



**WisDOT Division of Transportation System Development**  
Bureau of Traffic Operations  
4822 Madison Yards Way, 5<sup>th</sup> Floor South  
Madison, WI 53705

**Governor Tony Evers**  
**Secretary Craig Thompson**  
[wisconsindot.gov](mailto:wisconsindot.gov)  
(608) 266-1260  
[william.mcrary@dot.wi.gov](mailto:william.mcrary@dot.wi.gov)

**Date:** May 7, 2021

**To:** Ops Chiefs  
Planning Chiefs

**From:** William R. McNary, P.E.  
State Traffic Engineer

**Subject:** Trip Generation for Convenience Market/Gas Station – Interim Guidance

## INTRODUCTION

A traffic impact analysis (TIA) is a specialized engineering study that determines the potential traffic impacts of a proposed development. To determine what impact, if any, the proposed development may have on the surrounding roadway network, it is necessary to estimate the trip generation potential of the development. As outlined in the Wisconsin Department of Transportation (WisDOT) [Traffic Impact Analysis Guidelines](#), the most commonly accepted source for trip generation data for land use developments is the current version of the Institute of Transportation Engineers (ITE) *Trip Generation Manual*.

In 2017, with the release of the 10<sup>th</sup> Edition of the *Trip Generation Manual*, ITE modified the trip generation estimations for gas stations with convenience markets, which included the introduction of ITE land use code 960 for Super Convenience Markets/Gas Stations. (See below for additional details on the ITE land use codes available for gas stations.) After review of the updated trip generation rates, WisDOT determined that the new ITE 960 land use code may not provide an accurate representation of the trip generation potential of all super convenience market/gas station developments taking place in Wisconsin and that the location of the development (rural versus urban, freeway versus non-freeway, tourist versus non-tourist) should be taken into consideration.

WisDOT has initiated a study to develop Wisconsin-specific trip generation rates for gas stations with convenience stores. While the Wisconsin-specific trip generation study is ongoing, developers *should* use the following interim guidance when completing trip generation estimates and TIAs involving a convenience market/gas station. **This interim guidance is effective as of May 10, 2021 and will remain in effect until rescinded.** Coordinate with the WisDOT regional traffic contact to assess the applicability of this interim guidance for TIAs initiated prior to May 10, 2021. [Attachment 1](#) provides a map that shows the contact information for each regional office.

## ITE TRIP GENERATION LAND USE CODES

The ITE *Trip Generation Manual*, 10<sup>th</sup> Edition provides data plots, trip generation rates and equations for multiple land use descriptions for various independent variables, time periods and settings. Currently, the ITE *Trip Generation Manual* provides trip generation data for five land use categories (land use codes) related to a gas station with or without a convenience market: 853, 944, 945, 950, and 960. The following provides a brief description of each these land uses.

**853 – Convenience Market with Gasoline Pumps:** The primary business for this land use is the selling of convenience items, with the sale of fuel for motor vehicles being secondary. Sites fitting within this land use have a convenience store with a gross floor area of 2,000 square feet or more and have fewer than 10 vehicle fueling positions.

**944 – Gasoline/Service Station:** The primary business for this land use is the sale of fuel for motor vehicles. Sites fitting this land use can have between 2 to 20 vehicle fueling positions and typically have a small building (less than 2,000 square feet) that houses a cashier and limited motor vehicle maintenance supplies and general convenience products. These sites may have a car wash and may provide ancillary facilities for vehicle servicing/repair.

**945 – Gasoline/Service Station with Convenience Market:** The primary business for this land use is the sale of fuel for motor vehicles. Sites fitting within this land use have a convenience store with a gross floor area between 2,000 to 3,000 square feet and have 10 or more vehicle fueling positions. Common convenience items available include newspapers, coffee or other beverages, and snack items for the road. These sites may have a car wash and may provide ancillary facilities for vehicle servicing/repair.

**950 – Truck Stop:** Truck stops provide dedicated diesel fueling positions, are located near major roadways, and provide refueling, food and other services to truck drivers and other motorists. Sites fitting this land use typically contain convenience stores, showers, restaurants, and on-site truck parking spaces.

**960 – Super Convenience Market/Gas Station:** For this land use, both the sale of convenience items and fuel for motor vehicles are significant. Sites fitting within this land use have a convenience store with a gross floor area of at least 3,000 square feet and have 10 or more vehicle fueling positions. Common convenience items available include newspapers, freshly brewed coffee, daily-made donuts, bakery items, hot and cold beverages, breakfast items, dairy items, fresh fruits, soups, light meals, ready-to-go and freshly made sandwiches and wraps, and ready-to-go salads. These sites typically have automated teller machines (ATMs) and public restrooms and may also have a car wash.

## TRIP GENERATION VARIABLES

There are numerous independent variables available for estimating a site's trip generation potential. Some of the independent variables for the gas station land uses in the ITE *Trip Generation Manual* include:

- 1,000 square feet of gross floor area (GFA) of the convenience store,
- AM/PM peak hour traffic on the adjacent street,
- the number of employees, and
- the number of vehicle fueling positions.

Historically, WisDOT has used vehicle fueling positions as the primary independent variable for estimating the trip generation potential of a gas station.

In addition to the land uses and independent variables described above, the development location (rural versus urban, freeway versus non-freeway, tourist versus non-tourist) may also significantly impact the trip generation potential. Site selection for the upcoming WisDOT study will attempt to capture the differences based on these additional factors.

## TRIP GENERATION RATE SELECTION

The ITE trip generation data is currently available in an electronic file that allows for filtering the data sets by the region of the data source (United States, Midwest, Southeast, Southwest) along with time period, setting/location (general urban/suburban), and trip type (vehicle, truck) for each independent variable. This allows for some refinement of the trip generation data but does not fully account for other factors such as proximity of the freeway, nearby similar land uses or the impact of tourism.

To provide consistency, until the completion of the Wisconsin-specific trip generation study, use vehicle fueling positions as the independent variable and the trip generation rates summarized in [Table 1](#) and [Table 2](#). Obtain authorization from the WisDOT regional traffic contact prior to utilizing rates other than those specified in [Table 1](#) and [Table 2](#).

### **Gas Stations: <3,000 Square Foot Convenience Store and/or < 10 Fueling Stations**

Table 1 provides a summary of the statewide guidance for proposed gas stations that fit the descriptions of ITE land use codes 853, 944, or 945. For this guidance, the total number of vehicle fueling positions represent the maximum number of vehicles that can refuel simultaneously. When counting the number of fueling positions, do not count the diesel fueling positions that, when in use, would prevent the use of non-diesel fueling positions. See the discussion on Truck Stops below for how to account for diesel fueling positions in the trip generation calculations.

### **Truck Stop (ITE Land Use Code 950)**

The ITE trip generation rates for the Truck Stop (ITE 950) land use are based on a small sample size, and thus may not provide an accurate reflection of the true trip generation potential of all sites that fit the Truck Stop (ITE 950) land use description. WisDOT acknowledges, however, that the presence of stand-alone diesel fueling stations will likely result in fewer total vehicle trips than non-diesel pumps as larger diesel trucks take longer to fuel and navigate the site than passenger vehicles. To account for this difference, use the Truck Stop (ITE 950) rates, with number of diesel-fueling positions as the independent variable, to estimate the number of trips. The trip generation potential for all other fueling positions *should* be based on the applicable trip generation rate as defined in Table 1. For example, if the development consists of a 2,500 square foot convenience market, with a total of 16 fueling positions (12 non-diesel, 4 stand-alone diesel), the vehicle fueling position trip generation rate for ITE 945 would be applicable for the 12 non-diesel fueling stations and the vehicle fueling position trip generation rate for ITE 950 would be applicable for the 4 stand-alone diesel positions. When counting the number of fueling positions, do not count the diesel fueling positions that, when in use, would prevent the use of non-diesel fueling positions.

### **Gas Stations: ≥ 3,000 Square Foot Convenience Store and ≥ 10 Fueling Stations**

After considerable review and an assessment of prior developments, WisDOT determined that additional factors should be considered when deciding whether to use Gasoline/Service Station with Convenience Market (ITE 945) or Super Convenience Market/Gas Station (ITE 960) once the size of the convenience store reaches 3,000 square feet or more. The location of the development (rural versus urban, freeway versus non-freeway, tourist versus non-tourist) appears to have a more pronounced impact on the trip generation potential than at stations with smaller convenience stores. Refer to Table 2 for a summary of the recommended trip generation rates to apply to developments that fit under the Super Convenience Market/Gas Station (ITE 960) land use description.

### **SUMMARY**

TIA preparers *should* use the appropriate land use category as identified in Table 1 and Table 2 when completing trip generation estimates involving the convenience market/gas station land use. Follow the guidance outlined in the WisDOT [Traffic Impact Analysis Guidelines](#) for all other trip generation calculations, including the calculation of pass-by and linked-trips. Direct any questions regarding this interim guidance to the WisDOT regional traffic contact.

**Table 1 ITE Land Use Code Selection**

Size (GFA) of Convenience Market	# Fueling Positions	Applicable ITE Land Use Code
≥ 2,000 square feet	<10	853
< 2,000 square feet	Any	944
2,000 to 3,000 square feet	≥ 10	945
≥ 3,000 square feet	≥ 10	Varies by Location, See <a href="#">Table 2</a>

Notes:

- **GFA:** Gross Floor Area
- Use number of vehicle fueling positions as the independent variable
- Do not count diesel fueling positions that, when in use, would prevent the use of non-diesel fueling positions
- For stand-alone diesel fueling positions separated from other fueling positions, use Truck Stop (ITE 950) trip generation rate with number of diesel-fueling positions as the independent variable. Use the applicable trip generation rate as defined above for all other fueling positions. For example, if the development consists of a 2,500 square foot convenience market, with a total of 16 fueling positions (12 non-diesel, 4 stand-alone diesel), the vehicle fueling position trip generation rate for ITE 945 would be applicable for the 12 non-diesel fueling stations and the vehicle fueling position trip generation rate for ITE 950 would be applicable for the 4 stand-alone diesel positions.
- Obtain authorization from the WisDOT regional traffic contact prior to utilizing rates other than those specified above

**Table 2 Applicable ITE Land Use Codes for Super Convenience Market/Gas Station**

	Applicable ITE Land Use Code			
	Non-Tourist Freeway Location	Non-Tourist Non-Freeway Location	Tourist Freeway Location	Tourist Non-Freeway Location
<b>Rural Area</b>	960 Midwest	945	960 Midwest	945
<b>Urban Area</b>	960	960 Midwest	960	945

Notes:

- **GFA:** Gross Floor Area
- **Rural Area:** Within or near an isolated community with a population of < 5,000
- **Urban Area:** Within or near an area with a population of ≥ 5,000
- **Tourist Area:** Location where summer AADT is ≥ 50% of AADT the rest of the year (e.g., Minocqua, Eagle River, Lake Geneva, Wisconsin Dells)
- **Freeway Locations:** Locations are typically within ½ mile of an interchange. Consider locations near expressways (WIS 29, US 151, US 53, etc.) as non-freeway locations.
- **960 Midwest:** Trip generation rate based on data sources located only within the Midwest region
- Use number of vehicle fueling positions as the independent variable
- Do not count diesel fueling positions that, when in use, would prevent the use of non-diesel fueling positions
- For stand-alone diesel fueling positions separated from other fueling positions, use Truck Stop (ITE 950) trip generation rate with number of diesel-fueling positions as the independent variable. Use the applicable trip generation rate as defined above for all other fueling positions. For example, if the development consists of a 2,500 square foot convenience market, with a total of 16 fueling positions (12 non-diesel, 4 stand-alone diesel), the vehicle fueling position trip generation rate for ITE 945 would be applicable for the 12 non-diesel fueling stations and the vehicle fueling position trip generation rate for ITE 950 would be applicable for the 4 stand-alone diesel positions.
- Obtain authorization from the WisDOT regional traffic contact prior to utilizing rates other than those specified above.

**Attachment 1 Regional Office Traffic/TIA Contact Information**

**Superior Office**

1701 N. 4th St.  
Superior, WI 54880  
(715) 392-7925  
FAX (715) 392-7863  
[nwr.dtsd@dot.wi.gov](mailto:nwr.dtsd@dot.wi.gov)

**Rhineland Office**

510 N. Hanson Lake Rd.  
Rhineland, WI 54501  
(715) 365-3490  
FAX (715) 365-5780  
[ncr.dtsd@dot.wi.gov](mailto:ncr.dtsd@dot.wi.gov)

**Wisconsin Rapids Office**

1681 2<sup>nd</sup> Ave South  
Wisconsin Rapids, WI 54495  
(715) 421-8302  
FAX (715) 423-0334  
[ncr.dtsd@dot.wi.gov](mailto:ncr.dtsd@dot.wi.gov)



**Eau Claire Office**

718 W. Clairemont Ave.  
Eau Claire, WI 54701  
(715) 836-2891  
FAX (715) 836-2807  
[nwr.dtsd@dot.wi.gov](mailto:nwr.dtsd@dot.wi.gov)

**Green Bay Office**

944 Vanderperren Way  
Green Bay, WI 54304  
(920) 492-5643  
FAX (920) 492-5640  
[ner.dtsd@dot.wi.gov](mailto:ner.dtsd@dot.wi.gov)

**La Crosse Office**

3550 Mormon Coulee Rd.  
La Crosse, WI 54601  
(608) 785-9022  
FAX (608) 785-9969  
[swr.dtsd@dot.wi.gov](mailto:swr.dtsd@dot.wi.gov)

**Madison Office**

2101 Wright St.  
Madison, WI 53704  
(608) 246-3800  
FAX (608) 246-7996  
[swr.dtsd@dot.wi.gov](mailto:swr.dtsd@dot.wi.gov)

**Waukesha Office**

141 NW Barstow St.  
Waukesha, WI 53187  
(262) 548-5902  
FAX (262) 548-5662  
[ser.dtsd@dot.wi.gov](mailto:ser.dtsd@dot.wi.gov)