

**MEMORANDUM**

Add PCD File #  
PPR-2315

To: El Paso County

From: Erick Berry, PE, RSP1 (Ayres Associates)

Date: February 15, 2023

Project No.: 24-0409.00

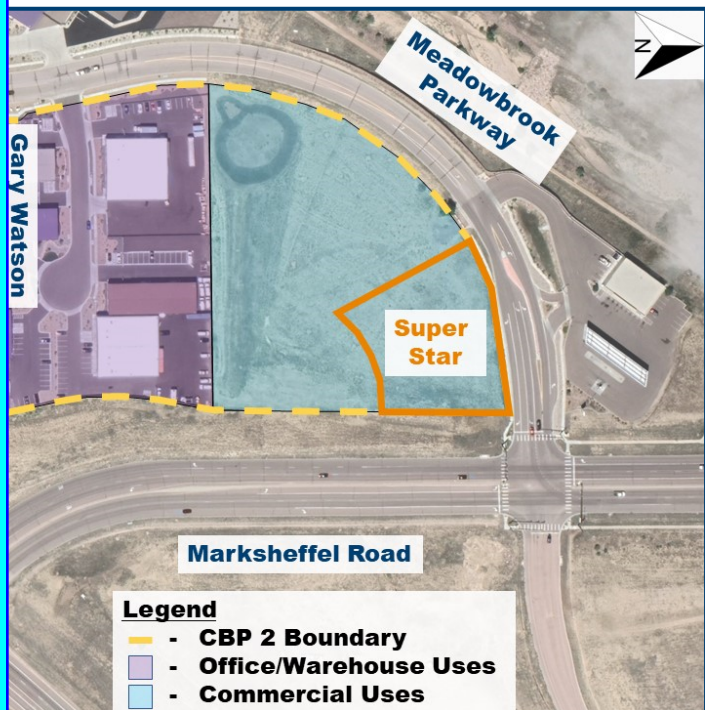
Re: Super Star Car Wash (Claremont Business Park 2) Traffic Compliance Letter

**Background**

Hammers Construction, Inc. contracted LSC Transportation Consultants, Inc. to prepare the July 2020 Claremont Business Park (Tract C, Filing 2) Transportation Memorandum for the Claremont Business Park 2 (CBP 2) development located in El Paso County, Colorado. The parcels on which the development is located are surrounded by the City of Colorado Springs limits; however, the CBP 2 parcels are not currently incorporated within the City. The development is located along the southeastern side of Meadowbrook Parkway, between Marksheffel Road and approximately 250 feet northeast of Woolsey Heights. The project location is shown in **Figure 1**.

The 2020 Memo analyzed the expected traffic impacts associated with the entire proposed CBP 2 development, a 13.72-acre site with approximately 34,000 square feet of gross floor area (GFA) for commercial uses and approximately 66,750 square feet of GFA for office and warehousing uses. At the time the memo was completed, in July of 2020, none of the CBP 2 development had been constructed. The 2020 Memo is included in **Attachment 1**.

*Figure 1 – Project Location*



**Traffic Impact Studies**

**Traffic Engineer's Statement**

The attached traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.

\_\_\_\_\_  
[Name, P.E. # \_\_\_\_\_] Date

**Developer's Statement**

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

\_\_\_\_\_  
[Name, Title] Date  
[Business Name]  
[Address]

Add signature page

Add table of contents

Please provide weekend traffic analysis as this period has the highest trip generation. Identify any changes to LOS, improvements etc. that are necessary due to the developments traffic.

Since the completion of the 2020 Memo, 34,000 square feet of GFA for office and warehouse uses has been developed, while the 34,000 square feet of GFA for commercial uses remains undeveloped. The northeastern corner of the commercial use area has been identified for the proposed construction of a Super Star Car Wash, as shown in **Figure 1**.

Super Star Car Wash retained Ayres Associates to complete a Traffic Compliance Letter for the proposed Super Star Car Wash. The purpose of this Traffic Compliance Letter is to perform a trip generation analysis for the Super Star Car Wash and verify that the expected trips generated by the proposed development are in compliance with the traffic analysis documented in the 2020 Memo.

## Trip Generation Analysis

The proposed Super Star Car Wash is expected to provide a single 150-foot-long car wash tunnel, along with three pay stations, and 29 vacuum stations, located on a 1.4-acre parcel in the northeastern corner of the CBP 2 development. The proposed site plan is included in **Attachment 2**.

A trip generation analysis was conducted for the proposed Super Star Car Wash, utilizing the methodology documented in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11<sup>th</sup> Edition. As described by ITE, the Trip Generation Manual contains text, tables, data plots, and statistics that describe the state-of-the-practice understanding of the relationship between walk, bicycle, transit, motor vehicle, and truck trip generation and characteristics associated with an individual development site or land use. The trip generation manual provides three methods for estimating trips at proposed developments: a data plot, a weighted trip generation rate, or a regression equation. Along with the weighted trip generation rate, a standard deviation value is also provided to indicate how widely dispersed the data points are around the calculated average.

Land Use 948, Automated Car Wash, was selected as the land use that best represented the proposed Super Star Car Wash. Land Use 948 currently features trip generation data for two time periods: a weekday PM peak hour and a Saturday peak hour. Based on the data available in the ITE Trip Generation Manual, the only time period analyzed in the 2020 Memo that could be evaluated was the weekday PM peak hour.

Although a direct comparison could not be made for two of the three trip generation periods evaluated in the 2020 Memo, considering the trip generation characteristics of a car wash, the PM peak hour is likely the peak time period that experiences the most significant traffic volumes during a typical weekday, and this time period could be evaluated. Super Star Car Wash stated that they serve approximately 400 vehicles during a typical weekday; however, they did not have any data to support this observation.

Based on the available trip generation, the Super Star Car Wash may generate the highest number of trips during a weekend peak hour. Considering that the 2020 Memo did not analyze expected trips for weekends, likely because this was not required by El Paso County, it was not possible to compare the expected weekend trips associated with the Super Star Car Wash.

Two independent variables are available for estimating trips associated with Land Use 948: gross floor area (GFA), and number of car wash tunnels. For the PM peak hour, the trip generation data based on the GFA includes one data point, while the trip generation data based on the number of car wash tunnels includes three data points. Both sets of data are based on small enough sample sizes that the ITE Trip Generation Manual recommends using them with caution.

When considering the validity of the trip generation data, the ITE Trip Generation Handbook, 3<sup>rd</sup> Edition, states that if the number of data points is one or two, the use of a different independent variable should be utilized, or local data for similar sites should be collected and utilized. The ITE Trip Generation Handbook also states that if the number of data points is three, four, or five, the collection and use of local data for similar sites is encouraged, but it is acceptable to utilize the data based on the three, four, or five data points. Based on the direction provided in the ITE Trip Generation Handbook, the number of car wash tunnels was selected as the preferred variable for the trip generation analysis.

The ITE Trip Generation Handbook does not include any pass-by trip reduction data for Land Use 948; therefore, no pass-by trip reductions were applied to the trip generation analysis.



The Super Star Car Wash is expected to generate 78 trips during the weekday PM peak hour. The Super Star Car Wash trip generation analysis results are summarized in **Table 1**. The trip generation land use description and data plots are included in **Attachment 3**.

**Table 1 – Super Star Car Wash Trip Generation Summary**

ITE Land Use (Code)	Size	Units	Time Period				
			Weekday PM Peak				
			Avg Rate	Std Dev	In	Out	Total
Automated Car Wash (948)	1.00	Car Wash Tunnel	77.5	33.07	50%	50%	78
					39	39	

### Trip Generation Comparison

The 2020 Memo analysis utilized the rates documented in the ITE Trip Generation Manual, 10<sup>th</sup> Edition. The analysis estimated the number of trips expected to be generated by the 66,750 square feet of GFA for office and warehouse uses, utilizing Land Use 150 (Warehousing), and estimated the number of trips expected to be generated by the 34,000 square feet of GFA for commercial uses, utilizing Land Use 820 (Shopping Center).

The analysis also assumed pass-by trip reductions were applicable for the commercial land uses and reduced the expected number of vehicle trips generated by the commercial land uses to determine the total net external vehicle trips.

The entire CBP 2 development was expected to generate approximately 2,635 net external vehicle trips on an average weekday, with 103 trips during the weekday AM peak hour, and 246 trips during the weekday PM peak hour. The 2020 Memo trip generation results are summarized in **Table 2**.

**Table 2 – 2020 Memo, Claremont Business Park 2 Trip Generation Summary**

ITE Land Use (Code)	Size	Units	Time Period						
			Weekday Daily	Weekday AM Peak		Weekday PM Peak			
			Total	In	Out	Total	In	Out	Total
Warehousing (150)	66.75	1,000 SF	151	26	8	34	10	26	36
Shopping Center (820)	33.80	1,000 SF	2,484	45	24	69	101	109	210
<b>Total</b>			<b>2,635</b>	<b>71</b>	<b>32</b>	<b>103</b>	<b>111</b>	<b>135</b>	<b>246</b>

As noted previously, the proposed 66,750 square feet of GFA for office and warehouse uses has been developed. The proposed Super Star Car Wash will be located within the currently undeveloped 34,000 square feet of GFA for commercial uses. Based on the 2020 Memo, 34,000 square feet of commercial uses were expected to generate 210 vehicular trips during the PM peak hour.



The number of weekday PM peak hour trips expected to be generated by the Super Star Car Wash is within the volume limits set by the weekday PM peak hour trips previously expected to be generated by the commercial uses within the CBP 2 development. Considering the difference between the expected trips generated by the Super Star Car Wash and the commercial uses of the CBP 2 development, the remaining undeveloped portions of the CBP 2 development may generate up to 132 trips during the PM peak hour. The comparison between the expected trips for the Super Star Car Wash and the commercial uses of the CBP 2 development is summarized in **Table 3**.

**Table 3 – Trip Generation Comparison Summary**

Development	ITE Land Use (Code)	Time Period						
		Weekday Daily	AM Peak Generation			PM Peak Generation		
		Total	In	Out	Total	In	Out	Total
Claremont Business Park	Shopping Center (820)	2,484	45	24	69	101	109	210
Super Star Car Wash	Automated Car Wash (948)	N/A	N/A	N/A	N/A	39	39	78
<b>Remaining Allowable Trips</b>		<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>N/A</b>	<b>62</b>	<b>70</b>	<b>132</b>

## Conclusion

Based on the results of this trip generation comparison, the construction of the proposed Super Star Car Wash is not expected to generate more traffic than calculated in the 2020 Memo.

At the time of the 2020 Memo, the proposed CBP 2 development included two proposed access points, provided as private streets, along Meadowbrook Parkway. The proposed south access point at Gary Watson Place, approximately 450 feet northeast of Woolsey Heights has been constructed. The proposed north access point at El Jefe Lane, approximately 490 feet west of Marksheffel Road, has not yet been constructed. While it is not specifically part of the Super Star Car Wash development, El Jefe Lane will serve as the only access to the development. El Jefe Lane is also expected to provide sole access to two other commercial use parcels.

The 2020 Memo developed a proposed lane configuration to provide an acceptable level of service for the intersection of Meadowbrook Parkway and El Jefe Lane. Considering the Super Star Car Wash development is expected to generate less than the total number of commercial land use trips analyzed in the 2020 Memo, the proposed lane configuration is expected to provide similar expected operations as documented in the 2020 Memo.

The 2020 Memo noted that an internal roadway, parallel to Meadowbrook Parkway, connecting El Jefe Lane and Gary Watson Place may be necessary at some point in the future. Upon the request of El Paso County, a 45-foot-wide easement connecting El Jefe Lane and Gary Watson Place was provided in the site plan included in the 2020 Memo. The Super Star Car Wash development will not be constructing this connection; however, it is also not expected to impact the easement outlined in the 2020 Memo.

The 2020 Memo stated that an exclusive southbound left-turn lane would be required at the intersection of Meadowbrook Parkway and Gary Watson Place. Based on the 2022 aerial imagery provided by Google Earth, it appears that this exclusive southbound left-turn lane has not yet been constructed. However, Super Star Car Wash will not utilize Gary Watson Place for access; therefore, this improvement is not specifically related to the proposed Super Star Car Wash.



While this trip generation should be noted **peak hour**. El Paso County

Provide analysis of the proposed access to El Jefe Heights. Identify whether any Aux. turn lanes are needed on El Jefe Heights into this driveway due to this developments traffic. Analyze the queuing to get into the site and the potential to back up into Meadowbrook parkway.

weekday PM peak hour; it **trips during a weekend** consider monitoring weekend

Based on the trip generation analysis documented in this letter, the Super Star Car Wash is expected to be in compliance with the July 2020 Claremont Business Park (Tract C, Filing 2) Transportation Memorandum. The potential traffic impacts associated with the Super Star Car Wash are expected to have been addressed by the 2020 Memo.

Provide line of sight analysis for driveway entrance into car wash from El Jefe Height. Utilize appropriate size truck and sight distance for road class in the commercial business/industrial use park area. State what the sight distance is for every affected access and whether it can be met. If it cannot be met, state the required modifications so that it can be met.

This was not detailed in the 2020 TIS.

Please coordinate with the developer to ensure that this TIS is in compliance with the updated TIS.

Comments were provided as part of the vacation/replat review PCD File # VR233 for updated traffic counts due based on age of 2020 study.

### B.3. - ASSESS TRAFFIC VOLUMES B.3.1. Existing Traffic

A.Roadway Traffic Volumes/Traffic Counts. Current A.M. and P.M. peak hour traffic counts as specified by the ECM Administrator shall be obtained for the roadways within the study area for one, non-holiday Tuesday, Wednesday, or Thursday. Each peak hour count shall be conducted over a two-hour period and shall include fifteen (15)-minute count data to clearly identify the peak hours.

Weekend counts and average daily counts on local roadways may also be required where appropriate when requested by the ECM Administrator. The DOT or CDOT average weekday traffic (AWT) counts may be used when available. Pedestrian counts and bicycle usage should be obtained. Vehicle classification counts may be required.

In any case, these volumes shall be no more than one year old (from the date of application submittal). The source(s) of each of the existing traffic volumes shall be explicitly stated. Summaries of current traffic counts shall be provided. The ECM Administrator may require the use of seasonal adjustment factors depending on when data was collected and if the project is considered to be in an area of higher risk for lower levels of services (i.e., Tourism).



**Attachment 1 – July 2020 Claremont Business Park (Tract C, Filing 2)  
Transportation Memorandum**



LSC TRANSPORTATION CONSULTANTS, INC.  
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Claremont Business Park (Tract C, Filing 2)  
Transportation Memorandum  
PCD No. SP197  
(LSC #195040)  
July 2, 2020\*

Traffic Engineer's Statement

This traffic report and supporting information were prepared under my responsible charge and they comport with the standard of care. So far as is consistent with the standard of care, said report was prepared in general conformance with the criteria established by the County for traffic reports.




Developer's Statement

I, the Developer, have read and will comply with all commitments made on my behalf within this report.

  
\_\_\_\_\_  
Steve Hammers

7-29-2020  
\_\_\_\_\_  
Date

  
\_\_\_\_\_  
Lena Gail Case

7/29/2020  
\_\_\_\_\_  
Date

\*minor revision 7/28/2020 per an EPC Comment



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July 2, 2020\*

Robert Green  
Hammers Construction  
1411 Woolsey Heights  
Colorado Springs, CO 80915

RE: Claremont Business Park 2  
El Paso County, CO  
Traffic Impact Study  
LSC #195040  
PCD No. SP197  
\*(minor rev.7/28)

Dear Mr. Green,

LSC Transportation Consultants, Inc. has prepared this transportation memorandum for the proposed development on Claremont Business Park 2 site in El Paso County, CO. Located generally southwest of the intersection of Marksheffel Road/Meadowbrook Parkway (El Paso County parcel ID 5408101054) within the Claremont Business Park, the 13.72-acre site is currently vacant. Access to the site is proposed to Meadowbrook Parkway via two access points. No direct access is proposed to US Highway 24 (US Hwy 24) or Marksheffel Road. This report has been prepared to accompany the amendment to the Claremont Commercial Filing No. 2 Preliminary Plan.

This site was studied previously in the report entitled "Claremont Commercial Filing No. 2 Updated Traffic Impact Study" dated July 6, 2018. The El Paso County PCD Project number is SP-17-004.

## REPORT CONTENTS

The preparation of this report included the following:

- An inventory of existing roadway and traffic conditions on major thoroughfares adjacent to the site, including surface conditions, functional classification, widths, pavement markings, traffic-control signs, posted speed limits, intersection and access spacing, roadway and intersection alignments, roadway grades, and auxiliary turn lanes;
- Weekday peak-hour turning-movement traffic counts at the intersection of Marksheffel Road/Meadowbrook Parkway;



- Estimated average weekday traffic (AWT) volumes adjacent to the proposed development on Marksheffel Road and Meadowbrook Parkway;
- Projections of 20-year background traffic volumes on Marksheffel Road and Meadowbrook Parkway;
- The proposed site land use and access plan;
- Estimates of average weekday and weekday peak-hour trip generation for the proposed industrial park and the estimated directional distribution of site-generated vehicle-trips on roadways and intersections adjacent to and in the vicinity of the site;
- Projected site-generated and resulting total peak-hour intersection traffic volumes at the following study-area intersections:
  - Marksheffel Road/Meadowbrook Parkway
  - Meadowbrook Parkway/El Jefe Lane
  - Meadowbrook Parkway/Gary Watson Place
- Projected total daily and peak-hour traffic volumes at the study-area intersections;
- Intersection level of service analysis at the study-area intersections;
- Queuing analysis on Meadowbrook Parkway between El Jefe Lane and Marksheffel Road;
- Evaluation of short- and long-term projected intersection volumes to determine potential requirements for any auxiliary right-/left-turn lanes at the proposed site access points based on the criteria in El Paso County's *Engineering Criteria Manual (ECM)*. Also included are potential long-term lane requirements; and
- Findings and recommendations for submittal to El Paso County.

#### **LIST OF OTHER TRAFFIC REPORTS USED IN THE PREPARATION OF THIS REPORT**

Previously-completed traffic reports in the vicinity of the proposed Claremont Business Park have been provided for reference and to provide context:

- Claremont Commercial Filing No. 2, Updated Traffic Impact Study – July 6, 2018
- Claremont Business Park, Tract C, Filing 2 – November 26, 2019
- Claremont Business Park (Filing 1A, Lot 2) – February 10, 2020

#### **LAND USE AND ACCESS**

Figure 1 shows the site location relative to the adjacent and nearby roadways. Located generally southwest of the intersection of Marksheffel Road/Meadowbrook Parkway (El Paso County parcel ID 5408101054), the 8.38-acre parcel is currently vacant. The anticipated land use for the 13.72-acre site consists of office/warehousing space. Of the 10 lots on the site's preliminary plan, seven lots access Gary Watson Place and three lots are provided access via El Jefe Lane. Also, the abutting 5.35 acres to the north is still planned for future commercial.

The following floor areas have been assumed for the proposed Claremont Business Park:

- 34,000 square feet for commercial uses (17 percent floor area ratio)
- 66,750 square feet for office/warehousing uses

Figure 1 shows the area circulation and access points to the adjacent public roads, while Figure 2 contains the proposed site plan showing the proposed land uses, on-site circulation, and proposed access points. Two full-movement, stop sign-controlled access points to Meadowbrook Parkway are proposed:

- El Jefe Lane (north site access) – 491 feet west of Marksheffel Road/Meadowbrook Parkway
- Gary Watson Place (south site access) located 780 feet south of the existing gas station access to the north and about 450 feet northeast of Woolsey Heights/Meadowbrook Parkway

The 2018 TIS report showed a street connection between this industrial site and the abutting commercial site to the north. This street connection has been removed from the plan. However, the plan includes a 45-foot-wide access easement between the proposed private access drive and the future commercial site to the north. It is anticipated that future plans for the commercial site to the north will also be required to show a matching/connecting access easement on that site plan. The access easement is at the request of El Paso County and the purpose is to allow for a potential future vehicular connection between the commercial site and this industrial site's internal access street/drive and access point to Meadowbrook Parkway, if ever needed in the future.

#### **ACCESS SIGHT DISTANCE**

Stopping sight distances along Meadowbrook Parkway and access sight distances prescribed in Tables 2-33 and 2-35, respectively, in ECM Section 2.4.1 will need to be maintained along the site frontage of Meadowbrook Parkway. Any site improvements including (but not limited to) landscaping, parking areas, buildings, monument signs etc. must not impede the required lines of sight. Note: there are no vertical curves on Meadowbrook Parkway that would limit sight distance.

#### **ROAD AND TRAFFIC CONDITIONS AND MTCP CLASSIFICATION**

Figure 1 shows the roads adjacent to and in the vicinity of the site. Adjacent roads serving the site are identified below, followed by a brief description of each:

**US Highway 24 (US Hwy 24)** is a state highway extending locally from the City of Colorado Springs to Peyton in a northeasterly direction and then continuing east. US Hwy 24 is classified as an Expressway by the Colorado Department of Transportation (CDOT) in the vicinity of the site and is shown as an Expressway on the El Paso County *Major Transportation Corridors Plan (MTCP)*. The 2040 MTCP shows US Hwy 24 to be upgraded to a 6-lane Expressway in the long-term.

**Marksheffel Road** is a Principal Arterial that extends north from the City of Fountain to Woodmen Road. It is currently a four-lane roadway with a posted speed limit of 50 mph adjacent to the study area. The intersection with Meadowbrook Parkway was recently signalized. Marksheffel Road is shown as a six-lane Expressway in the 2016 MTCP for 2060 corridor preservation.

**Meadowbrook Parkway** is a public, Non-Residential Collector that extends through the Claremont Business Park area from the US Hwy 24/SH 94 intersection to Marksheffel Road (generally parallel to US Hwy 24). Meadowbrook Parkway continues east from Marksheffel Road into Claremont Ranch to the east. Auxiliary left- and right-turn lanes currently exist on all approaches at the intersection of Meadowbrook/Marksheffel, which was recently signalized in early 2020. The posted speed limits on Meadowbrook are 35 mph west of Marksheffel and 25 mph east of Marksheffel.

### **Existing Traffic Volumes**

Vehicular turning-movement counts were conducted at the intersection of Marksheffel Road/Meadowbrook Parkway from 6:30-8:30 a.m. and from 4:00-6:00 p.m. on Tuesday, February 11, 2020. Figure 3 shows these turning-movement volumes, as well as the average weekday traffic volumes (estimated based on factored peak-hour count data) on the study-area roadways, including at the commercial access points north of the site. Raw count data is attached.

### **Crash History**

Three years of crash data were collected at the study intersections. The intersection of Meadowbrook Parkway/Marksheffel Road experienced nine crashes with two resulting in injuries. Of the nine crashes, five were broadside type crashes between an eastbound left-turning vehicle and a southbound through vehicle. All of these crashes occurred prior to the signal installation. With the signal, the rate of broadside crashes at this intersection is likely to drop.

The intersection of US Hwy 24/Marksheffel Road also had eight broadside crashes with no patterns and 13 rear-end crashes with no crash patterns.

### **PEDESTRIAN AND BICYCLE FACILITIES**

Meadowbrook Parkway has sidewalks and the street width is sufficient to accommodate bicycles. There is a 12-foot paved concrete trail along the west side of Marksheffel Road extending north from just south of the bridge just north of Meadowbrook.

### **TRIP GENERATION**

Estimates of the vehicle-trips projected to be generated by the proposed Claremont Business Park development have been made using the nationally published trip generation rates from *Trip Generation, 10<sup>th</sup> Edition, 2017* by the Institute of Transportation Engineers (ITE). Corresponding trip generation rates from the following ITE Land Use Categories have been used to develop the trip generation estimates for site buildout:

- 150 – Warehousing
- 820 – Shopping Center

Table 1 below presents a summary of the estimated external site trip generation. A detailed trip generation estimate for the industrial park, including ITE rates for the proposed land uses, is presented in Table 6 (attached). Figure 2 shows the layout within the proposed industrial park.

**Table 1: Estimated External Site Vehicle-Trip Generation**

Analysis Period	Weekday		
	In	Out	Total
Morning Peak Hour	75	35	110
Afternoon Peak Hour	122	148	270
Daily/24-hour	1,452	1,452	2,911

The proposed Claremont Business Park 2 Preliminary Plan is projected to generate about 2,911 total vehicle-trips on the average weekday during a 24-hour period, with approximately half entering and half exiting the site. During the morning peak hour, approximately 75 entering vehicles and 35 exiting vehicles would be generated. Approximately 122 entering and 148 exiting vehicles would be generated by the site during the afternoon peak hour.

Compared to trip-generation estimates in the previously-submitted traffic impact study for Claremont Business Park, the site would generate approximately:

- Average weekday 24-hour period – 309 fewer daily trips
- Morning peak hour – 8 fewer entering trip and 4 additional exiting trips
- Afternoon peak hour – 2 fewer entering trips and 16 fewer exiting trips

### **Pass-By and Diverted Trips**

The total number of trips to be generated by the site has also been aggregated by trip type to account for pass-by and diverted trips. A pass-by trip is one made by a motorist who would already be on an adjacent road regardless of the proposed development, but who stops in at the site while passing by. That pass-by motorist would then continue on his or her way to a final destination in the original direction. Table 6 (attached) shows the percent of the trips generated that were assumed to be pass-by trips. Non-primary trip percentage has been based on data from the *Trip Generation Handbook - An ITE Proposed Recommended Practice, 3rd Edition, 2014* by ITE and adjustments by LSC for site-specific conditions.

LSC has adjusted the average ITE percentage as pass-by trips for this site to only include trips from adjacent Meadowbrook Parkway. Diverted trips from adjacent US Highway 24 and Marksheffel Road are considered non-pass-by trips. These trips would be added to Meadowbrook Parkway and would result in altered turning movements at the nearby major intersections, but generally would not add “new impact” trips to US Highway 24 or Marksheffel Road. ITE-average percent of non-primary trips for shopping-related land used for this study are summarized in Table 6. The resulting primary and non-primary trips are shown in Table 6.

ITE *Trip Generation* estimated that the proposed Claremont Business Park development is projected to generate about 2,635 total non-pass-by vehicle-trips on the average weekday during a 24-hour period, with about half entering the site and half exiting the site during the afternoon peak hour. Compared to the previously-submitted traffic impact study, this represents a decrease of 301 daily external trips generated by the site.

## **TRIP DISTRIBUTION AND ASSIGNMENT**

### **Trip Directional Distribution**

The directional-distribution estimate of site-generated vehicle-trips to the study-area roads and intersections is a necessary component in determining the site's traffic impacts. Figure 5 shows the percentages of the site-generated vehicle-trips projected to be oriented to and from the site's major approaches. Estimates have been based on the following factors: the proposed new land use, the area roadway system serving the site, and the site's geographic location relative to the overall greater El Paso County/Colorado Springs area. Directional-distribution splits from LSC's previously-conducted Claremont Business Park traffic study (dated July 6, 2018) were used to estimate trip distributions and background volumes within the vicinity of the site.

### **Site-Generated Traffic**

Site-generated traffic volumes have been estimated at the following intersections:

- Marksheffel Road/Meadowbrook Parkway
- Meadowbrook Parkway/El Jefe Lane (proposed north full-movement site access)
- Meadowbrook Parkway/Gary Watson Place (proposed south full-movement site access)
- US Highway 24/Marksheffel Road
- US Highway 24/State Highway 94/Meadowbrook Parkway

These volumes have been calculated by applying the directional-distribution percentages estimated by LSC (from Figure 5) to the trip-generation estimates (from Table 6). Figure 6 shows the projected site-generated traffic volumes for the weekday morning and afternoon peak hours. The figure also shows the estimated average daily traffic volumes (ADTs).

### **2023 Short-Term Background Traffic Volumes**

Figure 4 shows LSC's estimates for projected short-term (year 2023) background traffic volumes, which were based on existing traffic volumes (from Figure 3) with a yearly growth rate of 2 percent. In addition, planned nearby developments that are anticipated to be constructed in the short term have been included in the background traffic, including Villas at Claremont.

Note: The Monument View Academy charter school is planned for a site within Claremont Ranch to the northeast. LSC is in the process of preparing a TIS report for that project. Please refer to that report (once completed), which will include projected traffic volumes/scenarios for that

project. That report will incorporate the site-generated traffic from this project into the “background traffic.”

**2023 Background + Site-Generated Traffic Volumes**

Figure 7 shows the sum of the 2023 background traffic volumes (from Figure 4) and site-generated peak-hour traffic volumes (shown in Figure 6). These volumes represent the projected short-term total traffic following site buildout. Laneage and traffic control at the study-area intersections following site buildout are shown in Figure 7.

**2040 Background Traffic Volumes**

Long-term background traffic volumes are estimates by LSC, based on the Colorado Department of Transportation (CDOT) twenty-year growth factor (about one and a half percent per year) on US Hwy 24 adjacent to the site. Additionally, traffic generated by planned adjacent and nearby developments has been included in 2040 background traffic volumes, as shown in Figure 8.

**2040 Total Traffic Volumes**

Figure 9 shows the sum of 2040 background traffic volumes (from Figure 8) plus site-generated traffic volumes (from Figure 6).

**LEVEL OF SERVICE ANALYSIS**

Level of service (LOS) is a quantitative measure of the level of congestion or delay at an intersection and is indicated on a scale from “A” to “F.” LOS A is indicative of little congestion or delay. LOS F indicates a high level of congestion or delay. Table 2 shows the level of service delay ranges for signalized and unsignalized intersections.

**Table 2: Intersection Levels of Service Delay Ranges**

Level of Service	Signalized Intersections	Unsignalized Intersections
	Average Control Delay (seconds per vehicle)	Average Control Delay (seconds per vehicle) <sup>1</sup>
A	≤ 10.0	≤ 10.0
B	10.1 – 20.0	10.1 – 15.0
C	20.1 – 35.0	15.1 – 25.0
D	35.1 – 55.0	25.1 – 35.0
E	55.1 – 80.0	35.1 – 50.0
F	≥ 80.1	≥ 50.1

<sup>1</sup> For unsignalized intersections, if V/C is > 1.00, then LOS is LOS F regardless of the projected average control delay per vehicle

LOS values have been included on each figure for each turning movement/approach during the weekday morning and afternoon peak hours for the proposed site-access intersections and off-site intersections in the study area:

- Figure 3: 2020 Existing Traffic, Lane Geometry, Traffic Control, and LOS
- Figure 4: 2023 Background Traffic, Lane Geometry, Traffic Control, and LOS
- Figure 7: 2023 Background + Site Traffic, Lane Geometry, Traffic Control, and LOS
- Figure 8: 2040 Background Traffic, Lane Geometry, Traffic Control, and LOS
- Figure 9: 2040 Background + Site Traffic, Lane Geometry, Traffic Control, and LOS

The following intersections were analyzed for LOS values on “part a” of Figures 3, 4, 7, 8, and 9:

- Marksheffel Road/Meadowbrook Parkway
- Meadowbrook Parkway/El Jefe Lane (proposed north full-movement site access)
- Meadowbrook Parkway/Gary Watson Place (proposed south full-movement site access)

The following intersections were analyzed for LOS values on “part b” of Figures 3, 4, 7, 8, and 9:

- US Highway 24/Marksheffel Road
- US Highway 24/State Highway 94/Meadowbrook Parkway

LOS calculations for long-term scenarios were based upon recommended lane geometries and traffic controls outlined in the figures above (which were based on recommended improvements in LSC’s previously-conducted Claremont Business Park traffic study, dated July 6, 2018).

### **Marksheffel Road/Meadowbrook Parkway**

#### Short-Term

Overall, the intersection of Marksheffel Road/Meadowbrook Parkway is projected to operate at LOS B during the short term upon site buildout. The eastbound through, westbound left-turn, and westbound through lanes are projected to operate at LOS E during at least one short-term peak hour. However, analysis results show a volume-to-capacity (v/c) ratio to be well below 1.00 for the eastbound through turning movement during all short-term traffic scenarios. This is not uncommon for minor street approaches on arterial streets to operate at levels of service E or even F during peak periods, as signal timings would be adjusted to favor heavier northbound and southbound through volumes on Marksheffel Road. All other individual turning movements are expected to operate at LOS D or better during both short-term peak hours, with or without the site-generated traffic.

#### Long-Term

During the long term, the intersection of Marksheffel/Meadowbrook is projected to operate at LOS C or better *overall* during both peak hours. However, the following individual turning movements are projected to operate at LOS E or worse during at least one peak hour due to high through volumes on Marksheffel Road: eastbound through, westbound left, westbound through,

and northbound left. Levels of service in the E range are due to the assumed long cycle length and minimum phase splits for eastbound/westbound to maximize green time and signal progression for northbound Marksheffel Road.

### **Meadowbrook Parkway/Gary Watson Place (South Site Access)**

All individual turning movements and approaches are projected to operate at LOS B or better during the short-term as a two-way stop sign-controlled intersection during both the short- and long-term traffic scenarios. Please refer to Figure 7 and Figure 9 for recommended lane configurations and LOS summaries at this intersection during the short- and long-term scenarios, respectively.

### **Meadowbrook Parkway/El Jefe Lane (North Site Access)**

#### Short-Term

All individual turning movements and approaches are projected to operate at LOS B or better during the short-term as a two-way stop sign-controlled intersection with the addition of a westbound left-turn deceleration lane. Please refer to Figure 7 for lane configuration analyzed and LOS summaries at this intersection during the short-term scenario.

#### Long-Term

The PM peak-hour LOS analysis indicates the northbound approach is projected to operate at LOS F. Despite this Synchro-reported LOS F (HCM methodology) for the northbound approach projection during the afternoon peak hour, gaps created from the nearby signal at Marksheffel/Meadowbrook would allow northbound vehicles exiting the site to turn left onto Meadowbrook. Also, analysis assuming a separate northbound right-turn lane on this northbound approach shows improvement of the northbound right-turn movement to LOS B. Please refer to Figure 9 for analysis lane configurations and reported lane group levels of service at the proposed north site access during the long-term scenario.

### **Marksheffel Road/US 24**

#### Short Term

The intersection of Marksheffel Road/US 24 is projected to operate at LOS E and LOS D overall during the morning and evening short-term peak hours, respectively, with or without the addition of short-term site-generated traffic. Southeast through- and northwest through-turning movements are projected to operate at LOS E or worse before and after considering site-generated traffic during the morning and afternoon peak hour, respectively. All other turning movements at this intersection are projected to operate at LOS D or better during the short term upon site buildout.



### Long Term

The intersection of Marksheffel Road/US 24 is projected to operate at LOS F overall during both the 2040 morning and afternoon peak hours, with and without considering site-generated traffic. High through volumes on US 24 and a high northeast-bound to north-bound left-turn volume (background traffic) are projected to result in LOS F overall operational performance during the 2040 evening peak hour.

### **US 24/Meadowbrook Parkway/SH 94**

#### Short Term

Overall, this intersection is projected to operate at LOS D or better during both the short-term morning and evening peak hours. The southwest-through turning movement at this intersection is projected to operate at LOS E during the morning peak hour, with or without the addition of site-generated traffic. All other individual turning movements would continue to operate at LOS D or better upon short-term buildout.

#### Long Term

Due to high through volumes on US 24 and a high left-turn volume from westbound SH 94 to southwest-bound US Hwy 24 (background traffic), the intersection of US Hwy 24/SH 94/Meadowbrook Parkway is projected to operate at LOS F overall during the 2040 morning peak hour and LOS D overall during the 2040 evening peak hour. The southwest-bound through movement is projected to operate at LOS F during the 2040 morning peak hour, while the northeast-bound through and southeast-bound through turning movements are projected to operate at LOS E during the 2040 afternoon peak hour. All other approaches are projected to operate at LOS D or better during both peak hours.

## **VEHICLE QUEUING**

### **Marksheffel Road/Meadowbrook Parkway**

This section contains the projected 95th-percentile queues for the eastbound approach at the intersection of Meadowbrook Parkway/Marksheffel Road and for the westbound left turn at El Jefe Lane. Projected queue lengths have also been shown for other key turning movements at this intersection. Table 3 through Table 5 present the 95th percentile queues reported on the Synchro analysis reports.

Both tables show the existing back-to-back left-turn vehicle storage lengths and the available stacking distance between the two intersections for the eastbound through/right lane. The latter distance is a function of the intersection spacing. The 95th-percentile queues for the projected short-term background plus site-generated and 2040 background plus site-generated scenarios are shown in the tables.

Short-Term

Short-term scenario queue reports indicate that the 95th-percentile eastbound queues would **not** exceed the available stacking length during either peak hour. Synchro queueing reports indicated a 95th-percentile queue length of 39 feet and 126 feet in the short-term A.M. and P.M. peak hours, respectively.

**Table 3: 95th-Percentile Queues (2023 Background + Site)  
 Marksheffel/Meadowbrook – Eastbound Left Turn Movement**

Turning Movement	A.M. Peak	P.M. Peak
Storage Length (ft)	225'	225'
Taper Length (ft)	50'	50'
95th-percentile Queue (ft)	39'	126'
Source: 95th-percentile queues from the Synchro reports		

Long-Term

Synchro queueing reports indicated a 95th-percentile queue length of 95 feet and 218 feet in the long-term A.M. and P.M. peak hours, respectively.

**Table 4: 95th-Percentile Queues (2040 Background + Site)  
 Marksheffel/Meadowbrook – Eastbound Dual Left-Turn Lanes**

Turning Movement	A.M. Peak	P.M. Peak
Storage Length (ft)	225'	225'
Taper Length (ft)	50'	50'
95th-percentile Queue (ft)	95'	218'
Source: 95th-percentile queues from the Synchro reports		

The 95th-percentile northbound left-turn queue on Marksheffel Road approaching Meadowbrook Parkway is projected to be about 142 feet and 60 feet long during the 2040 morning and afternoon peak hours, respectively. These queue lengths are based on the projected long-term total traffic volumes. The full-width lane length not including taper is about 420 feet.

**Meadowbrook Parkway/El Jefe Lane**

The proposed westbound left-turn lane into the north site access point (El Jefe Lane) from Meadowbrook Parkway is 75 feet long plus a 65-foot taper. This stacking distance would provide adequate storage capacity to accommodate the projected 95th-percentile queues, as shown in Table 5.

**Table 5: 95<sup>th</sup> Percentile Queue Lengths  
 Meadowbrook Parkway/El Jefe Lane – Westbound Left Turn**

Traffic Scenario	Storage Length	Taper Length	95th-Percentile Queue
<b>A.M. Peak Hour</b>			
2023 Background + Site	75'	65'	5'
2040 Background + Site	75'	65'	5'
<b>P.M. Peak Hour</b>			
2023 Background + Site	75'	65'	10'
2040 Background + Site	75'	65'	15'
Source: 95th-percentile queues from the Synchro reports			

**AUXILIARY TURN LANE ANALYSIS, INTERSECTION CONFIGURATION, AND TRAFFIC CONTROL**

Turn lanes associated with the north access were previously addressed with deviation requests. The turn lanes on Meadowbrook between El Jefe and Marksheffel cannot meet ECM criteria for deceleration plus storage plus taper due to the set intersection spacing. Note: deviation requests for these auxiliary turn lanes were approved by the County in 2018.

**Marksheffel Road/Meadowbrook Parkway**

The following auxiliary turn lanes were added at this intersection as part of an El Paso County intersection improvement project. No modifications would be required for the following auxiliary turn lanes as a result of site-generated traffic at this intersection:

- Dual eastbound left-turn deceleration lanes – 210 feet plus 55-foot taper
- Westbound left-turn deceleration lane – 300 feet plus 165-foot taper
- Westbound right-turn deceleration lane – 190 feet plus 125-foot taper

Additionally, an eastbound right-turn deceleration lane (195 feet plus 95-foot taper) was previously added as part of an El Paso County intersection improvement project.

**Meadowbrook Parkway/El Jefe Lane**

According to the El Paso County *Engineering Criteria Manual* (ECM), exclusive left-turn lanes shall be provided for any access on a Minor Arterial or Collector with a projected peak-hour ingress turning volume of 25 vehicles per hour (vph) or greater. The projected left-turn volumes at the north site access point (El Jefe Lane) is expected to exceed the minimum left-turn volume thresholds prescribing a turn lane outlined in the *ECM* upon site buildout. A westbound left-turn bay exists (75 feet plus 65-foot taper), as it was included in the recent redesign/improvement project at Meadowbrook Parkway/Marksheffel. No modifications to this westbound left-turn lane following site buildout.

Please refer to the Meadowbrook Parkway/Marksheffel intersection plans (project completed, plan sheet attached for reference), which shows the configuration of the back-to-back left-turn lanes on Meadowbrook Parkway between the north site access (El Jefe Lane) and Marksheffel Road. A westbound right-turn deceleration lane on Meadowbrook Parkway (for traffic turning right into the access/El Jefe Lane) would **not** be required at the proposed north site access (El Jefe Lane) based on projected turning movement volumes.

Note: Per the preliminary plan, ROW is being dedicated along the south side of Meadowbrook Parkway between Marksheffel and El Jefe Way. ROW reservation is being provided between El Jefe and Gary Watson Place. These were incorporated into the plan to accommodate potential future widening for additional laneage if ever needed.

### **Meadowbrook Parkway/Gary Watson Place**

A southbound auxiliary left-turn lane would be required at the proposed south site access (Gary Watson Place) based on projected turning-movement volumes. Meadowbrook Parkway has sufficient width for a striped center left-turn lane. Per ECM criteria, this southbound left-turn deceleration lane would be 315 feet long (155-foot lane length plus a 160-foot taper).

## **ROADWAY CLASSIFICATIONS**

Meadowbrook Parkway is an Urban, Non-Residential Collector Street. El Jefe Way and Gary Watson Place are proposed to be private streets.

## **COUNTY ROAD IMPROVEMENT FEE PROGRAM**

### **Transportation Impact Fees**

Per ECM Appendix B: *State what the current applicable Transportation Impact Fees are and what option the developer will be selecting for payment.*

It is our understanding that this site is within the Central Marksheffel District and will not be assessed any additional fees through the El Paso County Road Impact Fee program.

### **Reimbursable Improvements**

There are no El Paso County MTCP roadway improvement projects in the study identified by the year 2040 per Map 13 and Table 4 of El Paso County's 2016 MTCP.

## **MULTI-MODAL TRANSPORTATION AND TDM OPPORTUNITIES**

Meadowbrook Parkway has sidewalks and the street width is sufficient width to accommodate bicycles. There is a 12-foot wide paved concrete trail along the west side of Marksheffel Road

extending north from just south of the bridge just north of Meadowbrook. There is connectivity to the future Rock Island Regional Trail through the neighborhood to the north. The US Highway 24 PEL Study shows a proposed multi-use path along the north side of the highway. Mountain Metro Transit does not currently provide service adjacent to this site. However, the nearest route runs along Peterson Road (north of Galley). This is reasonably accessible via bicycle and the transit busses are furnished with bicycle racks. Transit service may expand to the east as growth continues to the east.

## **FINDINGS AND CONCLUSIONS**

- The site is projected to generate about 2,911 new driveway vehicle-trips on the average weekday.
- During the weekday morning peak hour of adjacent street traffic, 75 vehicles would enter the site while 35 vehicles would exit.
- During the weekday afternoon peak hour of adjacent street traffic, 122 vehicles would enter the site while 148 vehicles would exit.
- The northbound approach at the site access (El Jefe Lane) is projected to operate at LOS F during the PM peak hour. Please refer to the “Level of Service” section above for detailed LOS results and discussion regarding this reported level of service.
- Please refer to the “Auxiliary Turn Lane Analysis” section for evaluation of potential turn lane needs. With the development of the commercial site, LSC recommends consideration of the potential addition of a dedicated, separate northbound right-turn lane on El Jefe approaching Meadowbrook - for traffic exiting the commercial area. This shows improvement to LOS B for the right-turn movement.
- A southbound left-turn deceleration lane would be required based on projected total volumes at the intersection of Meadowbrook Parkway/Gary Watson Place. The owner of the commercial parcel has reserved additional potential future ROW along the south side of Meadowbrook Parkway to accommodate potential future widening for additional laneage if ever needed.
- Please refer to the “Auxiliary Turn Lane Analysis, Intersection Configuration, and Traffic Control” section for detailed findings/recommendations regarding turn lanes at the study area intersections.
- Meadowbrook Parkway is an Urban, Non-Residential Collector Street. El Jefe Way and Gary Watson Place are proposed to be private streets.
- Please refer to the “Queuing Analysis” section above for additional details. Long-term indicated that the eastbound 95<sup>th</sup> percentile left-turn queue at Marksheffel/Meadowbrook is

**not** projected to exceed the dual left-turn lane length during the morning or afternoon peak hour.

- Although the 95<sup>th</sup> percentile queue lengths from the Synchro reports are not greater than the available stacking lengths, there is the potential for queues to periodically back to the El Jefe/Meadowbrook intersection. Should eastbound vehicle queues more regularly begin extending back from Marksheffel/Meadowbrook to or through the El Jefe/Meadowbrook intersection, a “DO NOT BLOCK INTERSECTION” sign (MUTCD R10-7) could be installed on the eastbound approach to this intersection. This would notify eastbound motorists of the periodic need (during peak periods) to allow for a gap at the intersection – not only for traffic to turn from the side street onto Meadowbrook, but also not to impede the westbound left-in movement from Meadowbrook onto El Jefe and into the commercial site. Also, the owner of the commercial parcel has reserved additional potential future ROW along the south side of Meadowbrook Parkway to accommodate potential future widening/additional laneage if needed in the future.
- At some future date/time, a vehicular connection within the platted access easement between the commercial and industrial areas may need to be added in the future to provide an alternative to the north access. Another possibility could be to add another commercial access point (if necessary) between Lot 9 and Tract B with the commercial development. This would likely also be a private street/access, but would meet the local street spacing criteria along a Non-Residential Collector street (330 feet, per ECM Table 2-7).

\* \* \* \* \*

Please contact me if you have any questions regarding this report.

Respectfully Submitted,

LSC TRANSPORTATION CONSULTANTS, INC.

By: Jeffrey C. Hodsdon, P.E.  
Principal

JAB:jas

Enclosures: Table 6  
Figure 1 - Figure 9  
Traffic Count Reports  
SimTraffic Queue Reports  
Synchro LOS Reports

# Tables and Figures

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**Table 6: Detailed Trip Generation Estimate**

Code	ITE Description	Value	Units <sup>1</sup>	Trip Generation Rates <sup>2</sup>				% Internal	Driveway Trips Generated					% Pass-by	New External Trips Generated					
				Average Weekday	A.M.*		P.M.		Average Weekday	A.M.		P.M.			Average Weekday	A.M.		P.M.		
					In	Out	In	Out		Weekday	In	Out	In	Out		Weekday	In	Out	In	Out
<b>Previously-Approved Land Uses (July 2018)</b>																				
130	Industrial Park	6.260	Acres	61.17	6.81	1.39	1.79	6.74	0%	383	43	9	11	42	0%	383	43	9	11	42
820	Shopping Center	27.800	KSF	106.30	1.53	0.83	4.21	4.57	4%	2837	41	22	112	122	10%	2553	37	20	101	110
									<b>Total</b>	<b>3220</b>	<b>83</b>	<b>31</b>	<b>124</b>	<b>164</b>	<b>Total</b>	<b>2936</b>	<b>79</b>	<b>29</b>	<b>112</b>	<b>152</b>
<b>Currently-Proposed Land Uses</b>																				
150	Warehousing	66.750	KSF	2.26	0.38	0.11	0.14	0.39	0%	151	26	8	10	26	0%	151	26	8	10	26
820	Shopping Center	33.800	KSF	85.07	1.53	0.83	3.46	3.75	4%	2760	50	27	112	122	10%	2484	45	24	101	109
									<b>Total</b>	<b>2911</b>	<b>75</b>	<b>35</b>	<b>122</b>	<b>148</b>	<b>Total</b>	<b>2635</b>	<b>70</b>	<b>32</b>	<b>111</b>	<b>136</b>
<b>Change in Trip Generation</b>																				
150	Warehousing	-	-	-	-	-	-	-	-	-232	-17	-1	-2	-16	-	-232	-17	-1	-2	-16
820	Shopping Center	-	-	-	-	-	-	-	-	-77	9	5	0	0	-	-69	8	4	0	0
									<b>Total</b>	<b>-309</b>	<b>-8</b>	<b>4</b>	<b>-2</b>	<b>-16</b>	<b>Total</b>	<b>-301</b>	<b>-9</b>	<b>3</b>	<b>-2</b>	<b>-16</b>

<sup>1</sup> KSF = 1,000 square feet of floor space

<sup>2</sup> Source: "Trip Generation, 10th Edition, 2017" by the Institute of Transportation Engineers (ITE)

Note: A.M. Shopping Center rates were modified to match rates used in previous submittal (July 2018)



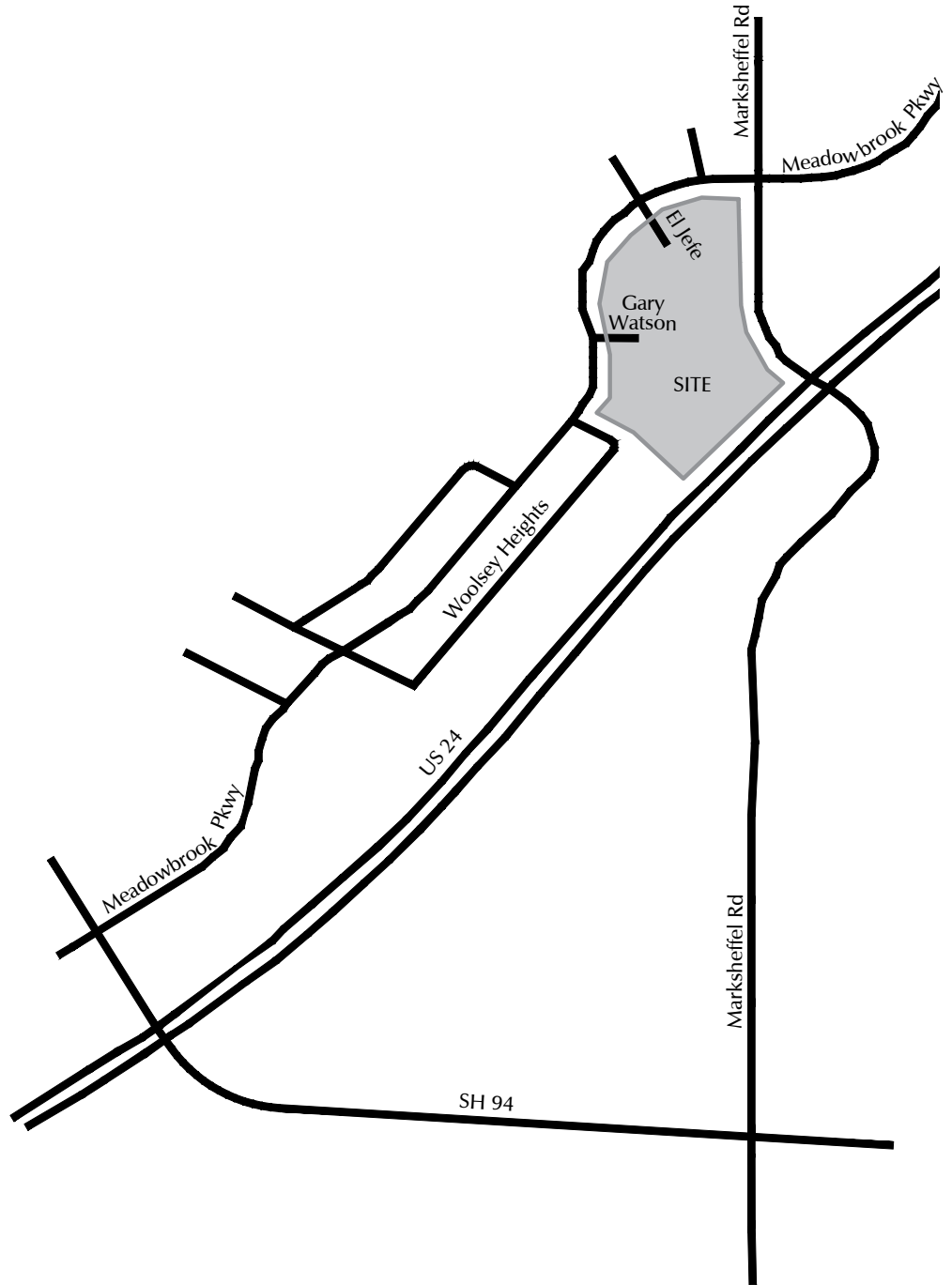
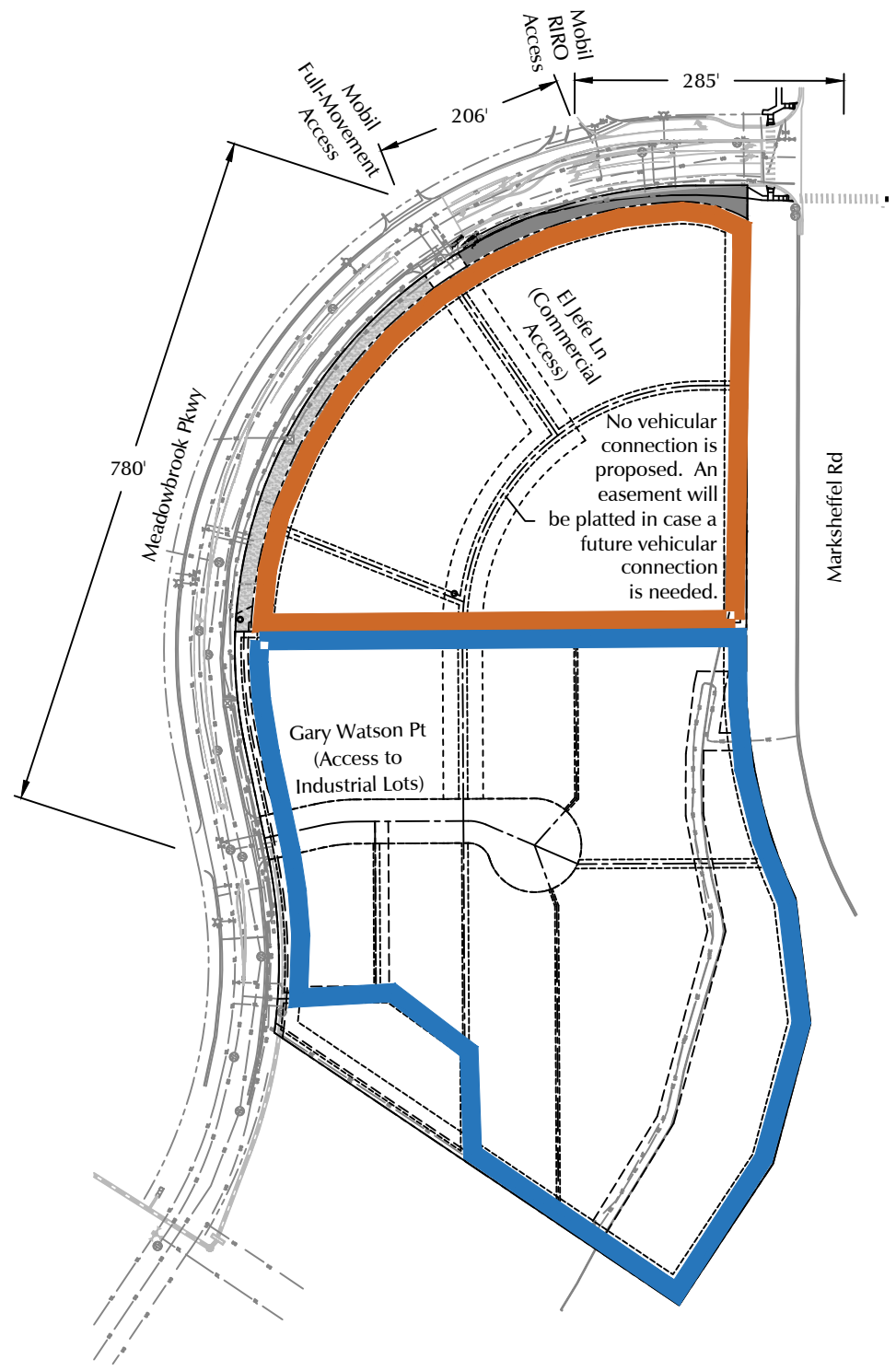




Figure 1  
Vicinity Map

Claremont Business Park 2 (LSC # 195040)



-  Future Commercial/Retail
-  Industrial Park

Note: See attached for lot details

Figure 2  
Site Plan





## **Attachment 2 – 2022 Super Star Car Wash Proposed Site Plan**



VICINITY MAP N.T.S.

PROJECT SUMMARY

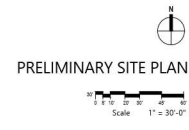
**SUPER STAR CAR WASH**

ID: 540541.0007  
 ZONE: CS CAD-0  
 SITE AREA: ±1.4 AC (60,994 SF)  
 PROPOSED CAR WASH USE  
 TOTAL BUILDING AREA: ±5,250 SF  
 - 150 CARWASH BAY / TUNNEL  
 - 3 PAY STATIONS  
 - 28 VACUUM STATIONS  
 CONSTRUCTION TYPE: V-B  
 OCCUPANCY: B

NOTE:  
 THE PRELIMINARY INFO ON THIS EXHIBIT ARE BASED ON A SCALED IMAGE,  
 AND SUBJECT TO ADJUSTMENT ANY FURTHER DEVELOPMENT IS SUBJECT  
 TO A THOROUGH SITE INVESTIGATION, THE APPROVAL OF CLIENTS, AND  
 GOVERNMENTAL AGENCIES.



**MEADOWBROOK PKWY**  
 COLORADO SPRINGS, CO 80915





## **Attachment 3 – Trip Generation Analysis Data**

# Land Use: 948

## Automated Car Wash

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### **Description**

An automated car wash is a facility that allows for the mechanical cleaning of the exterior of vehicles. Manual cleaning service may also be available at the facility. Self-service car wash (Land Use 947) and car wash and detail center (Land Use 949) are related uses.

### **Additional Data**

The sites were surveyed in the 1990s and the 2000s in New Jersey, New York, and Washington.

### **Source Numbers**

552, 555, 585, 599, 954

# Automated Car Wash (948)

**Vehicle Trip Ends vs: Car Wash Tunnels**  
**On a: Weekday,**  
**Peak Hour of Adjacent Street Traffic,**  
**One Hour Between 4 and 6 p.m.**

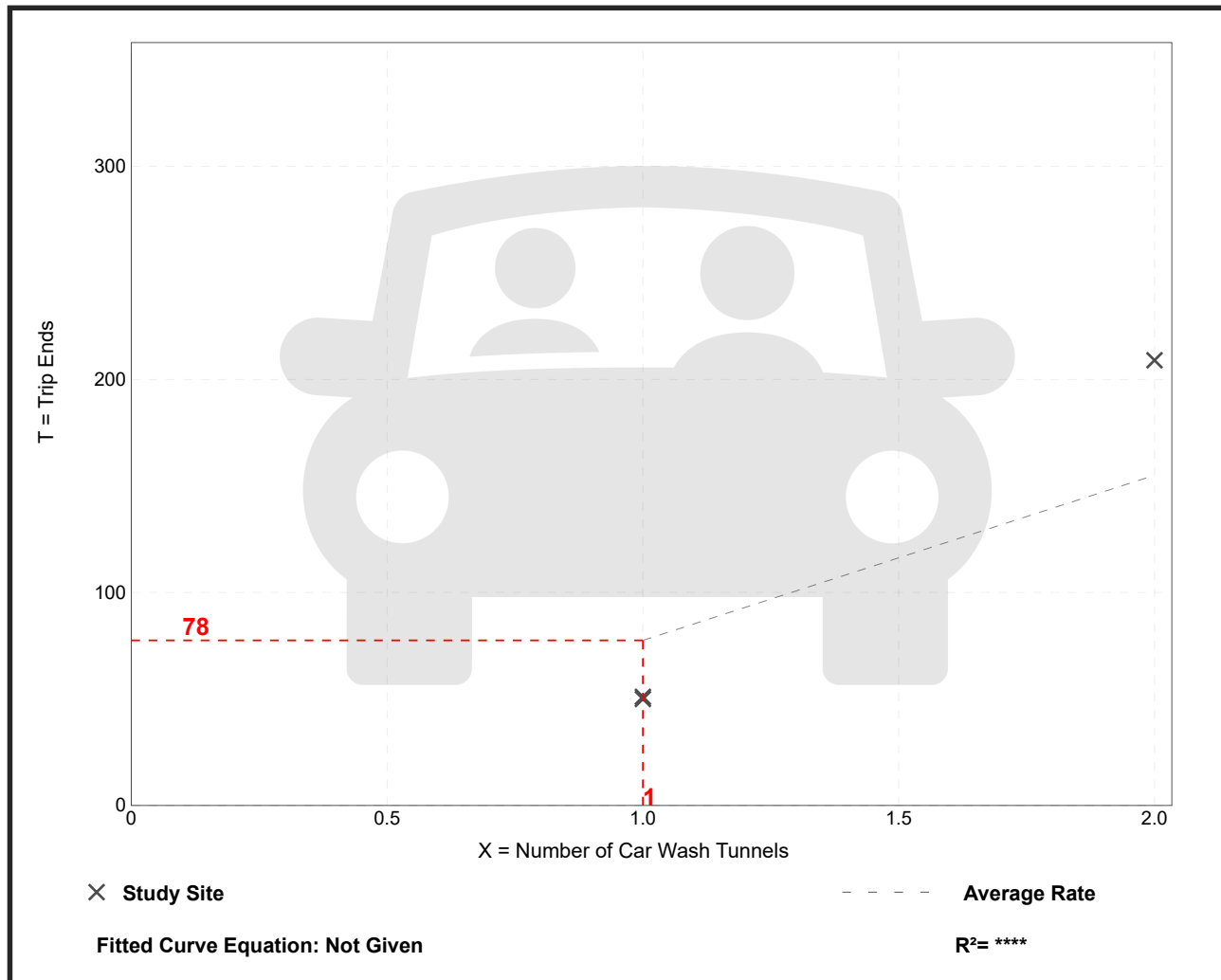
**Setting/Location: General Urban/Suburban**  
 Number of Studies: 3  
 Avg. Num. of Car Wash Tunnels: 1  
 Directional Distribution: 50% entering, 50% exiting

## Vehicle Trip Generation per Car Wash Tunnel

Average Rate	Range of Rates	Standard Deviation
77.50	50.00 - 104.50	33.07

## Data Plot and Equation

*Caution – Small Sample Size*



# Automated Car Wash (948)

Vehicle Trip Ends vs: Car Wash Tunnels

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 1

Avg. Num. of Car Wash Tunnels: 1

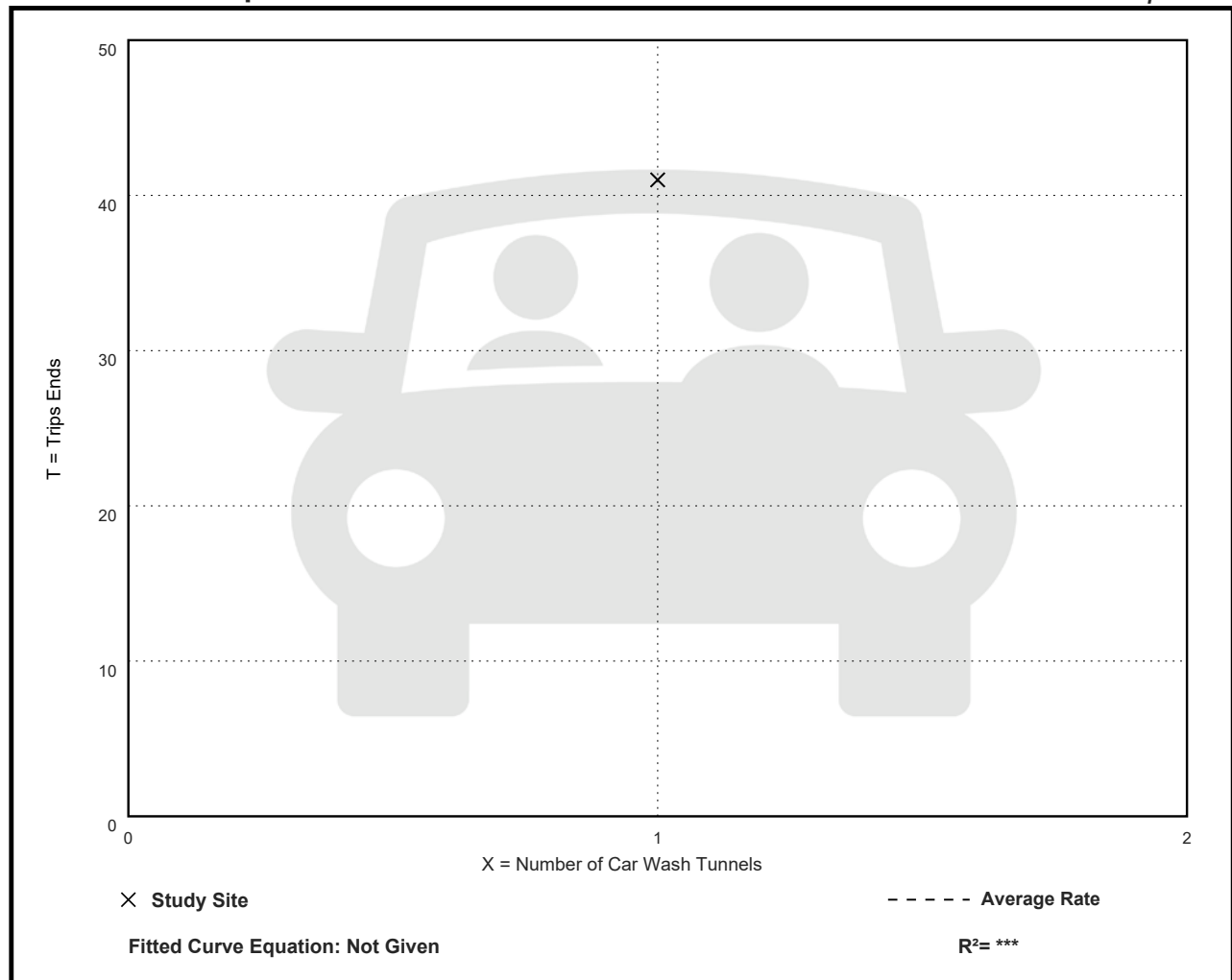
Directional Distribution: 46% entering, 54% exiting

## Vehicle Trip Generation per Car Wash Tunnel

Average Rate	Range of Rates	Standard Deviation
41.00	41.00 - 41.00	***

## Data Plot and Equation

Caution – Small Sample Size





# Automated Car Wash (948)

**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: 1

Avg. 1000 Sq. Ft. GFA: 2

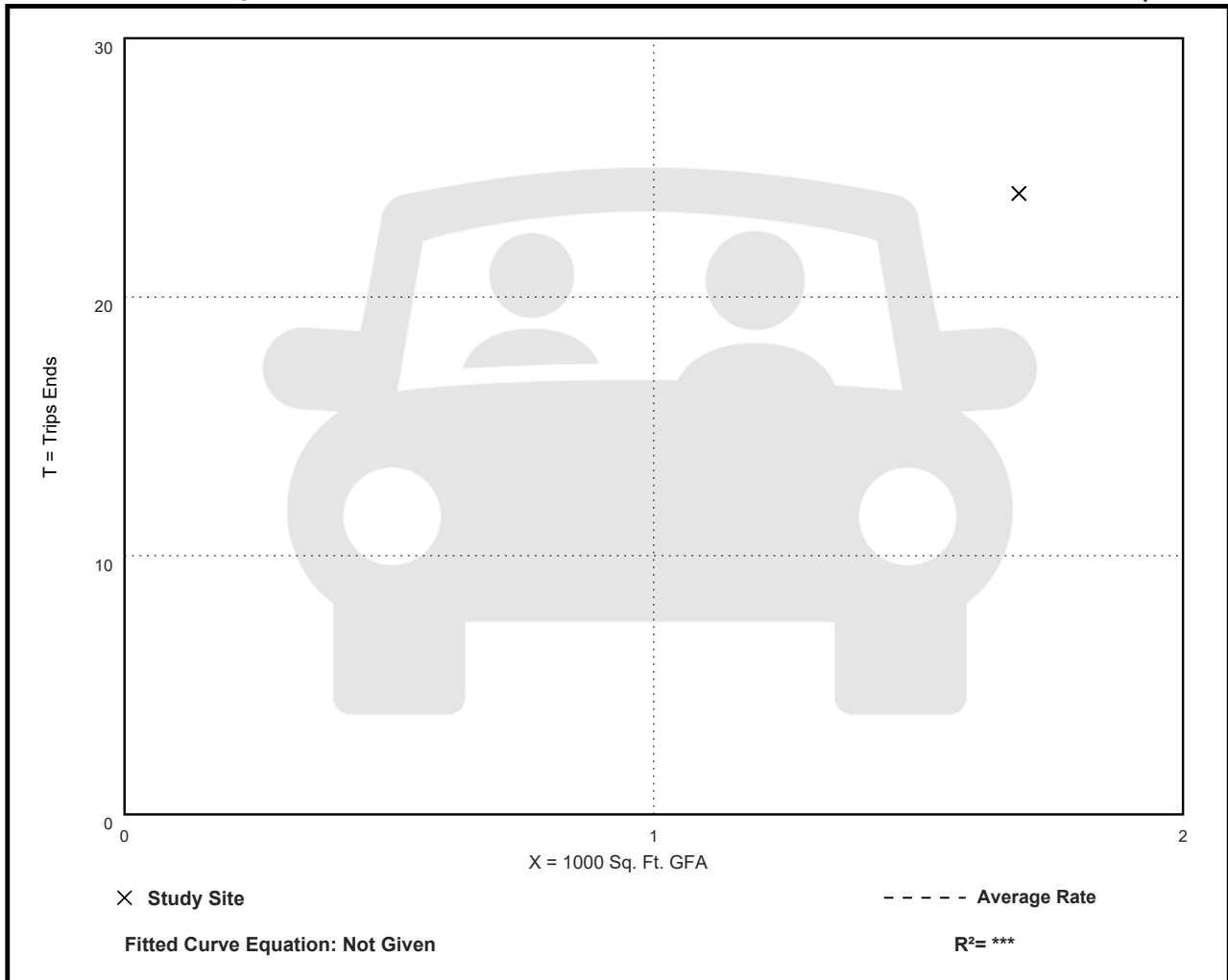
Directional Distribution: 50% entering, 50% exiting

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

Average Rate	Range of Rates	Standard Deviation
14.20	14.20 - 14.20	***

## Data Plot and Equation

*Caution – Small Sample Size*



# Automated Car Wash (948)

**Vehicle Trip Ends vs: 1000 Sq. Ft. GFA**

On a: **Weekday,**

**PM Peak Hour of Generator**

**Setting/Location: General Urban/Suburban**

Number of Studies: 2

Avg. 1000 Sq. Ft. GFA: 5

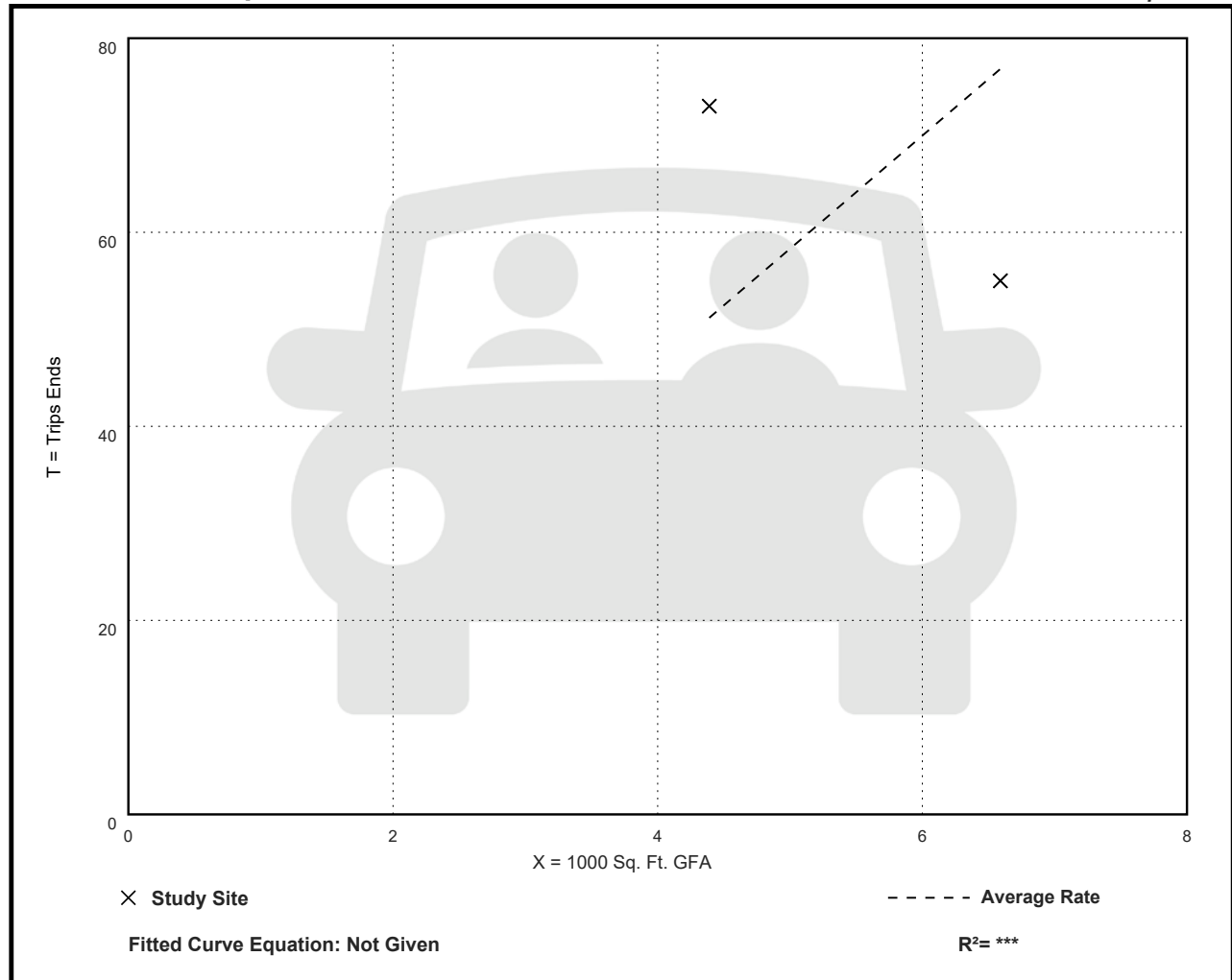
Directional Distribution: 50% entering, 50% exiting

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

Average Rate	Range of Rates	Standard Deviation
11.66	8.35 - 16.63	***

## Data Plot and Equation

*Caution – Small Sample Size*



# Automated Car Wash (948)

Vehicle Trip Ends vs: 1000 Sq. Ft. GFA

On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban

Number of Studies: 3

Avg. 1000 Sq. Ft. GFA: 4

Directional Distribution: 50% entering, 50% exiting

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

Average Rate	Range of Rates	Standard Deviation
30.40	14.20 - 37.75	9.63

## Data Plot and Equation

