

This manual has been prepared to address growth and development throughout the City of Brownsville and provide guidance on new requirements for all developments. All developments within the City of Brownsville are required to submit a Trip Generation analysis and, if applicable, a Traffic Impact Analysis (TIA) report.

This manual illustrates the differences between a Trip Generation and a TIA and explains the appropriate procedures for carrying out these processes.

## **Traffic Studies**

A traffic impact study may be required for proposed development projects that generate significant vehicular traffic as a result of the development.

### **Purpose**

The purpose of the TIA is to identify the adequacy of the existing street right of way to accommodate any changes in trips generated from a proposed development/redevelopment. If impacts are identified, potential mitigation measures (on-site or off-site) can be proposed and evaluated. The traffic impact analysis will be used to make a determination as to whether driveway(s) being considered are necessary to provide reasonable access to the private property consistent with the safety and convenience of the public.

A Traffic Impact Analysis is required if the estimated AM or PM Peak Hour Trips are greater than 100 trips per hour.

### **Trip Generation Definition**

Trip Generation is a type of transportation forecasting that predicts the number of trips originating in or destined for a particular traffic analysis zone. The purpose of a trip generation is to assist the Director of Traffic in determining whether a Traffic Impact Analysis will be required; although, the Director of Traffic, at his sole discretion, reserves the right to request a Traffic Impact Analysis of any project that will generate traffic that may have an impact on surrounding City Streets that may already be congested.

### **Reference**

Trip generation numbers are currently calculated using the Institute of Transportation Engineers' (ITE) publication titled *Trip Generation*, 7th edition. The set of books can be purchased from ITE ([www.ite.org](http://www.ite.org)).

A trip generation analysis should be performed and submitted to the Director of Traffic for all proposed developments in the City of Brownsville.

### **Process for Calculating Trip Generation**

The information needed to calculate trip generation rates are as follows:

- Land Use (not to be confused with zoning)
- Gross Square Footage (if applicable)
- Number of Units (if applicable)

An example of a trip generation calculation is as follows:

**A 14-acre tract of land proposed for residential development to consist of 50 homes.**

ITE Code	Anticipated Land Use	Project Size			AM Peak Hour Trips	PM Peak Hour Trips
		Acres	GFA	# of Units		
<b>210</b>	<b>Single-Family Detached Housing</b>	<b>14</b>	<b>n/a</b>	<b>50</b>	<b>48</b>	<b>60</b>

  

**A TIA is not required since both AM and PM will generate less than 100 peak hour trips.**

The data table below provides trip generation data for typical classes of development in the Brownsville area for weekday (ADT, Peak Hour - A.M. and Peak Hour - P.M.)

DEVELOPMENT	ITE CODE	Basis Unit for Trip Generation	Average Trip Generation Rates			UNITS FOR 100 PEAK HOUR TRIPS
			Weekday (ADT)	Peak Hour (A.M.)	Peak Hour (P.M.)	
Apartments	220	Dwelling Units	6.65	0.57	0.62	150
Hotel	310	Rooms	8.92	0.67	0.70	170
General Office Building	710	1,000 SF - GFA	11.01	1.55	1.49	65
Medical Offices	720	1,000 SF - GFA	36.13	2.30	3.46	29
Specialty Retail (Strip Shopping Centers)	814	1,000 SF - GFA	44.32	n/a	2.71	37
Convenience Store (w/ gas pumps)	853	Vehicle Fueling Positions	542.6	16.57	19.07	6
High Turnover (Sit Down Restaurant)	932	1,000 SF - GFA	127.15	11.52	11.15	9
Department Store	881	1,000 SF - GFA	88.16	2.66	10.35	10

Pharmacy (w/ Drive Thru)	881	1,000 SF - GFA	9.44	27.41	4
Bank (w/ Drive-Thru)	912	Drive Lanes			

A traffic impact analysis (TIA) is an important tool that identifies the need for any improvements to a transportation system to reduce congestion, improve safety, provide adequate access, and mitigate the impact associated with the project.

- ❖ **Must be conducted by or under the direction of a licensed professional engineer in the State of Texas with experience in Traffic Engineering**
- ❖ **New developments, changes to existing developments, and conditional use permits**
- ❖ **Submit at time of application (for plat/site plan, and conditional use permits) Submit to the Director of Traffic**
- ❖ **Evaluation of site access, traffic circulation, roadway system capacity, and for mitigation requirements for site**

### **TIA Levels of Analysis**

There are three levels of analysis for a TIA. Each successive level builds on the previous level of analysis. A Level 1 primarily includes site analysis; a Level 2 provides for project area analysis; and a Level 3 provides corridor analysis.

A **Level 1 TIA** consists of a study for a development that generates 101-300 trips. Placement and design of internal (on site) features such as parking layout, access to public streets, site circulation, intersection sight distance, pedestrian circulation, delivery and loading areas and internal public street layout. Study radius: ¼ mile

An example of a level 1 TIA is for a Medium commercial or multi-family development, medium residential subdivisions or an addition to an existing development.

A **Level 2 TIA** consists of a study for a development that generates 301-500 trips. On site analysis (level one) plus the impact of the development and its traffic on perimeter streets, adjoining developments, pedestrians and public transit facilities. Study radius: ½ mile.

An example of a Level 2 TIA consists of medium to large sized residential and commercial developments in new areas.

A **Level 3 TIA** consists of a study for a development that generates more 501trips or more. On site analysis (level one) plus project analysis (level two) plus the impact of the proposed development on a larger study area and the street and highway system that is being impacted by the addition or improvement of arterial streets and by other large developments in the study area. Study radius: 1 mile.

An example of a Level 3 TIA consists of large sized residential and commercial developments. A TIA **may** be required at the discretion of the Director of Traffic for sensitive areas where a

project may impact an already congested or high-accident location, or when specific site access and safety issues are of concern. A TIA **may not** be required if the project is part of a larger development for which a TIA has already been prepared.

TIA study reports shall include the following outline items:

**Level 1 TIA Outline**

- I. Project Description**
  - a. Complete description
  - b. Phase timeline of subdivision breakdown
- II. Transportation Circulation Setting**
  - a. Surrounding land uses
  - b. Site uses
  - c. Roadways
  - d. Features
- III. Analysis and Impact**
  - a. Trip generation
  - b. Trip distribution
  - c. Other impacts
- IV. Recommendations**
- V. Attachments and Figures**

**Levels 2 & 3 TIA Outline**

- I. Project description**
  - a. Complete description
  - b. Phase timeline/subdivision breakdown
- II. Transportation circulation setting**
  - a. Surrounding land uses
  - b. Site uses
  - c. Roadways
  - d. Photographs
  - e. Features
- III. Analysis and impact**
  - a. Trip generation
  - b. Trip distribution
  - c. Level of service analysis
  - d. Other impacts
- IV. Recommendations and Mitigation measures**
  - a. Measures
  - b. Timeline

**Attachments and figures**

## TIA Report Guidelines

The following are a set of guidelines to assist in the preparation of a Traffic Impact Analysis Report (TIA). These guidelines are not all inclusive; The Director of Traffic may require additional information or analysis. The Director of Traffic will instruct as to which Level (I, II, III), and radius of study that is required for the TIA on project basis. TIA reports should be bound, typed (8 1/2" x 11") and include exhibits (11" x 17").

### Project Description

- **Complete Description**
  - ❖ Describe proposed development include all relevant details, such as square footage, number of drive-through lanes. Supplement with exhibits illustrating driveways, parking (site-circulation)
- **Phase Timeline or Subdivision breakdown**
  - ❖ Describe phase time table and/or subdivision break down. Present as much of the development as possible this allows for an adequate estimation of the total impact.

### Transportation Circulation Setting

- **Existing & Proposed site uses:**
  - ❖ Describe the existing and proposed site uses including zoning, and land uses. Supplement with an exhibit.
- **Existing & Proposed surrounding land uses:**
  - ❖ Describe the existing and proposed land uses and zoning for the adjacent property and surrounding area. Supplement with and exhibit.
- **Existing & Proposed Roadways**
  - ❖ Describe existing roadways within the designated area; include: classification, condition, number of lanes, width, dedicated lanes, driveways in study area and signals phases for turning movements. Supplement with an exhibit.
  - ❖ Count data shall be includes and shall not be older than 1 year or up to date with development.
- **Photograph and Aerial of Existing Roadways**
  - ❖ Photographs of the adjacent streets. Supplement with an exhibit.
- **Existing & Proposed features**
  - ❖ Illustrate existing and proposed driveways, medians, pedestrian islands, traffic calming, sidewalks, etc...
- **Analysis & Impact**

- ❖ Trip distribution and justification. Supplement with an exhibit for each proposed and existing driveways showing percentages and volumes.
- ❖ Trip generation shall be estimated for the number of daily trips, am peak hour trips and pm peak hour trips. Show break down for entering and exiting trips, include code and description. Supplement with an exhibit illustrating trip assignments per driveway.

**Level of Service (LOS) Analysis**

- ❖ Where an intersection or roadway may experience a loss in LOS due to the estimated traffic generation of a project an analysis must be performed. Present condition (existing conditions) and projected conditions with the development must be analyzed. The latest version of the “Highway Capacity Manual” (HCM) by the Transportation Research Board (TRB)
- ❖ shall be the method used to conduct this analysis on both signalized and un-signalized intersections.

LOS Pre-Development	A	B	C	D	E	F
<b>Projected LOS</b>	<b>Minimum Acceptable LOS</b>					
A	NA					
B	B	NA				
C	C	C	NA			
D	C	C	C	NA		
E	C	C	C	D	NA	
F	C	C	C	D	E	NA

- ❖ The preferred analysis software to determine LOS is Syncho 7.

**Signal Warrant Analysis**

- ❖ Determine the need for a traffic signal

**Other Safety and Operational Analysis**

- ❖ On-Site Circulation
- ❖ Intersection Sight Distance
- ❖ Parking
- ❖ Realignment of an intersection
- ❖ Necessity for turning bays
- ❖ Safe travel speed
- ❖ Visibility on curved roadways

**Transportation Circulation Setting**

**Mitigation Measures**

- Address possible mitigation measures
  - ❖ Possible improvements

- ❖ Traffic control device warrants
  - Parking control
  - Roadway design features including Traffic Calming
- Discuss schedule of implementation on measures include milestones

### Summary of TIA Requirements

**Thresholds for TIA Levels**

100 or less Trips	<b>NO TIA</b>
101-300 Trips	<b>Level 1</b>
301-500 Trips	<b>Level 2</b>
501 or more Trips	<b>Level 3</b>

### Residential Driveways

Single family residential driveways shall be constructed with a minimum width of 12 ft maximum width of 25 ft at the right-of-way.

### Commercial Driveways

Commercial, non-single family residential and multi-family driveways that connect to an arterial street, highway, or freeway shall be a minimum of 25 ft wide to a maximum of 45 ft wide.

Driveways for utility facilities shall be constructed using single family residential driveway standards with specific approval from the Director of Traffic.