RESOLUTION 12-133

A RESOLUTION CHOOSING A SIGNAL CONFIGURATION ALTERNATIVE FOR THE INTERSECTION OF DUPLEX ROAD AND PORT ROYAL ROAD

WHEREAS, the City of Spring Hill Board of Mayor and Aldermen is considering a traffic light at the intersection of Duplex Road and Port Royal Road; and

WHEREAS, the Transportation Advisory Committee has recommended an order of alternatives provided by CDM Smith as follows:

1. Provide advance warning lights and signing to warn westbound traffic of the stopped vehicles at the signalized intersection and operate in the intersection with permissive left turns. (CDM Option #3) Estimated cost: $37,650.00

2. Locate westbound signals and stop bar near the crest of the hill with a westbound left turn prohibition from Duplex Road to Port Royal Road. (CDM Option #1) Estimated cost: $ 30,000.00

3. Locate westbound signals and stop bar near the crest of the hill at the split phase the eastbound and westbound Duplex Road approaches. (CDM Option #2) Estimated cost: $30,000.00

NOW, THEREFORE BE IT RESOLVED, by the Board of Mayor and Aldermen of the City of Spring Hill, Tennessee that the signal configuration choice for the intersection of Duplex Road and Port Royal Road in the order stated above, as recommended by the Transportation Advisory Committee; and

BE IT FURTHER RESOLVED that the expenditure be drawn from the State Street Aid Fund.

Passed and adopted by the Board of Mayor and Aldermen of the City of Spring Hill, Tennessee, this 17th day of December, 2012.

Michael Dinwiddie, Mayor

ATTEST:

April Goad, City Recorder

APPROVED AS TO FORM:

Tim Underwood, City Attorney

CDM Smith
1100 Marlon St., Suite 200
Knoxville, Tennessee 37921
tel: 865. 963.4300
fax: 865. 963-4301

December 6, 2012

Mr. Victor Lay
City Administrator
City of Spring Hill
199 Town Center Parkway
P.O. Box 789
Spring Hill, TN 37174

RE: DUPLEX ROAD (S.R. 247) AND PORT ROYAL ROAD TEMPORARY SIGNALIZATION ALTERNATIVES, SPRING HILL, TN.

Dear Mr. Lay:

CDM Smith completed its review of the signalization alternatives for the Duplex Road and Port Royal Road. Signalization of the intersection must consider the very limited westbound sight distance. Sight distance to the intersection is limited to approximately 200 feet due to the approaching vertical curve. Westbound traffic queues will be subject to rearend collisions. To mitigate this conflict, signalization must address this sight distance restriction with the placement of westbound signals and stop bar and the signal operation. The alternatives include the following:

1. Locate westbound signals and stop bar near the crest of the hill with a westbound left-turn prohibition from Duplex Road to Port Royal Road.
2. Locate westbound signals and stop bar near the crest of the hill and split phase the eastbound and westbound Duplex Road approaches.
3. Provide advance warning lights and signing to warn westbound traffic of the stopped vehicles at the signalized intersection and operate the intersection with permissive left turns.

Signalization at the crest of the hill provides for the necessary sight distance and the prohibition of the westbound left-turn movement mitigates any traffic queues subjected to rearend collisions. The left-turn movement may be permitted with split phasing the Duplex Road approaches, but the split phasing is a much reduced intersection efficiency resulting in a adverse eastbound and westbound queues greater than 400 feet. Split phasing is the separate signal phasing for the eastbound and westbound approaches such as they are not concurrent green displays, thereby removing the left-turn conflict with the opposing thru traffic movement. Non split phased operation allows the eastbound and westbound traffic to move concurrently but has the conflict between the left-turning traffic with the opposing thru traffic. With the left-turn prohibition, the westbound traffic queue may be limited to approximately 150 feet.

Operating the proposed traffic signal with permissive left-turn phasing may result in a traffic queue of approximately 175 feet requiring westbound advance warning of the traffic queue or any stopped vehicle because of the limited sight distance. Advance warning should include signs and flashers to establish the necessary traffic attention to the condition. This advance warning would operate with stop bar vehicle detection in delay mode to detect a stopped vehicle which would call the westbound signal phase and/or initiate the flashing warning. The stop bar detection and delay mode would identify a

stopped vehicle thereby requiring the traffic warning to be prepared to stop. Several advance warning flashers with signing would be installed both roadside and overhead to adequately warn the advancing traffic. The mitigation of the possible rearend collisions using the advance warning device will depend upon the public observance of the warning. Non observance of the warning would result in possible collisions. The location of the westbound signals and stop bar may remain at the crest of the hill with the warning device provided for the presence of left-turning vehicles. A reduction in the posted speed from 35mph to 30mph may be another consideration to further minimize the accident potential.

The estimated costs for these alternatives are as follows:

1. $30,000.00
2. $30,000.00
3. $37,650.00

Alternatives 1 and 2 are more safe than the alternative requiring the advance warning, for any warning device depends on the public observance of the warning and is subjective. The warning is required with the permissive left-turn phasing from Duplex Road to Port Royal Road. Alternative 2 provides for a protected left-turn phasing which may be designed and operated without the advance warning but will result in adverse queues for the eastbound and westbound approaches. Alternative 1 would the recommendation of CDM Smith given the safety and the more efficient signal operation. If the left-turn from Duplex Road to Port Royal Road is maintained and the longer queues acceptable to the City, the safer alternative is 2. Alternative 3 permits the left-turn and would experience acceptable queuing but public reaction to the warning will be essential for the safe operation.

If you have any questions regarding these traffic signal alternatives and estimated costs, please call me.

Sincerely,

CDM SMITH, INC.

John F. Gould

John F. Gould, P.E.
Senior Project Manager

Project No. 85908