CITY OF DURHAM | NORTH CAROLINA

Date: **March 25, 2015**

To: **Amy Wolff, Durham City County Planning Department**
From: **Bill Judge PE, City of Durham Department of Transportation**
Subject: **Family Fare - Carpenter Fletcher Road and NC 55 (Z1400041) Traffic Impact Analysis**

The Unified Development Ordinance (UDO) requires that a Traffic Impact Analysis (TIA) be prepared for proposed developments estimated to generate 150 or more peak-hour vehicle trips. The proposed development includes a convenience store with 12 fueling positions. The development is expected to generate 199 a.m. peak-hour trips (99 entering and 100 exiting) and 229 p.m. peak-hour trips (114 entering and 115 exiting). The proposed development is located on the west side of NC 55, north of Carpenter Fletcher Road.

The site will utilize two driveway connections. The northern right-in/right-out driveway to NC 55 (Access #1) will be located on the west side of NC 55 approximately 350 feet north of Carpenter Fletcher Road. Additionally, a full access driveway to Carpenter Fletcher Road (Access #2) is proposed along the north side of Carpenter Fletcher Road approximately 150 feet west of NC 55. The expected completion year is 2016, and the TIA analysis year is 2017. The Family Fare NC 55 TIA was prepared by Ramey Kemp & Associates, Inc. in December 2014.

Study Area
The study area includes the following intersections:

- NC 55 and Carpenter Fletcher Road;
- NC 55 and Site Driveway #1 (right-in/right-out access); and
- Carpenter Fletcher Road and Site Driveway #2 (full-access).

Trip Generation
Trip generation numbers are based on the Institute of Transportation Engineers (ITE) *Trip Generation Manual*, 9th *Edition*, 2012. The *ITE Trip Generation Manual* recommends the following trip reductions for this proposed land-use:

- 63% of the AM peak hour site trips will be pass-by trips from the adjacent roadways; and
- 66% of the PM peak hour site trips will be pass-by trips from the adjacent roadways.

The TIA trip generation estimate is shown in the table below:

ITE Land Use (Code)	Size	AM Peak Hour (vph)			PM Peak Hour (vph)		
		Enter	Exit	Total	Enter	Exit	Total
C-Store With Fuel Pumps (853)	12 fuel pos.	99	100	199	114	115	229
Pass-By Trips		-62	-63	-125	-75	-76	-151
External (New) Trips		**37**	**37**	**74**	**39**	**39**	**78**

Traffic Data Collection

The peak-hour intersection turning movement counts were taken from 7:00-9:00 a.m. and 4:00-6:30 p.m. in December 2014.

Trip Distribution and Assignment

The assignment of site traffic on the study area roadway network was based on the following trip distribution percentages:

- To/From the North via NC 55: 25% of site trips;
- To/From the South via NC 55: 30% of site trips;
- To/From the West via Carpenter Fletcher Road: 40% of site trips; and
- To/From the East via Carpenter Fletcher Road: 5% of site trips.

Approved Developments and Background Growth

There are no approved projects in the vicinity. A uniform annual compounded growth rate of 3% was utilized to determine the background traffic projections.

TIP Roadway Improvements

The City of Durham has a proposed bicycle/pedestrian project to install bicycle lanes and sidewalks along Carpenter Fletcher Road adjacent to the site. This project is currently under design.

Capacity Analysis

Capacity analyses were performed using the a.m. and p.m. peak-hour for the following scenarios:

- Existing (2014) conditions;
- No-Build (2017) conditions (2014 Existing + Background growth traffic);
- Build (2017) conditions (2017 No-Build + Site traffic); and
- Build (2017) with improvements conditions (2017 Build + improvements).

This development and project study area are located within the Suburban Tier where the adopted LOS standard is LOS D. The following table summarizes the average delay for the various Levels of Service (LOS) for unsignalized and signalized intersections:

	Signalized Intersections	Unsignalized Intersections
Level of Service	**Average Vehicle Delay (Seconds)**	**Average Vehicle Delay (Seconds)**
A	**0-10**	**0-10**
B	**10-20**	**10-15**
C	**20-35**	**15-25**
D	**35-55**	**25-35**
E	**55-80**	**35-50**
F	**>80**	**>50**

NC 55 and Carpenter Fletcher Road

The following table summarizes the Levels of Service at this existing signalized intersection:

Scenario	a.m. LOS	p.m. LOS
Existing (2014)	**B**	**C**
No-Build (2017)	**B**	**D**
Build (2017)	**C**	**D**

With the additional site traffic, the intersection will operate at an acceptable LOS D or better for both peak hours for the Build (2017) condition. No improvements are proposed or required at this intersection.

NC 55 and Site Driveway #1 (right-in/right-out)

The following table summarizes the Levels of Service at this proposed unsignalized intersection:

Scenario	a.m. LOS	p.m. LOS
Build (2017) with improvements	**C***	**C***

* Unsignalized operation, with LOS reported for the worst (EB) approach

With the additional site traffic and the following improvement, the intersection will operate at an acceptable LOS C for both peak hours:

- Construct Site Driveway #1 with one ingress lane and one egress lane.

To address safety and mobility concerns along NC 55, the following additional improvement is also required:

- Extend the existing southbound right-turn lane on NC 55 at Carpenter Fletcher Road to provide a minimum of 100 feet of storage and appropriate taper at Site Driveway #1.

Carpenter Fletcher Road and Site Driveway #2 (full-access)

The following table summarizes the Levels of Service at this proposed unsignalized intersection:

Scenario	a.m. LOS	p.m. LOS
Build with improvements (2017)	**B***	**C***

* Unsignalized operation, with LOS reported for the worst (SB) approach

With the additional site traffic and the following improvements, the intersection will operate at an acceptable LOS C or better for both peak hours:

- Construct a westbound right-turn lane with a minimum of 50 feet of storage and appropriate taper on Carpenter Fletcher Road at Site Driveway #2; and
- Construct Site Driveway #2 with one ingress lane and two egress lanes.

To address safety and mobility concerns along Carpenter Fletcher Road, the following additional improvement is also required:

- Extend the existing eastbound left-turn lane on Carpenter Fletcher Road at NC 55 to provide a minimum of 100 feet of storage and appropriate tapers at Site Driveway #2.

Summary of Required Improvements:

NC 55 and Site Driveway #1 (right-in/right-out)

1. Extend the existing southbound right-turn lane on NC 55 at Carpenter Fletcher Road to provide a southbound right-turn lane with adequate storage and appropriate tapers at Site Driveway #1.
2. Construct Site Driveway #1 with one ingress lane and one egress lane.

Carpenter Fletcher Road and Site Driveway #2 (full-access)

1. Extend the existing eastbound left-turn lane on Carpenter Fletcher Road at NC 55 to provide an eastbound left-turn lane with adequate storage and appropriate tapers at Site Driveway #2.
2. Construct a westbound right-turn lane with adequate storage and appropriate taper on Carpenter Fletcher Road at Site Driveway #2.
3. Construct Site Driveway #2 with one ingress lane and two egress lanes.