



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION
800 BAY ROAD
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DOVER, DELAWARE 19903

JENNIFER COHAN
SECRETARY

August 29, 2019

Mr. Eric Ostimchuk
Traffic Planning and Design, Inc.
2500 East High Street
Suite 650
Pottstown, PA 19464

Dear Mr. Ostimchuk:

The enclosed Traffic Impact Study (TIS) review letter for the **Barley Mill Plaza** (Tax Parcel 07-032.20-003) 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 Development Coordination Manual and other accepted practices and procedures for such studies. DelDOT accepts this letter and concurs with the recommendations. If you have any questions concerning this letter or the enclosed review letter, please contact me at (302) 760-2167.

Sincerely,

Troy Brestel
Project Engineer

TEB:km
Enclosures

cc with enclosures: Mr. Michael Hoffman, Tarabicos Grosso, L.L.P.
Ms. Constance C. Holland, Office of State Planning Coordination
Mr. George Haggerty, New Castle County Department of Land Use
Mr. Owen Robatino, New Castle County Department of Land Use
Mr. Mir Wahed, Johnson, Mirmiran & Thompson, Inc.
Ms. Joanne Arellano, Johnson, Mirmiran & Thompson, Inc.
DelDOT Distribution

DelDOT Distribution

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Anthony Aglio, Planning Supervisor, Statewide & Regional Planning
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Claudy Joinville, Project Engineer, Development Coordination



August 28, 2019

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

RE: Agreement No. 1774
Project Number T201769002
Traffic Impact Study Services
Subtask 1A-1-Barley Mill Plaza

Dear Mr. Brestel:

Johnson, Mirmiran and Thompson (JMT) has completed the review of the Traffic Impact Study (TIS) for Barley Mill Plaza prepared by Traffic Planning and Design, Inc. (TPD) dated May 7, 2019. This task was assigned Subtask Number 1A-1. The report is prepared in a manner generally consistent with DelDOT's *Development Coordination Manual*.

The TIS evaluates the impacts of a mixed-use development in New Castle County, Delaware located on the east side of Centre Road (Delaware Route 141), at the intersection of Centre Road and Lancaster Pike (Delaware Route 48). The developer seeks to redevelop approximately 556,696 square feet of office space with 33 multi-family low-rise dwellings, 80 multi-family mid-rise dwellings, 152,000 square feet of retail space, and 160,800 square feet of office space. Three access points are proposed: one rights-in/rights-out entrance on Centre Road, and two full access points, one each along Centre Road and Lancaster Pike by way of interconnection through Barley Mill Plaza. The subject property is on an approximately 56.11-acre parcel (Tax Parcel: 07-032.20-003) that is currently zoned as OR (Office Regional), and the developer does not plan to rezone the land. Construction is anticipated to be complete in 2023.

DelDOT currently has several relevant projects within the study area including the DelDOT Pedestrian Access Routes (PAR) Program project *SR 48, SR 141 to N. King Street PAR and Pavement Improvements* (Contract #T201601103). This project is designed to provide pedestrian accessible routes and sidewalk connections along Lancaster Pike from West Court Drive to DuPont Road. The project area includes study intersections along Lancaster Pike (the intersections with Imperial Drive, Court Drive, Farmers Market Entrance, and N. DuPont Road). The project will evaluate the appropriate design needs for the missing links and non-compliant features within the project area. Construction is anticipated to begin in Fall 2020 and end in Summer 2021.

As part of the PAR Program project, DelDOT also has a planned speed reduction resolution along Lancaster Pike from the Chestnut Run/Site Entrance C intersection to the S. DuPont Road intersection. The speed limit in this area will be reduced from 40 mph to 30 mph. Implementation of the speed reduction is dependent on the PAR project schedule.



The DelDOT Pavement and Rehabilitation project *Rehabilitation of Centre Road – Route 141* (Contract #T201706102) includes the reconstruction of Centre Road from Lancaster Pike to Montchanin Road and the associated Delaware Route 52/Kennett Pike ramps. The project also includes the reconstruction of the multi-use path along northbound Centre Road from Barley Mill Plaza to the eastbound Delaware Route 52 ramp. The Centre Road intersections with Lancaster Pike and Montchanin Road will have curb reconstruction and the pavement will be milled and overlaid. Additionally, crosswalks and pedestrian signals will be added along each approach to the Centre Road and Lancaster Pike intersection. This project is under construction and is anticipated to be completed by Fall 2019.

The DelDOT *Chestnut Run Plaza Pedestrian Improvements* project (Contract # T201801102.01) will install pedestrian facilities to improve connectivity along Centre Road and Lancaster Pike. Specifically, a pedestrian path with varying widths between 8 feet and 10 feet will be installed starting from the easterly side of the Centre Road/Mall Road intersection and ending at the southerly side of the Lancaster Pike/Site Entrance C intersection. Crosswalks will be added along the easterly side of the Centre Road/Mall Road intersection and the Center Road/Plaza Road intersection as well as along the southerly side of the Lancaster Pike/Site Entrance C intersection. The construction bid for this project is under advertisement and a construction start date has not been established.

Per a report generated by Senate Resolution No. 10, to study and make recommendations regarding truck traffic and freight movements along SR 41, SR 48, and SR 7, dated January 12, 2018, a Road Safety Audit has been done along Lancaster Pike. The audit report considers study intersections along Lancaster Pike at Hercules Road, Centerville Road, Harlech Drive/Hedgerow Place, Courtney Drive, and Downs Drive. The report recommends that signal warrant studies be conducted for the Lancaster Pike intersections with Courtney Drive and Harlech Drive/Hedgerow Place, and that a traffic engineering study be conducted to determine any potential improvements for intersections on Lancaster Pike that are currently operating at LOS E or worse.

DelDOT's 2012 Hazard Elimination Program (HEP) identified one location within the study area. The 2012 HEP Site X is a 0.29-mile corridor located along Barley Mill Road from 0.03 miles east of Overbrook Road to Delaware Route 141. The Site X Task I report includes a crash summary, a review of the Barley Mill Road corridor, and an assessment of the intersection of Barley Mill Road and Delaware Route 141. The Task I report recommended signing and striping improvements throughout the corridor. Additionally, the Task I report stated that capacity improvements at the Centre Road/Lancaster Pike intersection be considered as part of a long-term intersection improvement project.

A collaborative effort by DelDOT, WILMAPCO (Wilmington Area Planning Council), Delaware Greenways, Inc., and other groups developed the Corridor Management Plan in March 2005 for Delaware's Brandywine Valley National Scenic Byway. This was done as part of the Delaware Byways Program. The Delaware Byways Program includes the identification, promotion, preservation, and enhancement of Delaware roadways with at least one of the following qualities:



scenic, historic, natural, cultural, recreational, and archaeological. Delaware's Brandywine Valley National Scenic Byway is an approximately 12.25-mile long section of roadway starting from Rodney Square in Wilmington traveling on Delaware Route 52 and Delaware Route 100 to the Delaware-Pennsylvania State Line. Montchanin Road is part of this byway. A recommendation from the plan for Montchanin Road is to preserve the existing alignment and historical character of the roadway, including preserving its two travel lanes without shoulders and narrow intersection widths.

In August 2016, the Wilmington Area Planning Council (WILMAPCO), DelDOT, and the New Castle County Department of Land Use, established the *SR 141 Corridor 20-Year Land Use and Transportation Plan*. The goal of the plan was to develop a vision for the SR 141 corridor, between SR 2 and US 202, and create recommendations to address current and future land use and transportation needs. Per the plan, the transportation elements along the SR 141 corridor should improve safety, limit congestion, and enhance multi-modal mobility with providing transit, bike trails, and pedestrian facilities. The plan recommends retaining SR 141 as four-lane (two lanes in each direction) as well as maintaining the at-grade signalized intersections to discourage through traffic.

In addition, Section 104 of Delaware's Fiscal Year 2020 Bond and Capital Improvements Act, Senate Bill 180 (Bond Bill) provides as follows: *Routes 141 and 48. The Department is requested to refrain from issuing any permit, authorization or approval for use of any new, additional, revised or modified entrances for New Castle County Tax Parcel Numbers 07-032.20-003, 07-032.20-048 through and including 07-032.20-055, 07-032.20-057 and 07-032.30-072 onto or from Route 141 or Route 48, until such time as the Department obtains, reviews and comments upon a traffic operations analysis for the area, which among other elements addresses (1) the predicted levels of service on intersections, roadways or the Tyler McConnell Bridge affected by the proposed development of these parcels, and (2) the roadway improvements necessary to accommodate the development of these parcels, based upon the exploratory development plans submitted to the New Castle County Department of Land Use by the developer, as required by the County's Unified Development Code. To the extent that any submission of proposed development plans is substantially different than the original exploratory development plans submitted to the County, the Department is further requested to assess the impact of the new submission's traffic generation upon the local transportation network. The scope of the assessment shall be at the reasonable discretion of the Department.*

In an April 17, 2019 meeting, documented in an April 26, 2019, memorandum, DelDOT and New Castle County established a scope of work for the subject TIS. As defined in DelDOT's Development Coordination Manual, TIS are necessarily more comprehensive than traffic operational analyses. From the trip generation table and trip distribution diagram used at the meeting and attached to the memorandum, the proposed land use would add about 95 evening peak hour trips to Route 141 east of Montchanin Road, which is about 8 trips more than the re-occupation of the existing office buildings would add. For this reason, DelDOT found it



unnecessary to include analysis of the development's impact on the Tyler McConnell Bridge and intersections east of Montchanin Road in the TIS.

The TIS utilized count data from April 2019 at the Centre Road/Lancaster Pike intersection. However, due to the ongoing construction in the area, most notably at the Delaware Route 141/Delaware Route 52/Kennett Pike Interchange, DelDOT provided JMT traffic counts from January 2017 at the Centre Road/Lancaster Pike intersection to be utilized in the TIS review instead as those volumes were higher.

Based on our review of the traffic impact study, we have the following comments and recommendations:

Per the New Castle County Level of Service (LOS) Standards as stated in Section 40.11.210 of the Unified Development Code (UDC), the following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements.

<i>Intersection</i>	<i>Situations for which LOS deficiencies occur</i>
Site Entrance A/Centre Road (Delaware Route 141)/Barley Mill Road (New Castle Road 259)	2023 Weekday AM and PM without Development (Case 2) 2023 Weekday AM and PM with Existing Office Space Reoccupied (Case 3) 2023 Weekday AM and PM with Development (Case 4)
Site Entrance C/Lancaster Pike (Delaware Route 48)	2019 Weekday AM Existing (Case 1) 2023 Weekday AM and PM without Development (Case 2) 2023 Weekday AM and PM with Existing Office Space Reoccupied (Case 3) 2023 Weekday AM and PM with Development (Case 4)
Barley Mill Road (New Castle Road 271)/Montchanin Road (New Castle Road 225)	2019 Weekday AM and PM Existing (Case 1) 2023 Weekday AM and PM without Development (Case 2) 2023 Weekday AM and PM with Existing Office Space Reoccupied (Case 3) 2023 Weekday AM and PM with Development (Case 4)
Centre Road/Lancaster Pike	2019 Weekday AM and PM Existing (Case 1) 2023 Weekday AM and PM without Development (Case 2) 2023 Weekday AM and PM with Existing Office Space Reoccupied (Case 3) 2023 Weekday AM and PM with Development (Case 4)

Additionally, separate from the UDC but based on the LOS evaluation criteria as stated in Chapter 2 of DelDOT's *Development Coordination Manual*, movements at the following intersections exhibit level of service (LOS) deficiencies without the implementation of physical roadway and/or traffic control improvements.

<i>Intersection</i>	<i>Situations for which LOS deficiencies occur</i>
Site Entrance B/Centre Road	2023 Weekday AM and PM with Development (Case 4)
Barley Mill Road/Old Barley Mill Road (New Castle Road 266)	2023 Weekday PM without Development (Case 2) 2023 Weekday PM with Existing Office Space Reoccupied (Case 3) 2023 Weekday PM with Development (Case 4)
Centre Road/Faulkland Road (New Castle Road 270)	2019 Weekday PM Existing (Case 1) 2023 Weekday AM and PM without Development (Case 2) 2023 Weekday AM and PM with Existing Office Space Reoccupied (Case 3) 2023 Weekday AM and PM with Development (Case 4)
Lancaster Pike/Downs Drive	2019 Weekday AM Existing (Case 1) 2023 Weekday AM without Development (Case 2) 2023 Weekday AM with Existing Office Space Reoccupied (Case 3) 2023 Weekday AM with Development (Case 4)
Centerville Road (New Castle Road 273)/Lancaster Pike	2023 Weekday PM without Development (Case 2) 2023 Weekday AM and PM with Existing Office Space Reoccupied (Case 3) 2023 Weekday PM with Development (Case 4)
Lancaster Pike/Hercules Road (New Castle Road 282)	2019 Weekday AM Existing (Case 1) 2023 Weekday AM without Development (Case 2) 2023 Weekday AM with Existing Office Space Reoccupied (Case 3) 2023 Weekday AM with Development (Case 4)
Lancaster Pike/Court Drive	2019 Weekday AM Existing (Case 1) 2023 Weekday AM and PM without Development (Case 2) 2023 Weekday AM and PM with Existing Office Space Reoccupied (Case 3) 2023 Weekday AM and PM with Development (Case 4)

The Site Entrance A/Centre Road/Barley Mill Road intersection would exhibit LOS deficiencies under Case 2, 3 and 4 conditions during the weekday AM and PM peak hours. The Case 2 weekday AM and PM peak hour deficiencies can be mitigated through the provision of three through lanes along southbound Centre Road, as well as signal optimization. The Case 3 and 4 weekday AM and PM peak hour deficiencies can be mitigated through the provision of three through lanes along northbound and southbound Centre Road, as well as signal optimization. However, these improvements are outside the scope of this TIS, as any extensive widening improvements along Centre Road should be part of a larger long-term improvement project. Furthermore, per the August 2016 *SR 141 Corridor 20-Year Land Use and Transportation Plan*, Centre Road is encouraged to be maintained as four-lane (two lanes in each direction). Therefore, we do not recommend the developer implement any additional improvements at this intersection to mitigate the deficiencies.

The Site Entrance B/Centre Road intersection exhibits LOS deficiencies under Case 4 conditions during the weekday AM and PM peak hours. However, the deficiency occurs along the westbound Site Entrance B approach and would not impact operations along Centre Road. Additionally, the calculated 95th percentile queue length during Case 4 conditions along the westbound Site Entrance



B approach would only be 15 feet which would not impact on-site circulation. Therefore, we do not recommend the developer implement any additional improvements at this intersection to mitigate the deficiencies along the Site Entrance B approach.

The Site Entrance C/Lancaster Pike intersection exhibits LOS deficiencies under existing weekday AM peak hour conditions and would also exhibit LOS deficiencies under the Case 2, 3 and 4 weekday AM and PM peak hour conditions. However, deficiencies can be addressed by optimizing the signal timing. Therefore, we do not recommend the developer implement any additional improvements at this intersection.

The Barley Mill Road/Montchanin Road intersection exhibits LOS deficiencies under existing weekday AM and PM peak hour conditions and would also exhibit LOS deficiencies under the Case 2, 3, and 4 weekday AM and PM peak hour conditions. The southbound Montchanin Road right turning movement is currently signal controlled. The northbound approach of Montchanin Road provides a separate left turn lane, through lane, and right turn lane which is different from currently available aerial photography.

Under Case 4 conditions, the delay at the Barley Mill Road/Montchanin Road intersection can be reduced from LOS F (372.5 seconds of delay per vehicle) to LOS E (63.7 seconds of delay per vehicle) by providing two right turn lanes along the southbound Montchanin Road approach, modifying the signal phasing along the eastbound and westbound Barley Mill Road approaches to provide protected and permissive left turn phasing, and modifying the northbound and southbound approaches from split phase to concurrent operation with protected left turn phasing. Any improvements beyond those just described would not be feasible as per coordination with DelDOT. Furthermore, per the August 2016 *SR 141 Corridor 20-Year Land Use and Transportation Plan*, Barley Mill Road is encouraged to be maintained as four-lane (two lanes in each direction).

Per direction from DelDOT, a detailed crash evaluation could not be performed as part of this TIS review. Therefore, prior to any signal phasing modifications, an evaluation should be performed at this intersection to identify possible safety concerns based on detailed crash data and to determine the feasibility of adjusting the signal phasing. If phasing adjustments are not feasible, the delay can still be reduced from LOS F (372.5 seconds of delay per vehicle) to LOS F (80.3 seconds of delay per vehicle) with providing two signal-controlled right turn lanes along the southbound Montchanin Road approach and maintaining the existing signal phasing operation. There appears to be adequate width available to provide the southbound right turn lanes without physical widening of the roadway. As such, it is recommended that the developer restripe the southbound Montchanin Road approach to Barley Mill Road to provide two right turn lanes.

The Barley Mill Road and Old Barley Mill Road intersection would exhibit LOS deficiencies under Case 2, 3, and 4 conditions during the weekday PM peak hour. However, these deficiencies occur along the southbound Barley Mill Road approach and the calculated 95th percentile queue



length during Case 4 conditions is only about 10 feet. Therefore, we do not recommend the developer implement any improvements at this intersection.

The Centre Road and Lancaster Pike intersection exhibits LOS deficiencies under existing weekday AM and PM peak hour conditions and would also exhibit LOS deficiencies under the Case 2, 3, and 4 weekday AM and PM peak hour conditions. During Case 4, the delay can be reduced from LOS F (191.8 seconds of delay per vehicle) to LOS F (99.9 seconds of delay per vehicle) through signal timing optimization, the provision of three left turn lanes along eastbound Lancaster Pike and the provision of three through lanes along northbound and southbound Centre Road. However, these improvements are outside the scope of this TIS, as any extensive widening along Centre Road and Lancaster Pike should be part of a larger long-term improvement project. Furthermore, per the August 2016 *SR 141 Corridor 20-Year Land Use and Transportation Plan*, Centre Road is encouraged to be maintained as four-lane (two lanes in each direction). Therefore, we do not recommend the developer implement any improvements at this intersection.

The Centre Road/Faulkland Road intersection exhibits LOS deficiencies under existing weekday PM peak hour conditions and would also exhibit LOS deficiencies under the Case 2, 3 and 4 weekday AM and PM peak hour conditions. With signal timing optimization and the provision of two left turn lanes along northbound and southbound Centre Road, the deficiencies would be mitigated. It appears the provision of additional turn lanes along northbound and southbound Centre Road can be accommodated via widening using the existing medians along each approach. Therefore, it is recommended the developer modify the northbound and southbound Centre Road approaches to Faulkland Road to provide two left turn lanes.

The Lancaster Pike and Downs Drive intersection exhibits LOS deficiencies under existing weekday AM peak hour conditions and would also exhibit LOS deficiencies under the Case 2, 3, and 4 weekday AM peak hour conditions. However, these deficiencies occur along the northbound Downs Drive left turn lane and the calculated 95th percentile queue length during Case 4 conditions is only about 5 feet. Therefore, we do not recommend the developer implement any improvements at this intersection.

The Centerville Road and Lancaster Pike intersection would exhibit LOS deficiencies under Case 2 weekday PM peak hour conditions, Case 3 weekday AM and PM peak hour conditions, and Case 4 weekday PM peak hour conditions. The Case 2 weekday PM peak hour deficiencies can be mitigated through signal timing optimization. As mentioned in the TIS Review Letter dated September 25, 2017 for the Delaware National residential development, the provision of three through lanes was recommended along eastbound Lancaster Pike at this intersection. With three through lanes and signal timing optimization, the Case 3 weekday AM peak hour deficiencies can be mitigated. However, the Case 3 and 4 weekday PM peak hour would still operate at LOS E (57.0 seconds of delay per vehicle). With the three through lanes, signal timing optimization, as well as the modification of the eastbound Lancaster Pike approach to provide two left turn lanes, the LOS deficiencies would be mitigated and the intersection would improve to operate at LOS D or better under Case 3 and 4 during all peak periods. Although the capacity constraints would be



mitigated with the provision of two left turn lanes along the eastbound Lancaster Pike approach, it is our understanding that it may not be feasible to install two left turn lanes as the installation of the second receiving lane would significantly affect residential properties on northbound Centerville Road. Therefore, we do not recommend any additional improvements be implemented by the developer at this intersection; however, it is recommended that the developer be responsible to fund an equitable portion to the improvement to widen eastbound Lancaster Pike at the Centerville Road intersection to provide three through lanes.

The Lancaster Pike and Hercules Road intersection exhibits LOS deficiencies under existing weekday AM peak hour conditions and would also exhibit LOS deficiencies under the Case 2, 3 and 4 weekday AM peak hour conditions. However, deficiencies can be addressed by optimizing the signal timing. Therefore, we do not recommend the developer implement any additional improvements at this intersection.

The Lancaster Pike and Court Drive intersection exhibits LOS deficiencies under existing weekday AM peak hour conditions and would also exhibit LOS deficiencies under Case 2, 3 and 4 weekday AM and PM peak hour conditions. However, these deficiencies occur along the northbound Court Drive approach and the calculated 95th percentile queue length during Case 4 conditions is only about 50 feet. Therefore, we do not recommend the developer implement any improvements at this intersection.

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 should provide a bituminous concrete overlay to the northbound Centre Road existing travel lanes along the site frontage in the area affected by the Site Entrance B construction, including any auxiliary lanes, at DelDOT's discretion. DelDOT should analyze the existing lanes' pavement section and recommend an overlay thickness to the developer's engineer, if necessary.
2. The developer should maintain the full access site entrance for the proposed Barley Mill Plaza development on Centre Road at the intersection with Barley Mill Road to be consistent with the lane configurations as shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Barley Mill Road	One shared left turn/through lane and one right turn lane.	No change
Westbound Site Entrance A	One shared left turn/through lane and one right turn lane	No change
Northbound Centre Road	One left turn lane, two through lanes, and one right turn lane	No change
Southbound Centre Road	One left turn lane, two through lanes, and one right turn lane	No change

3. The developer should construct a rights-in/rights-out site entrance for the proposed Barley Mill Plaza development on Centre Road along the west side of the property, approximately 600 feet north of the northeast point of tangency at the intersection with Lancaster Pike to be consistent with the proposed lane configurations as shown in the table below:

Approach	Current Configuration	Proposed Configuration
Westbound Site Entrance B	Approach does not exist	One right turn lane
Northbound Centre Road	Two through lanes	Two through lanes and one right turn lane
Southbound Centre Road	Two through lanes	No change

Based on DelDOT's *Development Coordination Manual*, the recommended minimum storage length (excluding taper) is 350 feet for the northbound Centre Road right turn lane.

4. The developer should maintain the full access site entrance for the proposed Barley Mill Plaza development on Lancaster Pike at the intersection with Chestnut Run, to be consistent with the lane configurations as shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Lancaster Pike	Two left turn lanes, two through lanes, and one right turn lane	No change
Westbound Lancaster Pike	One left turn lane, two through lanes, and one right turn lane	No change
Northbound Chestnut Run	Two left turn lanes, one through lane, and one right turn lane	No change
Southbound Site Entrance C	Two left turn lanes, one through lane, and two right turn lanes	No change

5. The developer should restripe the southbound Montchanin Road approach to Barley Mill Road to provide an additional right turn lane. The proposed configuration is shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Barley Mill Road	One left turn lane, one through lane, and one shared through/right turn lane	No change
Westbound Barley Mill Road	One left turn lane, two through lanes, and one right turn lane	No change
Northbound Montchanin Road	One left turn lane, one through lane, and one right turn lane	No change
Southbound Montchanin Road	One left turn lane, one through lane, and one right turn lane	One left turn lane, one through lane, and two right turn lanes

The recommended minimum storage length (excluding taper) is 360 feet for the additional southbound right turn lane. It should be noted that the storage length based on the HCM results provide a shorter queue length than what is reported here.

6. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Barley Mill Road with Montchanin Road. The agreement should include signal heads, pedestrian signals, crosswalks, interconnection, etc. at DelDOT's discretion to accommodate the improvements to be built under Item 5 above. The developer should coordinate with DelDOT on the implementation of the improvements.
7. The developer should improve the northbound and southbound Centre Road approaches to Faulkland Road to provide an additional left turn lane. The proposed configuration is shown in the table below:

Approach	Current Configuration	Proposed Configuration
Eastbound Faulkland Road	Two left turn lanes, two through lanes, and one right turn lane	No change
Westbound Faulkland Road	Two left turn lanes, two through lanes, and one right turn lane	No change
Northbound Centre Road	One left turn lane, two through lanes, and one right turn lane	Two left turn lanes, two through lanes, and one right turn lane
Southbound Centre Road	One left turn lane, two through lanes, and one right turn lane	Two left turn lanes, two through lanes, and one right turn lane

The minimum storage lengths (excluding taper) are 260 feet for the additional northbound left turn lane and 110 feet for the additional southbound left turn lane based on the HCM results. However, based on the existing left turn lane storage lengths and the median widths, it is recommended that the storage lengths (excluding taper) for the additional left turn lanes provide a minimum of 450 feet.

8. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Centre Road with Faulkland Road. The agreement should include signal heads, pedestrian signals, crosswalks, interconnection, etc. at DelDOT's discretion to accommodate the additional northbound and southbound Centre Road left turn lanes. The developer should coordinate with DelDOT on the implementation of the improvements.
9. The developer should enter into an agreement with DelDOT to fund an equitable portion of the improvements planned at the Centerville Road/Lancaster Pike intersection to provide three through lanes along eastbound Lancaster Pike. The proposed configuration is shown in the table below. The Delaware National residential development is expected to be responsible for part of these improvements as well. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of these improvements.

Approach	Current Configuration	Proposed Configuration
Eastbound Lancaster Pike	One left turn lanes, two through lanes, and one right turn lane	One left turn lanes, three through lanes, and one right turn lane
Westbound Lancaster Pike	Two left turn lanes, two through lanes, and one right turn lane	No change
Northbound Centerville Road	One left turn lane, one shared left turn/through lane, one through lane, and one right turn lane	No change
Southbound Centerville Road	One left turn lane, one shared left turn/through lane, one through lane, and one right turn lane	No change

10. The developer should enter into a traffic signal agreement with DelDOT for the intersection of Lancaster Pike with Centerville Road. The agreement should include signal heads, pedestrian signals, crosswalks, interconnection, etc. at DelDOT's discretion to accommodate the additional eastbound Lancaster Pike through lane. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of the improvements.
11. The developer should fund an equitable portion of the improvements planned as part of the *SR 48, SR 141 to N. King Street PAR and Pavement Improvements* (Contract

#T201601103) project. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of the improvements during the plan review process. DelDOT anticipates requiring the developer to fund the portion of the work at the intersection of Lancaster Pike and N. DuPont Road.

12. The developer should fund an equitable portion of the improvements planned as part of the *Chestnut Run Plaza Pedestrian Improvements* (Contract # T201801102.01) project. The developer should coordinate with DelDOT on the implementation and equitable cost sharing of the improvements during the plan review process. DelDOT anticipates requiring the developer to fund the portion of the work along Lancaster Pike, from Centre Road to the south side of the Site Entrance C intersection.

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

- a. A minimum fifteen-foot wide permanent easement from the edge of the existing right-of-way should be dedicated to DelDOT along the Centre Road and Lancaster Pike site frontages. The developer should construct a ten-foot wide shared-use path along each side of Centre Road and Lancaster Pike that meets current AASHTO and ADA standards. A minimum five-foot setback should be maintained from the edge of pavement to the shared-use paths. If feasible, shared-use paths should be placed behind utility poles. The developer should coordinate with DelDOT's Development Coordination section during the plan review process to identify the exact location of the shared-use path and ensure connectivity to the improvements proposed as part of the *Chestnut Run Plaza Pedestrian Improvements* (Contract # T201801102.01) project.
- b. ADA compliant curb ramps and a marked crosswalk should be provided along the Site Entrance A and Site Entrance B approaches to Centre Road and the Site Entrance C approach to Lancaster Pike. The use of diagonal curb ramps is discouraged.
- c. Where internal sidewalks are located alongside of perpendicular or angular parking spaces, a buffer, physical barrier, or signage should be added to eliminate vehicular overhang onto the sidewalk.
- d. Minimum five-foot wide bicycle lanes should be incorporated in the right turn lane and shoulder along the Centre Road approaches to Site Entrance A and B, as well as along the Lancaster Pike approach to Site Entrance C.
- e. Utility covers should be moved outside of any designated bicycle lanes and any proposed sidewalks or should be flush with the pavement.



- f. Bike parking racks should be provided at the on-site roundabout and the Site Entrance B bus stops, as well as near the building entrances. Where the building architecture provides for an awning or other overhang, the bike parking should be covered.
- g. Adjacent to the site frontage, one new bus stop should be installed along northbound Centre Road and two new bus stops should be installed along southbound Centre Road. In addition, one new bus stop should be installed along both eastbound and westbound Lancaster Pike adjacent to the site frontage. An ADA compliant 5 foot by 8 foot bus pad with a sidewalk connection to a pedestrian pathway is recommended to be installed. The developer should coordinate with DelDOT and DART during the plan review process to determine the exact location and design of the new bus stops and to ensure connectivity to the improvements proposed as part of the *Chestnut Run Plaza Pedestrian Improvements* (Contract # T201801102.01) project.

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 review 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. Mark Buckalew of DelDOT's Traffic Section. Mr. Buckalew can be reached at (302) 894-6353 or by email at Mark.Buckalew@state.de.us.

Additional details on 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.

Joanne M. Arellano, P.E., PTOE

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

General Information

Report date: May 7, 2019

Prepared by: Traffic Planning and Design

Prepared for: Barley Mill Plaza

Tax Parcel: 07-032.20-003

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

Project Description and Background

Description: The developer seeks to redevelop approximately 556,696 square feet of office space with 33 multi-family low-rise dwellings, 80 multi-family mid-rise dwellings, 152,200 square feet of retail space, and 160,800 square feet of office space.

Location: The subject property is located on the east side of Centre Road (Delaware Route 141), at the intersection of Centre Road and Lancaster Pike (Delaware Route 48) in New Castle County, Delaware.

Amount of Land to be developed: The subject property is on an approximately 56.11-acre parcel.

Land Use approval(s) needed: Entrance Plan approval.

Proposed completion date: Construction is anticipated to be complete in 2023.

Proposed access locations: Three access points are proposed: one rights-in/rights-out on Centre Road and two full access points, one each along Centre Road and Lancaster Pike by way of interconnection through Barley Mill Plaza.

- 2019 Average Annual Daily Traffic on Delaware Route 141: 32,710 vehicles per day.
- 2019 Average Annual Daily Traffic on Delaware Route 48: 12,965 vehicles per day.

Site Map



**Graphic is an approximation based on the Land Development Plan prepared by CDA Engineering Inc., dated April 17, 2019.*

Relevant and On-going Projects

DelDOT currently has several relevant projects within the study area including the DelDOT Pedestrian Access Routes (PAR) Program project *SR 48, SR 141 to N. King Street PAR and Pavement Improvements* (Contract #T201601103). This project is designed to provide pedestrian accessible routes and sidewalk connections along Lancaster Pike from West Court Drive to DuPont Road. The project area includes study intersections along Lancaster Pike (the intersections with Chestnut Run/Site Entrance C, Imperial Drive, Court Drive, Farmers Market Entrance, N. DuPont Road, and S. DuPont Road). The project will evaluate the appropriate design needs for the missing links and non-compliant features within the project area. Construction is anticipated to begin in Fall 2020 and end in Summer 2021.

As part of the PAR Program project, DelDOT also has a planned speed reduction resolution along Lancaster Pike from the Chestnut Run/Site Entrance C intersection to the S. DuPont Road intersection. The speed limit in this area will be reduced from 40 mph to 30 mph. Implementation of the speed reduction is dependent on the PAR project schedule.

The DelDOT Pavement and Rehabilitation project *Rehabilitation of Centre Road – Route 141* (Contract #T201706102) includes the reconstruction of Centre Road from Lancaster Pike to Montchanin Road and the associated Delaware Route 52/Kennett Pike ramps. The project also includes the reconstruction of the multi-use path along northbound Centre Road from Barley Mill Plaza to the eastbound Delaware Route 52 ramp. The Centre Road intersections with Lancaster Pike and Montchanin Road will have curb reconstruction and the pavement will be milled and overlaid. Additionally, crosswalks and pedestrian signals will be added along each approach to the Centre Road and Lancaster Pike intersection. This project is under construction and is anticipated to be completed by Fall 2019.

The DelDOT *Chestnut Run Plaza Pedestrian Improvements* project (Contract # T201801102.01) will install pedestrian facilities to improve connectivity along Centre Road and Lancaster Pike. Specifically, a pedestrian path with varying widths between 8 feet and 10 feet will be installed starting from the easterly side of the Centre Road/Mall Road intersection and ending at the southerly side of the Lancaster Pike/Site Entrance C intersection. Crosswalks will be added along the easterly side of the Centre Road/Mall Road intersection and the Center Road/Plaza Road intersection as well as along the southerly side of the Lancaster Pike/Site Entrance C intersection. The construction bid for this project is under advertisement and a construction start date has not been established.

Per a report generated by Senate Resolution No. 10, to study and make recommendations regarding truck traffic and freight movements along SR 41, SR 48, and SR 7, dated January 12, 2018, a Road Safety Audit has been done along Lancaster Pike. The audit report considers study intersections along Lancaster Pike at Hercules Road, Centerville Road, Harlech Drive/Hedgerow Place, Courtney Drive, and Downs Drive. The report recommends that signal warrant studies be conducted for the Lancaster Pike intersections with Courtney Drive and Harlech Drive/Hedgerow Place, and that a traffic engineering study be conducted to determine any potential improvements for intersections on Lancaster Pike that are currently operating at LOS E or worse.

DelDOT's 2012 Hazard Elimination Program (HEP) identified one location within the study area. The 2012 HEP Site X is a 0.29-mile corridor located along Barley Mill Road from 0.03 miles east of Overbrook Road to Delaware Route 141. The Site X Task I report includes a crash summary, a review of the Barley Mill Road corridor, and an assessment of the intersection of Barley Mill Road and Delaware Route 141. The Task I report recommended signing and striping improvements throughout the corridor. Additionally, the Task I report stated that capacity improvements at the Centre Road/Lancaster Pike intersection be considered as part of a long-term intersection improvement project.

A collaborative effort by DelDOT, WILMAPCO (Wilmington Area Planning Council), Delaware Greenways, Inc., and other groups developed the Corridor Management Plan in March 2005 for Delaware's Brandywine Valley National Scenic Byway. This was done as part of the Delaware Byways Program. The Delaware Byways Program includes the identification, promotion, preservation, and enhancement of Delaware roadways with at least one of the following qualities: scenic, historic, natural, cultural, recreational, and archaeological. Delaware's Brandywine Valley National Scenic Byway is an approximately 12.25-mile long section of roadway starting from

Rodney Square in Wilmington traveling on Delaware Route 52 and Delaware Route 100 to the Delaware-Pennsylvania State Line. Montchanin Road is part of this byway. A recommendation from the plan for Montchanin Road is to preserve the existing alignment and historical character of the roadway, including preserving its two travel lanes without shoulders and narrow intersection widths.

In August 2016, the Wilmington Area Planning Council (WILMAPCO), DelDOT, and the New Castle County Department of Land Use, established the *SR 141 Corridor 20-Year Land Use and Transportation Plan*. The goal of the plan was to develop a vision for the SR 141 corridor, between SR 2 and US 202, and create recommendations to address current and future land use and transportation needs. Per the plan, the transportation elements along the SR 141 corridor should improve safety, limit congestion, and enhance multi-modal mobility with providing transit, bike trails, and pedestrian facilities. The plan recommends retaining SR 141 as four-lane (two lanes in each direction) as well as maintaining the at-grade signalized intersections to discourage through traffic.

Livable Delaware

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

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

The proposed development is located within the Investment Level 1 area.

Investment Level 1

Investment Level 1 areas are often municipalities, towns, or urban/urbanizing places in counties where density is generally higher than in surrounding areas. In Investment Level 1 Areas, state investments and policies should support and encourage a wide range of uses and densities, promote other transportation options, foster efficient use of existing public and private investments, and enhance community identity and integrity. Overall, it is the state's intent to use its spending and management tools to maintain and enhance community character, to promote well-designed and efficient new growth, and to facilitate redevelopment in Investment Level 1 Areas.

In Level 1 Areas the state's first priority will be for preserving existing facilities and making safety improvements. Level 1 areas will also be the highest priority for context sensitive transportation system capacity enhancements, transit-system enhancements, ADA accessibility, and for closing gaps in the pedestrian system, including the Safe Routes to School projects. Further, Level 1 areas are the first priority for planning projects and studies, bicycle facilities, signal-system enhancements, and the promotion of interconnectivity between neighborhoods and public facilities.

Proposed Development's Compatibility with Livable Delaware:

The proposed development is located in the Investment Level 1 area. According to Livable Delaware, Level 1 areas support and encourage a wide range of uses and densities to promote well-designed and efficient new growth, and to facilitate redevelopment. Therefore, the proposed

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

Comprehensive Plans

(Source: New Castle County 2012 Comprehensive Plan Update)

New Castle County Comprehensive Plan:

Per the *New Castle County Comprehensive Plan*, the existing land use of the subject property is Office Regional (OR) and the future land use is Office/Commercial/Industrial Development Area (OCI).

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

The proposed development will consist of office, residential, and retail uses. As such, the proposed use appears to be generally compatible 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 Building), Land Use Code 820 (Shopping Center), Land Use Code 220 (Multi-family Housing, Low-Rise), and Land Use Code 221 (Multi-family Housing, Mid-Rise).

The peak period trip generation utilized in the TIS for the proposed development is included in Table 1.

Table 1
Barley Mill Plaza Trip Generation

Existing Land Use

Land Use	ADT	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
556,696 SF Office (ITE Code 710)	5,610	473	77	550	93	489	582	159	136	295
Net New Trips	5,610	473	77	550	93	489	582	159	136	295

Proposed Land Use

Land Use	ADT	AM Peak Hour			PM Peak Hour			SAT Peak Hour		
		In	Out	Total	In	Out	Total	In	Out	Total
160,800 SF Office (ITE Code 710)	1,682	153	25	178	29	150	179	46	39	85
152,200 SF Shopping Center (ITE Code 820)	7,999	141	87	228	355	386	741	449	414	863
33 Units Multi-family Housing, Low-Rise (ITE Code 220)	209	4	13	17	14	8	22	11	12	23
80 Units Multi-family Housing, Mid-Rise (ITE Code 221)	434	7	21	28	22	14	36	19	21	40
Total Trips	10,324	305	146	451	420	558	978	525	486	1,011
Internal Capture	0	-14	-14	-28	-55	-55	-110	-31	-31	-62
Pass-By Trips	0	0	0	0	-111	-123	-234	-115	-102	-216
Net New Trips	10,324	291	132	423	254	380	634	379	353	733

Intersections examined:

1. Site Entrance A/Centre Road (Delaware Route 141)/Barley Mill Road (New Castle Road 259)
2. Site Entrance B/Centre Road (Delaware Route 141)
3. Site Entrance C/Lancaster Pike (Delaware Route 48)
4. Barley Mill Road (New Castle Road 271)/Kennett Pike (New Castle Road 9)*
5. Barley Mill Road/Montchanin Road (New Castle Road 225)
6. Barley Mill Road/Old Barley Mill Road (New Castle Road 266)
7. Centre Road/Lancaster Pike
8. Centre Road/Plaza Road
9. Centre Road/Mall Road/ Ferris School Entrance
10. Centre Road/Faulkland Road (New Castle Road 270)
11. Lancaster Pike/Downs Drive
12. Lancaster Pike/Courtney Drive
13. Lancaster Pike/Harlech Drive/Hedgerow Place
14. Centerville Road (New Castle Road 273)/Lancaster Pike
15. Lancaster Pike/Hercules Road (New Castle Road 282)
16. Lancaster Pike/Imperial Drive
17. Lancaster Pike/Court Drive
18. Lancaster Pike/Farmer Market Entrance
19. Lancaster Pike/N. DuPont Road (New Castle Road 52)
20. Lancaster Pike/S. DuPont Road (New Castle Road 27)
21. Barley Mill Road/Old Centre Road
22. Barley Mill Road/Overbrook Road
23. Barley Mill Road/Barley Drive/Fairthorne Avenue

*Note: Per the April 26, 2019 Scoping Meeting Memorandum by DelDOT, the Barley Mill Road/Kennett Pike intersection was not required to be included in the analysis.

Conditions examined:

1. Case 1 – Existing (2019)
2. Case 2 – 2023 without development
3. Case 3 – 2023 with the existing 556,696 square footage of office space reoccupied
4. Case 4 – 2023 with development

Peak hours evaluated: Weekday morning, weekday evening, and Saturday mid-day

Committed Developments considered:

1. AstraZeneca Fairfax Expansion (1,763,746 SF Research and Development Center).
2. DuPont Experimental Station Expansion (1,069,974 SF office space)
3. Boxwood Industrial Park (3,045,709 SF industrial park)
4. Delle Donne Corporate Center Addition (49,848 SF office space)
5. Little Falls Centre; Lots 1 & 2 (26,550 SF office space)

6. Little Falls Centre; Lot 9B (55,025 SF office space)
7. Little Falls Centre; Lot 10 (282,008 SF office space)
8. DuPont Chestnut Run Plaza (284,950 SF office space)
9. Tatnall School Expansion (37,736 SF additions to existing private school)
10. Hercules/Ashland Corporate Facility Expansion (50,500 SF office space and 80,000 SF warehouse space)
11. Greenville Center Additions (14,400 SF retail, 14,400 SF office space, 3,469 SF post office additions, and 3,680 SF bank with drive-thru; 16,846 SF of office space will be removed)
12. Montchanin Corporate Center Addition (32,245 SF office space)
13. LA Associates Expansion (41,106 SF office additions)
14. Limerick (23 unbuilt single-family detached housing units)

Intersection Descriptions

1. Site Entrance A/Centre Road (Delaware Route 141)/Barley Mill Road (New Castle Road 259)

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (Barley Mill Road) Existing one shared left turn/through lane and one channelized right turn lane

Westbound Approach: (Site Entrance A) Existing one shared left turn/through lane and one channelized right turn lane

Northbound Approach: (Centre Road) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

Southbound Approach: (Centre Road) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

2. Site Entrance B/Centre Road (Delaware Route 141)

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

Westbound Approach: (Site Entrance B) Proposed one right turn lane, stop controlled

Northbound Approach: (Centre Road) Existing two through lanes, proposed two through lanes and one right turn lane

Southbound Approach: (Centre Road) Existing two through lanes

3. Site Entrance C/Lancaster Pike (Delaware Route 48)

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (Lancaster Pike) Existing two left turn lanes, two through lanes, and one channelized right turn lane, yield controlled

Westbound Approach: (Lancaster Pike) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

Northbound Approach: (Chestnut Run) Existing two left turn lanes, one through lane, and one channelized right turn lane, yield controlled

Southbound Approach: (Site Entrance C) Existing two left turn lanes, one through lane, and two channelized right turn lanes, yield controlled

4. **Barley Mill Road/Montchanin Road (New Castle Road 225)**

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (Barley Mill Road) Existing one left turn lane, one through lane, and one shared through/right turn lane

Westbound Approach: (Barley Mill Road) Existing one left turn lane, two through lanes, and one right turn lane

Northbound Approach: (Montchanin Road) Existing one left turn lane, one through lane, and one channelized right turn lane, yield controlled

Southbound Approach: (Montchanin Road) Existing one left turn lane, one through lane, and one channelized right turn lane, signal controlled

5. **Barley Mill Road/Old Barley Mill Road (New Castle Road 266)**

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

Eastbound Approach: (Barley Mill Road) Existing one left turn lane and two through lanes

Westbound Approach: (Barley Mill Road) Existing one through lane and one shared through/right turn lane

Southbound Approach: (Old Barley Mill Road) Existing one shared left turn/right turn lane

6. **Centre Road (Delaware Route 141)/Lancaster Pike (Delaware Route 48)**

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (Lancaster Pike) Existing two left turn lanes, two through lanes, and one channelized right turn lane

Westbound Approach: (Lancaster Pike) Existing two left turn lanes, two through lanes, and one channelized right turn lane, yield controlled

Northbound Approach: (Centre Road) Existing two left turn lanes, two through lanes, and one channelized right turn lane, yield controlled

Southbound Approach: (Centre Road) Existing two left turn lanes, two through lanes, and one right turn lane

7. **Centre Road (Delaware Route 141)/Plaza Road**

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (Plaza Road) Existing one left turn lane, one shared left turn/through lane and one channelized right turn lane

Westbound Approach: (Plaza Road) Existing one shared left turn/through lane and one channelized right turn lane

Northbound Approach: (Centre Road) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

Southbound Approach: (Centre Road) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

8. Centre Road (Delaware Route 141)/Mall Road/ Ferris School Entrance

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (Ferris School Entrance) Existing one shared left turn/through/right turn lane

Westbound Approach: (Mall Road) Existing one shared left turn/through lane and one channelized right turn lane, yield controlled

Northbound Approach: (Centre Road) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

Southbound Approach: (Centre Road) Existing one left turn lane, two through lanes, and one right turn lane

9. Centre Road (Delaware Route 141)/Faulkland Road (New Castle Road 270)

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (Faulkland Road) Existing two left turn lanes, two through lanes, and one channelized right turn lane, yield controlled

Westbound Approach: (Faulkland Road) Existing two left turn lanes, two through lanes, and one channelized right turn lane, yield controlled

Northbound Approach: (Centre Road) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

Southbound Approach: (Centre Road) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

10. Lancaster Pike (Delaware Route 48)/Downs Drive

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

Eastbound Approach: (Lancaster Pike) Existing two through lanes, one channelized right turn lane, yield controlled

Westbound Approach: (Lancaster Pike) Existing one left turn lane and two through lanes

Northbound Approach: (Downs Drive) Existing one left turn lane and one channelized right turn lane, stop controlled

11. Lancaster Pike (Delaware Route 48)/Courtney Drive

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

Eastbound Approach: (Lancaster Pike) Existing two through lanes

Westbound Approach: (Lancaster Pike) Existing two through lanes and one channelized right turn lane

Southbound Approach: (Courtney Drive) Existing one right turn lane, stop controlled

12. Lancaster Pike (Delaware Route 48)/Harlech Drive/Hedgerow Place

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

Eastbound Approach: (Lancaster Pike) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

Westbound Approach: (Lancaster Pike) Existing one left turn lane, two through lanes, and one right turn lane

Northbound Approach: (Harlech Drive) Existing one channelized right turn lane, stop controlled

Southbound Approach: (Hedgerow Place) Existing one channelized right turn lane, stop controlled

13. Centerville Road (New Castle Road 273)/Lancaster Pike (Delaware Route 48)

Type of Control: Existing signalized intersection (four-leg intersection)

Eastbound Approach: (Lancaster Pike) Existing one left turn lane, two through lanes, and one channelized right turn lane, yield controlled

Westbound Approach: (Lancaster Pike) Existing two left turn lanes, two through lanes, and one channelized right turn lane, yield controlled

Northbound Approach: (Centerville Road) Existing one left turn lane, one shared left turn/through lane, one through lane, and one channelized right turn lane

Southbound Approach: (Centerville Road) Existing one left turn lane, one shared left turn/through lane, one through lane, and one channelized right turn lane

14. Lancaster Pike (Delaware Route 48)/Hercules Road (New Castle Road 282)

Type of Control: Existing signalized intersection (T- intersection)

Eastbound Approach: (Lancaster Pike) Existing two through lanes and one channelized right turn lane, yield controlled

Westbound Approach: (Lancaster Pike) Existing two left turn lanes and one through lane

Northbound Approach: (Hercules Road) Existing one left turn lane and two right turn lanes

15. Lancaster Pike (Delaware Route 48)/Imperial Drive

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

Eastbound Approach: (Lancaster Pike) Existing one through lane and one shared through/right turn lane

Westbound Approach: (Lancaster Pike) Existing one shared left turn/through lane and one through lane

Southbound Approach: (Imperial Drive) Existing one shared left turn/right turn lane, stop controlled

16. Lancaster Pike (Delaware Route 48)/Court Drive

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

Eastbound Approach: (Lancaster Pike) Existing one through lane and one shared through/right turn lane

Westbound Approach: (Lancaster Pike) Existing shared left turn/through lane and one through lane

Northbound Approach: (Court Drive) Existing one shared left turn/right turn lane, stop controlled

17. Lancaster Pike (Delaware Route 48)/Farmer Market Entrance

Type of Control: Existing signalized intersection (T-intersection)

Eastbound Approach: (Lancaster Pike) Existing one left turn lane and two through lanes

Westbound Approach: (Lancaster Pike) Existing two through lanes and one channelized right turn lane, yield controlled

Southbound Approach: (Farmer Market Entrance) Existing one left turn lane and one channelized right turn lane, yield controlled

18. Lancaster Pike (Delaware Route 48)/N. DuPont Road (New Castle Road 52)

Type of Control: Existing signalized intersection (T-intersection)

Eastbound Approach: (Lancaster Pike) Existing one shared left turn/through lane and one through lane

Westbound Approach: (Lancaster Pike) Existing one through lane and one shared through/right turn lane

Southbound Approach: (N. DuPont Road) Existing one left turn lane and one channelized right turn lane, yield controlled

19. Lancaster Pike (Delaware Route 48)/S. DuPont Road (New Castle Road 27)

Type of Control: Existing signalized intersection (T-intersection)

Eastbound Approach: (Lancaster Pike) Existing one through lane and one shared through/right turn lane

Westbound Approach: (Lancaster Pike) Existing one shared left turn/through lane and one through lane

Northbound Approach: (S. DuPont Road) Existing one left turn lane and one right turn lane

20. Barley Mill Road/Old Centre Road

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

Eastbound Approach: (Barley Mill Road) Existing one shared through/right turn lane, yield controlled

Westbound Approach: (Barley Mill Road) Existing one shared left turn/through lane

Southbound Approach: (Old Centre Road) Existing one shared left turn/right turn lane, stop controlled

21. Barley Mill Road/Overbrook Road

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

Eastbound Approach: (Barley Mill Road) Existing one shared left turn/through/right turn lane

Westbound Approach: (Barley Mill Road) Existing one shared left turn/through/right turn lane

Northbound Approach: (Overbrook Road) Existing one shared left turn/through/right turn lane, stop controlled

Southbound Approach: (Overbrook Road) Existing one shared left turn/through/right turn lane, stop controlled

22. Barley Mill Road/Barley Drive/Fairthorne Avenue

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

Eastbound Approach: (Barley Mill Road) Existing one left turn lane and one shared through/right turn lane

Westbound Approach: (Barley Mill Road) Existing one left turn lane and one shared through/right turn lane

Northbound Approach: (Barley Drive) Existing one shared left turn/through/right turn lane, stop controlled

Southbound Approach: (Fairthorne Avenue) Existing one shared left turn/through/right turn lane, stop controlled

Transit, Pedestrian, and Bicycle Facilities

Existing transit service: Delaware Transit Corporation (DTC) currently provides existing services via DART Routes 4, 18, and 20 within the study area. Per Gateway, bus stops exist along Lancaster Pike at the intersections with Centerville Road, Hedgerow Place/Harlech Drive, Downs Drive, Court Drive, Farmers Market Entrance, N. DuPont Road, and S. DuPont Road, as well as at the on-site roundabout.

Planned transit service: JMT contacted Mr. David Dooley, Planner at the DTC. Per email correspondence on June 5, 2019 from Mr. Dooley, DART currently does not have transit service along Centre Road but plans to implement service along that roadway in the future. As such, adjacent to the site frontage, one new bus stop should be installed along northbound Centre Road

and two new bus stops should be installed along southbound Centre Road. One new bus stop should be installed along both eastbound and westbound Lancaster Pike adjacent to the site frontage. A 5 foot by 8 foot bus pad with a sidewalk connection to a pedestrian pathway is recommended to be installed. The developer should coordinate with DART to determine the exact location of the new bus stops.

Existing bicycle and pedestrian facilities: According to DelDOT's *New Castle County Bicycle Map*, regional and connector bicycle routes exist within the study area. The regional bicycle route exists along Faulkland Road and S. DuPont Road and traverses through two of the study intersections (Faulkland Road/Centre Road and S. DuPont Road/ Lancaster Pike). The connector bicycle routes exist along Delaware Route 4, Centre Road, and Barley Mill Road and traverse through all of the study intersections except for the Barley Mill Road intersection with Old Barley Mill Road. Pedestrian facilities exist at seven of the Lancaster Pike intersections (Centerville Road, Harlech Drive/Hedgerow Place, Courtney Drive, Site Entrance C, Farmer Market Entrance, N. DuPont Road, and S. DuPont Road) and three of the Centre Road intersections (Faulkland Road, Site Entrance A/Barley Mill Road, and Montchanin Road). Construction is currently underway for the addition of pedestrian facilities at the Lancaster Pike intersection with Centre Road.

Planned bicycle and pedestrian facilities: Per email correspondence on June 7, 2019 from Ms. Maria Andaya, DelDOT's Pedestrian Coordinator, the following improvements were recommended:

- A 10-foot wide shared use path with a minimum 5-foot buffer from edge of pavement should be provided along the Lancaster Pike and Centre Road site frontages.
- The site shall dedicate right-of-way per the roadway classification and establish a 15-foot wide permanent easement along the Lancaster Pike and Centre Road site frontages.
- All entrance, roadway and/or intersection improvements required shall incorporate bicycle and pedestrian facilities.

Bicycle Level of Service and Bicycle Compatibility Index: According to the League of Illinois Bicyclists (LIB), Bicycle Level of Service (BLOS) is an emerging national standard for quantifying the bike-friendliness of a roadway by measuring on-road bicyclist comfort levels for specific roadway geometries and traffic conditions. Utilizing the 10-year projected AADT along the Lancaster Pike site frontage with a 45 miles per hour speed limit and the provision of a 5-foot wide bike lane, the BLOS with the build out construction of the proposed development is summarized below. Utilizing the 10-year projected AADT along the Centre Road site frontage with a 50 miles per hour speed limit and the provision of a 5-foot wide bike lane, the BLOS with the build out construction of the proposed development is summarized below. The BLOS was determined utilizing the calculators published on the LIB website: <http://rideillinois.org/blos/blosform.htm>

- Lancaster Pike – BLOS: C (2.51-3.50)
- Centre Road – BLOS: C (2.51-3.50)

Previous Comments

None

General Analysis Comments

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

1. For the analysis, Synchro 10 software was used by the TIS and JMT. Signalized and unsignalized intersection results were based on HCM 6th Edition methodology.
2. Per DelDOT's *Development Coordination Manual*, JMT used a heavy vehicle percentage of 3% for each movement in the Cases 2, 3, and 4 future scenario analyses, unless the existing heavy vehicle percentage was greater than 3% and there was no significant increase of vehicles along that movement, in which case the existing heavy vehicle percentage was used for analysis of future scenarios. The TIS used different heavy vehicle percentages.
3. Per DelDOT's *Development Coordination Manual*, JMT utilized the existing PHF for Case 1 and a future PHF for Cases 2, 3, and 4 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 TIS used different PHF.
4. JMT utilized updated Cases 1, 2, 3 and 4 volumes. The updated volumes were calculated to address volume development inconsistencies identified in the TIS report.
5. At signalized intersections, JMT incorporated pedestrian phasing when applicable, whereas the TIS did not.

Table 2
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
Site Entrance A/Centre Road (Delaware Route 141)/Barley Mill Road (New Castle Road 259) ²	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)	B (16.7)	B (11.6)	A (7.4)	C (25.6)	B (19.2)	A (9.8)
2023 without Development (Case 2)	D (37.6)	D (37.1)	A (8.2)	E (75.2)	E (73.7)	A (8.7)
2023 with Existing Office Space Reoccupied (Case 3)	F (85.9)	D (48.9)	B (11.3)	F (143.9)	F (95.2)	B (11.5)
2023 with Development (Case 4)	F (85.0)	E (65.3)	C (28.5)	F (153.1)	F (142.1)	D (38.3)
2023 with Development and Mitigation ³ (Case 4)	E (71.5)	D (54.3)	C (21.6)	D (43.7)	D (36.9)	C (24.2)

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

² Consistent with DelDOT standards, JMT utilized phase order and timings from the DelDOT timing plan sheets, whereas the TIS did not.

³ Mitigation used in the TIS included signal optimization. JMT applied signal optimization, as well as provided three through lanes along northbound and southbound Centre Road.

Table 3
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2023 with Development (Case 4)						
Site Entrance B Right-Out	E (37.5)	E (36.2)	C (16.8)	F (60.2)	E (41.6)	C (21.0)

Table 4
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
Site Entrance C/Lancaster Pike (Delaware Route 48) ^{4,5}	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)	D (37.0)	C (30.1)	A (8.0)	E (78.0)	D (51.2)	D (41.0)
2023 without Development (Case 2)	D (42.6)	C (32.8)	B (12.5)	F (88.7)	E (56.5)	D (43.1)
2023 with Existing Office Space Reoccupied (Case 3)	E (63.2)	D (43.3)	C (21.7)	F (116.5)	E (56.9)	D (44.2)
2023 with Development (Case 4)	E (55.5)	D (43.5)	C (33.5)	F (107.2)	E (56.6)	D (46.3)
2023 with Development and Mitigation ⁶ (Case 4)	D (42.7)	D (43.4)	C (33.5)	C (29.8)	C (29.2)	C (16.0)

⁴ JMT modeled the southbound right turn lane as yield controlled consistent with existing field conditions, whereas the TIS modeled the right turn lane as signal controlled.

⁵ Consistent with DelDOT standards, JMT utilized the MAX 1 timings from the DelDOT timing plan sheets, whereas the TIS used different timings.

⁶ Mitigation by the TIS and JMT included signal timing optimization.

Table 5
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Barley Mill Road (New Castle Road 271)/Montchanin Road (New Castle Road 225) ^{7, 8, 9}						
2019 Existing (Case 1)	C (26.6)	C (28.6)	C (20.6)	E (63.6)	F (100.6)	D (54.9)
2023 without Development (Case 2)	C (39.6)	E (62.6)	C (22.4)	F (111.2)	F (152.0)	D (51.3)
2023 with Existing Office Space Reoccupied (Case 3)	D (41.8)	E (66.5)	C (22.5)	F (104.0)	F (155.3)	D (52.0)

⁷ JMT and the TIS configured the northbound Montchanin Road approach as one left turn lane, one through lane, and one right turn lane, consistent with existing field conditions.

⁸ JMT modeled the southbound Montchanin Road right turn lane as channelized and signal controlled consistent with existing conditions, whereas the TIS did not.

⁹ JMT modeled the eastbound and westbound left turning movements as protected, whereas the TIS modeled left turning movements as protected and permissive. JMT modeled the northbound and southbound movements as split phase consistent with field observations, whereas the TIS did not.

Table 5 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Barley Mill Road (New Castle Road 271)/Montchanin Road (New Castle Road 225) ^{7, 8, 9}						
2023 with Development (Case 4)	D (41.5)	E (69.8)	C (22.6)	F (101.6)	F (158.2)	D (53.1)
2023 with Development and <i>Improvement Option 1</i> ¹⁰ (Case 4)	-	-	-	E (72.7)	F (91.6)	D (36.3)
2023 with Development and <i>Improvement Option 2</i> ¹¹ (Case 4)	-	-	-	E (58.4)	E (71.8)	C (26.1)

¹⁰ JMT Improvement Option 1 includes providing two right turn lanes along the southbound Montchanin Road approach and signal timing optimization.

¹¹ JMT Improvement Option 2 includes providing two right turn lanes along the southbound Montchanin Road approach, modifying the signal phasing along the eastbound and westbound approaches to provide protected and permissive left turn phasing, and modifying the northbound and southbound approaches from split phase to concurrent operation with protected left turn phasing. Signal timing optimization was also performed.

Table 5 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT (HCS)		
Barley Mill Road (New Castle Road 271)/Montchanin Road (New Castle Road 225) ^{7, 8, 9, 12, 13}	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2023 with Development (Case 4)				F (215.7)	F (372.5)	D (48.5)
2023 with Development and Improvement Option 1 ¹⁰ (Case 4)	-	-	-	F (95.0)	F (80.3)	D (48.4)
2023 with Development and Improvement Option 2 ¹¹ (Case 4)	-	-	-	F (87.9)	E (63.7)	D (39.8)

¹² JMT performed an additional analysis of the intersection in HCS7 software to supplement the Synchro analysis.

¹³ The HCS analysis applied an Arrival Type of 4 along eastbound and westbound Barley Mill Road to account for the signalized coordinated network of the corridor.

Table 6
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)						
Eastbound Barley Mill Road Left Turn	B (11.1)	B (13.3)	A (8.9)	B (11.8)	B (14.6)	A (9.1)
Southbound Barley Mill Road Approach	B (12.8)	C (16.7)	B (10.4)	B (13.6)	C (18.7)	B (10.7)
2023 without Development (Case 2)						
Eastbound Barley Mill Road Left Turn	B (13.8)	C (24.2)	B (10.2)	B (14.7)	D (27.7)	B (10.4)
Southbound Barley Mill Road Approach	C (15.5)	D (31.8)	B (12.0)	C (16.8)	E (36.7)	B (12.1)
2023 with Existing Office Space Reoccupied (Case 3)						
Eastbound Barley Mill Road Left Turn	B (14.4)	C (24.5)	B (10.3)	C (15.4)	D (28.2)	B (10.5)
Southbound Barley Mill Road Approach	C (16.1)	D (32.2)	B (12.1)	C (17.6)	E (37.0)	B (12.3)
2023 with Development (Case 4)						
Eastbound Barley Mill Road Left Turn	B (14.2)	C (25.0)	B (10.5)	C (15.2)	D (28.6)	B (10.7)
Southbound Barley Mill Road Approach	C (15.9)	D (33.0)	B (12.3)	C (17.3)	E (37.8)	B (12.4)

Table 7
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
Centre Road/Lancaster Pike ¹⁴	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)	F (145.7)	D (45.5)	D (35.9)	F (95.6)	F (92.6)	D (40.9)
2023 without Development (Case 2)	F (190.4)	E (79.3)	D (38.1)	F (181.1)	F (135.7)	D (38.8)
2023 with Existing Office Space Reoccupied (Case 3)	F (208.3)	F (88.6)	D (39.6)	F (194.6)	F (150.0)	D (39.0)
2023 with Development (Case 4)	F (203.9)	F (90.7)	D (41.7)	F (191.8)	F (140.4)	D (40.2)
2023 with Development and <i>Mitigation</i> ¹⁵ (Case 4)	F (99.2)	F (88.4)	D (40.2)	F (99.9)	F (85.6)	D (52.5)

¹⁴ Signal timings utilized at this intersection have been optimized.

¹⁵ TIS mitigation includes signal timing optimization. JMT mitigation includes signal timing optimization and the provision of three left turn lanes along eastbound Lancaster Pike and three through lanes along northbound and southbound Centre Road.

Table 8
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
Centre Road/Plaza Road ^{16,17,18}	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)	A (6.4)	C (23.2)	A (3.8)	A (7.1)	C (24.4)	A (4.3)
2023 without Development (Case 2)	B (16.9)	E (54.8)	A (6.5)	B (13.7)	D (40.8)	A (4.8)
2023 with Existing Office Space Reoccupied (Case 3)	C (20.2)	E (64.5)	A (6.5)	B (16.3)	D (49.5)	A (4.8)
2023 with Development (Case 4)	B (18.8)	E (61.8)	A (6.6)	B (15.1)	D (47.1)	A (4.8)

¹⁶ JMT modeled the eastbound approach as one left turn lane, one shared through/left turn lane and one channelized right turn lane consistent with existing field conditions, whereas the TIS modeled the approach as two left turn lanes and one shared through/right turn lane

¹⁷ JMT modeled the westbound right turn lane as free-flow consistent with existing field conditions, whereas the TIS modeled it as yield controlled.

¹⁸ JMT and the TIS modeled the eastbound and westbound approaches as split phase. However, JMT had the westbound approach first consistent with the DelDOT timing plan, whereas the TIS did not.

Table 9
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
Centre Road/Mall Road/Ferris School Entrance ¹⁹	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)	A (4.2)	B (11.7)	A (2.6)	A (4.6)	B (11.9)	A (3.0)
2023 without Development (Case 2)	A (8.2)	C (21.4)	A (2.8)	A (8.3)	B (17.2)	A (3.2)
2023 with Existing Office Space Reoccupied (Case 3)	B (10.5)	C (29.6)	A (2.9)	B (10.1)	C (23.9)	A (3.2)
2023 with Development (Case 4)	A (9.2)	C (27.5)	A (2.9)	A (9.2)	C (21.5)	A (3.3)

¹⁹ JMT configured the eastbound approach as one shared left turn/through/right turn lane consistent with existing field conditions, whereas the TIS configured the eastbound approach as one shared left turn/through lane and one right turn lane.

Table 10
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Centre Road/Faulkland Road (New Castle Road 270)						
2019 Existing (Case 1)	D (46.8)	D (44.4)	D (37.4)	D (52.9)	E (57.2)	C (34.1)
2023 without Development (Case 2)	F (99.1)	E (70.1)	D (42.0)	F (96.5)	F (81.1)	C (34.5)
2023 with Existing Office Space Reoccupied (Case 3)	F (113.9)	F (81.1)	D (42.1)	F (109.6)	F (91.5)	C (34.4)
2023 with Development (Case 4)	F (107.9)	E (78.4)	D (42.3)	F (104.4)	F (89.0)	C (34.5)
2023 with Development and Mitigation ²⁰ (Case 4)	-	-	-	D (53.5)	D (52.3)	C (31.7)

²⁰ JMT mitigation includes signal timing optimization and the provision of two left turn lanes along the northbound and southbound Centre Road approaches.

Table 11
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Lancaster Pike/Downs Drive ^{21,22}						
2019 Existing (Case 1)						
Westbound Lancaster Pike Left Turn	C (18.8)	B (12.7)	A (9.7)	C (18.8)	B (12.7)	A (9.7)
Northbound Downs Drive Left Turn	F (484.7)	F (143.6)	D (29.7)	F (91.0)	E (35.3)	C (18.3)
Northbound Downs Drive Right Turn	C (21.8)	B (14.5)	B (12.4)	C (21.8)	B (14.5)	B (12.4)
Northbound Downs Drive Approach	F (121.0)	E (46.8)	B (14.6)	E (36.6)	C (19.7)	B (13.1)
2023 without Development (Case 2)						
Westbound Lancaster Pike Left Turn	D (27.0)	C (16.1)	B (10.5)	D (27.1)	C (16.9)	B (11.0)
Northbound Downs Drive Left Turn	F (2362.8)	F (548.1)	E (44.2)	F (192.1)	F (57.3)	C (23.9)
Northbound Downs Drive Right Turn	D (31.2)	C (17.8)	B (13.7)	D (32.1)	C (18.2)	B (14.1)
Northbound Downs Drive Approach	F (538.1)	F (176.9)	C (19.4)	F (64.1)	D (30.2)	C (16.1)

²¹ JMT modeled the northbound right turn lane as stop controlled consistent with existing field conditions, whereas the TIS modeled the right turn lane as yield controlled.

²² JMT incorporated a two-stage left turn for the northbound approach, whereas the TIS did not.

Table 11 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Lancaster Pike/Downs Drive ^{21, 22}						
2023 with Existing Office Space Reoccupied (Case 3)						
Westbound Lancaster Pike Left Turn	D (29.4)	C (16.3)	B (10.7)	D (29.6)	C (17.1)	B (11.2)
Northbound Downs Drive Left Turn	F (2362.8)	F (630.8)	E (48.0)	F (238.1)	F (59.7)	C (24.7)
Northbound Downs Drive Right Turn	D (34.0)	C (18.1)	B (13.9)	E (35.0)	C (18.4)	B (14.4)
Northbound Downs Drive Approach	F (540.3)	F (201.9)	C (20.3)	F (75.6)	D (31.1)	C (16.5)
2023 with Development (Case 4)						
Westbound Lancaster Pike Left Turn	D (28.4)	C (16.7)	B (10.9)	D (28.6)	C (17.5)	B (11.5)
Northbound Downs Drive Left Turn	F (2362.8)	F (630.8)	F (53.1)	F (224.7)	F (61.4)	D (26.0)
Northbound Downs Drive Right Turn	D (32.9)	C (18.4)	B (14.3)	D (33.8)	C (18.8)	B (14.8)
Northbound Downs Drive Approach	F (539.4)	F (202.1)	C (21.6)	F (72.0)	D (31.9)	C (17.0)

Table 12
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Lancaster Pike/Courtney Drive						
2019 Existing (Case 1)						
Southbound Courtney Drive Approach	B (13.9)	C (19.8)	B (11.7)	B (13.9)	C (19.8)	B (11.7)
2023 without Development (Case 2)						
Southbound Courtney Drive Approach	C (17.1)	D (26.3)	B (12.7)	C (17.3)	D (26.1)	B (13.0)
2023 with Existing Office Space Reoccupied (Case 3)						
Southbound Courtney Drive Approach	C (17.3)	D (28.3)	B (12.9)	C (17.5)	D (28.0)	B (13.2)
2023 with Development (Case 4)						
Southbound Courtney Drive Approach	C (17.4)	D (27.8)	B (13.2)	C (17.6)	D (27.5)	B (13.5)

Table 13
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TPD			LOS per JMT		
Lancaster Pike/Harlech Drive/Hedgerow Place	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)						
Eastbound Lancaster Pike Left Turn	A (9.7)	B (14.6)	A (9.1)	A (9.7)	B (14.7)	A (9.1)
Westbound Lancaster Pike Left Turn	B (14.5)	B (10.6)	A (8.9)	B (14.5)	B (10.6)	A (8.9)
Northbound Harlech Drive Approach	C (16.6)	B (12.4)	B (10.4)	C (16.7)	B (12.5)	B (10.4)
Southbound Hedgerow Place Approach	B (11.4)	C (16.6)	B (10.7)	B (11.4)	C (16.6)	B (10.7)
2023 without Development (Case 2)						
Eastbound Lancaster Pike Left Turn	B (11.4)	C (19.9)	A (9.8)	B (11.6)	C (18.9)	B (10.0)
Westbound Lancaster Pike Left Turn	C (19.8)	B (12.8)	A (9.5)	C (19.6)	B (12.7)	A (9.8)
Northbound Harlech Drive Approach	C (21.6)	B (14.9)	B (11.1)	C (21.3)	B (14.7)	B (11.4)
Southbound Hedgerow Place Approach	B (13.4)	C (21.5)	B (11.5)	B (13.6)	C (20.4)	B (11.7)
2023 with Existing Office Space Reoccupied (Case 3)						
Eastbound Lancaster Pike Left Turn	B (11.5)	C (21.7)	A (10.0)	B (11.8)	C (20.5)	B (10.2)
Westbound Lancaster Pike Left Turn	C (21.4)	B (13.0)	A (9.7)	C (21.3)	B (12.8)	A (9.9)
Northbound Harlech Drive Approach	C (23.1)	C (15.0)	B (11.3)	C (22.8)	B (14.9)	B (11.6)
Southbound Hedgerow Place Approach	B (13.5)	C (23.0)	B (11.7)	B (13.7)	C (21.8)	B (11.8)

Table 13 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TPD			LOS per JMT		
Lancaster Pike/Harlech Drive/Hedgerow Place	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2023 with Development (Case 4)						
Eastbound Lancaster Pike Left Turn	B (11.5)	C (21.2)	B (10.2)	B (11.8)	C (20.1)	B (10.4)
Westbound Lancaster Pike Left Turn	C (20.7)	B (13.3)	A (9.9)	C (20.6)	B (13.1)	B (10.2)
Northbound Harlech Drive Approach	C (22.4)	C (15.3)	B (11.5)	C (22.2)	C (15.2)	B (11.8)
Southbound Hedgerow Place Approach	B (13.5)	C (22.7)	B (11.9)	B (13.8)	C (21.5)	B (12.1)

Table 14
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design D

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
Centerville Road (New Castle Road 273)/Lancaster Pike ²³	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)	D (41.7)	D (42.0)	B (18.9)	D (36.3)	D (51.8)	B (18.5)
2023 without Development (Case 2)	D (48.1)	E (75.2)	C (20.5)	D (52.4)	E (58.7)	C (20.1)
2023 with Existing Office Space Reoccupied (Case 3)	D (48.7)	F (88.1)	C (20.6)	E (56.0)	E (67.5)	C (20.2)
2023 with Development (Case 4) ²⁴ (Case 3)	D (48.4)	F (84.6)	C (20.7)	D (54.4)	E (65.1)	C (20.3)
2023 with Development and Improvement ²⁵ (Case 4)	-	-	-	D (41.0)	E (57.0)	B (19.6)
2023 with Development and Improvement and Mitigation ^{25, 26} (Case 4)	-	-	-	D (39.5)	D (47.1)	B (19.0)

²³ Consistent with DelDOT standards, JMT utilized the timings from the DelDOT timing plan sheets, whereas the TIS used different timings.

²⁴ Under Case 4 conditions, the TIS modeled the eastbound Lancaster Pike approach with three through lanes, whereas JMT maintained two through lanes consistent with existing conditions.

²⁵ Improvement includes adding 3 through lanes along eastbound Lancaster Pike per TIS letter dated September 25, 2017 for Delaware National Residential Development, along with signal timing optimization.

²⁶ JMT mitigation includes signal timing optimization and modifying the eastbound Lancaster Pike approach to provide two left turn lanes.

Table 15
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Lancaster Pike/Hercules Road (New Castle Road 282) ^{27,28}						
2019 Existing (Case 1)	C (20.4)	C (20.2)	B (13.9)	F (107.1)	C (22.8)	B (16.7)
2023 without Development (Case 2)	C (31.4)	C (23.8)	B (14.9)	F (106.5)	C (27.3)	B (17.9)
2023 with Existing Office Space Reoccupied (Case 3)	C (34.5)	C (27.2)	B (15.2)	F (115.7)	C (29.6)	B (18.2)
2023 with Development (Case 4)	C (33.2)	C (26.3)	B (15.5)	F (109.3)	C (29.0)	B (17.6)
2023 with Development and <i>Mitigation</i> ²⁹ (Case 4)	-	-	-	D (41.5)	C (26.9)	B (15.0)

²⁷ JMT configured the eastbound approach as two through lanes and one right turn lane consistent with existing field conditions, whereas the TIS modeled the eastbound approach as one through lane and one shared through/right turn lane.

²⁸ JMT modeled the northbound right turn as no right turn permitted on red consistent with existing field conditions, whereas the TIS modeled the northbound right turn as permitted on red.

²⁹ JMT mitigation includes signal timing optimization.

Table 16
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Lancaster Pike/Imperial Drive						
2019 Existing (Case 1)						
Westbound Lancaster Pike Left Turn	B (10.4)	A (9.3)	A (8.2)	B (10.4)	A (9.3)	A (8.2)
Northbound Imperial Drive Approach	B (12.2)	C (16.9)	C (13.0)	B (12.3)	C (16.9)	B (13.0)
2023 without Development (Case 2)						
Westbound Lancaster Pike Left Turn	B (11.3)	B (10.6)	A (8.4)	B (11.5)	B (10.8)	A (8.5)
Northbound Imperial Drive Approach	B (13.3)	C (24.4)	B (14.3)	B (13.4)	D (25.2)	B (14.8)
2023 with Existing Office Space Reoccupied (Case 3)						
Westbound Lancaster Pike Left Turn	B (11.4)	B (11.2)	A (8.5)	A (11.6)	B (11.4)	A (8.6)
Northbound Imperial Drive Approach	B (13.4)	D (27.8)	B (14.9)	B (13.5)	D (28.8)	C (15.4)
2023 with Development (Case 4)						
Westbound Lancaster Pike Left Turn	B (11.5)	B (11.0)	A (8.6)	B (11.6)	B (11.3)	A (8.7)
Northbound Imperial Drive Approach	B (13.5)	D (27.6)	C (15.9)	B (13.6)	D (28.8)	C (16.4)

Table 17
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Lancaster Pike/Court Drive ³⁰						
2019 Existing (Case 1)						
Westbound Lancaster Pike Left Turn	B (10.5)	A (9.6)	A (8.1)	B (10.5)	A (9.7)	A (8.4)
Northbound Court Drive Approach	E (36.1)	C (22.2)	B (12.4)	E (36.9)	C (23.0)	B (12.9)
2023 without Development (Case 2)						
Westbound Lancaster Pike Left Turn	B (11.4)	B (10.9)	A (8.4)	B (11.6)	B (11.1)	A (8.6)
Northbound Court Drive Approach	F (69.2)	E (36.4)	B (13.8)	F (71.4)	E (40.4)	B (14.8)
2023 with Existing Office Space Reoccupied (Case 3)						
Westbound Lancaster Pike Left Turn	B (11.5)	B (11.6)	A (8.4)	B (11.7)	B (11.7)	A (8.6)
Northbound Court Drive Approach	F (83.6)	E (44.7)	B (14.4)	F (83.6)	E (49.5)	C (15.5)
2023 with Development (Case 4)						
Westbound Lancaster Pike Left Turn	B (11.6)	B (11.4)	A (8.6)	B (11.8)	B (11.6)	A (8.8)
Northbound Court Drive Approach	F (82.1)	E (43.8)	C (15.4)	F (82.1)	E (49.0)	C (16.5)

³⁰ Due to the low volumes utilizing the southbound gas station driveway across from the northbound Court Drive approach, JMT did not include the southbound gas station driveway approach in the analysis.

Table 18
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD			LOS per JMT		
Lancaster Pike/Farmer Market Entrance ³¹	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)	A (3.0)	A (4.9)	A (7.8)	B (11.9)	B (13.2)	B (12.5)
2023 without Development (Case 2)	A (3.4)	A (4.8)	A (7.0)	B (13.9)	B (14.0)	B (12.4)
2023 with Existing Office Space Reoccupied (Case 3)	A (3.5)	A (4.8)	A (6.8)	B (14.7)	B (14.2)	B (12.4)
2023 with Development (Case 4)	A (3.5)	A (4.9)	A (6.5)	B (14.4)	B (14.4)	B (12.5)

³¹ JMT configured the westbound approach as two through lanes and one right turn lane consistent with existing field conditions, whereas the TIS configured the approach as one through lane and one shared through/channelized right turn lane.

Table 19
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD ³²			LOS per JMT ³²		
Lancaster Pike/N. DuPont Road (New Castle Road 52)	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)	A (9.8)	B (13.7)	A (6.7)	B (14.3)	B (16.3)	B (11.2)
2023 without Development (Case 2)	B (13.0)	B (16.5)	A (8.1)	C (27.7)	B (19.3)	B (11.8)
2023 with Existing Office Space Reoccupied (Case 3)	B (14.2)	B (18.2)	A (8.9)	D (41.5)	C (21.1)	B (12.0)
2023 with Development (Case 4)	B (13.9)	B (18.2)	B (10.8)	D (35.6)	C (21.5)	B (12.5)

³² LOS and delay results are based on Synchro methodology due to the limitations of HCM 6th edition regarding protected and permissive left turns from a shared lane.

Table 20
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Signalized Intersection ¹	LOS per TPD ³³			LOS per JMT ³³		
Lancaster Pike/S. DuPont Road (New Castle Road 27) ³³	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)	B (15.0)	B (16.7)	B (12.9)	B (14.1)	C (27.4)	B (15.4)
2023 without Development (Case 2)	B (17.3)	C (22.6)	B (13.7)	C (20.1)	C (23.5)	B (12.5)
2023 with Existing Office Space Reoccupied (Case 3)	B (18.6)	C (23.3)	B (13.9)	C (23.3)	C (26.1)	B (13.4)
2023 with Development (Case 4)	B (18.2)	C (24.9)	B (14.4)	B (17.9)	C (26.7)	B (11.3)

³³ JMT utilized signal phase split lengths observed during a June 2019 field visit.

Table 21
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control (T-Intersection) ¹	LOS per TPD			LOS per JMT		
	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
Barley Mill Road/Old Centre Road						
2019 Existing (Case 1)						
Westbound Barley Mill Road Left Turn	A (8.3)	A (8.2)	A (7.4)	A (8.3)	A (8.2)	A (7.4)
Northbound Old Centre Road Approach	B (11.2)	B (10.1)	A (8.7)	B (11.2)	B (10.1)	A (8.7)
2023 without Development (Case 2)						
Westbound Barley Mill Road Left Turn	A (8.5)	A (8.3)	A (7.4)	A (8.3)	A (8.3)	A (7.5)
Northbound Old Centre Road Approach	B (12.0)	B (10.3)	A (8.8)	B (11.2)	B (10.4)	A (8.9)
2023 with Existing Office Space Reoccupied (Case 3)						
Westbound Barley Mill Road Left Turn	A (8.5)	A (8.3)	A (7.4)	A (8.3)	A (8.3)	A (7.5)
Northbound Old Centre Road Approach	B (12.2)	B (10.4)	A (8.9)	B (11.4)	B (10.5)	A (9.0)
2023 with Development (Case 4)						
Westbound Barley Mill Road Left Turn	A (8.5)	A (8.3)	A (7.5)	A (8.3)	A (8.3)	A (7.5)
Northbound Old Centre Road Approach	B (11.9)	B (10.4)	A (8.9)	B (11.3)	B (10.5)	A (9.0)

Table 22
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TPD			LOS per JMT		
Barley Mill Road/Overbrook Road	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)						
Eastbound Barley Mill Road Left Turn	A (7.9)	A (7.8)	A (0.0)	A (8.0)	A (7.8)	A (0.0)
Westbound Barley Mill Road Left Turn	A (0.0)	A (7.5)	A (7.4)	A (0.0)	A (7.5)	A (7.4)
Northbound Overbrook Road Approach	B (10.2)	B (10.1)	A (9.1)	B (10.2)	B (10.1)	A (9.1)
Southbound Overbrook Road Approach	B (13.8)	B (11.2)	A (9.6)	B (13.9)	B (11.2)	A (9.6)
2023 without Development (Case 2)						
Eastbound Barley Mill Road Left Turn	A (8.1)	A (7.9)	A (0.0)	A (7.9)	A (8.0)	A (0.0)
Westbound Barley Mill Road Left Turn	A (0.0)	A (7.6)	A (7.4)	A (0.0)	B (7.6)	A (7.5)
Northbound Overbrook Road Approach	B (10.7)	B (10.4)	A (9.2)	B (10.1)	B (10.5)	A (9.4)
Southbound Overbrook Road Approach	C (15.8)	B (11.8)	A (9.8)	B (13.3)	B (12.0)	B (10.1)
2023 with Existing Office Space Reoccupied (Case 3)						
Eastbound Barley Mill Road Left Turn	A (8.1)	A (8.0)	A (0.0)	A (7.9)	A (8.1)	A (0.0)
Westbound Barley Mill Road Left Turn	A (0.0)	A (7.6)	A (7.4)	A (0.0)	A (7.6)	A (7.5)
Northbound Overbrook Road Approach	B (10.9)	B (10.5)	A (9.3)	B (10.2)	B (10.6)	A (9.5)
Southbound Overbrook Road Approach	C (16.2)	B (12.0)	A (9.8)	B (13.4)	B (12.2)	B (10.2)

Table 22 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TPD			LOS per JMT		
Barley Mill Road/Overbrook Road	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2023 with Development (Case 4)						
Eastbound Barley Mill Road Left Turn	A (8.0)	A (8.0)	A (0.0)	A (0.0)	A (8.0)	A (0.0)
Westbound Barley Mill Road Left Turn	A (0.0)	A (7.6)	A (7.4)	A (7.9)	A (7.6)	A (7.5)
Northbound Overbrook Road Approach	B (10.7)	B (10.5)	A (9.3)	B (10.2)	B (10.7)	A (9.5)
Southbound Overbrook Road Approach	C (15.1)	B (12.0)	B (10.0)	B (13.4)	B (12.2)	B (10.3)

Table 23
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TPD			LOS per JMT		
Barley Mill Road/Barley Drive/Fairthorne Avenue	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2019 Existing (Case 1)						
Eastbound Barley Mill Road Left Turn	A (7.9)	A (7.8)	A (7.3)	A (7.9)	A (7.8)	A (7.3)
Westbound Barley Mill Road Left Turn	A (7.9)	A (7.5)	A (7.3)	A (7.9)	A (7.5)	A (7.4)
Northbound Barley Drive Approach	B (12.6)	B (10.8)	A (8.9)	B (12.7)	B (10.9)	A (9.0)
Southbound Fairthorne Avenue Approach	B (14.9)	B (11.9)	A (9.5)	C (15.1)	B (11.9)	A (9.6)
2023 without Development (Case 2)						
Eastbound Barley Mill Road Left Turn	A (8.1)	A (8.0)	A (7.3)	A (7.9)	A (8.0)	A (7.4)
Westbound Barley Mill Road Left Turn	A (8.1)	A (7.6)	A (7.4)	A (7.9)	A (7.6)	A (7.4)
Northbound Barley Drive Approach	B (14.2)	B (11.3)	A (9.0)	B (12.4)	B (11.4)	A (9.2)
Southbound Fairthorne Avenue Approach	C (17.4)	B (12.6)	A (9.7)	B (14.4)	B (12.7)	B (10.1)
2023 with Existing Office Space Reoccupied (Case 3)						
Eastbound Barley Mill Road Left Turn	A (8.1)	A (8.0)	A (7.4)	A (7.9)	A (8.1)	A (7.4)
Westbound Barley Mill Road Left Turn	A (8.1)	A (7.6)	A (7.4)	A (7.9)	A (7.6)	A (7.5)
Northbound Barley Drive Approach	B (14.5)	B (11.5)	A (9.1)	B (12.6)	B (11.5)	A (9.3)
Southbound Fairthorne Avenue Approach	C (17.9)	B (12.9)	A (9.8)	B (14.6)	B (12.9)	B (10.1)

Table 23 (continued)
Peak Hour Levels Of Service (LOS)
Based on Traffic Impact Study for Barley Mill Plaza
Report Dated: May 7, 2019
Prepared by Traffic Planning & Design

Unsignalized Intersection Two-Way Stop Control ¹	LOS per TPD			LOS per JMT		
Barley Mill Road/Barley Drive/Fairthorne Avenue	Weekday AM	Weekday PM	Saturday	Weekday AM	Weekday PM	Saturday
2023 with Development (Case 4)						
Eastbound Barley Mill Road Left Turn	A (8.0)	A (8.0)	A (7.4)	A (7.9)	A (8.0)	A (7.4)
Westbound Barley Mill Road Left Turn	A (8.1)	A (7.6)	A (7.4)	A (7.9)	A (7.6)	A (7.5)
Northbound Barley Drive Approach	B (13.7)	B (11.5)	A (9.1)	B (12.5)	B (11.6)	A (9.3)
Southbound Fairthorne Avenue Approach	C (16.5)	B (12.9)	A (9.9)	B (14.5)	B (13.0)	B (10.3)