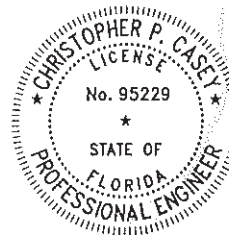


**TRIP GENERATION REPORT**  
**THE ASTUTE CHILDREN'S ACADEMY**  
**3026 HOWLAND BLVD.**

**City of Deltona**  
**ZEI#343**

**August 22, 2024**

**Prepared By:**  
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**Zahn Engineering, Inc.**



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Christopher Casey  
P.E. # 95229

## **Narrative**

Given the existing conditions of the site, the City of Deltona future land use (FLU) and zoning maps have the site currently designated as Commercial FLU, with General Commercial (C-2) zoning. The site is proposed to be developed as a day care center with a maximum student enrollment of 152, and a gross floor area (GFA) of 10,653 square feet (SF). The proposed development use is allowed in the site's current zoning with the approval of a conditional use. As such, an application for a conditional use has been submitted concurrently.

## **ITE Trips**

The projected average daily trips and peak hour trips have been compiled using the Institute of Transportation Engineers Trip Generation, 11<sup>th</sup> Edition (**Appendix A**).

For the pre-development conditions, we assumed the maximum number of trips generated to be based on a general office building use with the maximum floor area ratio (FAR) allowed by the commercial (C-2) zoning designation. Calculations for the trips generated based on the FAR are included in **Appendix A**.

The post-development number of trips generated is based on the maximum number of enrolled students, as this variable showed a greater impact than the number of trips generated based on the facility's GFA. Calculations for the trips generated based on the number of students are included in **Appendix A**.

## **Trip generation for the existing conditions**

FLU designation Commercial, land use: 710 General Office Building

Given the current C-2 zoning, the highest use was based on general office building with a maximum FAR (0.5).

$$[(60,075 \text{ sf}) \times (0.5)] = 30,038 \text{ sf}$$

General office building:

Weekday Average Daily Trip:  $\ln(T) = 0.87\ln(x) + 3.05$

Existing total number of Weekday Average Daily Trips = 407

Weekday Peak Hour AM Trip:  $\ln(T) = 0.86(x) + 1.16$

Existing total number of Weekday Peak Hour AM Trips = 59

Weekday Peak Hour PM Trip:  $\ln(T) = 0.83(x) + 1.29$

Existing total number of Weekday Peak Hour PM Trips = 61

### **Trip generation for the proposed conditions**

FLU designation Commercial, land use: 565 Day Care Center

Given the proposed use of a day care center, the highest use was based on the variable of maximum student enrollment (152 students).

Day Care Center:

Weekday Average Daily Trip:  $T = 3.56(x) + 47.23$

Existing total number of Weekday Average Daily Trips = 622

Weekday Peak Hour AM Trip:  $\ln(T) = 0.77(x) + 0.74$

Existing total number of Weekday Peak Hour AM Trips = 120

Weekday Peak Hour PM Trip:  $\ln(T) = 0.78(x) + 0.68$

Existing total number of Weekday Peak Hour PM Trips = 123

### **Conclusion**

Given the specific use for this parcel, the maximum trip generation conditions have been selected to determine the change in average daily trips. The change in average

daily trips from the maximum allowable office building use to the proposed daycare use is  $(407-622) = \text{Increase in 215 average daily trips}$ . The change in weekday AM peak hour trips from the maximum allowable office building use to the proposed daycare use is  $(59-120) = \text{Increase in 61 weekday AM peak hour trips}$ . The change in weekday PM peak hour trips from the maximum allowable office building use to the proposed daycare use is  $(61-123) = \text{Increase in 62 weekday PM peak hour trips}$ .

**Land Use: 565**  
**Day Care Center**

**Description**

*"A day care center is a facility where care for pre-school age children is provided, normally during daytime hours. A day care facility generally includes classrooms, offices, eating areas, and playgrounds. A center may also provide after-school care for school-age children."*

**Land Use: 710**  
**General Office Building**

**Description**

*"A general office building is a location where affairs of businesses, commercial or industrial organizations, or professional persons or firms are conducted. An office building houses multiple tenants that can include, as examples, professional services, insurance companies, investment brokers, a banking institution, a restaurant, or other service retailers. A general office building with a gross floor area of 10,000 square feet or less is classified as a small office building (Land Use 712). Corporate headquarters building (Land Use 714), single tenant office building (Land Use 715), medical-dental office building (Land Use 720), office park (Land Use 750), research and development center (Land Use 760), and business park (Land Use 770) are additional related uses."*

## Appendix A – ITE Trip Generation Graphs

# General Office Building (710)

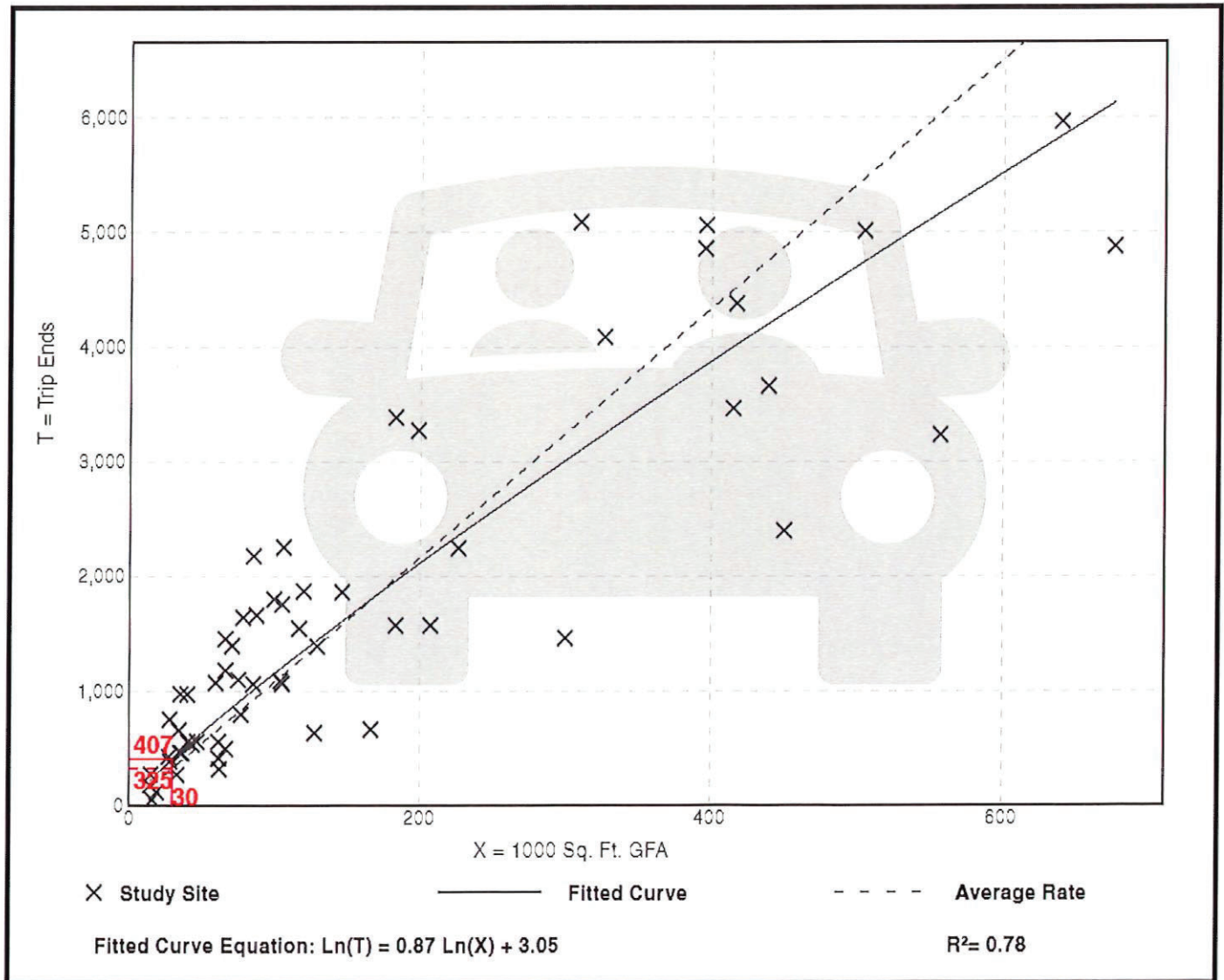
Vehicle Trip Ends vs: 1000 Sq. Ft. GFA  
On a: Weekday

Setting/Location: General Urban/Suburban  
Number of Studies: 59  
Avg. 1000 Sq. Ft. GFA: 163  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
10.84	3.27 - 27.56	4.76

## Data Plot and Equation



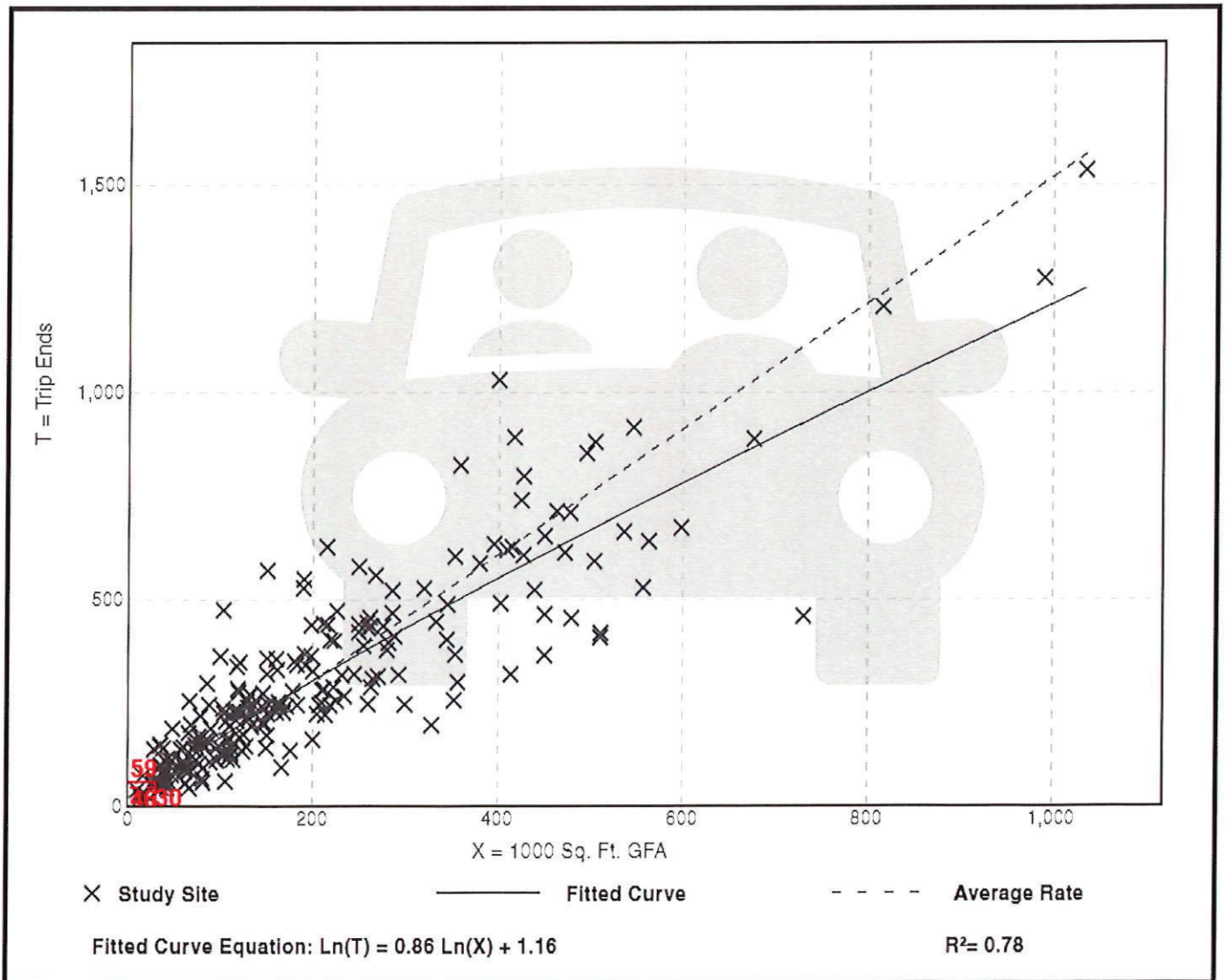
# General Office Building (710)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 7 and 9 a.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 221  
 Avg. 1000 Sq. Ft. GFA: 201  
 Directional Distribution: 88% entering, 12% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.52	0.32 - 4.93	0.58

## Data Plot and Equation





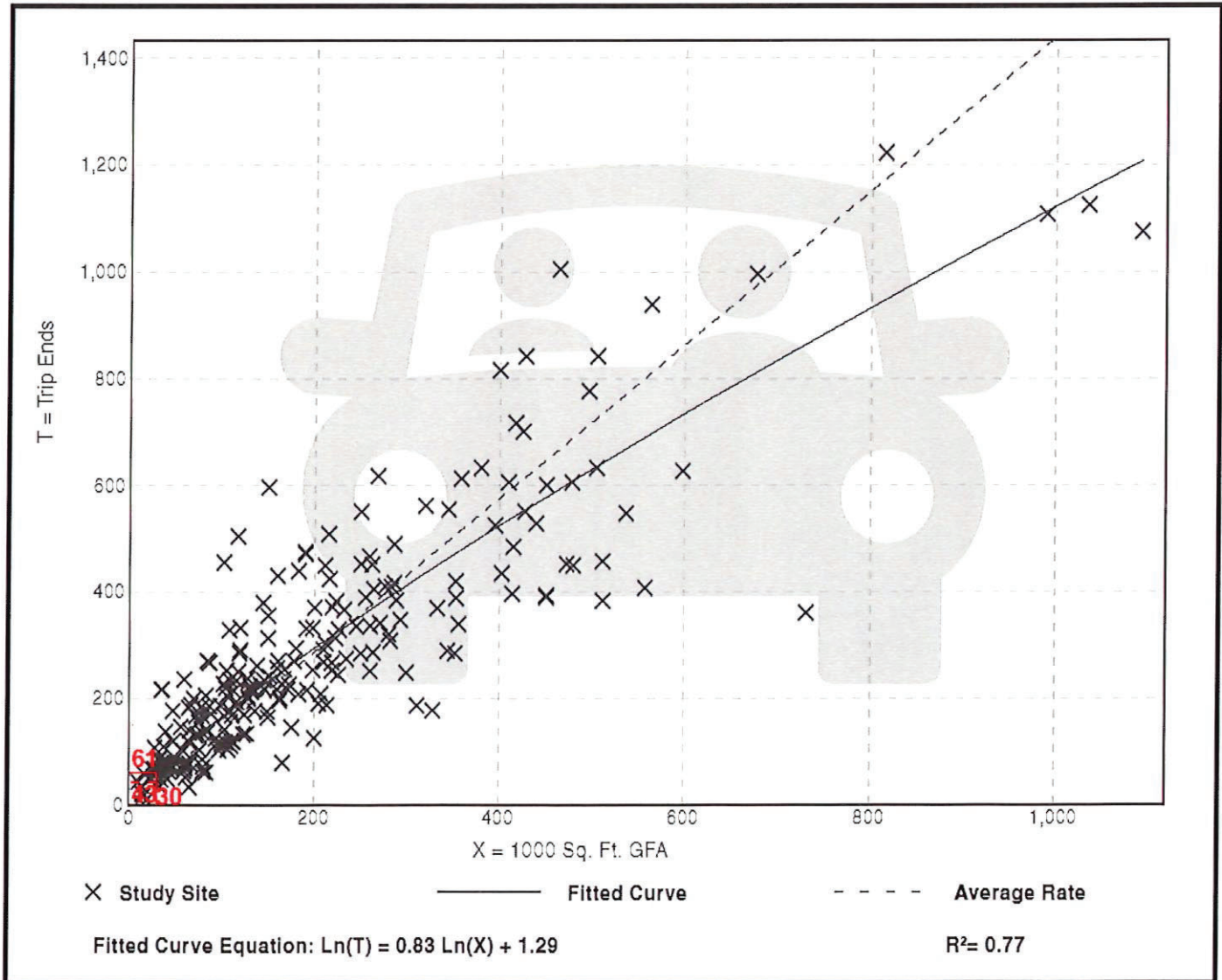
# General Office Building (710)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**  
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 232  
 Avg. 1000 Sq. Ft. GFA: 199  
 Directional Distribution: 17% entering, 83% exiting

## Vehicle Trip Generation per 1000 Sq. Ft. GFA

Average Rate	Range of Rates	Standard Deviation
1.44	0.26 - 6.20	0.60

## Data Plot and Equation



# Day Care Center (565)

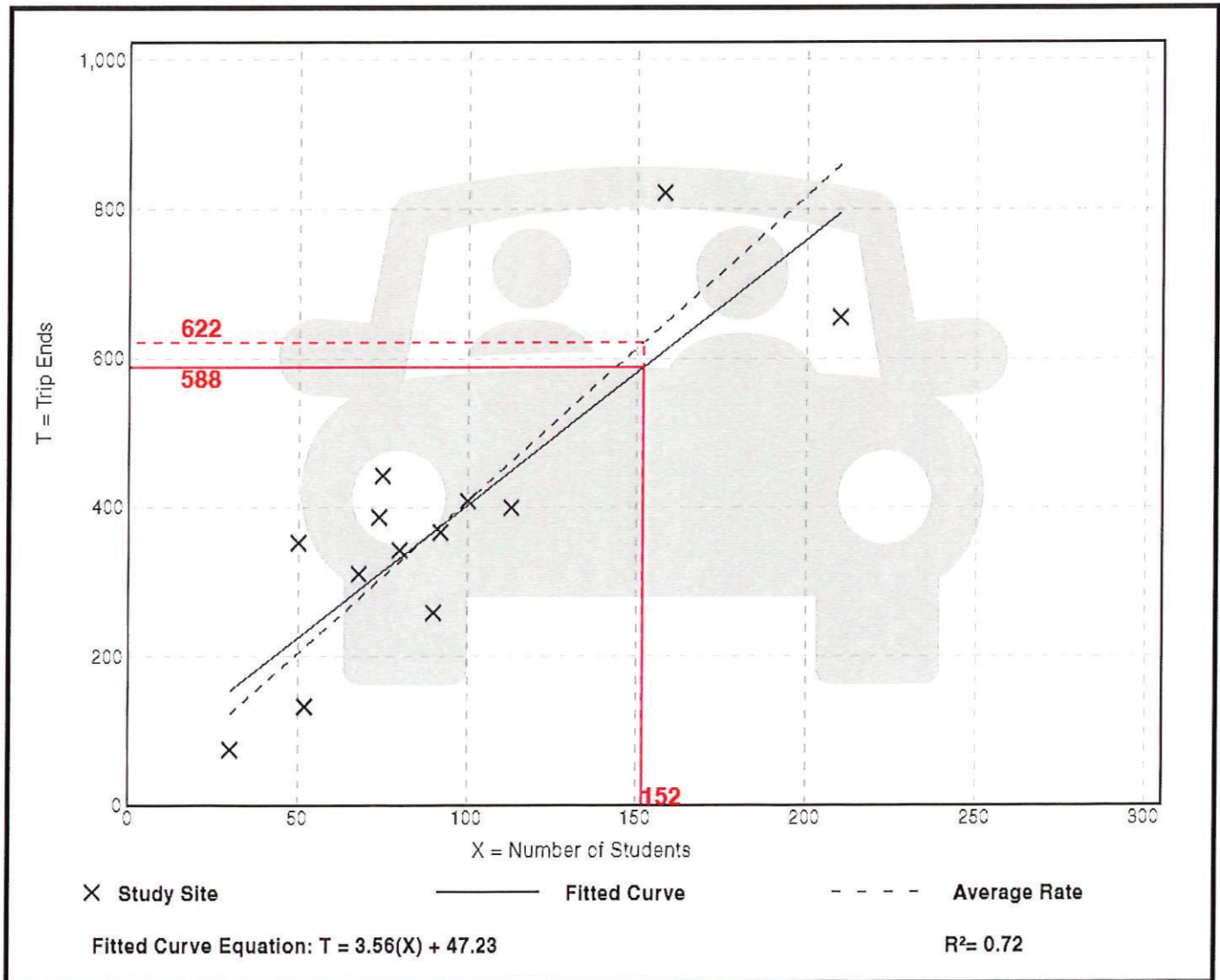
**Vehicle Trip Ends vs: Students**  
**On a: Weekday**

**Setting/Location: General Urban/Suburban**  
Number of Studies: 14  
Avg. Num. of Students: 89  
Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
4.09	2.50 - 7.06	1.21

## Data Plot and Equation



# Day Care Center (565)

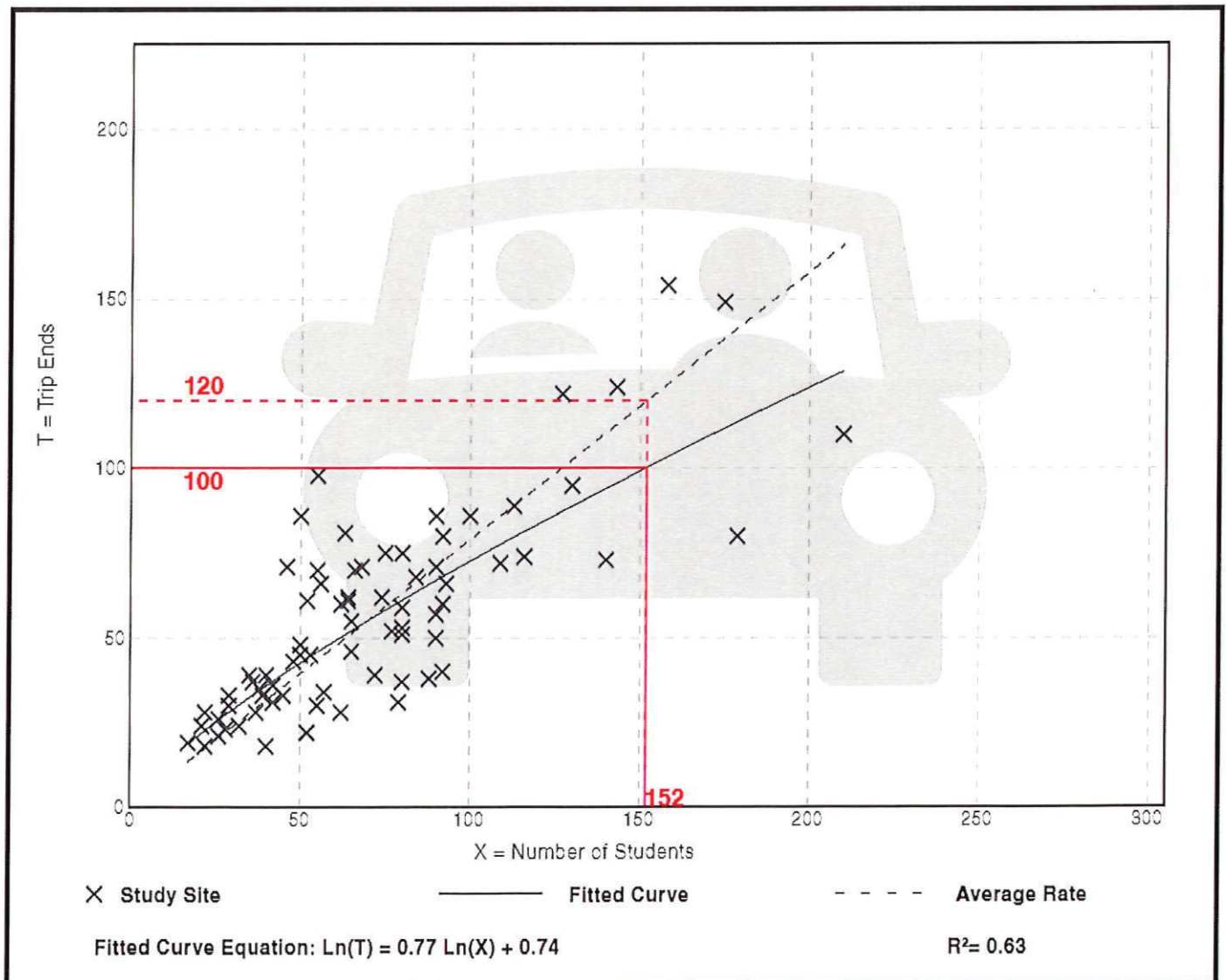
Vehicle Trip Ends vs: **Students**  
 On a: **Weekday,**  
**AM Peak Hour of Generator**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 75  
 Avg. Num. of Students: 71  
 Directional Distribution: 53% entering, 47% exiting

## Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
0.79	0.39 - 1.78	0.27

## Data Plot and Equation



# Day Care Center (565)

Vehicle Trip Ends vs: **Students**  
 On a: **Weekday,**  
**PM Peak Hour of Generator**

**Setting/Location: General Urban/Suburban**  
 Number of Studies: 75  
 Avg. Num. of Students: 71  
 Directional Distribution: 47% entering, 53% exiting

## Vehicle Trip Generation per Student

Average Rate	Range of Rates	Standard Deviation
0.81	0.29 - 1.72	0.30

## Data Plot and Equation

