.3)	C (26.2)	C (24.7)	C (26.2)
2011 With Royal Farms development (Case 3 with full access on Delaware Route 14)	C (24.3)	C (26.3)	C (24.7)	C (25.7)
2011 With Royal Farms development (Case 3 with right-in/right-out only on Delaware Route 14)	C (24.3)	C (26.3)	C (24.7)	C (25.7)
2011 With Royal Farms development (Case 3 with right-in/right-out/left-in on Delaware Route 14)	C (24.3)	C (26.3)	C (24.7)	C (25.7)
2011 With Royal Farms development (Case 3 with right-in only access on Delaware Route 14) ⁷	-	-	C (24.7)	C (25.7)

⁵ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

⁶ Both JMT and the TIS used a 120 second cycle length for AM and PM peak hours.

⁷ JMT performed additional analyses for Build conditions with right-in only site access permitted onto Delaware Route 14. Volumes from this access were redistributed to the other two site driveways and carried through the other intersections.

Table 4
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Royal Farms development
Report dated May, 2009
Prepared by Orth-Rodgers and Associates.

Unsignalized Intersection ⁸ One-Way Stop Control (T-intersection)	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 SB & Site Access				
2009 Existing Conditions ⁹ (Case 1)				
Southbound US Route 13 -Left	A (7.2)	A (7.2)	A (7.2)	A (7.2)
Eastbound East Liberty Street	-	-	C (16.0)	C (24.0)
Westbound Site Access	B (10.9)	B (13.5)	B (14.3)	C (19.4)
2011 without Royal Farms development ⁹ (Case 2)				
Southbound US Route 13-Left	A (7.2)	A (7.2)	A (7.2)	A (7.2)
Eastbound East Liberty Street	-	-	C (16.9)	D (28.1)
Westbound Site Access	B (11.1)	B (14.4)	B (14.9)	C (22.0)
2011 with Royal Farms development (Case 3 with full access on Delaware Route 14) ¹⁰				
Southbound US Route 13- Left	A (7.3)	A (7.3)	A (7.3)	A (7.3)
Westbound Site Access -Left Only	B (12.9)	C (17.1)	B (12.9)	C (17.4)

⁸ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

⁹ The TIS analyzed the intersection of US Route 13 SB and Site Driveway as a T-intersection. JMT analyzed this intersection as a four-legged intersection as observed in the field counts, including the illegal through movements to and from E. Liberty Street.

¹⁰ For Build conditions analyses, right-turn only restrictions are assumed to be in place at E. Liberty Street and hence, JMT and the TIS analyzed the intersection of US Route 13 SB with the site driveway as a T-intersection, without the E. Liberty Street movements.

Table 4 (Continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Royal Farms development
Report dated May, 2009
Prepared by Orth-Rodgers and Associates

Unsignalized Intersection One-Way Stop Control (T-intersection)	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 SB & Site Access				
2011 with Royal Farms development (Case 3 with right in/right-out only on Delaware Route 14) ¹⁰				
Southbound US Route 13 -Left	A (7.3)	A (7.3)	A (7.3)	A (7.3)
Westbound Site Access-Left Only	B (13.0)	C (17.4)	B (13.0)	C (17.7)
2011 with Royal Farms development (Case 3 with right in/right-out/left-in on Delaware Route 14) ¹⁰				
Southbound US Route 13 -Left	A (7.3)	A (7.3)	A (7.3)	A (7.3)
Westbound Site Access-Left Only	B (13.0)	C (17.4)	B (13.0)	C (17.7)
2011 with Royal Farms development (Case 3 with right-in only access on Delaware Route 14) ^{10,11}				
Southbound US Route 13 -Left	-	-	A (7.3)	A (7.3)
Westbound Site Access-Left Only	-	-	B (13.4)	C (18.7)

¹¹ JMT performed additional analyses for Build conditions with right-in only site access permitted on Delaware Route 14. Volumes from this access were redistributed to the other two site driveways and carried through the other study intersections.

Table 5
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Royal Farms development
Report dated May, 2009
Prepared by Orth-Rodgers and Associates

Unsignalized Intersection ¹² One-Way Stop Control (T-intersection)	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 NB & Site Access				
2009 Existing Conditions (Case 1)				
Northbound US Route 13	A (7.3)	A (7.3)	A (7.3)	A (7.3)
Eastbound Site Access –Left Only	B (11.3)	B (11.9)	B (11.3)	B (11.9)
2011 without Royal Farms development (Case 2)				
Northbound US Route 13	A (7.3)	A (7.3)	A (7.3)	A (7.3)
Eastbound Site Access–Left Only	B (11.6)	B (12.4)	B (11.6)	B (12.4)
2011 with Royal Farms development (Case 3 with full access on Delaware Route 14)				
Northbound US Route 13	A (7.4)	B (7.4)	A (7.4)	A (7.4)
Eastbound Site Access–Left Only	B (13.8)	B (14.4)	B (13.8)	B (14.5)
2011 with Royal Farms development (Case 3 with right in/right-out only on Delaware Route 14)				
Northbound US Route 13	A (7.4)	A (7.4)	A (7.4)	A (7.4)
Eastbound Site Access–Left Only	B (13.9)	B (14.7)	B (13.9)	B (14.8)

¹² For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 5 (Continued)
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Royal Farms development
Report dated May, 2009
Prepared by Orth-Rodgers and Associates

Unsignalized Intersection One-Way Stop Control (T-intersection)	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 NB & Site Access				
2011 with Royal Farms development (Case 3 with right in/right-out/left-in on Delaware Route 14)				
Northbound US Route 13	A (7.4)	A (7.4)	A (7.4)	A (7.4)
Eastbound Site Access–Left Only	B (13.8)	B (14.4)	B (13.8)	B (14.5)
2011 with Royal Farms development (Case 3 with right-in only access on Delaware Route 14) ¹³				
Southbound US Route 13 -Left	-	-	A (7.4)	A (7.4)
Eastbound Site Access-Left Only	-	-	B (13.9)	B (14.8)

¹³ JMT performed additional analyses for Build conditions with right-in only site access permitted on Delaware Route 14. Volumes from this access were redistributed to the other two site driveways and carried through the other intersections.

Table 6
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Royal Farms development
Report dated May, 2009
Prepared by Orth-Rodgers and Associates

Unsignalized Intersection ¹⁴ One-Way Stop Control (T-intersection)	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
Delaware Route 14 & Site Access				
2009 Existing Conditions (Case 1)				
Southbound Site Access	B (12.9)	C (15.6)	B (13.0)	C (15.9)
Eastbound Delaware Route 14-Left	A (8.1)	A (8.5)	A (8.1)	A (8.6)
2011 without Royal Farms development (Case 2)				
Southbound Site Access	B (14.6)	C (17.8)	B (14.4)	C (17.0)
Eastbound Delaware Route 14-Left	A (8.4)	A (8.8)	A (8.4)	A (8.8)
2011 with Royal Farms development (Case 3 with full access on Delaware Route 14) ¹⁵				
Southbound Site Access	B (13.1)	C (15.7)	B (12.9)	C (15.6)
Eastbound Delaware Route 14 -Left	A (8.4)	A (8.8)	A (8.4)	A (8.8)
2011 with Royal Farms development (Case 3 with right in/right-out only on Delaware Route 14) ¹⁵				
Southbound Site Access -Right	B (11.6)	B (12.8)	B (11.5)	B (12.7)
2011 with Royal Farms development (Case 3 with right in/right-out /left-in Only) ¹⁵				
Southbound Site Access-Right	B (11.6)	B (12.8)	B (11.5)	B (12.7)
Eastbound Delaware Route 14-Left	A (8.4)	A (8.8)	A (8.4)	A (8.8)

¹⁴ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

¹⁵ TIS assumed the westbound Delaware Route 14 approach to be a shared through/right-turn lane. JMT analyzed this approach as one through lane and one right-turn lane.

Table 7
PEAK HOUR LEVELS OF SERVICE (LOS)
Based on Traffic Impact Study for Royal Farms development
Report dated May, 2009
Prepared by Orth-Rodgers and Associates

Unsignalized Intersection ¹⁶ One-Way Stop Control (T-intersection)	LOS per TIS		LOS per JMT	
	Weekday AM	Weekday PM	Weekday AM	Weekday PM
US Route 13 SB & E. Liberty Street¹⁷				
2011 with Royal Farms development (Case 3 with full access on Delaware Route 14)				
Eastbound East Liberty Street-Right only	-	-	B (10.3)	B (12.1)
2011 with Royal Farms development (Case 3 with right in/right-out only on Delaware Route 14)				
Eastbound East Liberty Street-Right only	-	-	B (10.3)	B (12.1)
2011 with Royal Farms development (Case 3 with right in/right-out/left-in on Delaware Route 14)				
Eastbound East Liberty Street-Right only	-	-	B (10.3)	B (12.1)
2011 with Royal Farms development (Case 3 with right-in only access on Delaware Route 14) ¹⁸				
Eastbound East Liberty Street-Right only	-	-	B (10.4)	B (12.5)

Note: The intersection of US Route 13 SB and E. Liberty Street is analyzed along with the existing site driveway for Cases 1 and 2 and reported in Table 1.

¹⁶ For signalized and unsignalized analyses, the numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

¹⁷ This intersection is assumed to operate as a right-in/right-out only in build conditions with the installation of a concrete median to prevent the existing through movements.

¹⁸ JMT performed additional analyses for Build conditions with right-in only site access permitted on Delaware Route 14. Volumes from this access were redistributed to the other two site driveways and carried through the other intersections.