



STATE OF DELAWARE
DEPARTMENT OF TRANSPORTATION

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

October 4, 2010

CAROLANN WICKS, P.E.
SECRETARY

Ms. Sarah E. Keifer
Director of Planning
Department of Planning Services
Kent County Administrative Complex
555 Bay Road
Dover, DE 19901

Dear Ms. Keifer:

This letter is to address an August 2010 Traffic Operational Analysis prepared by Davis, Bowen & Friedel (DBF) for Bush Farm, LLC regarding their proposed Loganberry Village development. DelDOT required this analysis because of observed queuing problems on Walnut Shade Road (Delaware Route 10A and Kent Road 30) in the area of Barney Jenkins Road (Kent Road 370) and the westernmost Polytech High School entrance. We understand that the County has made acceptance of the Loganberry Village subdivision plan contingent upon satisfactory completion of the TOA.

Loganberry Village is a proposed development of 50 townhouses, 48 duplex dwellings and 59 single-family detached houses, to be located on the east side of Barney Jenkins Road east of US Route 13. The land is currently zoned AR (Agricultural Residential) and is proposed for development as a Planned Unit Development (PUD).

Because the plan for Loganberry Village was filed with the County before April 1, 2008, this development is grandfathered with respect to our Standards and Regulations for Subdivision Streets and State Highway Access, which were adopted in November 2007. We understand from DBF that the development is also exempt from the County's Adequate Public Facilities Ordinance (APFO).

As detailed later in this letter, we recommend that various improvements be required based on the current condition and functional classification of Barney Jenkins Road and the amount of traffic the development would add there and on Walnut Shade Road. However, we have relatively little to recommend on the basis of the TOA.

Specific results of the TOA are detailed in the enclosed Level of Service (LOS) tables, but briefly the TOA found an LOS deficiency only for traffic exiting the Polytech campus during the morning peak hour. This finding of adequate LOS despite eastbound queues observed at the Polytech entrance during the morning peak hour, at times blocking the Barney

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Jenkins Road intersection, about 200 feet away, suggests that the queuing on Walnut Shade Road is due to traffic congestion on the Polytech campus. There are likely several possible measures that could improve this situation, including left turn and right turn lanes on Walnut Shade Road at the existing Polytech entrance and changes to the internal traffic flow on the Polytech campus. These improvements would appear to be clearly the responsibility of the Polytech school district.

One possible improvement would involve Loganberry Village traffic, realignment of the Polytech entrance opposite Barney Jenkins Road and, possibly, the installation of a signal there. This improvement was recommended by our Traffic Section in a March 2007 letter (copy enclosed) in response to a request from the school for a signal at their entrance. The school has not pursued the signal further, suggesting that they are not interested in pursuing the realignment either. Absent continued interest on the part of the school district, we have no current plans to install a signal at this location.

As detailed in the LOS Tables, if the Polytech entrance were realigned and a signal installed, several turning lanes would need to be added. Of these, only the eastbound right turn lane would be directly associated with traffic generated by the Loganberry Village development.

Should the 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) should be executed prior to entrance plan approval for the proposed development.

- 1) The developer should provide a bypass lane for southbound traffic on Barney Jenkins Road at the site entrance. If Merritt Drive (a paper street opposite the proposed site entrance) is ever developed, the developer of that street will be required to provide northbound and southbound left turn lanes.
- 2) The developer should provide a minimum right-of-way dedication of 30 feet from the centerline along the site frontage on Barney Jenkins Road.
- 3) The developer should provide a 10-foot wide multi-use path in a 15-foot wide easement along the site frontage on Barney Jenkins Road.
- 4) The developer should improve Barney Jenkins Road, from the south limit of the site frontage to Walnut Shade Road, to provide 11-foot lanes and 5-foot shoulders.
- 5) The developer should provide a 285-foot right turn lane from Walnut Shade Road to Barney Jenkins Road.

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Please contact me at (302) 760-2109 if you have any questions concerning this correspondence.

Sincerely,



T. William Brockenbrough, Jr.
County Coordinator

TWB/km
Enclosures

cc: D.J. Hughes, II, Davis, Bowen & Friedel
Frederick H. Schranck, Deputy Attorney General
Brett Taylor, Chief of Community Relations, Public Relations
Natalie Barnhart, Director, Transportation Solutions (DOTS)
Ralph A. Reeb, Director of Planning
Michael H. Simmons, Assistant Director, Project Development South, DOTS
Donald D. Weber, Chief Traffic Engineer, DOTS
Mark Luszcz, Assistant Chief Traffic Engineer, DOTS
Thomas E. Meyer, Traffic Studies Manager, Traffic, DOTS
Theodore G. Bishop, Assistant Director, Development Coordination
Thomas Greve, Central District Engineer, Maintenance & Operations (M&O)
Eric Cimo, Central District Public Works Engineer, M&O
Jennifer Pinkerton, Deputy Principal Assistant, Pavement Management, M&O
William J. Dryden, Transportation Planner, Project Development South, DOTS
Kristen Melendez, Traffic Studies Engineer, DOTS
Anthony Aglio, Bicycle Coordinator, Statewide & Regional Planning
Richard Sinegar, Statewide & Regional Planning
J. Marc Cote', Subdivision Engineer
Todd J. Sammons, Kent County Development Coordination Engineer
Diane M. Calloway, Subdivision Manager
Troy E. Brestel, Project Engineer

Table 1
 PEAK HOUR LEVELS OF SERVICE (LOS)
 Loganberry Village TOA
 Prepared by Davis, Bowen & Friedel, Inc.

| Unsignalized Intersection ¹ | LOS per TOA | | LOS per DelDOT | |
|--|-------------|------------|----------------|------------|
| | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| Site Access / Barney Jenkins Road | | | | |
| 2015 with development | | | | |
| Site Access Westbound | A (9.1) | A (9.0) | A (9.0) | A (9.0) |
| Queue Length | 25 feet | 25 feet | 25 feet | 25 feet |
| Barney Jenkins Road Southbound LT | A (7.4) | A (7.5) | A (7.3) | A (7.4) |
| Queue Length | 25 feet | 25 feet | 25 feet | 25 feet |

¹ The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 2
 PEAK HOUR LEVELS OF SERVICE (LOS)
 Loganberry Village TOA
 Prepared by Davis, Bowen & Friedel, Inc.

| Unsignalized Intersection ¹ | LOS per TOA | | LOS per DelDOT | |
|---|-------------|------------|----------------|------------|
| | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| Walnut Shade Road / Barney Jenkins Road | | | | |
| 2010 Existing | | | | |
| Walnut Shade Road Eastbound LT | B (10.5) | A (9.0) | B (10.4) | A (9.0) |
| Queue Length | 25 feet | 25 feet | 25 feet | 25 feet |
| Barney Jenkins Road Northbound | C (19.3) | C (16.3) | C (18.9) | C (16.2) |
| Queue Length | 25 feet | 25 feet | 25 feet | 25 feet |
| | | | | |
| 2015 without development | | | | |
| Walnut Shade Road Westbound LT | A (9.8) | A (8.7) | A (9.8) | A (8.8) |
| Queue Length | 25 feet | 25 feet | 25 feet | 25 feet |
| Barney Jenkins Road Northbound | C (16.0) | B (15.0) | C (16.6) | C (15.4) |
| Queue Length | 25 feet | 25 feet | 25 feet | 25 feet |
| | | | | |
| 2015 with development | | | | |
| Walnut Shade Road Westbound LT | A (10.0) | A (9.1) | A (10.0) | A (9.0) |
| Queue Length | 25 feet | 25 feet | 25 feet | 25 feet |
| Barney Jenkins Road Northbound | D (25.6) | C (21.3) | C (24.9) | C (21.2) |
| Queue Length | 55 feet | 28 feet | 53 feet | 28 feet |

¹ The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 3
 PEAK HOUR LEVELS OF SERVICE (LOS)
 Loganberry Village TOA
 Prepared by Davis, Bowen & Friedel, Inc.

| Unsignalized Intersection ¹ | LOS per TOA | | LOS per DelDOT | |
|--|-------------|------------|----------------|------------|
| | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| Walnut Shade Road / Polytech High School West Entrance | | | | |
| 2010 Existing | | | | |
| Walnut Shade Road Eastbound LT | A (9.7) | A (8.4) | A (9.7) | A (8.3) |
| Queue Length | 42 feet | 25 feet | 42 feet | 25 feet |
| School Entrance Southbound | F (123.7) | D (32.9) | F (120.9) | D (32.2) |
| Queue Length | 276 feet | 129 feet | 268 feet | 126 feet |
| | | | | |
| 2015 without development | | | | |
| Walnut Shade Road Eastbound LT | A (9.9) | A (8.5) | A (9.8) | A (8.4) |
| Queue Length | 44 feet | 25 feet | 43 feet | 25 feet |
| School Entrance Southbound | F (156.8) | E (39.3) | F (111.7) | D (30.8) |
| Queue Length | 309 feet | 148 feet | 258 feet | 121 feet |
| | | | | |
| 2015 with development | | | | |
| Walnut Shade Road Eastbound LT | A (9.9) | A (8.6) | A (9.7) | A (8.5) |
| Queue Length | 45 feet | 25 feet | 43 feet | 25 feet |
| School Entrance Southbound | F (189.6) | E (47.5) | F (124.7) | D (34.3) |
| Queue Length | 339 feet | 174 feet | 279 feet | 137 feet |

¹ The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

Table 4
 PEAK HOUR LEVELS OF SERVICE (LOS)
 Loganberry Village TOA
 Prepared by Davis, Bowen & Friedel, Inc.

| Signalized Intersection ¹ | LOS per TOA | | LOS per DelDOT | |
|---|-----------------------|-----------------------|-----------------------|-------------------------|
| | Weekday AM | Weekday PM | Weekday AM | Weekday PM |
| Realignment - Walnut Shade Road / Barney Jenkins Road / Polytech High School West Entrance | | | | |
| 2015 without development | D (39.5) ² | C (21.6) ² | D (39.5) ² | C (23.5) ^{2,3} |
| 2015 without development and with three additional exclusive lanes (eastbound left-turn lane, westbound right-turn lane, southbound right-turn lane) | B (18.3) | B (10.4) | B (15.2) ³ | B (14.6) ³ |
| 2015 with development | D (47.8) ² | D (35.8) ² | D (49.7) ² | C (27.9) ^{2,3} |
| 2015 with development and with three additional exclusive lanes (eastbound left-turn lane, westbound right-turn lane, southbound right-turn lane) | B (19.6) | B (13.2) | B (17.3) ³ | B (15.4) ³ |
| 2015 with development and with four additional exclusive lanes (eastbound left-turn lane, eastbound right-turn lane, westbound right-turn lane, southbound right-turn lane) | N/A | N/A | B (17.2) ³ | B (14.8) ³ |

¹ The numbers in parentheses following levels of service are average delay per vehicle, measured in seconds.

² For these analysis scenarios, queue lengths along one or more approaches would be excessively long.

³ These analysis scenarios were completed using a 75-second cycle length.



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800 BAY ROAD
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CAROLANN WICKS, P.E.
SECRETARY

March 20, 2007

Mr. John R. Sadowski
Transportation Supervisor
Polytech High School
P.O. Box 97
Woodside, DE 19980-0097

RE: Walnut Shade Road (DE Route 10A) @ Polytech High School
- Request for Traffic Signal

Dear Mr. Sadowski:

In December 2006, the Department of Transportation (DelDOT) received your request to perform a traffic engineering study to determine the feasibility of installing a traffic signal at Walnut Shade Road and Polytech High School. The Department has completed the traffic engineering study of the above-mentioned intersection and this letter serves as a response to your request.

Our review of your request included a field study, turning movement count, existing condition capacity analysis, crash trend analysis and traffic signal warrant analysis. It should be noted that there are two access points for Polytech High School on Walnut Shade Road. The eastern most access point serves as the entrance for school buses and faculty members, and the western most access point serves as the school's main entrance and is the main focus of this study.

Our field study gathered existing field data such as lane widths and an inventory of traffic control devices at and near the study intersection and also included observations of traffic operations at the study intersection. Traffic at the main entrance to Polytech High School is currently controlled by a stop sign. Barney Jenkins Road, a local roadway servicing primarily residential traffic is located approximately 215 feet to the west. As a result, the main entrance to Polytech High School and Barney Jenkins Road form a staggered intersection (two closely spaced T-intersections) with Walnut Shade Road.

During the course of the field study, a few near-miss rear-end type crashes were observed when a queue of vehicles formed waiting to turn left onto Barney Jenkins Road from westbound Walnut Shade Road. An interview with Mr. Mike Sampere and Mr. Ed Bitner, who are teacher/volunteer traffic controllers at Polytech High School, confirmed our field observations. Mr. Sampere and Mr. Bitner stated that there are frequent rear-



end crashes between vehicles stopped on westbound Walnut Shade Road waiting to turn left onto Barney Jenkins Road and the vehicles traveling behind those left-turning vehicles. The cause for the frequent near-miss rear-end crashes could be attributed to drivers not checking their right side for stopped vehicles at the Barney Jenkins Road intersection while executing a right turn from Polytech High School.

Our field study also revealed that many student drivers became impatient in the vehicle queue leaving from the school, and some student drivers were observed not stopping completely at the stop sign, and a few incidents of road rage were observed.

The results of our 8-hour turning movement count identified the peak hours as 7:15 AM - 8:15 AM, 11:45 AM - 12:45 PM and 2:45 PM - 3:45 PM throughout the day. The AM and the PM peak hours coincided with time periods students arriving at school in the morning and leave school in the afternoon. Overall, traffic volumes appear to be relatively low during the off-peak hours at this intersection as compared to other locations that have been studied in the past where traffic a signal has been installed. Traffic congestion appears to be a problem during the AM and PM peak periods only.

The results from our operational analysis showed that there were very minimal delays for traffic turning left from eastbound Walnut Shade Road during all three peak hours. In addition, the traffic approaching the intersection from the southbound main exit of Polytech High school operates without much delay during the Midday peak hour; however, the approach operates with heavy delay during the AM and PM peak periods. The heavy delay for the southbound approach in the AM peak period appears to be caused by vehicles leaving the school after dropping students off at the school premises and the heavy delay for the southbound approach in the PM peak period appears to be caused by vehicles driven by the students leaving the school premises.

Crash data, which covered the period from September 2003 through August 2006, was also examined as a part of this study. According to the data, there were twelve (12) reported crashes occurring at or near the intersection of Walnut Shade Road and Polytech High School. The majority of the crashes that occurred in the vicinity of the study intersection were rear-end type crashes, which are commonly caused by inattentive driving. Rear-end type crashes are the type of crashes likely to increase when a traffic signal is installed. There were eight (8) reported rear-end crashes at or near the study intersection and of those eight rear-end crashes, four (4) crashes involved vehicles turning left onto Barney Jenkins Road from the westbound lane of Walnut Shade Road and vehicles traveling through on westbound Walnut Shade Road. There were also two (2) reported angle crashes at the intersection of Walnut Shade Road and Barney Jenkins Road. Angle crashes are the type of crashes susceptible to reduction when a traffic signal is installed. Installing a traffic signal at the intersection of Walnut Shade Road and Polytech High School would not reduce angle crashes at the intersection of Walnut Shade Road and Barney Jenkins Road. In addition, high school students were involved in six (6) of the twelve reported crashes; however, there were no crashes that directly involved a school bus at the study intersection.

The results from the traffic signal warrants analysis revealed that a traffic signal is warranted by the peak hour warrant. The peak hour warrant is intended for use at a location where traffic conditions are such that for a minimum of one hour of an average day, the minor-street traffic suffers undue delay when entering or crossing the major street. In this warrant, the two-way major street volume is plotted against the highest single-direction volume on the minor street. In order for this warrant to be satisfied, traffic volume for one hour must plot above the appropriate decision line to meet the criteria. It should be noted that the peak hour warrant should be applied only in 'unusual' locations that attract or discharge large number of vehicles over a short period or time. High schools could be classified as one of the 'unusual' cases.

In conclusion, a traffic signal is warranted at the intersection of Walnut Shade Road and the main entrance to Polytech High School; however, we feel that there are some improvements which must be made in order for the warranted traffic signal to function properly. The crash data revealed that the majority of the crashes occurring at the study intersection are rear-end type crashes. Rear-end type crashes are the type of crashes likely to increase in frequency following installation of a traffic signal. As stated earlier, there were eight (8) reported rear-end crashes at or near the study intersection and of those eight rear-end crashes, four (4) crashes involved vehicles turning left onto Barney Jenkins Road from westbound lane of Walnut Shade Road and vehicles traveling through on westbound Walnut Shade Road. It appears that the cause for the majority of the reported rear-end crashes is the offset between the main entrance to Polytech High School and Barney Jenkins Road, which creates a staggered intersection. In addition, driver's habit of only looking to the left while turning right and when there is a queue of vehicles attempting to turn onto Barney Jenkins Road may contribute in increasing the driver's chance of causing a rear-end crash.

We do understand that the problems that are occurring at this location are very important to Polytech High School; however, the data that we have analyzed for this study shows that the existing safety issues will not be resolved by installation of a traffic signal alone. In order for a traffic signal to work effectively at this location, the existing two T-intersections should be realigned to form a conventional four-legged intersection. Realignment of the entrance to Polytech High School would allow for the provision of separate left-turn lanes in both directions on Walnut Shade Road. Installing a traffic signal at the existing intersection of Walnut Shade Road and the main entrance to Polytech High School would most likely create additional safety hazards at the intersection. In addition, a traffic signal could block vehicles from turning left onto southbound Barney Jenkins Road from westbound Walnut Shade Road when there is a queue of vehicles stopped at the signal in the eastbound direction. Converting the existing two T-intersections into a four-legged intersection should eliminate extended queues formed by vehicles turning left from westbound Walnut Shade Road onto Barney Jenkins Road, which in turn would not impede with the vehicles exiting from Polytech High School. Therefore, based on all of our observations and data analysis, a traffic signal is not the appropriate solution for this location at this time. If Polytech High School were to realign the entrance to create a four-legged intersection, the Department

Mr. J. Sadowski
March 20, 2007
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would be happy to revisit the installation of a traffic signal at that time. If you would like to discuss the results of this traffic study in person, Adam Weiser and I would be happy to meet with you.

I would like to thank you for your interest in traffic safety on Delaware's roads. If you have any questions or concerns about any aspect of this study, you may contact Adam Weiser or myself at (302) 672-7800 or (302) 659-2005, respectively.

Sincerely,



Thomas E. Meyer, P.E.
Traffic Studies Engineer

TEM:bjjs

Cc: The Honorable Carolann D. Wicks, P.E., Secretary of Transportation
The Honorable William Outten, House of Representatives
Donald D Weber, P.E., Chief Traffic Engineer
Mark Luszcz, P.E., P.T.O.E., Assistant Chief Traffic Engineer
Darrel Cole, Director, Public Relations
Tina Shockey, Community Relations Officer
Adam Weiser, Transportation Engineer, RK&K
Joan Wutka, Transportation Liaison
Terry Petrucci, Legislative Liaison