



City of Deltona

Memo

To: James V. Chisolm, City Manager

From: Joseph Ruiz, Planning & Development Services Interim Director

Cc: *JR* Planning & Development Services

Date: May 1, 2023

Subject: Deltona Village BCC Traffic Memorandum

The City Commission recently denied Ordinance No. 04-2023, an ordinance to increase the number of multi-family units allowed from 414 to 652, amend the Development Agreement approved by Ordinance No. 21-2009, and to add and rezone 26.57 acres of land to the Deltona Village Business Planned Unit Development (BPUD). The reasons for the denial expressed were related to traffic concerns due to vested trip allocations based on a 2009 traffic study (Kimley-Horn), and school concurrency concerns regarding level of service.

Based on the concerns expressed, staff was directed to request our traffic consultant, BCC Engineering, review the original 2009 traffic study and bring it up to current trip generation rates and data based on the Institute of Traffic Engineers (ITE) Manual, 11th and latest edition. The Technical Memorandum prepared by BCC Engineering, dated April 28, 2023, is attached and is summed up by the following:

- In 2009 Kimley-Horn projected the Deltona Village development at full build-out would generate **17,806** New Net Average Daily Trips (ADTs) and **1,141** New Net PM Peak Hour

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Trips. **See Table II** (Several flaws were found within the review of the report and noted by BCC Engineering)

- Based on BCC's review to bring the trip counts up-to-date using the latest ITE Manual generation rates and accounting for internal capture and pass-by trips, the Deltona Village BPUD is now projected to generate **24,417** New Net ADTs and **2,271** New Net PM Peak Hour Trips at full build-out.
 - This is a projected total net increase of **6,611** of ADTs, and total net increase of **1,130** of PM Peak Hour trips, based on updated data. **See Table IV**
- In evaluating all of the Deltona Village approved and proposed developments within the traffic study update, BCC generated a Trip Generation Study providing the projected trip counts for projects both approved and proposed. It is projected the Deltona Village BPUD, if all currently proposed projects are approved, would be generating **10,502** New Net ADTs, and **812** PM Peak Hour Trips. **See Table VI**
 - The **10,502** New Net Average Daily trips fall below the originally approved **17,808** ADTs. (**7,306** ADTs remain available)
 - The **812** New Net PM Peak Hour Trips fall below the originally approved **1,141** PM Peak Hour Trips. (**329** PM Peak Hour Trips remain available)
- BCC also updated the traffic equivalency matrix to give a current day outlook based on the **900,000** square feet of retail and commercial approved for the BPUD. The updated equivalence matrix finds the projects both approved and proposed are equivalent to **387,030** of retail square-footage.
 - The **387,030** square-foot equivalency falls below the originally approved **900,000** square feet of retail. (**512,970** square feet remain available)

In summary, the findings from BCC Engineering's Technical Memo determine the updated Deltona Village project trip generation impacts (per ITE Manual, 11th edition) at full build-out is anticipated to be a total net increase of **6,611** ADTs and **1,130** PM Peak Hour trips. However, the Technical Memo does also find that all the BPUD's currently approved and proposed projects listed within **Table VI**, would generate **10,502** ADTs and **812** PM Peak Hour Trips. This is an equivalent of

387,030 square-feet of retail. Thus per this new data, Deltona Village BPUD would remain compliant with the originally approved **17,808** ADTs, **1,141** PM Peak Hour Trips, and **900,000** square feet of retail.

Trip Generation Equivalency Framework

Contract Name: City of Deltona Transportation and Planning Services

Subject #: Update to Deltona Village Town Center

Date: April 28, 2023

BCC Engineering has prepared a technical memorandum to prepare a trip generation equivalency matrix to allow the conversion of approved uses analyzed in the existing traffic impact analysis (TIA) prepared by Kimley Horn & Associates (KHA) in December of 2009 for the Deltona Village Town Center. The technical memorandum incorporates the latest trip generation rates and equations published by the Institute of Transportation Engineers (ITE) Tri Generation Handbook.

This commercial project, located in the southeast corner of I-4/SR 472 (Howland Boulevard) interchange in the City of Deltona, was approved to include:

- 96,000 square feet of commercial & retail uses for City of Deltona,
- 804,000 square feet of commercial & retail uses developed in three phases for County of Volusia.

The trip generation equivalency analysis was conducted according to the following steps including:

- Review the existing TIA prepared by KHA,
- Calculate the internal and external number of trips for the existing and approved developments,
- Update trip generation equivalency matrix with the conversion rates per the current Institute of Transportation Engineers (ITE) trip generation manual (11th Edition) to include the proposed 351 multi-family residential dwelling units (additional to the 301 dwelling units currently under construction) to the currently approved development.

The **first step** in the analysis is to review the existing TIA and replicate the rates and trips generated. The report prepared by KHA assumed the project gross trip generation rate was based on the previously approved total trip generation for phase I of the DRI. The following were the rates assumed for trip generation calculations:

- Daily = 22.6114 trips/ksf,
- PM Peak Hour = 2.1955 trips/ksf.

Note: ksf = 1,000 square feet.

Table I below, reflects the gross trips generated based on the rates assumed:

Table I – Gross Trips

Land Use Code		Development Sizes from 2009		Units	Gross Trips Generated	
					Daily	PM Pk Hr
LUC 820	County	Phase I	301,000	SF	6,806	661
		Phase II	269,000	SF	6,082	591
		Phase III	234,000	SF	5,291	514
	City	-	96,000	SF	2,171	211
Total			900,000	SF	20,350	1,976

Additionally, the report suggested that an approved:

- Internal capture of 12.5% and
- Pass-by trips for the PM peak period of 34% was assumed.

Table II below reflects the net new trips generated by the development sizes based on 2009 rates and assumptions:

Table II – Net New Trips

Net new Trips Generated		
Phase	Daily	PM Pk Hr
Phase I	5,955	382
Phase II	5,322	341
Phase III	4,630	297
-	1,899	122
Total	17,806	1,141

Hence, the net new trips generated by the proposed 900,000 square feet of commercial-retail land use generated net new external trips of:

- Daily = 17,806 trips and
- PM Peak Hour = 1,141 trips.

Deficiencies with the assumptions made with the above approach:

- The trip rates used for the calculations are from the year 2009 and not the latest edition trip generation manual,
- An internal capture percentage of 12.5% was used although a single land use of 820 proposed and used for calculations,
- Pass-by trips were not assumed in the calculations of daily trips.

To overcome the above mentioned deficiencies, the next step will calculate the daily and PM peak hour trips considering the:

- Latest ITE Trip Generation Manual (11th Edition) for trip generation rates,
- The internal capture percentage based on the variety of uses that are previously proposed within the approved development,
- Pass-by trips will be used for daily trips.

The **second step** in the analysis is to calculate the trip generation for the same amount of land use (900,000 square feet) using updated trip rates based on the latest **ITE Trip Generation Manual (11th Edition)**. Using the land use code (LUC) for shopping center:

- For areas greater than 150,000 square feet - LUC 820 will be used and,
- For areas between 40,000 and 150,000 square feet - LUC 821 will be used.

Based on the above LUCs, following are the rates obtained:

- Daily trip generation calculation: Based on ITE recommended criteria, the average trip generation rate of 37.01 for LUC 820 and 94.49 for LUC 821 were used, which deduces a value of 38,827 gross trips.
- PM Peak Hour trip generation calculation: The average rate of 3.4 and 9.03 were used for LUCs 820 and 821 respectively which deduces a value of 3,600 gross trips.

Table III below reflects the gross trips generated based on the Trip Generation Manual 11th edition:

Table III – Gross Trips (Latest ITE 11th Edition Trip Generation Manual)

New Rates from Trip Generation Manual 11th Edition						
Land Use Code	Entity	2009 Development Sizes		Units	Gross Trips Generated	
					Daily	PM Pk Hr
820	County	Phase I	301,000	SF	11,140	1,023
		Phase II	269,000	SF	9,956	915
		Phase III	234,000	SF	8,660	796
821	City	-	96,000	SF	9,071	867
Total			900,000	SF	38,827	3,600

Although land use was assumed as a single use when approved back in 2009, the newly proposed developments has a mix of uses varying from residential, restaurants, movie theater, gas station etc. which will have an internal capture. For a valid comparison, instead of using 0% for internal capture, values of 11.8% and 11.3% (calculated using the proposed uses within the development and NCHRP report 684) were used for daily and PM peak hour net new trip calculation of the approved 900,000 square feet of commercial-retail use.

The vehicle pass-by rates based on the latest trip generation manual for the weekday PM peak period is:

- 29% for sites with area size between 150,000 and 300,000 square feet and
- 19% for sites with size between 300,000 and 900,000 square feet.

The formula for the net new trips calculation is:

$$\text{Net new trips} = \text{Gross trips} \times (1 - \text{Internal capture}\%) \times (1 - \text{Pass-by rate}\%)$$

Based on the above assumptions and formula, **Table IV** below reflects the net new trips generated by the development sizes based on the latest trip generation manual:

Table IV – Net New Trips (Latest ITE IIth Edition Trip Generation Manual)

Net new Trips Generated			
Entity	Phase	Daily	PM Pk Hr
County	Phase I	7,959	735
	Phase II	6,234	576
	Phase III	5,423	501
City	-	4,800	459
	Total	24,417	2,271

Hence, the net new trips generated by the proposed 900,000 square feet of commercial-retail land use generated net new external trips of:

- Daily = 24,417 trips and
- PM Peak Hour = 2,271 trips.

Based on the trips generated above, following are the rates for the approved development based on the new trip generation manual:

Average rate for the Gross trips:

- Daily = 43.14 trips/ksf,
- PM Peak Hour = 4.00 trips/ksf.

Average rate for the net new trips:

- Daily = 27.13 trips/ksf,
- PM Peak Hour = 2.52 trips/ksf.

The **third step** in the analysis is to perform the trip generation for the newly proposed 351 multi-family housing units (additional to the existing and previously approved land uses within the development) using the latest ITE Trip Generation Manual. The land uses additional to the newly proposed residential units are as following:

- EPIC theatres with a size of 51,116 square feet which is approved,
- Race Trac with a size of 5,928 square feet which is approved,
- Duke Energy substation,
- Burger King with a size of 3,369 square feet which is approved,
- Panda Express with a size of 2,600 square feet being proposed,
- Integra Phase I which is a 301 residential dwelling units which is approved and under construction,
- Integra Phase II, which is a 351 residential dwelling units being proposed,

- Starbucks with a size of 2,630 square feet which is approved,
- The Nutty Bavarian with a size of 52,800 square feet which is approved,
- Storage facility with a size of 120,000 square feet.

It is assumed that Duke Energy substation is an unmanned facility and may have a couple of trips monthly for maintenance. Hence it is not considered for trip generation analysis. **Table VI** below shows the land use codes, designations, sizes and trip generation for the proposed developments:

Table VI – Trip Generation Summary

Proposed Use	Land Use Code	Designation	New Development Sizes	Units	Gross Trips Generated	
					Daily	PM Pk Hr
Epic Theatres (12 screens)	445	Movie Theater	51,116	Square Feet	3,992	315
Race Trac	945	Convenience Store/Gas Station	5,928		4,152	323
Duke Energy Substation	Assume unmanned facility				-	-
Burger King	934	Fast-Food Restaurant with Drive-Thru Window	3,369		1,575	111
Panda Express			2,600	1,215	86	
Integra Phase I	220	Multifamily Housing (Low-Rise)	301	Dwelling Units	2,005	150
Integra Phase II			351		2,325	171
Starbucks	937	Coffee/Donut Shop with Drive-Through Window	2,630	Square Feet	1,403	103
The Nutty Bavarian	110	General Light Industrial	52,800		257	34
Storage Facility	151	Mini Warehouse	120,000		174	17
Gross Total Trips					17,099	1,311
Internal Capture (11.8% daily and 11.3% PM)					2,018	148
Pass-by (Race Trac = 75%)					3,114	242
Pass-by (Burger King/Panda Express = 52.5% daily and 55% PM)					1,465	108
Net-New Trips Generated					10,502	812

The trips were calculated based on the ITE recommended criteria for each land use. The following assumptions/calculations are made for internal capture and pass-by trips:

- The land uses from **Table VI** were input into NCHRP report 684 (Internal Trip Capture Estimation Tool) was used to calculate the internal capture, the rates of 12.3% and 11.3% were estimated from the tool. For the calculation of daily trips, average of AM and PM capture rates was used (11.8%),
- Pass-by rates for the land uses were obtained from the 2021 Pass-by rates from the 11th edition Trip Generation Manual.



As can be observed from the **Table VI**, following are the net new trips for the approved and proposed land uses with the development:

- Daily = 10,502 trips and
- PM Peak Hour = 812 trips.

The **final step** is to create equivalency matrix to understand how much of the initially approved commercial retail use of 900,000 square feet is utilized by the newly proposed land uses shown in **Tables V and VI**.

Two scenarios were assumed for the equivalency matrix:

- Scenario I using the rates from gross trips generated and,
- Scenario II using the rates from net new trips generated.

Scenario I: Table VII below shows the equivalency matrix to convert newly proposed or approved variety of land uses to the previously approved commercial retail land use using the rates from gross trips generated.

Table VII – Equivalency Matrix based on Gross Trips

Proposed Use	Land Use Code	Proposed Land Use Size	Daily Trip Rate	Equivalency Statement	Equivalent retail rate (KSF)	Equivalent to 2009 approved retail square footage (KSF)
Epic Theatres (12 screens)	445	51.116 KSF	78.09	1 KSF equivalent to	1.81	92.53
Race Trac	945	5.928 KSF	700.43	1 KSF equivalent to	16.24	96.25
Burger King	934	3.369 KSF	467.48	1 KSF equivalent to	10.84	36.51
Panda Express		2.600 KSF		1 KSF equivalent to		28.17
Integra Phase I	220	301 DU	6.66	1 DU equivalent to	0.15	46.47
Integra Phase II		351 DU	6.62		0.15	53.86
Starbucks	937	2.63 KSF	533.57	1 KSF equivalent to	12.37	32.53
The Nutty Bavarian	110	52.8 KSF	4.87	1 KSF equivalent to	0.11	5.96
Storage Facility	151	120 KSF	1.45	1 KSF equivalent to	0.03	4.03
Shopping Center	820 & 821	-	43.14	1 KSF equivalent to	1.00	-
Total Equivalent Shopping Center square footage						396.30



The daily trip rates are obtained from the ITE Trip Generation Manual (11th Edition) for all the uses except the shopping center which is a mix of land use codes of 820 and 821. The daily trip rate for the shopping center is calculated using the overall gross trips of 38,827 trips generated over 900,000 square feet of approved land use which is 43.14 trips/ksf.

An example for equivalency calculation is – 100 dwelling units (LUC 220) is equivalent to $100 \times 0.15 = 15$ ksf (15,000 square feet) of approved shopping center land use.

Based on the above calculations, the newly proposed and approved land uses are calculated to be equivalent to or utilizes **396,300 square feet** of the 900,000 square feet approved in 2009. Hence the **remaining balance** is **503,700 square feet** of equivalent retail shopping center land use.

Scenario II: Table VIII below shows the equivalency matrix to convert newly proposed or approved variety of land uses to the previously approved commercial retail land using the rates from net new trips generated.

Table VIII – Equivalency Matrix based on Net New Trips

Proposed Use	Land Use Code	Proposed Land Use Size	Daily Trip Rate	Equivalency Statement	Equivalent retail rate (KSF)	Equivalent to 2009 approved retail square footage (KSF)
Epic Theatres (12 screens)	445	51.116 KSF	68.88	1 KSF equivalent to	2.54	129.78
Race Trac	945	5.928 KSF	92.46	1 KSF equivalent to	3.41	20.20
Burger King	934	3.369 KSF	166.89	1 KSF equivalent to	6.15	20.72
Panda Express		2.600 KSF		1 KSF equivalent to		15.99
Integra Phase I	220	301 DU	5.87	1 DU equivalent to	0.22	65.13
Integra Phase II		351 DU	5.84		0.22	75.56
Starbucks	937	2.63 KSF	470.61	1 KSF equivalent to	17.35	45.62
The Nutty Bavarian	110	52.8 KSF	4.30	1 KSF equivalent to	0.16	8.37
Storage Facility	151	120 KSF	1.28	1 KSF equivalent to	0.05	5.66
Shopping Center	820 & 821	-	27.13	1 KSF equivalent to	1.00	-
Total Equivalent Shopping Center square footage						387.03

The daily trip rates are calculated for each land use after the gross trips are discounted with internal capture and pass-by trips (if applicable) and divided by the size of each land use.



Based on the above rates and assumptions, the newly and approved land uses are calculated to be equivalent to or utilizes **387,030 square feet** of the 900,000 square feet approved in 2009. Hence the **remaining balance** is **512,970 square feet** of equivalent retail shopping center land use.

The **Table IX** below shows the outputs from both scenarios:

Table IX – Comparison of Scenario I vs Scenario II for Equivalency

Scenario	Equivalency to 2009 approved square footage	Remainig Balance (Square Feet)
Rates from Gross Trips	396,300	503,700
Rates from Net New Trips	387,030	512,970

Based on the above **Table IX**, it can be seen that both the scenarios deduce similar values for the utilization of the approved retail square footage. Given the similar results, the City may consider using calculations based on gross trip generation rates due to its simplicity (using the direct rates from the latest trip generation manual without any adjustments).

It should be noted that the equivalency matrix provided by the developer (*Table 2 – Interstate 4/State Road 472 Activity Center DRI, Approved/Proposed Development Equivalency, dated November 8, 2022*) shows a utilization equivalency of 125 ksf which is significantly less compared to the approximately 396 ksf calculated in this report.