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August 14, 2017

Mr. Jimmy Wiseman, PE  
Assistant Director of Engineering  
109 3<sup>rd</sup> Avenue South  
Franklin, Tennessee 37065

**RE: Transportation Impact Analysis Review for Colletta Park**

Dear Mr. Wiseman:

This memorandum provides the findings of the independent review of the Colletta Park Residential Development Traffic Impact Study (TIS). The task completed included review of the traffic projections and the operational analyses; evaluation of the proposed roadway network; review and evaluation of the recommended infrastructure improvements; and identification of any recommended modifications or additions to the recommended infrastructure improvements identified in the TIS.

**General Project Information**

The Colletta Park Residential Development TIS, dated June 2017, was completed by Fischbach Transportation Group, LLC (FTG, LLC) for Land Solutions Company. The proposed Colletta Park development is located between Highway 96E and S. Carothers Road in Franklin, Tennessee. There are two proposed access locations for the 259 single-family home project site. The projected buildout is 2020. Access to the north of the development is currently proposed via an extension of Stanford Drive and an additional access is proposed to the south at one location on S. Carothers Road. There is no direct access proposed onto Highway 96 E (Murfreesboro Road) from the development.

**Traffic Data and Analyses**

In May 2017, traffic volume data were collected at the intersections along Highway 96 E (Murfreesboro Road) from Carothers Parkway to Arno Road, Carothers Parkway and S. Carothers Road, and S. Carothers Road in the vicinity of the project site. This data was used in the development of the traffic projections and in the operational analyses for the intersections within the study area.

Trip Generation and Distribution

The historic average annual traffic growth estimated in the study was shown to be 7.03% for TDOT Station 40 and 6.36% for TDOT Station 41 from 2009 to 2015. Consequently, as stated in the study, to calculate the background traffic volumes, a 10% total growth rate was applied to the existing traffic data to estimate the initial background year (2020) traffic volumes. The background traffic volumes should be representative of the traffic volumes for the analysis year equivalent to the projected buildout year of the entire development. Based on the historic traffic data provided in the study, the average annual growth rate utilized to calculate the background traffic growth could have been as high as 6.7% per year if utilizing the 2009-2015 years of data or 4.0% if utilizing the 2011-2015 years of data. Based on the trends in the data from 2009 to 2015, it is reasonable to assume the 2011 to 2015 traffic data is more representative of the continued growth around the study area. Based on this assumption, the

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total traffic growth from 2017 to 2020 would have been 12.0%. However, by including the projected peak hour traffic volumes for other development projects (approved and/or under construction) within the study area, utilizing the 10% total growth is acceptable. The peak hour traffic volumes from these developments were added to the study's background traffic volumes to determine the final background traffic volumes.

Future trips generated from the Colletta Park development were calculated using ITE's *Trip Generation*, Ninth Edition based on the future land use. The land use used to determine the project-generated trips was Single-Family Homes (210). The 259 homes are expected to produce 2,466 trips per day with 195 trips in the AM peak hour and 259 trips in the PM peak hour.

	Total Trips Generated
AM Enter	49
AM Exit	146
PM Enter	163
PM Exit	96

#### Intersection Analyses

The operational analyses for the intersections within the study area were all completed utilizing of Highway Capacity Software version 7 (HCS 2010) and Synchro 9. Each intersection was evaluated for existing, background, and projected conditions along with a revised projected conditions scenario. Based on the capacity analysis for the projected peak hour conditions, all intersections provide an overall acceptable level of service, however, it should be noted that most of the intersections have a few minor turning movements with levels of service E or F.

#### Traffic Signal Warrant

The *Manual on Uniform Traffic Control Devices* (MUTCD) specifies different warrants for the justification of a traffic control signal at a particular location. As detailed in the MUTCD, reduced (70%) may be used at locations where the major-street speed exceeds 40 miles per hour (mph) or is located in an isolated community with a population of less than 10,000. As noted in the TIS, the posted speed limit for Carothers Parkway and Highway 96E are respectively, 40 mph and 45 mph, therefore, the full traffic signal warrant thresholds were deemed appropriate. Also, the MUTCD provides Guidance for the application of the traffic signal warrant evaluations. This Guidance should be reviewed and, if applicable, utilized in the traffic signal warrant evaluations.

A traffic signal warrant analysis was completed on the intersections of Carothers Parkway and S. Carothers Road and for Highway 96E and Chester Stevens Road / Ridgeway Drive based on the existing traffic conditions. Both of the traffic signal warrant analyses did not yield a traffic signal to be necessary at either intersection based on the existing conditions.

To satisfy the total projected conditions, updated traffic signal warrant analyses were conducted for the intersections of Carothers Parkway and S. Carothers Road, as well as, for the intersection of Highway 96E and Chester Stevens Road / Ridgeway Drive. For the total projected conditions, including the additional approved residential projects in the area, the intersection of Carothers Parkway and S. Carothers Road yields a traffic signal based on Warrant 1 Condition B from the MUTCD. At the intersection of Highway 96E and Chester Stevens Road / Ridgeway Drive, Warrant 1 Condition A and B and Warrant 2 are not satisfied and therefore do not warrant a traffic signal at this intersection in the total projected conditions.

### Turn Lane Analysis

The need for the additional turn lanes at the site accesses were evaluated based on Figures 2-5 and 2-6 in the *NCHRP Report 457 – Evaluating Intersection Improvements: An Engineering Study Guide*. Based on the analysis results, a dedicated northbound right turn lane was warranted on Carothers Parkway at S. Carothers Road and a dedicated eastbound right turn lane is warranted on Highway 96E at Ridgeway Drive.

### **Connectivity**

Connectivity is essential to offer multiple routes of access in a community in which congestion continues to be a hindrance to quality of life. The *Franklin Land Use Plan* provides specific guidance for new development within the Seward Hall Special Area 3:

- 12. New subdivisions should provide street connections in all directions and should be planned to connect with adjacent planned or existing roads. Establishing more local street connections helps disperse traffic thereby reducing the volume on major corridors and easing congestion. Additionally, more local street connections increases accessibility and can reduce vehicle miles traveled and average trip length.*

The *Franklin Zoning Ordinance*, through standards in Section 5.10.4, mandate specific requirements that must be satisfied for any development with the City of Franklin.

Connectivity of the Colletta Park development was reviewed according the guidance of the *Land Use Plan* and the requirements of the *Zoning Ordinance*:

#### Future Connectivity to Carothers Parkway or South Carothers Road

This development will establish a connection between Highway 96 E (Murfreesboro Road) and South Carothers Road/Carothers Parkway. The Colletta Park development proposes connectivity to the existing Franklin East subdivision, but no other existing subdivisions. This does not meet the information contained in #12 above for the Seward Hall Special Area 3. The northern portion of the project will not directly connect to Highway 96 E, however, Stanford Drive off of Ridgeway Drive, will be extended in the Franklin East subdivision. For the southern portion of the project, the major access will involve connecting to S. Carothers at the 90-degree curve just to the east of the intersection of Carothers Parkway and South Carothers.

### **Recommendations Identified in the TIA**

The following are the infrastructure improvements recommended in the study and the reviewer's response to each.

1. At the intersection with Highway 96 E, the northbound approach of Ridgeway Drive should be widened to included two northbound turn lanes. Specifically, the existing northbound lane should be retained as left turn lane, and a separate through/right turn lane with at least 75 feet of storage should be constructed to the east.

**Staff Response:** *The design shall be completed according to AASHTO, TDOT, and City of Franklin standards.*

2. At the intersection with Ridgeway Drive, an eastbound right turn lane should be provided on Highway 96 E. This turn lane should include at least 150 feet of storage and should be designed and constructed according to AASHTO standards.

**Staff Response:** *To facilitate improved safety and operations at the intersection, an eastbound right turn lane shall be added along Highway 96 E (Murfreesboro Road) at Ridgeway Drive/Chester Stevens Road. The design shall be completed according to AASHTO, TDOT, and City of Franklin standards.*

3. A northbound right turn lane should be provided on Carothers Parkway at the intersection with S. Carothers Road. This turn lane should include at least 100 feet of storage and should be designed and constructed according to AASHTO standards.

**Staff Response:** *The design shall be completed according to AASHTO and City of Franklin standards.*

4. A traffic signal will likely be warranted at the intersection of Carothers Parkway and S. Carothers Road as all of the approved residential projects on Carothers Parkway and S. Carothers Road are developed. If constructed, this traffic signal should be designed and constructed to include protected and permissive signal phases for southbound motorists, as well as right turn overlap signal phases for northbound and westbound approaches.

**Staff Response:** *As traffic volumes and traffic congestion increase at this intersection, the City shall determine when the traffic signal is warranted for installation.*

5. The analyses conducted for the purposes of this study indicate that all of the critical turning movements at the intersection of S. Carothers Road and the project access will operate acceptably even if dedicated turn lanes are not provided at this location.

In conjunction with the preparation of final construction documents for the proposed project, sight triangles should be provided to identify the sight distances which will be available, based on the specific location of the project access and its design parameters. These sight triangles should be developed based on guidelines that are included in A Policy on Geometric Design of Highways and Streets, which is published by the American Association of State Highway and Transportation Officials (AASHTO) and commonly known as The Green Book. Specifically, The Green Book indicates that for a speed of 40 mph, the minimum stopping sight distance is 305 feet. This is the distance that motorists on S. Carothers Road will need to come to a stop if a vehicle turning from the project access creates a conflict. Also, based on The Green Book, the minimum intersection sight distance is 445 feet. This is the distance that motorists on the project access will need to safely complete a turn onto S. Carothers Road.

**Staff Response:** *At such time as the development plans are prepared, the developer's engineer shall develop intersection design plans according to AASHTO and the City of Franklin standards. The engineer shall show that all approaches to the intersection maintain sufficient stopping sight distance, clear sight triangles for all approaches and satisfy any grade or skew requirements.*

*Based on the NCHRP Report 457 criteria, the projected traffic volumes at this intersection are marginal for warranting an eastbound left turn lane at the project access. However, due to roadway geometrics, vehicle speeds and anticipated additional growth in the surrounding area, it*

*is recommended an eastbound left turn lane be constructed at this location. This turn lane should include a minimum 75 feet of storage plus taper and should be designed and constructed according to AASHTO and City of Franklin standards.*

6. In order to limit the impact of the site-generated traffic on the existing roadways on the south side of Highway 96E, the following modifications have been proposed by the developer of the Colletta Park project:
  - Stripe the existing 25 feet of pavement on Ridgeway Drive to include one 10-foot travel lane and a 2.5-foot shoulder in each direction.
  - Provide street lamps on Ridgeway Drive between Highway 96E and Stanford Drive.
  - Consider reducing the speed limit on Ridgeway Drive from 30 mph to 25 mph and providing appropriate signage and painted lettering on the pavement.

**Staff Response:** *These recommendations shall be coordinated with the City of Franklin, Williamson County and the specific neighborhood homeowners association. If determined by each to be acceptable, the design shall be completed according to AASHTO the City of Franklin and Williamson County standards.*

#### **Additional Staff Recommendations**

Based on the review of the information included in the TIS, the following conclusions and recommendations have been developed in addition to the recommendations outlined in the TIS and discussed in the previous section of this letter.

1. The location of the proposed access for the project site on S. Carothers Road shall be coordinated and approved by the City of Franklin Engineering Department prior to development of site layout plans.

#### **Closing**

The Colletta Park Residential Development TIS covered the typical required traffic impact study components and identified several feasible and necessary infrastructure improvements. The review of the traffic impact study identified some areas of the Study and Development Plan that need further evaluation and revisions. Also, as noted in the last section of the letter, an additional recommendation was identified to be included in the conditions of approval for the development.

This review was completed by Gerald Bolden, PE, PTOE and Micah Wood, AICP of Volkert, Inc.