ATTACHMENT 5

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

RECEIVED
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By

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

August 12, 2011

To: Lyle W. Overcash, P.E
Martin/Alexiou/Bryson, PLLC
4000 Westchase Boulevard, Suite 530
Raleigh, NC 27607

Subject: Proposed Voyager Academy Elementary School Traffic Impact Analysis and Addendum Review

The proposed Voyager Academy Elementary School site, prepared for the Hock Development Corporation, is located on the southwest corner of Ben Franklin Boulevard and Medical Park Drive intersection) in Durham, North Carolina. The proposed development will consist of a 400 student charter elementary school with an anticipated build-out year of 2012 and analysis year of 2013. The proposed elementary school is projected to generate 399 A.M. peak hour site trips and 212 P.M. peak hour site trips via one site drive access.

The TIA analyzed the following nine (9) intersections:
- *US 501 Business (Roxboro Street) and Pacific Avenue – Signalized
- *US 501 Business (Roxboro Street) and William Penn Plaza/Frasier Street – Signalized
- Ben Franklin Boulevard and William Penn Plaza – Unsignalized
- Ben Franklin Boulevard and Pacific Avenue – Unsignalized
- Ben Franklin Boulevard and Hock Park Lane/ Freedom Lake Drive – Unsignalized
- Ben Franklin Boulevard and Medical Park Drive – Unsignalized
- Ben Franklin Boulevard and Technology Drive/Presidents Drive – Unsignalized
- Ben Franklin Boulevard and * SR 1648 (Danube Lane) – Unsignalized
- Medical Park Drive and Proposed Site Drive #1 (Voyager Connector Road) – Unsignalized

*State Maintained Roads

Approved Surrounding Developments
1. Voyager Academy High School - The proposed development will consist of a 400 student high school with an anticipated build-out year of 2011 and analysis year of 2012. The proposed high school is projected to generate 514 A.M. peak hour site trips and 327 P.M. peak hour site trips via three site drive accesses.

TIP Roadway Improvement Projects Relevant to Proposed Development
- There are no funded NCDOT TIP roadway improvement projects in the vicinity of the study area.

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The proposed roundabout exceeds capacity in the 2012 construction year during peak conditions. Possible alternatives include, but are not limited to, a multi-lane roundabout or signalized intersection if the roundabout exceeds capacity with the forty-five (45) minute time buffer for school traffic. It is recommended that this intersection be monitored for circulation flow and potential onsite school traffic spillback that could impair the roundabout capacity and operations.

Ben Franklin Boulevard and Technology Drive/Presidents Drive Intersection
The TIA recommends no geometric improvements at this intersection to mitigate site-generated traffic.

Ben Franklin Boulevard and SR 1648 (Danube Lane) Intersection
No future geometric improvements are necessary at this intersection at this time to mitigate site-generated traffic.

Medical Park Drive and Proposed Site Drive #1 (Voyager Connector Road) Intersection
The TIA recommends the following improvements.

Eastbound Proposed Site Drive #1

- Construct a two (2) lane cross-section consisting of one (1) ingress lane and one (1) egress lane. The egress lane should provide a shared right and left-turn lane with a minimum of 100 feet of internal protected storage.

Onsite Queuing

The school should provide a minimum of 883 feet of queuing distance to accommodate students in the loading/unloading zone, as recommended by the MSTA School calculator. The site plan reflects that onsite storage for traffic has a single queuing capacity that accommodates 690 feet (including the 5 car loading area) and a double queuing capacity of 1,220 feet, exceeding the minimum recommended queuing distance.

Onsite and Multi-site Operations
The school must maintain a minimum of 45 minutes as a buffer between early release, inclement weather, and/or regular schedule times as reflected in the Transportation Management Plan. The respective schools must also enforce the circulation plans and designated routes for drop off and pick up procedures to avoid safety issues such as excessive queuing, blockage of intersections, and site drives. Bicyclist and Pedestrians should follow the school's safety policy to reduce vehicle/ pedestrian conflicts and congestion.

Campus and Driveway Restrictions, as outlined in the TMP, should be conducted as follows:

- Student Loading Zones should be clearly identified and consist of vehicle loading bays and "extra time" loading bays. "Extra time" loading bays should be relocated approximately 20 feet in front of the queuing area along the curb, if possible, to reduce student crossing within the loading zone.
- The middle school loading zone should be coned off between the loop road and Hock Park Lane during afternoon operations
- As stated in the high school TIA, onsite traffic is recommended to circulate in a pattern that allows carpool traffic to enter Site Drive #3 utilizing the full stacking capacity onsite and exit Site Drive #2. Deterrents such as signing and/or cones should be used to block internal drive aisles in an attempt to prevent parents from circumventing the designated area for queuing and pick-up. Site Drive #1 will also provide access to the staff and visitor-only parking lot during the peak hour and should be

prohibited for parents attempting to pick-up students from this area or using this drive to access the loading zone located in the rear on the site.

Provide a staff member at the intersections of Medical Park Drive and the Voyager Connector Road as well as the Elementary School Loop Road and the Voyager Connector Road to direct traffic and minimize conflicts. Utilize necessary personnel, as outlined in the TMP, to ensure efficiency while minimizing confusion for parents and students in the loading zone.

General

Due to, but not limited to, the comments and recommendations from this review of the proposed developments, changes in the internal circulation may be necessary to ensure that driver confusion is minimized to the maximum extent possible.

Any signal revisions, modifications, or additions necessitated by the development should be coordinated with the Regional Traffic Engineer, the Division Traffic Engineer, the Signals and Geometrics Section and the City of Durham.

Any pavement marking revisions/modifications necessitated by the development should be the responsibility of the developer and coordinated with the Division Traffic Engineer.

Any roadway modifications or improvements necessitated by the development should be the responsibility of the developer unless otherwise noted.

Reference should also be made to the information included in the "General Recommendations Attachment."

If we can provide further assistance, please contact me at (919) 220-4750.

Sincerely,

Michelle R. F. Gray

Michelle R. F. Gray
Acting District Engineer

Attachment

cc: Mr. H. Wesley Parham, P.E.

General Recommendations Attachment
(For Voyager Academy Elementary School)

Adequate horizontal and vertical sight distances should be reserved at all proposed entrances. Foliage that interferes with sight distance should be cut back to protect lines of sight. The District Engineer should determine if all drainage facilities are adequate. Curb cuts and curb ramps should be constructed in conformance with the "*Guidelines for Curb Cuts and Ramps for Disabled Persons*," if applicable.

The developer may be required to obtain an approved encroachment agreement covering proposed work within the state right-of-way. If this is the case, the encroachment should be cross-referenced to this review.

All street and driveway entrances onto state system roadways should be controlled with appropriate traffic control devices, including but not limited to, stop, yield, directional, regulatory, and advisory signs and pavement markings. All traffic control devices shall conform to the requirements set forth in the Manual on Uniform Traffic Control Devices. Final pavement marking and signing plans should be submitted to the Division Traffic Engineer for approval prior to the installation of any signs and/or pavement markings.

Unless otherwise noted, a recommended width of 40 feet (curb face to curb face) should be used at each drive. It is also recommended that 40 feet (minimum) radii should be used at each drive to accommodate any service type vehicles or truck traffic that may visit the site.

If the developer anticipates adding or petitioning for addition to the state system, all roads/streets should be designed and constructed in conformance with the current North Carolina Department of Transportation design and construction guidelines.

All "outparcels" or "excluded areas" should be served internally with no additional access onto abutting roadways. The developer should convey this condition in any lease or sell agreements.

As required by the "*Policy on Street and Driveway Access to North Carolina Highways*," dated July 2003, the applicant is responsible for identifying all right-of-way and/or control-of-access limits and for including this information on all submittals. Failure to accurately disclose R/W and C/A limits could result in the denial or closure of access points.

Adequate right-of-way for widening and sight distance triangles should be reserved. Consideration should be given to the possible future need for signalization and associated span poles, controller and pad, and guy wires at the intersections

Any additional development, either within this site or adjacent to this site, that intends on using this development's access will require an updated driveway permit and re-evaluation of geometric and traffic control needs.

All widening should include appropriate transitional and deceleration tapers. Recommended turn lane and transitional treatments are shown on pages 78 and 79 of the "*Policy on Street and Driveway Access to North Carolina Highways*," dated July 2003.

Where possible, opposite side driveways should be aligned to prevent the operational and safety problems caused by offset driveways.