LIGHTHOUSE VILLAGE DEVELOPMENT

TRAFFIC IMPACT ANALYSIS

Final Report (November 18, 2023)

CITY OF HOMER
TERM CONTRACT FOR
ENGINEERING SERVICES

TASK ORDER #23-03
DOYON TRAFFIC IMPACT
ANALYSIS

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Abbreviations

AAC	Alaska Administrative Code
AADT	Average Annual Daily Traffic
AASHTO	American Association Of State Highway And Transportation Officials
ATM	Alaska Traffic Manual
AM	Morning
CDS	Coordinated Data System
DNR	Department Of Natural Resources
DOT&PF	Alaska Department Of Transportation And Public Facilities
EB	Westbound
EBLT	Eastbound Left-Turn
EBRT	Eastbound Right-Turn
EBT	Eastbound Through
FAA	Federal Aviation Administration
GC1	General Commercial 1
GDHS	Geometric Design Of Highways And Streets
GFA	Gross Floor Area
HCM	Highway Capacity Manual
HCS	Highway Capacity Software
HMTP	Homer Master Transportation Plan
ITE	Institute Of Transportation Engineers
KE	Kinney Engineering, LLC
LOS	Level Of Service
LU	Land Use
MEV	Million Entering Vehicles
MPH	Miles Per Hour
MUTCD	Manual On Uniform Traffic Control Devices
NB	Northbound
NBLT	Northbound Left-Turn
NBRT	Northbound Right-Turn
NBT	Northbound Through
PSD	Pedestrian Sight Distance
PHF	Peak Hour Factor
PM	Afternoon Evening
S, or SEC	Seconds
S/VEH	Seconds Per Vehicle
SB	Southbound
SBLT	Southbound Left-Turn
SBRT	Southbound Right-Turn
SBT	Southbound Through

SF	Square Foot Or Feet
SSD	Stopping Sight Distance
TIA	Traffic Impact Analysis
TWSC	Two-Way-Stop-Control
VEH	Vehicle
VEH/H, HOUR	Vehicles Per Hour
VEH/S, SEC	Vehicles Per Second
W&A	Wormer & Associates
WB	Westbound
WBLT	Westbound Left-Turn
WBRT	Westbound Right-Turn
WBT	Westbound Through

Contents

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1 Executive Summary of Recommendations

This is the final report for the Lighthouse Village Development Traffic Impact Analysis. Agency comments of the draft report and responses are included under Attachment I. Conditional acceptance of this Traffic Impact Analysis Report is included under Attachment J.

Doyon, Limited is proposing the Lighthouse Village Development project in Homer, Alaska. The development includes a 100-guestroom hotel with on-site employee housing, and five triplex condominium buildings (15 residential units). The development is expected to generate site traffic volumes of 88 trips per hour in 2026, the full-buildout year.

An analysis shows that the westbound FAA Road-Ocean Drive-Homer Spit Road intersection (one of two intersections in the study area) is impacted by the site traffic to the extent that level of service for the westbound approach will decline to D, thus subject to mitigation.

Pedestrian crossing at the intersection without site traffic are subject to long delays and poor levels of service. Site traffic does not impact, or worsen, these crossing performance measures.

The other intersection in the study area, Kachemak Drive-Homer Spit Road intersection doesn't have impacts that require mitigation. There is an uncontrolled pedestrian crosswalk, of which crossing pedestrians were not impacted by additional site traffic. However the crosswalk was evaluated to determine if additional electronic warning devices would be warranted, and it was found that it is not eligible.

Recommendations include the following:

The following are recommendations resulting from this TIA analysis.

- No intersection control, channelization, or geometric capacity improvements are recommended. Instead, implement improvements to enhance active transportation modes and potentially reduce vehicle demand at intersections and roadways.

- Instead of the frontage road between the North and South Accesses driveways shown in Figure 4 on page 17, construct a pathway fronting the Lighthouse Village Development to connect the site to the crossing at Kachemak Drive-Homer Spit Road crosswalk. The pathway should meet DOT&PF standards and located for compatibility with future pedestrian improvement projects along Homer Spit Road.

- Construct a connection between the Lighthouse Village Development to Bay Avenue using the B Street right-of-way to allow walking and biking trips to use the lower volume, low speed Bay Avenue, for non-motorist trip segments..

- Install a marked median refuge, and a potential marked crosswalk on the Homer Spit Road approach to the Ocean Drive-Homer Spit Road-FAA Road intersection. The crosswalk would only be installed if the crossing demand could be established as 20 vehicles per hour

or more at this location. However, the median refuge could be implemented without the crosswalk. This is presented in the following Figure 23 on page 75.

- Consider implementing a rapid rectangular flashing beacon at the marked crosswalk at Kachemak Drive for the Homer Spit Road crossing.

- The North Access Driveway and South Access Driveway may be constructed with two lanes, one lane outbound and one lane inbound. Driveways must comply with the recommendations in the DOT&PF Highway Preconstruction Manual (Section 1190).

- In addition to the above, the following recommendations were explicitly requested by DOT&PF after review of the draft report.

    - Construct internal pedestrian connectivity between the hotel and the condominiums.
    - Revise the site plan to realign the South Access Driveway directly across from the Kachemak Drive approach to function as a four-leg intersection. Moreover, it is essential to align the South Access Driveway with Kachemak Drive to assure that required 35 mph driveway spacing distance between the North and South Access Driveways, cited as 260 feet in the DOT&PF Highway Preconstruction Manual Table 1190-3, is achieved (see addition discussion on separation below). Install stop sign control for the South Access Driveway.
    - Construct a rapid rectangular flashing beacon at the existing crosswalk across Homer Spit Road just south of Kachemak Drive.

- Following the draft report, we evaluated driveway spacing. The DOT&PF Highway Preconstruction Manual Table 1190-3 requires driveway spacing to be 260 feet for roadway speeds of 35 mph. The distance in Table 1190-3 is measured between the edge of driveways as depicted in Figure 1190-2. With this requirement, it is essential to align the South Access Driveway with Kachemak Drive as well as realign/reposition the North Access Driveway to the north to achieve the full 260 feet of separation required in Table 1190-3. The North Access Driveway could be relocated about 20 to 25 feet to the north and still meet minimum driveway sight distance standards.

- The May 2012 Transfer of Responsibilities Agreement (TORA) between the City of Homer and DOT&PF for parking and pedestrian facilities near the project area apply to the improvements recommended in this TIA. Ownership and maintenance of the proposed pathway and pedestrians crossings will be finalized between the City of Homer, DOT&PF, and the developer prior to final permits being issued.

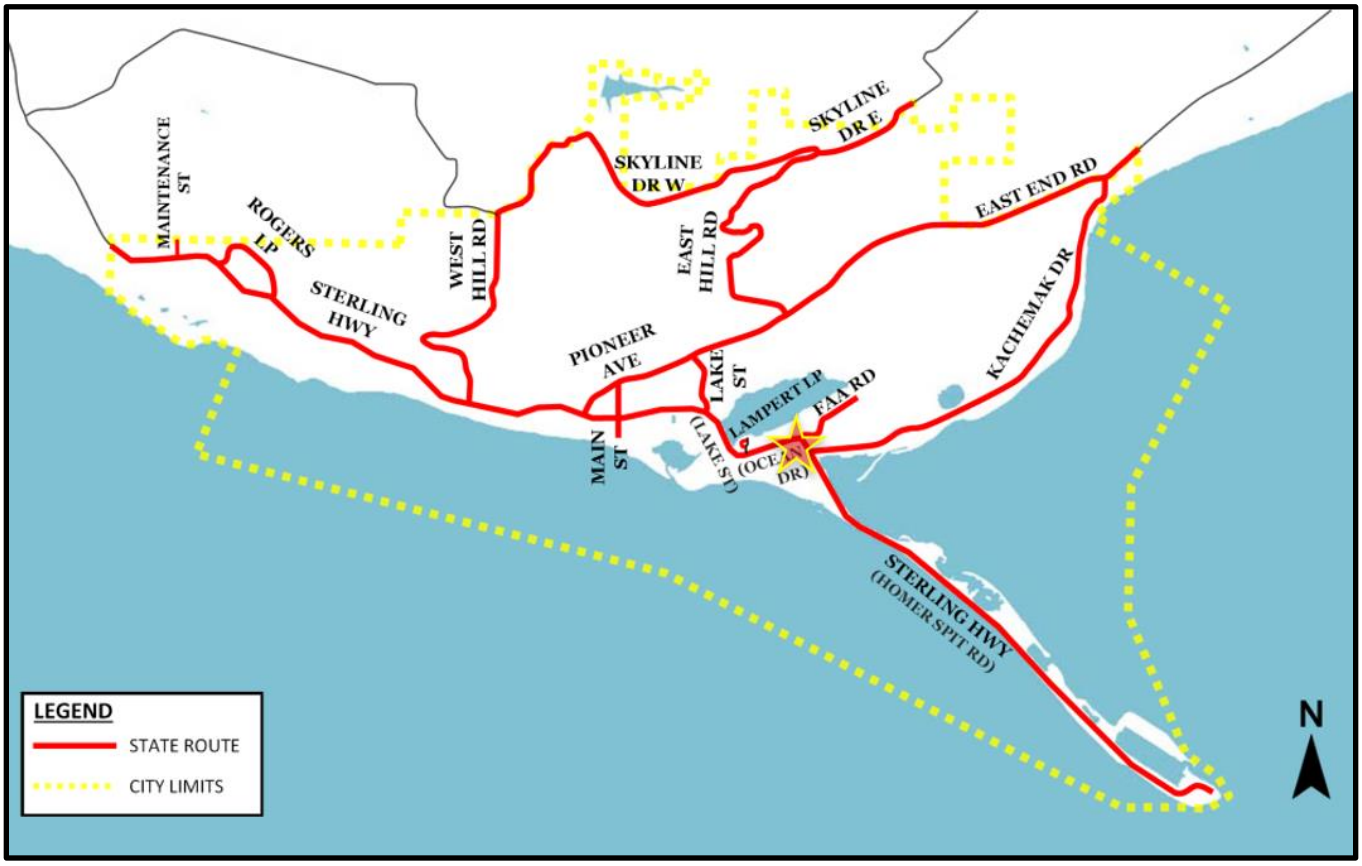
All recommendations will require DOT&PF and City of Homer approval.

2 Introduction

This is the final report for the Lighthouse Village Development Traffic Impact Analysis. Agency comments of the draft report and responses are included under Attachment I. Conditional acceptance of this Traffic Impact Analysis Report is included under Attachment J.

2.1 Proposed Development

Doyon, Limited is proposing the Lighthouse Village Development project in Homer, Alaska. The development includes a 100-guestroom hotel with on-site employee housing, and five triplex condominium buildings (15 residential units). The City of Homer is requiring a Traffic Impact Analysis (TIA). A State of Alaska Department of Transportation and Public Facilities (DOT&PF) driveway permit will be required for access to the State-owned Homer Spit Road and, DOT&PF have requested this TIA as well. As such, both DOT&PF and the City of Homer are overseeing agencies for the TIA.



Source: Homer Master Transportation Plan, State Route Plan

Figure 1: Location Map for Homer and DOT&PF State Routes (★ indicates Lighthouse Village Development site)

Aerial Photo Source: Google Maps.

Figure 2: Vicinity Map (Proposed Site Circled)

This Traffic Impact Analysis Report organized according to the subject matter requirements presented in DOT&PF's TIA checklist. In addition, the Homer City Code requirements for TIAs are addressed in a separate section.

2.2 Report Organization

DOT&PF has a comprehensive Traffic Impact Analysis Checklist found here: (https://dot.alaska.gov/stwddes/dcstraffic/tia/pop_tia_checklist.shtml). General Sections include the following:

Section	Subject Area
3	Pre-Analysis Meeting
4	Development Information
5	Project Area Background
6	Data Requirements
7	Traffic Forecasting
8	Traffic Analysis
9	Homer City Code TIA Requirements (In addition to the TIA Checklist)
10	Summary of Impacts
11	Mitigation

At the beginning of each section (except 9), we list the elements from TIA Checklist that will be addressed.

3 Pre-Analysis Meeting

Under this section, the DOT&PF TIA Checklist requires the following items to be addressed:

- *The design year (This is typically the buildout year or 10 years beyond the buildout year, depending on the development size and location)*
- *The study area*
- *Key intersections and key road segments to consider/evaluate in the TIA*
- *The projected area-wide traffic growth rate*
- *Level of Service (LOS) standards*
- *Other planned developments to consider*
- *Planned road improvements to consider*
- *Any other items of note regarding the TIA*

3.1 Meeting Participants and Process

DOT&PF requires a Pre-Analysis Meeting to address specific issues in their *TIA Requirement Checklist* (https://dot.alaska.gov/stwddes/dcstraffic/tia/pop_tia_checklist.shtml) prior to beginning analysis work. A pre-analysis meeting was held on August 30, 2023 in a video conference meeting. Participants in the meeting and subsequent discussions included:

- DOT&PF: Cynthia Ferguson and Orion LeCroy.
- Homer: Ryan Foster and Jan Keiser.
- Kinney Engineering, LLC (KE): Randy Kinney and Jeanne Bowie.

KE prepared the analysis required by DOT&PF's TIA checklist and submitted a technical memorandum summarizing the analysis.. Orion LeCroy and Jan Keiser provided emailed comments after the pre-analysis meeting. The TIA checklist, the Pre-Analysis technical memorandum document, and comments (LeCroy and Keiser) are included under Attachment A.

3.2 Meeting Results

The following discussion points, required by the TIA checklist, were discussed in the Pre-Analysis Meeting technical memorandum and in subsequent responses by Homer and DOT&PF.

- The design year - For this development, the peak trip generation will be less than 250 trips per hour (presented below in Section 7). Therefore, in accordance with DOT&PF (17 AAC 10.070. Traffic impact analysis.) and Homer (21.76.060 Required projections.) requirements, the analysis need only consider background base traffic and trip generated traffic that will occur during the full buildout opening year. The design year is 2026, the year of full buildout. (Note that this is discussed in detail with this TIA.)

- The study area and key intersections / key road segments to consider/evaluate in the TIA - Intersections to be analyzed include the FAA Road/Ocean Drive intersection and Kachemak Drive/Homer Spit Road intersection. Road segments will not be evaluated.

- The projected area-wide traffic growth rate – Base traffic will use a 1% per year growth rate (Homer Master Transportation Plan).

- Level of Service (LOS) standards - DOT&PF standards defined in 17 AAC 10.070 will be used for this analysis. These state:

  "The minimum acceptable LOS at intersections and on road segments both on the development's opening date and in the design year is
  (1) LOS C, if the LOS on the date of application is LOS C or better; or
  (2) LOS D, if the LOS on the date of application is LOS D or poorer; however, if the LOS is poorer than LOS D, a lower minimum LOS is acceptable if the operation of the highway does not deteriorate more than 10 percent in terms of delay time or other appropriate measures of effectiveness from the LOS before the development's opening date."

  Homer's Code states:

  21.76.040 Level of service minimums.
  The minimum acceptable LOS at intersections and on road segments both on the development's opening date and in the design year is:

  a. LOS C, if the LOS on the date of application is LOS C or better;

  b. LOS C, if the LOS on the date of application is LOS D;

  c. LOS D, if the LOS on the date of application is LOS E or poorer. [Ord. 08-29, 2008].

- Other planned developments to consider – Port expansion and airport leasing expansion.

- Planned road improvements to consider -
  - Homer Bay Avenue, indefinite schedule.
  - Sterling Highway: MP 169 to 175 Pavement Preservation (CFHWY00857) – estimated construction is 2025 or beyond.
  - Kachemak Drive MP 0-3.5 Pavement Preservation (CFHWY00602) – estimated construction is 2025 or beyond.

- Any other items of note regarding the TIA – DOT&PF recommends a TIA considers non-motorized movements and safety. Homer and DOT&PF requested that the employee housing be included as a generating unit.

4 Development Information

Under this section, the DOT&PF TIA Checklist requires the following items to be addressed:

- *Development description*
- *Land use intensity including square footage, types of land use, employees, etc.*
- *Proposed zoning changes or zoning variances*
- *Construction year, opening year, projected year for full buildout*
- *Map of the development, including traffic circulation and parking area*
- *Sight distance evaluation from access points*
- *Alternatives to the proposed location*

4.1 Development Description and Land Use Intensity

The Lighthouse Village Development will be constructed on three parcels owned by Doyon Limited and Doyon Tourism.

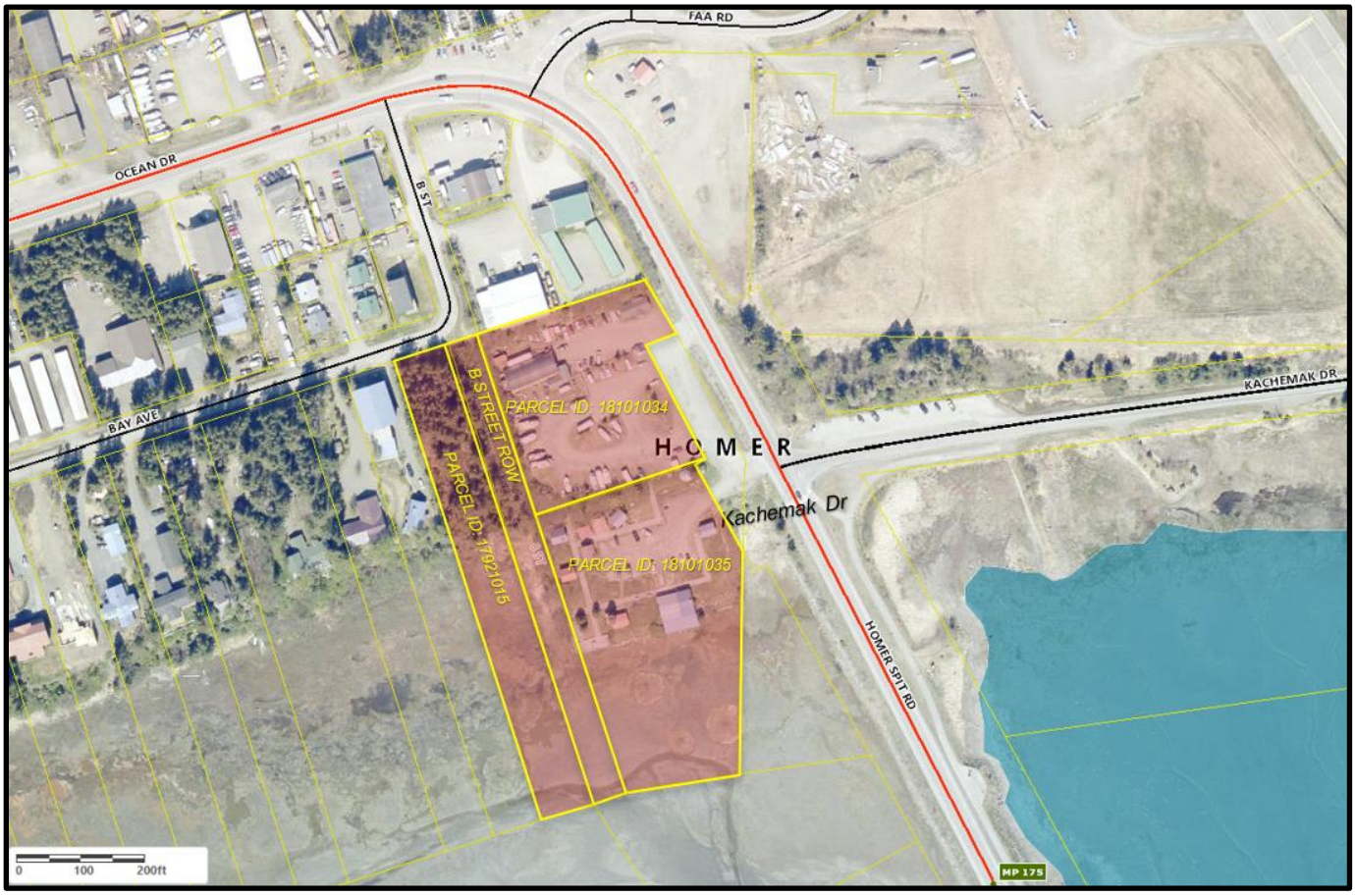
- **PARCEL ID: 18101034**: Legal Description- T 6S R 13W SEC 21 SEWARD MERIDIAN HM 0940051 BAYVIEW SUB NO 6 LOT 164-A; Address- 1563 HOMER SPIT RD
- **PARCEL ID: 18101035**: Legal Description- T 6S R 13W SEC 21 SEWARD MERIDIAN HM 0940051 BAYVIEW SUB NO 6 LOT 164-B; Address- 1663 HOMER SPIT RD
- **PARCEL ID: 17921015**: Legal Description- T 6S R 13W SEC 21 SEWARD MERIDIAN HM 0000839 BAY VIEW SUB LOT 163; Address- 1491 BAY AVE

In addition, the Lighthouse Village Development uses B Street right-of-way that is to the east of and adjacent to Parcel 17921015. The vacation of B Street right-of-way is not addressed in this TIA, and is assumed to go forward as part of the development. These parcels are shown in the vicinity map, Figure 3 on page 15.

Womer & Associates (W&A) is preparing plans for the Lighthouse Village Development. The key trip generation attributes of the development are provided by W&A in their September 28, 2023 and October 9, 2023 emails and are listed below. Some facility attributes cited in an August 2023 development version are assumed to be part of the current plans and are included as well.

1. The hotel is a 3 story, 70,794 square feet (sf) of gross floor area (GFA) building, with 100 guest rooms. The number of employees are not known. The August 2023 plan had a public restaurant (94 seats), public bar (42 seats), convention space (250-persons) and meeting rooms.
2. The employee housing is a 3 story, 13,000 sf GFA, with 25 dormitory-style resident rooms (single and double occupancy) and common areas for dining, recreation and other functions. Note that the number of rooms were not provided in the above-mentioned emails, but since GFA has not changed, the employee housing rooms described in an August 22, 2023 email was assumed to still apply. The number of residents in the employee housing are not known, although original plans in August 2023 indicated the housing accommodates 40 persons.

3. The five triplex condominiums buildings will have a total of 15 residential units. These units will be sold as permanent or seasonal residences.



Source: Kenai Peninsula Borough, https://gis.kpb.us/map/index.html?viewer=basic

Figure 3: Lighthouse Village Development Site, Parcels

4.2 Zoning Changes or Variations

Section 5.1 Surrounding Land Zoning on page 21 for the discussion about land zoning. Parcel ID 17921015 is currently zoned Rural Residential and proposed by the applicant to be rezoned to General Commercial 1, aligning with the other two project parcels.

4.3 Construction Year, Opening Year, Full Buildout Year

According to W&A, construction will begin in 2024. The condominiums will be prioritized first, and are expected to be completed in 2024. The hotel and employee housing construction will follow the condominiums, and the entire Lighthouse Village Development is expected to be completed in 2026.

The construction year and opening year is 2024. The full buildout year is 2026.

4.4 Development Site Plan Map

The conceptual site plan, developed by W&A, is presented in Figure 4 on page 17. There are two accesses to the proposed Lighthouse Village Development, labeled North Access and South Access, that are in the same approximate location as the existing accesses to the parcels. This TIA recommends that the South Access Driveway be aligned with Kachemak Drive to correct the offset currently depicted.

The site plan shows a frontage road within the State of Alaska Homer Spit Road right-of-way between the North and South Accesses. Approval of the frontage road is pending by DOT&PF, but the analysis assumes it will not be approved because it will constrain future improvement to Homer Spit Road and Kachemak Drive intersection. Moreover, as described above, the triplex condominiums are to be sold as residential units, and therefore there is little need or likelihood of trips that will have origins and destinations combinations of the hotel and condominium. For example, a trip to the hotel is unlikely to continue to the condominiums and vice-versa. If not, then the frontage road is not necessary for internal site circulation. Because of the public attractions in the hotel, pedestrian connectivity between the hotel and the condominiums is desirable.

This analysis assumes that the North Access driveway will serve the hotel and employee housing, and the South Access driveway will serve the triplex condominiums.

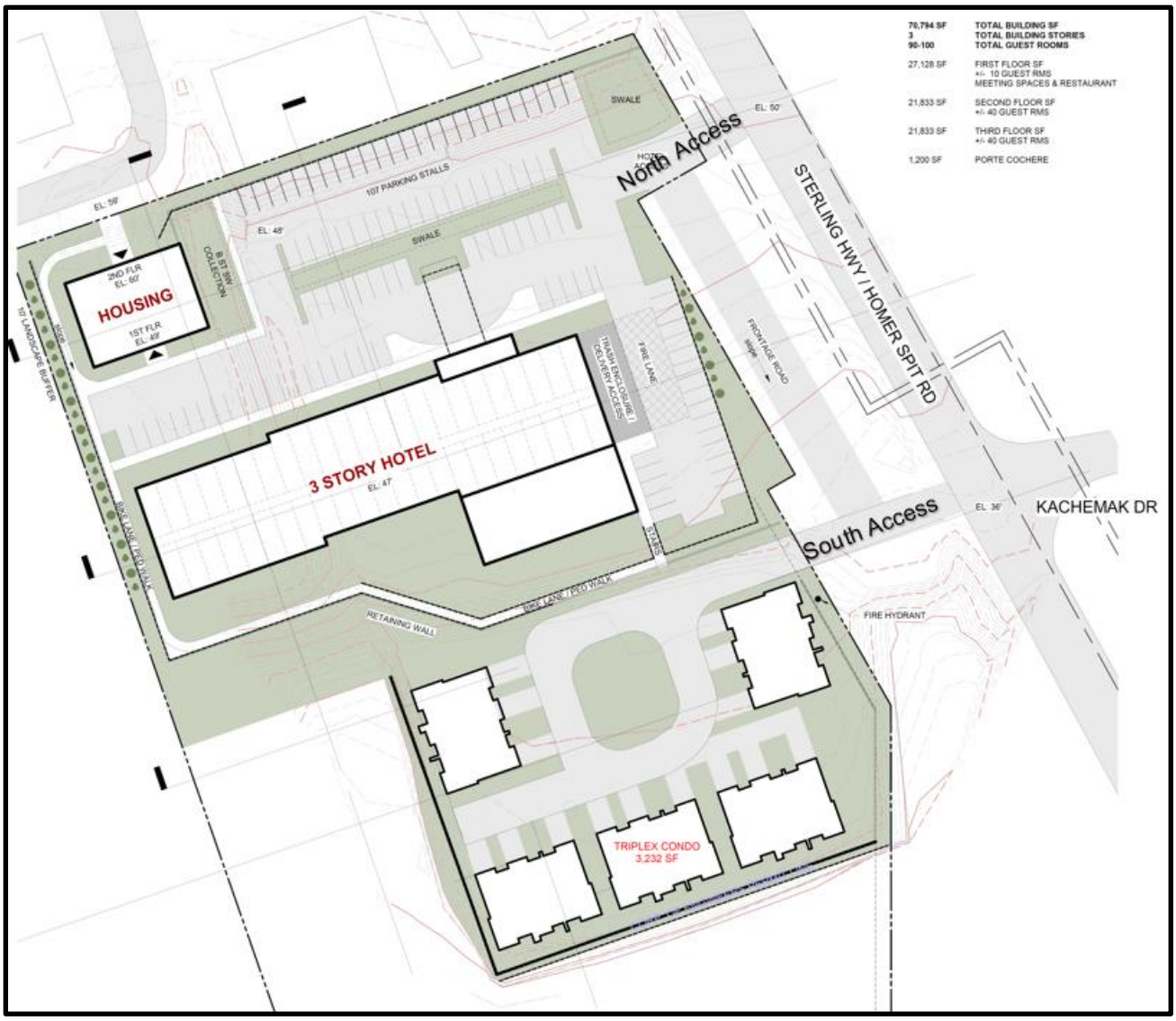


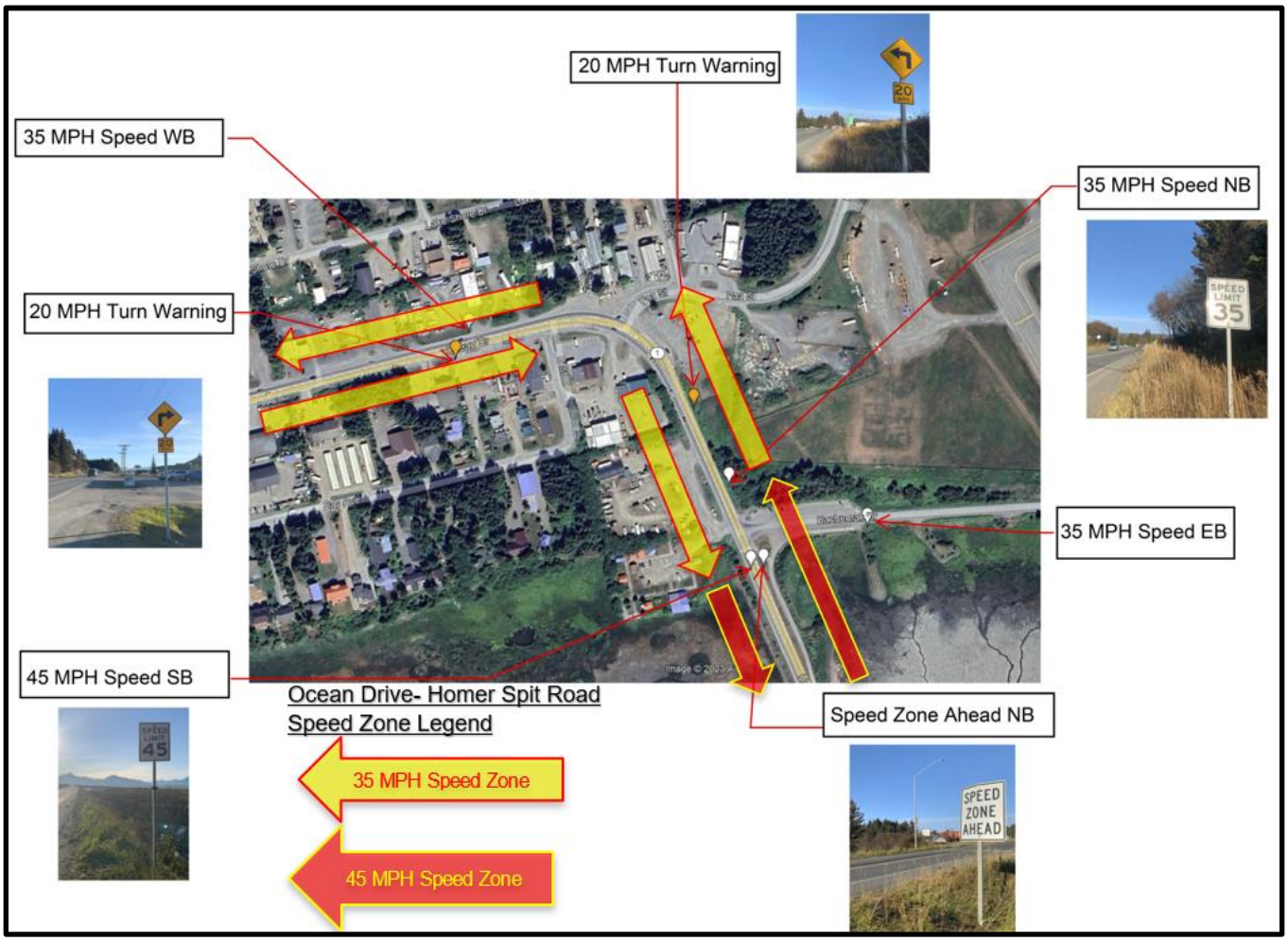
Figure Source: Womer and Associates Plans

Figure 4: Conceptual Site Plan

4.5 Sight Distance Evaluation from Access Points

4.5.1 Speeds

Figure 5 on page 18 present the regulatory and speed signing on the arterial and collector streets in the vicinity of the proposed Lighthouse Village Development. The posted speed on Homer Spit Road adjacent to the development is 35 miles per hour (mph) between the proposed North and South Accesses. The South Access is within a transition zone between 35 and 45 mph speed limits The northbound traffic is within the 45 mph zone and the southbound traffic is within the 35 mph zone. These posted speeds will be used for this TIA analysis (access point sight distance).



Aerial Photo Source: Google Earth

Figure 5: Regulatory and Advisory Speed Signs

4.5.2 Driveway Sight Distance for Development Access Points

The DOT&PF Highway Pre-Construction Manual Figure 1190-1 provides required driveway sight distance. Minimum driveway sight distance is stopping sight distance, enabling approaching vehicles the time and distance to fully stop for a driveway egress vehicle. The following figure provides key driveway sight distance parameters.

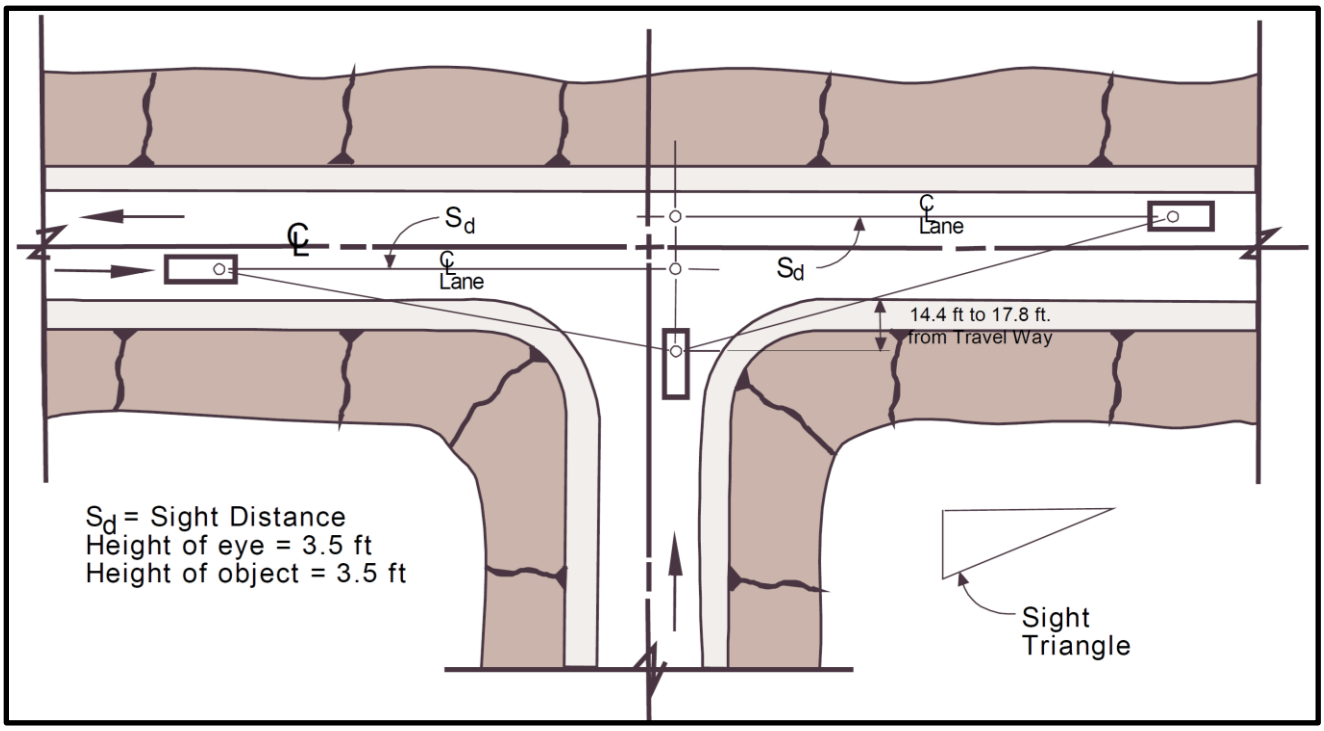


Figure Source: DOT&PF Highway Pre-Construction Manual, Figure 1190-1

Figure 6: Driveway Sight Distance Parameters

Stopping sight distance (SSD) is computed with this formula from the American Association of State Highways and Transportation Officials (AASHTO) A Policy on the Geometric Design of Highways and Streets (GDHS):

$$SSD = (1.47 \times t \times V) + \frac{V^2}{30\left(\frac{a}{g} \pm G\right)}$$

Equation 1

The variables in this SSD equation are as follows:

- *V* is design speed in mph
- *t* is a perception reaction time constant, 2.5 seconds.
- *a* is deceleration, 11.2 feet/second^2 to represent passenger car characteristics (AASHTO's 10th percentile value).
- *g* is gravity constant, 32.2 feet/second^2
- *G* is grade in ft/ft., "+" is climbing, - is descending or downgrade
    - May ignore G if: -0.03 ≤ G ≤ +0.03. Without G, the SSD equation is:

$$SSD = 1.47 \times V \times t + 1.075 \times V^2/a$$

Equation 2

For 35 mph, the minimum SSD and corresponding driveway sight distance is 250 feet for roadway grades between -3% and +3%. However, Homer Spit Road is on a 5% downgrade (measured

steepest segment) for the southbound direction, in which case the required sight distance is increased to 270 feet. Conversely, in the northbound direction, there is an upgrade of 5% and required sight distance could be reduced to 235 feet, but SSD is typically not reduced for adverse grades.

For 45 mph, the minimum SSD and corresponding driveway sight distance is 360 feet for roadway grades between -3% and +3%. However, with the 5% downgrade for the southbound direction, in which case the required sight distance is increased to 395 feet.

The planned North and South Accesses shown in Figure 4 on page 17 show the new driveways will be the same location as the existing driveways. Sight distance was measured from these existing driveway locations using the key parameters shown in Figure 6.

The North Access driveway's sight distance to the north is constrained by the 20 mph horizontal curve to the north linking Ocean Drive with Homer Spit Road. The North Access driveway is located within the posted speed zone of 35 mph, and 35 mph is used as the SSD analysis speed. The sight distance was field measured to be 305 feet, which is greater than the minimum length of 270 feet, adjusted for the 5% downgrade. The North Access driveway sight distance to the south is greater than 1,000 feet (not measured).

The South Access driveway's sight distance to the north is also constrained by the horizontal curve linking Ocean Drive with Homer Spit Road. This location is located in the transition zone between 35 and 45 mph posted speed. The sight distance to the north is measured to be 560 feet, greater that the minimum length of 270 feet for 35 mph and 395 feet for 45 mph. The South Access driveway sight distance to the south is greater than 1,000 feet (not measured).

Driveway sight distance for both North and South Accesses are satisfactory.

4.6 Driveway Spacing

The distance between the North Access Driveway as shown on the site plan Figure 4 on page 17, and the South Access Driveway that will be aligned with Kachemak Drive is estimated from Google Earth to be 260 feet centerline to centerline.

The DOT&PF Highway Preconstruction Manual Table 1190-3 requires driveway spacing to be 260 feet for roadway speeds of 35 mph. The distance in Table 1190-3 is measured between the edge of driveways as depicted in Figure 1190-2. With this requirement, it is essential to align the South Access Driveway with Kachemak Drive as well as realign/reposition the North Access Driveway to the north to achieve the full 260 feet of separation required in Table 1190-3. The North Access Driveway could be relocated about 20 to 25 feet to the north and still meet minimum driveway sight distance standards.

4.7 Alternatives to the Proposed Location

No alternative locations are considered in this TIA.

5 Project Area Background

Under this section, the DOT&PF TIA Checklist requires the following items to be addressed:

- *Surrounding land zoning*
- *Surrounding land uses and site land use*
- *Adjacent development*
- *Traffic improvements already funded, programmed, or planned*
- *Other planned developments*

5.1 Surrounding Land Zoning

The area zoning is presented in Figure 7 on page 22. The proposed Lighthouse Village Development is on land zoned General Commercial 1 (GC1). The Codes states:

> *"The General Commercial 1 (GC1) District is primarily intended to provide sites for businesses that require direct motor vehicle access and may require larger land area, and to provide business locations in proximity to arterials and transportation centers. It is also intended to minimize congestion and adverse effects on adjacent residential districts and on the appearance of the community."*

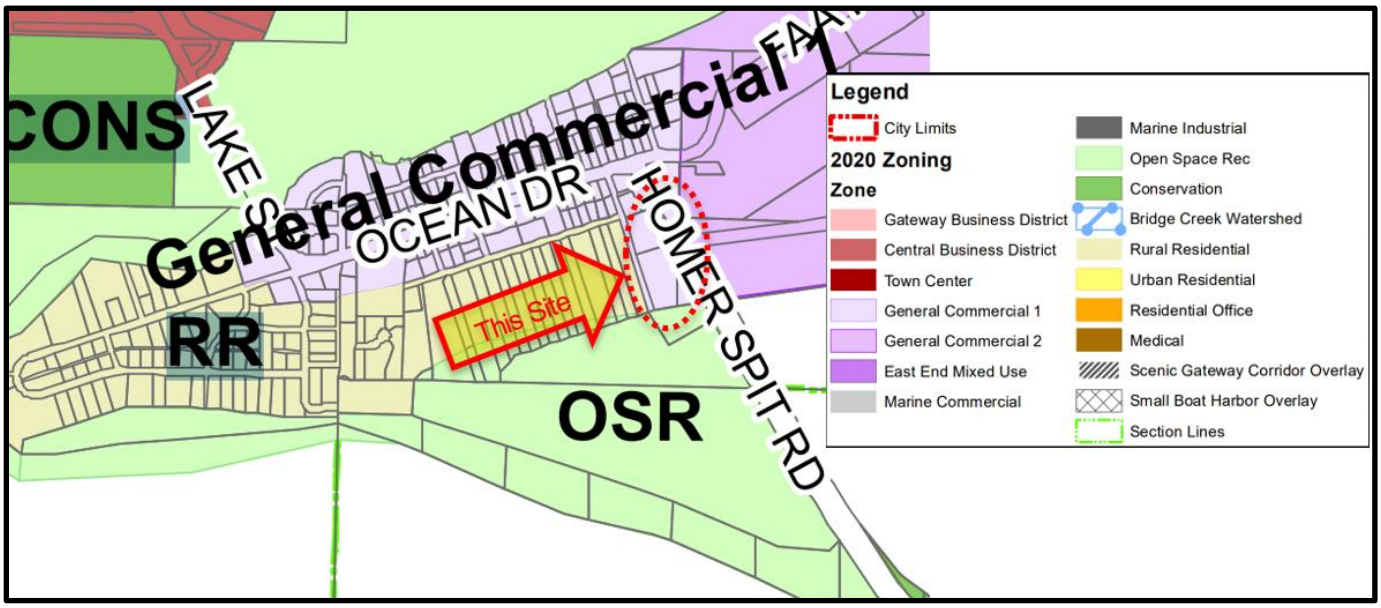
Homer City Code *Chapter 21.24 GC1 General Commercial 1 District* lists permitted uses under 21.24.020 Permitted uses and structures that include those that apply to this Lighthouse Village Development:

> c. Dwelling units located in buildings primarily devoted to business use: Likely to apply to the employee housing.
>
> k. Hotels and motels: Applies to the planned hotel.

Section 21.24.030 Conditional uses and structures allows these uses when authorized by a conditional use permit issued in accordance with *Chapter 21.71 Conditional Use Permit* of the Homer City Code:

> c. Multiple-family dwelling: Likely to apply to the Triplex condominiums.
>
> g. Townhouses: Likely to apply to the Triplex condominiums,

The proposed Lighthouse Village Development is consistent with GC1 zoning requirements. This TIA is based upon the premise that the developer will comply with Homer and a Conditional Use permit is secured. This TIA is also based on the premise that Parcel ID 17921015 is rezoned to General Commercial 1 from Rural Residential, aligning with the other two project parcels



Source:
https://www.cityofhomer-ak.gov/sites/default/files/fileattachments/planning/page/7313/small_zonng_map_2020.pdf
Figure 7: Site and Area Zoning

The surrounding zoning immediately to the north of the proposed Lighthouse Village Development site is also GC1. To the west the zoning is predominately Rural Residential. To the east, across Homer Spit Road, the zoning is East End Mixed Use. And, finally, to the south of the development, the land is zoned Open Space Recreation.

5.2 Surrounding Land Uses and Site Land Use / Adjacent Development

Figure 8 on page 24 depicts the land use in the immediate area of the Lighthouse Village Development (light red). Most of the land to the east and south of the proposed development site is owned by public State or City Agencies (Aviation, Department of Natural Resources (DNR), City of Homer), and will likely not be developed. The one exception is the triangular-shaped private commercial lot in the east quadrant of the FAA Road-Ocean Drive-Homer Spit Road Intersection. On the north side, the land is fully developed commercially and with private residents. The land on the west side is also fully developed with residential homes.

In summary, the potential for additional development in the immediate area which would conflict with the proposed Lighthouse Village Development traffic patterns and access is low.

Source: Kenai Peninsula Borough, https://gis.kpb.us/map/index.html?viewer=express

Figure 8: Land Use and Lighthouse Village Development Map

5.3 Traffic Improvements Already Funded, Programmed or Planned

5.3.1 Homer Intersections Planning Study (2005)

The study, found at https://www.cityofhomer-ak.gov/planning/homer-intersections-planning-study-akdot-2005, was completed by Kinney Engineering, Brooks and Associates, and USKH, Inc. The study included the Sterling Highway (Homer Spit Road) and Kachemak Drive intersection. Key points of that study with regard to the intersection included:

- There were 13 crashes in 10 years (1993 to 2002), yielding a crash rate higher than the comparative population, but lower than the critical rate, thus indicating no significant safety issues.

- The westbound approach was forecasted to have a level of service of F and >150 seconds/vehicle of control delay in the PM peak hour in the planning horizon year of 2021 (see Section 8.1.1 on page 48 for details on level of service and control delay). The results were based on traffic forecasts at that time (summer peak hours) and on the era's capacity analysis methods, which have since evolved.

- Signalization warrants (only Warrant 1 Condition B) were forecasted to be met by 2011 for summer peak hour conditions. Roundabout guidelines at the time indicated that the intersection would be a good candidate for a modern roundabout.

- Roundabouts, signalization with a 150-foot length SBLT lane, and all-way-stop control (rejected as feasible) were alternatives evaluated in the study. Roundabouts and signalization alternatives provided good operational performance measures for the planning study horizon of 2021.

- The intersection's recommendations included that no changes be implemented immediately, and that a reevaluation occur in 2010. The intersection operations was expected to be adequate until 2010, and then decline to undesirable levels in 2011.

5.3.2 Homer Master Transportation Plan (Draft 2023)

KE is preparing the Homer Master Transportation Plan (HMTP). In addition to establishing an area-wide traffic growth rate of 1% per year for the planning horizon, the HMTP has these observations and recommendations for the transportation network in the Lighthouse Village Development's vicinity.

- Homer Spit Road, Ocean Drive, and Kachemak Bay Drive are all along the Tsunami evacuation route. Any road improvements need to consider needs during an evacuation.

- Difficulty for pedestrians crossing the road is a concern frequently heard.

- Pedestrian connectivity through the area must be maintained.

- Providing bicycle parking is encouraged.

- Kachemak Bay Drive is a popular route for walking and biking, but there is not sufficient right-of-way to adequately separate vehicle and non-motorized traffic. The plan proposes a reconnaissance engineering study to identify possible improvements.

- Pedestrian and bicycle facilities should be constructed to facilitate winter maintenance.

The proposed Lighthouse Village Development is consistent with the HMTP. The development is expected to be a high pedestrian and bicycle mode generator for employees, hotel guests, and condominium residences. The development is expected to increase the number of non-motorized crossings of Homer Spit Rd to access the multiuse pathway along the east side of the spit, increasing conflict occurrences between vulnerable road users and motorists. As such, implementing the active transportation recommendations of the HMTP will benefit walkers and bicyclists traveling to and from the site.

5.3.3 City of Homer Pavement Restoration- Bay Avenue, B Street, and E Street

This project on Homer local streets to the north of the Lighthouse Village Development has been designed and is awaiting available funding. The project will restore pavement driving surfaces to good condition, provide drainage improvements, provide minor utility improvements, and new signing and pavement markings.

Bay Avenue parallels Ocean Drive and provides pedestrian/bike access to the Farmers Market. As a local street, with low volumes and speeds, bicycles and pedestrians may and do choose to use Bay Avenue as a shared roadway with vehicles instead of the Ocean Drive shoulders adjacent to higher speed and traffic volumes.

Early versions of the Lighthouse Village Development site plan showed a pedestrian pathway connection between the site and B Street/Bay Avenue, but current plans omit that connection.

The proposed development is consistent with and will not conflict with the improvements on Bay Avenue, B Street, and E Street.

5.3.4 State of Alaska DOT&PF Projects

DOT&PF cited two projects in the vicinity:

- Sterling Highway: MP 169 to 175 Pavement Preservation (CFHWY00857) – estimated construction is 2025 or beyond.

- Kachemak Drive MP 0-3.5 Pavement Preservation (CFHWY00602) – estimated construction is 2025 or beyond.

A review of the projects page on DOT&PF web site and the current draft Statewide Transportation Improvement Plan yielded no detail information for these projects. However, safety and pedestrian

improvements will benefit the Lighthouse Village Development's site traffic; and the development will not conflict with these projects.

5.4 Other Planned Developments

Comments on the Pre-Analysis meeting cited expansion/ improvements to the Homer Port and to the Airport leasing facilities. A review of Homer and State of Alaska plans and websites yielded no information on these future developments.

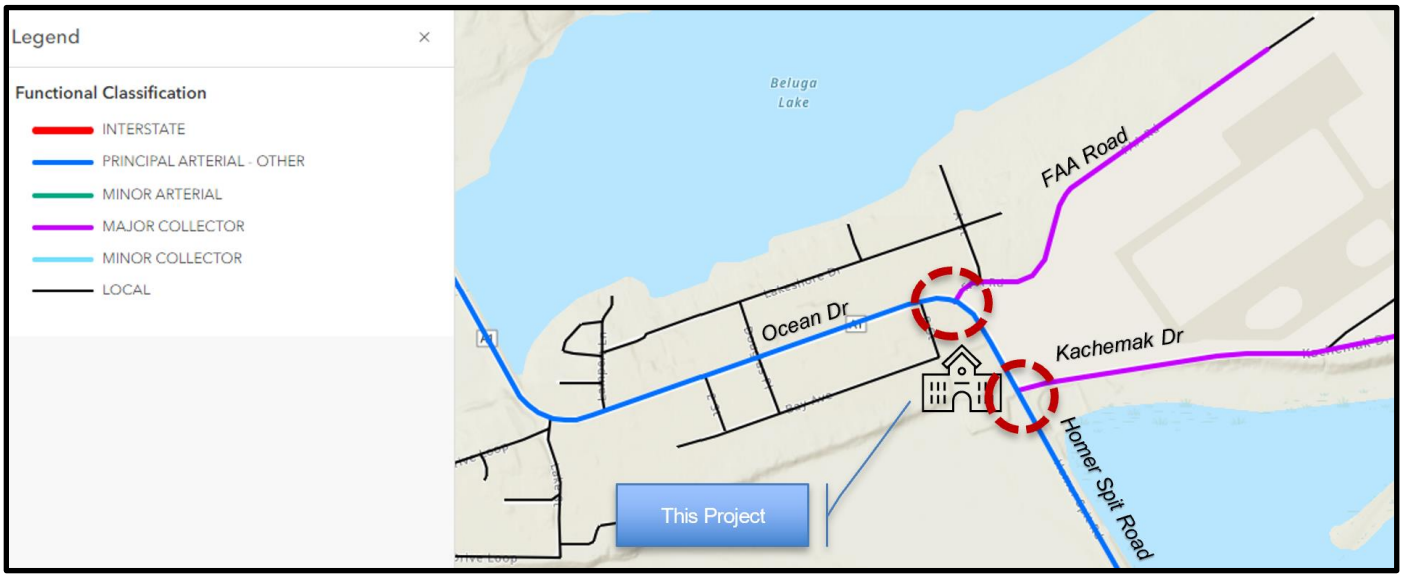
6 Data Requirements

Under this section, the DOT&PF TIA Checklist requires the following items to be addressed:

- *Map of the study area street network*
- *Peak hour intersection turning movement counts for all key intersections*
- *Daily volume counts for all streets and roadways in the study area*
- *Number of lanes on the streets in the study area*
- *Intersection geometry information for all key intersections*
- *Traffic signal phasing and timing information for all key intersections (not addressed)*
- *5 year crash history within the study area*
- *Sidewalks and other pedestrian facilities*
- *Bike lanes and other bicycle facilities*
- *Transit operation and facilities including pullouts, frequency of service and utilization (not addressed)*

6.1 Study Area Street Network Map

The near vicinity study area maps and street functional classification is shown in Figure 9 below.



Source: https://akdot.maps.arcgis.com/apps/mapviewer/index.html?webmap=8d34059bbfed4fada20a4fdc2a138aca

Figure 9: Area Street Map and Functional Classification

The Ocean Drive-Homer Spit Road connected roads are functionally classified as Principal Arterials as they are also on the Sterling Highway corridor (CDS Route 110000) extending from Seward Highway to the end of the Homer Spit. FAA Road and Kachemak Drive are functionally classified as Major Collectors. Other streets in the near vicinity are Local Streets (B Street, Bay Avenue), and are not connected to the proposed Lighthouse Village Development.

The FAA Road/Ocean Drive intersection and Kachemak Drive/Homer Spit Road intersection are in the immediate vicinity of the Lighthouse Village Development (circled). These intersections will be evaluated for operation impacts resulting from the proposed development.

6.2 Intersection Peak Hour Turning Movements

Capacity analysis studies evaluate operational quality during peak hours of operations, usually hours of significance 2 or more times daily. The base traffic peak represents traffic conditions without the Lighthouse Village Development site traffic, as referred to as a no-build condition. Site traffic is added to the base traffic to represent conditions occurring with site traffic, or the build condition. Operational impacts, then, are estimated by comparing build and no-build performance measures.

Peak hours to be evaluated in this TIA correspond to the trip generation peak hours estimated in for the Lighthouse Village Development and include:

- ***Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am*** – This hour typically is concurrent with the morning commuting peak hour.
- ***Weekday, AM Peak Hour of Generator*** – This hour depicts the peak traffic activity of the land use (LU) generator that will occur during the morning, typically business hours before noon. This analysis assumes that the AM peak hour of the generator will occur during the highest traffic period in the morning on adjacent roadways that occurs outside of the commuting period between 7 am and 9 am.
- ***Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm*** – This hour typically is concurrent with the evening commuting peak hour.
- ***Weekday, PM Peak Hour of Generator*** – This hour depicts the peak traffic activity of the LU generator that will occur during the afternoon, evening, or night periods. This analysis assumes that the PM peak hour of the generator will occur during the highest traffic period in the afternoon/evening on adjacent roadways that occurs outside of the commuting period between 4 pm and 6 pm.
- ***Saturday, Peak of Generator*** – This hour depicts the peak traffic activity of the LU generator that will occur during anytime on a Saturday during the morning, afternoon, evening, or night periods.
- ***Sunday, Peak of Generator*** (not evaluated)– This hour depicts the peak traffic activity of the LU generator that will occur during anytime on a Sunday during the morning, afternoon, evening, or night periods

Because Sunday's trip generation characteristics and summer base traffic is similar to Saturday (but less), we will not evaluate Sunday peak hours in this TIA.

Turning movement volumes were counted during September 2023 between hours of 7 and 9 am (to capture morning commuting peak), between 11 am and 1 pm, and between 4 and 6 pm (to capture evening commuting peak). These counts are summarized in Attachment G. The FAA Road-Ocean Drive-Homer Spit Road intersection count data was collected on Wednesday, September 13. The Kachemak Drive-Homer Spit Road count data was collected on Thursday,

September 14. These counts were the raw data in which the peak hour cases for base traffic above were formulated with the following post-processing steps.

- Homer has a marked seasonal fluctuation in monthly traffic volumes. At the continuous count station (CCS) on Homer Spit Road (Station 10300021,Sterling Highway MP 175), monthly average daily traffic (MADT) in September 2022 is about ½ of the MADT in July 2022, the peak summer month. This is exhibited in Figure 10 on page 32 under Section 6.4 below. Note that 2022 seasonal data is used as it is the most recent complete year Therefore, the first adjustment made to the September counts were increasing the observed volumes by a factor of 1.98 to convert the count to a July condition.

- Since intersections were counted on different days, volumes across the system were balanced so that there is a continuity of traffic between intersections (that is, volumes leaving a downstream intersection will approximately equal the volumes entering the upstream intersection).

- As shown in Table 9 on page 45, the Lighthouse Village Development's trip generation peaks occur outside of the commuting peak hours, typically 7 AM to 9 AM and 4 PM to 6 PM. To account for this, we applied a factor of July weekday hourly average traffic to factor the observed morning commute, noon, or evening commute counts to compute the base traffic occurring in the morning, evening or Saturday outside of commuting periods. For example, the CCS 10300021 on Homer Spit Road shows that the weekday July 2022 morning non-commuting peak occurs at 11 am with an average of 597 vehicles. The noon weekday average hourly count is 658. So applying a factor of 597/658, or 0.91, was applied to the post-processed noon counts that we observed in the observed September count.

- Finally, the established design year is 2026 (see Section 7.1.8 Design Year Requirements on page 46). As such, the observed volumes must be factored from 2023 to 2026 using the 1% per year growth rate (see Section 5.3.2 Homer Master Transportation Plan (Draft 2023) on page 25).

Attachment B presents the observed counts and design year peak traffic with the above-mentioned post-processing factors.

6.3 Intersection Pedestrian Counts

Pedestrians were counted during the September field counts at the FAA Road-Ocean Drive-Homer Spit Road intersection and at the Kachemak Drive-Homer Spit Road intersection. The following tables summarize the observed pedestrian intersection crossings.

Table 1: Observed September 13, 2023 Pedestrian Crossings at FAA Road-Ocean Drive-Homer Spit Road Intersection

Time Period	Crossing Ocean Drive (North Leg)	Crossing Homer Spit Road (South Leg)	Crossing FAA Road (Stop Sign)	Non-Crossing Along Ocean Drive (South Side) and Homer Spit Road (West Side)
7:00 AM to 9:00 AM	0	0	0	0
11:00 AM to 1:00 PM	0	0	1	3
4:00 PM to 6:00 PM	0	1	2	6

Table 2: Observed September 13, 2023 Pedestrian Crossings at Kachemak Drive-Homer Spit Road Intersection

Time Periods	Crossing Homer Spit Road (North Leg)	Crossing Homer Spit Road (South Leg)	Crossing Kachemak Drive (Stop Sign, Crosswalk Between Parking and Trail)	Non-Crossing Along Homer Spit Road (West Side)
7:00 AM to 9:00 AM	1	1	0	4
11:00 AM to 1:00 PM	0	2	5	1
4:00 PM to 6:00 PM	1	2	7	4

The observed crossings in September, shown above, are likely to be substantially less than pedestrian/bicycle activity in the summer. As such, these volumes are not used to forecast background peak hour demands.

6.4 Daily Volume Counts For All Streets And Roadways In The Study Area

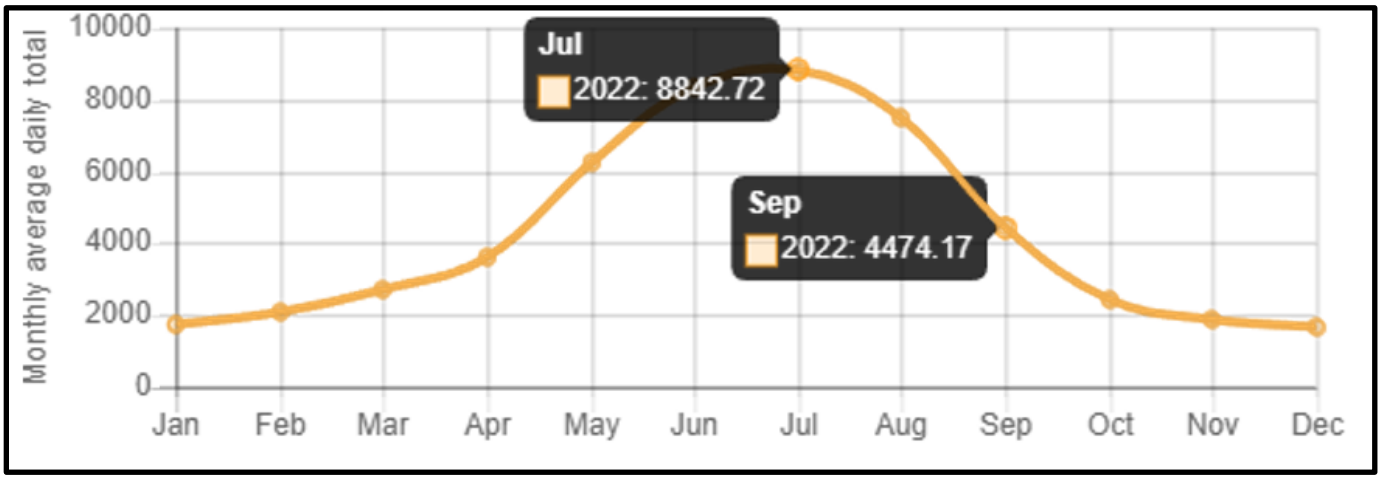
Average Annual Daily Traffic (AADT) and percent trucks (% T) for the vicinity arterial and collector streets are summarized in the following table.

Table 3: Street Network AADT (2017-2022) and Percent Trucks (2020-2022)

Street	Station/Type	2017	2018	2019	2020		2021		2022	
		AADT	AADT	AADT	AADT	% T	AADT	% T	AADT	% T
Ocean Dr - Btwn Douglas & FAA St	51008000 / Short Term	8,856	8,900 (estimated)	8,962	7,860	8%	9,000	8%	8,480	8%
Homer Spit Road (Sterling Hwy MP 175) @ Homer Spit	10300021 / Continuous	4,281	4,299	4,296	3,770	5%	4,510	5%	4,290	6%
FAA St - Btwn Spit Rd/Ocean Dr and Airport Parking Lot	54134000 / Short Term	924	900 (estimated)	903	780	-	830	-	840	-
Kachemak Dr - Just east of Homer Spit Rd parking lot	51251000 / Short Term	1,537	1,500 (estimated)	1,502	1,350	-	1,490	-	1,490	-

Source: https://alaskatrafficdata.drakewell.com/publicmultinodemap.asp

Homer traffic has seasonal variation, with highest-daily peak traffic volumes occurring in the summer (typically July). Intersection turning movements at the TIA studied intersections were collected in September, and as such, needed to be factored from observed September condition to the estimated peak July condition to adequately address peak traffic. This was accomplished by using the 2022 complete year MADT data at the Homer Spit Road continuous count station, shown in Figure 10 below.



Source: https://alaskatrafficdata.drakewell.com/sitedashboard.asp?node=AKDOT_CCS&cosit=000010300021

Figure 10: 2022 MADT on Homer Spit Road at Continuous Count Station 1030002

Counts in July are about 98% higher than September ((computed as 8843/4474 x 100)%-100%= 98%). Therefore, the monthly seasonal factor to convert September counts to the summer season peak is 1.98.

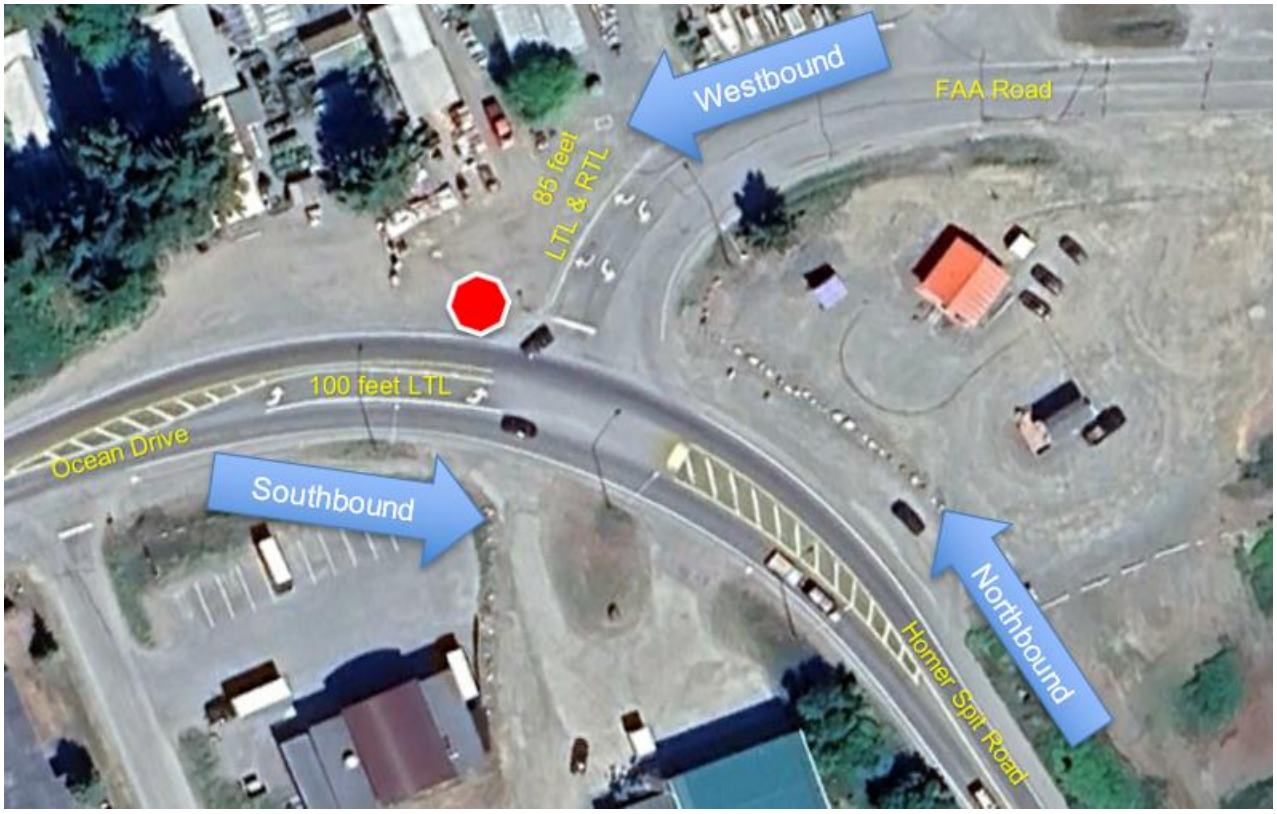
6.5 Street Lanes and Intersections Geometry

6.5.1 Street Lanes

All roadways in the TIA study area have two lanes and shoulders

6.5.2 Ocean Drive-Homer Spit Road-FAA Road Intersection

Figure 11 on page 33 depicts the intersection lane configuration. The intersection is configured as a “tee” intersection with auxiliary turn lane channelization. For purposes of this analysis, the FAA Road approach is designated westbound (WB), the Homer Spit Road approach is northbound (NB),and the Ocean Drive approach is designated as southbound (SB). The southbound left-turn lane (SBLT) on Ocean Drive is nominally 100 feet in length, which can store a 4-vehicle queue. The westbound left-turn land (WBLT) and westbound right-turn lane (WBRT) on the FAA Road approach are nominally 85 feet in length, storing 3 vehicles in each. FAA Road approach traffic is under stop sign control. There are no marked crosswalks at this intersection.



Aerial Photo Source: Google Earth

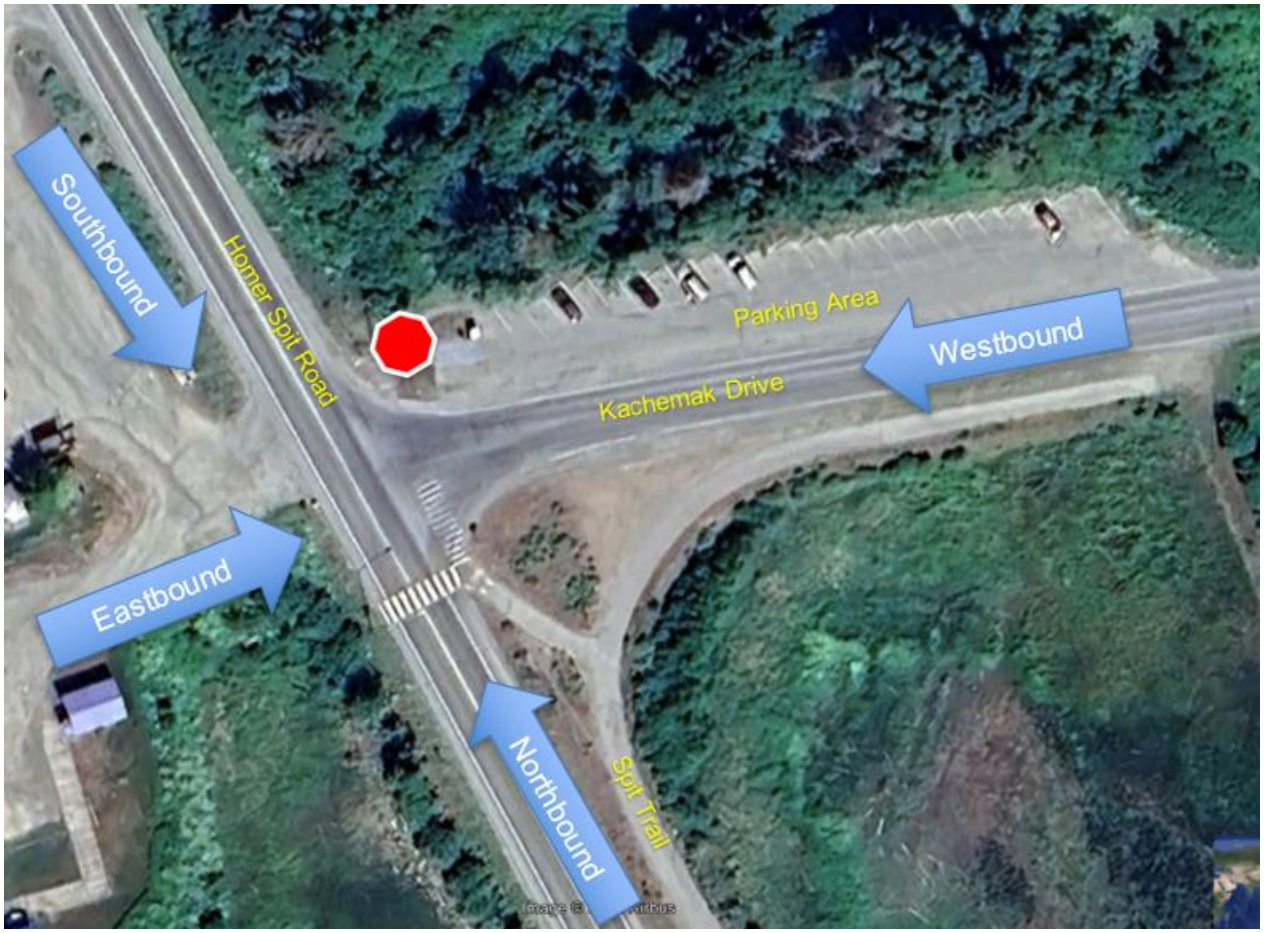
Figure 11: Ocean Drive-Homer Spit Road-FAA Road Intersection

6.5.3 Homer Spit Road- Kachemak Drive

Figure 12 on page 34 presents the intersection configuration. In its current condition, the intersection is effectively a 3-leg "Tee" intersection, with a low volume driveway opposite the minor approach. Kachemak Drive intersection approach, designated as westbound, is under stop sign control and Homer Spit Road, northbound and southbound approaches, is free flow. The future tri-plex condominium part of the Lighthouse Village Development will improve and reconfigure site access to align with the Kachemak Drive approach.

There are no channelized turn lanes. The SBLT from Homer Spit Road to Kachemak Drive turns from the through lane, and yields to northbound traffic. However, the Kachemak Drive approach is flared to allow two vehicles by a queue of through or left-turning vehicles.

There is a marked crosswalk with pedestrian crossing ahead warning signs (W11-2 and W11-2P) across the north approach.



Aerial Photo Source: Google Earth

Figure 12: Homer Spit Road-Kachemak Drive Intersection

6.6 5-Year Crash History Within The Study Area

Crash data between 2017 and 2021 was provided by DOT&PF. There were 8 reported crashes in the 5-year duration. The data is summarized in the following table.

Table 4: 2017-2021 Crash Data for Study Area

Crash Number	DateTime	Number of Motorized Units	Crash Severity	First Harmful Event	Manner of Collision	Crash Type	Direction of Travel	Road Surface	Lighting
201822299	6/24/2018 12:40:00 PM	2	No Apparent Injury	Motor Vehicle In-Transport	Front-To-Rear	Angle - Left Turning	Southbound	Dry	Daylight
201857967	7/11/2018 11:09:00 AM	1	No Apparent Injury	Tree (Standing Only)	Not a Collision with a Motor Vehicle In-	Single Vehicle Run-Off-Road	Eastbound	Dry	Daylight
201945257	1/16/2020 4:00:00 PM	1	No Apparent Injury	Ditch	Not a Collision with a Motor Vehicle In-	Single Vehicle Run-Off-Road	Eastbound	Snow	Daylight
201970669	9/18/2020 2:00:00 PM	1	No Apparent Injury	Traffic Sign Support	Not a Collision with a Motor Vehicle In-	Single Vehicle Run-Off-Road	Westbound	Unknown	Daylight
202100653*	12/31/2021 12:00:00 AM	1	No Apparent Injury	Pedestrian	Not a Collision with a Motor Vehicle In-Transport	Pedestrian	Southbound	Snow	Dark - Not Lighted
202100743	4/15/2021 12:20:00 PM	2	Suspected Minor Injury	Motor Vehicle In-Transport	Front-To-Rear	Rear End	Southbound	Dry	Daylight
202100753	8/11/2021 12:00:00 AM	1	Suspected Minor Injury	Ground	Not a Collision with a Motor Vehicle In-	Motorcycle	Northbound	Dry	Dark - Lighted
201969923	9/9/2020 5:00:00 PM	2	No Apparent Injury	Motor Vehicle In-Transport	Unknown	Undetermined	Unknown	Dry	Daylight

Of the eight crashes provided, Crash Number 202100653 occurred about 2,100 feet south of Kachemak Drive, well outside of the study area. Also, Crash Number 201857967 occurred over 800 feet to the east of the Homer Spit Road-Kachemak Drive Intersection, again outside of the study area.

The remaining 6 crash locations within the study area, not including Crash Number 202100653 and Crash Number 201857967, are presented in the following figure.

Aerial Photo Source: Google Earth

Figure 13: Study Area Crash Locations, 2017 to 2021

Crash Number 201945257 was an eastbound, single vehicle run-off-road (ditch) occurring outside of the Homer Spit Road-Kachemak Drive Intersection functional area. Crash Number 201970669 was a westbound, single vehicle run-off-road (traffic sign), and occurred outside of the Ocean

Drive-Homer Spit Road-FAA Road Intersection functional area. Seemingly, neither of these crash types would be affected by the traffic generated by the Lighthouse Village Development.

Ocean Drive-Homer Spit Road-FAA Road Intersection and the Homer Spit Road-Kachemak Drive Intersection each had two crashes over the five year study period, a frequency of less than ½ crash per year. Crash rates for these intersections are presented in the table below. Average Entering AADT is estimated from Table 3 on page 31

Table 5: Intersection Crash Rates

Intersection	Crashes 2017 to 2021	Average Entering AADT 2017 to 2021	5-year Million Entering Vehicles (MEV)	Crashes / MEV	Populations (Comparative Intersection Type*)	Upper Critical Limit @ 95.00% Confidence	Above Average?	Above Critical?
Ocean-FAA-Homer Spit	2	6,907	12.605	0.159	0.5 (tee stop sign control)	0.867	no	no
Homer Spit-Kachemak	2	6,090	11.115	0.180	0.5 (tee stop sign control)	0.894	no	no

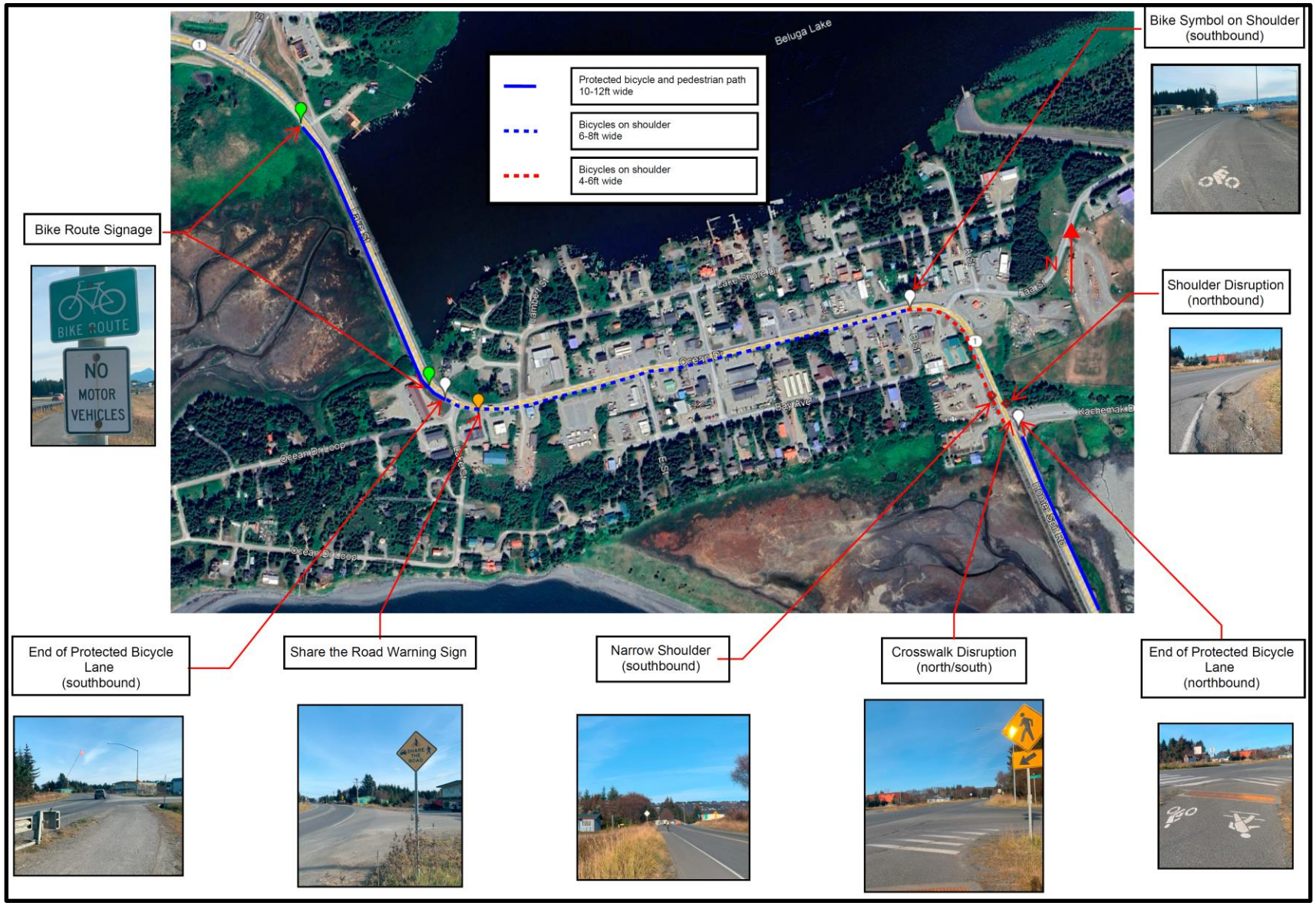
**From "Alaska DOT&PF Highway Safety Improvement Program, High Accident Location Screening Process, Formulas and Factors, for the FFY'18 HSIP" Published 2018 values are 0.52.*

The upper critical limit value is one in which, if exceeded, is an indicator that crashes are not strictly random and may have contributing factors. Generally, exceeding an upper critical limit may require corrective action. Neither intersection has a rate that is of concern.

6.7 Pedestrian and Bicycle Facilities

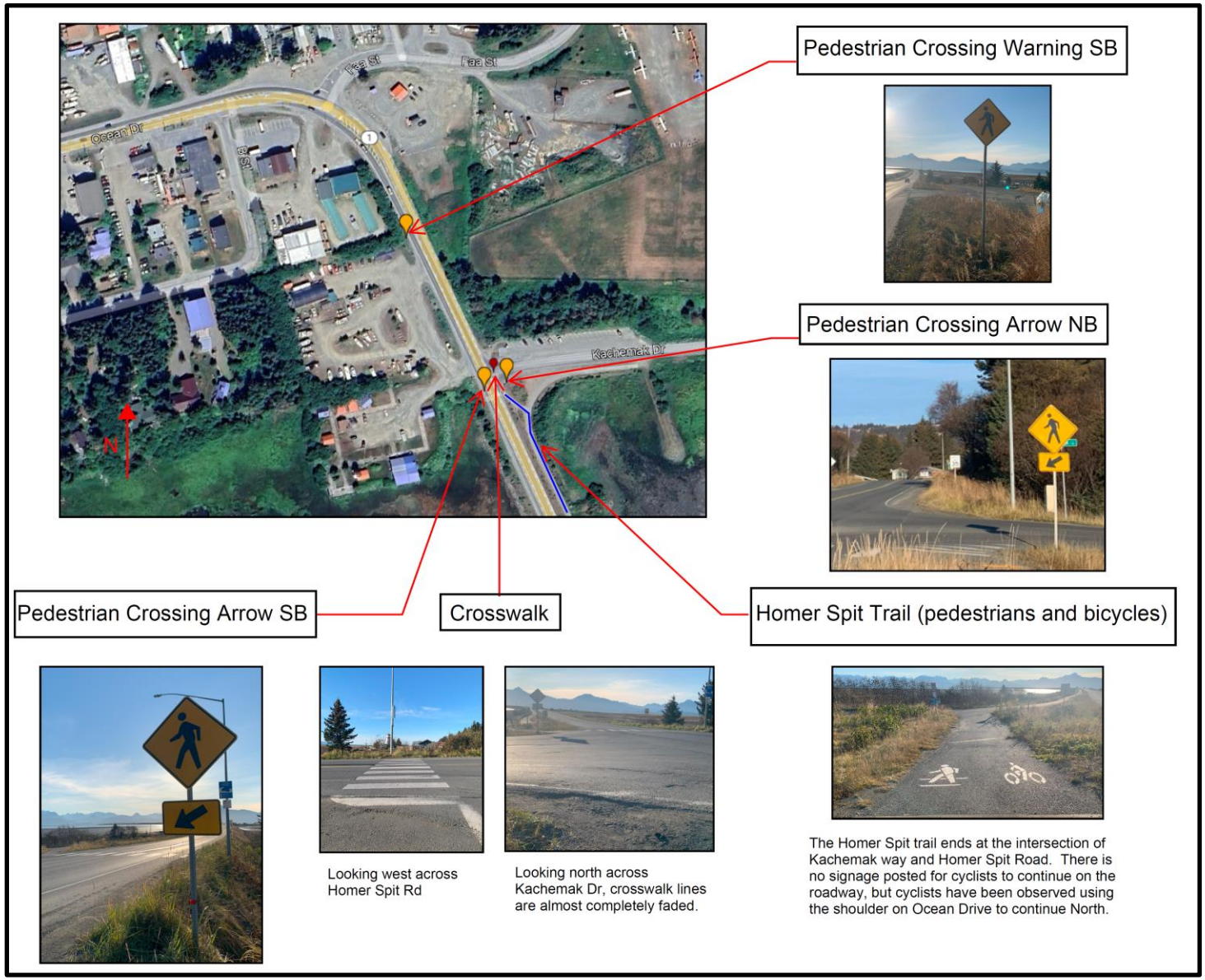
There are no sidewalks or pathways along Ocean Drive and along Homer Spit Road in the immediate frontage area of the proposed Lighthouse Village Development, although the Spit Trail begins at Kachemak Drive. Pedestrians use shoulders and bicycles either use shoulders or ride in the travel lanes on Ocean Drive and on Homer Spit Road between Lake Street Pathway Kachemak Drive.

Pedestrian and bicycle facilities are depicted in Figure 14 and Figure 15 below.



Aerial Photo Source: Google Earth

Figure 14: Area Pedestrian and Bicycle Facilities



Aerial Photo Source: Google Earth

Figure 15: Pedestrian and Bicycle Facilities on Homer Spit Road

7 Traffic Forecasting

Under this section, the DOT&PF TIA Checklist requires the following items to be addressed:

- *Projected traffic to be generated by the development (Use the ITE Trip Generation Manual, latest version).*
- *Projected trip distribution, turning movements, and rationale for determining same*
- *Projected total traffic for the design year (base traffic + site traffic) at all key area intersections and route segments within the study*
- *Trip generation from other planned developments*

7.1 Project Traffic-Trip Generation

7.1.1 Methodology

This trip generation analysis uses the methods and data of the Institute of Transportation (ITE) Trip Generation Manual (11th edition) and Trip Generation Handbook (3rd edition). ITE has developed a web application of the Trip Generation Manual, https://itetripgen.org/, which was used in this analysis. Trip generation is computed by the product of an independent variable average rate and the corresponding independent variable value; or by a regression function equation using the independent variable. The Trip Generation Handbook provides a methodology for selecting whether to use average rates, regression equations (if available), or develop local data in trip computations. When the Trip Generation Handbook guidelines recommend that local data be collected, the rate or equation is instead used for this TIA as collecting local data is not feasible in a smaller community with limited similar developments and with a limited budget.

This methodology is presented under Attachment D and is programmed by KE within an MS Excel spreadsheet.

ITE does not address the precise facility described by W&A's program in its land use data base for the combination of the hotel and employee housing. In such cases, the Lighthouse Village Development is modeled conservatively as individual land uses selected from the ITE land use categories and then the individual sub-generator trips combined to estimate the total trips that will be generated by the new facility.

7.1.2 Trip Generation Analysis Periods

Of interest to the Alaska DOT&PF and Homer is the peak hour trip totals during any one hour to determine:

- Need for a TIA (> 100 trips per hour)
- Analysis period/Design Year (>250 trips per hour requires a design year = full-buildout year + 10 years, otherwise design year is full buildout year).
- Traffic impact computations for intersections and segments conforming to State and Homer codes.

As previously discussed in Section 6.2 on page 29, ITE presents peak hour generation for many land use categories, and these will apply to this TIA:

- Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am
- Weekday, AM Peak Hour of Generator
- Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm
- Weekday, PM Peak Hour of Generator
- Saturday, Peak of Generator

7.1.3 Hotel Trip Generation

ITE has land use (LU) classifications for several hotel types including:

- ***LU 310 Hotel.*** ITE description: "*A hotel is a place of lodging that provides sleeping accommodations and supporting facilities such as a full-service restaurant, cocktail lounge, meeting rooms, banquet room, and convention facilities. A hotel typically provides a swimming pool or another recreational facility such as a fitness room*." The proposed development aligns with this description.

- ***LU 311 All Suites Hotel***: ITE description: *"An all-suites hotel is a place of lodging that provides sleeping accommodations, a small restaurant and lounge, and small amounts of meeting space. Each suite includes a sitting room and separate bedroom. An in-room kitchen is often provided."* The proposed development will have some suites, but is not an all-suite hotel. As such, the development does not align with this description and is not used.

- ***LU 312 Business Hotel***: ITE description: *"A business hotel is a place of lodging aimed toward the business traveler but also accommodates a growing number of recreational travelers. These hotels provide sleeping accommodations and other limited facilities, such as a breakfast buffet bar and afternoon beverage bar. Some provide a full-service restaurant geared toward hotel guests. Some provide a swimming pool; most provide fitness facilities. Limited space for meeting facilities may be provided. Each unit is a large single room."* The proposed development does not align entirely with this land use description, and LU-310 appears to fit better. That being the case, LU 312 will not be used.

- ***LU 320 Motel***: ITE description: *"A motel is a place of lodging that provides sleeping accommodations and provides little or no meeting space and few supporting facilities. Exterior corridors accessing rooms (immediately adjacent to a parking lot) is common for a motel."* The proposed development does not align with this description.

- ***LU 330 Resort Hotel.*** ITE description: *"A resort hotel is similar to a hotel (Land Use 310) in that it provides sleeping accommodations, full-service restaurants, cocktail lounges, retail shops, and guest services. The primary difference is that a resort hotel caters to the tourist and vacation industry, often providing a wide variety of recreational facilities/programs (e.g., golf courses, tennis courts, beach access, or other amenities) rather than convention and*

meeting business." The proposed development does not align entirely with this land use description, and LU-310 appears to fit better. That being the case, LU 330 will not be used.

ITE LU 310 Hotel is the category used for the hotel trip generation. The proposed hotel will include lodging, restaurant, bar, and convention facilities described in LU 310. The category description and data summary, excerpted from https://itetripgen.org/, is included under Attachment C. This analysis uses General Urban/Suburban setting data. LU 310 has three independent variables that may be applied to the analysis including Rooms, Occupied Rooms, and Employees. Rooms is the variable applied to this analysis, which for the proposed hotel has a value of 100. The outputs of the computations are vehicle trips. LU 310 Hotel trip generation is summarized for time periods in Table 6, below

Table 6: LU 310 Hotel Trip Generation

Time Period (Method: Average Rate or Regression Equation, As Recommended by ITE Trip Generation Handbook	Independent Variable (IV)	IV Value (X)	Average Rate or Equation	Computed Trips	Entering Trips	Exiting Trips
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am (Regression Equation)	Rooms	100	T = 0.50(X) - 7.45	43	24	19
Weekday, AM Peak Hour of Generator (Regression Equation)			Ln(T) = 0.86 Ln(X) + 0.12	59	31	28
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm (Regression Equation)			T = 0.74(X) - 27.89	46	24	22
Weekday, PM Peak Hour of Generator (Regression Equation)			Ln(T) = 0.95 Ln(X) - 0.27	61	35	26
Saturday, Peak of Generator (Regression Equation)			T = 0.69(X) + 5.95	75	42	33

7.1.4 Employee Housing Trip Generation

The hotel trip generation rates presented in ITE are intended to include guest, employee, vendor, and other types of trips, thus making the employee housing trips inclusive in the hotel. DOT&PF and Homer stated after the Pre-Analysis meeting that the employee housing trip generation must be considered as external to the site and hotel, and treated as an additional and separate land use computations.

The employee housing is a seasonal dormitory type of facility with single and double occupancy rooms, each with its own bathroom (toilet, sink, shower) closet, storage, desks and beds. There is a common kitchen and dining area and a common laundry room. Employees that reside in this facility will walk to and from the hotel and will have no need to access the hotel site with a vehicle for work trips. In fact, most employees housed in the dormitory will not have access to automobile, and employee parking on site may be prohibited (per Doyon representatives. As such, most external trips to and from the site are expected to be by active transportation modes (walking, biking, ride share, etc.). Since there is no ITE land use that adequately describes this type of facility, estimation methods for vehicle trips must be logically formulated.

The following ITE land uses were considered for this part of the Lighthouse Village Development. As noted above, using these land uses will require modifications to better model this dormitory use.

- ***LU 220 Multi-Family Housing (Low-Rise).*** ITE description: *"Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse."* Of the three Multifamily Housing sub-categories; low-rise (1 to 3 stories), mid-rise (4 to 10 stories), high-rise (11 or more stories); this low-rise category is most applicable to the proposed employee housing 3-story building.
- ***LU 223 Affordable Housing***. ITE description: *"Affordable housing includes all multifamily housing that is rented at below market rate to households that include at least one employed member. Eligibility to live in affordable housing can be a function of limited household income and resident age."* This land use has insufficient studies (2) and will not provide data for analysis periods. LU 223 is not used for this analysis.
- ***LU 225 Off-Campus Student Apartment (Low-Rise).*** ITE Description: *"An off-campus student apartment (low-rise) complex houses college or university students in structures with two or three floors of living space. The apartments are typically rented by the bedroom and most contain a common area or shared living space (living room, kitchen, dining area). Each bedroom typically has a private bath. These apartments are sometimes called independent bedroom apartments. The dwelling unit typically ranges in size between a studio apartment and a five-bedroom apartment. It can be rented furnished or unfurnished. It is common for each apartment to have a washer and dryer. The property is typically located near or within walking distance of a college campus and provides student-related amenities such as free high-speed Internet, a study lounge, fitness center, sports court, and swimming pool. An off-campus student apartment complex typically provides security and 24-hour emergency maintenance."* Although this land use description fits the proposed employee housing, the range of bedrooms for LU 225 is 200 to 1,000 bedrooms, well over the 25 units in the employee housing.

A cursory review of other related ITE land uses reveals no other categories that will apply well to the employee housing. Of the ones listed above, **LU 220 Multi-Family Housing (Low-Rise)** is recommended. The category description and data summary, excerpted from https://itetripgen.org/, is included under Attachment C. This analysis uses General Urban/Suburban setting data. LU 220 has two independent variables that may be applied to the analysis including dwelling units and residents.

Dwelling units is the variable applied to this analysis. The number of dormitory rooms 25, effectively 25 bedrooms. Because most apartment dwelling have more than one bedroom, and because dormitory residents will have limited use of automobiles, we use 12 dwelling units (about two dormitory bedrooms per dwelling unit equivalent) as the surrogate value for this land use.

Also, the ITE Trip Generation Handbook methodology indicates that a regression equation should be applied to estimate vehicle trips. However, we use average rate for each case since the assumed 12 dwelling units are on the lower limits of the data set, and by inspection of Trip

Generation graphs in Attachment C, the average rate better fits observed data cluster for every time period case.

LU 220 Multi-Family trip generation is summarized for time periods in following table.

Table 7: LU 220 Multi-Family Housing (Low-Rise), Employee Housing

Time Period (Method: Average Rate or Regression Equation, As Recommended by ITE Trip Generation Handbook Method, Attachment B)	Independent Variable (IV)	IV Value (X)	Average Rate or Equation	Computed Trips	Entering Trips	Exiting Trips
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am (Regression Equation)	Dwellings	12	0.4	5	1	4
Weekday, AM Peak Hour of Generator (Regression Equation)			0.47	5	1	4
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm (Regression Equation)			0.51	6	4	2
Weekday, PM Peak Hour of Generator (Regression Equation)			0.57	7	4	3
Saturday, Peak of Generator ("Collect Local Data", Average Rate Used)			0.41	4	2	2

7.1.5 Triplex Condominium Trip Generation

Five buildings will have three single-family residential units each. The ITE land use that best applies to this part of the development is LU 215 Single-Family Attached Housing. The description for this land use is summarized below.

- ***LU 215 Single-Family Attached Housing***. ITE Description: *"Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space. The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance)"*

The category description and data summary for LU 215, excerpted from https://itetripgen.org/, is included under Attachment C. This analysis uses General Urban/Suburban setting data. LU 215 has two independent variables that may be applied to the analysis including dwelling units and residents. Dwelling is the variable applied to this analysis, which for the proposed building has a value of 15. The outputs of the computations are vehicle trips. LU 215 Single-Family Attached Housing trip generation is summarized for time periods in

Table 8: LU 215 Single-Family Attached Housing , Triplex Condominiums

Time Period (Method: Average Rate or Regression Equation, As Recommended by ITE Trip Generation Handbook	Independent Variable (IV)	IV Value (X)	Average Rate or Equation	Computed Trips	Entering Trips	Exiting Trips
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am (Regression Equation)	Dwellings	15	T = 0.52(X) - 5.7	3	1	2
Weekday, AM Peak Hour of Generator (Regression Equation)			Ln(T) = 0.92 Ln(X) - 0.26	9	2	7
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm (Regression Equation)			T = 0.6(X) - 3.93	5	3	2
Weekday, PM Peak Hour of Generator (Regression Equation)			Ln(T) = 0.88 Ln(X) + 0.06	11	7	4
Saturday, Peak of Generator (Average Rate)			0.57	9	4	5

7.1.6 Summary of Site Trips

Trip generation computations for all three land uses on the site, as well as the total site trips are presented in the following table.

Table 9: Summary of Individual Generators and Site Total

Time Period	ITE LU 310 Hotel		LU 220 Multi-Family Housing (Low-Rise)		LU 215 Single-Family Attached Housing		Site Trip Generation		
	Hotel Entering Trips	Hotel Exiting Trips	Employee Housing Entering Trips	Employee Housing Exiting Trips	Triplex Entering Trips	Triplex Exiting Trips	Total Entering Trips	Total Exiting Trips	Total Trips
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am	24	19	1	4	1	2	26	25	51
Weekday, AM Peak Hour of Generator	31	28	1	4	2	7	34	39	73
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm	24	22	4	2	3	2	31	26	57
Weekday, PM Peak Hour of Generator	35	26	4	3	7	4	46	33	79
Saturday, Peak of Generator	42	33	2	2	4	5	48	40	88

As the table shows, the highest peak hour volume is 88 trips during the Saturday peak hour of the generator.

7.1.7 Need for a TIA Analysis

The DOT&PF threshold requirement for a Traffic Impact Analysis is 100 trips per hour. This requirement is defined in 17 AAC 10.060. Driveways not part of highway construction.:

> *"(c) If a development is projected to generate more than 100 vehicle trips on a highway during any hour of the day, or the traffic generated is expected to detract from the safety of the highway, an applicant must perform a traffic impact analysis that meets the requirements of 17 AAC 10.070."*

On a traffic volume basis, the Alaska Administrative Code 17 AAC 10.060 does not require a TIA for this Lighthouse Village Development because the development peak hour trips are less than 100 trips.

The City of Homer has no threshold peak hour volumes that trigger requirements for TIAs. The Homer City Planner determined a TIA is required per Homer City Code 21.71.020 Application for Conditional Use Permit by this paragraph:

> *8. Any additional information the City Planner may require to determine whether the application satisfies the criteria for issuance of a permit.*

7.1.8 Design Year Requirements

Both City of Homer and DOT&PF use a peak hour threshold of 250 trips per hour to determine if the analysis should use a design year that will occur 10 years after the full buildout year. If so, then the street system base traffic, that is traffic that will occur 10 years from full buildout, will need to be estimated with an approved growth rate. The development trip generated traffic remains constant throughout the analysis period, and will be added to the street system base traffic. For this development, the peak trip generation (88) will be less than 250 trips per hour. Therefore, the analysis need only consider base traffic and trip generated traffic that will occur during the full build out year.

The opening year of this facility is expected to be 2024, and the full buildout is expected to be completed in 2026 (See discussion in Section 4.3 Construction Year, Opening Year, Full Buildout Year on page 15). This analysis uses 2026 as the design year.

7.2 Projected Trip Distribution, Turning Movements, And Rationale For Determining Same

Base traffic was developed for 2026 peak hour conditions, discussed under Section 6.4 Daily Volume Counts For All Streets And Roadways In The Study Area on page 31, and presented in Attachment B.

Site Traffic was distributed to external nodes of the system based proportionally to inbound and outbound traffic of the post-processed intersection counts. This methodology is in accordance with standard practice.

As previously discussed, all hotel and employee housing trips distributed to and from the site will use the North Access Driveway. Triplex Condominium trips distributed to and from the site will use the South Access Driveway (across from Kachemak Drive).

7.3 Projected Total Traffic for the Design Year

Reference Attachment E for the base background traffic, the site traffic, and final build condition intersection turning movements that apply to the Lighthouse Village Development peak hour cases in the design year, 2026.

8 Traffic Analysis

Under this section, the DOT&PF TIA Checklist requires the following items to be addressed:

- *Baseline LOS calculations for all Key Intersections and Key Road Segments (For LOS computations, use the TRB Special Report 209, Highway Capacity Manual, latest version)*
    - *No- Build Alternative— Without Development*
        - *Projected LOS calculations for all key intersections and key road segments for the opening date or the design year, as required*
        - *Vehicle queue lengths (95th percentile) and available storage*
        - *Pedestrian considerations, including applicable school walking routes*
        - *Bicycle considerations*
        - *Transit considerations (Not Considered)*
        - *Safety considerations for all Key Intersections and key road segments*
    - *Build Alternative— With Development*
        - *Projected LOS calculations for all key intersections and key road segments for the opening date or the design year, as required*
        - *Vehicle queue lengths (95th percentile) and available storage*
        - *Pedestrian considerations, including applicable school walking routes*
        - *Bicycle considerations*
        - *Transit considerations (Not Considered)*
        - *Safety considerations for all Key Intersections and key road segments*

8.1 Traffic Input Parameters

Highway Capacity Software 2022 (HCS), two-way-stop-control (TWSC) module, based on Highway Capacity Manual 2022 methods, was used to analyze the intersections of the TIA study area.

8.1.1 Vehicles

The following table summarizes the vehicle HCS input parameters used in the analysis.

Table 10: Traffic Input Parameters

FAA Road - Ocean Drive - Homer Spit Road Intersection								
Parameter	**WBLT**	**WBRT**	**NBT**	**NBRT**	**SBLT**	**SBT**		
Peak Hour Factor	0.95							
Percent Heavy Vehicles	5%	5%	-	-	8%	-		
Pedestrians	10		10		10			
Hotel Driveway – Homer Spit Road Intersection								
Parameter	**EBLT**	**EBRT**	**NBLT**	**NBT**	**SBT**	**SBRT**		
Peak Hour Factor	0.95							
Percent Heavy Vehicles	3%	3%	7%	-	-	-		
Pedestrians	10		10		10			
Kachemak Road – Homer Spit Road Intersection								
Parameter	**EBLT**	**EBT**	**EBRT**	**WBLT**	**WBT**	**WBRT**	**NBLT**	**SBLT**
Peak Hour Factor	0.95							
[1]Flared Street Approach Storage for Right Turns	-			2			-	-
Percent Heavy Vehicles	3%	3%	3%	5%	5%	5%	6%	7%
Pedestrians	10			10			10	10

The peak hour factors (PHFs) observed during the September counts were in the 0.8 to 0.95 range. The September MADT volumes were at about ½ of July MADT volumes. As such, it is assumed that the significant increase in hourly volumes will tend to make 15-minute intervals more even, and a PHF of 0.95 is used for the capacity studies.

Truck% were derived from the September counts and from the Homer road traffic data found on https://alaskatrafficdata.drakewell.com/publicmultinodemap.asp on Ocean Drive and Homer Spit Road (Table 3 on page 31).

Vehicle performance measures include control delay in seconds per vehicle (s/veh) for individual movements and approaches; as well as movement and approach level of service (LOS). Control delay is used to provide the LOS performance measure as shown in the following table.

Control Delay (s/veh)	LOS by Volume-to-Capacity Ratio $v/c \leq 1.0$	$v/c > 1.0$
0–10	A	F
>10–15	B	F
>15–25	C	F
>25–35	D	F
>35–50	E	F
>50	F	F

Note: The LOS criteria apply to each lane on a given approach and to each approach on the minor street. LOS is not calculated for major-street approaches or for the intersection as a whole.

Source: HCS TWSC Module User Guide

Figure 16: Level of Service for Control Delay Ranges

Control delay includes delay while decelerating from desirable speed to stop, time stopped, and delay while accelerating from stop to desirable speed. Typically only minor street vehicles under stop sign or yield control, or left turning vehicle on the main street turning into the minor street experience measurable control delay. Main street through and right turning traffic are considered free-flow and experience little if any delay. The exception is when left-turns must turn from a lane also used by through vehicles. In those situations, the left-turning vehicle delays the following vehicles while waiting for suitable gaps to turn.

The 95th percentile queues (length that is not exceeded 95% of the time) are presented for delayed movements as well. This is of concern because queues that spill back behind an auxiliary turn may block adjacent uncontrolled movements to create operational and safety issues.

8.1.2 Pedestrians

Pedestrian mode level of service is dependent upon the probability of a non-delayed crossing, or pedestrian satisfaction. The volume of pedestrians is not a factor in the level of service; the method only considers the likelihood of any pedestrian being delayed. The level of service also has safety implications. Pedestrians that experience high delays may become impatient and take chances with insufficient and unsafe gaps in traffic. Although the Alaska Administrative Code 13 AAC 02.155(a) requires drivers to yield to pedestrians in a crosswalk, pedestrian crossing conspicuity should help improve driver yield compliance.

The following figure presents level of service rating based on probability ranges.

LOS	Condition	Comments
A	$P_D < 0.05$	Nearly all pedestrians would be satisfied
B	$0.05 \leq P_D < 0.15$	At least 85% of pedestrians would be satisfied
C	$0.15 \leq P_D < 0.25$	Fewer than one-quarter of pedestrians would be dissatisfied
D	$0.25 \leq P_D < 0.33$	Fewer than one-third of pedestrians would be dissatisfied
E	$0.33 \leq P_D < 0.50$	Fewer than one-half of pedestrians would be dissatisfied
F	$P_D \geq 0.50$	The majority of pedestrians would be dissatisfied

Note: P_D = proportion of pedestrians giving a "dissatisfied" rating or worse.

Source: HCS TWSC Module User Guide

Figure 17: Pedestrian Mode Street Crossings Level of Service for Probability Delayed Crossing, P_D

The probability and level of service is computed within the HCS two-way-stop-control module. HCS outputs reports probability of non-delayed crossing for a pedestrian, or P_{nd}. P_{nd} and P_d are related as:

$$P_{nd} = 1 - P_d$$

Equation 3

8.2 Ocean Drive-FAA Road-Homer Spit Road Intersection

8.2.1 Ocean Drive-FAA Road-Homer Spit Road Intersection Vehicle Performance Measures No-Build and Build Conditions

The following tables summarize the no-build and build performance measures for the Ocean Drive-FAA Road-Homer Spit Road intersection westbound movements and southbound movements. Northbound approach (on Homer Spit Road) is not summarized since no movements experience control delay. Turning movements for no-build and build conditions are found in Attachment B and HCS intersection capacity analysis summary reports are in Attachment F.

Table 11: Ocean Drive-FAA Road-Homer Spit Road Intersection (No-Build Condition Without Site Traffic) 2026 Design Year

Approach	**Westbound, FAA Road, Stop Sign Control**		**Southbound, Ocean Drive**	
Movement	**WBLT**	**WBRT**	**SBLT**	**SBT**
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.				
95% Queue Length, Q95 (veh)	0.1	0.1	0.1	-
Control Delay (s/veh)	16.1	10.3	8.1	0.2
Level of Service (LOS)	C	B	A	A
Approach Delay (s/veh)	12.3		0.9	
Approach LOS	B		A	
Weekday, AM Peak Hour of Generator				
95% Queue Length, Q95 (veh)	0.6	0.5	0.3	-
Control Delay (s/veh)	26.9	12.8	9.0	0.5
Level of Service (LOS)	D	B	A	A
Approach Delay (s/veh)	17.2		1.8	
Approach LOS	C		A	
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.				
95% Queue Length, Q95 (veh)	1.0	0.6	0.2	-
Control Delay (s/veh)	30.5	14.0	9.1	0.5
Level of Service (LOS)	D	B	A	A
Approach Delay (s/veh)	20.1		1.6	
Approach LOS	C		A	
Weekday, PM Peak Hour of Generator				
95% Queue Length, Q95 (veh)	1.1	0.6	0.2	-
Control Delay (s/veh)	31.9	14.2	9.2	0.5
Level of Service (LOS)	D	B	A	A
Approach Delay (s/veh)	20.8		1.6	

Approach	Westbound, FAA Road, Stop Sign Control		Southbound, Ocean Drive	
Movement	**WBLT**	**WBRT**	**SBLT**	**SBT**
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.				
Approach LOS	C		A	
Saturday, Peak of Generator				
95% Queue Length, Q95 (veh)	1.4	0.7	0.3	-
Control Delay (s/veh)	37.9	15.0	9.4	0.6
Level of Service (LOS)	E	B	A	A
Approach Delay (s/veh)	23.4		1.7	
Approach LOS	C		A	

Table 12: Ocean Drive-FAA Road-Homer Spit Road Intersection (Build Condition with Site Traffic) 2026 Design Year

Approach	Westbound, FAA Road, Stop Sign Control		Southbound, Ocean Drive	
Movement	**WBLT**	**WBRT**	**SBLT**	**SBT**
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.				
95% Queue Length, Q95 (veh)	0.2	0.1	0.1	-
Control Delay (s/veh)	16.6	10.5	8.2	0.2
Level of Service (LOS)	C	B	A	A
Approach Delay (s/veh)	12.7		0.9	
Approach LOS	B		A	
Weekday, AM Peak Hour of Generator				
95% Queue Length, Q95 (veh)	0.7	0.5	0.3	-
Control Delay (s/veh)	28.7	13.1	9.1	0.6
Level of Service (LOS)	D	B	A	A
Approach Delay (s/veh)	18.2		1.8	
Approach LOS	C		A	
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.				
95% Queue Length, Q95 (veh)	1.1	0.6	0.2	-
Control Delay (s/veh)	32.4	14.2	9.2	0.5
Level of Service (LOS)	D	B	A	A
Approach Delay (s/veh)	21.2		1.6	
Approach LOS	C		A	
Weekday, PM Peak Hour of Generator				
95% Queue Length, Q95 (veh)	1.3	0.7	0.2	-
Control Delay (s/veh)	35.0	14.4	9.3	0.5
Level of Service (LOS)	E	B	A	A
Approach Delay (s/veh)	22.6		1.6	
Approach LOS	C		A	
Saturday, Peak of Generator				
95% Queue Length, Q95 (veh)	1.6	0.8	0.3	-

Approach	Westbound, FAA Road, Stop Sign Control		Southbound, Ocean Drive	
Movement	WBLT	WBRT	SBLT	SBT
Control Delay (s/veh)	42.0	15.3	9.5	0.6
Level of Service (LOS)	E	C	A	A
Approach Delay (s/veh)	25.5		1.7	
Approach LOS	D		A	

The following table presents the changes in the primary performance measures (delay and Level of Service.

Table 13: Ocean Drive-FAA Road-Homer Spit Road Intersection Capacity Summary Change in Performance Measures with Additional Site Traffic 2026 Design Year

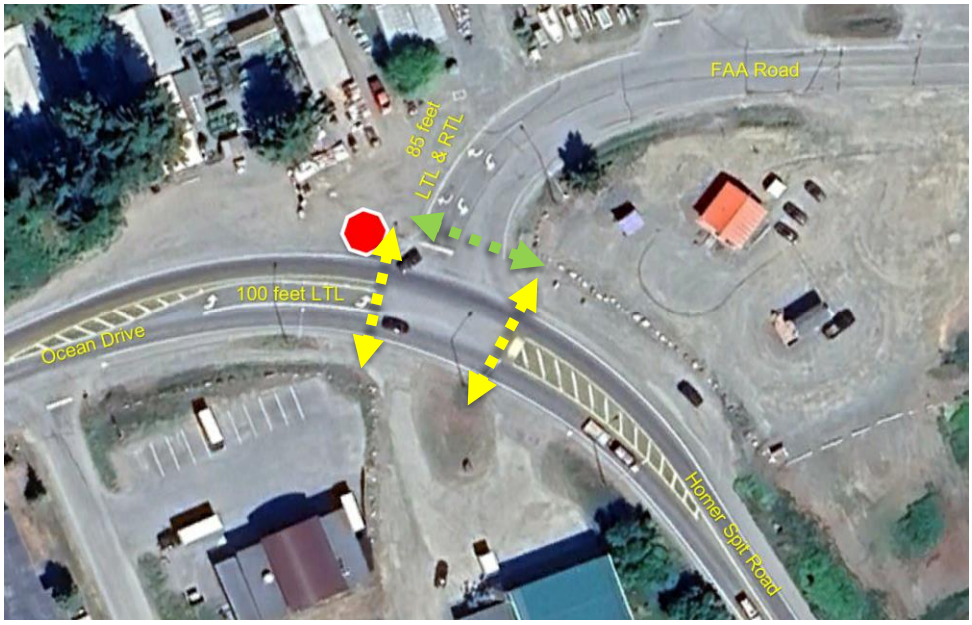
Approach	Westbound, FAA Road, Stop Sign Control		Southbound, Ocean Drive	
	Approach Delay	Approach LOS	Approach Delay	Approach LOS
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.				
No-Build	12.3	B	0.9	A
Build	12.7	B	0.9	A
Difference	0.4	None	0	None
Weekday, AM Peak Hour of Generator				
No-Build	17.2	C	1.8	A
Build	18.2	C	1.8	A
Difference	1	None	0	None
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.				
No-Build	20.1	C	1.6	A
Build	21.2	C	1.6	A
Difference	1.1	None	0	None
Weekday, PM Peak Hour of Generator				
No-Build	20.8	C	1.6	A
Build	22.6	C	1.6	A
Difference	1.8	None	0	None
Saturday, Peak of Generator				
No-Build	23.4	C	1.7	A
Build	25.5	D	1.7	A
Difference	**2.1**	**C➔D**	0	None

8.2.2 Ocean Drive-FAA Road-Homer Spit Road Intersection Queues

For all peak hour cases, SBLT 95th percentile queues are computed as less than 1 vehicle. The SBLT auxiliary lane length can accommodate 4 vehicles so SBLT queues will be contained in the lane. The WBRT and WBLT 95th percentile queues are 2 vehicles or less, and are accommodated by the auxiliary lanes that hold 3 cars in queue.

8.2.3 Ocean Drive-FAA Road-Homer Spit Road Intersection Pedestrian and Bicycle Performance Measures

Figure 18 below depicts the intersection lane configuration and main street unmarked crossings. Pedestrians do not have a marked crosswalk. Yellow dashed arrow lines show uncontrolled crossings where pedestrians must determine and use acceptable gaps in the mainline traffic flow. Crossing of westbound FAA Road are under stop sign control of vehicles who yield to crossing pedestrians, shown with green dashed arrow lines.



Aerial Photo Source: Google Earth

Figure 18: Uncontrolled Pedestrian Ocean Drive-FAA Road-Homer Spit Road Intersection

From personal experiences in trying to cross Homer Spit Road or Ocean Drive at this intersection, we have found it challenging to judge gaps, and find that the pedestrian sight distance is limited for crossing, especially on the inside of the curve. Furthermore, the crossing is long, about 50 feet across the Homer Spit Road approach, further lengthening pedestrian sigh distance requirements.

Pedestrian sight distance is computed with this formula (for single pedestrians or pedestrians walking abreast in a single row):

$$PSD = 1.47 \times S_V \times \left(\frac{L}{S_P} + t_S\right)$$

Equation 4

Where:

- ***PSD*** is pedestrian sight distance, feet
- S_v is the vehicle approach speed in mph
- L is the crossing length, feet

- S_p is the pedestrian walking speed, in feet per second (usually 3.5 feet per second)

- t_s is the startup time for pedestrians, perceiving, reacting and initiating the crossing (usually 2.5 seconds for PSD computations

If there is more than one row of pedestrian, then substitute critical gap for the L/S_p term in Equation 4. The critical crossing gap, t_G, is computed as:

$$t_G = \left(\frac{L}{S_P} + t_S\right) + t_{S-R}(N-1)$$

Equation 5

Where:

- t_G is critical gap in seconds

- L is the crossing length, feet

- S_p is the pedestrian walking speed, in feet per second (usually 3.5 feet per second)

- t_S is the startup time for pedestrians, perceiving, reacting and initiating the crossing (usually 3 seconds for critical gap computations)

- $t_{S\text{-}R}$ is the startup time for pedestrians in following rows (usually 2 seconds)

- N is the number of pedestrian rows waiting to cross the street.

The computed PSD from the inside crossing point of Homer Spit Road approach is 860 feet using the crossing length of 50 feet and a single pedestrian. Looking south, a pedestrian sight line to an approaching northbound vehicle provides about 280 feet of estimated actual PSD sight distance (from Google Earth). Looking west, along Ocean Drive, the pedestrian has at a minimum 350 of estimated actual PSD (from Google Earth) for east bound traffic, with sight lines restricted by a row of parking.

Neither of the measured values meet the desirable PSD of 860 feet. However, SSD is 250 for the 35 mph speed zones. As such, approaching drivers will have time to adjust speeds or stop when pedestrians are in the unmarked cross walk.

The follow tables presents pedestrian crossing performance for each of the peak hour cases described above, for the no-build and build conditions. All pedestrian peak hour case evaluations are part of the HCS intersection reports found under Attachment F.

Table 14: Ocean Drive-FAA Road-Homer Spit Road Intersection Pedestrian Level of Service, No-Build Without Site Traffic, 2026 Peak Hours

Approach	Homer Spit Approach Crossing (South Leg)	Ocean Drive Approach Crossing (North Leg)
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.		
Conflicting Vehicular Flow (veh/h)	711	732
Average Delay (s)	35.0	39.9
Probability of Non-Delayed Crossing, P_{nd}	0.139	0.121
Level of Service (LOS)	F	F
Weekday, AM Peak Hour of Generator		
Conflicting Vehicular Flow (veh/h)	985	1028
Average Delay (s)	37.3	55.2
Probability of Non-Delayed Crossing, P_{nd}	0.096	0.067
Level of Service (LOS)	F	F
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.		
Conflicting Vehicular Flow (veh/h)	1045	1079
Average Delay (s)	37.2	57.2
Probability of Non-Delayed Crossing, P_{nd}	0.091	0.062
Level of Service (LOS)	F	F
Weekday, PM Peak Hour of Generator		
Conflicting Vehicular Flow (veh/h)	1066	1102
Average Delay (s)	37.2	58.0
Probability of Non-Delayed Crossing, P_{nd}	0.089	0.059
Level of Service (LOS)	F	F
Saturday, Peak of Generator		
Conflicting Vehicular Flow (veh/h)	1140	1178
Average Delay (s)	37.0	60.8
Probability of Non-Delayed Crossing, P_{nd}	0.083	0.052
Level of Service (LOS)	F	F

Table 15: Ocean Drive-FAA Road-Homer Spit Road Intersection Pedestrian Level of Service, Build With Site Traffic, 2026 Peak Hours

Approach	Homer Spit Approach Crossing (South Leg)	Ocean Drive Approach Crossing (North Leg)
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.		
Conflicting Vehicular Flow (veh/h)	747	756
Average Delay (s)	35.7	41.4
Probability of Non-Delayed Crossing, P_{nd}	0.131	0.115
Level of Service (LOS)	F	F
Weekday, AM Peak Hour of Generator		
Conflicting Vehicular Flow (veh/h)	1022	1061
Average Delay (s)	37.3	56.5
Probability of Non-Delayed Crossing, P_{nd}	0.093	0.064

Approach	Homer Spit Approach Crossing (South Leg)	Ocean Drive Approach Crossing (North Leg)
Level of Service (LOS)	F	F
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.		
Conflicting Vehicular Flow (veh/h)	1072	1103
Average Delay (s)	37.2	58.1
Probability of Non-Delayed Crossing, P_{nd}	0.088	0.059
Level of Service (LOS)	F	F
Weekday, PM Peak Hour of Generator		
Conflicting Vehicular Flow (veh/h)	1102	1135
Average Delay (s)	37.1	59.3
Probability of Non-Delayed Crossing, P_{nd}	0.086	0.056
Level of Service (LOS)	F	F
Saturday, Peak of Generator		
Conflicting Vehicular Flow (veh/h)	1183	1218
Average Delay (s)	36.8	62.3
Probability of Non-Delayed Crossing, P_{nd}	0.081	0.049
Level of Service (LOS)	F	F

As the tables above show, both of the no-build and build peak hours pedestrian crossings have long delays and low probability of non-delayed crossings. The impact of site traffic is not significant since the intersection has poor pedestrian crossing performance without site traffic.

8.2.4 Ocean Drive-FAA Road-Homer Spit Road Intersection Qualitative Traffic Safety Evaluation

Between 2017 and 2021, there were two crashes at this intersection. One involved a motorcycle that went down and the other involved two vehicles with unknown type or cause. By inspection, the crashes are not a substantive safety issue, which is further supported by the crash rate evaluation results in Table 5 on page 37.

The intersection is channelized to reduce conflicts between movements, and to provide capacity. The additional site traffic does not introduce new conflict patterns or crash types. The overall increase in delay is not to an extent that will encourage additional risk taking by the WBLT or WBRT under stop sign control. The additional Lighthouse Village Development vehicle traffic will not likely create a vehicle crash issue since none exists now.

However, pedestrian crossings of Ocean Drive and Homer Spit Road are subject to long delays and may cause impatient pedestrians to take risk with unacceptable gaps to cross. Desirable PSD is not satisfied for pedestrian crossing from the inside of the horizontal curve, although SSD is satisfied. Moreover, the Lighthouse Village Development's new hotel, employee housing, and condominiums will likely increase the pedestrian and bicycle traffic in the area. As discussed above, additional site vehicular traffic has no practical effect on the already-poor pedestrian operational quality. However, crossing improvements at this intersection should be considered as

an improvement in delay reduction and pedestrian crossing operational quality and to improve PSD for safety benefits. These are discussed as alternatives in Section 11.1.3.1.

8.3 Kachemak Drive-South Access Driveway-Homer Spit Road Intersection

8.3.1 Kachemak Drive-South Access Driveway-Homer Spit Road Intersection Vehicle Performance Measures No-Build and Build Conditions

The following tables summarize key no-build and build performance measures for the Kachemak Drive-South Access Driveway-Homer Spit Road Intersection. Full intersection reports are in Attachment F.

All approach movements; EB, WB, NB, and SB right- turns, left-turns, and through movements; are served from the single approach lane.

Under the no-build condition, only one peak hour (AM Peak Hour of Generator) had observed EB driveway volumes, 2 EBLTs from our September counts.

Table 16: Kachemak Road-South Access Driveway-Homer Spit Road Intersection (No-Build Condition) 2026 Design Year

Approach	Eastbound, South Access Triplex, Stop Sign Control	Westbound, Kachemak Drive, Stop Sign Control	Northbound, Homer Spit Road			Southbound, Homer Spit Road		
Movement	**All**	**All**	**NBLT**	**NBT**	**NBRT**	**SBLT**	**SBT**	**SBRT**
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.								
95% Queue Length, Q95 (veh)	-	1.0	0.0	-	-	0.4	-	-
Control Delay (s/veh)	-	11.4	7.8	0.0	0.0	8.2	1.2	1.2
Level of Service (LOS)	-	B	A	A	A	A	A	A
Approach Delay (s/veh)	-	11.4	0.0			4.0		
Approach LOS	-	B	A			A		
Weekday, AM Peak Hour of Generator								
95% Queue Length, Q95 (veh)	0.1	1.6	0.0	-	-	0.4	-	-
Control Delay (s/veh)	31.3	14.0	8.1	0.0	0.0	8.7	1.3	1.3
Level of Service (LOS)	D	B	A	A	A	A	A	A
Approach Delay (s/veh)	31.3	14.0	0.0			3.4		
Approach LOS	D	B	A			A		
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.								
95% Queue Length, Q95 (veh)	-	1.7	0.0	-	-	0.5	-	-
Control Delay (s/veh)	-	15.1	8.1	0.0	0.0	9.2	1.7	1.7
Level of Service (LOS)	-	C	A	A	A	A	A	A
Approach Delay (s/veh)	-	15.1	0.0			4.0		
Approach LOS	-	C	A			A		

Approach	Eastbound, South Access Triplex, Stop Sign Control	Westbound, Kachemak Drive, Stop Sign Control	Northbound, Homer Spit Road			Southbound, Homer Spit Road		
Movement	**All**	**All**	**NBLT**	**NBT**	**NBRT**	**SBLT**	**SBT**	**SBRT**
Weekday, PM Peak Hour of Generator								
95% Queue Length, Q95 (veh)	-	1.9	0.0	-	-	0.5	-	-
Control Delay (s/veh)	-	15.8	8.1	0.0	0.0	9.2	1.8	1.8
Level of Service (LOS)	-	C	A	A	A	A	A	A
Approach Delay (s/veh)	-	15.8	0.0			4.1		
Approach LOS	-	C	A			A		
Saturday, Peak of Generator								
95% Queue Length, Q95 (veh)	-	2.4	0.0	-	-	0.6	-	-
Control Delay (s/veh)	-	18.4	8.2	0.0	0.0	9.5	2.0	2.0
Level of Service (LOS)	-	C	A	A	A	A	A	A
Approach Delay (s/veh)	-	18.4	0.0			4.3		
Approach LOS	-	C	A			A		

The following table presents performance measures of the intersection with site traffic, which is only traffic generated by the triplex condominiums. All approach movements; EB, WB, NB, and SB right- turns, left-turns, and through movements; are served from the single approach lane.

Table 17: Kachemak Road-South Access Driveway-Homer Spit Road Intersection (Build Condition) 2026 Design Year

Approach	Eastbound, South Access Triplex, Stop Sign Control	Westbound, Kachemak Drive, Stop Sign Control	Northbound, Homer Spit Road			Southbound, Homer Spit Road		
Movement	**All**	**All**	**NBLT**	**NBT**	**NBRT**	**SBLT**	**SBT**	**SBRT**
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.								
95% Queue Length, Q95 (veh)	0.0	1.1	0.0	-	-	0.4	-	-
Control Delay (s/veh)	15.9	11.6	7.8	0.0	0.0	8.2	1.2	1.2
Level of Service (LOS)	C	B	A	A	A	A	A	A
Approach Delay (s/veh)	15.9	11.6	0.0			4.0		
Approach LOS	C	B	A			A		
Weekday, AM Peak Hour of Generator								
95% Queue Length, Q95 (veh)	0.2	1.8	0.0	-	-	0.4	-	-
Control Delay (s/veh)	28.6	14.7	8.1	0.0	0.0	8.8	1.4	1.4
Level of Service (LOS)	D	B	A	A	A	A	A	A
Approach Delay (s/veh)	28.6	14.7	0.0			3.5		
Approach LOS	D	B	A			A		
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.								

Approach	Eastbound, South Access Triplex, Stop Sign Control	Westbound, Kachemak Drive, Stop Sign Control	Northbound, Homer Spit Road			Southbound, Homer Spit Road		
Movement	**All**	**All**	**NBLT**	**NBT**	**NBRT**	**SBLT**	**SBT**	**SBRT**
95% Queue Length, Q95 (veh)	0.0	1.9	0.0	-	-	0.6	-	-
Control Delay (s/veh)	25.6	15.9	8.1	0.0	0.0	9.2	1.8	1.8
Level of Service (LOS)	D	C	A	A	A	A	A	A
Approach Delay (s/veh)	25.6	15.9	0.0			4.1		
Approach LOS	D	C	A			A		
Weekday, PM Peak Hour of Generator								
95% Queue Length, Q95 (veh)	0.1	2.1	0.0	-	-	0.6	-	-
Control Delay (s/veh)	33.3	17.1	8.1	0.0	0.0	9.3	1.9	1.9
Level of Service (LOS)	D	C	A	A	A	A	A	A
Approach Delay (s/veh)	33.3	17.1	0.1			4.2		
Approach LOS	D	C	A			A		
Saturday, Peak of Generator								
95% Queue Length, Q95 (veh)	0.1	2.8	0.0	-	-	0.7	-	-
Control Delay (s/veh)	33.6	20.5	8.2	0.0	0.0	9.6	2.2	2.2
Level of Service (LOS)	D	C	A	A	A	A	A	A
Approach Delay (s/veh)	33.6	20.5	0.0			4.4		
Approach LOS	D	C	A			A		

The following table presents the changes in the primary performance measures (delay and Level of Service for the roadway approaches of the intersection. The eastbound approach, South Access for the triplex condominiums are not included since level of service impact requirements cited in 17 AAC 10.070 and Homer City Code 21.76.040 apply to roadways. Also, the eastbound volumes are low, in all peak hour cases turning movements on the approach are less than 10 vehicles per hour.

Table 18: Kachemak Drive - Homer Spit Road Intersection Capacity Summary Change in Performance Measure with Additional Site Traffic 2026 Design Year

Approach	Westbound, Kachemak Drive, Stop Sign Control		Northbound, Homer Spit Road		Southbound, Homer Spit Road	
	Approach Delay	**Approach LOS**	**Approach Delay**	**Approach LOS**	**Approach Delay**	**Approach LOS**
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.						
No-Build	11.4	B	0	A	4	A
Build	11.6	B	0	A	4	A
Difference	0.2	None	0	None	0	None
Weekday, AM Peak Hour of Generator						
No-Build	14.1	B	0	A	3.4	A
Build	14.8	B	0	A	3.5	A
Difference	0.7	None	0	None	0.1	None

Approach	Westbound, Kachemak Drive, Stop Sign Control		Northbound, Homer Spit Road		Southbound, Homer Spit Road	
	Approach Delay	Approach LOS	Approach Delay	Approach LOS	Approach Delay	Approach LOS
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.						
No-Build	15.1	C	0	A	4	A
Build	15.9	C	0	A	4.1	A
Difference	0.8	None	0	None	0.1	None
Weekday, PM Peak Hour of Generator						
No-Build	15.8	C	0	A	4.1	A
Build	17.1	C	0.1	A	4.2	A
Difference	1.3	None	0.1	None	0.1	None
Saturday, Peak of Generator						
No-Build	18.4	C	0	A	4.3	A
Build	20.5	C	0	A	4.4	A
Difference	2.1	None	0	None	0.1	None

8.3.2 Kachemak Drive-South Access Driveway-Homer Spit Road Intersection Queues

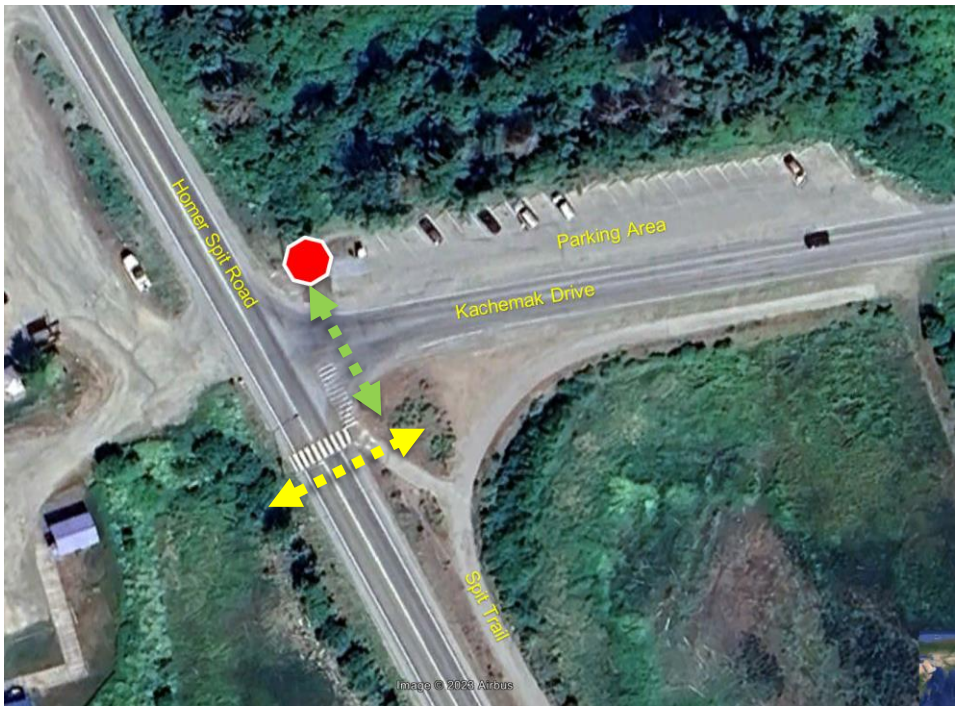
There are no auxiliary lanes for this intersection. The EB lane has a 95th percentile queues of 3 vehicles at most, which will not block access to the adjacent parking lot. The South Access eastbound driveway approach has length for 4 vehicles in a queue with spilling back into the parking area. All peak hour cases have an eastbound 95th percentile queue of 1 car or less.

8.3.3 Kachemak Drive-South Access Driveway-Homer Spit Road Intersection Pedestrian Performance Measures

Figure 12 on page 34 present the intersection configuration and main street crossings (yellow dashed lines show uncontrolled crossings). There is a marked crosswalk with pedestrian crossing ahead warning signs (W11-2 and W11-2P) across the south leg as shown. However, the pedestrian must select adequate gaps in the Homer Spit Road traffic flow. The marked crosswalk and advanced signing will result in some motorists yielding to crossing pedestrians (about 76% per HCS).

Since there is a marked crosswalk at the intersection, the north leg of the intersection is not evaluated. Note that crossings of Kachemak Drive are under stop sign control of vehicles, shown by the green dashed arrow lines, and are not evaluated since vehicles must yield to westbound Kachemak vehicles.

Looking south, the desirable PSD for the 28-foot crossing Homer Spit Road is computed to be about 700 feet (for 45 mph approach speeds). Available sight distance is >1,000 feet. Looking north, desirable PSD is computed to be about 620 feet, and available PSD is between 540 feet for 35 mph and 620 for 40 mph (transition between speed zones). SSD is met for the crosswalk.



Aerial Photo Source: Google Earth

Figure 19: Pedestrian Crossings Homer Spit Road-Kachemak Drive Intersection

The follow table presents pedestrian crossing performance for each of the peak hour cases described above, for the no-build and build conditions. All pedestrian peak hour case evaluations are part of the HCS intersection reports found under Attachment F.

Table 19: Kachemak Drive - Homer Spit Road Intersection Pedestrian Level of Service, No-Build Without Site Traffic, 2026 Peak Hours

Approach	**Homer Spit Road Approach (South Leg, Crosswalk) No-Build**	**Homer Spit Road Approach (South Leg, Crosswalk) Build**
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.		
Conflicting Vehicular Flow (veh/h)	455	469
Average Delay (s)	3.0	3.0
Probability of Non-Delayed Crossing, P_{nd}	0.643	0.643
Level of Service (LOS)	D	D
Weekday, AM Peak Hour of Generator		
Conflicting Vehicular Flow (veh/h)	746	768
Average Delay (s)	3.2	3.2
Probability of Non-Delayed Crossing, P_{nd}	0.639	0.639
Level of Service (LOS)	D	D
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.		
Conflicting Vehicular Flow (veh/h)	852	872
Average Delay (s)	3.2	3.2
Probability of Non-Delayed Crossing, P_{nd}	0.636	0.636

Approach	Homer Spit Road Approach (South Leg, Crosswalk) No-Build	Homer Spit Road Approach (South Leg, Crosswalk) Build
Level of Service (LOS)	D	D
Weekday, PM Peak Hour of Generator		
Conflicting Vehicular Flow (veh/h)	869	897
Average Delay (s)	3.2	3.2
Probability of Non-Delayed Crossing, P_{nd}	0.636	0.635
Level of Service (LOS)	D	D
Saturday, Peak of Generator		
Conflicting Vehicular Flow (veh/h)	929	957
Average Delay (s)	3.1	3.1
Probability of Non-Delayed Crossing, P_{nd}	0.633	0.632
Level of Service (LOS)	D	D

As the table shows, the additional site traffic does not reduce pedestrian crossing performance measures.

8.3.4 Kachemak Drive - Homer Spit Road Intersection Qualitative Traffic Safety Evaluation

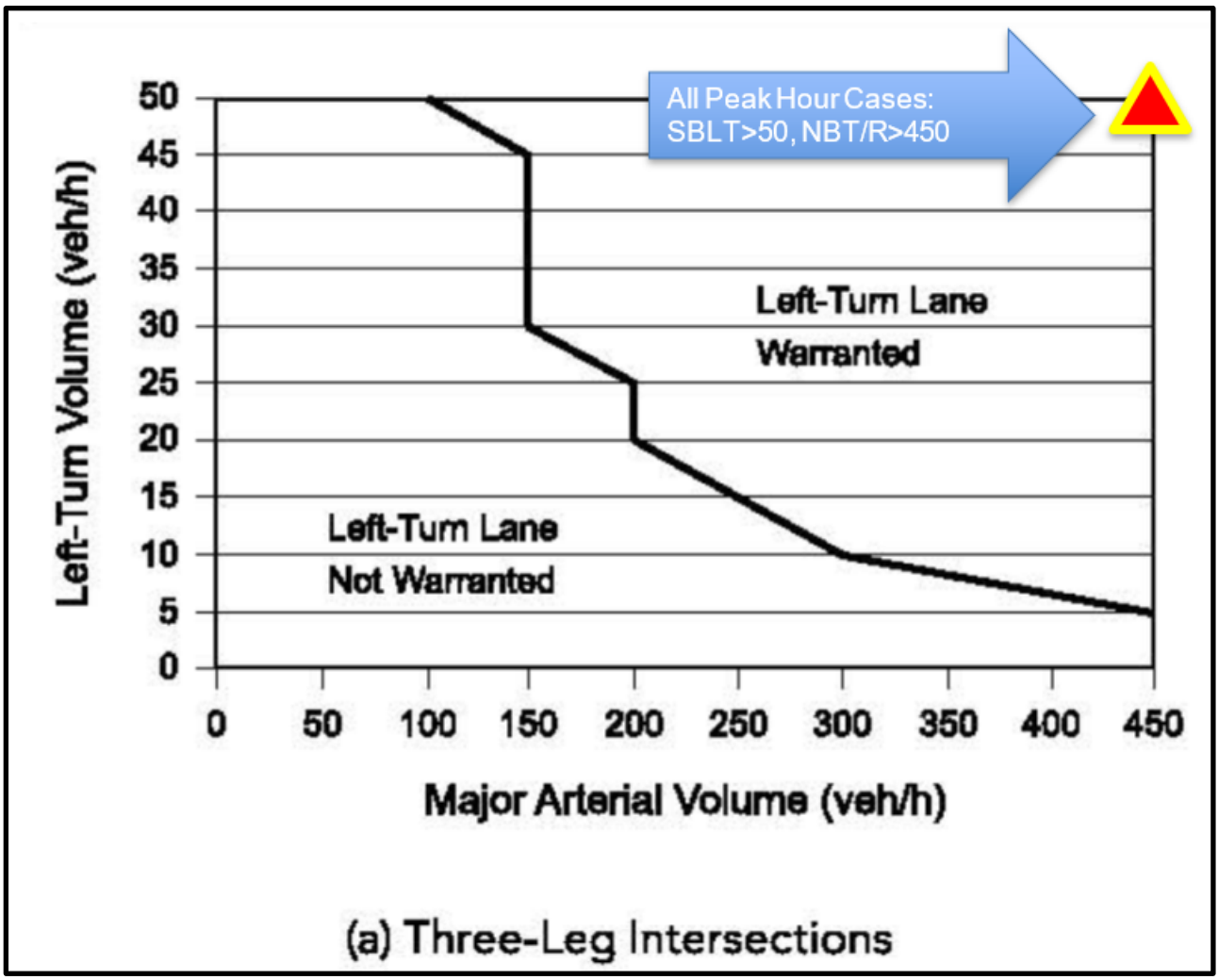
Between 2017 and 2021, there were two crashes at this intersection. Both involved southbound rear-end crashes, likely preceded by the lead vehicle turning from Homer Spit Road. By inspection, the crashes are not a substantive safety issue, which is further supported by the crash rate evaluation results in Table 5 on page 37.

As reported in Section 5.3.1 Homer Intersections Planning Study (2005) on page 25, this intersection was forecasted to be a candidate for signalization or roundabout control improvements between 2011 and 2021. Thea traffic growth for that study period was forecasted to be at growth rate of 2% per year. However, the actual growth rate for that period of time was much lower. For example, the AADT on Homer Spit Road is 2022 is essentially the same as it was in 2014.

Other longer-term improvements may include auxiliary lanes, especially main line left-turn lanes. AASHTO GDHS left-turn treatment guides from the 2011 and 2018 editions indicate that the intersection should have a SBLT lane on Homer Spit Road to Kachemak Drive (see Figure 20 on page 64). However, since there are no apparent capacity issues at the intersection with 2026 design year peak hour conditions, this improvement may be considered as part of the Kachemak Drive Reconnaissance study recommended in the Homer Master Transportation Plan.

The driveway will introduce additional inbound and outbound conflicts between site traffic and the Homer Spit Road and Kachemak Drive motorists and non-motorists traffic. However, the volume on the eastbound approach is low and the safety impacts of the new conflicts is likely insignificant.

As such additional safety issues are not expected at this intersection because of the development.



Source: Figure 9-35, AASHTO 2018 GDHS
Figure 20: Left-Turn Lane Guidelines for SBLT on Homer Spit Road

8.4 North Access Driveway-Homer Spit Road Driveway Intersection

8.4.1 North Access Driveway-Homer Spit Road Driveway Intersection Vehicle Performance Measures Build Condition

The North Access Driveway-Homer Spit Road intersection performance measures are summarized in the following table for the build condition. There is no driveway in place under a no-build condition.

This driveway intersection is configured with single land NB, SB, and EB approaches. The EB approach traffic will be under stop sign control. NBLT traffic turns from the through lane.

Table 20: North Access Driveway-Homer Spit Road Driveway Intersection (Build Condition) 2026 Design Year

Approach	Eastbound, North Access Driveway, Stop Sign Control	Northbound, Homer Spit Road	
Movement	**All Movements**	**NBLT**	**NBT**
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am.			
95% Queue Length, Q95 (veh)	0.2	0	
Control Delay (s/veh)	13.3	8.3	0.1
Level of Service (LOS)	B	A	A
Approach Delay (s/veh)	13.3	0.4	
Approach LOS	B	A	
Weekday, AM Peak Hour of Generator			
95% Queue Length, Q95 (veh)	0.3	0.1	
Control Delay (s/veh)	17.5	8.6	0.2
Level of Service (LOS)	C	A	A
Approach Delay (s/veh)	17.5	0.5	
Approach LOS	C	A	
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm.			
95% Queue Length, Q95 (veh)	0.3	0.0	
Control Delay (s/veh)	18.3	8.6	0.2
Level of Service (LOS)	C	A	A
Approach Delay (s/veh)	18.3	0.4	
Approach LOS	C	A	
Weekday, PM Peak Hour of Generator			
95% Queue Length, Q95 (veh)	0.4	0.1	
Control Delay (s/veh)	19.6	8.7	0.3
Level of Service (LOS)	C	A	A
Approach Delay (s/veh)	19.6	0.6	
Approach LOS	C	A	
Saturday, Peak of Generator			
95% Queue Length, Q95 (veh)	0.5	0.1	
Control Delay (s/veh)	21.1	8.8	0.3
Level of Service (LOS)	C	A	A
Approach Delay (s/veh)	21.1	0.6	
Approach LOS	C	A	

8.4.2 North Access Driveway-Homer Spit Road Driveway Intersection Queues

The North Access eastbound driveway approach has length for 3 vehicles in a queue with spilling back into the parking area. All peak hour cases have an eastbound 95th percentile queue of 1 car or less.

8.4.3 North Access Driveway-Homer Spit Road Driveway Intersection Pedestrian Performance Measures

Pedestrian crossings are not expected at the location and are not evaluated.

8.4.4 North Access Driveway-Homer Spit Road Driveway Intersection Qualitative Traffic Safety Evaluation

The driveway introduces new conflict points in the roadway segment. However, the driveway will be constructed to DOT&PF standards and will meet nominal safety standards (sight distance, geometrics, etc.). No additional safety issues are expected.

9 Homer City Code TIA requirements

Homer has TIA requirements, which for the most part are addressed by the DOT&PF TIA requirements. Homer requirements are listed below, with red text inserted to comment on the requirement.

The Homer City Code states:

> ***21.76.050 Traffic impact analysis – Required elements.***
> *A traffic impact analysis prepared under this chapter must include consideration of:*
>
> *a. Intersections on streets or alleys where traffic on any approach is expected to increase as a result of the proposed development by at least five percent of the approach's capacity;*
>
> The study area was established in the Pre-Analysis meeting. The study area includes the Ocean Drive-FAA Road-Homer Spit Road intersection and the Kachemak Drive-South Access Driveway-Homer Spit Road intersection.
>
> In addition, the following table summarizes the percent increase in 2026 base traffic with added site traffic for the study intersections.

Table 21: Base and Site Volumes on Study Area Intersections

Peak Hour	FAA Road-Ocean Drive-Homer Spit Road								
	Northbound Volumes			Southbound Volumes			Westbound Volumes		
	Base	Site	% Increase	Base	Site	% Increase	Base	Site	% Increase
Weekday, AM Commute	318	12	3.8%	404	13	3.2%	42	1	2.4%
AM Peak of Generator	507	21	4.1%	505	14	2.8%	97	3	3.1%
Weekday, PM Commute	567	14	2.5%	487	11	2.3%	127	3	2.4%
PM Peak of Generator	578	18	3.1%	497	16	3.2%	129	5	3.9%
Saturday Peak of Generator	618	20	3.2%	532	21	3.9%	138	3	2.2%

Peak Hour	Kachemak Drive-Homer Spit Road								
	Northbound Volumes			Southbound Volumes			Westbound Volumes		
	Base	Site	% Increase	Base	Site	% Increase	Base	Site	% Increase
Weekday, AM Commute	204	6	2.9%	394	13	3.3%	191	6	3.1%
AM Peak of Generator	397	11	2.8%	475	16	3.4%	214	6	2.8%
Weekday, PM Commute	493	12	2.4%	485	12	2.5%	205	5	2.4%
PM Peak of Generator	509	18	3.5%	499	16	3.2%	211	7	3.3%
Saturday Peak of Generator	540	15	2.8%	535	19	3.6%	226	9	4.0%

> All approaches for the study intersections are under the 5% threshold of the allowable additional site traffic increase. Since traffic disperses with further distances from the Lighthouse Village Development, we can deduce that the site will not increase traffic at any other intersections in the system above the 5% threshold.
>
> *b. Segments of streets or alleys between intersections where total traffic is expected to increase as a result of the proposed development by at least five percent of the segments' capacity;*

Segments are not evaluated in this TIA.

c. Intersections on streets or alleys where the safety of facilities will deteriorate as a result of the traffic generated by the development;

Safety analyses find no issues.

d. Each driveway or approach road that will allow egress or ingress to a street for the proposed development;

North and South Accesses are included in the analysis.

e. Parking and circulation routes within the proposed development, to the extent necessary to ensure that traffic does not back up onto a street; and

The North Access eastbound driveway approach has length for 3 vehicles in a queue with spilling back into the parking area. All peak hour cases have an eastbound 95th percentile queue of 1 car or less.

The South Access eastbound driveway approach has length for 4 vehicles in a queue with spilling back into the parking area. All peak hour cases have an eastbound 95th percentile queue of 1 car or less.

f. Pedestrian and bicycle facilities that are a part of the street or alley to which a permit applicant seeks access. [Ord. 08-29, 2008].

10 Summary

Under this section, the DOT&PF TIA Checklist requires the following items to be addressed:

- *Summary of Impacts*

10.1 FAA Road-Ocean Drive-Homer Spit Road Intersection

The critical LOS threshold for this analysis is level of service C, in which the control delay threshold between C and D is 25 seconds per vehicle. The FAA Road's westbound approach level of service for 2026 Saturday Peak Hour falls from a low "C" level of service (delay of 23.4 seconds per vehicle) to a high "D" level of service (delay of 25.5 seconds per vehicle). Both the DOT&PF (Alaska Administrative Code) and Homer City Code may require mitigation, to be discussed in the next section.

Uncontrolled pedestrian crossings of the Ocean Drive and Homer Spit Road are not significantly impacted by the Lighthouse Village Development's site traffic since the pedestrian performance measures of the no-build case are poor. The no-build and build analysis show that the crossings have long delays, high delay probability, and LOS F.

10.2 Kachemak Drive-Homer Spit Road

All peak hour build conditions have westbound approach LOS of C or better. As such intersection mitigation is not indicated because of added Lighthouse Village Development site traffic.

The crosswalk LOS is D, and delays for pedestrian are similar for both no-build (without site development traffic) and build (with site development traffic). Although mitigation is not required, the proposed Lighthouse Village Development will likely increase pedestrian crossing demand at the intersection and DOT&PF has requested that improvements to the crosswalk, specifically electronic devices, be considered.

11 Mitigation

Under this section, the DOT&PF TIA Checklist requires the following items to be addressed:

- *Mitigation measure alternatives to address capacity, delay, pedestrian, bicycle, transit and safety issues caused by or exacerbated by the development*
- *Proposed mitigation measures*
- *Proposed improvements to development parking and circulation routes*
- *Mitigation measure affects (include projected LOS calculations and / or crash reduction factors as applicable)*
- *Conclusion*

11.1 FAA Road-Ocean Drive-Homer Spit Road Intersection

The decline in level of service for the westbound approach traffic may be mitigated with a change of control type (convert a two-way stop control to signalization or a roundabout) or through demand management countermeasures. These are discussed below.

11.1.1 Traffic Signal

The Manual on Uniform Traffic Control Devices (MUTCD) provides warrants for traffic signal installations at intersections. MUTCD indicates that signals should not be installed without meeting at least one warrant. However, signalization has adverse consequences in that they are expensive to construct and maintain. Also, while reducing delay on minor approaches, traffic signals typically increase overall intersection delay for all movements. Finally, signals may increase certain types of crashes, typically rear-ends on previously uncontrolled, free-flow main streets.

The following table summarizes estimated hourly movements for this intersection used for warrant analysis. For this, we use the peak hour conditions intersection for the morning commuting peak hour (8-9 am), the morning peak of the generator (11-12 am), the afternoon peak of the generator (3-4 pm), and the evening commuting peak hour (4-5 pm). Crash experience warrants are not considered here and may be added upon reception of crash data from DOT&PF. Pedestrian volume warrants that are not considered here because it is highly unlikely pedestrian volumes (75 per hour) will be met in the future even with the proposed Lighthouse Village Development.

Table 22: Signal Warrant Hourly Volumes (Green: Observed and Factored for 2026 Weekday Summer Peak Condition, Yellow: Interpolated between Observed Values)

Hour	WBLT	WBT	NBT	NBRT	SBLT	SBT
8:00 AM	15	27	301	29	37	380
9:00 AM	21	41	364	33	50	401
10:00 AM	27	54	427	36	63	422
11:00 AM	33	67	489	39	76	443
12:00 PM	39	71	508	37	73	445
1:00 PM	44	75	527	35	69	447
2:00 PM	49	78	547	33	66	449
3:00 PM	53	81	565	31	62	451
4:00 PM	50	80	550	31	61	437

HCS has a Warrants module which was used to estimate whether the intersection meets warrants based on the hourly volumes in the table above.

If the westbound right-turn movements are included in warrant computations, then the intersection would meet MUTCD Warrants:

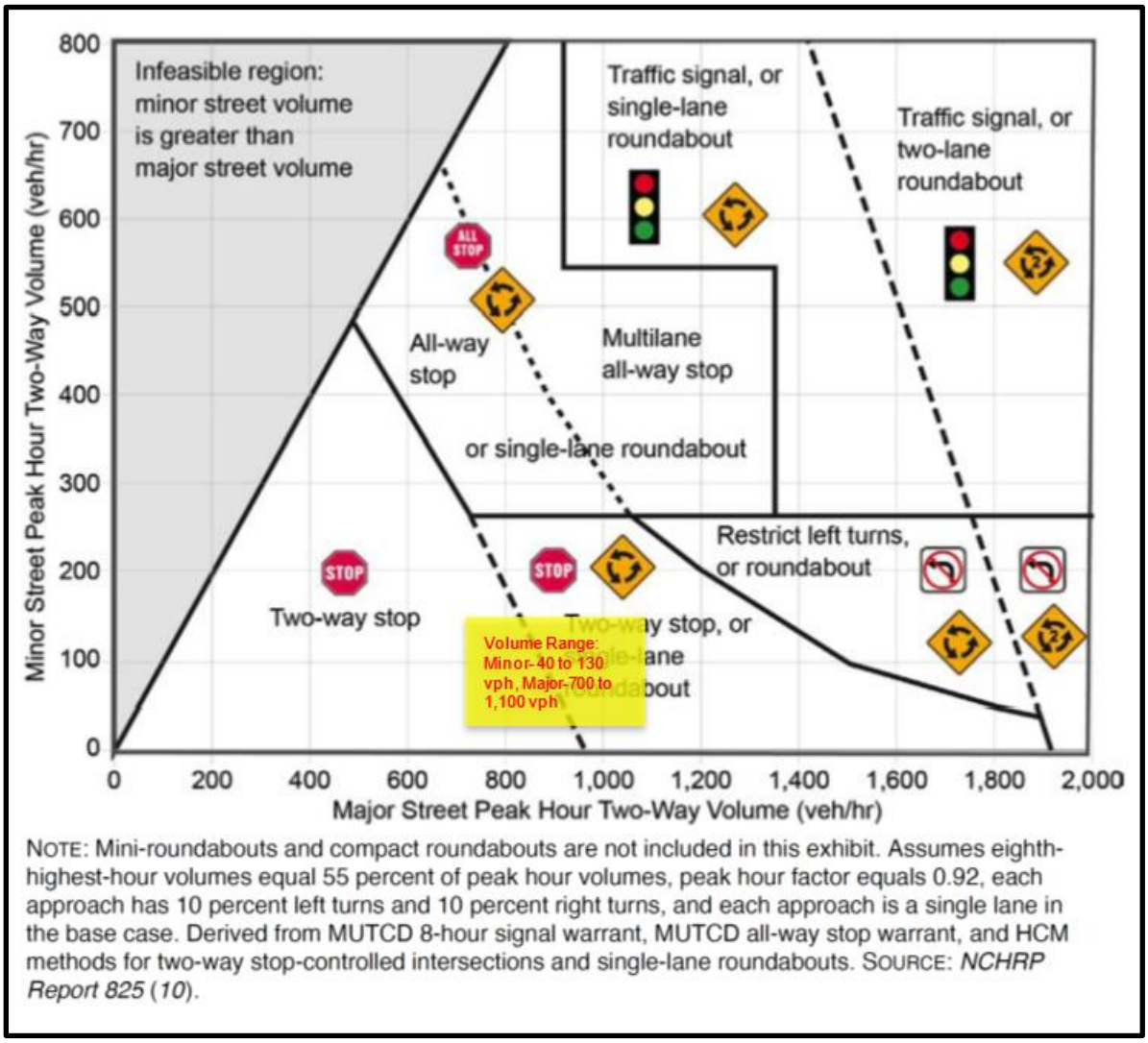
1. Warrant 1 Eight-Hour Vehicular Volume, Condition B. Interruption of Continuous Traffic.
2. Warrant 2 Four-Hour Vehicular Volume
3. Warrant 3 Peak Hour, Condition B.

However the MUTCD recommends that engineering judgment be applied to determine if the minor street right turn volumes should be included in the warrant evaluation. Since the right turn LOS is B and right-turning traffic has an WBRT exclusive lane, our judgement is that they should not be included in the warrant computation.

In conclusion, signalization is not warranted for this intersection and is not considered as a feasible mitigation alternative.

11.1.2 Roundabout

NCHRP Report 1043 *Guide for Roundabouts* provides guidelines to determine if a roundabout might be applied to the intersection. This is presented graphically in Figure 21 on page 72. The yellow highlighted box is an approximate range of minor (40 to 120 vehicles per hour) and major intersection volumes (700 to 1,100 vehicles per hour) at FAA Road-Ocean Drive-Homer Spit Road intersection.



NOTE: Mini-roundabouts and compact roundabouts are not included in this exhibit. Assumes eighth-highest-hour volumes equal 55 percent of peak hour volumes, peak hour factor equals 0.92, each approach has 10 percent left turns and 10 percent right turns, and each approach is a single lane in the base case. Derived from MUTCD 8-hour signal warrant, MUTCD all-way stop warrant, and HCM methods for two-way stop-controlled intersections and single-lane roundabouts. SOURCE: *NCHRP Report 825* (*10*).

Figure 21: Intersection Control Guidelines from NCHRP Report 1043 Guide for Roundabouts Exhibit 8.7

As the figure indicates, TWSC (existing) or roundabouts are feasible intersection control alternatives for this intersection volume range.

11.1.3 Demand Management Through Pedestrian Improvements

Converting vehicle trips to non-motorist trips will reduce vehicle demand at the intersection and reduce delay. As such, improving active transportation facilities to encourage people to change modes from automobiles to pedestrian and bike trips is a potential mitigation for the Ocean Drive-FAA Road-Homer Spit Road intersection performance.

Moreover, the proposed Lighthouse Village Development hotel guests, staff using employee housing, and the tri-plex condominium residents are expected to have a high proportion of users that will use non-motorized modes especially if the facilities are in place. To that end, the following

countermeasures will serve that latent active transportation demand as well as potentially improve operations at the Ocean Drive-FAA Road-Homer Spit Road intersection.

- Instead of the frontage road between the North and South Accesses driveways shown in Figure 4 on page 17, construct a pathway along the Lighthouse Village Development to connect the site to the crossing at Kachemak Drive-Homer Spit Road crosswalk. The pathway should meet DOT&PF standards and located to be compatible with future pedestrian improvement projects along Homer Spit Road.

- Construct a connection between the Lighthouse Village Development to Bay Avenue using the B Street right-of-way to allow walking and biking trips to use the lower volume, low speed Bay Avenue, for non-motorist trip segments.

- Install a marked median refuge, and a potential marked crosswalk on the Homer Spit Road approach to the intersection. This is discussed in more detail in the following subsection.

11.1.3.1 Pedestrian Crosswalk and Pedestrian Median Refuge Homer Spit Road

As configured, the tee intersection with the SBLT lane on the Ocean Drive approach has a striped median area opposite of the SBLT which can be converted to a pedestrian refuge. In fact, this is the only location on Ocean Drive and Homer Spit Road where there is existing pavement width that could accommodate a median refuge.

Median refuges break the crossing into two shorter distance stages, each with acceptable reduced gaps, The median allows the pedestrian to assess and cross gaps in one directional traffic stream at a time, and finally reduces required pedestrian sight distance. Because of the shorter crossing distances and gap requirement, PSD is reduced as well.

Since Homer Spit Road is a State owned roadway, the crosswalk markings, refuge median, and signage would have to satisfy DOT&PF requirements. The DOT&PF *Alaska Traffic Manual* Table 3B-101, shown in Figure 22 on page 74, indicates that there should be at least 20 crossing pedestrians per hour (or 15 elderly pedestrians or children pedestrians) for a crosswalk installation. If the pedestrian demand were to be met, and the proposed Lighthouse Village Development has the potential of increasing demand, then a crosswalk would be a recommended at the location according to Table 3B-101, given two or three lanes, AADT (<9000 AADT), and speeds of 35 mph (see figure below and red dashed circle). Even though observed September pedestrian volumes were low (see Table 1 on page 31) pedestrian crossing demand is likely to higher in summer months and further may increase with the Lighthouse Development for these reasons:

- The hotel employees living on site (40 or so) in the designated employee housing will have lower ownership or access of automobiles, and thus more likely be pedestrians and cyclists.
- There both origins (residential neighborhoods, businesses) and destinations (e.g., Homer Brewing Company) on the north side of Ocean Drive that can use low volume and low speed local streets to connect to the crossing at FAA Road.
- Furthermore, the hotel becomes a local origin for guests walking about Homer, and wanting to explore other areas. It becomes a localized walking destination for neighborhood

residents and workers north of Ocean Drive or on the airport side wishing to patronize the bar and restaurant, all of which would benefit from this crossing.

Highway Capacity Software estimates that the crosswalk and median refuge configuration would improve the pedestrian crossing level of service from F to C, with P_{nd} of 0.484 and 2.4 seconds of average delay. Even if the crosswalk were not to be installed, a median refuge alone would improve the pedestrian crossing level of service from F to D, with P_{nd} of 0.445 and 5.5 seconds of average delay.

In addition, PSD requirements will be reduced because of the shorter distances across one lane. PSD will be reduced from over 860 feet to 363 feet for a 16-foot crossing, which is greater than the 350 feet to the west currently restricted by parking. Looking south, though, the pedestrian position is in the median, and the available sight distance from the median to northbound traffic is over 500 feet, well above desirable PSD of 363 feet.

A conceptual crosswalk and median refuge configuration is presented in Figure 23 on page 75.

Table 3B-101. Recommended Practice for Crosswalk Marking on Uncontrolled Approaches or at Midblock Locations

No of Lanes	Raised Median?	Vehicle ADT													
		<9,000				>9,000 to 12000				>12,000 to 15,000			>15,000		
		Speed Limit (MPH)													
		<30	35	40	>45	<30	35	40	>45	<30	35	>40	<30	35	>40
2	No	C	C	M	N	C	C	M	N	C	C	N	C	M	N
3	No	C	C	M	N	C	M	M	N	M	M	N	M	N	N
>4	Yes	C	C	M	N	C	M	N	N	M	M	N	N	N	N
>4	No	C	M	N	N	M	M	N	N	N	N	N	N	N	N

Source: FHWA-RD-01-075, Safety Effects of Marked vs. Unmarked Crosswalks at Uncontrolled Locations, 2002

C — Candidate sites for marked crosswalks. Before marking a crosswalk, the site should be studied to ensure it is suitable. The study may include a review of pedestrian volumes, available gaps, sight distance (see Note 1), vehicle mix, pedestrian mix, distance to adjacent crossings (see Note 2), etc. Crosswalks should not be installed at locations with fewer than 20 pedestrian crossings per peak hour (or 15 for elderly and/or child pedestrians).

M — Marginal candidate sites for marked crosswalks: Pedestrian accident risk may increase if crosswalks are marked. If pedestrian improvements are necessary, other options should be explored before marking crosswalks.

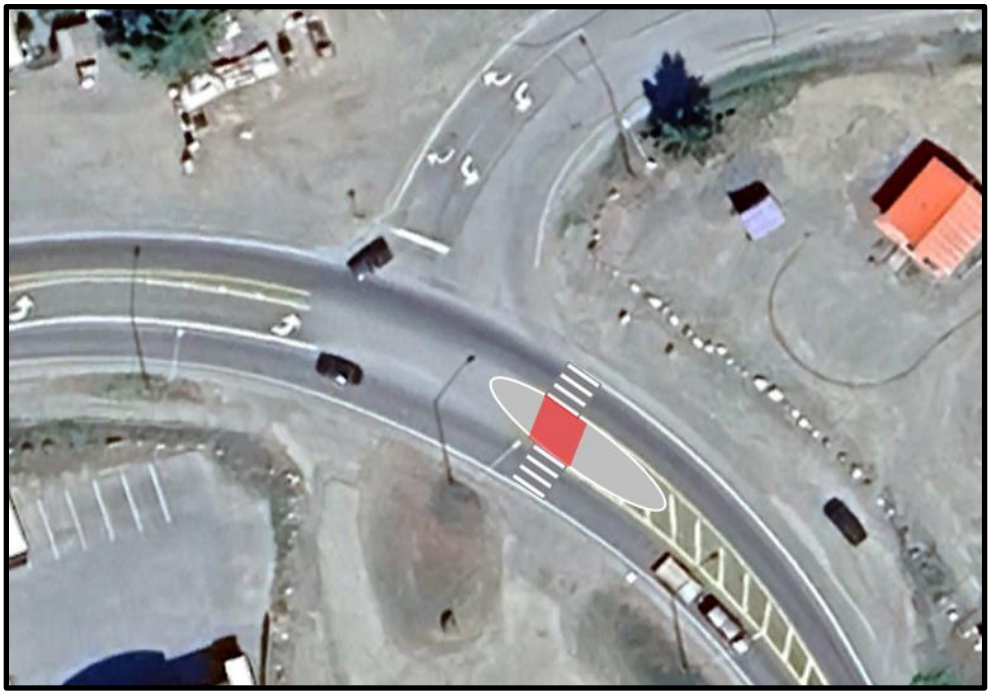
N — Crosswalks should not be installed at these locations.

Notes: 1. Marked crosswalks should not be installed on uncontrolled approaches or at midblock locations where visibility distance of pedestrians or the crosswalk would be less than the "Stopping Sight Distance for Design" given in the latest version of the AASHTO A Policy on Geometric Design of Highways and Streets. Desirably, crosswalks would only be installed where there is sufficient sight distance to allow pedestrians to cross the road without conflicting with vehicles continuing at the 85th-percentile speed, assuming the pedestrian starts walking at the moment the vehicle comes into sight. Pedestrian crossing time should be computed in accordance with the procedure for determining adequate gaps given in the Institute of Transportation Engineers Traffic Engineering Handbook (page 78 in the 4th Edition).

2. Crosswalks should not be installed on uncontrolled approaches or at midblock locations where they will encourage pedestrians to divert from nearby signalized or grade-separated pedestrian crossings.

Source: Alaska Traffic Manual Table 3B-101

Figure 22: Guidance for Crosswalk Markings (Red Dashed Circle is FAA Road-Ocean Drive-Homer Spit Road Intersection Conditions)



Aerial Photo Source: Google Earth

Figure 23: Ocean Drive-Homer Spit Road-FAA Road Intersection Conceptual Crosswalk and Median Refuge (Schematic only, Requires Engineering Design)

11.2 Kachemak Drive-Homer Spit Road Intersection

11.2.1 Intersection Vehicular Traffic Mitigation Improvements

This intersection performance measures with additional site traffic indicates that the roadway approach LOS does not fall below thresholds that require mitigation (LOS C or better, see Table 18 on page 60). No control, channelization, or geometric improvements are proposed.

11.2.2 Pedestrian Crosswalk Improvements

The pedestrian crosswalk has a LOS of D. Once the Lighthouse Village Development is completed, the hotel, employee housing and triplex condos are expected to create an increased demand for recreational and utility walking and biking trips. As such, an improvement at this crossing could include additional traffic control device treatments to reduce delay by increasing rates of motorists yielding to crossing pedestrians. Creating two-stage crossing with a median refuge is not considered because of the extent of widening and construction that would be required at the intersection to create a space for the refuge.

The existing crossing has a crosswalk marking, advanced and at crosswalk pedestrian warning signs, and overhead street lighting electroliers. The Alaska Traffic Manual provides procedural guide on the level of guidance for traffic control devices at uncontrolled crossings.

Figure 24: Existing Conditions Kachemak Drive Crosswalk

The likely next step for intersection improvement would be implantation of an electronic or regulatory device. Table 4A-101 of the Alaska Traffic Manual is used to evaluate potential improvements using these existing traffic conditions:

- Lanes: 2 lanes.

- Speeds: Deploying electronic warning or regulatory devices apply to speeds of 40 to 45 mph with approaching traffic. The crosswalk is within a transitional zone from 35 to 45 mph in both directions. Without a speed study to determine precise speeds, it could be inferred that speeds should be 40 mph on average.

- AADT: AADT ranges of 4,500 to 9,000 are required for electronic warning or regulatory devices. As shown in Table 3 on page 31, Homer Spit Road AADT in 2021 was above 4,500, but fell to 4,200 in 2022. Nevertheless, Summer MADT is in the 8,000 to 9,000 vehicles daily range. As such, we assume that future AADT will fall within the 4,500 to 9,000 range.

- Pedestrian Crossing Volumes: Since there is a crosswalk in place now, it is implied that the crossing volume is greater than 20 per hour.

Table 4A-101 from the Alaska Traffic Manual is shown below with outcomes using above data yield a conclusion that electronic warning devices are applicable for this location.

Table 4A-101. Grouping of Traffic Control Device Alternatives Based on Conditions at Uncontrolled Crossing Locations

Recurring Hourly Pedestrian (PED) Crossing Volume	Vehicular Traffic Volume and Speed																	
			Vehicle AADT (vpd)															
			<= 4500	>4500 to 9,000				> 9,000 to 12,000				>12,000 to 15,000			>15,000			
			Speed (MPH)															
	No. of Lanes	Raised Median or Refuge?	All	<=30	35	40	>=45	<=30	35	40	>=45	<=30	35	40	<=30	35	40	
< 20 /hr	Any	Any	NE See also 2C.01 and 3B.18															
>=20 /hr	2,3	Yes	NE: See also 2C.01 and 3B.18	NE	NE	EW	ER	NE	NE	EW	ER	NE	NE	ER	NE	EW	ER	
	2	No		NE	NE	EW	ER	NE	NE	EW	ER	NE	NE	ER	NE	EW	ER	
	3	No		NE	NE	EW	ER	NE	EW	EW	ER	EW	EW	ER		ER	ER	
	>=4	Yes		NE	NE	EW	ER	NE	EW	ER	ER	EW	EW	ER	ER	ER	ER	
	>=4	No		NE	EW	ER	ER	EW	EW	ER	ER	ER	ER	ER	ER	ER	ER	
School Crossing	EW - See Part 7 for school routes, beacon systems, and Part 4 for Signal Warrants																	
>= 20 /hr	ER - See Part 4 for Pedestrian Hybrid Beacon Guidelines and School Crossing Warrants (Engineering Study required)																	
>=75 /hr	ER - See Part 4 for Traffic Control Signal Warrants (Engineering Study required)																	

DEVICE GROUPING	**NE:**	Non-electrical devices (sight distance, signs, striping, medians, etc.)
	EW:	Electrical warning devices (beacons, lighting, sign borders, in-pavement lights, etc.)
	ER:	Electrical regulatory devices (hybrid beacons, signals)
Abbreviations	**vpd:**	vehicles per day (typically annual average daily traffic or ADT)
	AADT:	Annual Average Daily Traffic (volume in vehicles per day)
	MPH:	Miles per hour
	PED Crossing Volume:	Frequent and recurring, e.g. average annual peak hourly volume or seasonal peak hourly volume over three months or more Reduce PED volume to 15 / hr for NE, EW devices, or by by 50% for ER devices if elderly and/or child pedestrians recur frequently.

Source: Alaska Traffic Manual Table 4A-101

Figure 25: Guidance for Traffic Control Devices at Crossings

The next step would be to use Table 4A-102 to determine electronic warning device type. Since the crosswalk has street illumination, the next treatment in priority would be an actuated rectangular rapid flashing beacon.

Table 4A-102. Recommended Order of Selection for Traffic Control Devices or Strategies at Uncontrolled Crossing Locations

	Priority of factors for consideration after Table 4A-101						
	1	2	3	4			
DEVICE GROUPING	PED VOLUME	SAFETY HISTORY	SIGHT DISTANCE	GAPS	TRAFFIC CONTROL STRATEGIES FOR A CROSSING LOCATION	ORDER OF DEVICE SELECTION	OPTIONAL DEVICES
NE - Non-electrical[1]	> 20/hr and factors 2, 3, or 4	< 75 %ile crash history	Above Minimum PSD	≥ 1 per minute average or ≥ 1 per adjacent signal cycle	Devices not provided for sites with adequate gaps, good visibility, low pedestrian volume or low crash history	None	
		> 75 %ile crash history, primarily crossing related	Below minimum PSD, Above minimum SSD	< 1 per 2 minutes average or < 1 per adjacent signal cycle	Locate or provide alternative crossing location (primarily to improve sight distance)	Increasing Command ↓ of Attention/Respect	
					Median refuge island or divided/split highway lanes (primarily to achieve gaps)[2]		
					Standard retroreflective signs (primarily for warning or drawing attention)		
					High visibility warning signs, markings, delineators, or post reflectors (primarily for warning or drawing attention)		
					Flag-carry		↓
					Portable in-street signs[3]		
EW - Electrical Warning	>20/hr and factors 2, 3, or 4 OR > 75 /hr	> 95 %ile crash history, primarily crossing related	Below minimum PSD, Above minimum SSD with high visibility devices	< 1 per 2 minutes average or < 1/ adjacent signal cycle	Pedestrian street lighting electrolier(s) [4]	Increasing Command ↓ of Attention/Respect	
					Ped Activated Rectangular Rapid Flashing Beacons RRFB (when >=40 MPH; >2 lanes; or roundabout exits)[5]		
					Overhead active alternating LED beacon w/ped detection[5]		
					Continuous single roundel LED beacons above sign[6]		
					Continuous single Overhead LED beacon		
					LED bollards for walkways (primarily used in transit areas)		
					Continuous LED flashing borders in-sign		
					Ped activated LED flashing borders in-sign		
					Combined side mount and Overhead ped activated beacons		
					In pavement crosswalk lights[7]		
					Other electrical warning devices		↓
ER - Electrical Regulatory[8]	>= 20/hr	> 95 %ile crash history, primarily crossing related	Below minimum SSD	< 1 per 2 minutes average or < 1 per adjacent signal cycle	*Pedestrian Hybrid Beacon (Engineering Study required)*	Increasing Command ↓ of Attention/Respect	
	>= 75/hr				*Signal, Midblock signal, or Half-signal (Engineering Study required)*		

FOOTNOTES to Table 4A-102

1. NE - nonelectrical project solutions are acceptable until an electrical project can be determined as needed
2. Median refuge may be used to convert undesirable gaps into adequate two stage gaps
3. Consider portable in-street signs primarily for special events and school control. These require active onsite oversight.
4. Provide overhead lighting at marked crosswalks when feasible to address nighttime ped crossing issues
5. Active flashing beacon systems are preferable to passive beacon systems
6. Flashing beacon systems may be used to mark zones not identifiable as a single crossing, or areas without overhead lighting
7. In pavement lights should only be considered in a low risk environment for damage, where there is extensive maintenance capability
8. Should be 1/4 mile or more from existing signals on arterial 2 way roadways, unless coordinated with existing signals

DEVICE GROUPING

- **NE:** Non-electrical devices. See Section 3B.18.
- **EW:** Electrical warning devices - use at unsignalized, midblock locations where conflict with signals is not a concern.
- **ER:** Electrical regulatory devices.
- **OPT:** Optional devices which are low priority enhancements due to frequent maintenance and resource limitations

OTHER FACTORS/TERMS

- **PED VOLUME:** Frequent and recurring, e.g. average annual peak hourly volume or seasonal peak hourly volume over three months or more. Reduce PED volume to 15 / hr for NE, EW devices, or by by 50% for ER devices if elderly and/or child pedestrians recur frequently
- **SAFETY HISTORY:** Analysis of ped-vehicle crash data related to crossing attempts, including experience at locations with similar characteristics
- **%ile:** Percentile grouping of locations based on analysis of statewide crossing-related ped-vehicle crash data
- **SIGHT DISTANCE:** Unobstructed road distance visible to a pedestrian or motorist providing time necessary to execute crossing or driving maneuvers
- **PSD:** Pedestrian Sight Distance (PSD) = (2.5 s + Crossing Distance/3.5 fps) x Posted Speed fps
- **SSD:** Motorist Stopping Sight Distance (SSD), See Tables 3-1 and 3-2, AASHTO Policy on Geometric Design of Highways and Streets
- **GAPS:** Spacing of vehicular traffic, such that pedestrians have an opportunity to execute a crossing
- **avg:** Average measurement per hour
- **LED:** Light Emitting Diode or alternative light source

Source: Alaska Traffic Manual Table 4A-102

Figure 26: Recommended Order of Device Selection

As shown in the table, outcome of the warning device selection is based on these four factors:

- Factor 1- >20 pedestrians per hour with factors 2, 3, or 4 satisfied; or >75 pedestrians per hour: Based on the existing crosswalk markings (implying at least 20 crossing pedestrians per Figure 22 on page 74) and the likelihood that the Lighthouse Village Development will generate significantly more non-motorized users, we assume the 20 pedestrians per hour is satisfied.

- Factor 2- >95th percentile crash history: This intersection has two crashes in 5 years (see Section 6.6 on page 34). This location and crash experience will not satisfy Factor 2.

- Factor 3- Available sight distance of 625 feet is just above desirable PSD of 616 feet (assuming 40 mph southbound traffic through the transition area). From access driveway sight distance discussion, the sight distance to the north from the South Access Driveway is around 560 fee and the crosswalk is about 65 feet further. Using this data and measuring from Google earth, we estimate that the maximum sight line between a southbound vehicle on Homer Spit Road and a pedestrian staging to cross Homer Spit Road at the cross walk will provide 625 feet of sight distance.

  As discussed in exceeding SSD for both 35 and 45 mph. Pedestrian sight distance is computed for a 28-foot crossing distance, a 2.5 second startup time (per Table 4A-102), 40 mph vehicle speeds (transition zone between 35 and 45 mph posted speeds) to be over 600 feet. If so, pedestrian sight distance to the north is not satisfied.

- Factor 4- Gaps are less than 1 gap per 2 minutes on average: The CCS 1030021 station shows the highest average hourly flow to be 729 vehicles per hour in July 2022. If we assume that gap distribution follows a negative exponential distribution (common practice), then the following computations apply.

Future Hourly Volume (2-way or 1-way)	729	vph
Crossing Width (L)	28	feet
Ped Walk Speed, S_p for School Children	3.5	feet/second
Startup, t_s for School Children	3	seconds
Critical Gaps, $t_G = (L / S_p) + t_s$	11.0	seconds

  A negative exponential distribution is used for random traffic flows, and is depicted in the following figure.

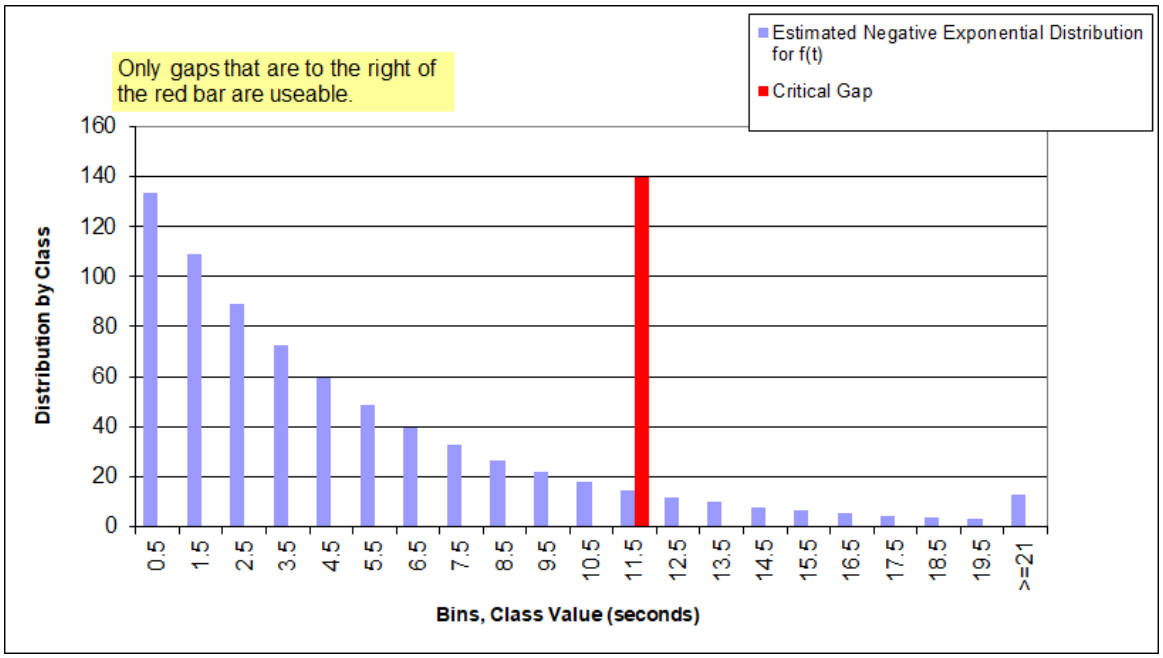


Figure 27: Estimated Gaps at Kachemak Crossing

The following table shows gap data conclusions based on the above distribution.

Analysis Output		Comments
Useable Gaps in one hour (>t_G)	79	There are 79 gaps with lengths greater than 11 seconds
In one hour, the sum of the gaps>t_G (sec)==>	1242	
Gaps per minute	**1.88**	OK, Gaps per minute >=1
% Delay	**66%**	
Maximum % Delay for N=1 Rows of Peds	**83%**	OK, % Delay is less than Maximum % Delay

Based on these calculations, there are about 2.6 acceptable gaps every 2 minutes.

It appears that Factors 2, 3, and 4 are not fully satisfied, and thus any addition electronic warning (or regulatory) devices would not be recommended by the procedures in the ATM. However, the PSD provided, 625 feet from the crosswalk to the north, is only a few feet over the computed necessary sight distance of 616 feet. As such, a rapid rectangular flashing beacon is may be justified.

If the rapid rectangular flashing beacon were to be installed, the LOS would improve from D to B.

11.3 Conclusion and Recommendations

The following are recommendations resulting from this TIA analysis.

- No intersection control, channelization, or geometric capacity improvements are recommended. Instead, implement improvements to enhance active transportation modes and potentially reduce vehicle demand at intersections and roadways.

- Instead of the frontage road between the North and South Accesses driveways shown in Figure 4 on page 17, construct a pathway fronting the Lighthouse Village Development to connect the site to the crossing at Kachemak Drive-Homer Spit Road crosswalk. The pathway should meet DOT&PF standards and located to be compatible with future pedestrian improvement projects along Homer Spit Road.

- Construct a connection between the Lighthouse Village Development to Bay Avenue using the B Street right-of-way to allow walking and biking trips to use the lower volume, low speed Bay Avenue, for non-motorist trip segments.

- Install a pedestrian median refuge, and a potential marked crosswalk on the Homer Spit Road approach to the Ocean Drive-Homer Spit Road-FAA Road intersection. The crosswalk would only be installed if the crossing demand could be established as 20 vehicles per hour or more at this location. However, the median refuge could be implemented without the crosswalk. This is presented in the following Figure 23 on page 75.

- Consider implementing a rapid rectangular flashing beacon at the marked crosswalk at Kachemak Drive for the Homer Spit Road crossing.

- The North Access Driveway and South Access Driveway may be constructed with two lanes, one lane outbound and one lane inbound. Driveways must comply with the recommendations in the DOT&PF Highway Preconstruction Manual (Section 1190).

- In addition to the above, the following recommendations were explicitly requested by DOT&PF after review of the draft report.

    - Construct internal pedestrian connectivity between the hotel and the condominiums.
    - Revise the site plan to realign the South Access Driveway directly across from the Kachemak Drive approach to function as a four-leg intersection. Moreover, it is essential to align the South Access Driveway with Kachemak Drive to assure that required 35 mph driveway spacing distance between the North and South Access Driveways, cited as 260 feet in the DOT&PF Highway Preconstruction Manual Table 1190-3, is achieved (see addition discussion on separation below). Install stop sign control for the South Access Driveway.
    - Construct a rapid rectangular flashing beacon at the existing crosswalk across Homer Spit Road just south of Kachemak Drive.

- Following the draft report, we evaluated driveway spacing. The DOT&PF Highway Preconstruction Manual Table 1190-3 requires driveway spacing to be 260 feet for roadway speeds of 35 mph. The distance in Table 1190-3 is measured between the edge of driveways as depicted in Figure 1190-2. With this requirement, it is essential to align the South Access Driveway with Kachemak Drive as well as realign/reposition the North Access Driveway to the north to achieve the full 260 feet of separation required in Table 1190-3. The North Access Driveway could be relocated about 20 to 25 feet to the north and still meet minimum driveway sight distance standards.

- The May 2012 Transfer of Responsibilities Agreement (TORA) between the City of Homer and DOT&PF for parking and pedestrian facilities near the project area apply to the improvements recommended in this TIA. Ownership and maintenance of the proposed pathway and pedestrians crossings will be finalized between the City of Homer, DOT&PF, and the developer prior to final permits being issued.

Attachment A: Pre-Analysis Meeting Documents

Follows this page.

Traffic Impact Analysis Requirement Checklist

Pre-analysis meeting

The developer and the registered engineer that will sign and seal the TIA must meet with the DOT&PF Regional Traffic & Safety engineer and Right-of-Way agent before beginning the TIA. At the meeting, the following will be determined:

- The design year (This is typically the buildout year or 10 years beyond the buildout year, depending on the development size and location)
- The study area
- Key intersections and key road segments to considere/evaluate in the TIA
- The projected area-wide traffic growth rate
- Level of Service (LOS) standards
- Other planned developments to consider
- Planned road improvements to consider
- Any other items of note regarding the TIA

Traffic Impact Analysis. Include the following:

Development Information

- ☐ Development description
- ☐ Land use intensity including square footage, types of land use, employees, etc.
- ☐ Proposed zoning changes or zoning variances
- ☐ Construction year, opening year, projected year for full buildout
- ☐ Map of the development, including traffic circulation and parking area
- ☐ Sight distance evaluation from access points
- ☐ Alternatives to the proposed location

Project Area Background

- ☐ Surrounding land zoning
- ☐ Surrounding land uses and site land use
- ☐ Adjacent development
- ☐ Traffic improvements already funded, programmed, or planned
- ☐ Other planned developments

Data Requirements

- ☐ Map of the study area street network
- ☐ Peak hour intersection turning movement counts for all key intersections

- ☐ Daily volume counts for all streets and roadways in the study area
- ☐ Number of lanes on the streets in the study area
- ☐ Intersection geometry information for all key intersections
- ☐ Traffic signal phasing and timing information for all key intersections
- ☐ 5 year crash history within the study area
- ☐ Sidewalks and other pedestrian facilities
- ☐ Bike lanes and other bicycle facilities
- ☐ Transit operation and facilities including pullouts, frequency of service and utilization

Traffic Forecasting

- ☐ Projected traffic to be generated by the development (Use the ITE Trip Generation Manual, latest version)
- ☐ Projected trip distribution, turning movements, and rationale for determining same
- ☐ Projected total traffic for the design year (base traffic + site traffic) at all key intersections and route segments within the study area
- ☐ Trip generation from other planned developments

Traffic Analysis

- ☐ Baseline LOS calculations for all key intersections and key road segments (For LOS computations, use the TRB Special Report 209, Highway Capacity Manual, latest version)

No-Build Alternative – Without Development

- ☐ Projected LOS calculations for all key intersections and key road segments for the opening date or the design year, as required
- ☐ Vehicle queue lengths (95^{th} percentile) and available storage
- ☐ Pedestrian considerations, including applicable school walking routes
- ☐ Bicycle considerations
- ☐ Transit considerations
- ☐ Safety considerations for all key intersections and key road segments

Build Alternative – With Development

- ☐ Projected LOS calculations for all key intersections and key road segments for the opening date or the design year, as required
- ☐ Vehicle queue lengths (95^{th} percentile) and available storage
- ☐ Pedestrian considerations, including applicable school walking routes

- ☐ Bicycle considerations
- ☐ Transit considerations
- ☐ Safety considerations for all key intersections and key road segments

Summary

- ☐ Summary of impacts

Mitigation

- ☐ Mitigation measure alternatives to address capacity, delay, pedestrian, bicycle, transit and safety issues caused by or exacerbated by the development
- ☐ Proposed mitigation measures
- ☐ Proposed improvements to development parking and circulation routes
- ☐ Mitigation measure affects (include projected LOS calculations and / or crash reduction factors as applicable)
- ☐ Conclusion

Typical Reporting Requirements:

- Submit electronic data/files compatible with Microsoft Office products, latest release of Autodesk AutoCAD, Trafficware Synchro Studio 7, and MacTrans HCS+

KINNEY ENGINEERING, LLC

MEMORANDUM

TO:	City of Homer, Alaska State Department of Transportation and Public Facilities
FROM:	Randy Kinney, PE, PTOE, Kinney Engineering, LLC
DATE:	August 29, 2023
SUBJECT:	Pre-Analysis Meeting Analysis

Doyon, Limited is proposing the Lighthouse Village Development in Homer, Alaska. The development is a hotel with on-site employee housing. The Homer City Code indicates that a Traffic Impact Analysis (TIA) is required; however, it is not clear to us from a search of the code if there is a traffic threshold that will trigger a TIA.

A State of Alaska Department of Transportation and Public Facilities (DOT&PF) driveway permit will be required for access to the State-owned Homer Spit Road. If the development trip generation exceeds more than 100 trips per hour, the DOT&PF will require a TIA.

As such, both DOT&PF and the City of Homer are overseeing agencies for a Traffic Impact Analysis for this development. DOT&PF requires a Pre-Analysis Meeting to address specific issues and that is the subject matter for this memorandum.

1 Project Description

The development will be constructed on two parcels owned by Doyon Limited.

- **PARCEL ID: 18101034**: Legal Description- T 6S R 13W SEC 21 SEWARD MERIDIAN HM 0940051 BAYVIEW SUB NO 6 LOT 164-A; Address- 1563 HOMER SPIT RD
- **PARCEL ID: 18101035**: Legal Description- T 6S R 13W SEC 21 SEWARD MERIDIAN HM 0940051 BAYVIEW SUB NO 6 LOT 164-B; Address- 1663 HOMER SPIT RD

These parcels are shown in the vicinity map, Figure 1 on page 2.

Womer & Associates (W&A) is preparing plans for the development. The key points of the development are provided by W&A are listed below.

1. The hotel is a 4 story structure.
2. The hotel room count is 100 guestrooms.
3. The hotel Gross Floor Area (GFA) is 112,000 square feet (sf).
4. The employee housing is 25 rooms.
5. Employee housing GFA is 12,992 sf.

A conceptual site plan is presented in Figure 2 on page 2.

Source: [Geocortex Viewer for HTML5 (kpb.us) https://gis.kpb.us/map/index.html?viewer=basic](https://gis.kpb.us/map/index.html?viewer=basic)

Figure 1: Vicinity Map and Hotel Development Site

Figure Source: Womer and Associates Plans

Figure 2: Conceptual Site Plan

2 Pre-Analysis Meeting Requirements

These Pre-Analysis Meeting requirements are found on the webpage Alaska DOT&PF - Statewide Design & Engineering Services - D&CS - Traffic & Safety (HSIP) at this address: https://dot.alaska.gov/stwddes/dcstraffic/tia/pop_tia_checklist.shtml. These are summarized here:

> *"The developer and the registered engineer that will sign and seal the TIA must meet with the DOT&PF Regional Traffic & Safety engineer and Right-of-Way agent before beginning the TIA. At the meeting, the following will be determined:*
> - *The design year (This is typically the buildout year or 10 years beyond the buildout year, depending on the development size and location)*
> - *The study area*
> - *Key intersections and key road segments to consider/evaluate in the TIA*
> - *The projected area-wide traffic growth rate*
> - *Level of Service (LOS) standards*
> - *Other planned developments to consider*
> - *Planned road improvements to consider*
> - *Any other items of note regarding the TIA"*

3 Trip Generation

Although not specifically required in the list above, trip generation is required to determine if a TIA will be required (DOT&PF), and to determine a design year.

3.1 Methodology

This trip generation analysis uses the methods and data of the Institute of Transportation (ITE) Trip Generation Manual (11th edition) and Trip Generation Handbook (3rd edition). ITE has developed a web application of the Trip Generation Manual, at this address https://itetripgen.org/, which was used in this analysis. Trip generation is computed by the product of an independent variable average rate and the corresponding independent variable value; or by a regression function equation using the independent variable. Not all data has the regression choice, but when available the Trip Generation Handbook provides a methodology for selecting whether to use average rates or regression equations in trip computations. This methodology is presented under Attachment B and is programmed by KE within an MS Excel spreadsheet.

ITE does not address the precise facility described by W&A's program in its land use data base for the combination of the hotel and employee housing. In such cases, the development is modeled conservatively as individual land uses selected from the ITE land use categories and then the individual sub-generator trips combined to estimate the total trips that will be generated by the new facility.

3.1.1 Hotel Trip Generation

ITE has land use (LU) classifications for several hotel types including:

- ***LU 310-Hotel.*** ITE description: "*A hotel is a place of lodging that provides sleeping accommodations and supporting facilities such as a full-service restaurant, cocktail lounge, meeting rooms, banquet room, and convention facilities. A hotel typically provides a swimming pool or another recreational facility such as a fitness room*." The proposed development aligns with this description.

- ***LU 311-All Suites Hotel***: ITE description: *"An all suites hotel is a place of lodging that provides sleeping accommodations, a small restaurant and lounge, and small amounts of meeting space. Each*

suite includes a sitting room and separate bedroom. An in-room kitchen is often provided." The proposed development will have some suites, but is not an all suite hotel. As such, the development doe not align with this description and is not used.

- ***LU 312-Business Hotel***: ITE description: *"A business hotel is a place of lodging aimed toward the business traveler but also accommodates a growing number of recreational travelers. These hotels provide sleeping accommodations and other limited facilities, such as a breakfast buffet bar and afternoon beverage bar. Some provide a full-service restaurant geared toward hotel guests. Some provide a swimming pool; most provide fitness facilities. Limited space for meeting facilities may be provided. Each unit is a large single room."* The proposed development does not align entirely with this land use description, and LU-310 appears to fit better. That being the case, LU 312 will not be used.

- ***LU 320-Motel***: ITE description: *"A motel is a place of lodging that provides sleeping accommodations and provides little or no meeting space and few supporting facilities. Exterior corridors accessing rooms (immediately adjacent to a parking lot) is common for a motel."* The proposed development does not align with this description.

- ***LU 330-Resort Hotel.*** ITE description: *"A resort hotel is similar to a hotel (Land Use 310) in that it provides sleeping accommodations, full-service restaurants, cocktail lounges, retail shops, and guest services. The primary difference is that a resort hotel caters to the tourist and vacation industry, often providing a wide variety of recreational facilities/programs (e.g., golf courses, tennis courts, beach access, or other amenities) rather than convention and meeting business."* The proposed development does not align entirely with this land use description, and LU-310 appears to fit better. That being the case, LU 330 will not be used.

ITE LU 310-Hotel is the category used for the hotel trip generation. The category description and data summary, excerpted from https://itetripgen.org/, is included under Attachment A. This analysis uses General Urban/Suburban setting data. LU 310 has three independent variables that may be applied to the analysis including Rooms, Occupied Rooms, and Employees. Rooms is the variable applied to this analysis, which for the proposed hotel has a value of 100. The outputs of the computations are vehicle trips.

3.1.2 Employee Housing Trip Generation

The 25-unit employee housing is a seasonal dormitory facility with single and double occupancy rooms, each with its own bathroom (toilet, sink, shower) closet, storage, desks and beds. There is a common kitchen and dining area and a common laundry room. Employees that reside in this facility will walk to and from the hotel and will have no need to access the hotel site with a vehicle. There is no ITE land use that describes this this type of facility.

However, the hotel trip generation rates presented in ITE are intended to include guest, employee, vendor, and other types of trips. Providing employee housing on-site results in a reduction of employee vehicle trips for the hotel. Therefore, by applying the full hotel trip generation rates to this analysis without deduction for staff on-site walking trips is a conservative approach in which we may ignore any incidental vehicle trips generated by employee housing.

3.1.3 Trip Generation Analysis Periods

Of interest to the Alaska DOT&PF is the peak hour trip totals during any one hour as cited above in the Introduction. In fact, ITE presents peak hour generation of many land use categories for the following time cases:

- ***Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am*** – This hour typically is concurrent with the morning commuting peak hour.

- ***Weekday, AM Peak Hour of Generator*** – This hour depicts the peak traffic activity of the LU generator that will occur during the morning, typically business hours before noon.
- ***Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm*** – This hour typically is concurrent with the evening commuting peak hour.
- ***Weekday, PM Peak Hour of Generator*** – This hour depicts the peak traffic activity of the LU generator that will occur during the afternoon, evening, or night periods.
- ***Saturday, Peak of Generator*** – This hour depicts the peak traffic activity of the LU generator that will occur during anytime on a Saturday during the morning, afternoon, evening, or night periods.
- ***Sunday, Peak of Generator*** – This hour depicts the peak traffic activity of the LU generator that will occur during anytime on a Sunday during the morning, afternoon, evening, or night periods.

.

3.2 Analysis

Trip generation computations for the time cases are presented in the table below, as computed by the ITE app https://itetripgen.org/.

Table 1: LU 310 Hotel Trip Generation for Peak Hours

Time Period (Method: Average Rate or Regression Equation, As Recommended by ITE Trip Generation Handbook Method, Attachment B)	**Independent Variable (IV)**	**IV Value (X)**	**Average Rate or Equation**	**Computed Trips**	**Entering Trips**	**Exiting Trips**
Weekday, Peak Hour of Adjacent Traffic, One Hour between 7 am and 9 am (Regression Equation)	Rooms	100	T = 0.50(X) - 7.45	43	24	19
Weekday, AM Peak Hour of Generator (Regression Equation)			Ln(T) = 0.86 Ln(X) + 0.12	59	31	28
Weekday, Peak Hour of Adjacent Traffic, One Hour between 4 pm and 6 pm (Regression Equation)			T = 0.74(X) - 27.89	46	24	22
Weekday, PM Peak Hour of Generator (Regression Equation)			Ln(T) = 0.95 Ln(X) - 0.27	61	35	26
Saturday, Peak of Generator (Regression Equation)			**T = 0.69(X) + 5.95**	**75**	**42**	**33**
Sunday, Peak of Generator (Average Rate)			0.57	57	27	30

As the table shows, the highest peak hour volume occurs on a Saturday with 75 vehicle trips generated in one hour.

3.3 Need for a TIA Analysis

The DOT&PF threshold requirement for a Traffic Impact Analysis is 100 trips per hour. This requirement is defined in 17 AAC 10.060. Driveways not part of highway construction.:

> *"(c) If a development is projected to generate more than 100 vehicle trips on a highway during any hour of the day, or the traffic generated is expected to detract from the safety of the highway, an applicant must perform a traffic impact analysis that meets the requirements of 17 AAC 10.070."*

On a traffic volume basis, DOT&PF does not require a TIA for this development because the development peak hour trips are less than 100. However, it may be required for other issues.

The City of Homer has no threshold peak hour volumes that trigger requirements for TIAs.

3.4 Trip Generation Results Action/Decision

- Confirm Approve Trip Generation Results.
- The DOT&PF and COH should confirm that a TIA should be conducted.

4 Design Year

4.1 Design Year Requirements

Both City of Homer and DOT&PF use a peak hour threshold of 250 trips per hour to determine if the analysis needs to include a design year that will occur 10 years after the opening year. If so, then the street system background traffic, that is traffic that will occur 10 years from opening, will need to be estimated with an approved growth rate. The development trip generated traffic remains constant throughout the analysis period, and will be added to the street system background traffic. For this development, the peak trip generation (75) will be less than 250 trips per hour. Therefore, the analysis need only consider background traffic and trip generated traffic that will occur during the opening year.

4.2 Design Year Action/Decision

- The DOT&PF and COH to review and confirm that the analysis only consider opening year.
- If so, KE will work with DOYON and W&A to determine opening year.
- If so, KE will prepare forecasts for background traffic during opening year in the study area.

5 Study Area-Intersections, Streets, and Pedestrian/Bike Facilities

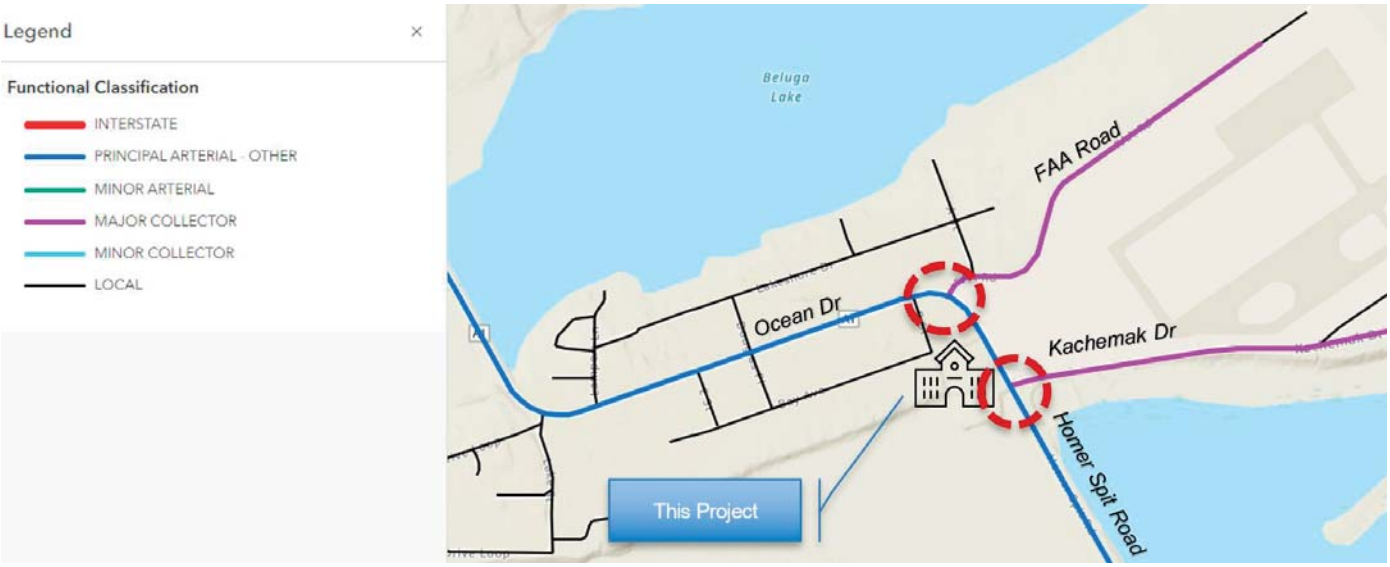
The Homer City Code states:

> ***21.76.050 Traffic impact analysis – Required elements.***
> *A traffic impact analysis prepared under this chapter must include consideration of:*
>
> *a. Intersections on streets or alleys where traffic on any approach is expected to increase as a result of the proposed development by at least five percent of the approach's capacity;*
>
> *b. Segments of streets or alleys between intersections where total traffic is expected to increase as a result of the proposed development by at least five percent of the segments' capacity;*
>
> *c. Intersections on streets or alleys where the safety of facilities will deteriorate as a result of the traffic generated by the development;*
>
> *d. Each driveway or approach road that will allow egress or ingress to a street for the proposed development;*
>
> *e. Parking and circulation routes within the proposed development, to the extent necessary to ensure that traffic does not back up onto a street; and*
>
> *f. Pedestrian and bicycle facilities that are a part of the street or alley to which a permit applicant seeks access. [Ord. 08-29, 2008].*

5.1 Intersections

Since this is an urbanized area, traffic flow regime will fall under interrupted flow. Intersections are the dominate factor in traffic operations.

The near vicinity study area roads functional classification is found at: Functional Classification (arcgis.com), https://akdot.maps.arcgis.com/apps/mapviewer/index.html?webmap=8d34059bbfed4fada20a4fdc2a138aca. This is shown in the following Figure 3 below.



Source: https://akdot.maps.arcgis.com/apps/mapviewer/index.html?webmap=8d34059bbfed4fada20a4fdc2a138aca

Figure 3: Area Streets Functional Classification

The Sterling Highway-Ocean Drive-Homer Spit Road connected roads are functionally classified as Principal Arterials. FAA Road and Kachemak Drive are functionally classified as Major Collectors. The FAA Road/Ocean Drive intersection and Kachemak Drive/Homer Spit Road intersection are in the immediate vicinity of the development and thus should be evaluated (circled).

There are no other major intersections to the south. The closest major intersection to the north is the Lake Street and Sterling Highway, about 1 mile from the proposed development. The estimated westbound approach hourly volume there is approximately 400 vehicles per hour. If all of the peak exiting traffic from the development (33 vehicles, see Table 1 on page 5) were to travel to the north through the intersection, then the Sterling/Lake westbound approach volume would increase 8%. However, traffic will distribute directionally to the south and east, as well as disperse along the corridor so that it is unlikely that the approaches at Sterling/Lake will exceed 5%.

We propose to only include the FAA Road/Ocean Drive intersection and Kachemak Drive/Homer Spit Road intersection in this TIA evaluation.

5.2 Segments

No roadway segments will be evaluated since intersections are the primary traffic operational control in interrupted flow regimes.

5.3 Pedestrians and Bicycles

Pedestrian and Bicycle safety will be evaluated at crossings resulting from the development.

5.4 Analysis Period

The peak hour of the generator occurs on a Saturday, and does not occur during the peak hours of the adjoining roadway network (morning and evening commuting times). We will superimpose the development's Saturday peak condition on evening commute background traffic condition, and use the development's peak morning condition on the morning commute background traffic condition.

5.5 Required Data for Study Area

KE will collect intersection turning movements for morning (7 am to 9 am) and evening (4 pm to 6 pm) peak hours. The counts will be adjusted for a seasonal summer peak hours using DOTPF CCS data, and the opening year using the traffic growth rate discussed below. Site trips from the development will be directionally distributed consistent with turning movements.

5.6 Study Area Action/Decision

- The DOT&PF and COH to review and confirm the proposed extents of analysis:
  - Intersections of Ocean Drive/FAA Road and Homer Spit Road
  - Pedestrian and Bicycle crossings
- The DOT&PF and COH to review and confirm analysis hour (summer peak) and site traffic distribution methods (current traffic patterns)

6 Project Area Growth Rate

6.1 Homer Transportation Plan

KE developed a 1% per year traffic growth rate for Homer.

6.2 Growth Rate Action/Decision

The DOT&PF and COH to review and confirm the proposed growth rate for analysis years.

7 Level of Service (LOS) standards

7.1 Code Requirements

The Homer City code states:

> ***21.76.040 Level of service minimums.***
> *The minimum acceptable LOS at intersections and on road segments both on the development's opening date and in the design year is:*
>
> *a. LOS C, if the LOS on the date of application is LOS C or better;*
>
> *b. LOS C, if the LOS on the date of application is LOS D;*
>
> *c. LOS D, if the LOS on the date of application is LOS E or poorer. [Ord. 08-29, 2008].*

The Alaska Administrative Code states:

> ***17 AAC 10.070. Traffic impact analysis.***
> *(b) Level of service (LOS) and operational analysis for a traffic impact analysis prepared under this section must be performed in accordance with the Transportation Research Board's publication Special*

Report 209, Highway Capacity Manual (1997 Update). The minimum acceptable LOS at intersections and on road segments both on the development's opening date and in the design year is

(1) LOS C, if the LOS on the date of application is LOS C or better; or

(2) LOS D, if the LOS on the date of application is LOS D or poorer; however, if the LOS is poorer than LOS D, a lower minimum LOS is acceptable if the operation of the highway does not deteriorate more than 10 percent in terms of delay time or other appropriate measures of effectiveness from the LOS before the development's opening date.

7.2 LOS Action/Decision

- Request that we adopt DOT&PF standards for this analysis. DOT&PF and COH to approve this.

8 Other Planned Developments To Consider

-
-
-

9 Planned Road Improvements To Consider

- Homer Master Transportation Plan
-
-
-

10 Any Other Items Of Note Regarding The TIA

- DOT&PF TIA Checklist is attached under Attachment C.
-
-
-

Randy Kinney

From: Janette Keiser <JKeiser@ci.homer.ak.us>
Sent: Tuesday, September 5, 2023 6:14 PM
To: Randy Kinney; Ryan Foster; 'LeCroy, Orion (DOT)'; Ferguson, Cynthia L (DOT)
Cc: Jeanne M. Bowie
Subject: [EXT] RE: Pre-Analysis Meeting Report

Randy

1. **Re: Employee Housing trips**. I do not support the elimination of analyzing employee housing trip generation. First, I cannot rely on the developer's wishful intent that its employees use bikes and walk to the grocery store or Alice's, instead of using a car. Second, we need to be mindful about the record we are building, because it's all going to be subject to public disclosure at some point. In particular, we cannot avoid taking a step because we think it's not worth the effort, without a rational basis. Bottom line is that it is ok to do a basic level analysis and conclude that there is no need to go further, but we can't ignore it.
2. **Re: ROW vacation.** As I understand the City's rules on ROW vacation, the vacated ROW goes to the adjacent property owners – both of them. So, the Developer shouldn't depend on using the entire ROW it hopes will be vacated, for its development. Also, I understand the development will need a CUP, which means public hearings. I have to believe someone will be there strongly advocating for a natural buffer between the development and the adjacent property, which could limit the development's footprint. Further, Public Works is not going to support abandoning or vacating an active drainage channel.

Regards,
Jan

Janette ("Jan") Keiser, PE
Director of Public Works
City of Homer

Office: 907-435-3141
Cell: 206-714-8955

From: Randy Kinney <Randy.Kinney@kinneyeng.com>
Sent: Friday, September 1, 2023 11:49 AM
To: Janette Keiser <JKeiser@ci.homer.ak.us>; Ryan Foster <rfoster@ci.homer.ak.us>; 'LeCroy, Orion (DOT)' <orion.lecroy@alaska.gov>; Ferguson, Cynthia L (DOT) <cynthia.ferguson@alaska.gov>
Cc: Jeanne M. Bowie <Jeanne.Bowie@kinneyeng.com>
Subject: RE: Pre-Analysis Meeting Report

Hi Jan,
Thanks for the comments. I'm including Cynthia Ferguson and Orion LeCroy from DOTPF in this reply so that they can view your comments as well.

I have called Zach Dunlap at DOYON to address questions raised during the Pre-Analysis Meeting.

- On the question regarding employee housing trip generation, Zach stated that the employees residing there will be seasonal and from out of town. DOYON's intent is for them to use active transportation (walk, bike, shuttle

Randy Kinney

From: LeCroy, Orion (DOT) <orion.lecroy@alaska.gov>
Sent: Friday, September 8, 2023 8:50 AM
To: Randy Kinney
Cc: Jeanne M. Bowie; Janette Keiser; Ryan Foster; Ferguson, Cynthia L (DOT)
Subject: [EXT] RE: Pre-Analysis Meeting Report

Hi Randy,

Please find our comments for the Lighting Village Development Pre-Analysis meeting memo from 8-30-23.

- Section 1 Paragraph 1: If required, update description of parcels to reflect proposed development. Figure 2 shows development of third parcel and B Street ROW, although we understand that this has not been finalized.
- Section 1 Item 4: Identify employee housing as a separate facility with rooms in addition to the hotel.
- Section 1 Figure 1: If required, update to include all parcels proposed for development.
- Section 3.1.1 Selected Land Use: We conditionally agree with LU 310-Hotel if :
    - The TIA confirms that staff housing is limited to onsite employees and additional trips will not be generated by occupants that may work elsewhere.
    - The TIA confirms that anticipated staff schedules or days off would not further contribute to the peak hour trips. If this can not be determined, we recommend inclusion of staff housing as an additional trip generator.
- Section 3.2: Non-motorized user trip generation and connectivity.
    - Homer Spit Road: Because the proposed development is tourism based and across Homer Spit Road from an existing shared use pathway extending down Homer Spit, the TIA should consider non-motorized trip generation at the site. We would anticipate additional ped-bike crossings at Kachemak Bay Drive intersection to walk/bike down the spit. The TIA should evaluate the existing crossing to determine if mitigation is needed based on the increased demand. The evaluation should consider ADA connectivity, sight distances, and gaps in traffic (construction year) to determine whether additional electrical warning or regulatory devices are warranted per ATM Table 4A-102.
    - B Street/Bay Ave: If proposed as part of the development or mitigation, the TIA should evaluate pedestrian crossing sight distance and ADA connectivity at the B Street/Bay Ave non-motorized connection.
- Section 3.4: DOT&PF recommends a TIA with consideration of non-motorized movements and safety.
- Section 4.2: We agree with opening year only, with traffic growth rate to match rate identified in Homer Transportation Plan (Section 6.1 outlines 1% per year growth).
- Section 5.1 Paragraph 4: Recommend a check or calibration with hourly flow rate data for Station ID: 51008000. Site Data>Volume>Hourly Direction. https://alaskatrafficdata.drakewell.com/publicmultinodemap.asp
- Section 5.5: May require a longer count duration to capture weekday am/pm peaks and weekend peaks. Count stations show high two-way volumes mid-day on Saturday and Sunday. Consider video counts that include existing non-motorized counts at crossing as baseline for potential increases.
- Section 9: Two DOT&PF projects in design:
    - Sterling Highway: MP 169 to 175 Pavement Preservation (CFHWY00857) – estimated construction 2025 or beyond.
    - Kachemak Drive MP 0-3.5 Pavement Preservation (CFHWY00602) – estimated construction 2025 or beyond.

Please let me know if you have any questions.

Thank you,
J. Orion LeCroy, PE
HSIP Engineer
Alaska DOT&PF, CR
4111 Aviation Ave.
Anchorage, AK 99502
Office (907) 269-0653
Personal Cell (907) 382-0134

From: Randy Kinney <Randy.Kinney@kinneyeng.com>
Sent: Tuesday, September 5, 2023 6:45 PM
To: Janette Keiser <JKeiser@ci.homer.ak.us>; Ryan Foster <rfoster@ci.homer.ak.us>; LeCroy, Orion (DOT) <orion.lecroy@alaska.gov>; Ferguson, Cynthia L (DOT) <cynthia.ferguson@alaska.gov>
Cc: Jeanne M. Bowie <Jeanne.Bowie@kinneyeng.com>
Subject: RE: Pre-Analysis Meeting Report

Ok Jan, message received on the employee housing.

DOYON owns both parcels flanking the ROW. However, hearing some of the other issues/requirements, I wonder should the ROW vacation be resolved before the TIA goes forward? My proposed approach was to assume the development shown in the site plan would be approved (with ROW vacation) for the TIA, which results in higher trips (more conservative from the City/DOT viewpoint). If it wasn't going forward, I would expect that the buildings shrink with the site, and perhaps the employee housing goes away.

I am available if you and Ryan would like to talk more about this.

RANDY KINNEY, P.E., PTOE

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www.kinneyeng.com

From: Janette Keiser <JKeiser@ci.homer.ak.us>
Sent: Tuesday, September 5, 2023 6:14 PM
To: Randy Kinney <Randy.Kinney@kinneyeng.com>; Ryan Foster <rfoster@ci.homer.ak.us>; 'LeCroy, Orion (DOT)' <orion.lecroy@alaska.gov>; Ferguson, Cynthia L (DOT) <cynthia.ferguson@alaska.gov>
Cc: Jeanne M. Bowie <Jeanne.Bowie@kinneyeng.com>
Subject: [EXT] RE: Pre-Analysis Meeting Report

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Regards,
Jan

Janette ("Jan") Keiser, PE
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To: Janette Keiser <JKeiser@ci.homer.ak.us>; Ryan Foster <rfoster@ci.homer.ak.us>; 'LeCroy, Orion (DOT)' <orion.lecroy@alaska.gov>; Ferguson, Cynthia L (DOT) <cynthia.ferguson@alaska.gov>
Cc: Jeanne M. Bowie <Jeanne.Bowie@kinneyeng.com>
Subject: RE: Pre-Analysis Meeting Report

Hi Jan,
Thanks for the comments. I'm including Cynthia Ferguson and Orion LeCroy from DOTPF in this reply so that they can view your comments as well.

I have called Zach Dunlap at DOYON to address questions raised during the Pre-Analysis Meeting.

- On the question regarding employee housing trip generation, Zach stated that the employees residing there will be seasonal and from out of town. DOYON's intent is for them to use active transportation (walk, bike, shuttle bus/van?) for off-site trips. In fact, they are contemplating providing bicycles for employee use. There will be a manager apartment that will likely have a vehicle. So, with this information, please let me know if we can forego computing trip generation for employee housing. As we noted in the report and during our meeting, the employee housing dormitory doesn't fit well into an ITE land use, and we would likely have to adapt another residential LU for the computations. However, we believe that employee trips from the dormitory will not contribute to the peak hours that we are evaluating and therefore request that the employee housing not be included in the trip generation calculations.

- On the question of the development intrusion into the existing B Street ROW south of Bay Avenue and onto the third DOYON parcel west of the B Street ROW, DOYON intends to pursue an acquisition/transfer of the B Street ROW. We do not have details on how that will go forward. Zach is aware that the ROW is currently contains a drainage channel from Bay Avenue. Parking and the Employee Housing will be located on the abandoned or vacated ROW. For purposes of the Traffic Impact Analysis, the current development plan is based on the site plan and ROW transfer outcome, and represents the highest development level. As such, we intend to base the traffic analysis on that site plan and development, which from the traffic analysis perspective, presents the highest trip generation (worst) case.

- DOYON does not want to connect to Bay Avenue or B Street, except with the trail as shown on the site plan. I recommend that the TIA determines if the additional connection is needed for mitigation, but if not, it would not be pursued or evaluated..

Please consider the above recommendations and requests. Let us know if you all agree, or if we need to address these items in the TIA report.

RANDY KINNEY, P.E., PTOE

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From: Janette Keiser <JKeiser@ci.homer.ak.us>
Sent: Thursday, August 31, 2023 1:03 PM
To: Randy Kinney <Randy.Kinney@kinneyeng.com>; Ryan Foster <rfoster@ci.homer.ak.us>
Cc: Jeanne M. Bowie <Jeanne.Bowie@kinneyeng.com>
Subject: [EXT] RE: Pre-Analysis Meeting Report

Hello Randy and Ryan
I apologize for missing the meeting yesterday. One of the candidates for the PW Director position was here and I got caught up on an interview with him.

I have reviewed the Pre-Analysis Meeting Analysis and have the following comments:

1. **Page 4, Section 3.1.2 – Employee Housing Trip Generation.** While employees will not need vehicles to travel between the dormitory and the hotel, the employees will no doubt make personal trips from the dormitory to the grocery store, Alice's and other personal destinations. These trips would not be generated but for the hotel, and should be taken into account.
2. **Page 9, Section 9 – Planned Road Improvements to Consider.** This section should mention the Bay Avenue Pavement Restoration Project.

Thanks,
Jan

Janette ("Jan") Keiser, PE
Director of Public Works
City of Homer

Office: 907-435-3141
Cell: 206-714-8955

From: Randy Kinney <Randy.Kinney@kinneyeng.com>
Sent: Wednesday, August 30, 2023 11:48 AM
To: Ryan Foster <rfoster@ci.homer.ak.us>; Janette Keiser <JKeiser@ci.homer.ak.us>; Ferguson, Cynthia L (DOT) <cynthia.ferguson@alaska.gov>; 'LeCroy, Orion (DOT)' <orion.lecroy@alaska.gov>
Cc: Jeanne M. Bowie <Jeanne.Bowie@kinneyeng.com>
Subject: Pre-Analysis Meeting Report

CAUTION: This email originated from outside your organization. Exercise caution when opening attachments or clicking links, especially from unknown senders.

Is attached. I apologize for the tardiness, but I can go through it with you at the meeting.

RANDY KINNEY, P.E., PTOE

KINNEY ENGINEERING, LLC
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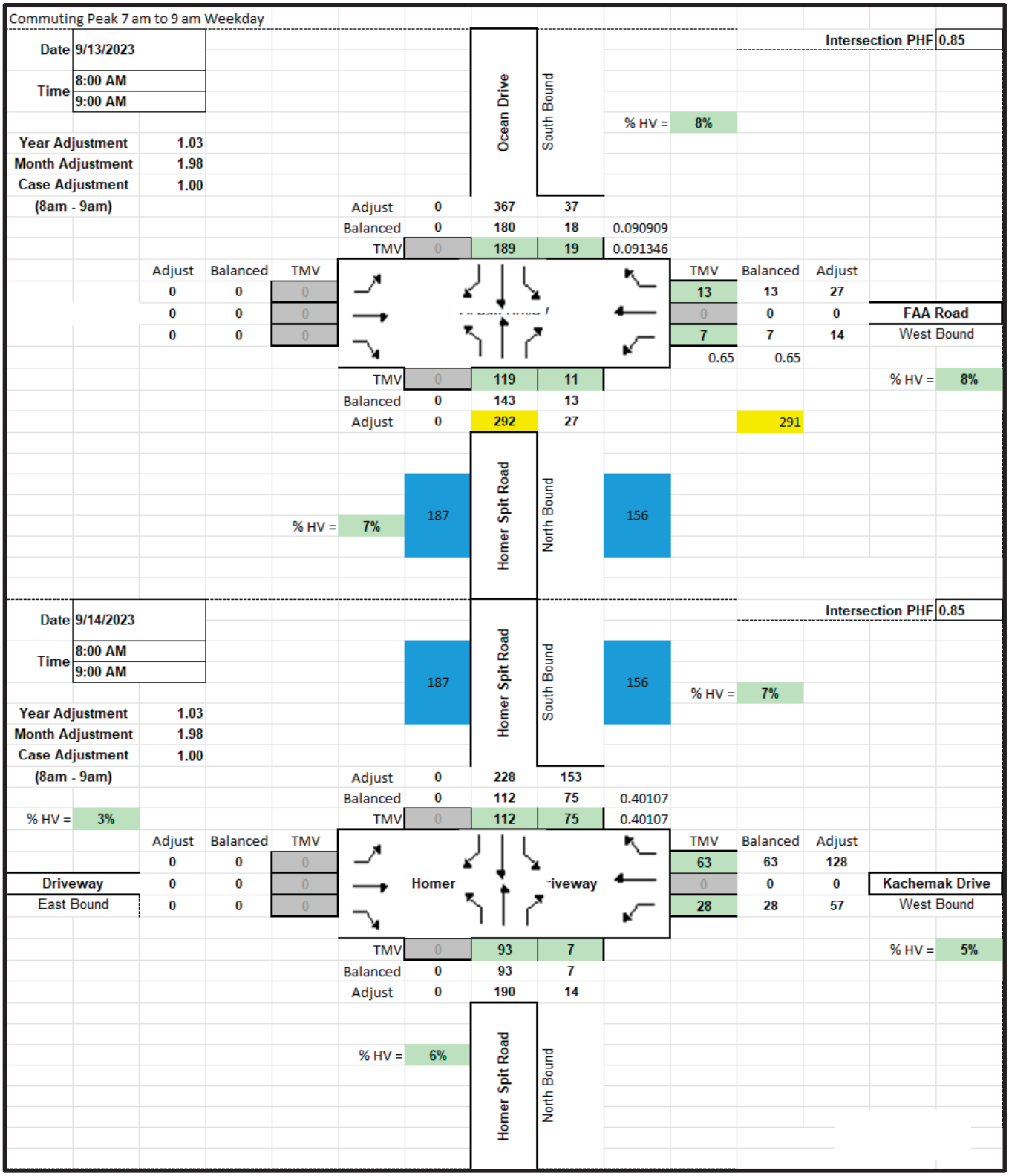
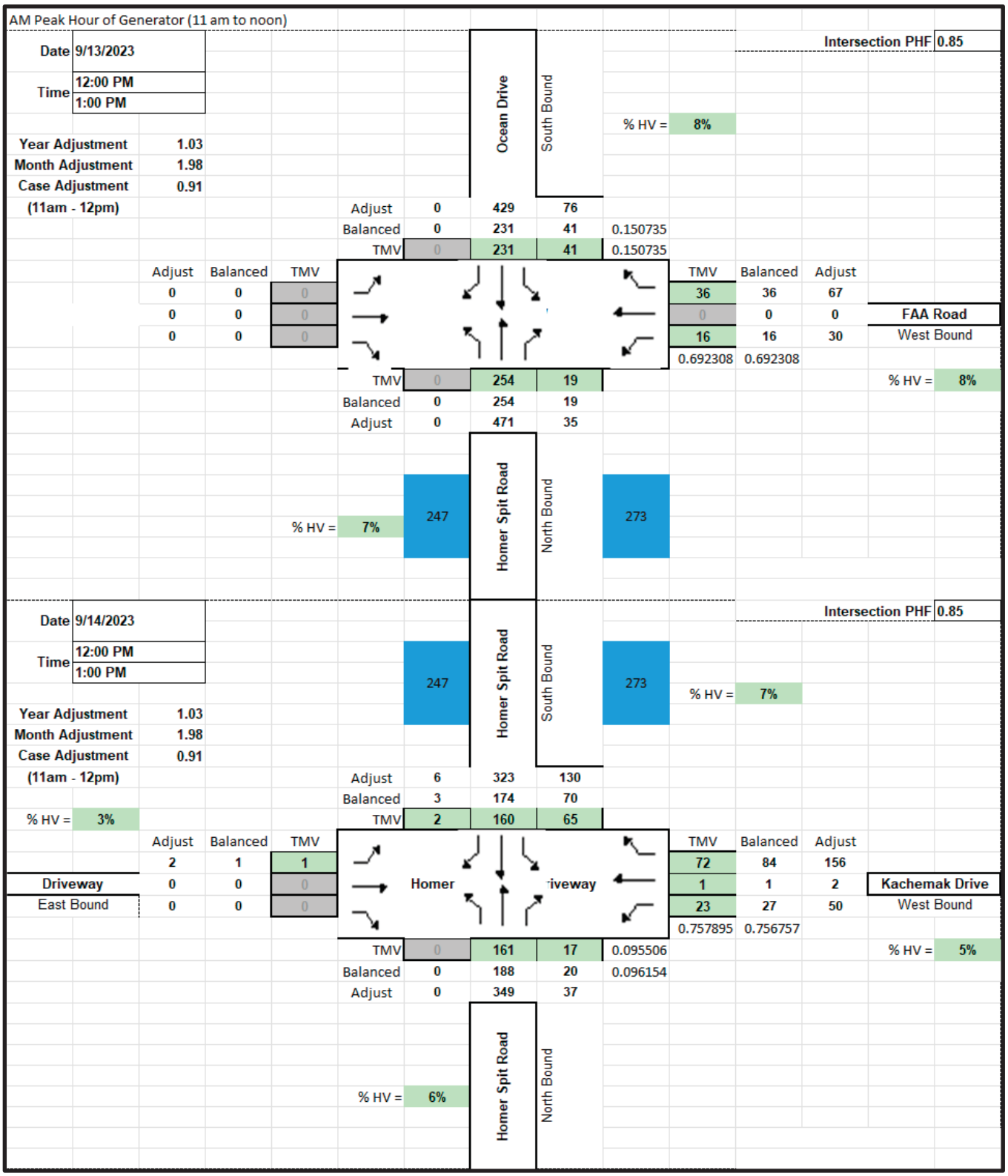
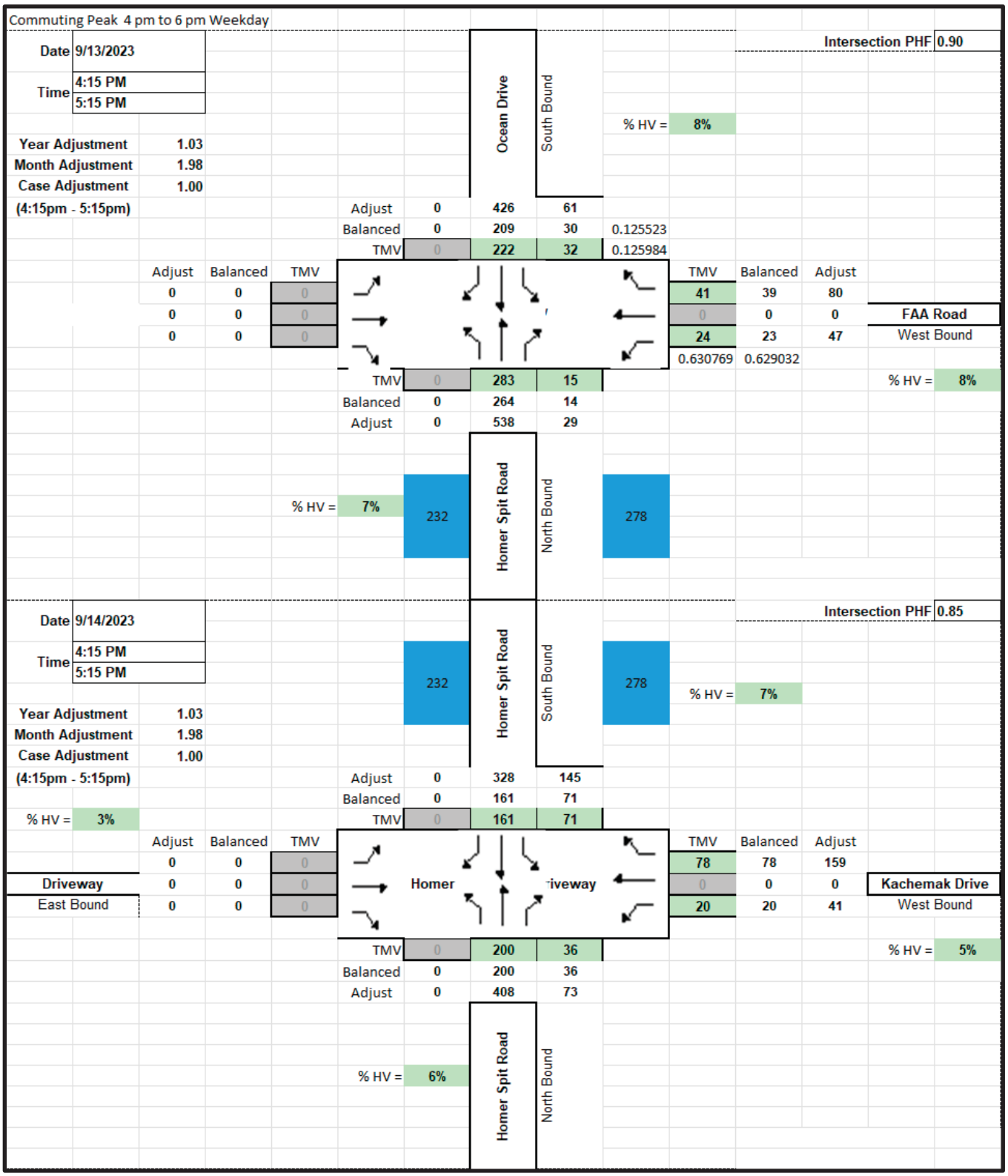
3909 Arctic Boulevard, Ste 400, Anchorage, AK 99503
Phone 907.344.7575 Fax 907.349.7496
www.kinneyeng.com

Attachment B: Intersection Turning Movements for Base Traffic: September 2023 Counts Converted to Summer Peak 2026


Commuting Peak 7 am to 9 am Weekday
Date 9/13/2023
Time 8:00 AM
9:00 AM
Intersection PHF 0.85
Ocean Drive
South Bound
% HV = 8%
Year Adjustment 1.03
Month Adjustment 1.98
Case Adjustment 1.00
(8am - 9am)
Adjust 0 367 37
Balanced 0 180 18 0.090909
TMV 0 189 19 0.091346
Adjust Balanced TMV
0 0 0
0 0 0
0 0 0
TMV Balanced Adjust
13 13 27
0 0 0
7 7 14
0.65 0.65
FAA Road
West Bound
TMV 0 119 11
Balanced 0 143 13
Adjust 0 292 27
291
% HV = 8%
187
156
% HV = 7%
Homer Spit Road
North Bound
Date 9/14/2023
Time 8:00 AM
9:00 AM
Intersection PHF 0.85
187
Homer Spit Road
South Bound
156
% HV = 7%
Year Adjustment 1.03
Month Adjustment 1.98
Case Adjustment 1.00
(8am - 9am)
Adjust 0 228 153
Balanced 0 112 75 0.40107
% HV = 3%
TMV 0 112 75 0.40107
Adjust Balanced TMV
0 0 0
Driveway
East Bound
0 0 0
0 0 0
TMV Balanced Adjust
63 63 128
0 0 0
28 28 57
Kachemak Drive
West Bound
Homer
iveway
TMV 0 93 7
Balanced 0 93 7
Adjust 0 190 14
% HV = 5%
% HV = 6%
Homer Spit Road
North Bound


AM Peak Hour of Generator (11 am to noon)
Date 9/13/2023
Time 12:00 PM
1:00 PM
Year Adjustment 1.03
Month Adjustment 1.98
Case Adjustment 0.91
(11am - 12pm)
Intersection PHF 0.85
Ocean Drive
South Bound
% HV = 8%
Adjust 0 429 76
Balanced 0 231 41 0.150735
TMV 0 231 41 0.150735
Adjust Balanced TMV
0 0 0
0 0 0
0 0 0
TMV Balanced Adjust
36 36 67
0 0 0
16 16 30
0.692308 0.692308
FAA Road
West Bound
TMV 0 254 19
Balanced 0 254 19
Adjust 0 471 35
% HV = 8%
% HV = 7%
247
Homer Spit Road
North Bound
273
Date 9/14/2023
Time 12:00 PM
1:00 PM
Year Adjustment 1.03
Month Adjustment 1.98
Case Adjustment 0.91
(11am - 12pm)
Intersection PHF 0.85
247
Homer Spit Road
South Bound
273
% HV = 7%
Adjust 6 323 130
Balanced 3 174 70
% HV = 3%
TMV 2 160 65
Adjust Balanced TMV
2 1 1
Driveway
East Bound
0 0 0
0 0 0
TMV Balanced Adjust
72 84 156
1 1 2
23 27 50
0.757895 0.756757
Kachemak Drive
West Bound
TMV 0 161 17 0.095506
Balanced 0 188 20 0.096154
Adjust 0 349 37
% HV = 5%
% HV = 6%
Homer Spit Road
North Bound


Commuting Peak 4 pm to 6 pm Weekday
Date 9/13/2023
Time 4:15 PM
5:15 PM
Intersection PHF 0.90
Ocean Drive
South Bound
% HV = 8%
Year Adjustment 1.03
Month Adjustment 1.98
Case Adjustment 1.00
(4:15pm - 5:15pm)
Adjust 0 426 61
Balanced 0 209 30 0.125523
TMV 0 222 32 0.125984
Adjust Balanced TMV
0 0 0
0 0 0
0 0 0
TMV Balanced Adjust
41 39 80
0 0 0
24 23 47
0.630769 0.629032
FAA Road
West Bound
TMV 0 283 15
Balanced 0 264 14
Adjust 0 538 29
% HV = 8%
% HV = 7%
232
Homer Spit Road
North Bound
278
Date 9/14/2023
Time 4:15 PM
5:15 PM
Intersection PHF 0.85
232
Homer Spit Road
South Bound
278
% HV = 7%
Year Adjustment 1.03
Month Adjustment 1.98
Case Adjustment 1.00
(4:15pm - 5:15pm)
Adjust 0 328 145
Balanced 0 161 71
% HV = 3%
TMV 0 161 71
Adjust Balanced TMV
0 0 0
Driveway
East Bound
0 0 0
0 0 0
TMV Balanced Adjust
78 78 159
0 0 0
20 20 41
Kachemak Drive
West Bound
Homer
iveway
TMV 0 200 36
Balanced 0 200 36
Adjust 0 408 73
% HV = 5%
% HV = 6%
Homer Spit Road
North Bound

Attachment C: ITE Trip Generation Manual Land Use Descriptions and Generation Data

Hotel (Land Use Code 310: Lodging, Hotel)

Follows this page.

Land Use: 310
Hotel

Description

A hotel is a place of lodging that provides sleeping accommodations and supporting facilities such as a full-service restaurant, cocktail lounge, meeting rooms, banquet room, and convention facilities. A hotel typically provides a swimming pool or another recreational facility such as a fitness room. All suites hotel (Land Use 311), business hotel (Land Use 312), motel (Land Use 320), and resort hotel (Land Use 330) are related uses.

Additional Data

Twenty-five studies provided information on occupancy rates at the time the studies were conducted. The average occupancy rate for these studies was approximately 82 percent.

Some properties in this land use provide guest transportation services (e.g., airport shuttle, limousine service, golf course shuttle service) which may have an impact on the overall trip generation rates.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in California, District of Columbia, Florida, Georgia, Indiana, Minnesota, New York, Ontario (CAN), Pennsylvania, South Dakota, Texas, Vermont, Virginia, and Washington.

For all lodging uses, it is important to collect data on occupied rooms as well as total rooms in order to accurately predict trip generation characteristics for the site.

Trip generation at a hotel may be related to the presence of supporting facilities such as convention facilities, restaurants, meeting/banquet space, and retail facilities. Future data submissions should specify the presence of these amenities. Reporting the level of activity at the supporting facilities such as full, empty, partially active, number of people attending a meeting/banquet during observation may also be useful in further analysis of this land use.

Source Numbers

170, 260, 262, 277, 280, 301, 306, 357, 422, 507, 577, 728, 867, 872, 925, 951, 1009, 1021, 1026, 1046

Hotel
(310)

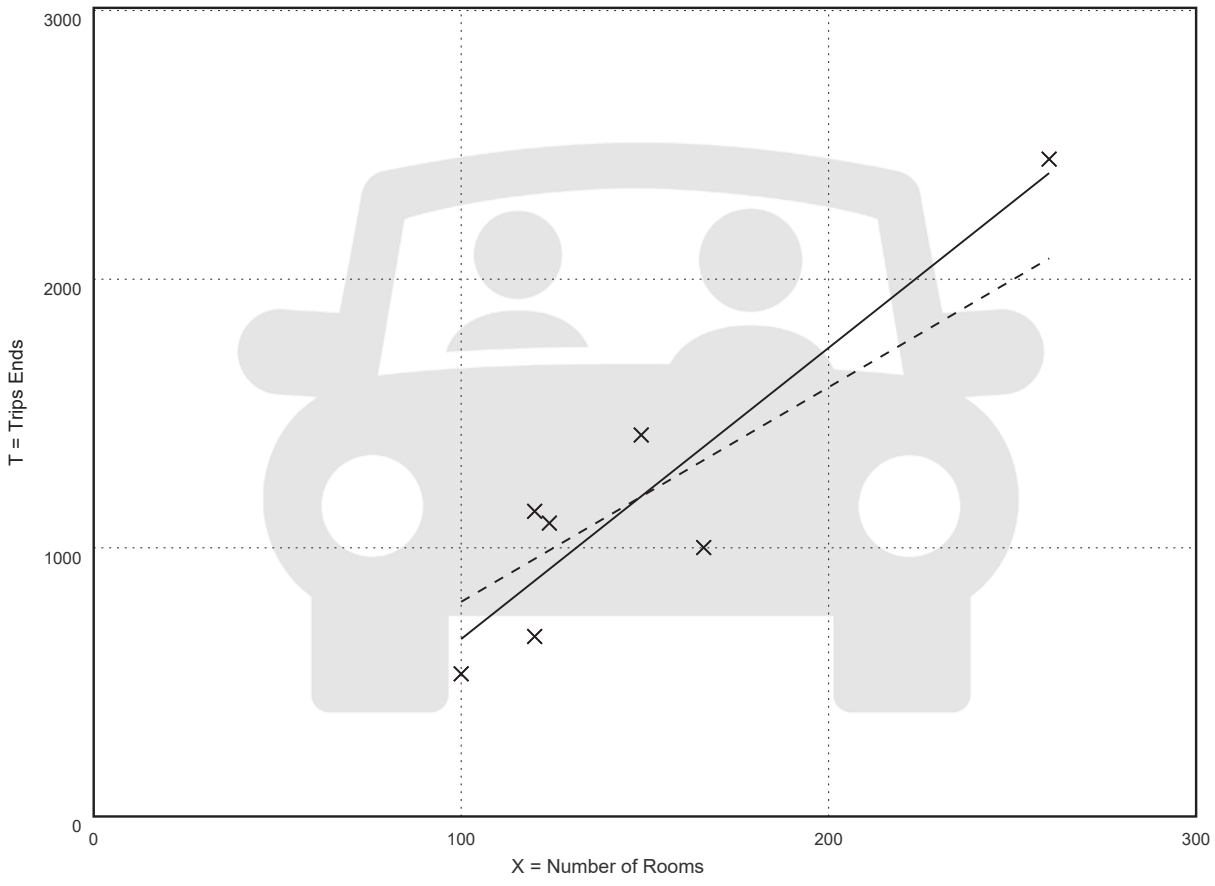
Vehicle Trip Ends vs: Rooms
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 7
Avg. Num. of Rooms: 148
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
7.99	5.31 - 9.53	1.92

Data Plot and Equation



Fitted Curve Equation: T = 10.84(X) - 423.51

R^2= 0.85

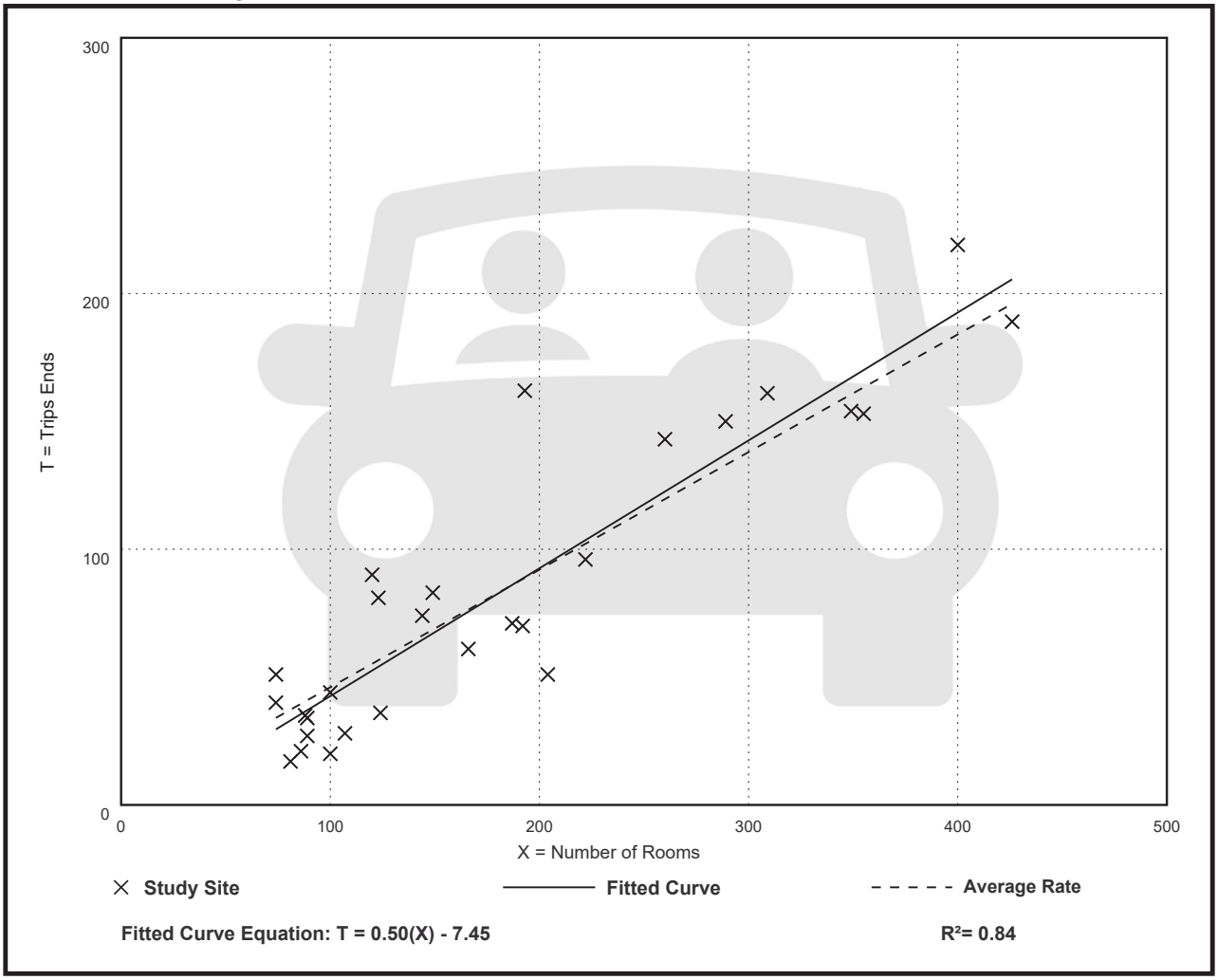
Hotel
(310)

Vehicle Trip Ends vs: Rooms
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: 28
Avg. Num. of Rooms: 182
Directional Distribution: 56% entering, 44% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.46	0.20 - 0.84	0.14

Data Plot and Equation



Fitted Curve Equation: T = 0.50(X) - 7.45

R^2= 0.84

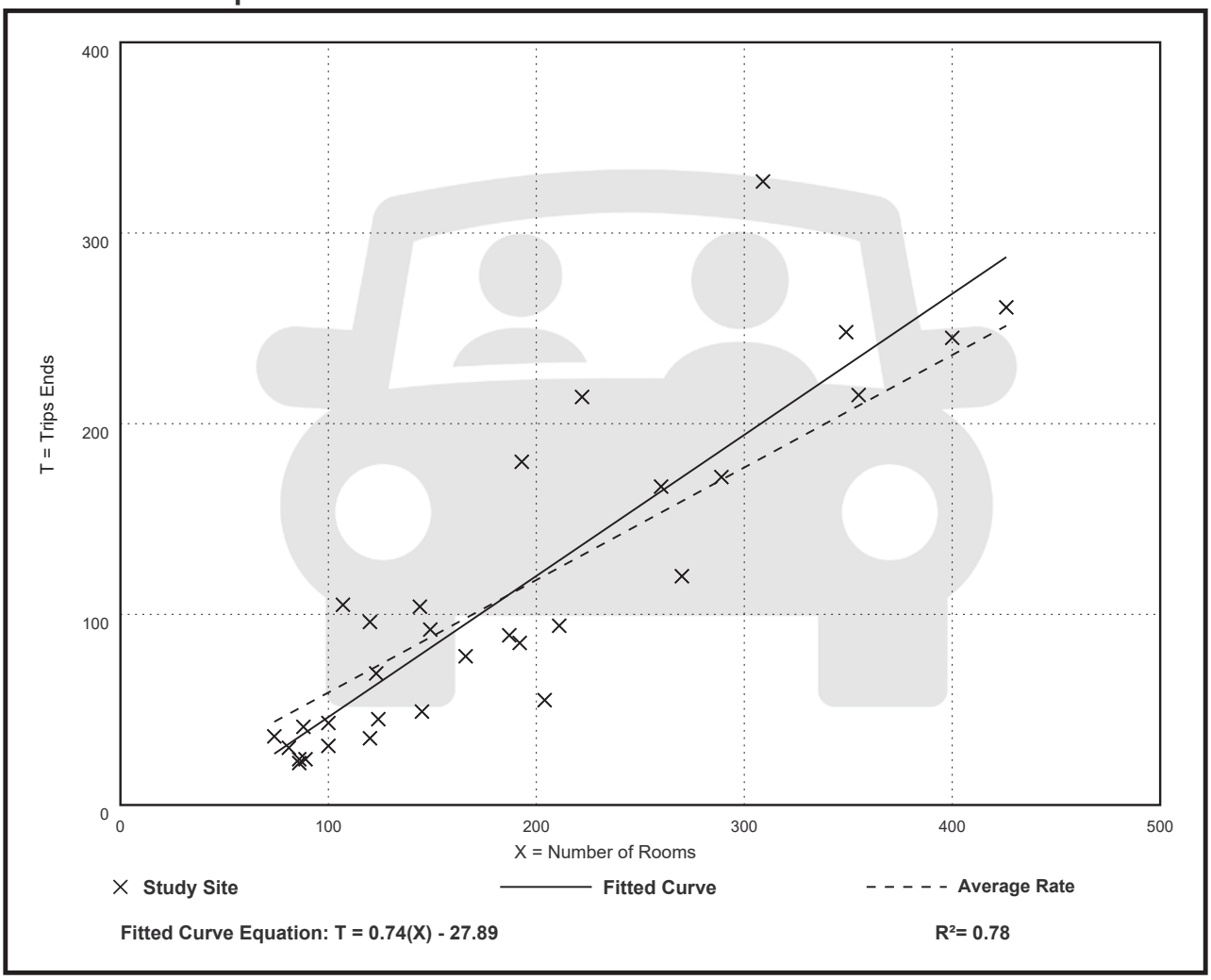
Hotel
(310)

Vehicle Trip Ends vs: Rooms
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: 31
Avg. Num. of Rooms: 186
Directional Distribution: 51% entering, 49% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.59	0.26 - 1.06	0.22

Data Plot and Equation



Hotel
(310)

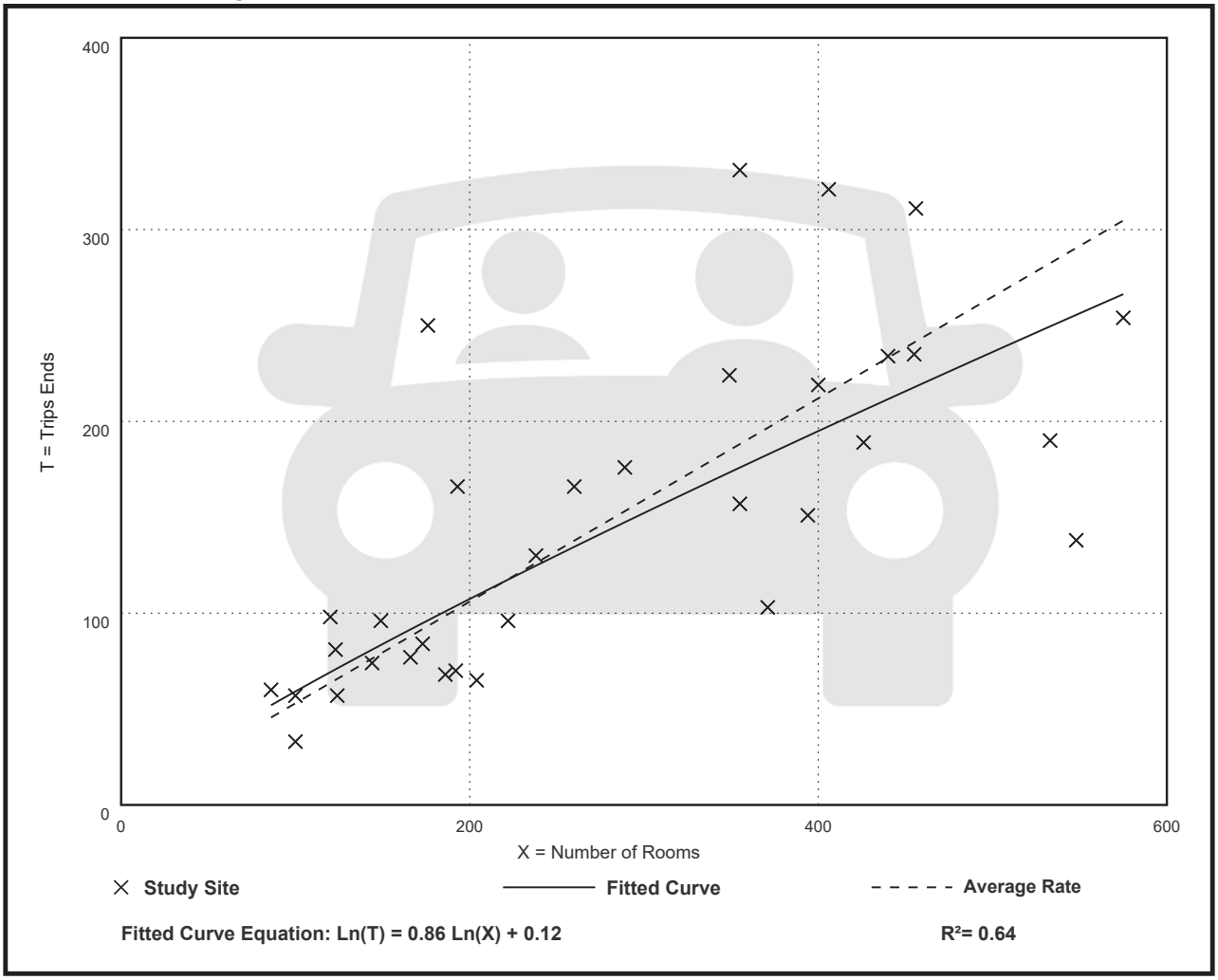
Vehicle Trip Ends vs: Rooms
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 33
Avg. Num. of Rooms: 282
Directional Distribution: 53% entering, 47% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.53	0.25 - 1.42	0.21

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.86 Ln(X) + 0.12

R^2= 0.64

Hotel
(310)

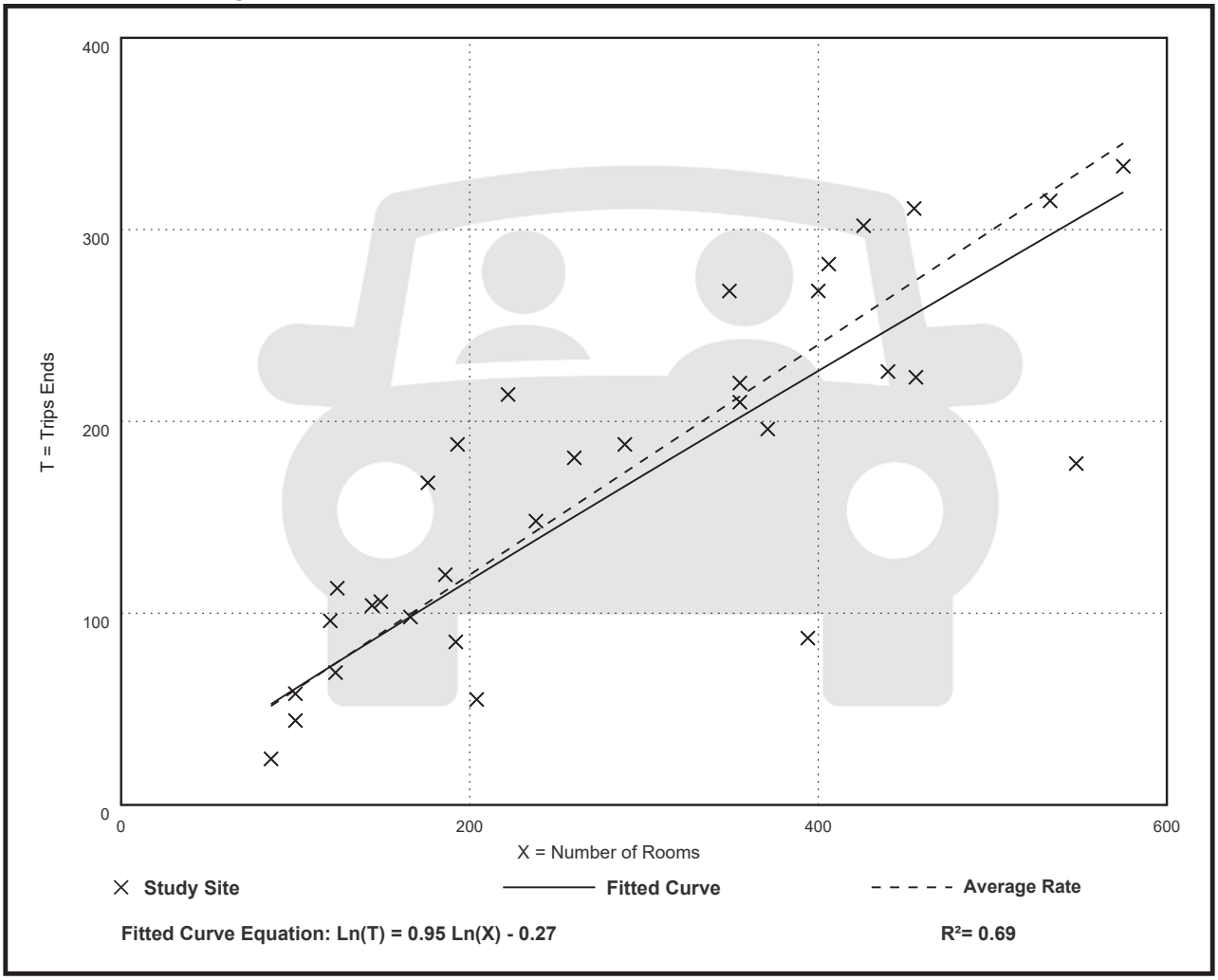
Vehicle Trip Ends vs: Rooms
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 32
Avg. Num. of Rooms: 285
Directional Distribution: 58% entering, 42% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.60	0.22 - 0.97	0.18

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.95 Ln(X) - 0.27

R^2= 0.69

Hotel
(310)

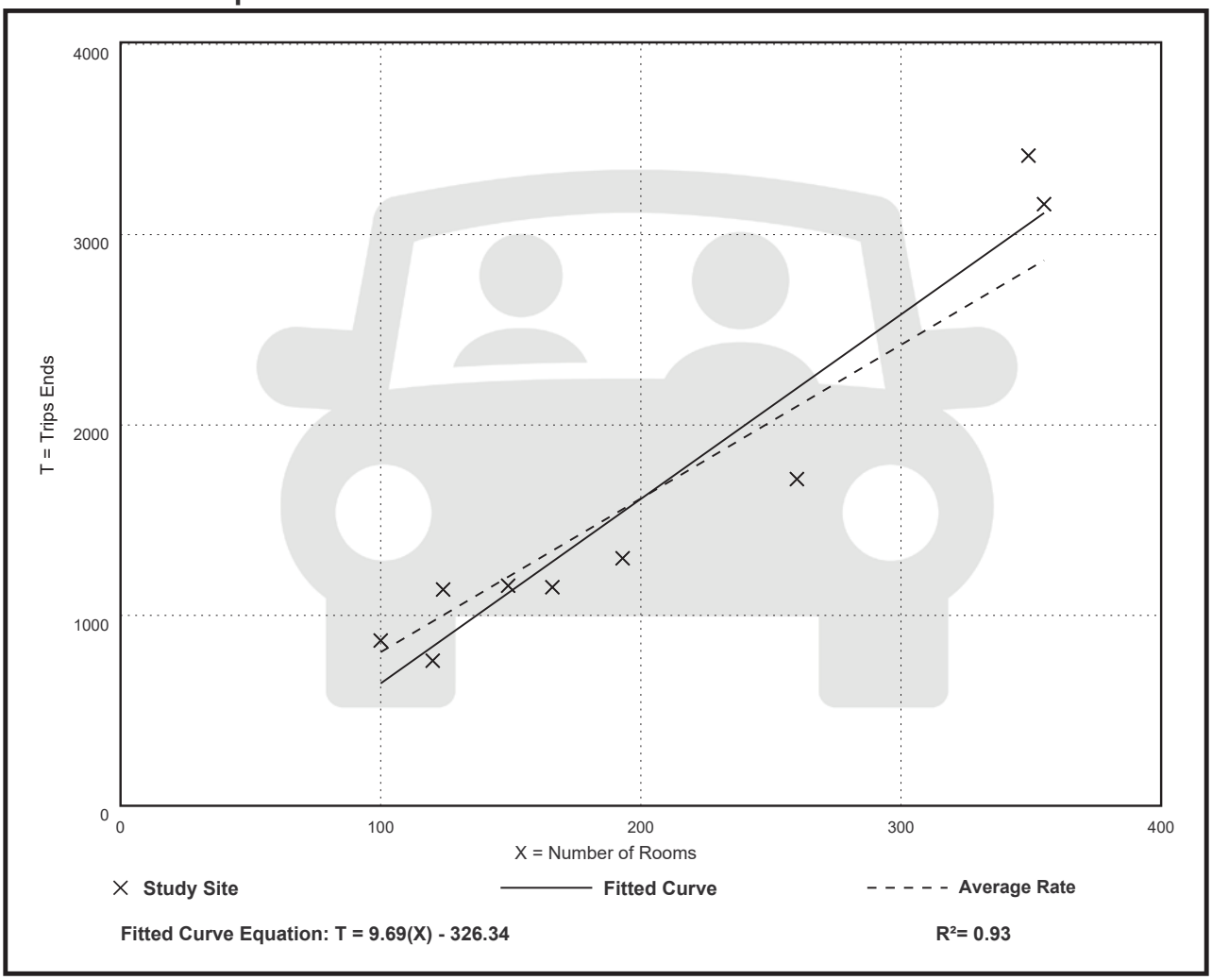
Vehicle Trip Ends vs: Rooms
On a: Saturday

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Rooms: 202
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
8.07	6.35 - 9.79	1.35

Data Plot and Equation



Fitted Curve Equation: T = 9.69(X) - 326.34

R^2= 0.93

Hotel
(310)

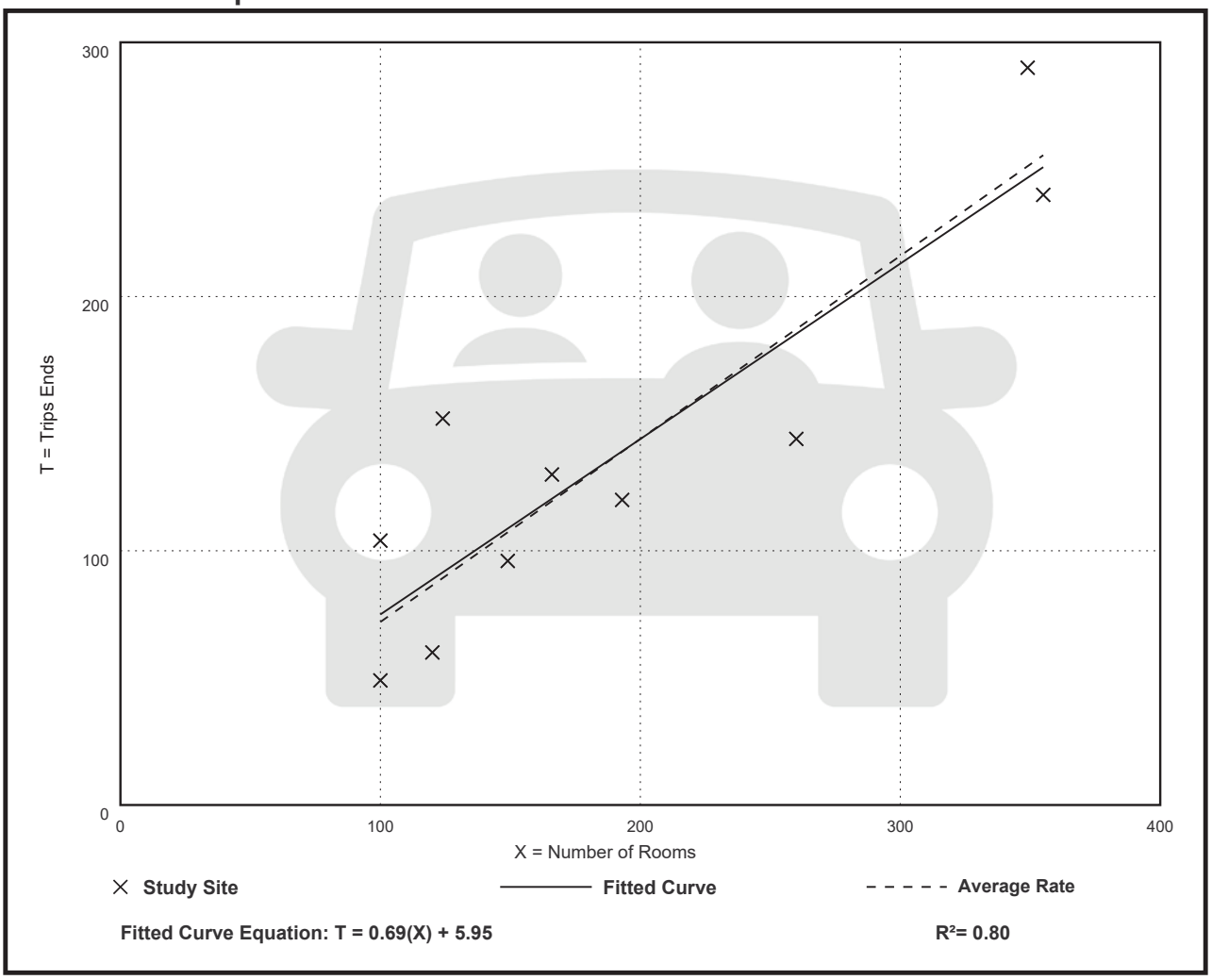
Vehicle Trip Ends vs: Rooms
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 10
Avg. Num. of Rooms: 192
Directional Distribution: 56% entering, 44% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.72	0.49 - 1.23	0.20

Data Plot and Equation



Fitted Curve Equation: T = 0.69(X) + 5.95

R^2= 0.80

Hotel
(310)

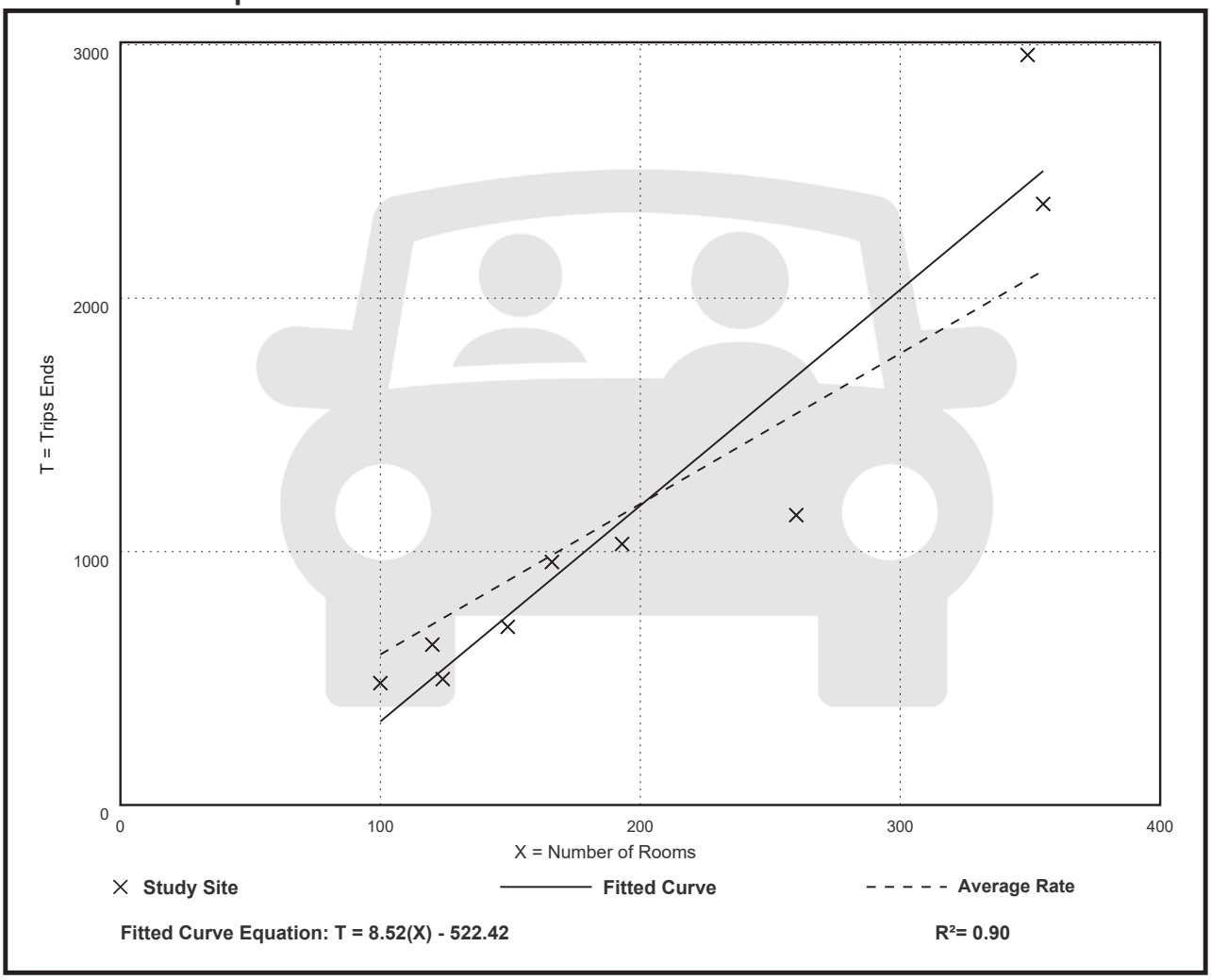
Vehicle Trip Ends vs: Rooms
On a: Sunday

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Rooms: 202
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
5.94	4.01 - 8.48	1.58

Data Plot and Equation



Fitted Curve Equation: T = 8.52(X) - 522.42

R^2= 0.90

Hotel
(310)

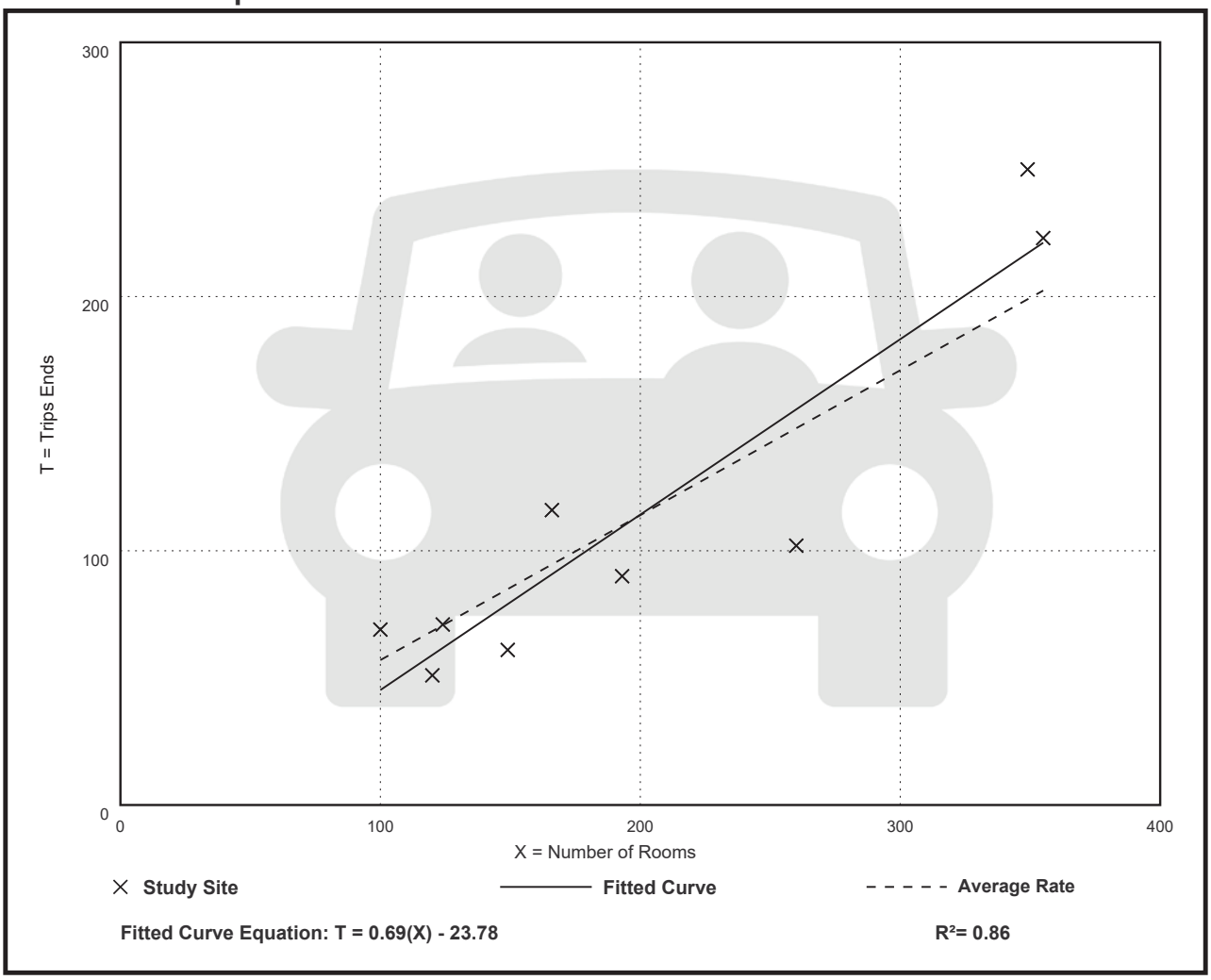
Vehicle Trip Ends vs: Rooms
On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Rooms: 202
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per Room

Average Rate	Range of Rates	Standard Deviation
0.57	0.39 - 0.72	0.14

Data Plot and Equation



Fitted Curve Equation: T = 0.69(X) - 23.78

R^2= 0.86

Hotel
(310)

Vehicle Trip Ends vs: Occupied Rooms
On a: Weekday

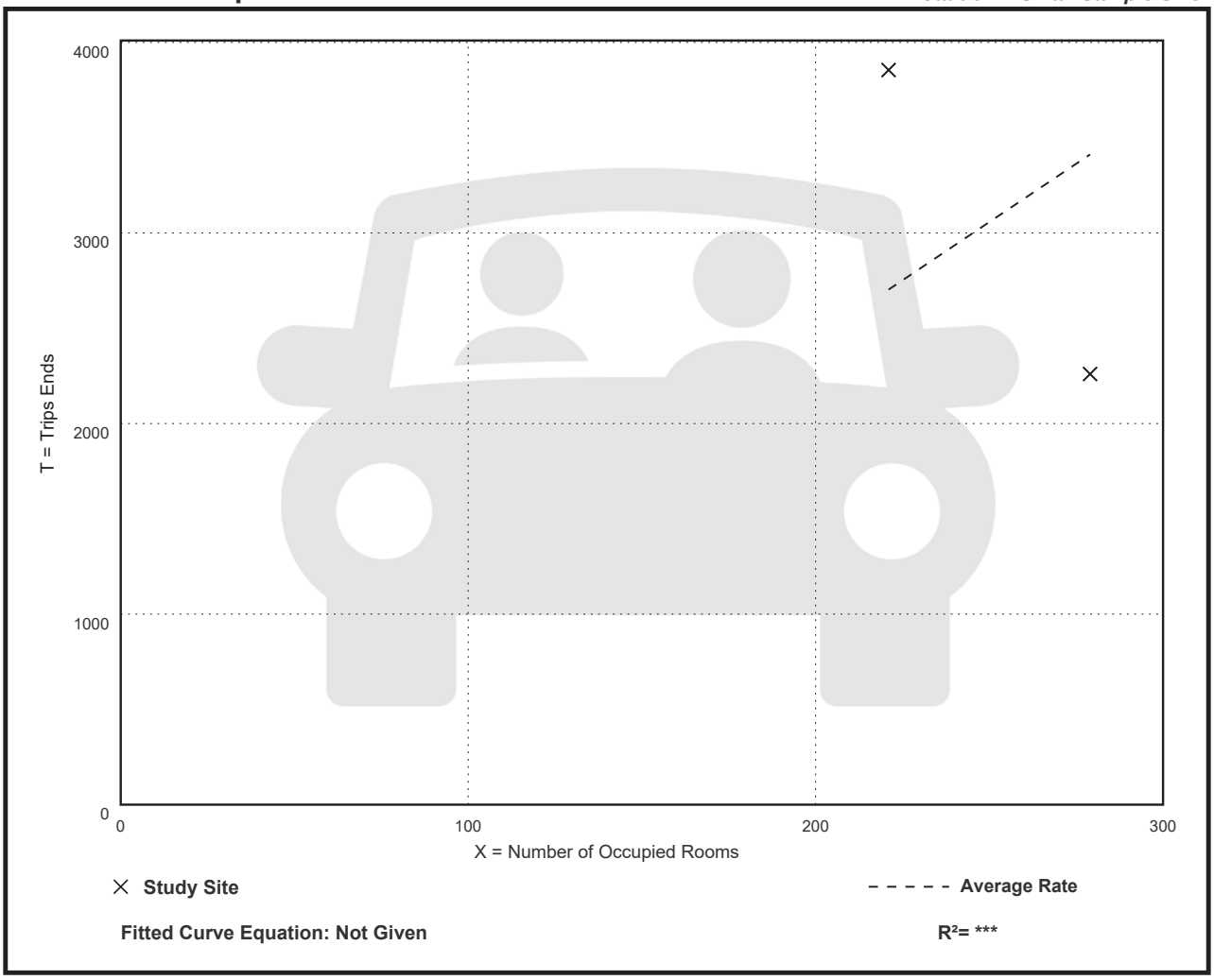
Setting/Location: General Urban/Suburban
Number of Studies: 2
Avg. Num. of Occupied Rooms: 250
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
12.23	8.10 - 17.44	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ***

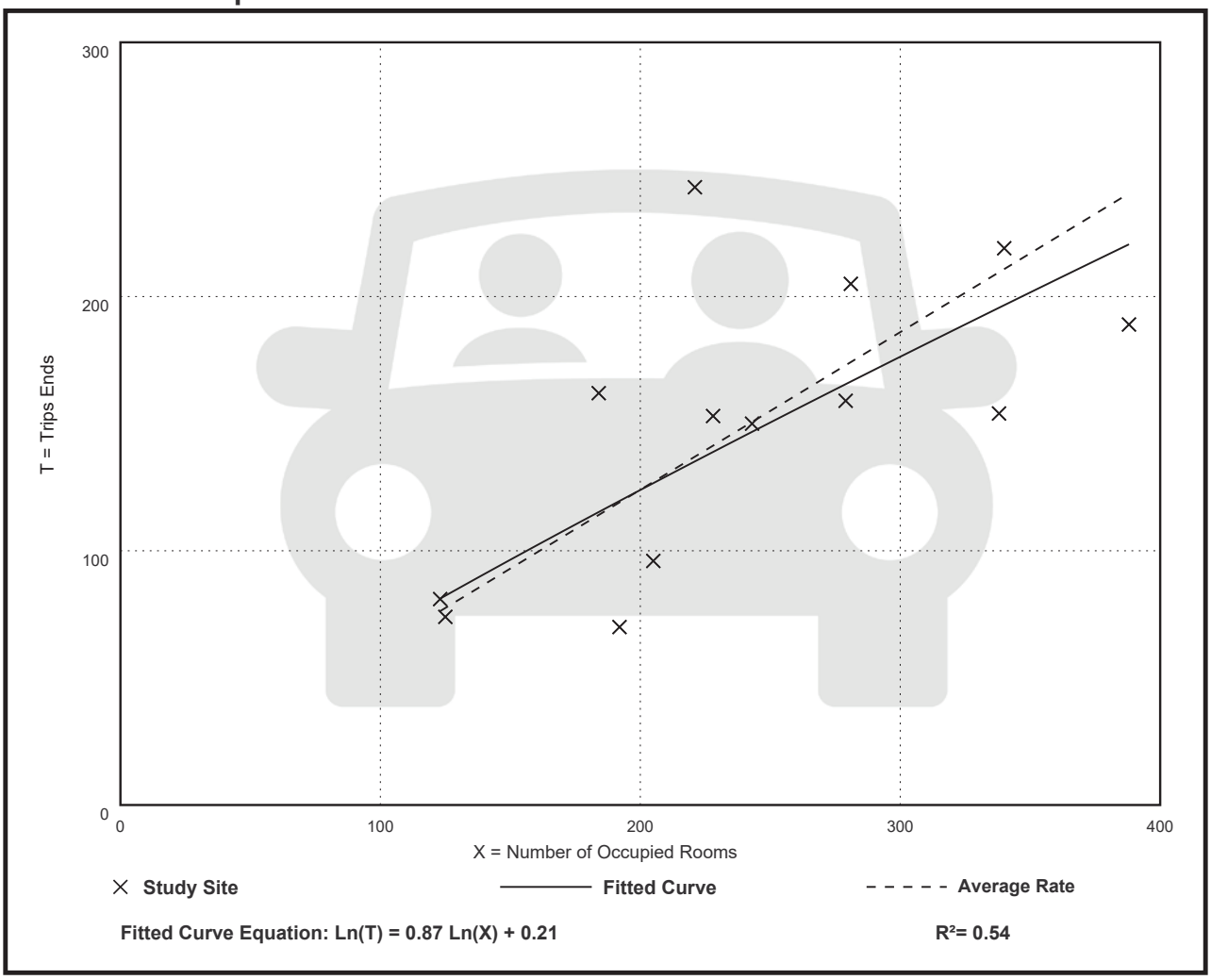
Hotel
(310)

Vehicle Trip Ends vs: Occupied Rooms
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: 13
Avg. Num. of Occupied Rooms: 242
Directional Distribution: 56% entering, 44% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
0.62	0.36 - 1.10	0.19

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.87 Ln(X) + 0.21

R^2= 0.54

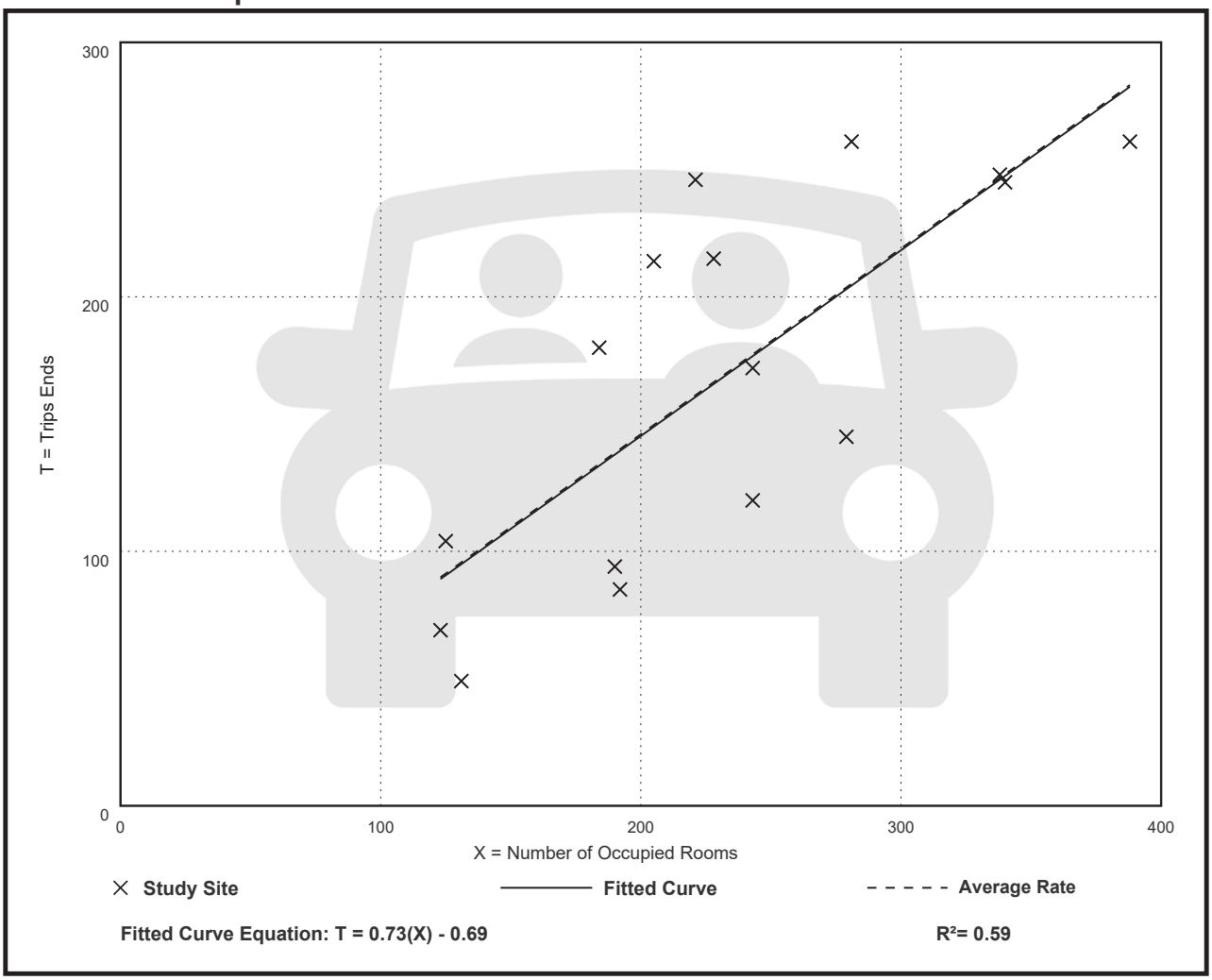
Hotel
(310)

Vehicle Trip Ends vs: Occupied Rooms
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: 16
Avg. Num. of Occupied Rooms: 232
Directional Distribution: 49% entering, 51% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
0.73	0.37 - 1.11	0.21

Data Plot and Equation



Hotel
(310)

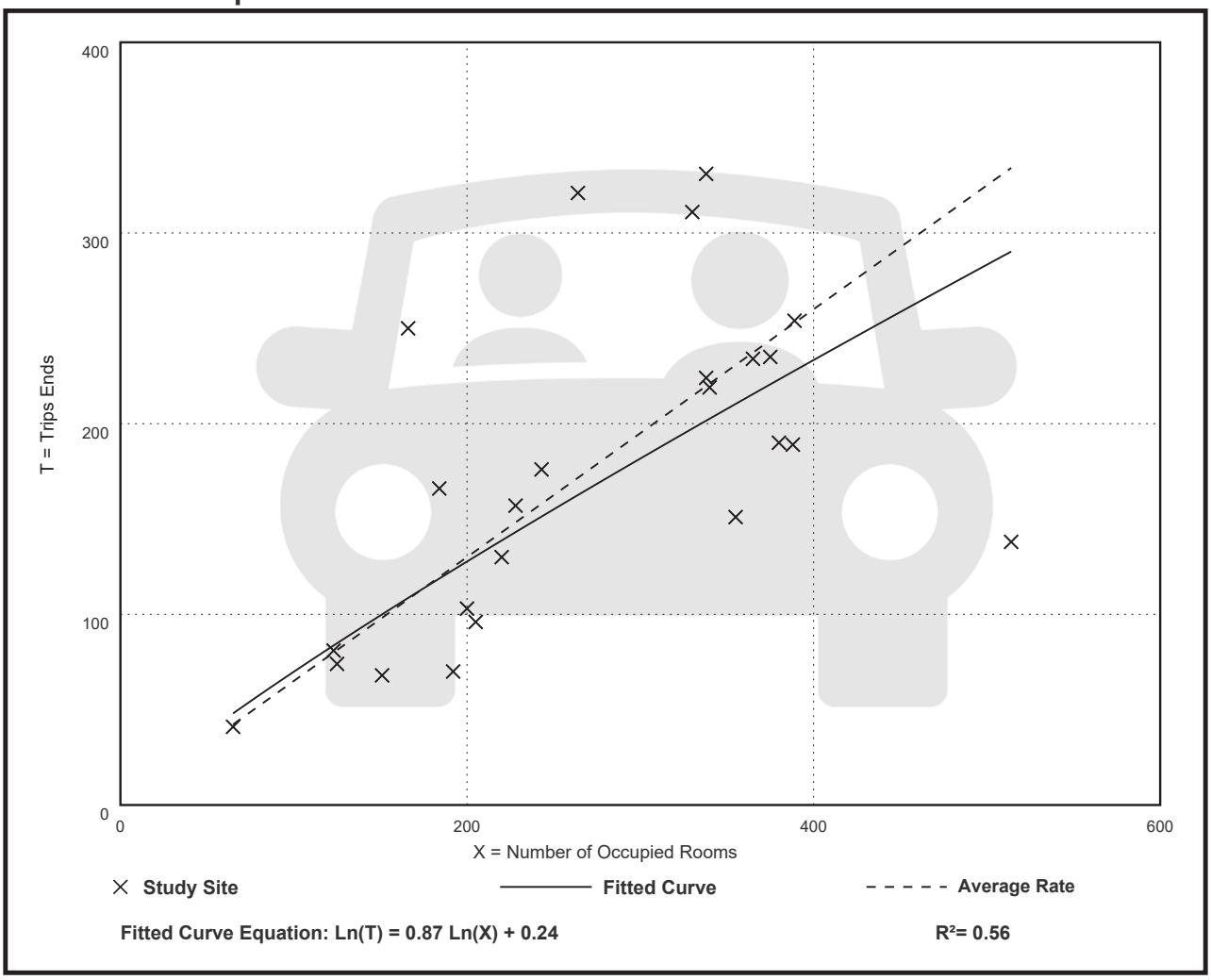
Vehicle Trip Ends vs: Occupied Rooms
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 24
Avg. Num. of Occupied Rooms: 270
Directional Distribution: 54% entering, 46% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
0.65	0.27 - 1.51	0.26

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.87 Ln(X) + 0.24

R^2= 0.56

Hotel
(310)

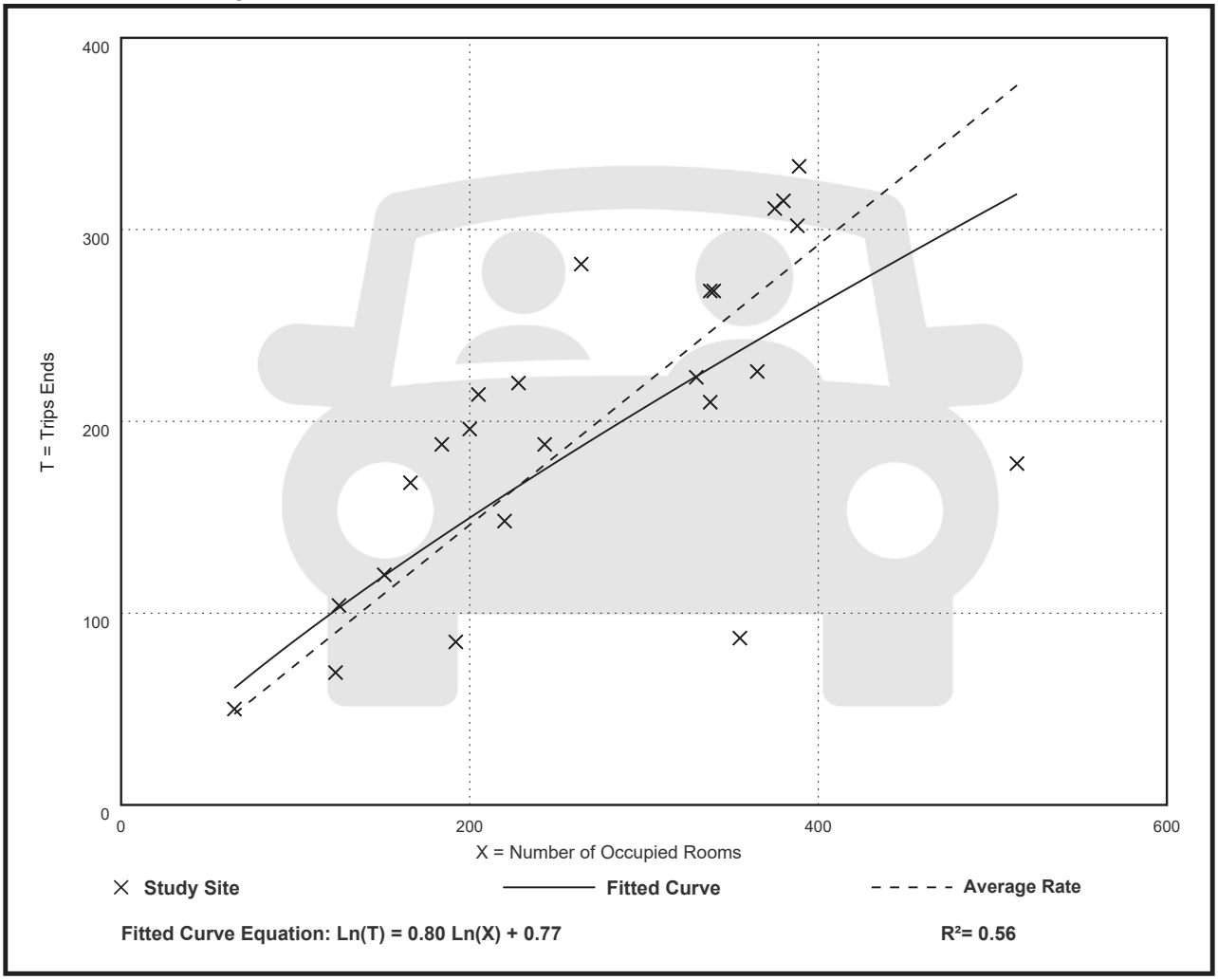
Vehicle Trip Ends vs: Occupied Rooms
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 24
Avg. Num. of Occupied Rooms: 270
Directional Distribution: 57% entering, 43% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
0.73	0.25 - 1.07	0.22

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.80 Ln(X) + 0.77

R^2= 0.56

Hotel
(310)

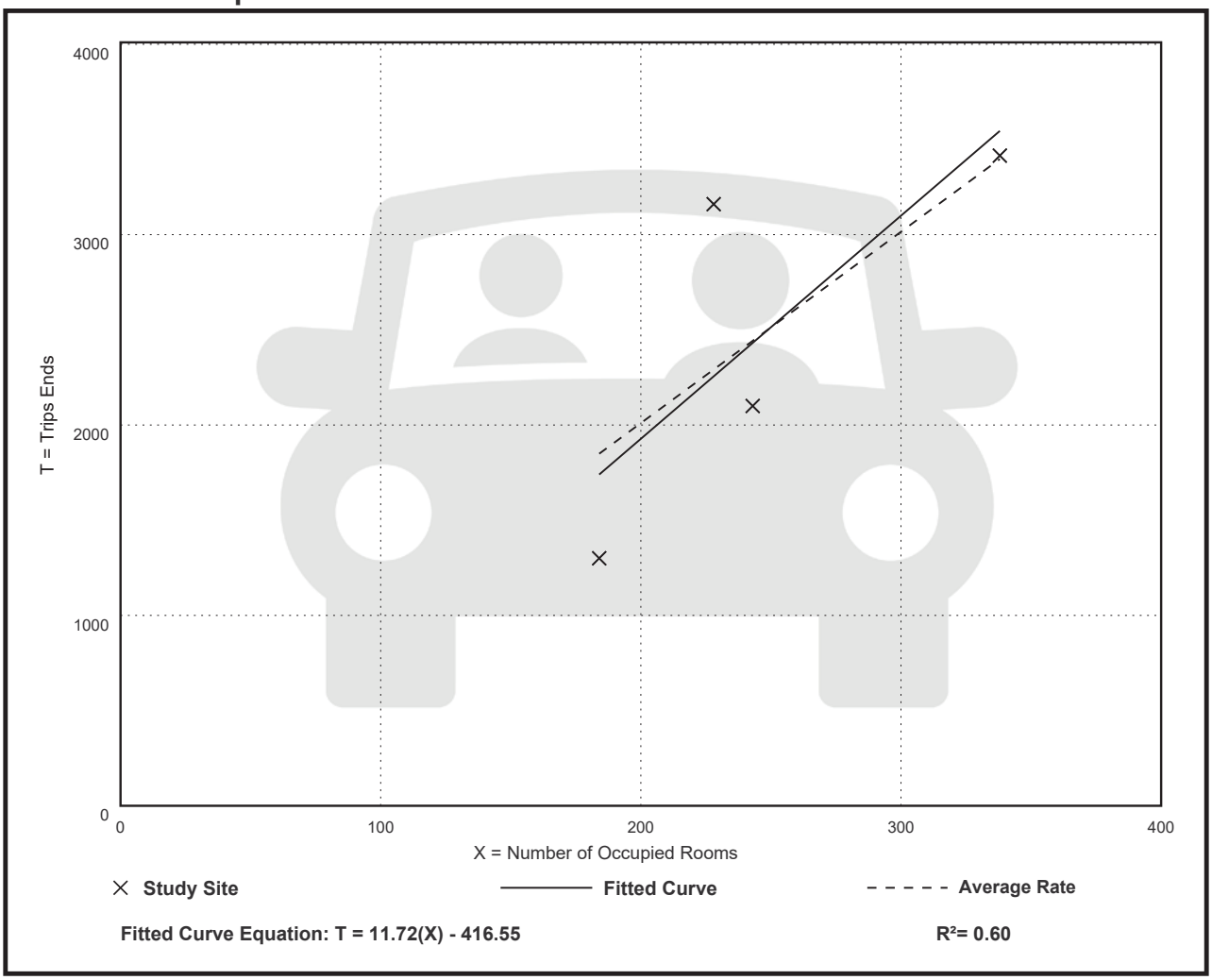
Vehicle Trip Ends vs: Occupied Rooms
On a: Saturday

Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. Num. of Occupied Rooms: 248
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
10.05	7.07 - 13.86	2.70

Data Plot and Equation



Fitted Curve Equation: T = 11.72(X) - 416.55

R^2= 0.60

Hotel
(310)

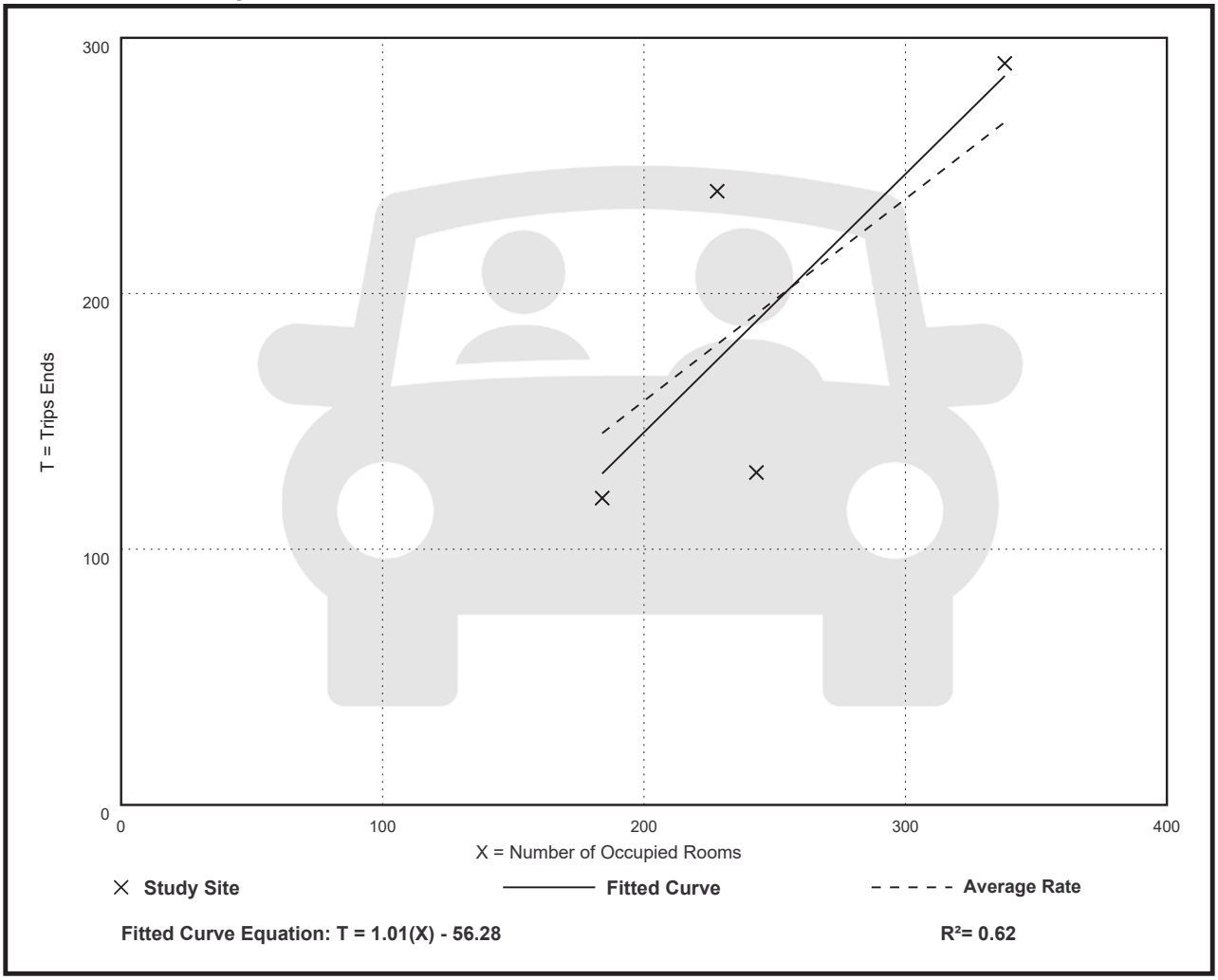
Vehicle Trip Ends vs: Occupied Rooms
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. Num. of Occupied Rooms: 248
Directional Distribution: 45% entering, 55% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
0.79	0.53 - 1.05	0.22

Data Plot and Equation



Fitted Curve Equation: T = 1.01(X) - 56.28

R^2= 0.62

Hotel
(310)

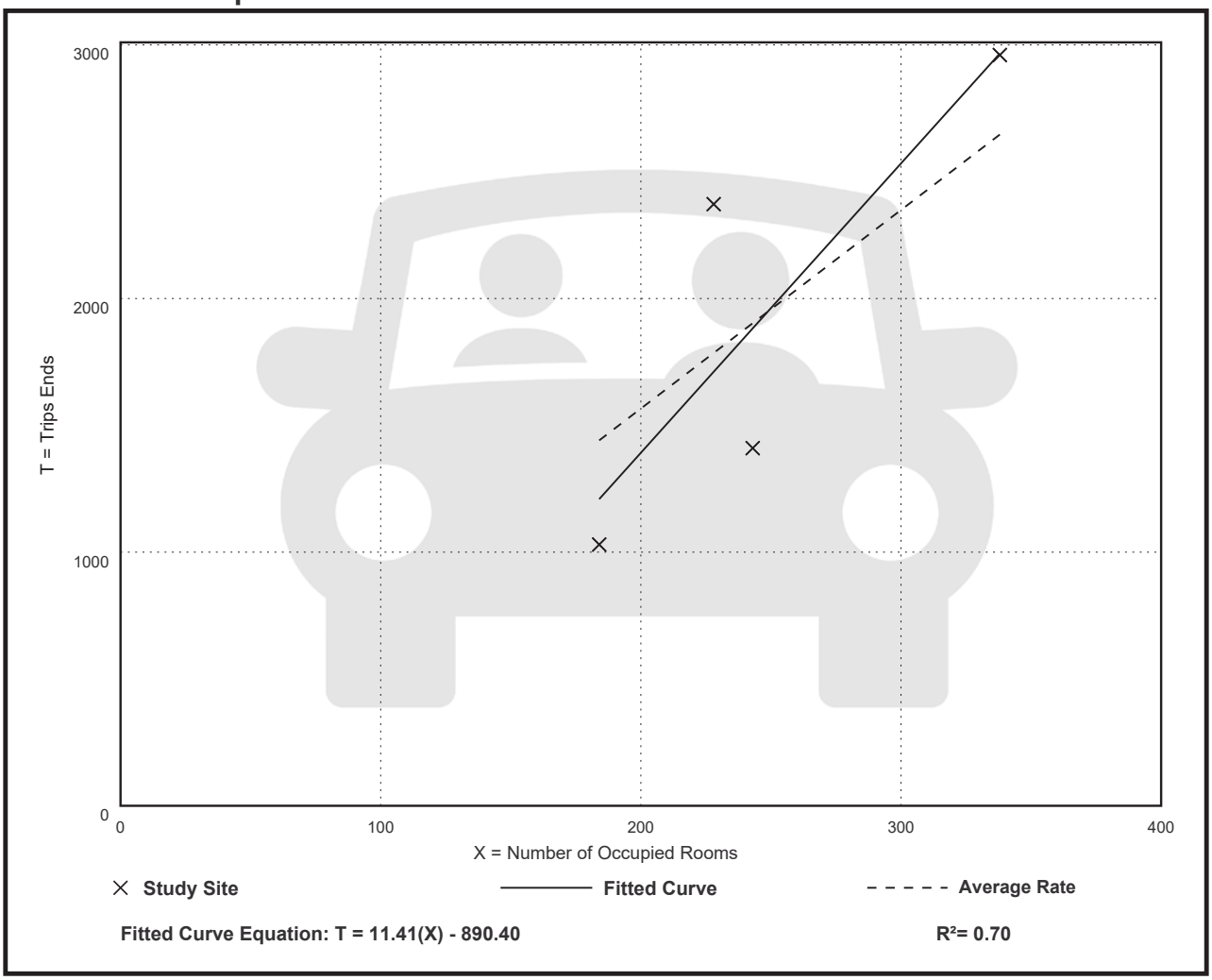
Vehicle Trip Ends vs: Occupied Rooms
On a: Sunday

Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. Num. of Occupied Rooms: 248
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
7.83	5.60 - 10.40	2.23

Data Plot and Equation



Fitted Curve Equation: T = 11.41(X) - 890.40

R^2= 0.70

Hotel
(310)

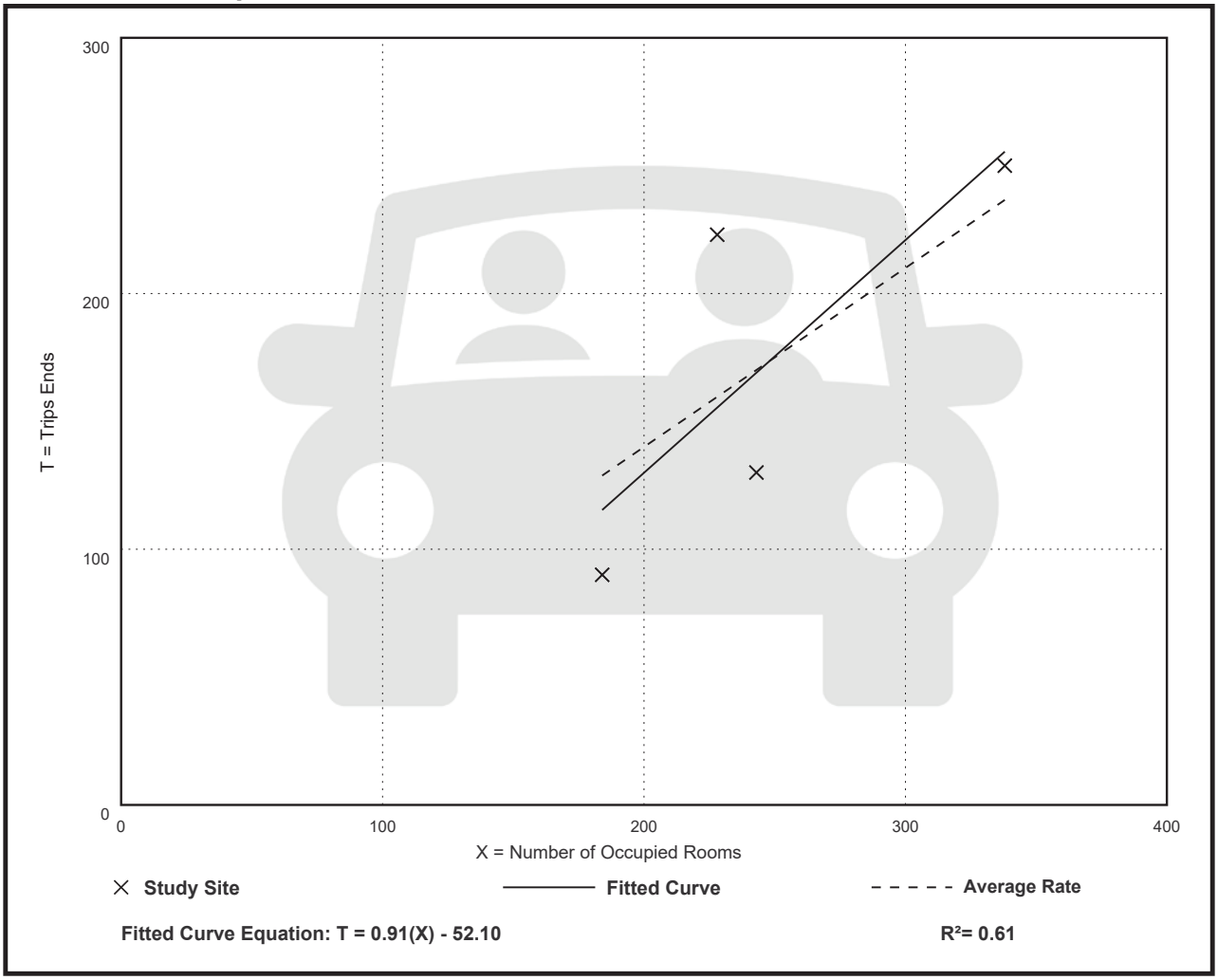
Vehicle Trip Ends vs: Occupied Rooms
On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 4
Avg. Num. of Occupied Rooms: 248
Directional Distribution: 53% entering, 47% exiting

Vehicle Trip Generation per Occupied Room

Average Rate	Range of Rates	Standard Deviation
0.70	0.49 - 0.98	0.21

Data Plot and Equation



Fitted Curve Equation: T = 0.91(X) - 52.10

R^2= 0.61

Hotel
(310)

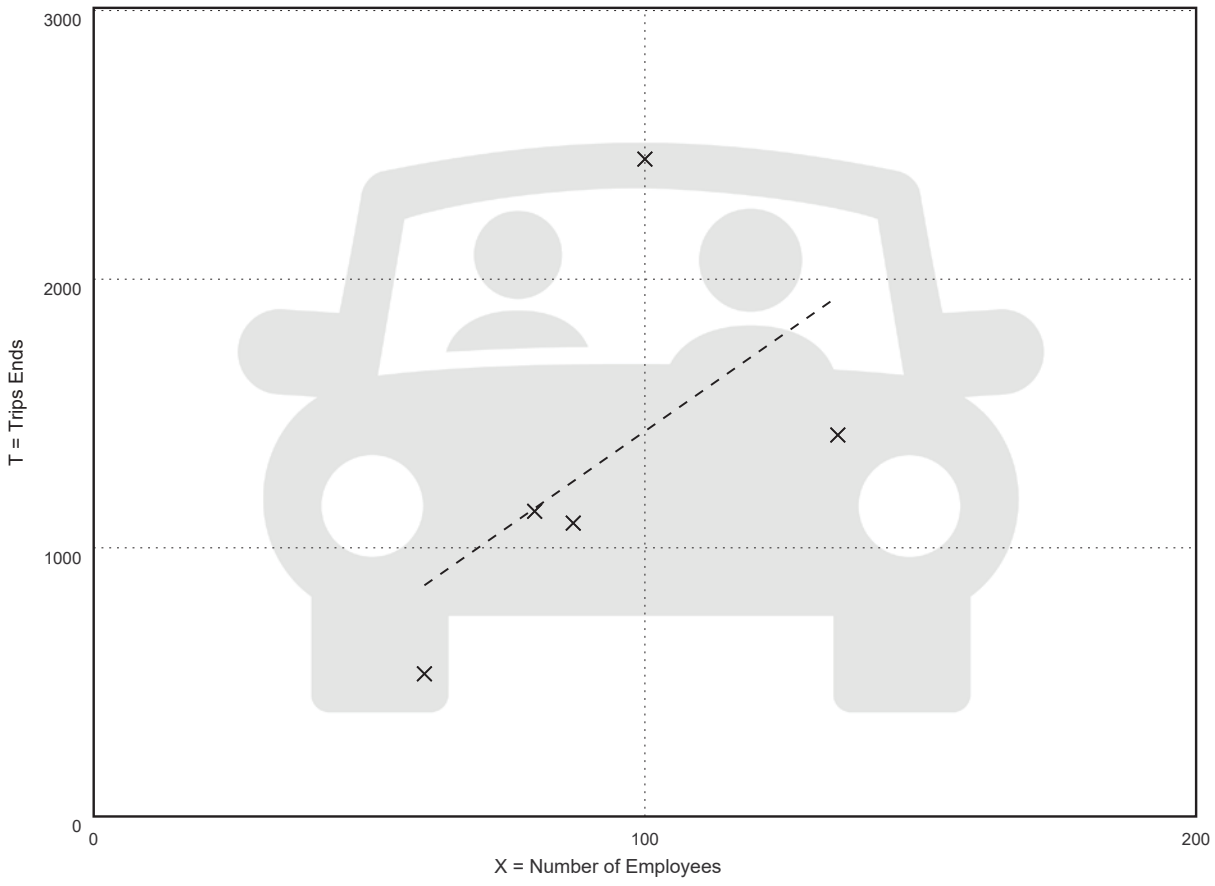
Vehicle Trip Ends vs: Employees
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Employees: 92
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
14.34	8.85 - 24.47	6.22

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ***

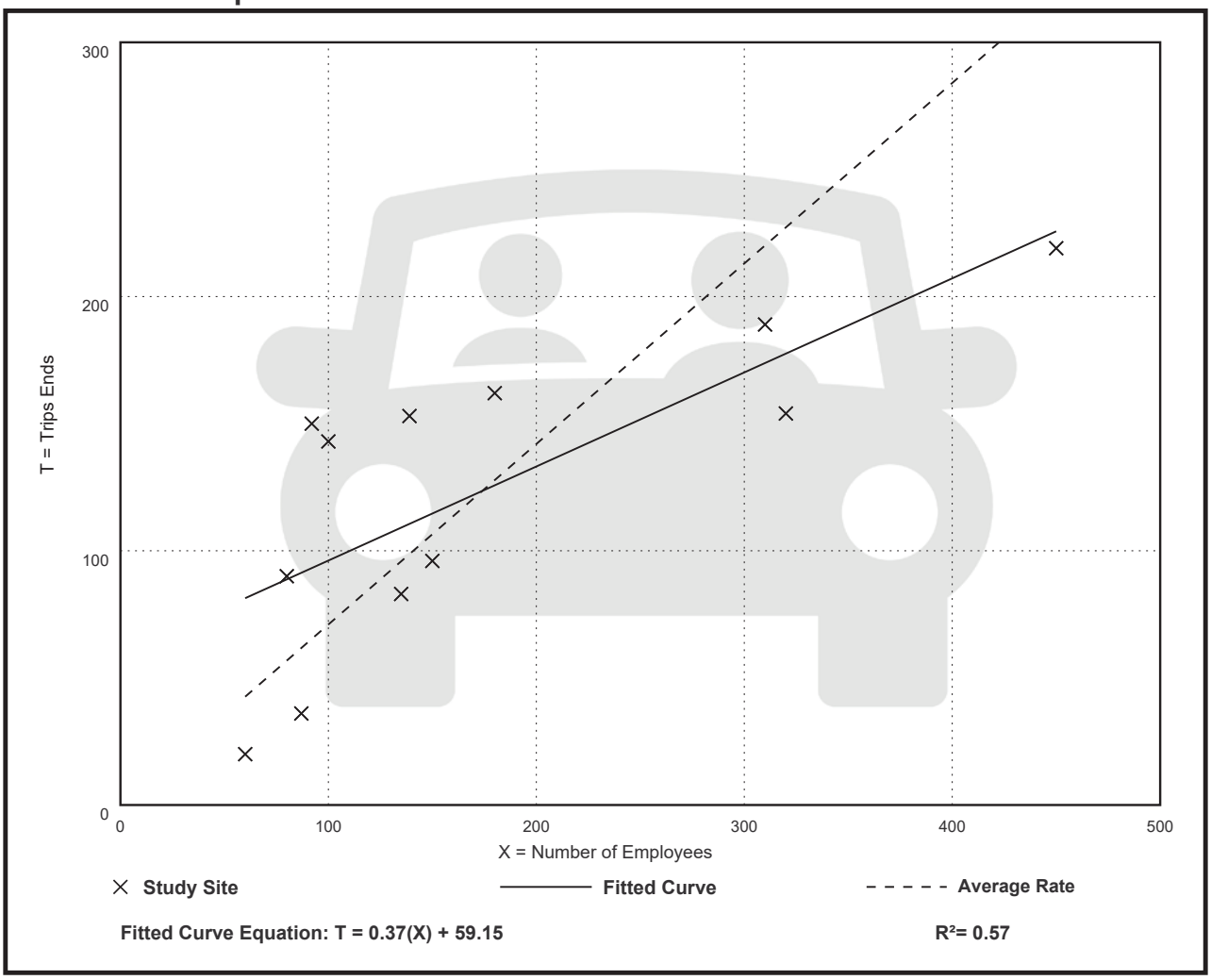
Hotel
(310)

Vehicle Trip Ends vs: Employees
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: 12
Avg. Num. of Employees: 175
Directional Distribution: 59% entering, 41% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.71	0.33 - 1.63	0.35

Data Plot and Equation



Fitted Curve Equation: T = 0.37(X) + 59.15

R^2= 0.57

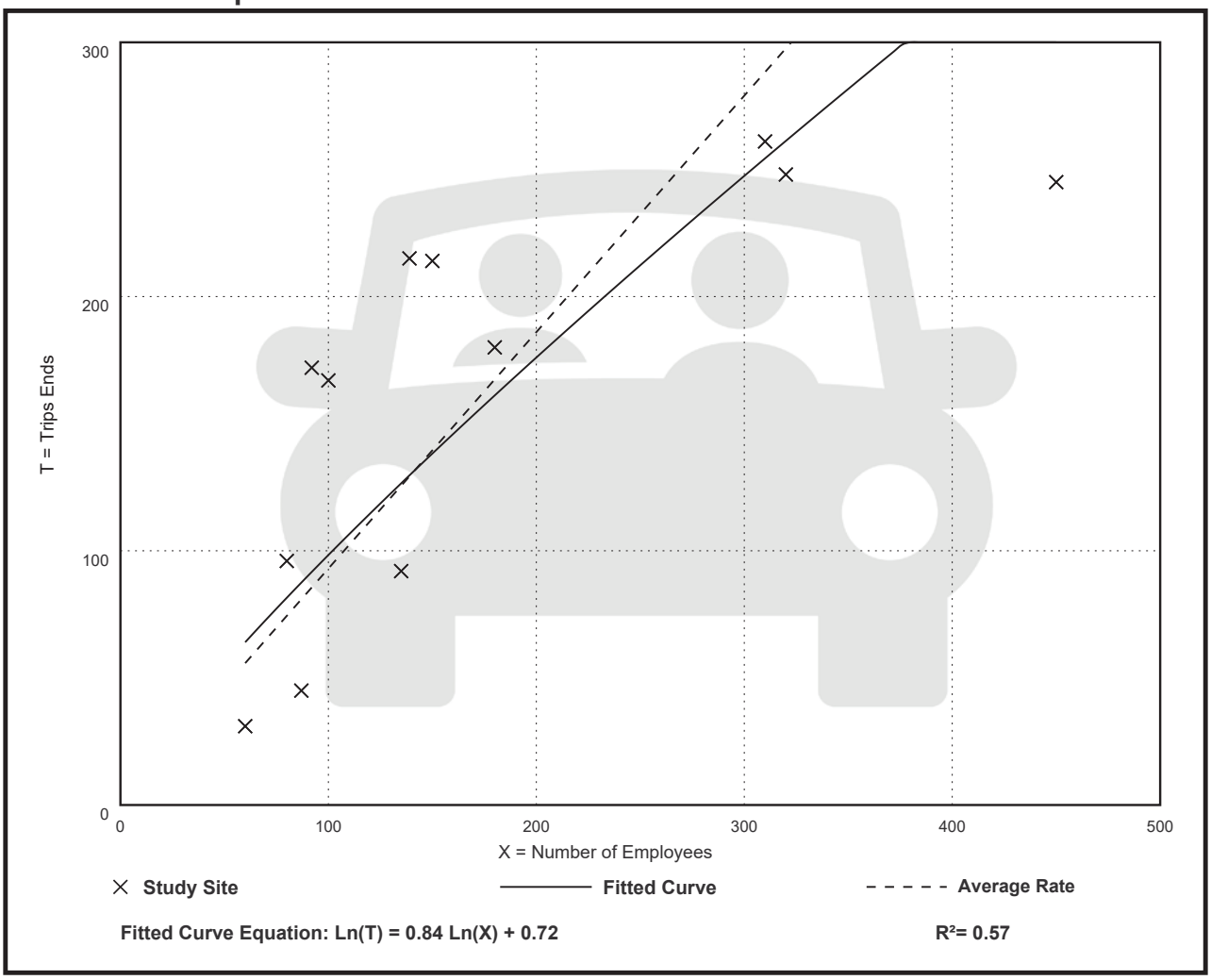
Hotel
(310)

Vehicle Trip Ends vs: Employees
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: 12
Avg. Num. of Employees: 175
Directional Distribution: 54% entering, 46% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.93	0.52 - 1.87	0.42

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.84 Ln(X) + 0.72

R^2= 0.57

Hotel
(310)

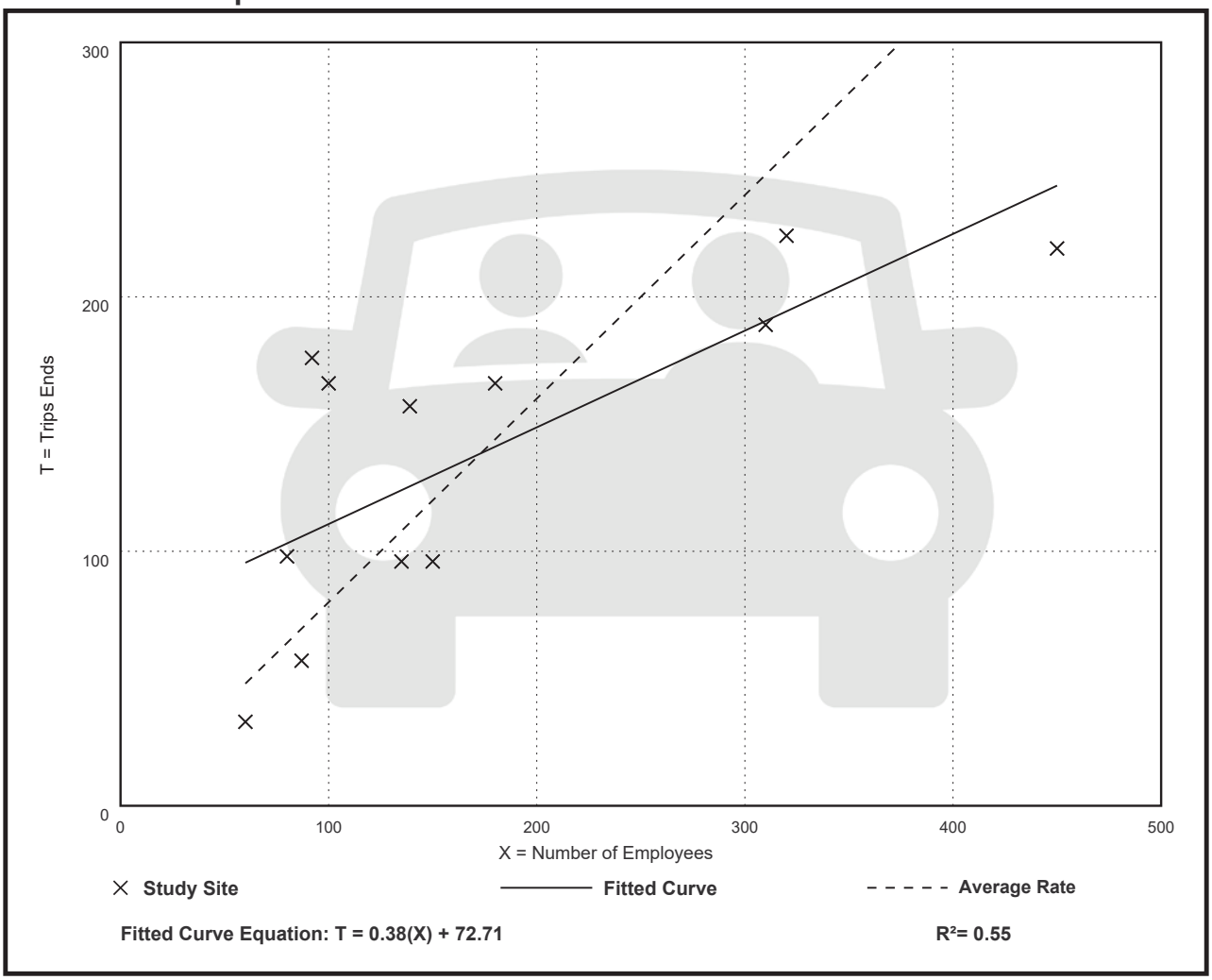
Vehicle Trip Ends vs: Employees
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 12
Avg. Num. of Employees: 175
Directional Distribution: 55% entering, 45% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.80	0.49 - 1.91	0.39

Data Plot and Equation



Fitted Curve Equation: T = 0.38(X) + 72.71

R^2= 0.55

Hotel
(310)

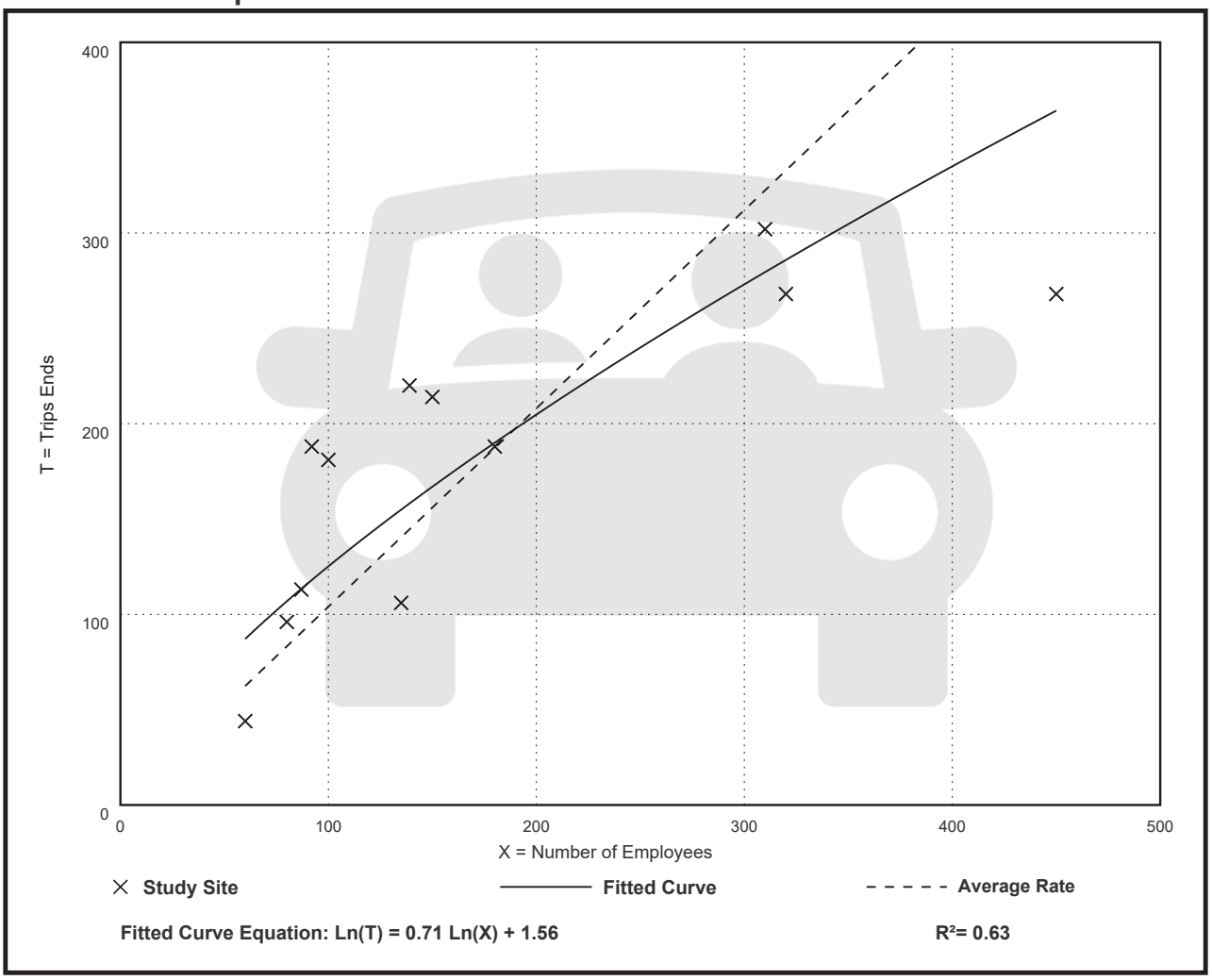
Vehicle Trip Ends vs: Employees
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 12
Avg. Num. of Employees: 175
Directional Distribution: 59% entering, 41% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.04	0.60 - 2.04	0.42

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.71 Ln(X) + 1.56

R^2= 0.63

Hotel
(310)

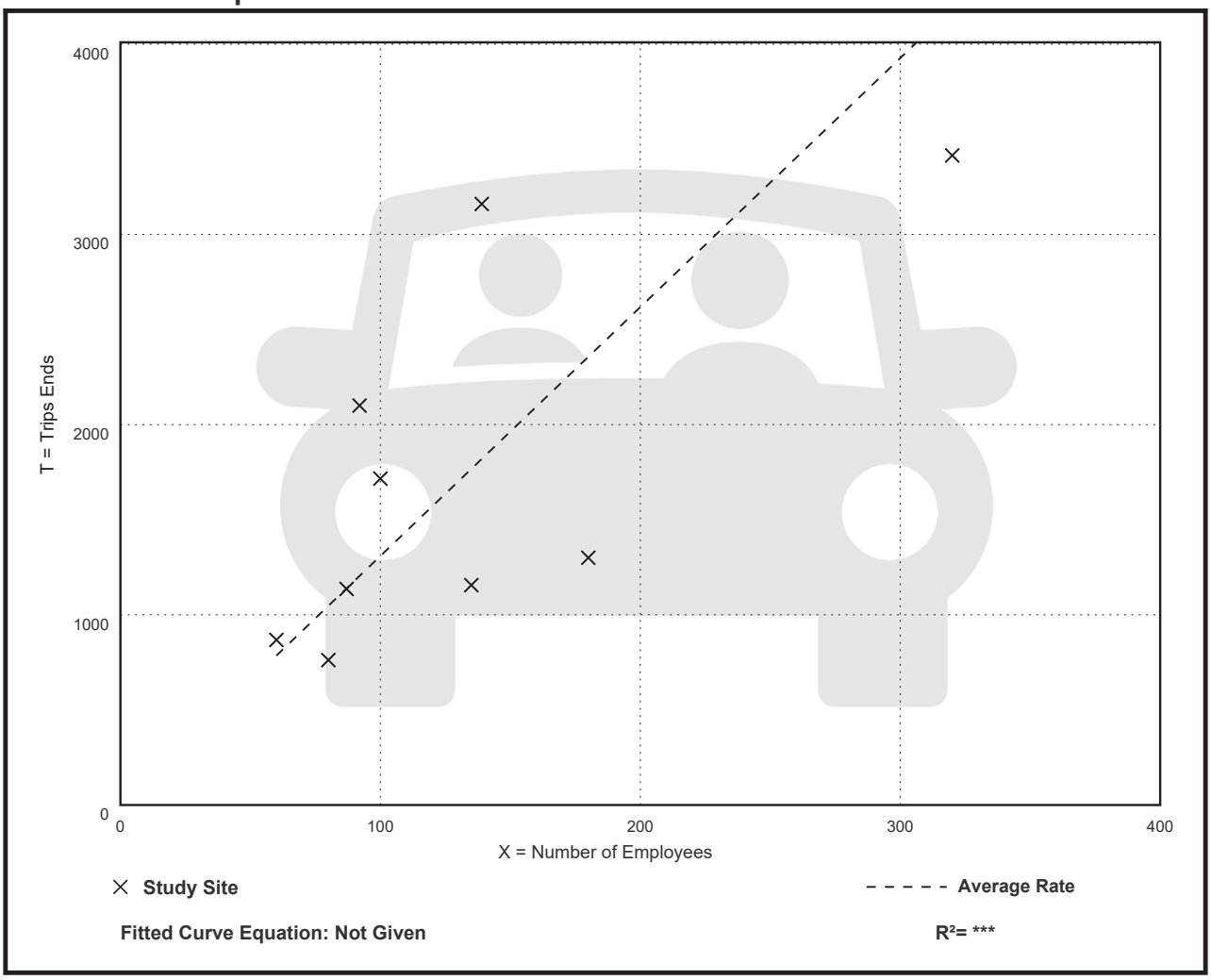
Vehicle Trip Ends vs: Employees
On a: Saturday

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Employees: 133
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
13.09	7.22 - 22.83	5.77

Data Plot and Equation



Hotel
(310)

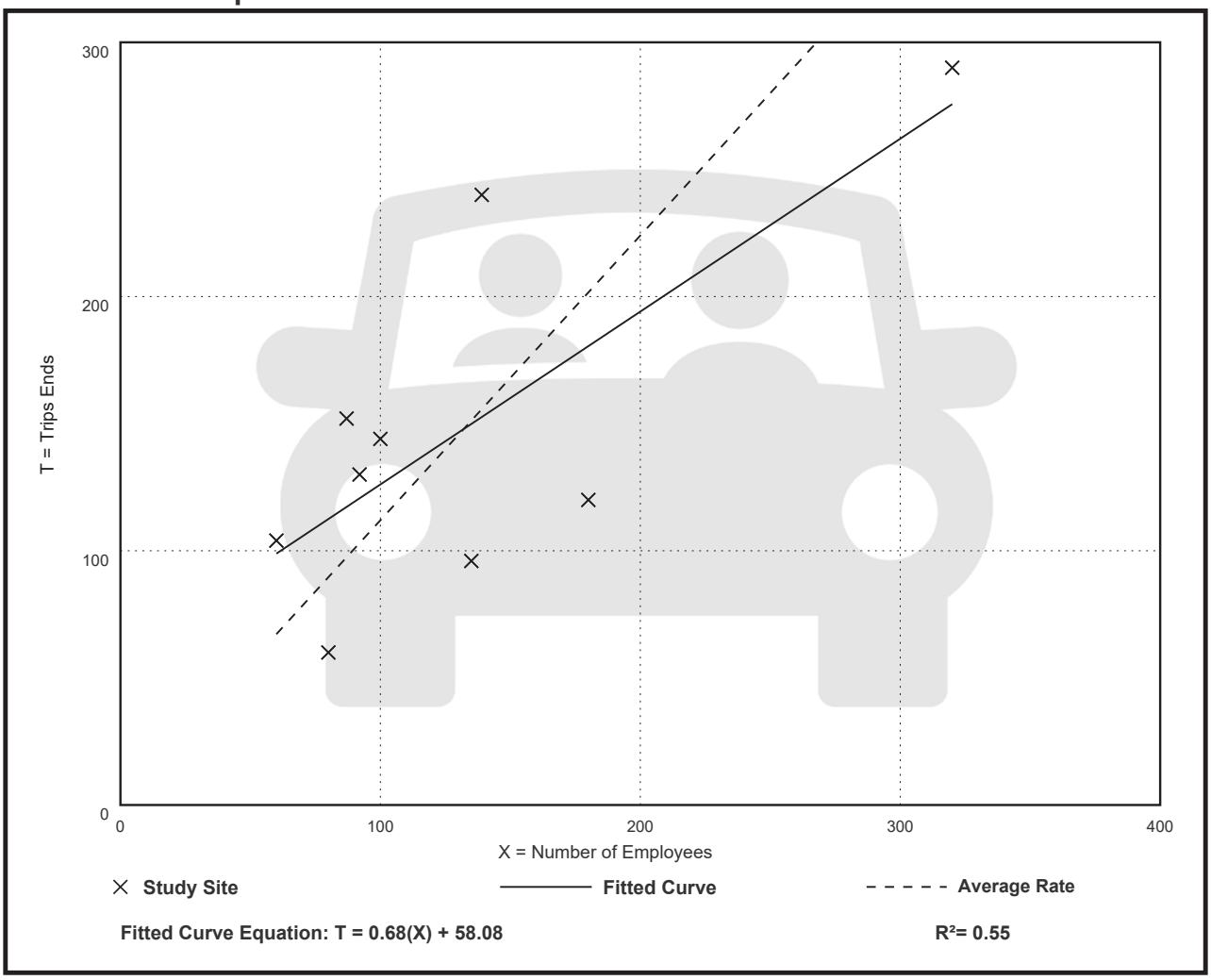
Vehicle Trip Ends vs: Employees
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Employees: 133
Directional Distribution: 54% entering, 46% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
1.12	0.67 - 1.75	0.45

Data Plot and Equation



Fitted Curve Equation: T = 0.68(X) + 58.08

R^2= 0.55

Hotel
(310)

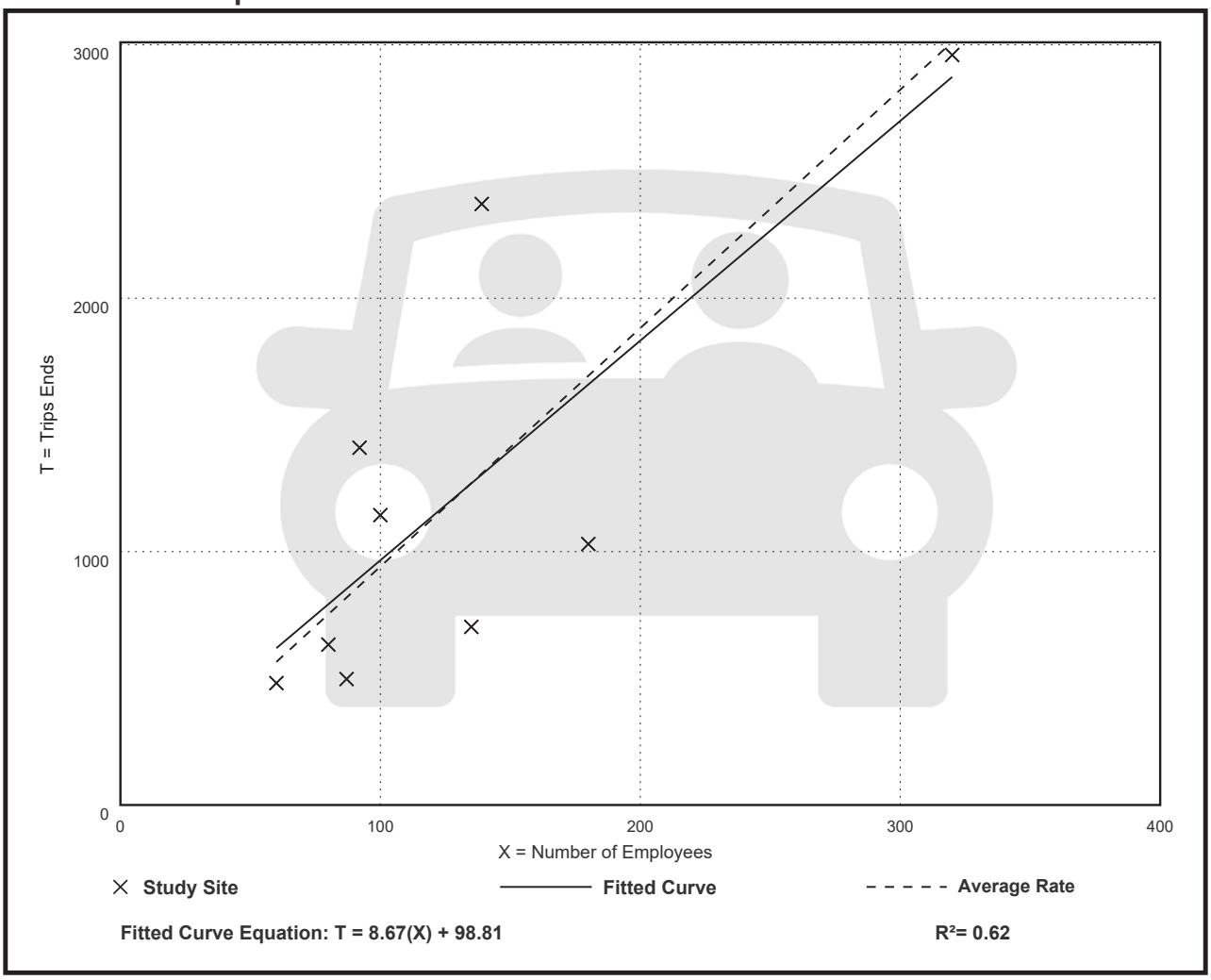
Vehicle Trip Ends vs: Employees
On a: Sunday

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Employees: 133
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
9.41	5.21 - 17.06	4.13

Data Plot and Equation



Fitted Curve Equation: T = 8.67(X) + 98.81

R^2= 0.62

Hotel
(310)

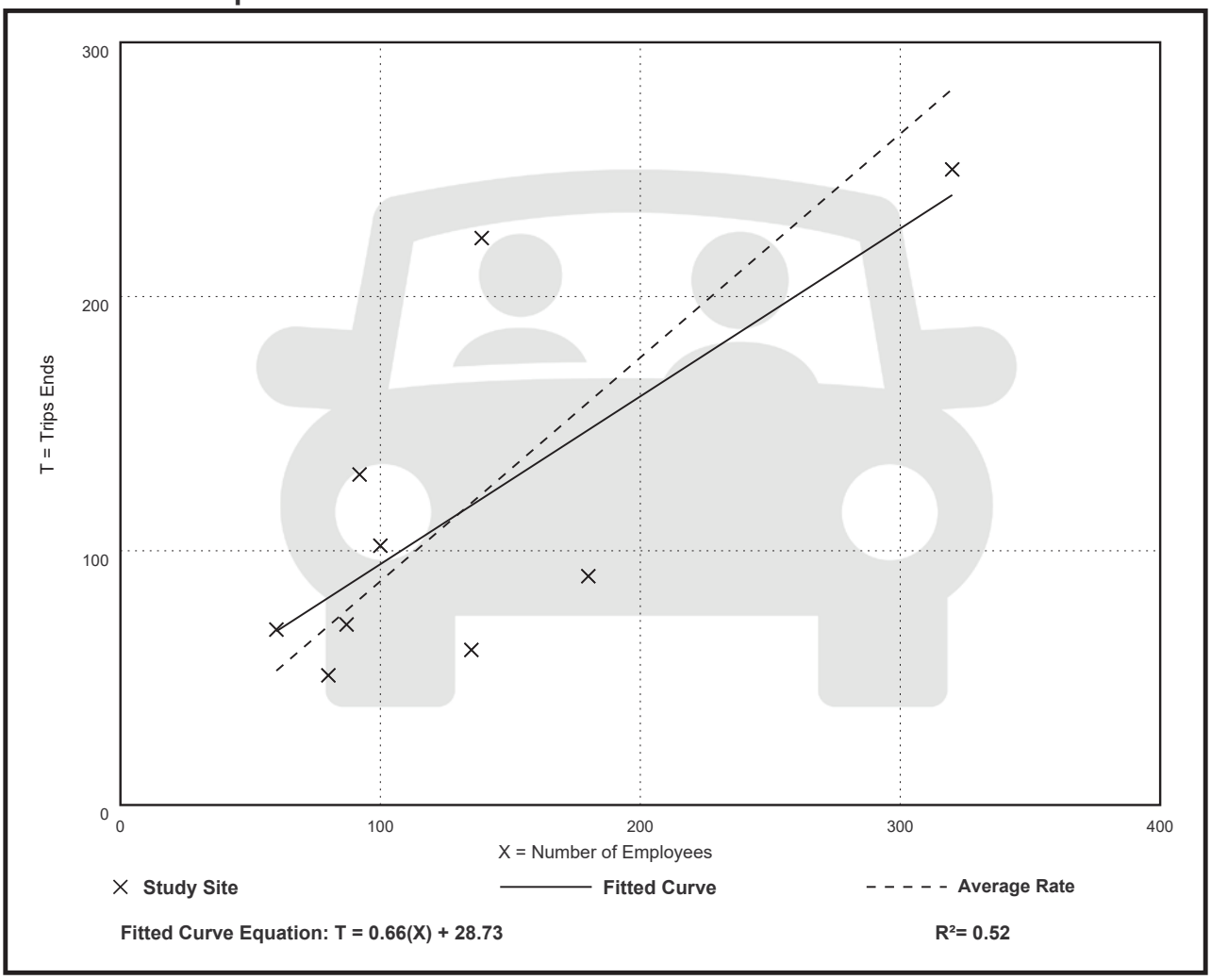
Vehicle Trip Ends vs: Employees
On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Employees: 133
Directional Distribution: 47% entering, 53% exiting

Vehicle Trip Generation per Employee

Average Rate	Range of Rates	Standard Deviation
0.88	0.45 - 1.60	0.39

Data Plot and Equation



Fitted Curve Equation: T = 0.66(X) + 28.73

R^2= 0.52

Employee Housing (Land Use Code 220: Residential, Multi-Family Housing Low Rise)

Follows this page

Land Use: 220
Multifamily Housing (Low-Rise)

Description

Low-rise multifamily housing includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have two or three floors (levels). Various configurations fit this description, including walkup apartment, mansion apartment, and stacked townhouse.

- A walkup apartment typically is two or three floors in height with dwelling units that are accessed by a single or multiple entrances with stairways and hallways.

- A mansion apartment is a single structure that contains several apartments within what appears to be a single-family dwelling unit.

- A fourplex is a single two-story structure with two matching dwelling units on the ground and second floors. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

- A stacked townhouse is designed to match the external appearance of a townhouse. But, unlike a townhouse dwelling unit that only shares walls with an adjoining unit, the stacked townhouse units share both floors and walls. Access to the individual units is typically internal to the structure and provided through a central entry and stairway.

Multifamily housing (mid-rise) (Land Use 221), multifamily housing (high-rise) (Land Use 222), affordable housing (Land Use 223), and off-campus student apartment (low-rise) (Land Use 225) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the three sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.72 residents per occupied dwelling unit.

For the two sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96.2 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip

generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

For the three sites for which data were provided for both occupied dwelling units and residents, there was an average of 2.72 residents per occupied dwelling unit.

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1980s, the 1990s, the 2000s, the 2010s, and the 2020s in British Columbia (CAN), California, Delaware, Florida, Georgia, Illinois, Indiana, Maine, Maryland, Massachusetts, Minnesota, New Jersey, Ontario (CAN), Oregon, Pennsylvania, South Carolina, South Dakota, Tennessee, Texas, Utah, and Washington.

Source Numbers

188, 204, 237, 300, 305, 306, 320, 321, 357, 390, 412, 525, 530, 579, 583, 638, 864, 866, 896, 901, 903, 904, 936, 939, 944, 946, 947, 948, 963, 964, 966, 967, 1012, 1013, 1014, 1036, 1047, 1056, 1071, 1076

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

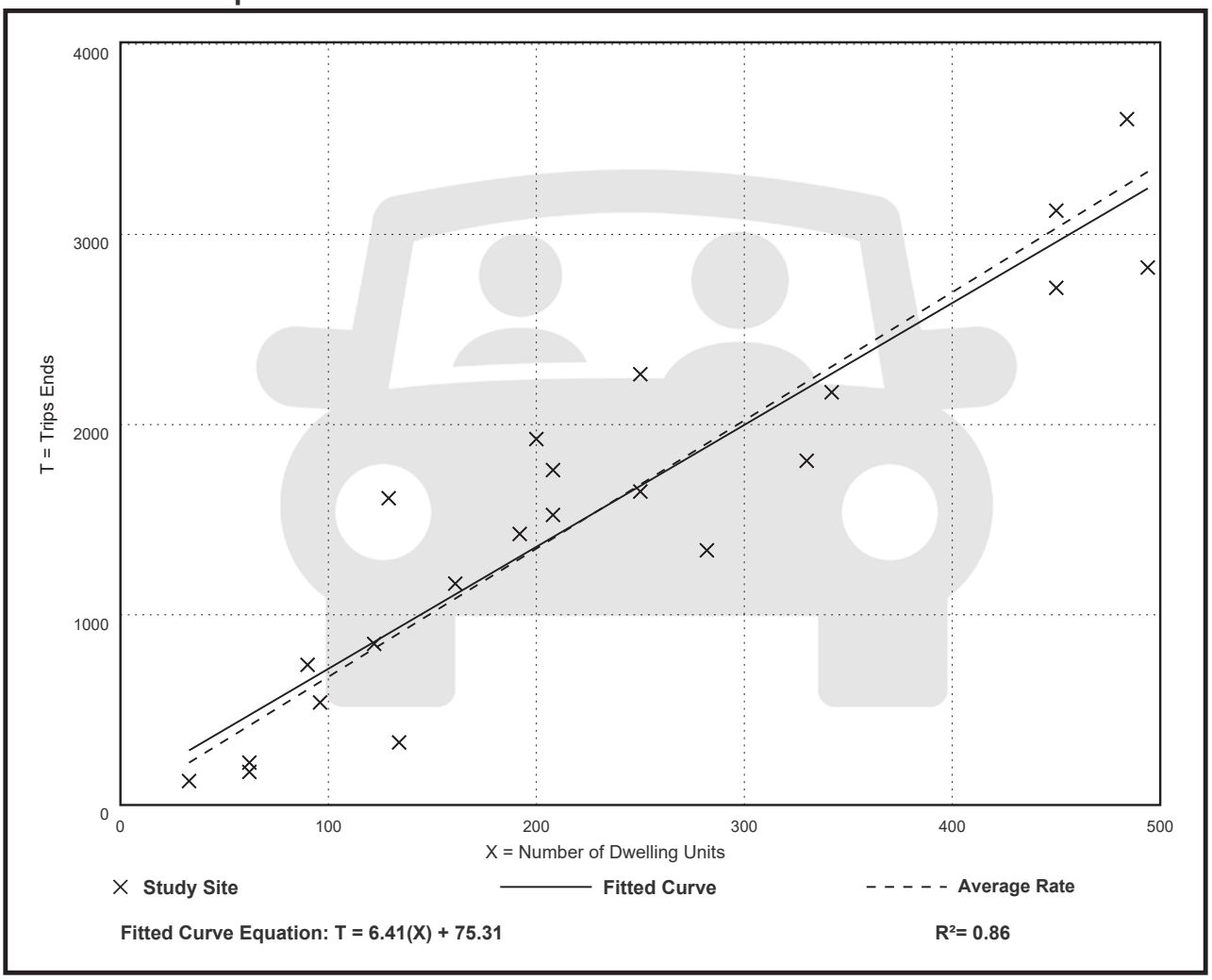
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 22
Avg. Num. of Dwelling Units: 229
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
6.74	2.46 - 12.50	1.79

Data Plot and Equation



Fitted Curve Equation: T = 6.41(X) + 75.31

R^2= 0.86

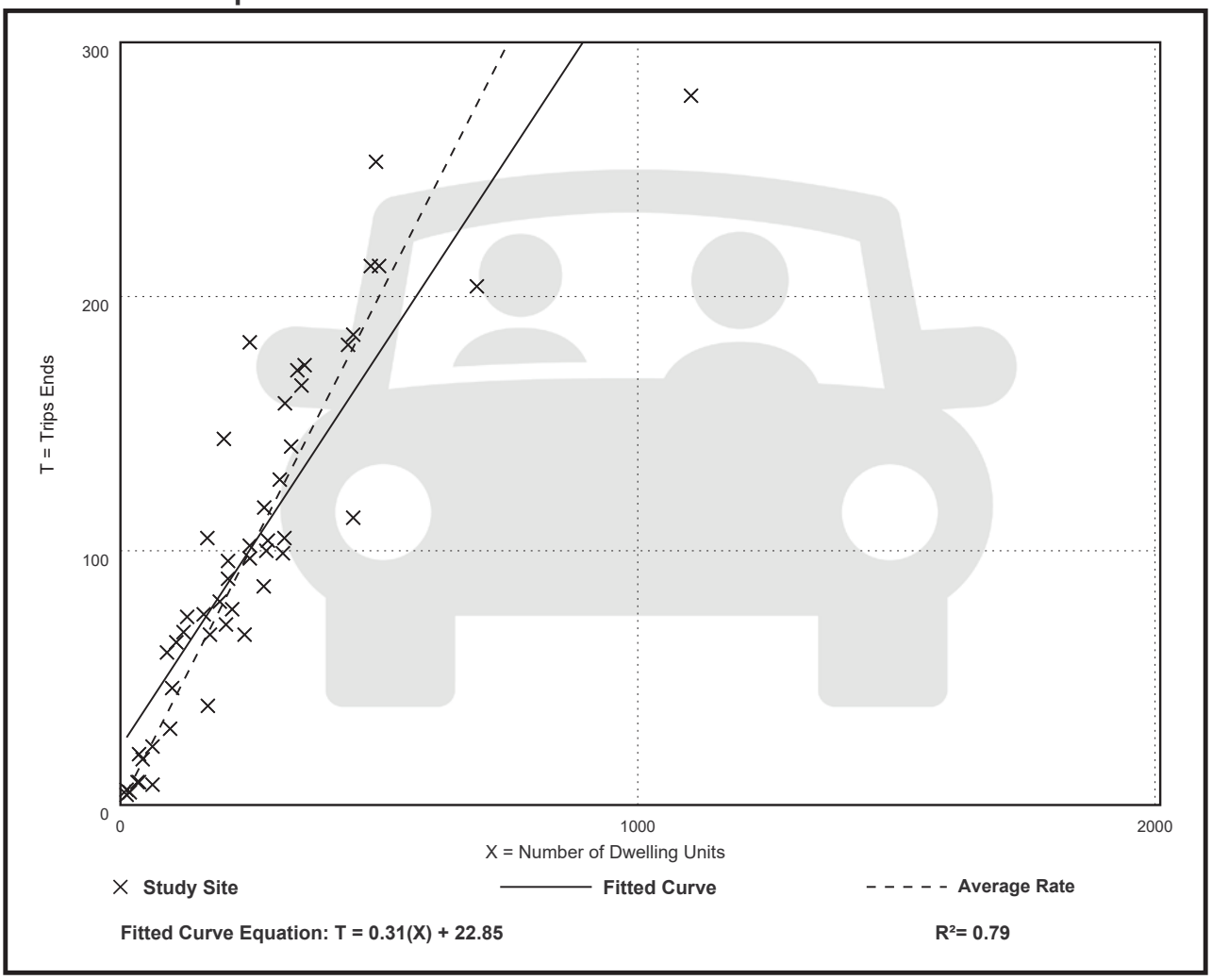
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
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: 49
Avg. Num. of Dwelling Units: 249
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.40	0.13 - 0.73	0.12

Data Plot and Equation



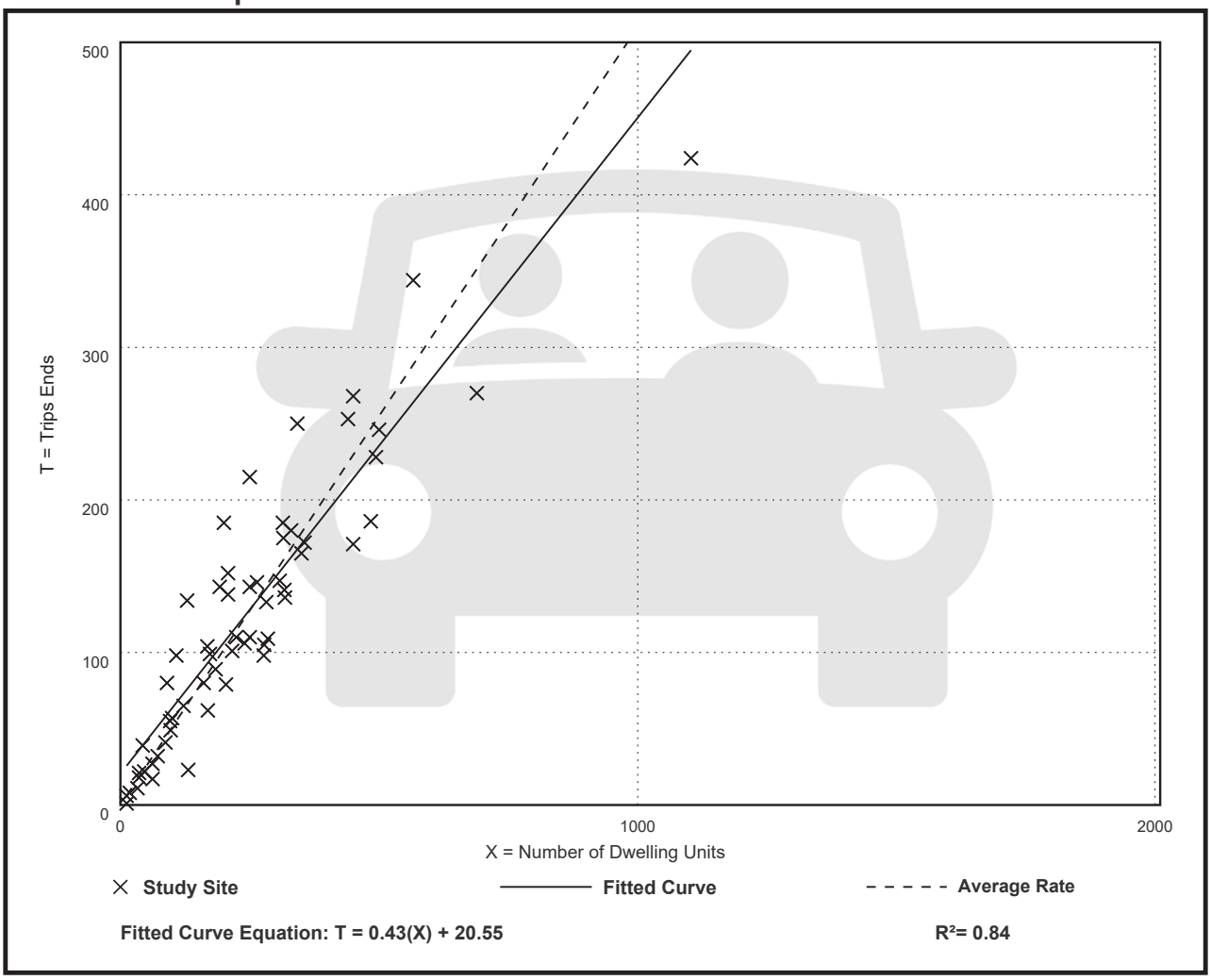
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
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: 59
Avg. Num. of Dwelling Units: 241
Directional Distribution: 63% entering, 37% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.51	0.08 - 1.04	0.15

Data Plot and Equation



Fitted Curve Equation: T = 0.43(X) + 20.55

R^2= 0.84

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

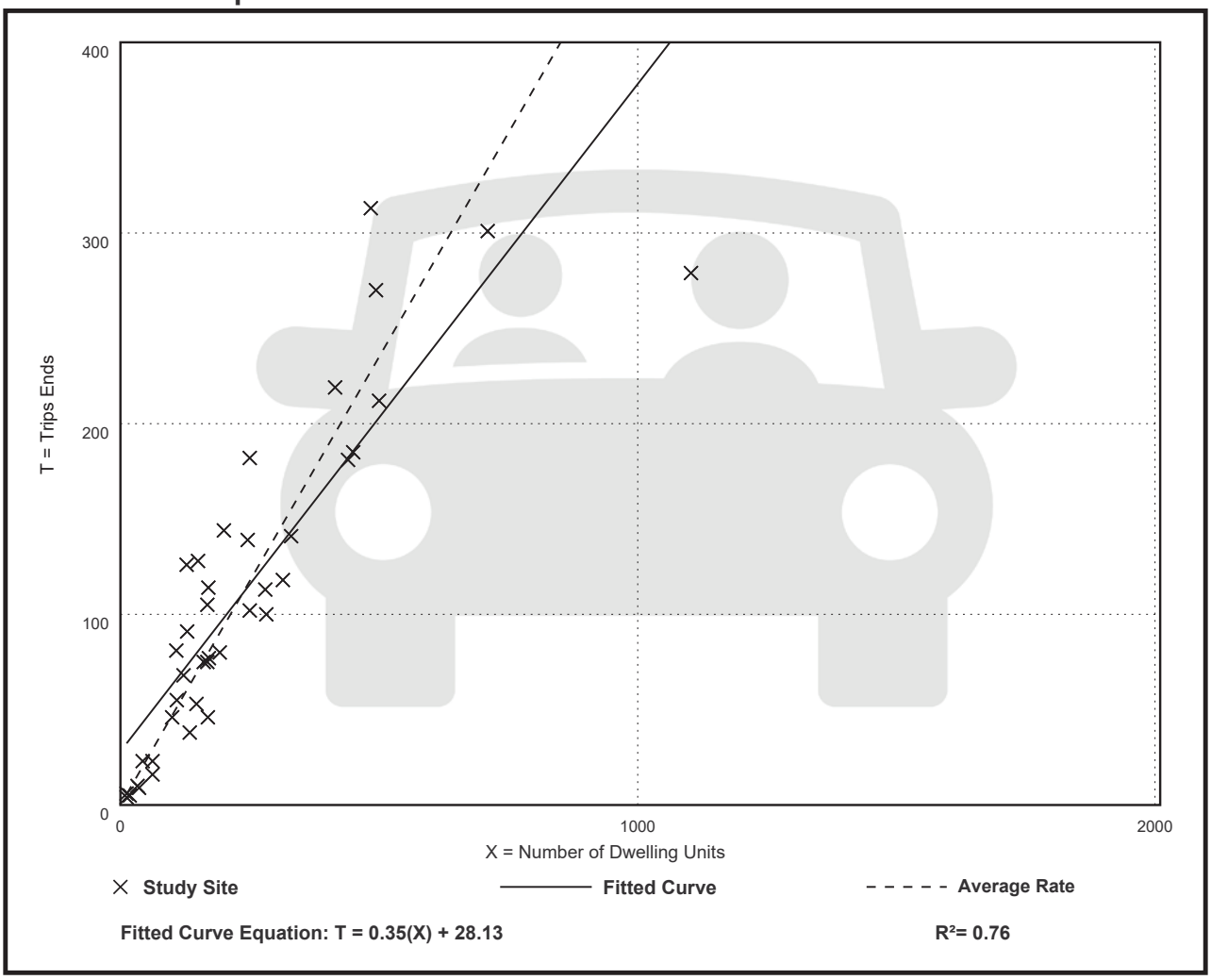
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 40
Avg. Num. of Dwelling Units: 234
Directional Distribution: 24% entering, 76% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.47	0.25 - 0.98	0.16

Data Plot and Equation



Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

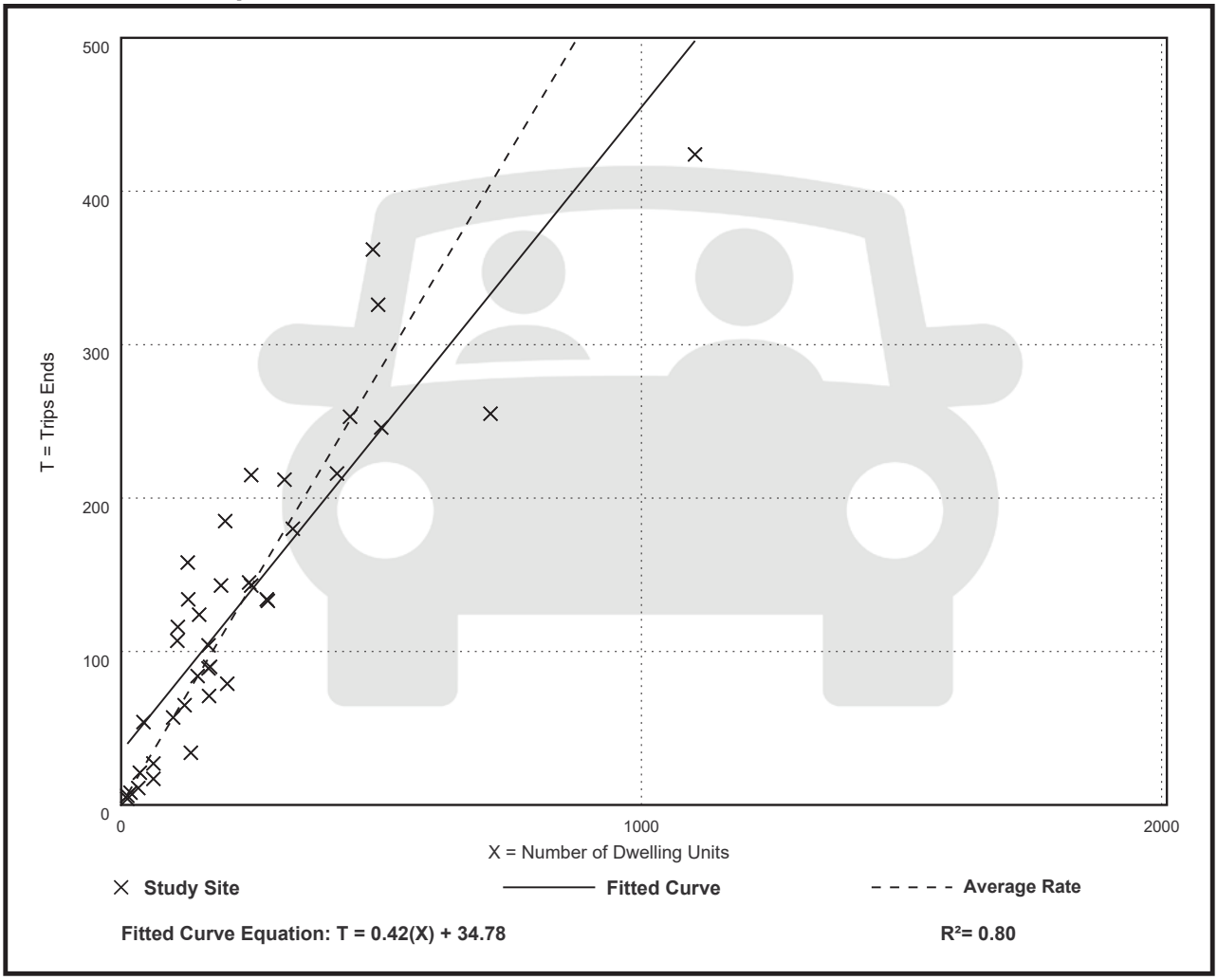
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 38
Avg. Num. of Dwelling Units: 231
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.25 - 1.26	0.20

Data Plot and Equation



Fitted Curve Equation: T = 0.42(X) + 34.78

R^2= 0.80

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Saturday

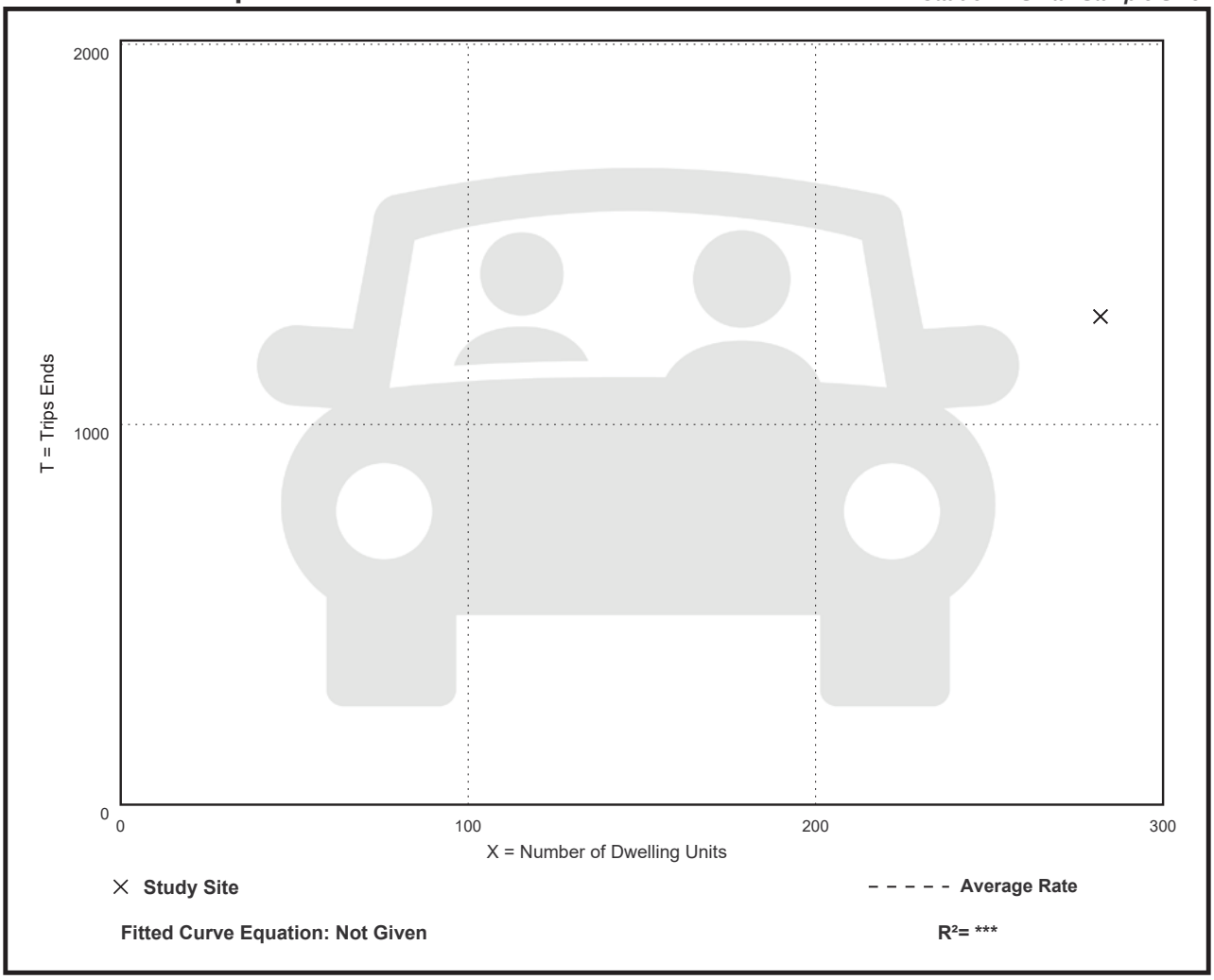
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 282
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.55	4.55 - 4.55	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= *

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Saturday, Peak Hour of Generator

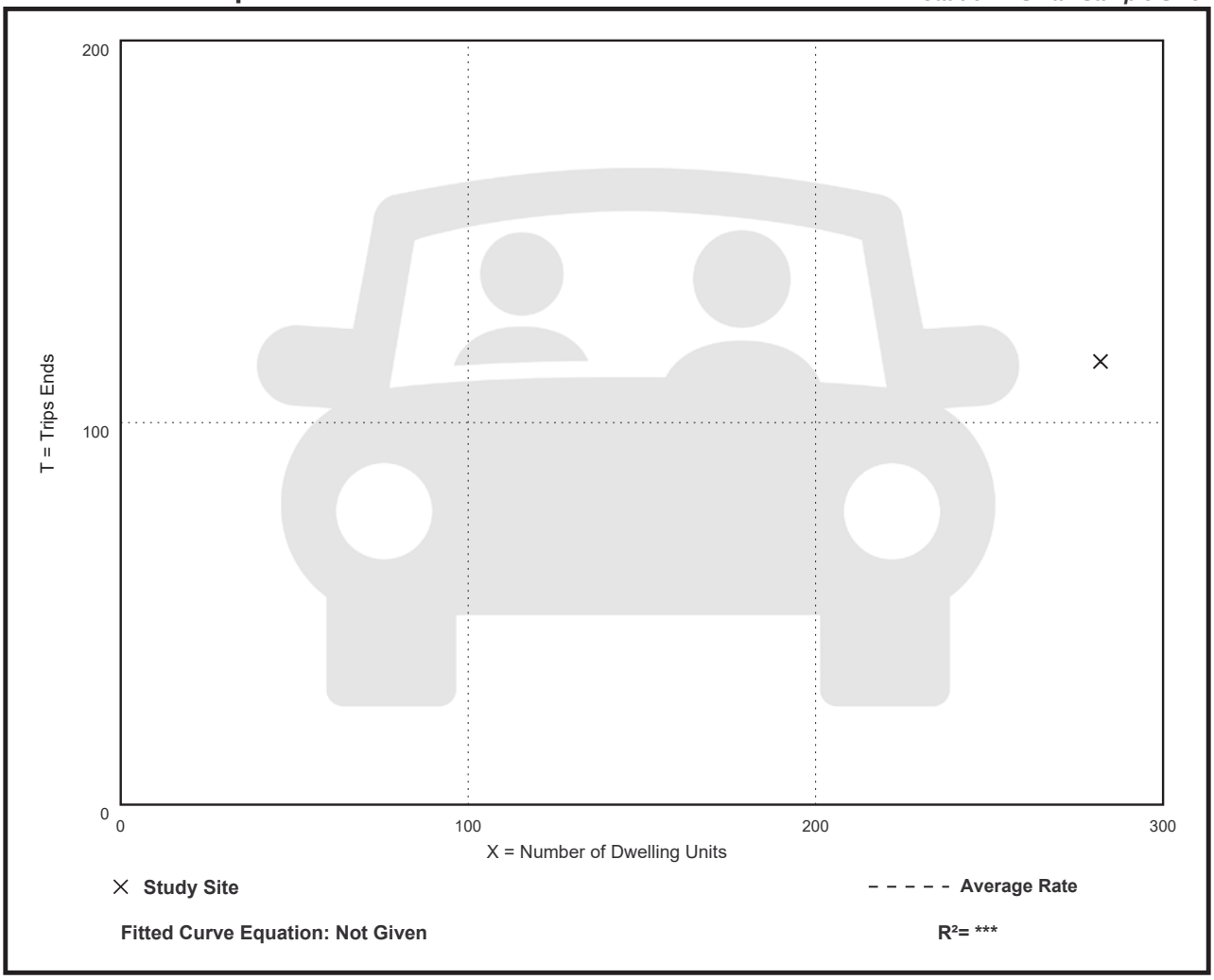
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 282
Directional Distribution: Not Available

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.41	0.41 - 0.41	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Sunday

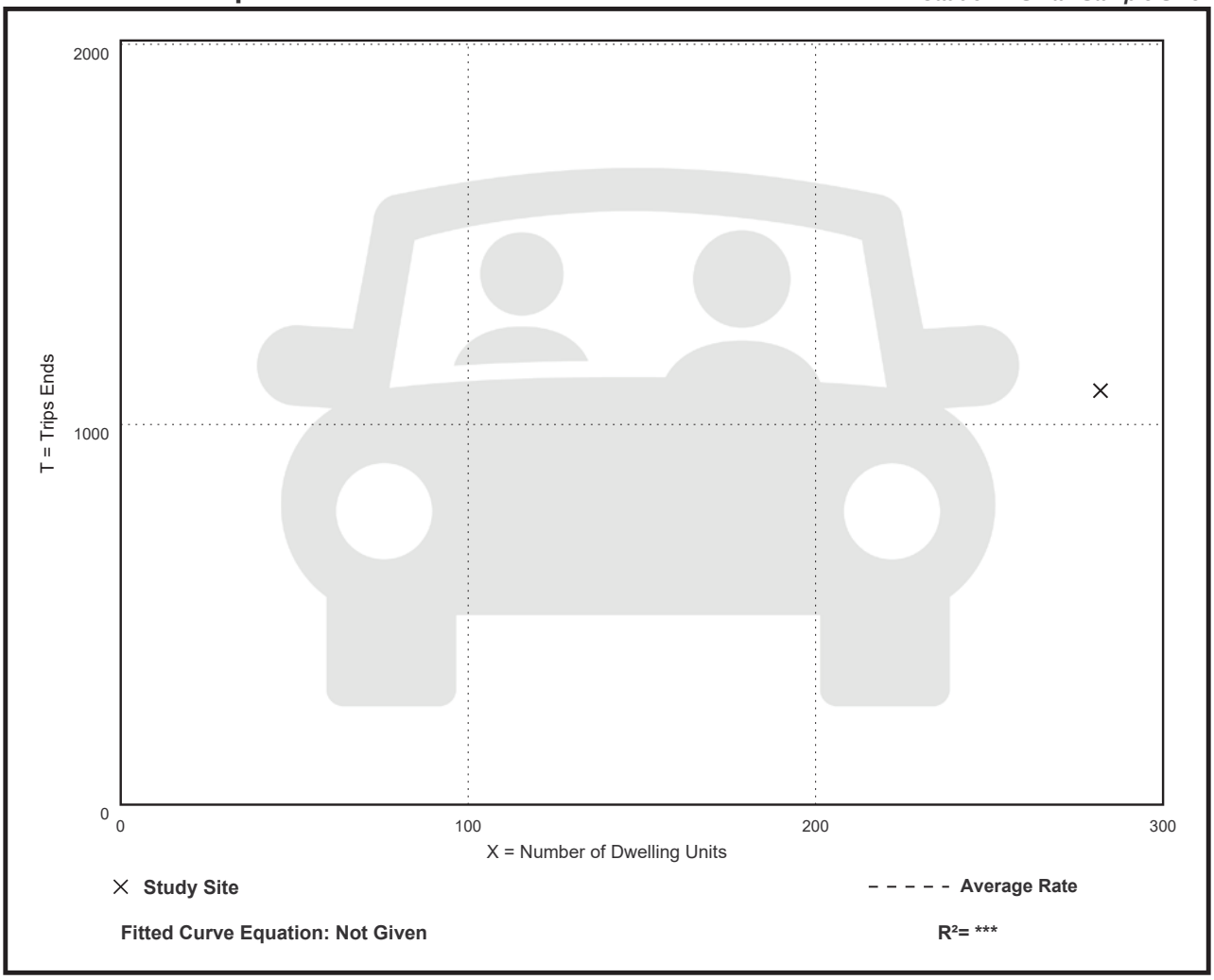
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 282
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
3.86	3.86 - 3.86	***

Data Plot and Equation

Caution – Small Sample Size



Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Sunday, Peak Hour of Generator

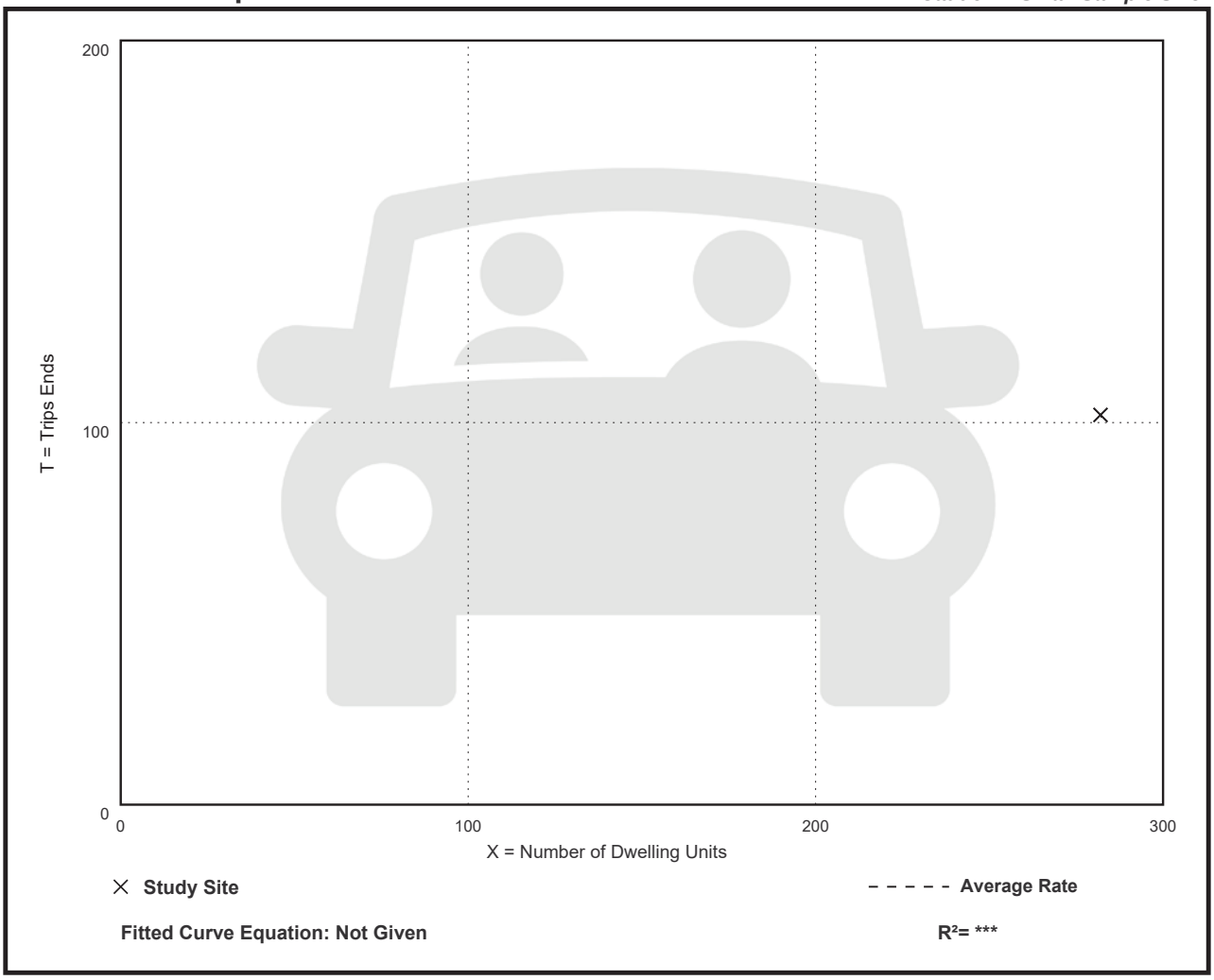
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 282
Directional Distribution: Not Available

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.36	0.36 - 0.36	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= *

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Vehicle Trip Ends vs: Residents
On a: Weekday

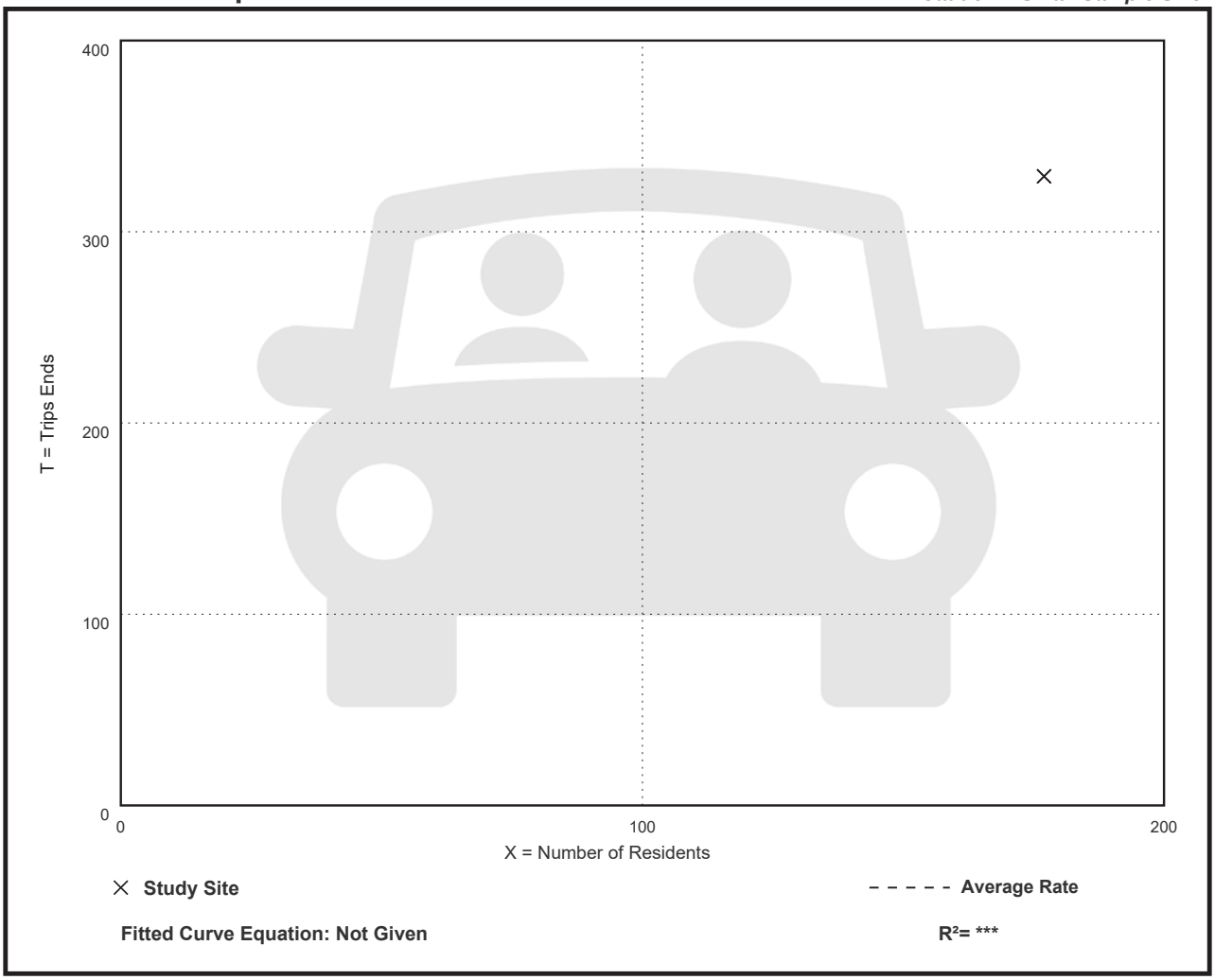
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Residents: 177
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
1.86	1.86 - 1.86	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= *

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

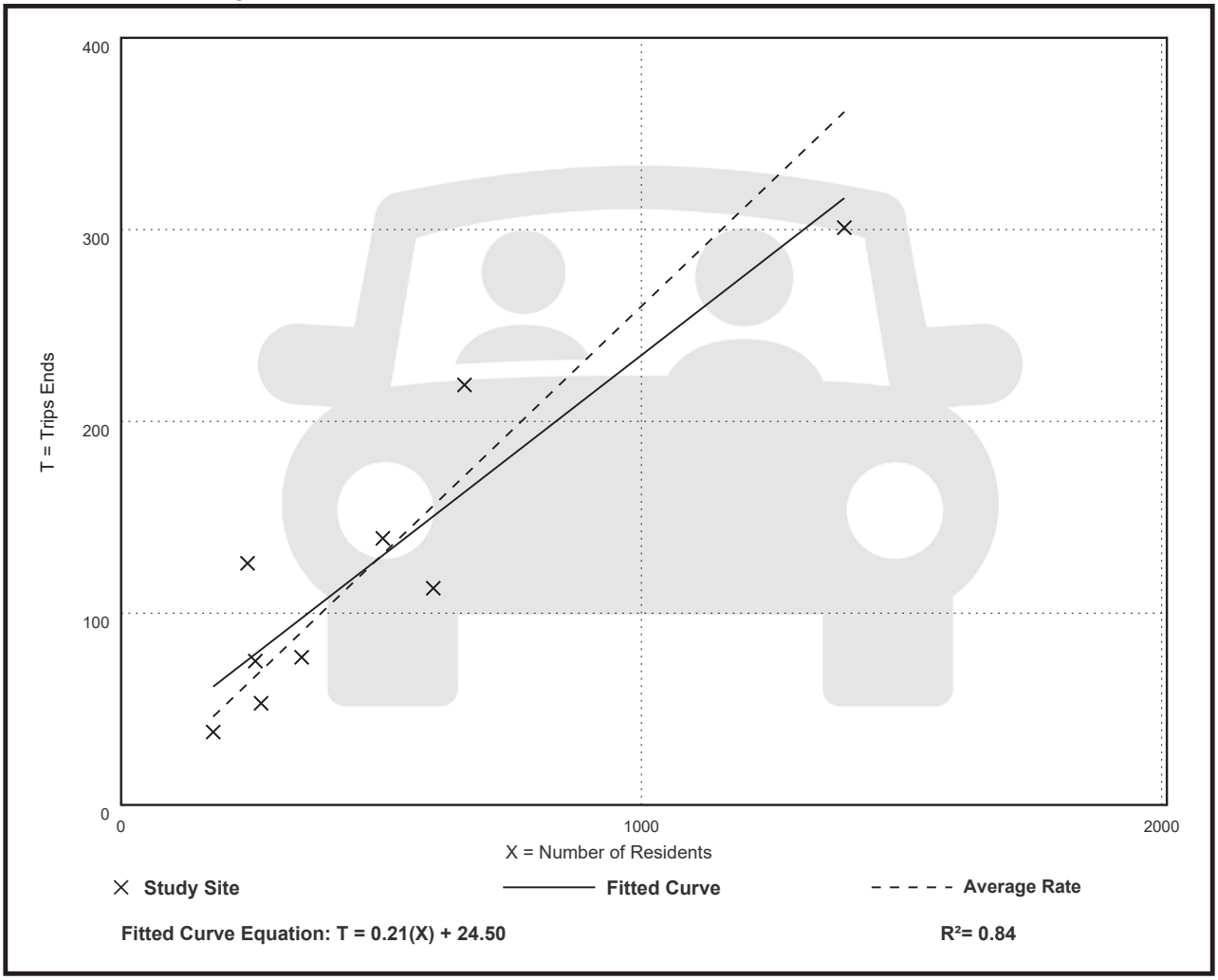
Vehicle Trip Ends vs: Residents
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Residents: 494
Directional Distribution: 17% entering, 83% exiting

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
0.26	0.19 - 0.52	0.08

Data Plot and Equation



Fitted Curve Equation: T = 0.21(X) + 24.50

R^2= 0.84

Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

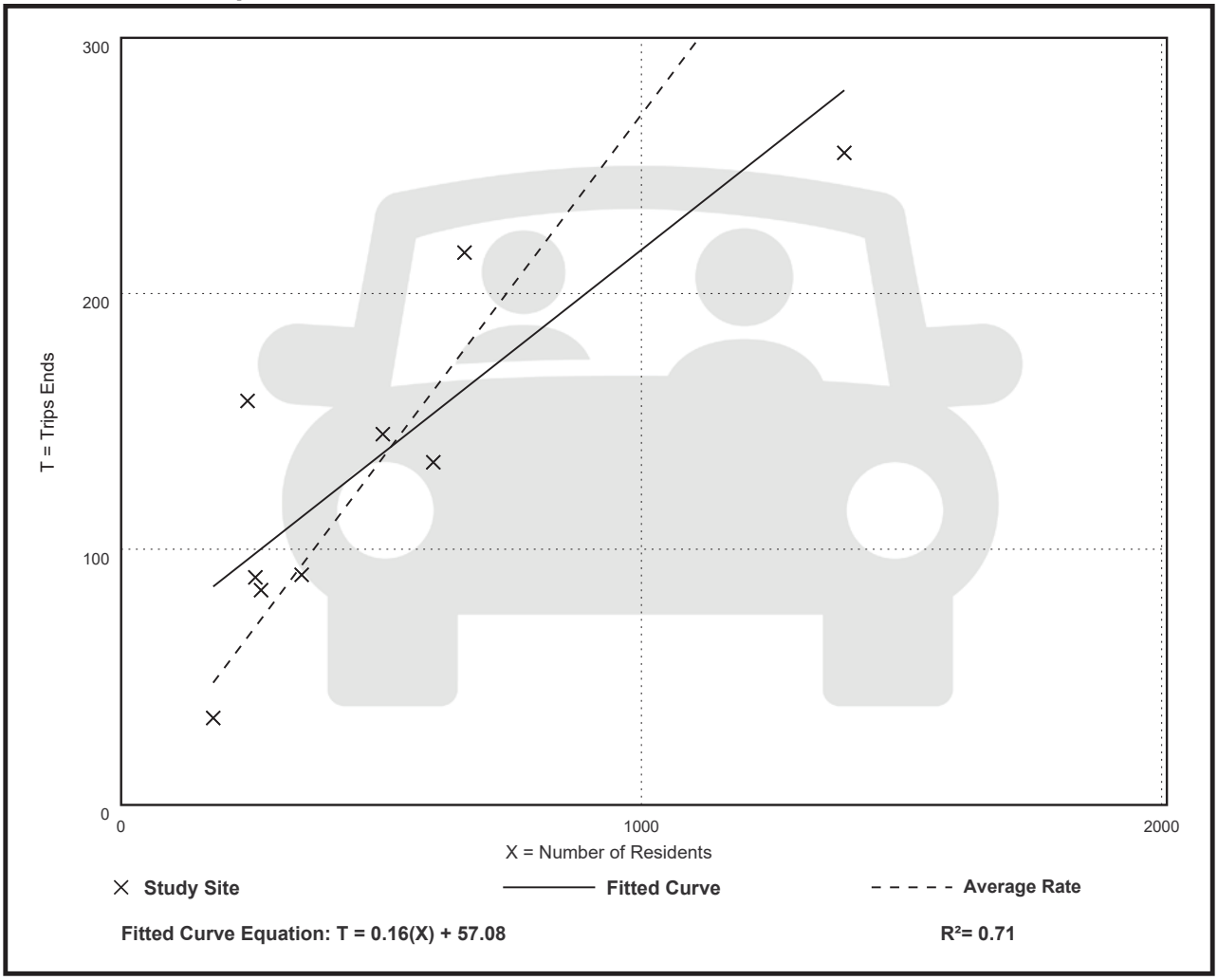
Vehicle Trip Ends vs: Residents
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Residents: 494
Directional Distribution: 66% entering, 34% exiting

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
0.27	0.18 - 0.65	0.11

Data Plot and Equation



Fitted Curve Equation: T = 0.16(X) + 57.08

R^2= 0.71

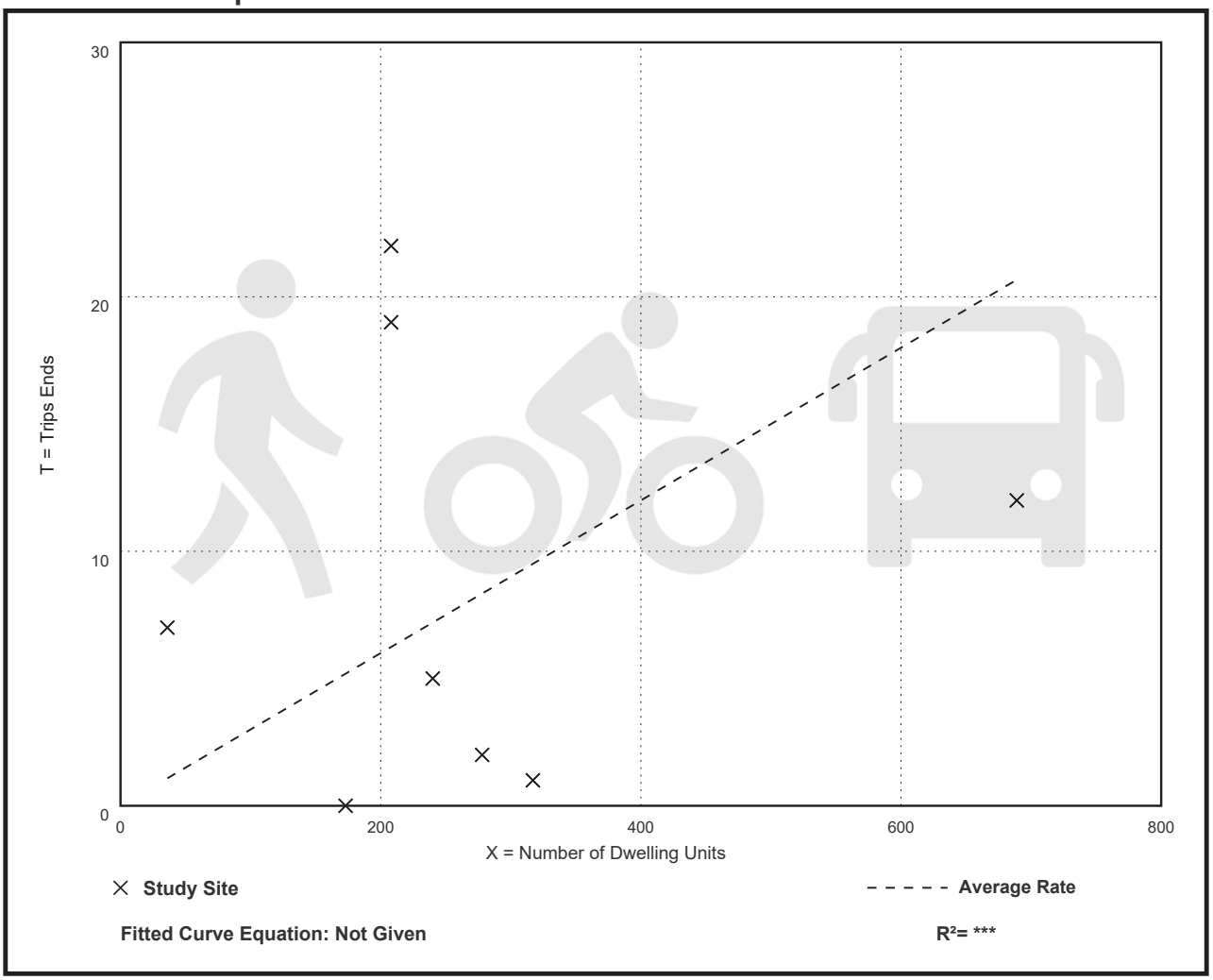
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Walk+Bike+Transit Trip Ends vs: Dwelling Units
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: 8
Avg. Num. of Dwelling Units: 269
Directional Distribution: 43% entering, 57% exiting

Walk+Bike+Transit Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.03	0.00 - 0.19	0.04

Data Plot and Equation



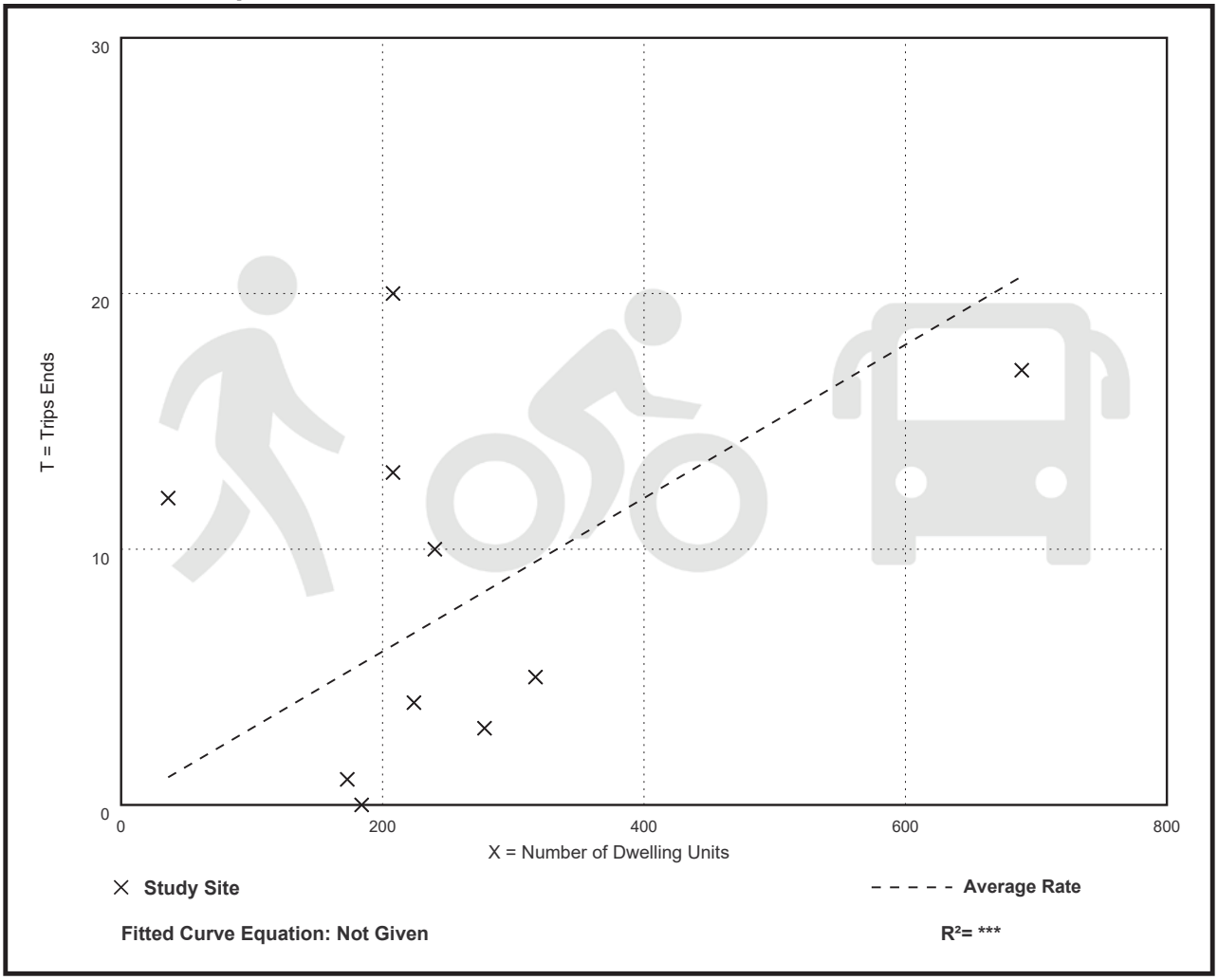
Multifamily Housing (Low-Rise)
Not Close to Rail Transit (220)

Walk+Bike+Transit Trip Ends vs: Dwelling Units
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: 10
Avg. Num. of Dwelling Units: 256
Directional Distribution: 50% entering, 50% exiting

Walk+Bike+Transit Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.03	0.00 - 0.33	0.05

Data Plot and Equation



Multifamily Housing (Low-Rise)
Close to Rail Transit (220)

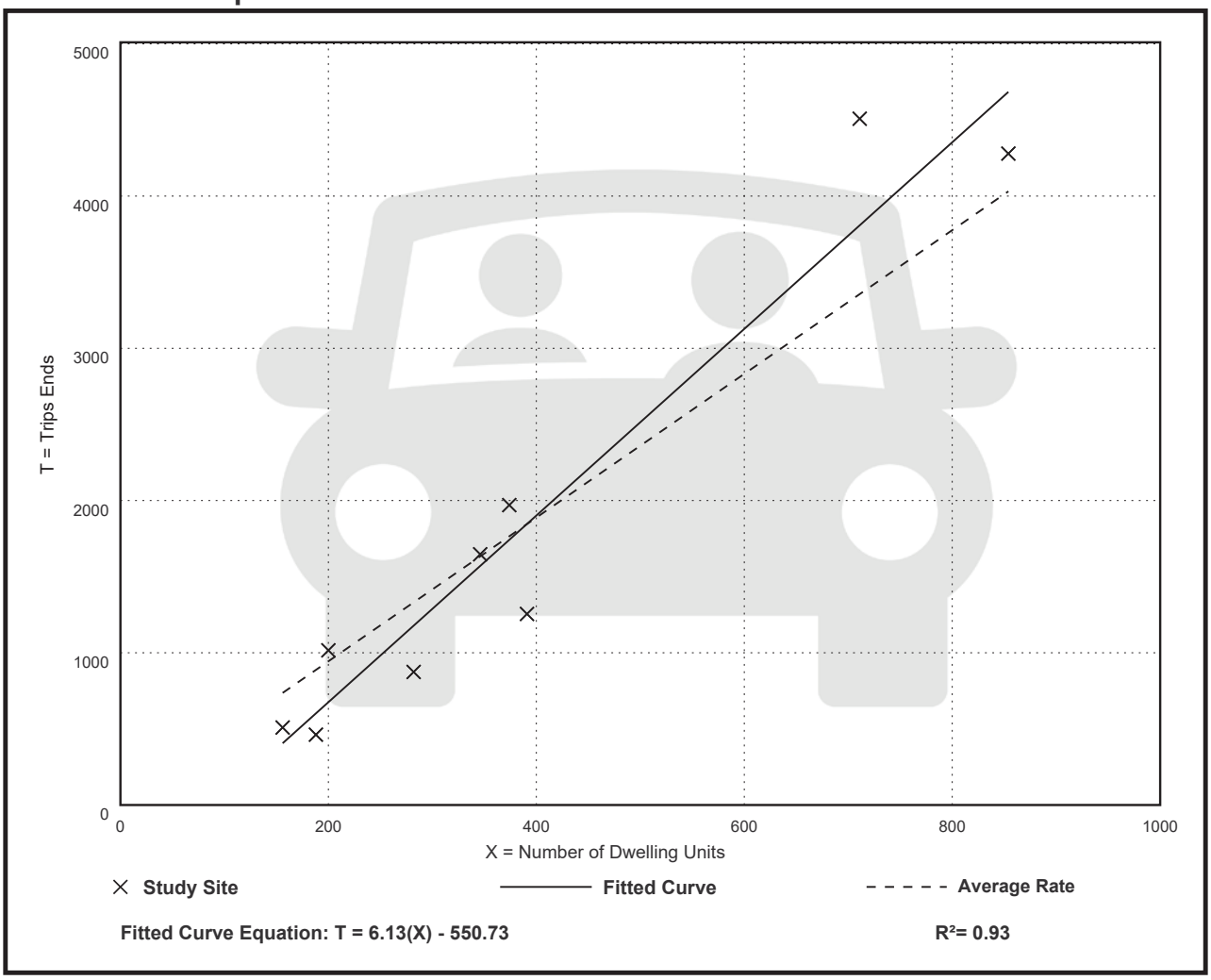
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 9
Avg. Num. of Dwelling Units: 389
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
4.72	2.46 - 6.34	1.27

Data Plot and Equation



Fitted Curve Equation: T = 6.13(X) - 550.73

R^2= 0.93

Multifamily Housing (Low-Rise)
Close to Rail Transit (220)

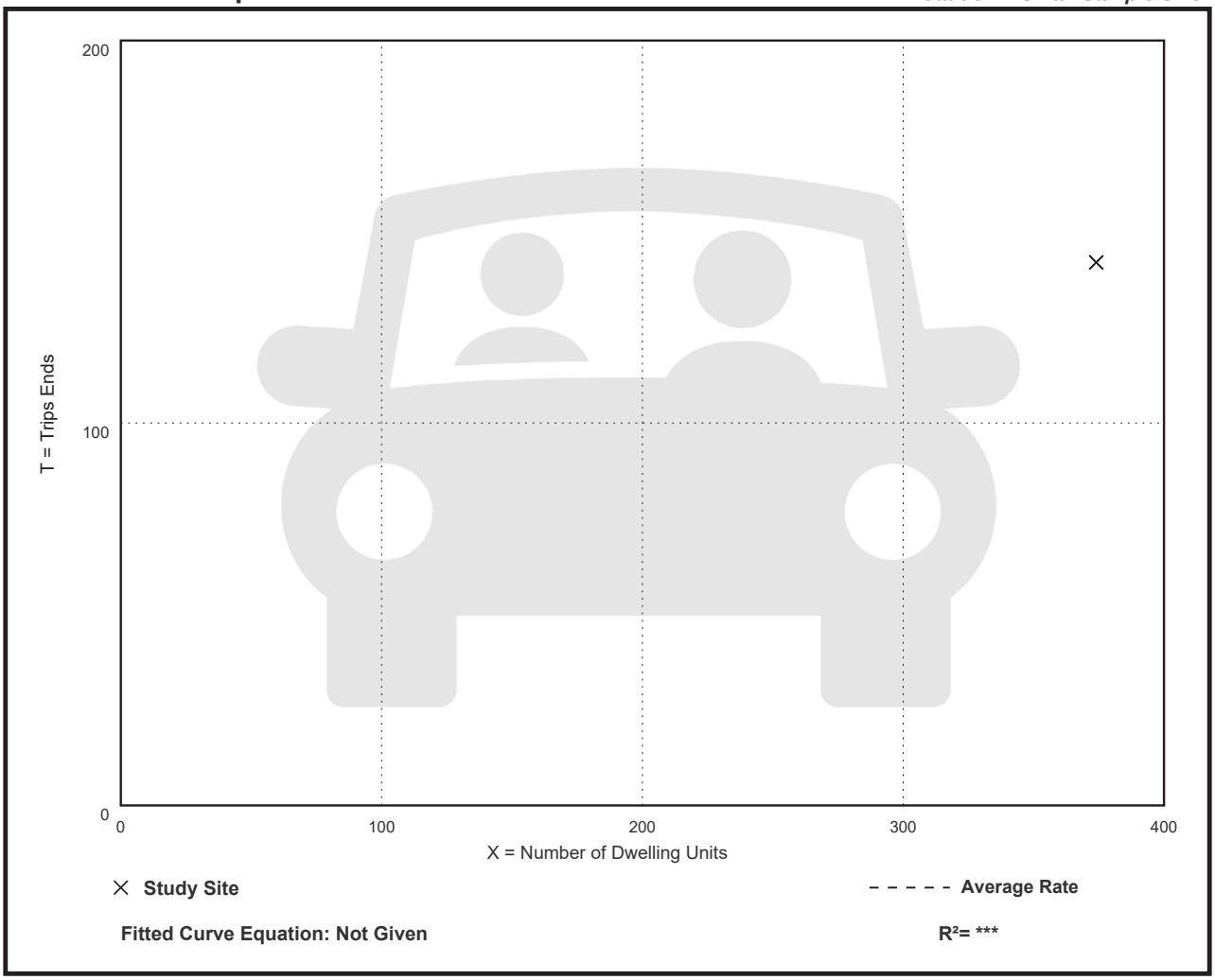
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 374
Directional Distribution: 29% entering, 71% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.38	0.38 - 0.38	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ***

Multifamily Housing (Low-Rise)
Close to Rail Transit (220)

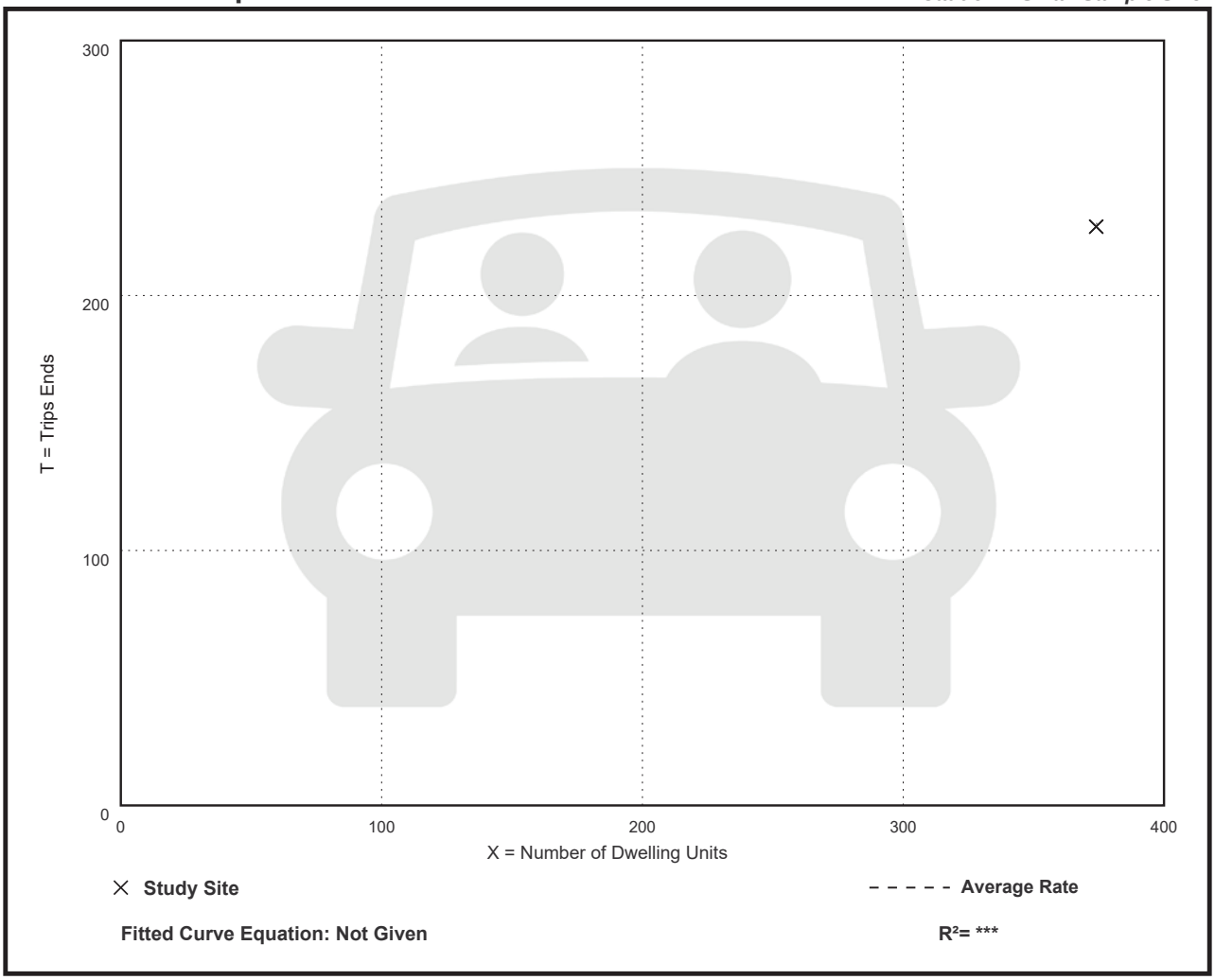
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 374
Directional Distribution: 60% entering, 40% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.61	0.61 - 0.61	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ***

Multifamily Housing (Low-Rise) Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
AM Peak Hour of Generator

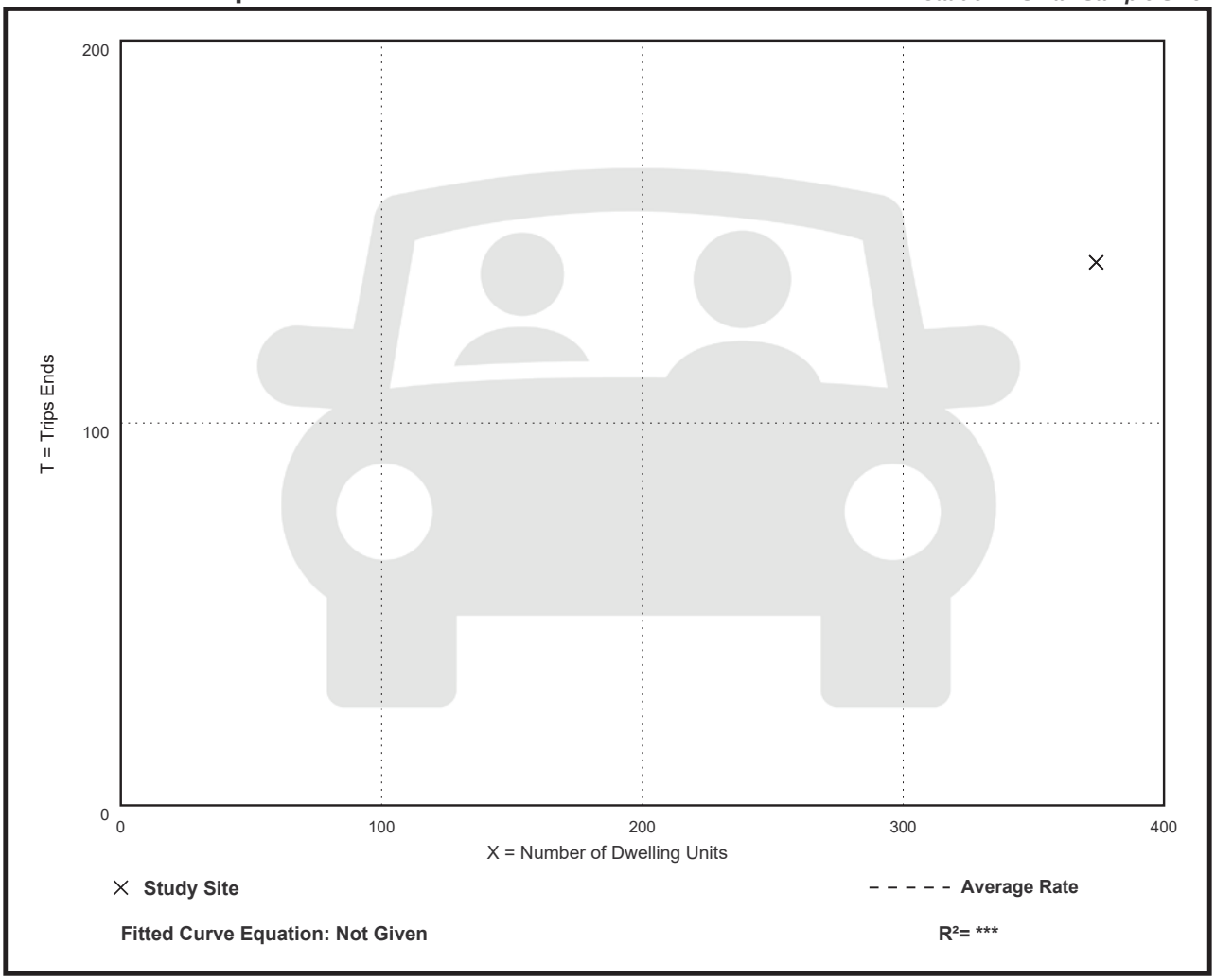
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 374
Directional Distribution: 29% entering, 71% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.38	0.38 - 0.38	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= *

Multifamily Housing (Low-Rise)
Close to Rail Transit (220)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
PM Peak Hour of Generator

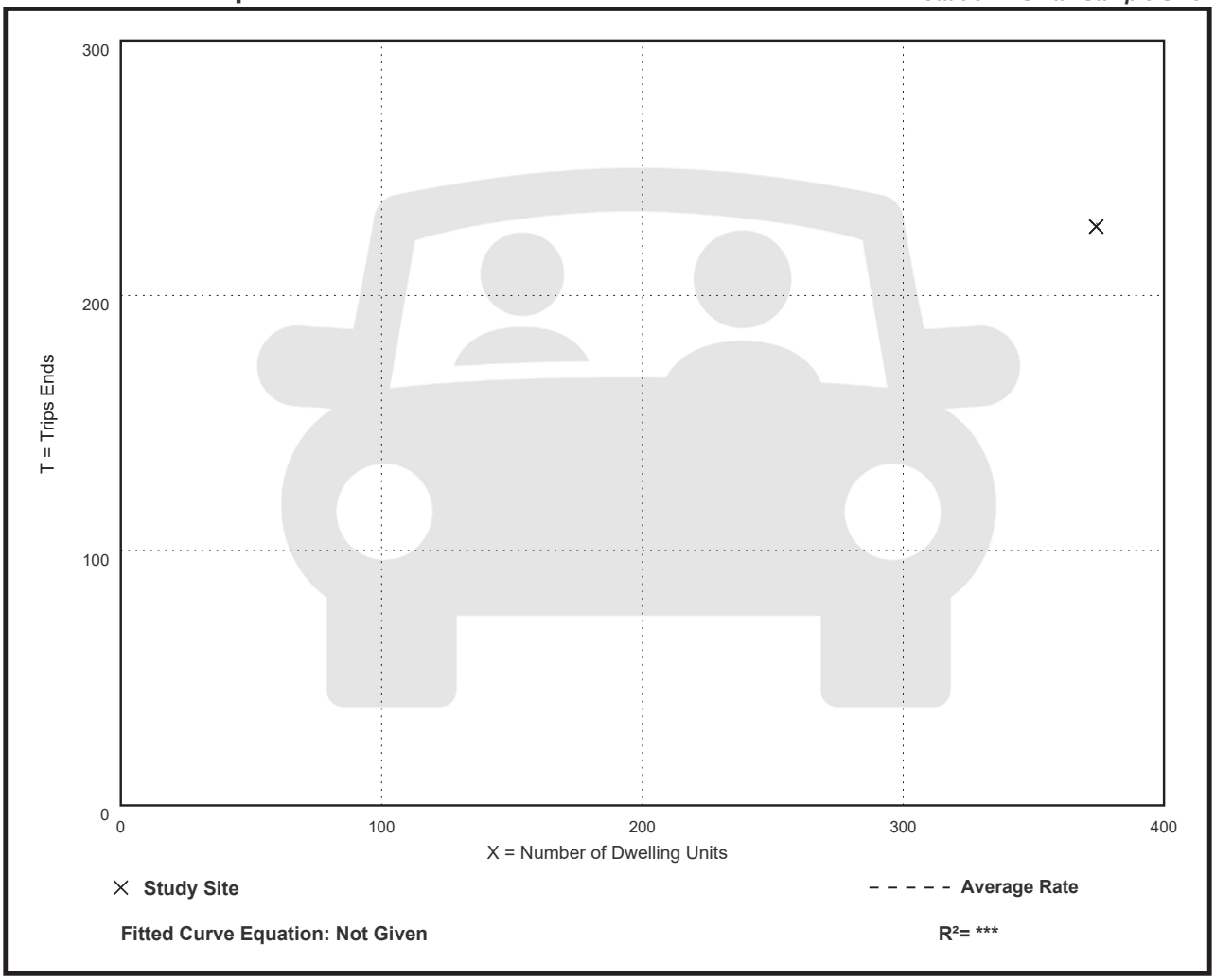
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Dwelling Units: 374
Directional Distribution: 60% entering, 40% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.61	0.61 - 0.61	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= *

Triplex (Land Use Code 215: Residential, Single-Family Attached Housing)

Follows this page

Land Use: 215
Single-Family Attached Housing

Description

Single-family attached housing includes any single-family housing unit that shares a wall with an adjoining dwelling unit, whether the walls are for living space, a vehicle garage, or storage space.

Additional Data

The database for this land use includes duplexes (defined as a single structure with two distinct dwelling units, typically joined side-by-side and each with at least one outside entrance) and townhouses/rowhouses (defined as a single structure with three or more distinct dwelling units, joined side-by-side in a row and each with an outside entrance).

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

The sites were surveyed in the 1980s, the 1990s, the 2000s, and the 2010s in British Columbia (CAN), California, Georgia, Illinois, Maryland, Massachusetts, Minnesota, New Jersey, Ontario (CAN), Oregon, Pennsylvania, South Dakota, Utah, Virginia, and Wisconsin.

Source Numbers

168, 204, 211, 237, 305, 306, 319, 321, 357, 390, 418, 525, 571, 583, 638, 735, 868, 869, 870, 896, 912, 959, 1009, 1046, 1056, 1058, 1077

Single-Family Attached Housing
(215)

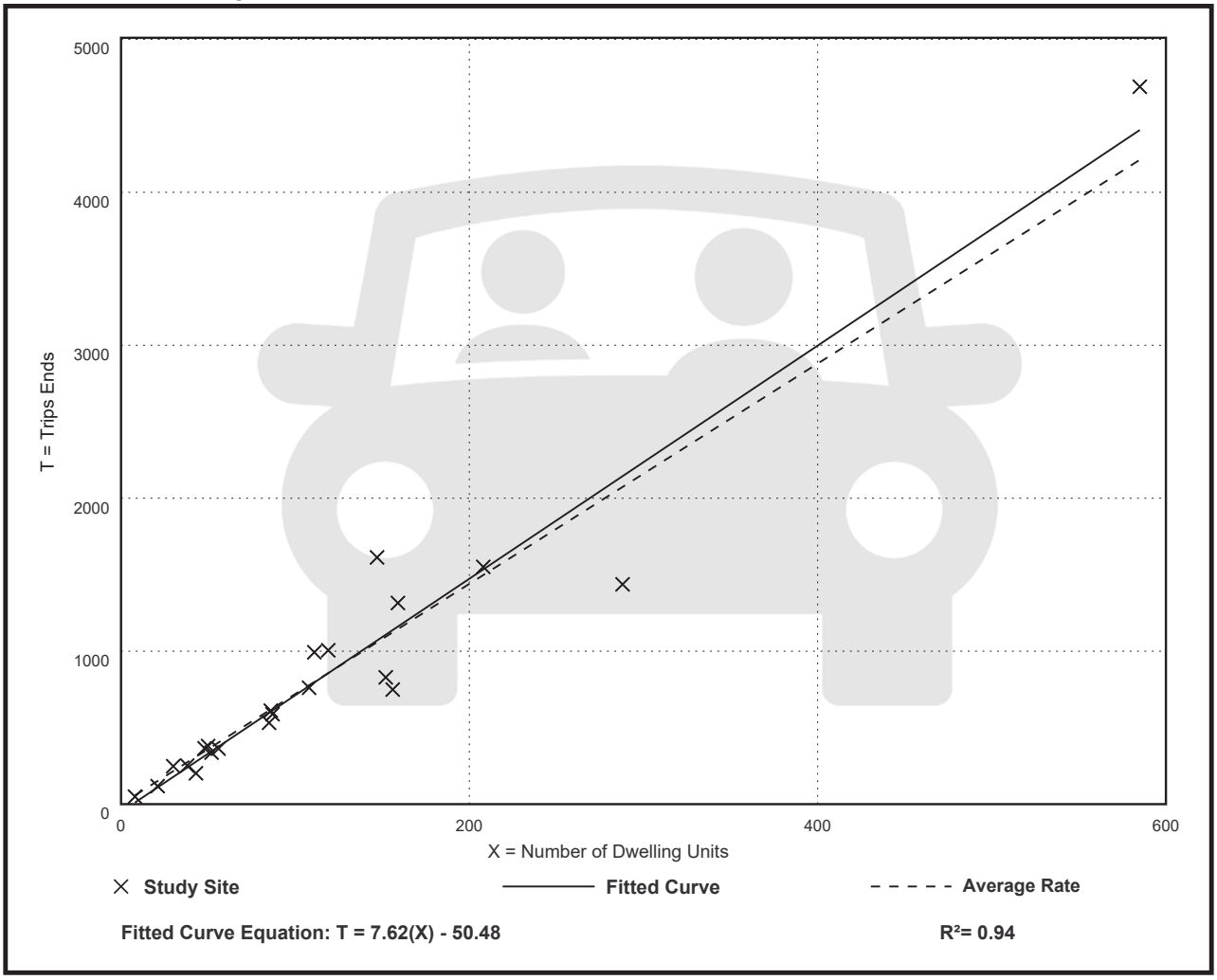
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday

Setting/Location: General Urban/Suburban
Number of Studies: 22
Avg. Num. of Dwelling Units: 120
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
7.20	4.70 - 10.97	1.61

Data Plot and Equation



Fitted Curve Equation: T = 7.62(X) - 50.48

R^2= 0.94

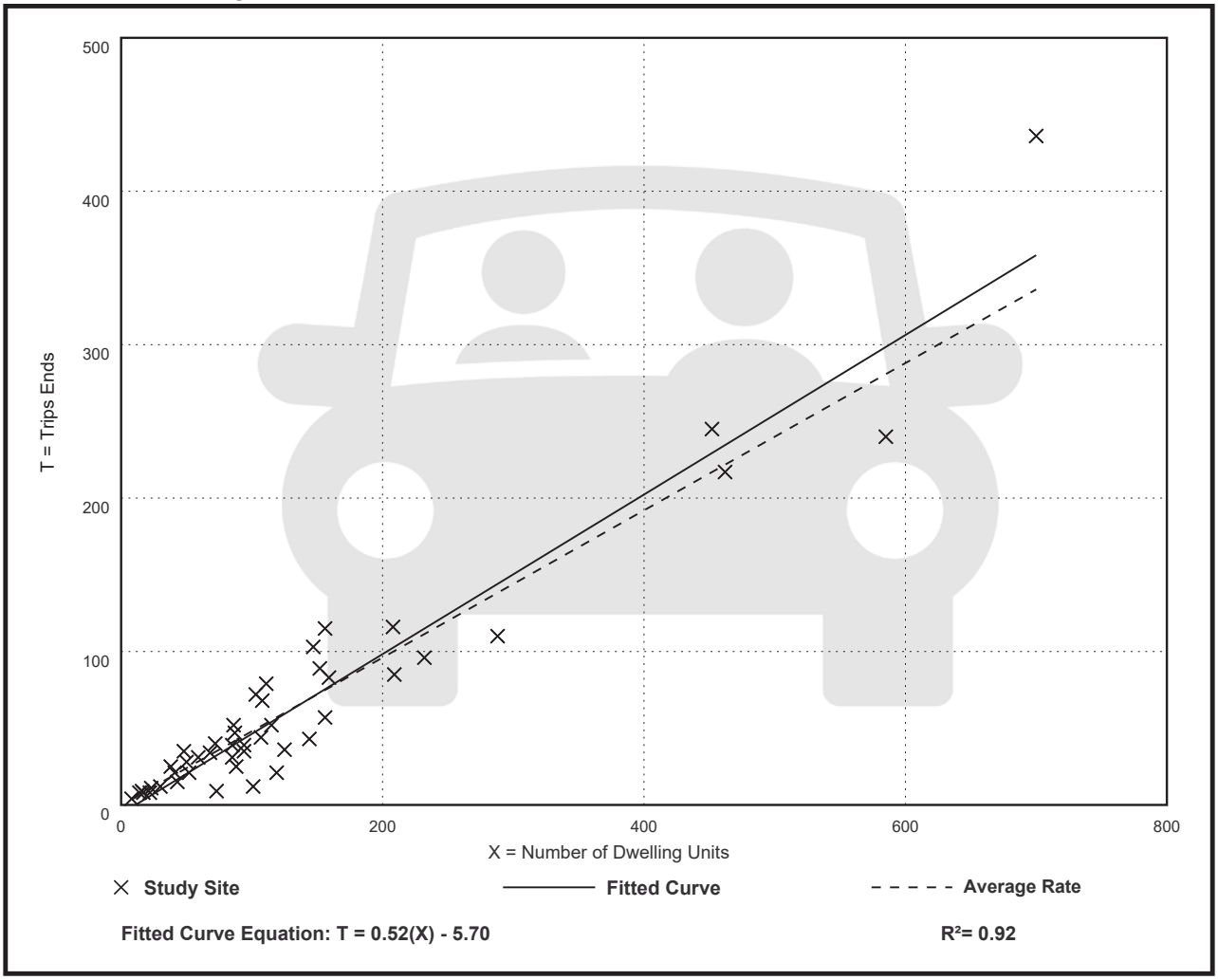
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: Dwelling Units
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: 46
Avg. Num. of Dwelling Units: 135
Directional Distribution: 31% entering, 69% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.48	0.12 - 0.74	0.14

Data Plot and Equation



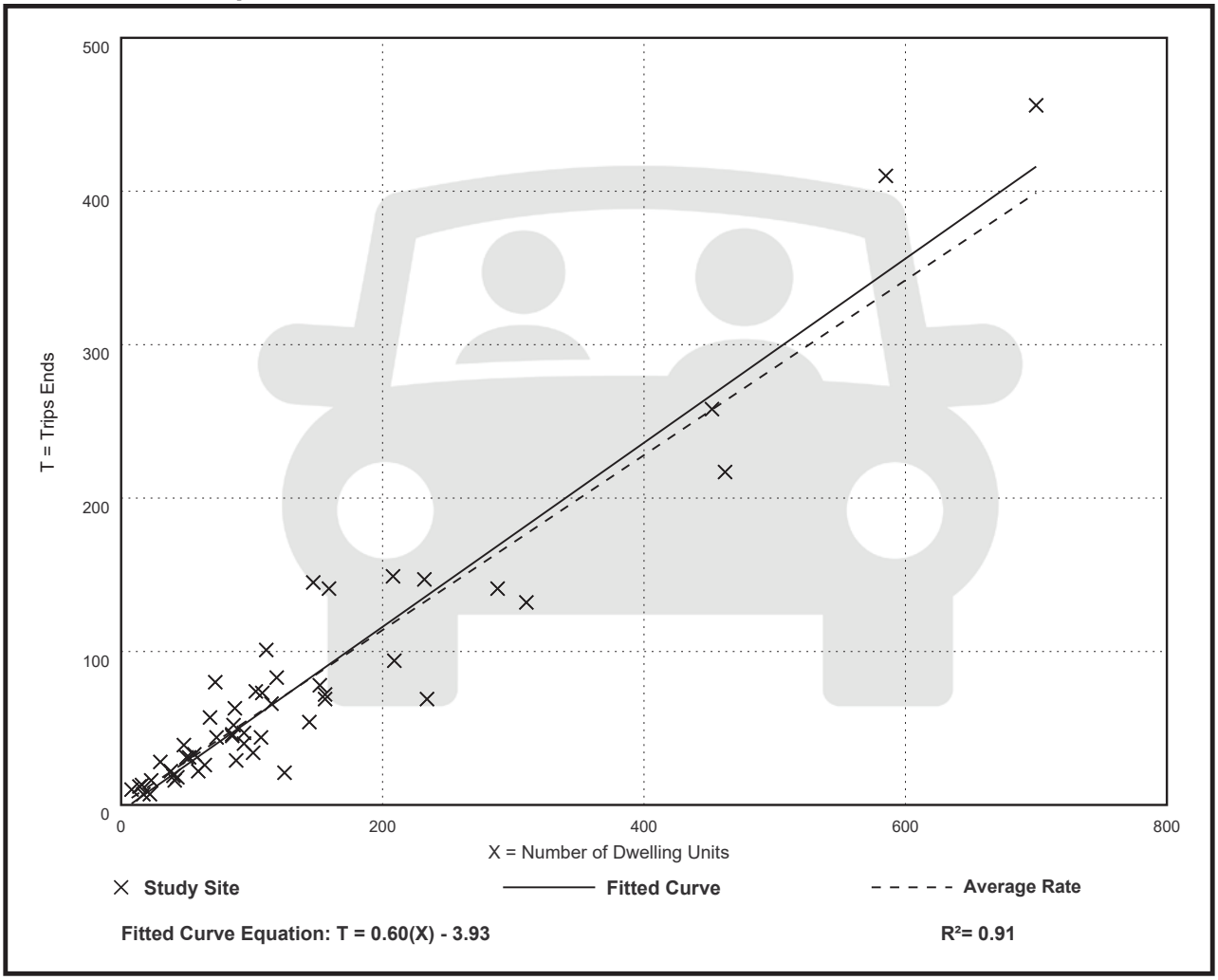
Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: Dwelling Units
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: 51
Avg. Num. of Dwelling Units: 136
Directional Distribution: 57% entering, 43% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.17 - 1.25	0.18

Data Plot and Equation



Single-Family Attached Housing
(215)

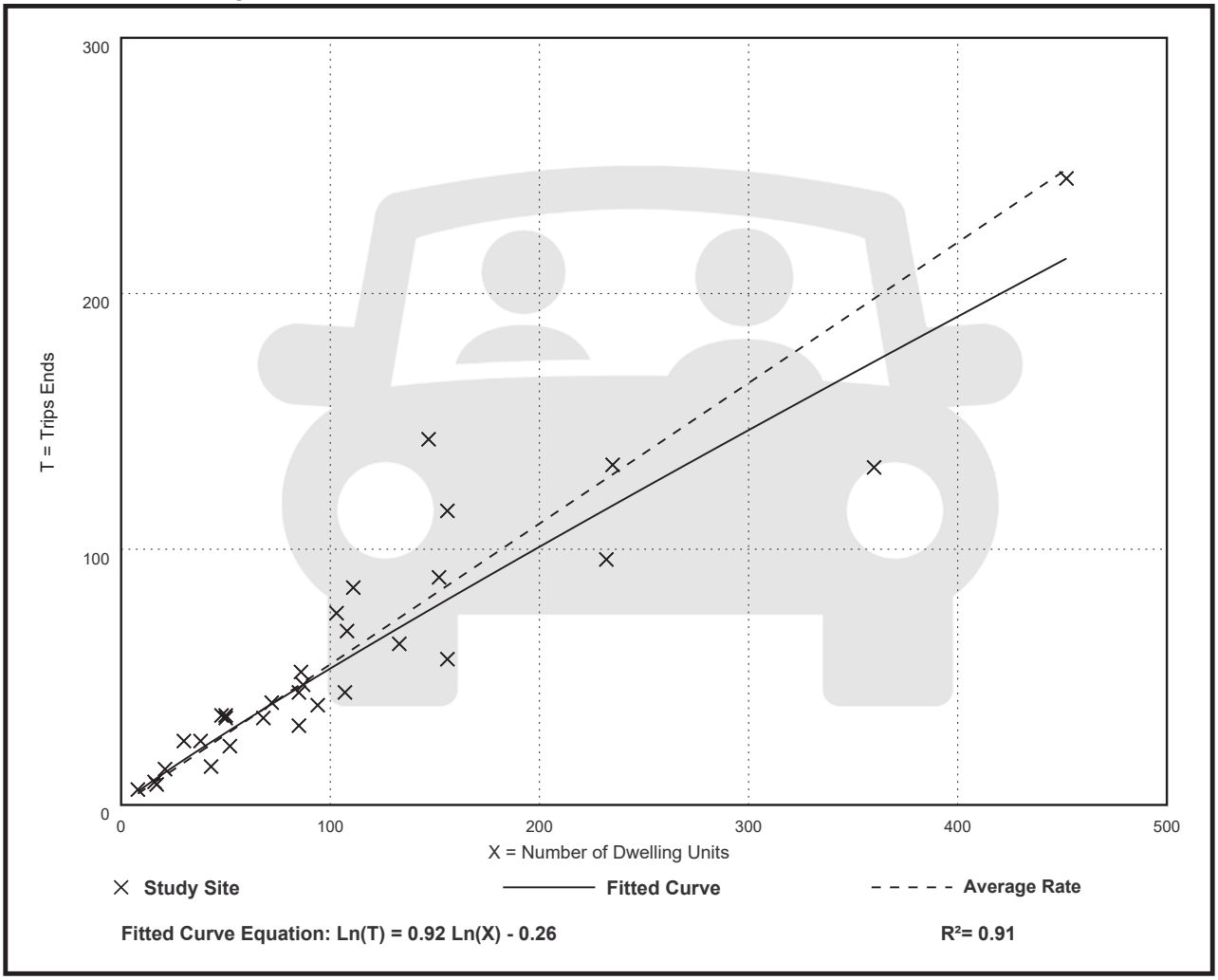
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
AM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 31
Avg. Num. of Dwelling Units: 110
Directional Distribution: 25% entering, 75% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.55	0.35 - 0.97	0.16

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.92 Ln(X) - 0.26

R^2= 0.91

Single-Family Attached Housing
(215)

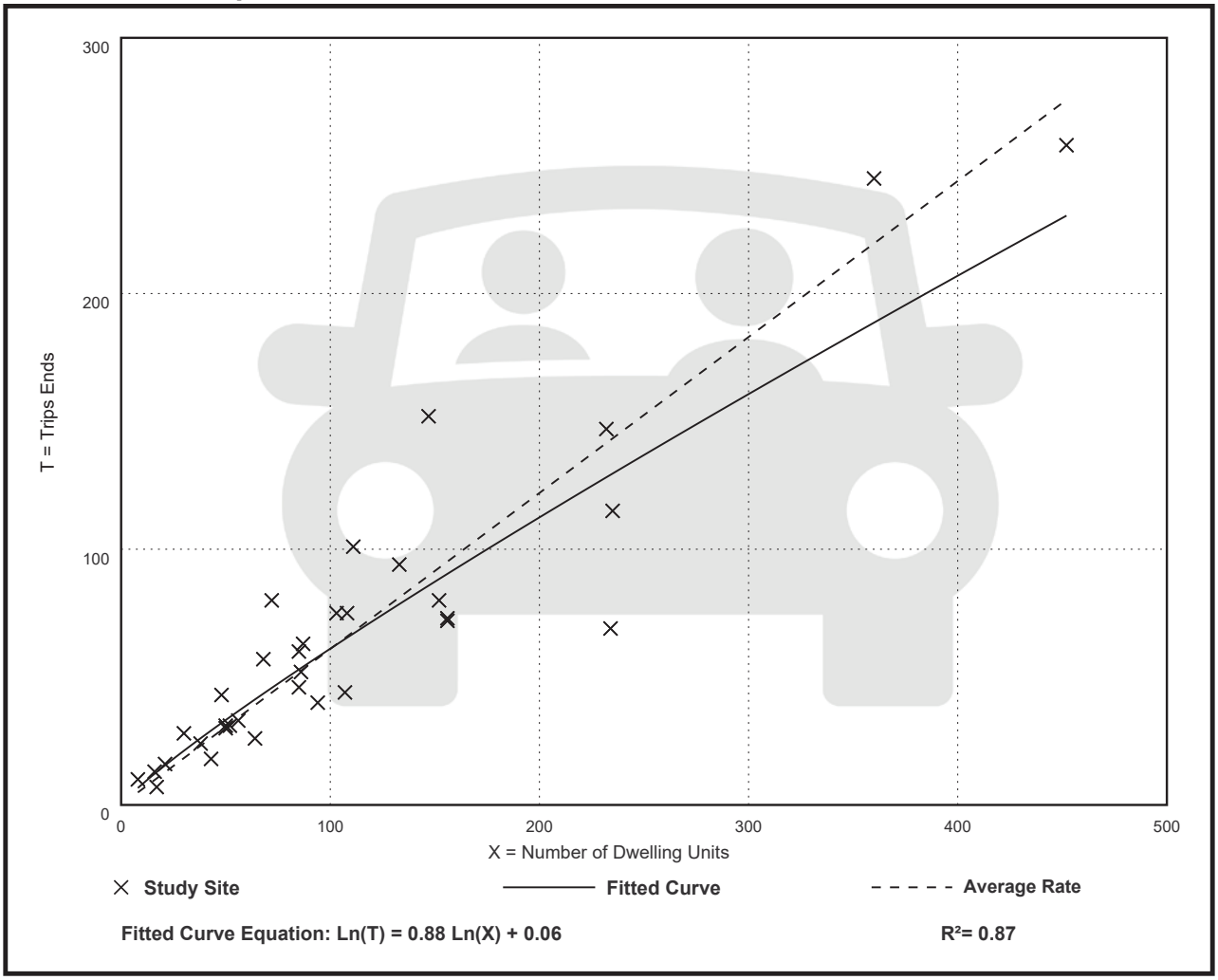
Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
PM Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 34
Avg. Num. of Dwelling Units: 110
Directional Distribution: 62% entering, 38% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.61	0.29 - 1.25	0.18

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.88 Ln(X) + 0.06

R^2= 0.87

Single-Family Attached Housing
(215)

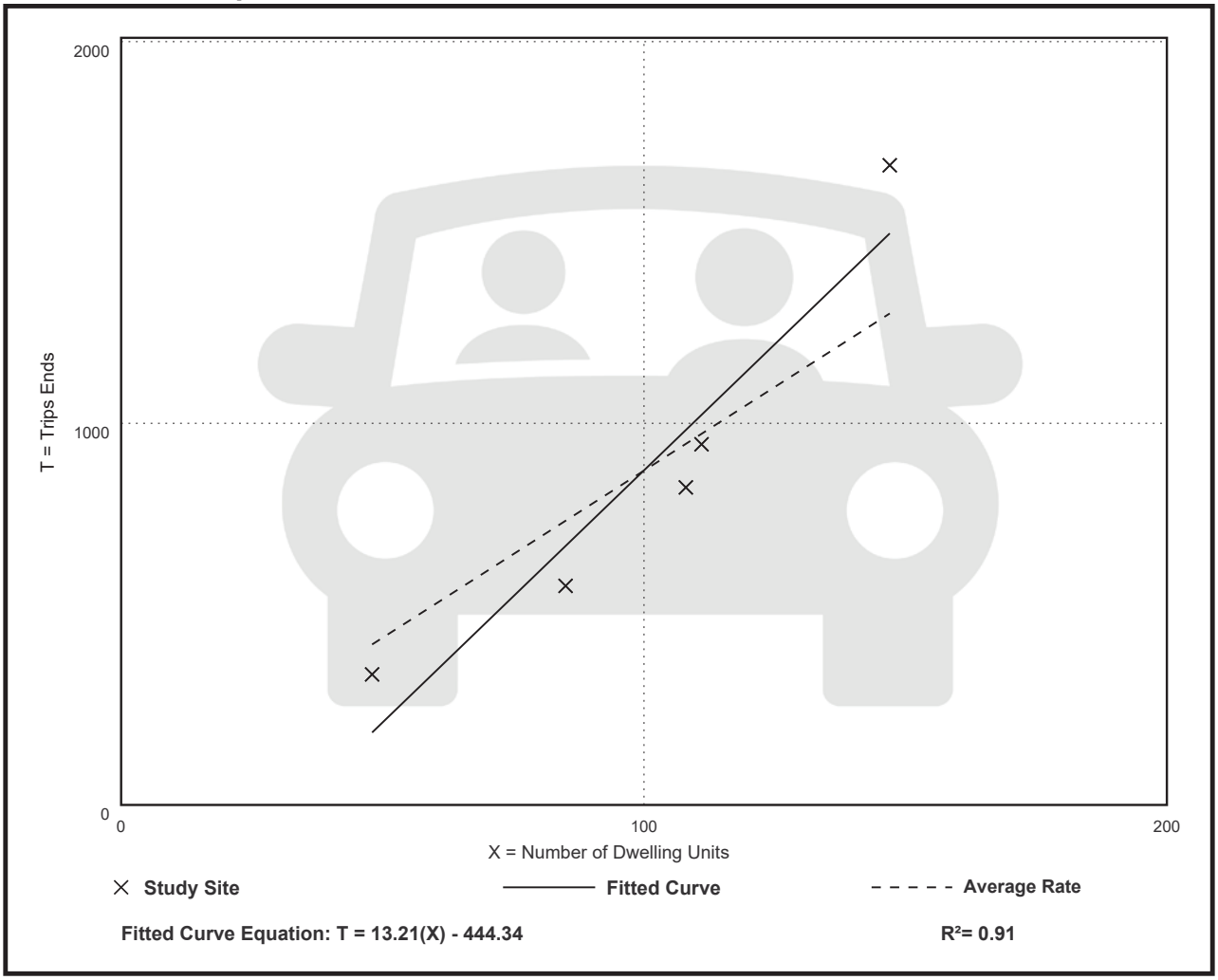
Vehicle Trip Ends vs: Dwelling Units
On a: Saturday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Dwelling Units: 100
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
8.76	6.75 - 11.40	2.02

Data Plot and Equation



Fitted Curve Equation: T = 13.21(X) - 444.34

R^2= 0.91

Single-Family Attached Housing
(215)

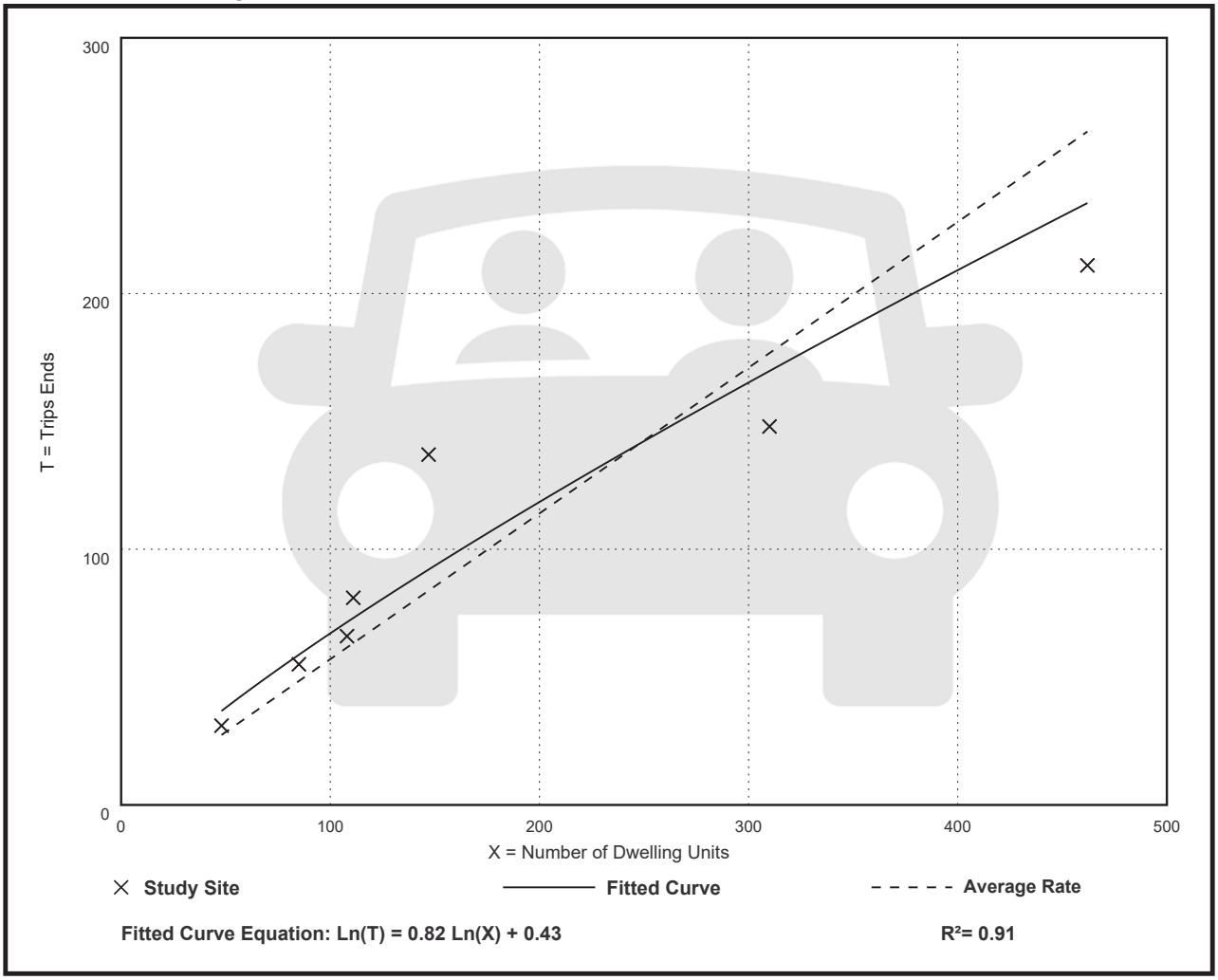
Vehicle Trip Ends vs: Dwelling Units
On a: Saturday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 7
Avg. Num. of Dwelling Units: 182
Directional Distribution: 48% entering, 52% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.57	0.46 - 0.93	0.17

Data Plot and Equation



Fitted Curve Equation: Ln(T) = 0.82 Ln(X) + 0.43

R^2= 0.91

Single-Family Attached Housing
(215)

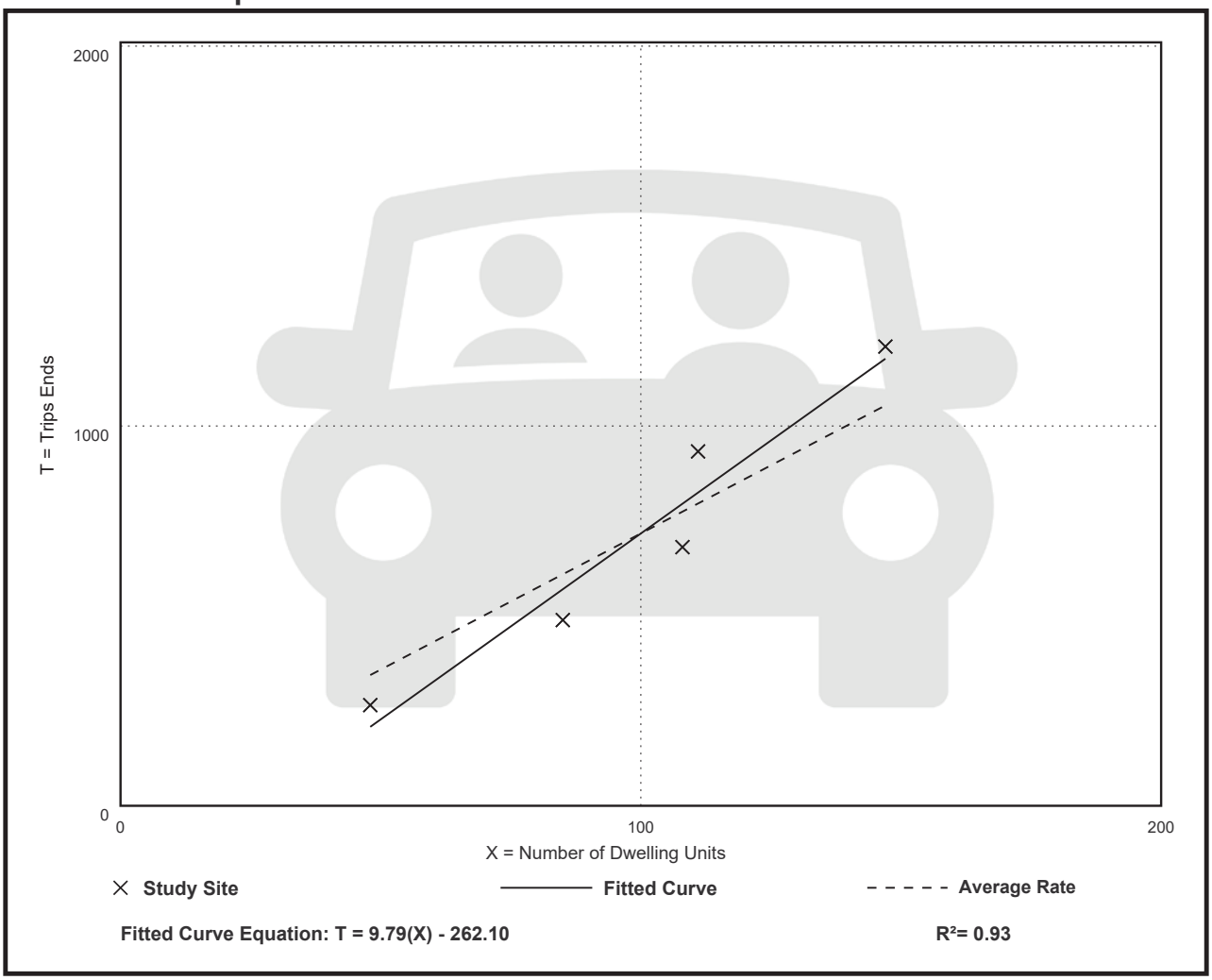
Vehicle Trip Ends vs: Dwelling Units
On a: Sunday

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Dwelling Units: 100
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
7.17	5.52 - 8.41	1.34

Data Plot and Equation



Fitted Curve Equation: T = 9.79(X) - 262.10

R^2= 0.93

Single-Family Attached Housing
(215)

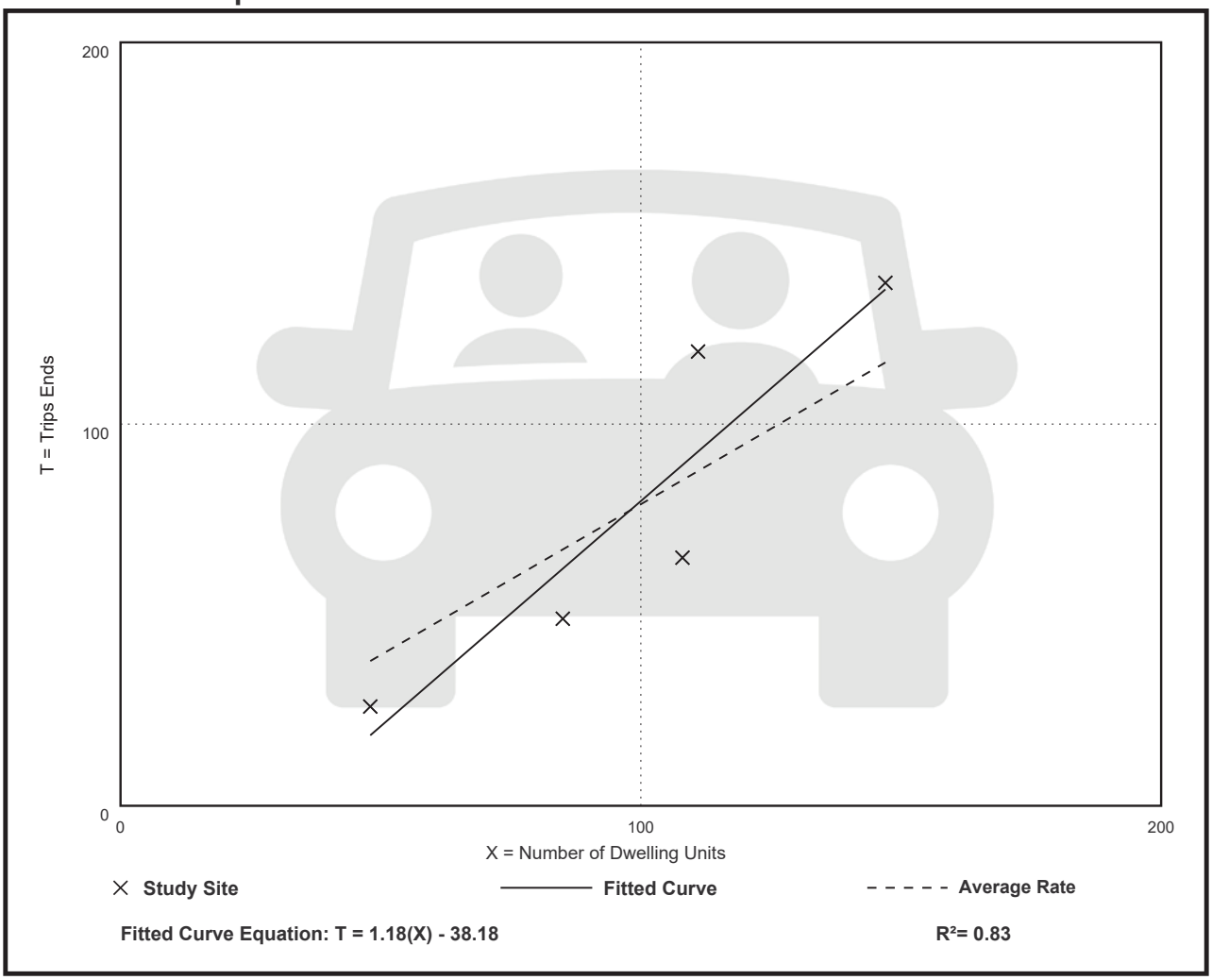
Vehicle Trip Ends vs: Dwelling Units
On a: Sunday, Peak Hour of Generator

Setting/Location: General Urban/Suburban
Number of Studies: 5
Avg. Num. of Dwelling Units: 100
Directional Distribution: Not Available

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.79	0.54 - 1.07	0.24

Data Plot and Equation



Fitted Curve Equation: T = 1.18(X) - 38.18

R^2= 0.83

Single-Family Attached Housing
(215)

Vehicle Trip Ends vs: Residents
On a: Weekday

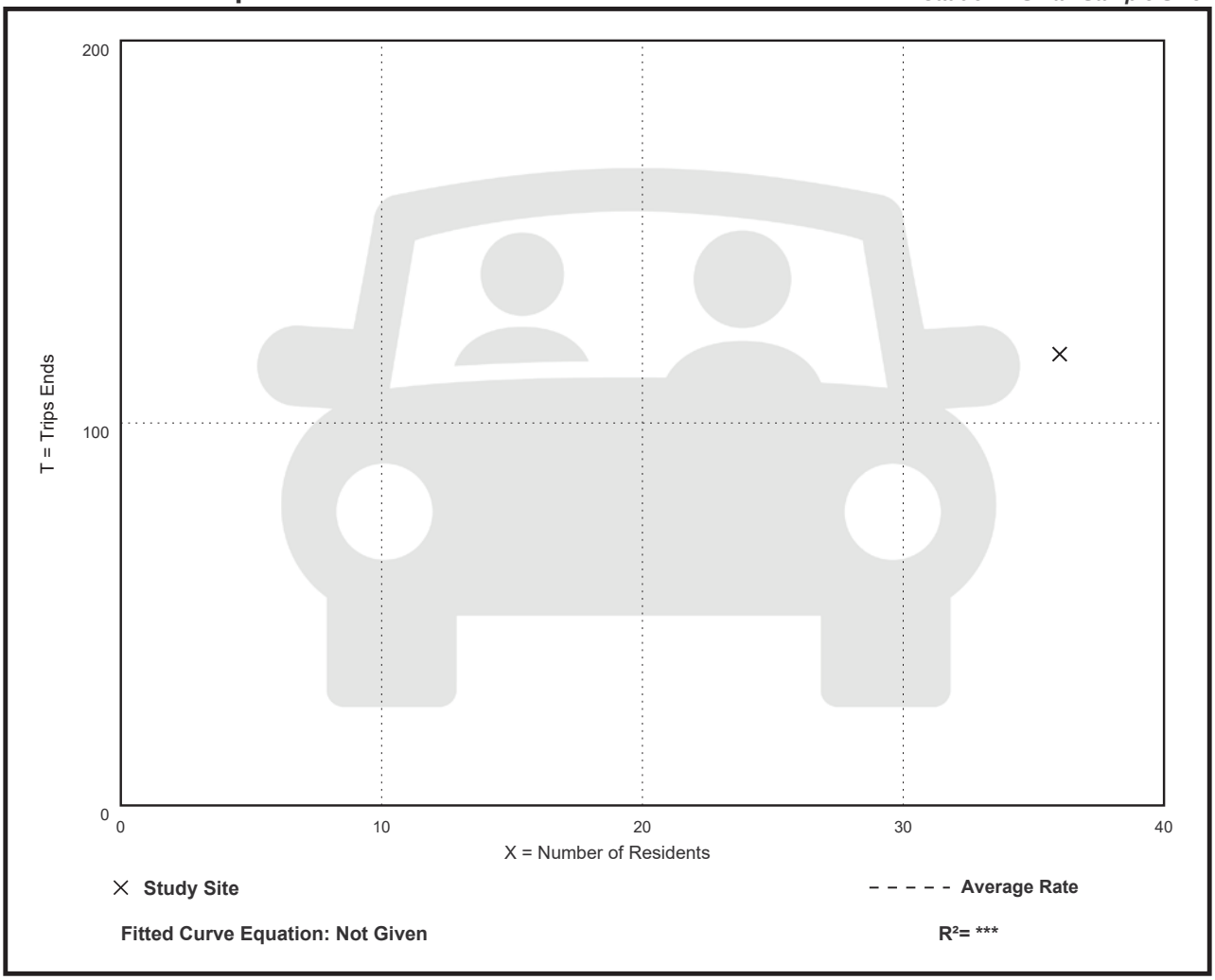
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Residents: 36
Directional Distribution: 50% entering, 50% exiting

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
3.28	3.28 - 3.28	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ***

Single-Family Attached Housing
(215)

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

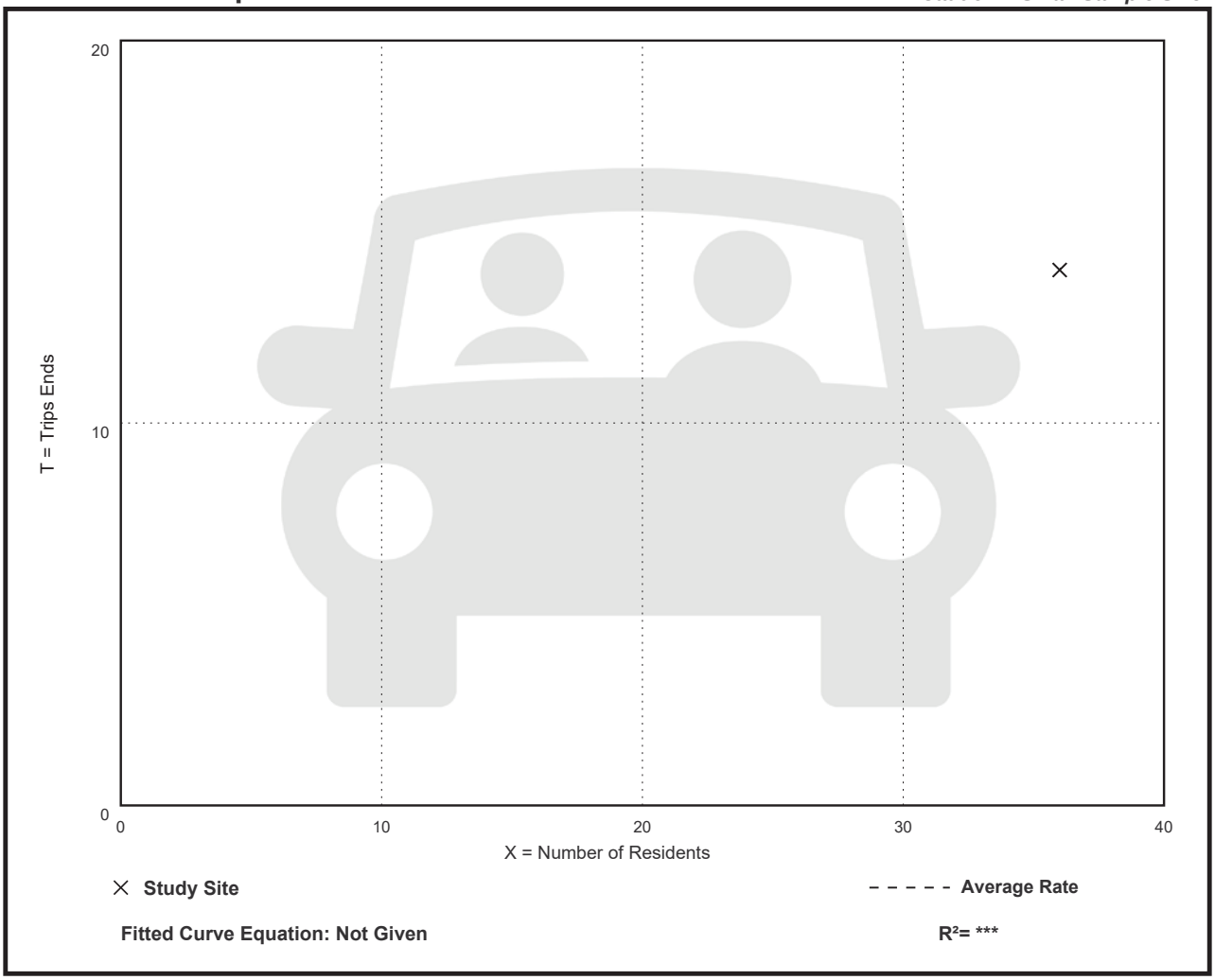
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Residents: 36
Directional Distribution: Not Available

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
0.39	0.39 - 0.39	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ***

Single-Family Attached Housing
(215)

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

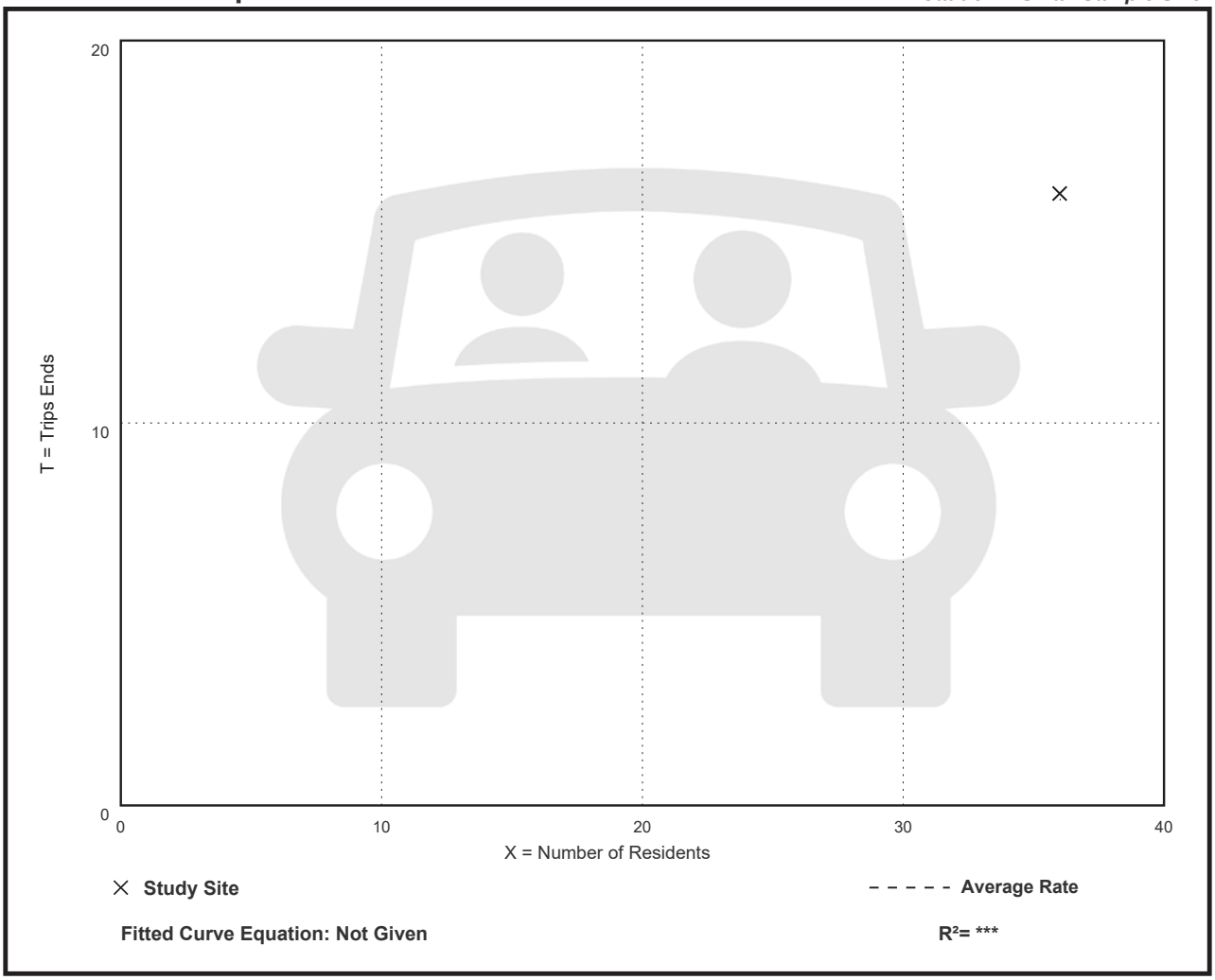
Setting/Location: General Urban/Suburban
Number of Studies: 1
Avg. Num. of Residents: 36
Directional Distribution: Not Available

Vehicle Trip Generation per Resident

Average Rate	Range of Rates	Standard Deviation
0.44	0.44 - 0.44	***

Data Plot and Equation

Caution – Small Sample Size



Fitted Curve Equation: Not Given

R^2= ***

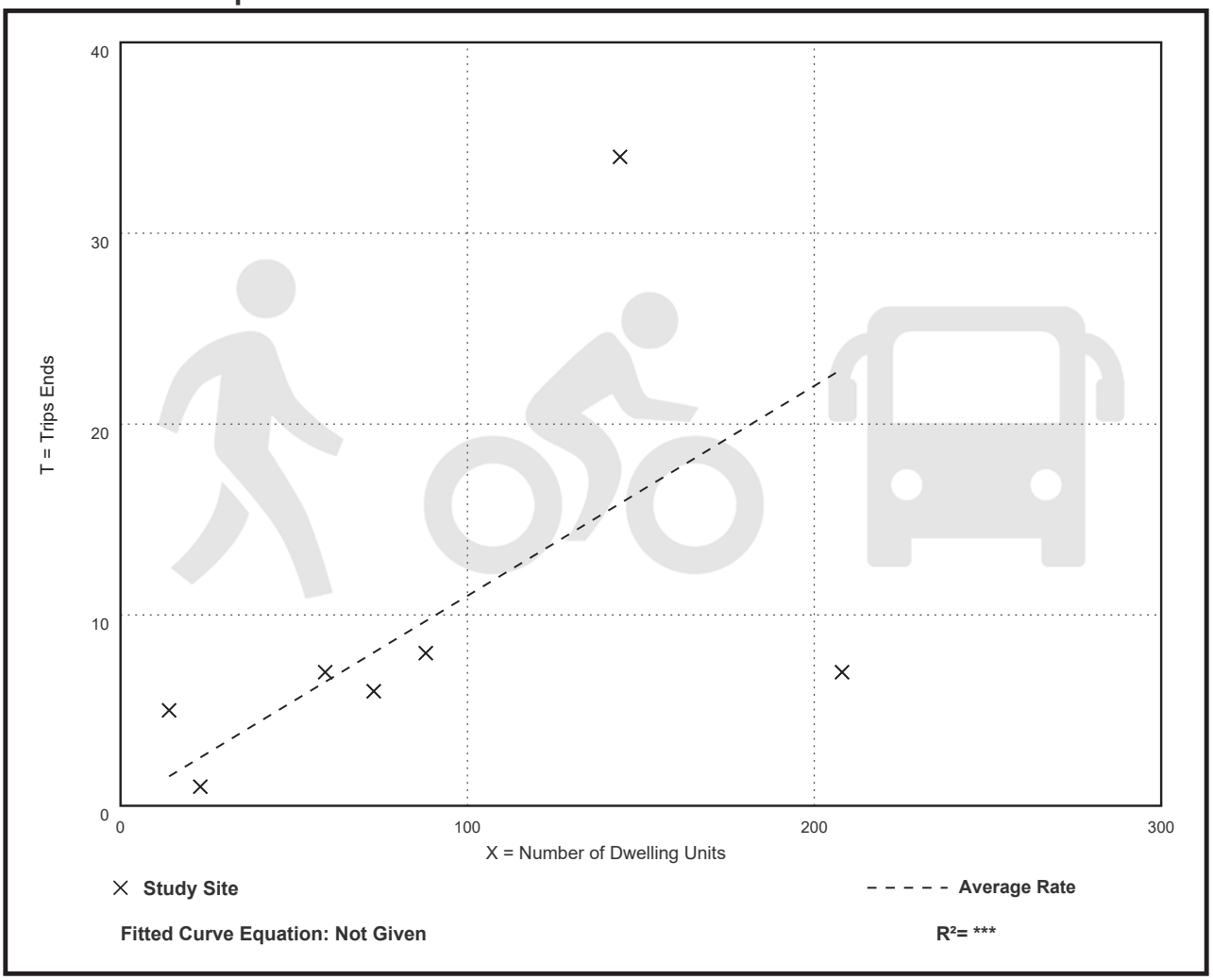
Single-Family Attached Housing
(215)

Walk+Bike+Transit Trip Ends vs: Dwelling Units
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: 7
Avg. Num. of Dwelling Units: 87
Directional Distribution: 75% entering, 25% exiting

Walk+Bike+Transit Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.11	0.03 - 0.36	0.09

Data Plot and Equation



Fitted Curve Equation: Not Given

R^2= ***

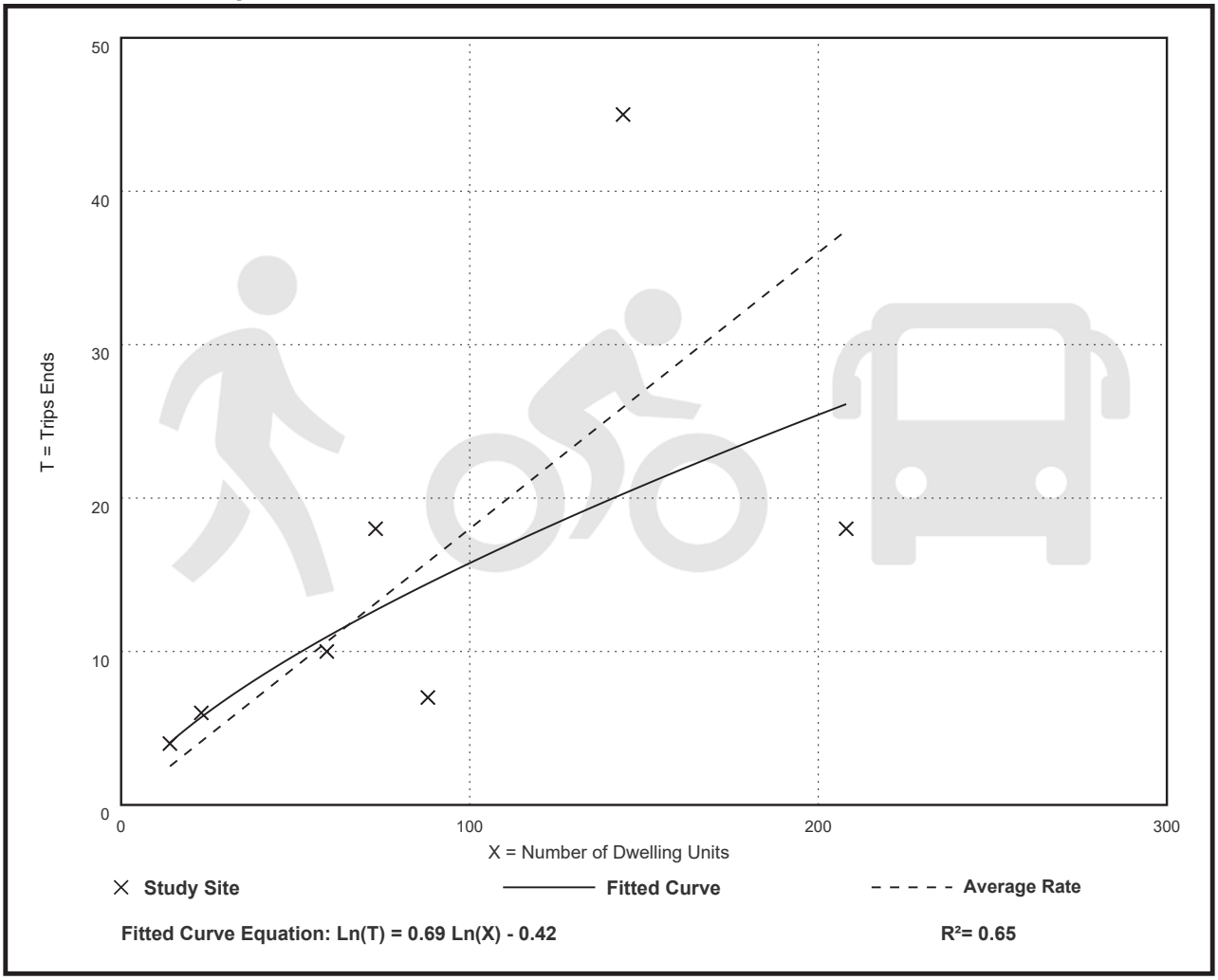
Single-Family Attached Housing
(215)

Walk+Bike+Transit Trip Ends vs: Dwelling Units
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: 7
Avg. Num. of Dwelling Units: 87
Directional Distribution: 38% entering, 62% exiting

Walk+Bike+Transit Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.18	0.08 - 0.31	0.11

Data Plot and Equation

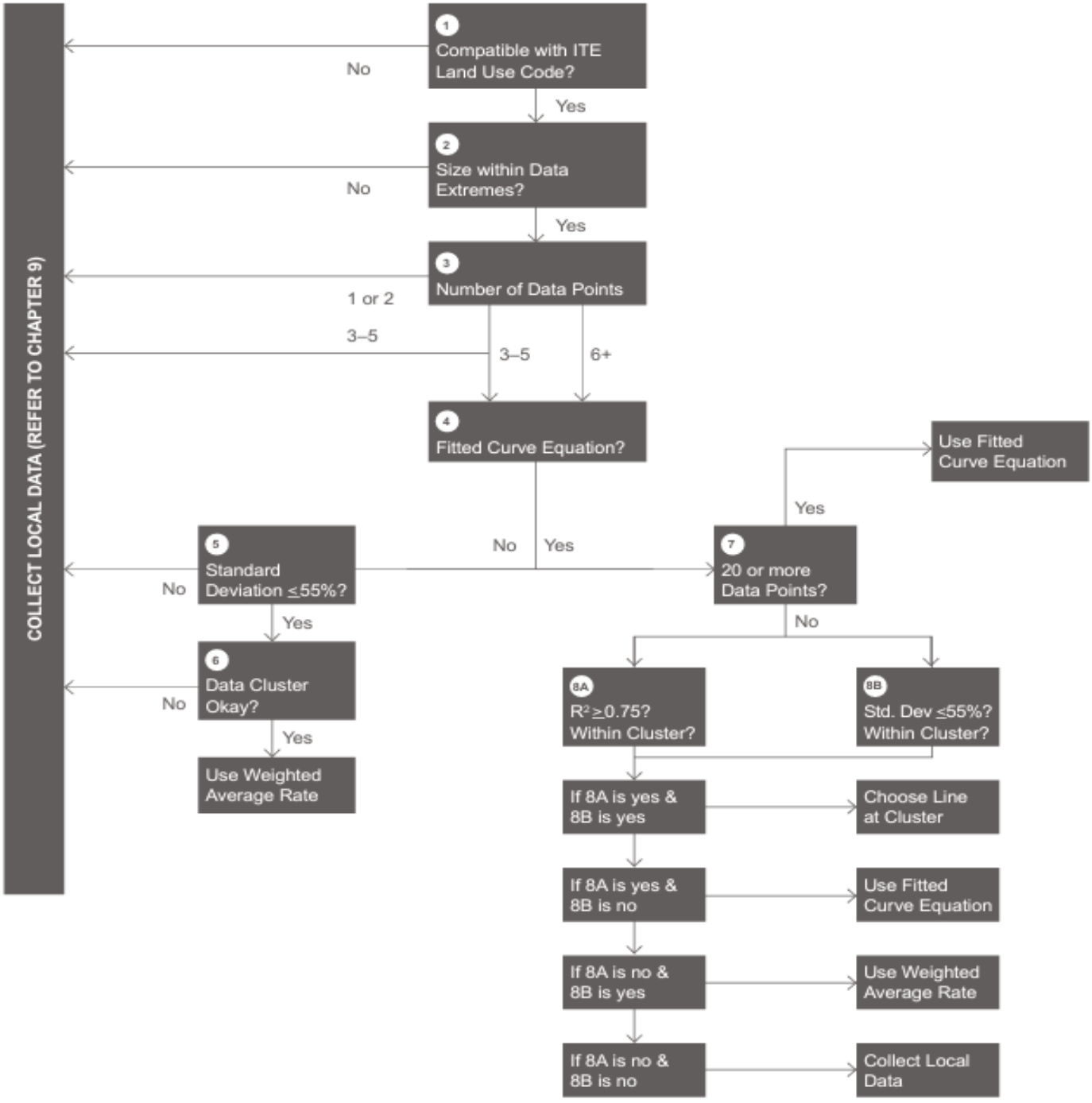


Fitted Curve Equation: Ln(T) = 0.69 Ln(X) - 0.42

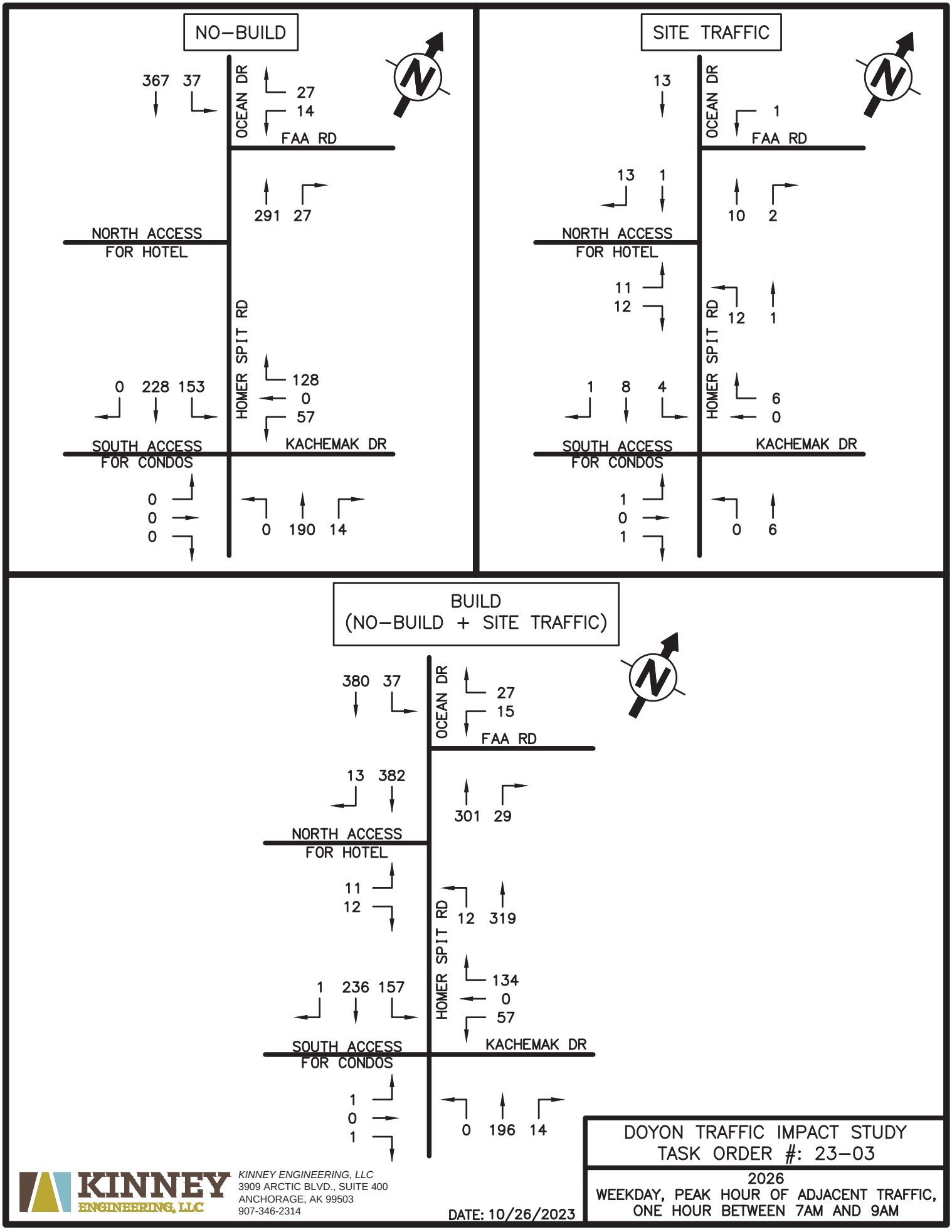
R^2= 0.65

Attachment D: Trip Generation Handbook Method of Selecting Trip Generation Calculation: Average Rate or Equation

Figure 4.2 Process for Selecting Average Rate or Equation in *Trip Generation Manual* Data



Attachment E: Peak Hour Cases No-Build, Site Traffic, Combined Turning Movement Counts

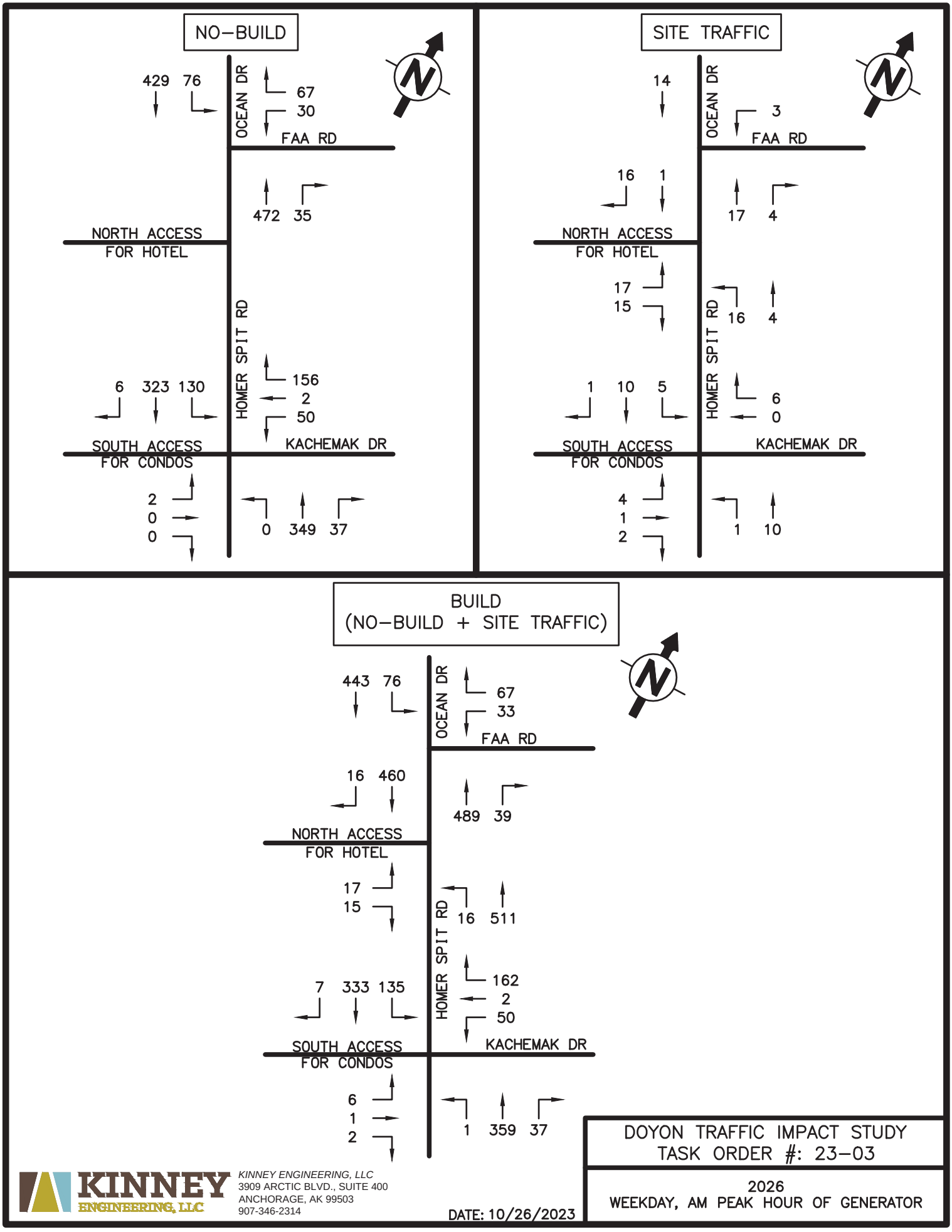


KINNEY ENGINEERING, LLC
KINNEY ENGINEERING, LLC
3909 ARCTIC BLVD., SUITE 400
ANCHORAGE, AK 99503
907-346-2314

DATE: 10/26/2023

DOYON TRAFFIC IMPACT STUDY
TASK ORDER #: 23-03

2026
WEEKDAY, PEAK HOUR OF ADJACENT TRAFFIC,
ONE HOUR BETWEEN 7AM AND 9AM

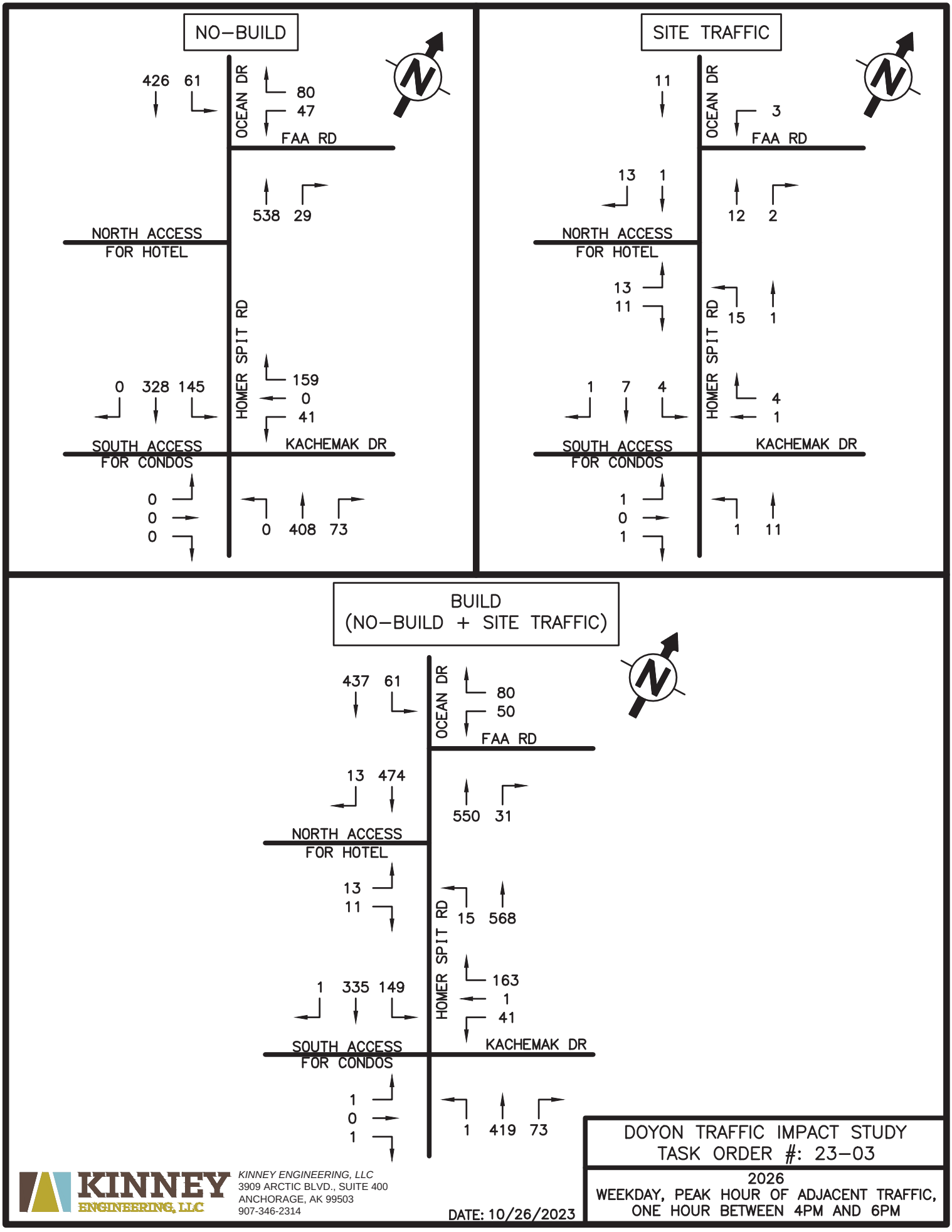


DOYON TRAFFIC IMPACT STUDY
TASK ORDER #: 23-03

2026
WEEKDAY, AM PEAK HOUR OF GENERATOR

KINNEY ENGINEERING, LLC
3909 ARCTIC BLVD., SUITE 400
ANCHORAGE, AK 99503
907-346-2314

DATE: 10/26/2023

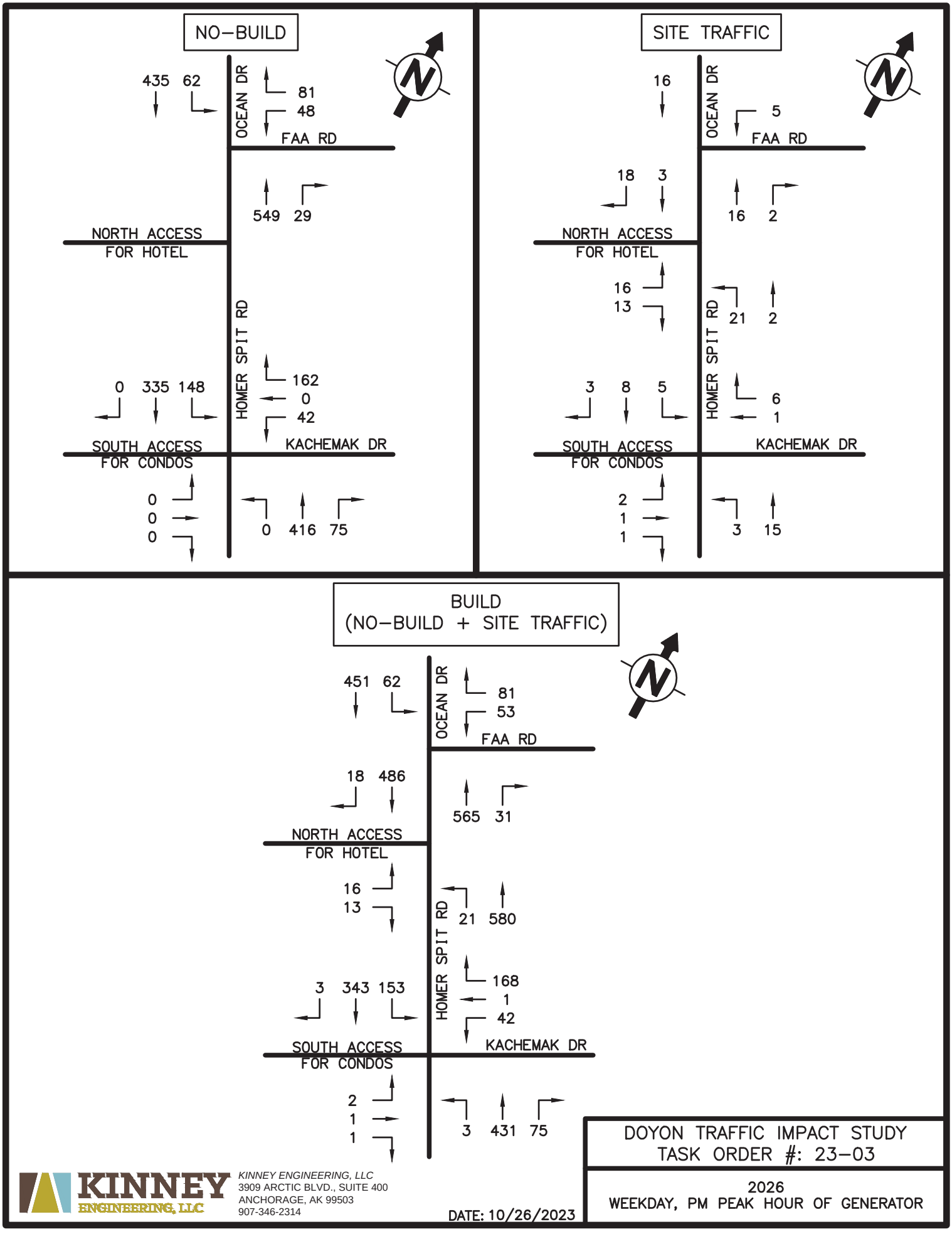


KINNEY ENGINEERING, LLC
KINNEY ENGINEERING, LLC
3909 ARCTIC BLVD., SUITE 400
ANCHORAGE, AK 99503
907-346-2314

DATE: 10/26/2023

DOYON TRAFFIC IMPACT STUDY
TASK ORDER #: 23-03

2026
WEEKDAY, PEAK HOUR OF ADJACENT TRAFFIC,
ONE HOUR BETWEEN 4PM AND 6PM

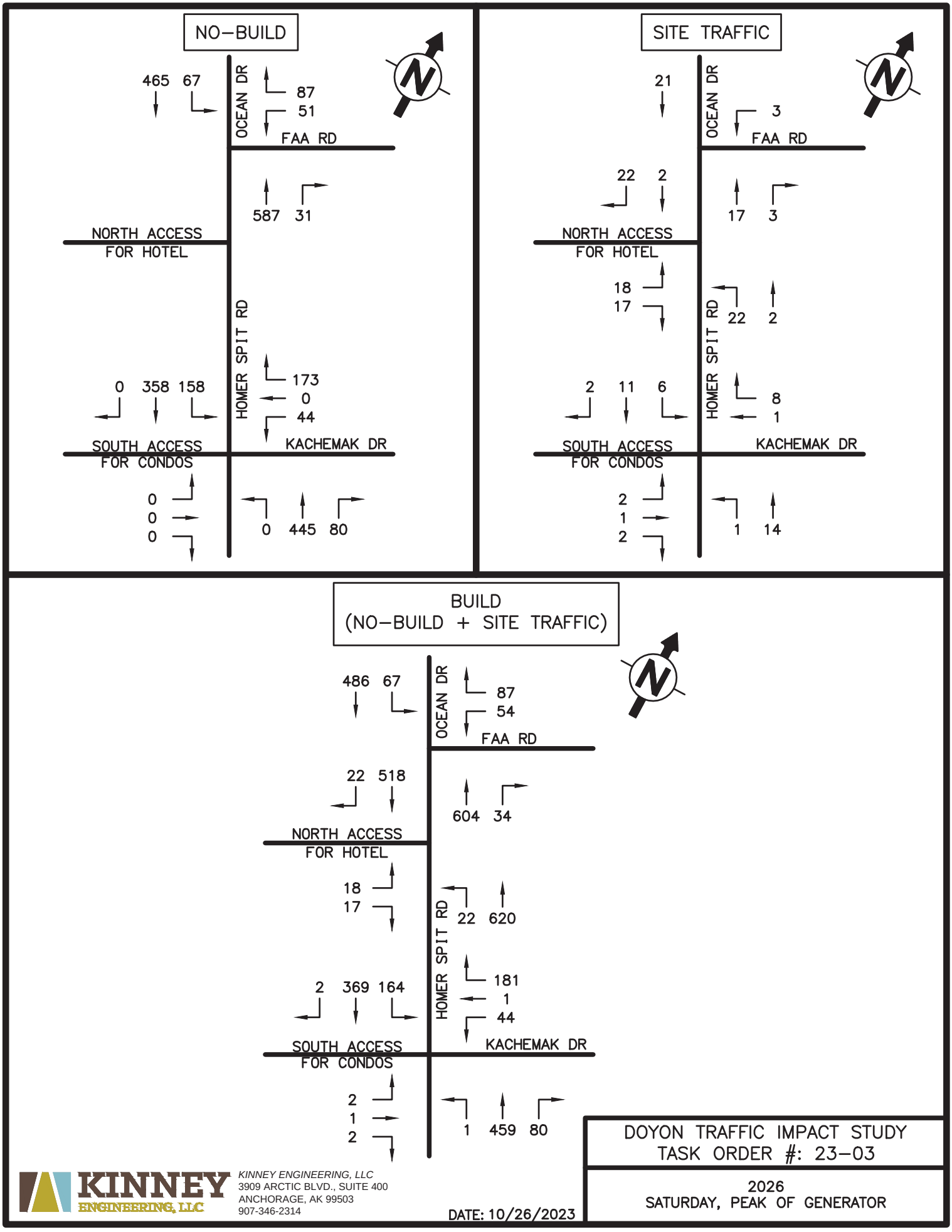


DOYON TRAFFIC IMPACT STUDY
TASK ORDER #: 23-03

2026
WEEKDAY, PM PEAK HOUR OF GENERATOR

KINNEY ENGINEERING, LLC
3909 ARCTIC BLVD., SUITE 400
ANCHORAGE, AK 99503
907-346-2314

DATE: 10/26/2023


NO-BUILD
465 67
OCEAN DR
87
51
FAA RD
587 31
NORTH ACCESS
FOR HOTEL
HOMER SPIT RD
0 358 158
173
0
44
SOUTH ACCESS
FOR CONDOS
KACHEMAK DR
0
0
0
0 445 80
SITE TRAFFIC
21
OCEAN DR
3
FAA RD
22 2
17 3
NORTH ACCESS
FOR HOTEL
18
17
22 2
HOMER SPIT RD
2 11 6
8
1
SOUTH ACCESS
FOR CONDOS
KACHEMAK DR
2
1
2
1 14
BUILD
(NO-BUILD + SITE TRAFFIC)
486 67
OCEAN DR
87
54
FAA RD
22 518
604 34
NORTH ACCESS
FOR HOTEL
18
17
22 620
HOMER SPIT RD
2 369 164
181
1
44
SOUTH ACCESS
FOR CONDOS
KACHEMAK DR
2
1
2
1 459 80
DOYON TRAFFIC IMPACT STUDY
TASK ORDER #: 23-03
2026
SATURDAY, PEAK OF GENERATOR
KINNEY ENGINEERING, LLC
KINNEY ENGINEERING, LLC
3909 ARCTIC BLVD., SUITE 400
ANCHORAGE, AK 99503
907-346-2314
DATE: 10/26/2023

Attachment F: Highway Capacity Software Reports

HCS Two-Way Stop-Control Report

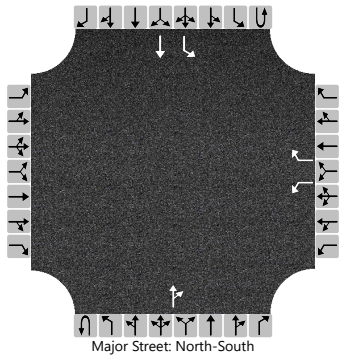
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	8am-9am(No-Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						14		27			291	17		37	367	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						15		28						39		
Capacity, c (veh/h)						340		702						1202		
v/c Ratio						0.04		0.04						0.03		
95% Queue Length, Q_{95} (veh)						0.1		0.1						0.1		
Control Delay (s/veh)						16.1		10.3						8.1	0.2	
Level of Service (LOS)						C		B						A	A	
Approach Delay (s/veh)						12.3								0.9		
Approach LOS						B								A		

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		0	10	10
Two-Stage Crossing			No	No
Pedestrian Platooning			No	No
Conflicting Vehicular Flow (veh/h)			711	732
Average Delay (s)			35.0	39.9
Prob. of Non-Delayed Crossing, P_{nd}			0.139	0.121
Proportion of Dissatisfied Peds, P_D			0.712	0.721
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

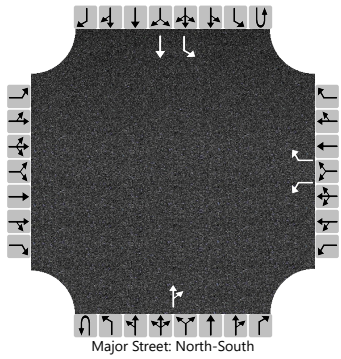
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	11am-12pm(No-Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						30		67			472	35		76	429	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						32		71						80		
Capacity, c (veh/h)						196		529						986		
v/c Ratio						0.16		0.13						0.08		
95% Queue Length, Q_{95} (veh)						0.6		0.5						0.3		
Control Delay (s/veh)						26.9		12.8						9.0	0.5	
Level of Service (LOS)						D		B						A	A	
Approach Delay (s/veh)						17.2								1.8		
Approach LOS						C								A		

Pedestrian Level of Service				
Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		10	10	10
Two-Stage Crossing		No	No	No
Pedestrian Platooning		No	No	No
Conflicting Vehicular Flow (veh/h)			985	1028
Average Delay (s)			37.3	55.2
Prob. of Non-Delayed Crossing, P_{nd}			0.096	0.067
Proportion of Dissatisfied Peds, P_D			0.752	0.767
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

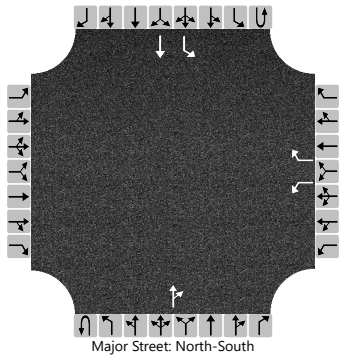
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	4:15pm-5:15pm(No-Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						47		80			538	29		61	426	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						49		84						64		
Capacity, c (veh/h)						190		485						934		
v/c Ratio						0.26		0.17						0.07		
95% Queue Length, Q_{95} (veh)						1.0		0.6						0.2		
Control Delay (s/veh)						30.5		14.0						9.1	0.5	
Level of Service (LOS)						D		B						A	A	
Approach Delay (s/veh)						20.1								1.6		
Approach LOS						C								A		

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		10	10	10
Two-Stage Crossing		No	No	No
Pedestrian Platooning		No	No	No
Conflicting Vehicular Flow (veh/h)			1045	1079
Average Delay (s)			37.2	57.2
Prob. of Non-Delayed Crossing, P_{nd}			0.091	0.062
Proportion of Dissatisfied Peds, P_D			0.758	0.773
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

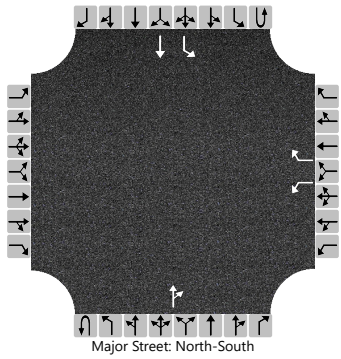
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pm(No-Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						48		81			549	29		62	435	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						51		85						65		
Capacity, c (veh/h)						183		478						924		
v/c Ratio						0.28		0.18						0.07		
95% Queue Length, Q_{95} (veh)						1.1		0.6						0.2		
Control Delay (s/veh)						31.9		14.2						9.2	0.5	
Level of Service (LOS)						D		B						A	A	
Approach Delay (s/veh)						20.8								1.6		
Approach LOS						C								A		

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		10	10	10
Two-Stage Crossing		No	No	No
Pedestrian Platooning		No	No	No
Conflicting Vehicular Flow (veh/h)			1066	1101
Average Delay (s)			37.2	58.0
Prob. of Non-Delayed Crossing, P_{nd}			0.089	0.059
Proportion of Dissatisfied Peds, P_D			0.761	0.776
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

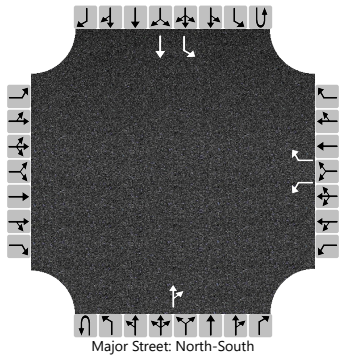
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pmSAT(No-Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						51		87			587	31		67	465	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						54		92						71		
Capacity, c (veh/h)						162		453						891		
v/c Ratio						0.33		0.20						0.08		
95% Queue Length, Q_{95} (veh)						1.4		0.7						0.3		
Control Delay (s/veh)						37.9		15.0						9.4	0.6	
Level of Service (LOS)						E		B						A	A	
Approach Delay (s/veh)						23.4								1.7		
Approach LOS						C								A		

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		10	10	10
Two-Stage Crossing		No	No	No
Pedestrian Platooning		No	No	No
Conflicting Vehicular Flow (veh/h)			1140	1178
Average Delay (s)			37.0	60.8
Prob. of Non-Delayed Crossing, P_{nd}			0.083	0.052
Proportion of Dissatisfied Peds, P_D			0.768	0.784
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

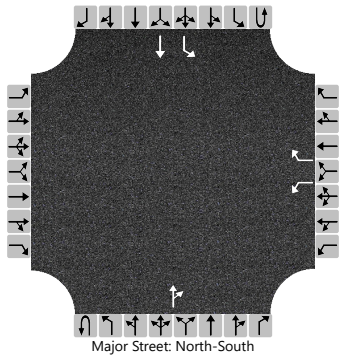
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	8am-9am(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						15		27			301	29		37	380	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						16		28						39		
Capacity, c (veh/h)						326		687						1179		
v/c Ratio						0.05		0.04						0.03		
95% Queue Length, Q_{95} (veh)						0.2		0.1						0.1		
Control Delay (s/veh)						16.6		10.5						8.2	0.2	
Level of Service (LOS)						C		B						A	A	
Approach Delay (s/veh)						12.7								0.9		
Approach LOS						B								A		

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		0	10	10
Two-Stage Crossing			No	No
Pedestrian Platooning			No	No
Conflicting Vehicular Flow (veh/h)			747	756
Average Delay (s)			35.7	41.4
Prob. of Non-Delayed Crossing, P_{nd}			0.131	0.115
Proportion of Dissatisfied Peds, P_D			0.718	0.726
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

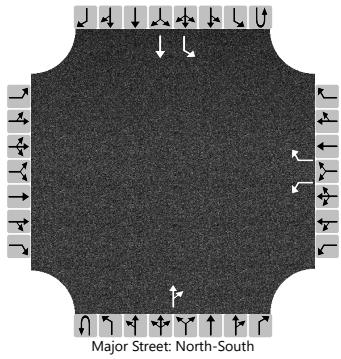
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	11am-12pm(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						33		67			489	39		76	443	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						35		71						80		
Capacity, c (veh/h)						186		515						968		
v/c Ratio						0.19		0.14						0.08		
95% Queue Length, Q_{95} (veh)						0.7		0.5						0.3		
Control Delay (s/veh)						28.7		13.1						9.1	0.6	
Level of Service (LOS)						D		B						A	A	
Approach Delay (s/veh)						18.2								1.8		
Approach LOS						C								A		

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		10	10	10
Two-Stage Crossing		No	No	No
Pedestrian Platooning		No	No	No
Conflicting Vehicular Flow (veh/h)			1022	1061
Average Delay (s)			37.3	56.5
Prob. of Non-Delayed Crossing, P_{nd}			0.093	0.064
Proportion of Dissatisfied Peds, P_D			0.756	0.771
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

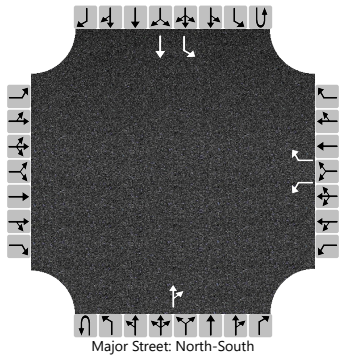
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	4:15pm-5:15pm(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						50		80			550	31		61	437	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						53		84						64		
Capacity, c (veh/h)						183		476						922		
v/c Ratio						0.29		0.18						0.07		
95% Queue Length, Q_{95} (veh)						1.1		0.6						0.2		
Control Delay (s/veh)						32.4		14.2						9.2	0.5	
Level of Service (LOS)						D		B						A	A	
Approach Delay (s/veh)						21.2								1.6		
Approach LOS						C								A		

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		10	10	10
Two-Stage Crossing		No	No	No
Pedestrian Platooning		No	No	No
Conflicting Vehicular Flow (veh/h)			1072	1103
Average Delay (s)			37.2	58.1
Prob. of Non-Delayed Crossing, P_{nd}			0.088	0.059
Proportion of Dissatisfied Peds, P_D			0.761	0.776
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

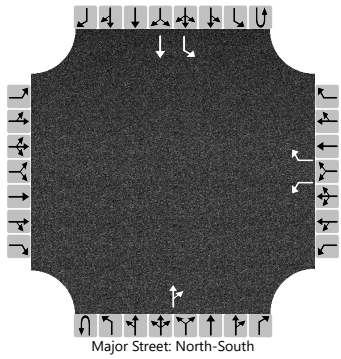
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pm(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						53		81			565	31		62	451	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						56		85						65		
Capacity, c (veh/h)						175		467						909		
v/c Ratio						0.32		0.18						0.07		
95% Queue Length, Q_{95} (veh)						1.3		0.7						0.2		
Control Delay (s/veh)						35.0		14.4						9.3	0.5	
Level of Service (LOS)						E		B						A	A	
Approach Delay (s/veh)						22.6								1.6		
Approach LOS						C								A		

Pedestrian Level of Service				
Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		10	10	10
Two-Stage Crossing		No	No	No
Pedestrian Platooning		No	No	No
Conflicting Vehicular Flow (veh/h)			1102	1135
Average Delay (s)			37.1	59.3
Prob. of Non-Delayed Crossing, P_{nd}			0.086	0.056
Proportion of Dissatisfied Peds, P_D			0.764	0.780
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

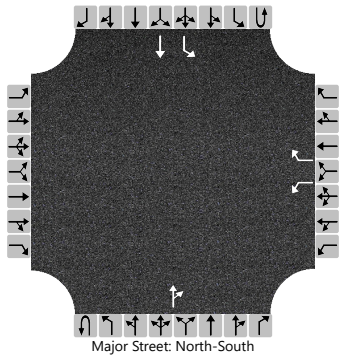
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pmSAT(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	FAA Road, Ocean Dr/Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	FAA Road
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	0	0		1	0	1	0	0	1	0	0	1	1	0
Configuration						L		R				TR		L	T	
Volume (veh/h)						54		87			604	34		67	486	
Percent Heavy Vehicles (%)						5		5						8		
Proportion Time Blocked																
Percent Grade (%)						0										
Right Turn Channelized						No										
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)						7.1		6.2						4.1		
Critical Headway (sec)						6.45		6.25						4.18		
Base Follow-Up Headway (sec)						3.5		3.3						2.2		
Follow-Up Headway (sec)						3.55		3.35						2.27		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)						57		92						71		
Capacity, c (veh/h)						152		441						875		
v/c Ratio						0.37		0.21						0.08		
95% Queue Length, Q_{95} (veh)						1.6		0.8						0.3		
Control Delay (s/veh)						42.0		15.3						9.5	0.6	
Level of Service (LOS)						E		C						A	A	
Approach Delay (s/veh)						25.5								1.7		
Approach LOS						D								A		

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)		10	10	10
Two-Stage Crossing		No	No	No
Pedestrian Platooning		No	No	No
Conflicting Vehicular Flow (veh/h)			1183	1218
Average Delay (s)			36.8	62.3
Prob. of Non-Delayed Crossing, P_{nd}			0.081	0.049
Proportion of Dissatisfied Peds, P_D			0.773	0.788
Level of Service (LOS)			F	F

HCS Two-Way Stop-Control Report

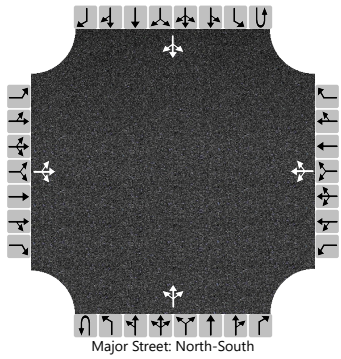
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	8am-9am(No-Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	0		57	0	128		0	190	14		153	228	0
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			0				195			0				161		
Capacity, c (veh/h)			0				761			1280				1302		
v/c Ratio							0.26			0.00				0.12		
95% Queue Length, Q_{95} (veh)							1.0			0.0				0.4		
Control Delay (s/veh)							11.4			7.8	0.0	0.0		8.2	1.2	1.2
Level of Service (LOS)							B			A	A	A		A	A	A
Approach Delay (s/veh)						11.4				0.0				4.0		
Approach LOS						B				A				A		

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			455	
Average Delay (s)			3.0	
Prob. of Non-Delayed Crossing, P_{nd}			0.643	
Proportion of Dissatisfied Peds, P_D			0.282	
Level of Service (LOS)			D	

HCS Two-Way Stop-Control Report

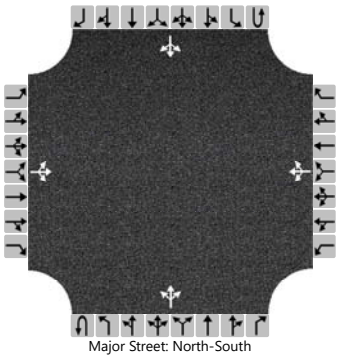
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	11am-12pm(No-Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	0	0		50	2	156		0	349	37		130	323	6
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			2				219			0				137		
Capacity, c (veh/h)			139				616			1169				1106		
v/c Ratio			0.02				0.36			0.00				0.12		
95% Queue Length, Q_{95} (veh)			0.0				1.6			0.0				0.4		
Control Delay (s/veh)			31.3				14.0			8.1	0.0	0.0		8.7	1.3	1.3
Level of Service (LOS)			D				B			A	A	A		A	A	A
Approach Delay (s/veh)	31.3				14.0				0.0				3.4			
Approach LOS	D				B				A				A			

Pedestrian Level of Service				
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			746	
Average Delay (s)			3.2	
Prob. of Non-Delayed Crossing, P_{nd}	0.994	0.742	0.639	
Level of Service (LOS)	D	E	D	

HCS Two-Way Stop-Control Report

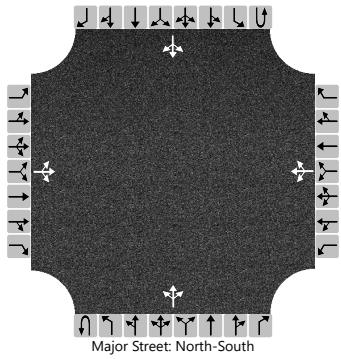
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	4:15pm-5:15pm(No-Built)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	0		41	0	159		0	408	73		145	328	0
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			0				211			0				153		
Capacity, c (veh/h)			0				564			1170				1015		
v/c Ratio							0.37			0.00				0.15		
95% Queue Length, Q_{95} (veh)							1.7			0.0				0.5		
Control Delay (s/veh)							15.1			8.1	0.0	0.0		9.2	1.7	1.7
Level of Service (LOS)							C			A	A	A		A	A	A
Approach Delay (s/veh)					15.1				0.0				4.0			
Approach LOS					C				A				A			

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			852	
Average Delay (s)			3.2	
Prob. of Non-Delayed Crossing, P_{nd}			0.636	
Proportion of Dissatisfied Peds, P_D			0.315	
Level of Service (LOS)			D	

HCS Two-Way Stop-Control Report

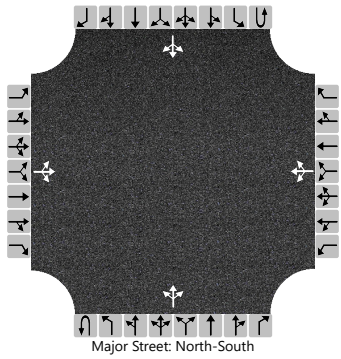
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pm(No-Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	0		42	0	162		0	416	75		148	335	0
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			0				215			0				156		
Capacity, c (veh/h)			0				547			1163				1005		
v/c Ratio							0.39			0.00				0.15		
95% Queue Length, Q_{95} (veh)							1.9			0.0				0.5		
Control Delay (s/veh)							15.8			8.1	0.0	0.0		9.2	1.8	1.8
Level of Service (LOS)							C			A	A	A		A	A	A
Approach Delay (s/veh)					15.8				0.0				4.1			
Approach LOS					C				A				A			

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			869	
Average Delay (s)			3.2	
Prob. of Non-Delayed Crossing, P_{nd}			0.636	
Proportion of Dissatisfied Peds, P_D			0.317	
Level of Service (LOS)			D	

HCS Two-Way Stop-Control Report

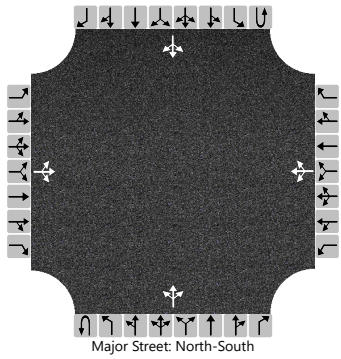
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pmSAT(No-Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes


Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		0	0	0		44	0	173		0	445	80		158	358	0
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			0				228			0				166		
Capacity, c (veh/h)			0				494			1139				975		
v/c Ratio							0.46			0.00				0.17		
95% Queue Length, Q_{95} (veh)							2.4			0.0				0.6		
Control Delay (s/veh)							18.4			8.2	0.0	0.0		9.5	2.0	2.0
Level of Service (LOS)							C			A	A	A		A	A	A
Approach Delay (s/veh)					18.4				0.0				4.3			
Approach LOS					C				A				A			

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			929	
Average Delay (s)			3.1	
Prob. of Non-Delayed Crossing, P_{nd}			0.633	
Proportion of Dissatisfied Peds, P_D			0.322	
Level of Service (LOS)			D	

HCS Two-Way Stop-Control Report

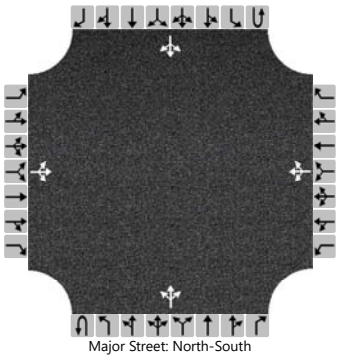
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	8am-9am(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		1	0	1		57	0	134		0	196	14		157	236	1
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)		0				0										
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			2				201			0				165		
Capacity, c (veh/h)			332				749			1270				1295		
v/c Ratio			0.01				0.27			0.00				0.13		
95% Queue Length, Q_{95} (veh)			0.0				1.1			0.0				0.4		
Control Delay (s/veh)			15.9				11.6			7.8	0.0	0.0		8.2	1.2	1.2
Level of Service (LOS)			C				B			A	A	A		A	A	A
Approach Delay (s/veh)		15.9				11.6				0.0				4.0		
Approach LOS		C				B				A				A		

Pedestrian Level of Service				
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			469	
Average Delay (s)			3.0	
Prob. of Non-Delayed Crossing, P_{nd}	0.997	0.759	0.643	
Level of Service (LOS)	D	E	D	

HCS Two-Way Stop-Control Report

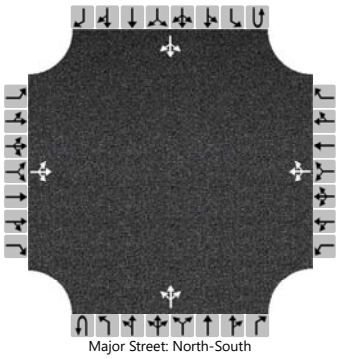
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	11am-12pm(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		6	1	2		50	2	162		1	359	37		135	333	7
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			9				225			1				142		
Capacity, c (veh/h)			162				593			1158				1096		
v/c Ratio			0.06				0.38			0.00				0.13		
95% Queue Length, Q_{95} (veh)			0.2				1.8			0.0				0.4		
Control Delay (s/veh)			28.6				14.7			8.1	0.0	0.0		8.8	1.4	1.4
Level of Service (LOS)			D				B			A	A	A		A	A	A
Approach Delay (s/veh)	28.6				14.7				0.0				3.5			
Approach LOS	D				B				A				A			

Pedestrian Level of Service				
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			768	
Average Delay (s)			3.2	
Prob. of Non-Delayed Crossing, P_{nd}	0.983	0.735	0.639	
Level of Service (LOS)	D	E	D	

HCS Two-Way Stop-Control Report

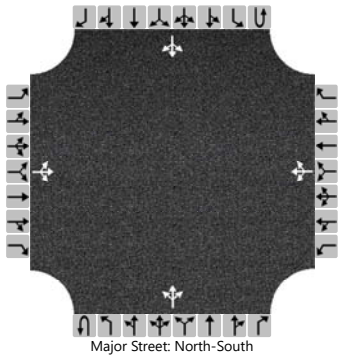
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	4:15pm-5:15pm(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		1	0	1		41	1	163		1	419	73		149	335	1
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			2				216			1				157		
Capacity, c (veh/h)			177				544			1162				1005		
v/c Ratio			0.01				0.40			0.00				0.16		
95% Queue Length, Q_{95} (veh)			0.0				1.9			0.0				0.6		
Control Delay (s/veh)			25.6				15.9			8.1	0.0	0.0		9.2	1.8	1.8
Level of Service (LOS)			D				C			A	A	A		A	A	A
Approach Delay (s/veh)	25.6				15.9				0.0				4.1			
Approach LOS	D				C				A				A			

Pedestrian Level of Service				
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			872	
Average Delay (s)			3.2	
Prob. of Non-Delayed Crossing, P_{nd}	0.995	0.745	0.636	
Level of Service (LOS)	D	E	D	

HCS Two-Way Stop-Control Report

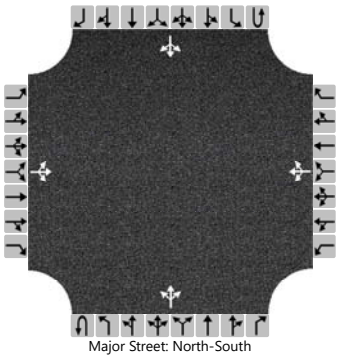
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pm(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	1	1		42	1	168		3	431	75		153	343	3
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			4				222			3				161		
Capacity, c (veh/h)			131				518			1152				992		
v/c Ratio			0.03				0.43			0.00				0.16		
95% Queue Length, Q_{95} (veh)			0.1				2.1			0.0				0.6		
Control Delay (s/veh)			33.3				17.1			8.1	0.0	0.0		9.3	1.9	1.9
Level of Service (LOS)			D				C			A	A	A		A	A	A
Approach Delay (s/veh)	33.3				17.1				0.1				4.2			
Approach LOS	D				C				A				A			

Pedestrian Level of Service				
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			897	
Average Delay (s)			3.2	
Prob. of Non-Delayed Crossing, P_{nd}	0.992	0.738	0.635	
Level of Service (LOS)	D	E	D	

HCS Two-Way Stop-Control Report

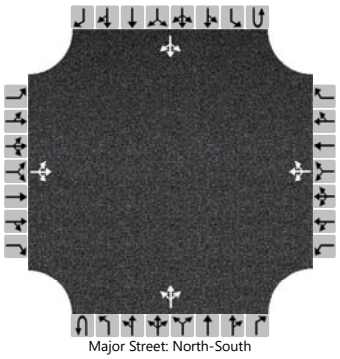
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pmSAT(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Kachemak / Triplex Condo Driveway / Homer...
Jurisdiction	Homer, Alaska
East/West Street	Kachemak / Triplex Condo Driveway
North/South Street	Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Major Street: North-South

Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	1	0	0	0	1	0	0	0	1	0
Configuration			LTR				LTR				LTR				LTR	
Volume (veh/h)		2	1	2		44	1	181		1	459	80		164	369	2
Percent Heavy Vehicles (%)		3	3	3		5	5	5		6				7		
Proportion Time Blocked																
Percent Grade (%)	0				0											
Right Turn Channelized																
Median Type | Storage	Undivided															

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1	6.5	6.2		7.1	6.5	6.2		4.1				4.1		
Critical Headway (sec)		7.13	6.53	6.23		7.15	6.55	6.25		4.16				4.17		
Base Follow-Up Headway (sec)		3.5	4.0	3.3		3.5	4.0	3.3		2.2				2.2		
Follow-Up Headway (sec)		3.53	4.03	3.33		3.55	4.05	3.35		2.25				2.26		

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			5				238			1				173		
Capacity, c (veh/h)			131				468			1126				963		
v/c Ratio			0.04				0.51			0.00				0.18		
95% Queue Length, Q_{95} (veh)			0.1				2.8			0.0				0.7		
Control Delay (s/veh)			33.6				20.4			8.2	0.0	0.0		9.6	2.2	2.2
Level of Service (LOS)			D				C			A	A	A		A	A	A
Approach Delay (s/veh)	33.6				20.4				0.0				4.4			
Approach LOS	D				C				A				A			

Pedestrian Level of Service				
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			957	
Average Delay (s)			3.1	
Prob. of Non-Delayed Crossing, P_{nd}	0.991	0.724	0.632	
Level of Service (LOS)	D	E	D	

HCS Two-Way Stop-Control Report

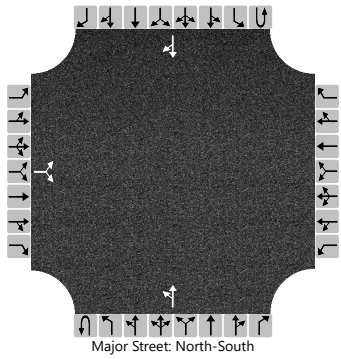
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	8am-9am(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Hotel Driveway / Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	Hotel Driveway
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		11		12						12	319				382	13
Percent Heavy Vehicles (%)		3		3						7						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.17						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.26						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			24							13						
Capacity, c (veh/h)			458							1097						
v/c Ratio			0.05							0.01						
95% Queue Length, Q_{95} (veh)			0.2							0.0						
Control Delay (s/veh)			13.3							8.3	0.1					
Level of Service (LOS)			B							A	A					
Approach Delay (s/veh)		13.3								0.4						
Approach LOS		B								A						

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10		0	0
Two-Stage Crossing	No			
Pedestrian Platooning	No			
Conflicting Vehicular Flow (veh/h)				
Average Delay (s)				
Prob. of Non-Delayed Crossing, P_{nd}				
Proportion of Dissatisfied Peds, P_D				
Level of Service (LOS)				

HCS Two-Way Stop-Control Report

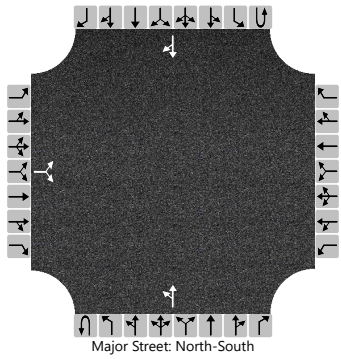
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	11am-12pm(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Hotel Driveway / Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	Hotel Driveway
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		17		15						16	511				460	16
Percent Heavy Vehicles (%)		3		3						7						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.17						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.26						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			34							17						
Capacity, c (veh/h)			322							1019						
v/c Ratio			0.10							0.02						
95% Queue Length, Q_{95} (veh)			0.3							0.1						
Control Delay (s/veh)			17.5							8.6	0.2					
Level of Service (LOS)			C							A	A					
Approach Delay (s/veh)		17.5								0.5						
Approach LOS		C								A						

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10		0	0
Two-Stage Crossing	No			
Pedestrian Platooning	No			
Conflicting Vehicular Flow (veh/h)				
Average Delay (s)				
Prob. of Non-Delayed Crossing, P_{nd}				
Proportion of Dissatisfied Peds, P_D				
Level of Service (LOS)				

HCS Two-Way Stop-Control Report

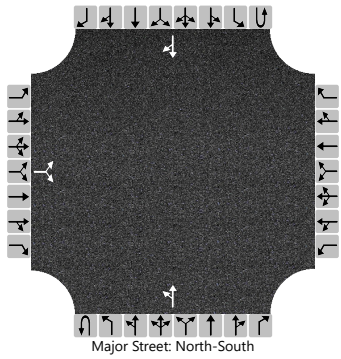
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	4:15pm-5:15pm(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Hotel Driveway / Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	Hotel Driveway
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		13		11						15	568				474	13
Percent Heavy Vehicles (%)		3		3						7						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.17						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.26						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			25							16						
Capacity, c (veh/h)			296							1009						
v/c Ratio			0.09							0.02						
95% Queue Length, Q_{95} (veh)			0.3							0.0						
Control Delay (s/veh)			18.3							8.6	0.2					
Level of Service (LOS)			C							A	A					
Approach Delay (s/veh)		18.3								0.4						
Approach LOS		C								A						

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10		0	0
Two-Stage Crossing	No			
Pedestrian Platooning	No			
Conflicting Vehicular Flow (veh/h)				
Average Delay (s)				
Prob. of Non-Delayed Crossing, P_{nd}				
Proportion of Dissatisfied Peds, P_D				
Level of Service (LOS)				

HCS Two-Way Stop-Control Report

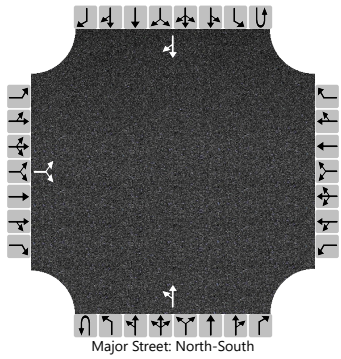
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pm(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Hotel Driveway / Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	Hotel Driveway
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		16		13						21	580				486	18
Percent Heavy Vehicles (%)		3		3						7						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.17						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.26						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			31							22						
Capacity, c (veh/h)			277							994						
v/c Ratio			0.11							0.02						
95% Queue Length, Q_{95} (veh)			0.4							0.1						
Control Delay (s/veh)			19.6							8.7	0.3					
Level of Service (LOS)			C							A	A					
Approach Delay (s/veh)		19.6								0.6						
Approach LOS		C								A						

Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10		0	0
Two-Stage Crossing	No			
Pedestrian Platooning	No			
Conflicting Vehicular Flow (veh/h)				
Average Delay (s)				
Prob. of Non-Delayed Crossing, P_{nd}				
Proportion of Dissatisfied Peds, P_D				
Level of Service (LOS)				

HCS Two-Way Stop-Control Report

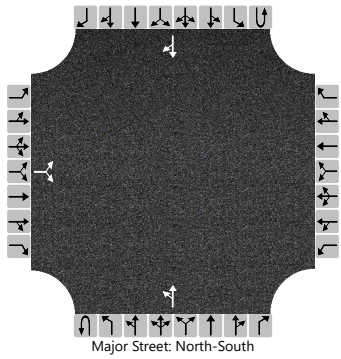
General Information

Analyst	Beau Collin
Agency/Co.	Kinney Engineering LLC
Date Performed	10/24/2023
Analysis Year	2026
Time Analyzed	3pm-4pmSAT(Build)
Intersection Orientation	North-South
Project Description	Doyon Traffic Impact Study

Site Information

Intersection	Hotel Driveway / Homer Spit Rd
Jurisdiction	Homer, Alaska
East/West Street	Hotel Driveway
North/South Street	Ocean Dr/Homer Spit Rd
Peak Hour Factor	0.95
Analysis Time Period (hrs)	0.25

Lanes



Vehicle Volumes and Adjustments

Approach	Eastbound				Westbound				Northbound				Southbound			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Priority		10	11	12		7	8	9	1U	1	2	3	4U	4	5	6
Number of Lanes		0	1	0		0	0	0	0	0	1	0	0	0	1	0
Configuration			LR							LT						TR
Volume (veh/h)		18		17						22	620				518	22
Percent Heavy Vehicles (%)		3		3						7						
Proportion Time Blocked																
Percent Grade (%)		0														
Right Turn Channelized																
Median Type | Storage		Undivided														

Critical and Follow-up Headways

Base Critical Headway (sec)		7.1		6.2						4.1						
Critical Headway (sec)		6.43		6.23						4.17						
Base Follow-Up Headway (sec)		3.5		3.3						2.2						
Follow-Up Headway (sec)		3.53		3.33						2.26						

Delay, Queue Length, and Level of Service

Flow Rate, v (veh/h)			37							23						
Capacity, c (veh/h)			260							962						
v/c Ratio			0.14							0.02						
95% Queue Length, Q_{95} (veh)			0.5							0.1						
Control Delay (s/veh)			21.1							8.8	0.3					
Level of Service (LOS)			C							A	A					
Approach Delay (s/veh)		21.1								0.6						
Approach LOS		C								A						

Pedestrian Level of Service

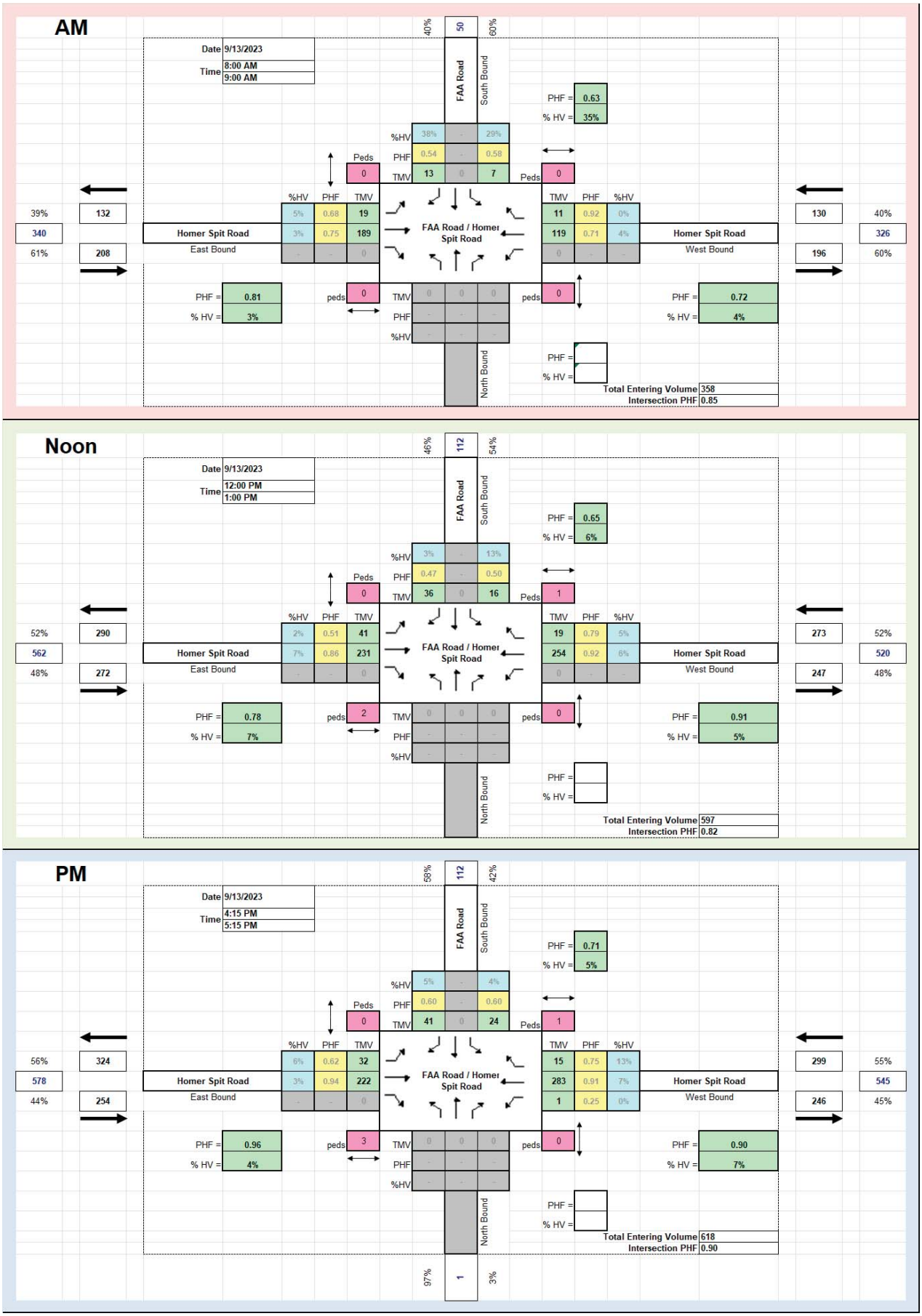
Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10		0	0
Two-Stage Crossing	No			
Pedestrian Platooning	No			
Conflicting Vehicular Flow (veh/h)				
Average Delay (s)				
Prob. of Non-Delayed Crossing, P_{nd}				
Proportion of Dissatisfied Peds, P_D				
Level of Service (LOS)				

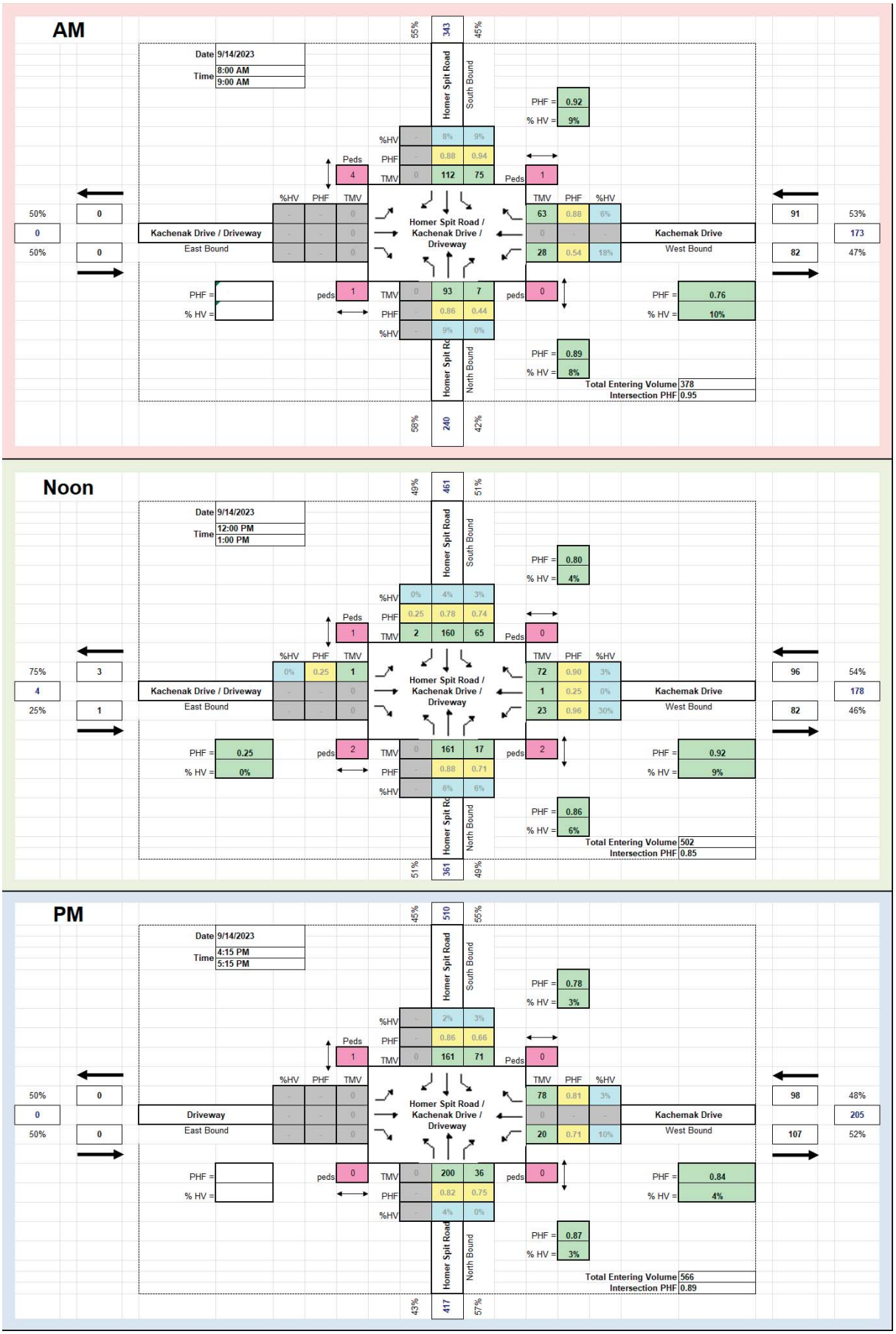
Pedestrian Level of Service

Approach	Eastbound	Westbound	Northbound	Southbound
Flow (ped/hr)	10	10	10	0
Two-Stage Crossing	No	No	No	
Pedestrian Platooning	No	No	No	
Conflicting Vehicular Flow (veh/h)			957	
Average Delay (s)			3.1	
Prob. of Non-Delayed Crossing, P_{nd}			0.632	
Proportion of Dissatisfied Peds, P_D			0.325	
Level of Service (LOS)			D	

Attachment G: September 2022 Intersection Counts

Follows this page


AM
Date 9/13/2023
Time 8:00 AM
9:00 AM
40% 50 60%
FAA Road
South Bound
PHF = 0.63
% HV = 35%
%HV 38% - 29%
PHF 0.54 - 0.58
Peds 0
TMV 13 0 7
Peds 0
39% 132
340
61% 208
%HV PHF TMV
5% 0.68 19
3% 0.75 189
- - 0
Homer Spit Road
East Bound
FAA Road / Homer Spit Road
TMV PHF %HV
11 0.92 0%
119 0.71 4%
0 - -
Homer Spit Road
West Bound
130 40%
326
196 60%
PHF = 0.81
% HV = 3%
peds 0
TMV 0 0 0
PHF - - -
%HV - - -
peds 0
PHF = 0.72
% HV = 4%
PHF =
% HV =
North Bound
Total Entering Volume 358
Intersection PHF 0.85
Noon
Date 9/13/2023
Time 12:00 PM
1:00 PM
46% 112 54%
FAA Road
South Bound
PHF = 0.65
% HV = 6%
%HV 3% - 13%
PHF 0.47 - 0.50
Peds 0
TMV 36 0 16
Peds 1
52% 290
562
48% 272
%HV PHF TMV
2% 0.51 41
7% 0.86 231
- - 0
Homer Spit Road
East Bound
FAA Road / Homer Spit Road
TMV PHF %HV
19 0.79 5%
254 0.92 6%
0 - -
Homer Spit Road
West Bound
273 52%
520
247 48%
PHF = 0.78
% HV = 7%
peds 2
TMV 0 0 0
PHF - - -
%HV - - -
peds 0
PHF = 0.91
% HV = 5%
PHF =
% HV =
North Bound
Total Entering Volume 597
Intersection PHF 0.82
PM
Date 9/13/2023
Time 4:15 PM
5:15 PM
58% 112 42%
FAA Road
South Bound
PHF = 0.71
% HV = 5%
%HV 5% - 4%
PHF 0.60 - 0.60
Peds 0
TMV 41 0 24
Peds 1
56% 324
578
44% 254
%HV PHF TMV
6% 0.62 32
3% 0.94 222
- - 0
Homer Spit Road
East Bound
FAA Road / Homer Spit Road
TMV PHF %HV
15 0.75 13%
283 0.91 7%
1 0.25 0%
Homer Spit Road
West Bound
299 55%
545
246 45%
PHF = 0.96
% HV = 4%
peds 3
TMV 0 0 0
PHF - - -
%HV - - -
peds 0
PHF = 0.90
% HV = 7%
PHF =
% HV =
North Bound
Total Entering Volume 618
Intersection PHF 0.90
97% 1 3%


AM
Date 9/14/2023
Time 8:00 AM
9:00 AM
Homer Spit Road
South Bound
55% 343 45%
PHF = 0.92
% HV = 9%
%HV - 8% 9%
PHF - 0.88 0.94
Peds 4 TMV 0 112 75 Peds 1
%HV PHF TMV
50% 0
0
50% 0
Kachenak Drive / Driveway
East Bound
Homer Spit Road / Kachenak Drive / Driveway
TMV PHF %HV
63 0.88 6%
0 - -
28 0.54 18%
Kachemak Drive
West Bound
91 53%
173
82 47%
PHF =
% HV =
peds 1
TMV 0 93 7
PHF - 0.86 0.44
%HV - 9% 0%
peds 0
PHF = 0.76
% HV = 10%
Homer Spit Road
North Bound
PHF = 0.89
% HV = 8%
Total Entering Volume 378
Intersection PHF 0.95
58% 240 42%
Noon
Date 9/14/2023
Time 12:00 PM
1:00 PM
49% 461 51%
Homer Spit Road
South Bound
PHF = 0.80
% HV = 4%
%HV 0% 4% 3%
PHF 0.25 0.78 0.74
Peds 1 TMV 2 160 65 Peds 0
%HV PHF TMV
75% 3
4
25% 1
Kachenak Drive / Driveway
East Bound
Homer Spit Road / Kachenak Drive / Driveway
TMV PHF %HV
72 0.90 3%
1 0.25 0%
23 0.96 30%
Kachemak Drive
West Bound
96 54%
178
82 46%
PHF = 0.25
% HV = 0%
peds 2
TMV 0 161 17
PHF - 0.88 0.71
%HV - 6% 6%
peds 2
PHF = 0.92
% HV = 9%
Homer Spit Road
North Bound
PHF = 0.86
% HV = 6%
Total Entering Volume 502
Intersection PHF 0.85
51% 361 49%
PM
Date 9/14/2023
Time 4:15 PM
5:15 PM
45% 510 55%
Homer Spit Road
South Bound
PHF = 0.78
% HV = 3%
%HV - 2% 3%
PHF - 0.86 0.66
Peds 1 TMV 0 161 71 Peds 0
%HV PHF TMV
50% 0
0
50% 0
Driveway
East Bound
Homer Spit Road / Kachenak Drive / Driveway
TMV PHF %HV
78 0.81 3%
0 - -
20 0.71 10%
Kachemak Drive
West Bound
98 48%
205
107 52%
PHF =
% HV =
peds 0
TMV 0 200 36
PHF - 0.82 0.75
%HV - 4% 0%
peds 0
PHF = 0.84
% HV = 4%
Homer Spit Road
North Bound
PHF = 0.87
% HV = 3%
Total Entering Volume 566
Intersection PHF 0.89
43% 417 57%

Attachment H: HCS Signal Warrants- FAA Road-Ocean Drive-Homer Spit Road Intersection

Follows this page

HCS Warrants Report

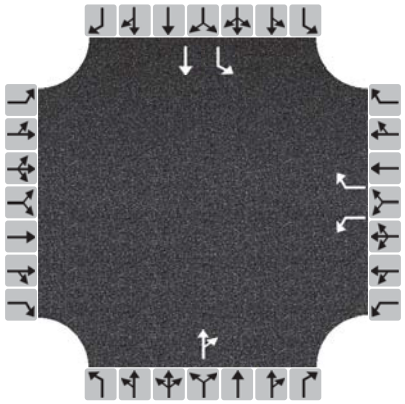
Project Information

Analyst	Kinney	Date	10/29/2023
Agency	KELLC	Analysis Year	2006
Jurisdiction		Time Period Analyzed	Weekday, Summer
Project Description	FAA Road Ocean Homer Spit Warrants All WB movements		

General

Major Street Direction	North-South	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	35	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	5000		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	0	0	1	0	1	0	1	0	1	1	0
Lane Usage				L		R		TR		L	T	
Vehicle Volumes Averages (veh/h)	0	0	0	29	0	51	0	389	28	51	357	0
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	1

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	10

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	751	42	793	0	0	No	No	No	No	No	No	No	No	No
08 - 09	823	57	880	0	0	No	No	No	Yes	No	No	No	No	No
09 - 10	898	71	969	0	0	No	No	Yes	Yes	No	No	No	No	No
10 - 11	974	86	1060	0	0	No	No	Yes	Yes	Yes	No	No	No	No
11 - 12	1047	100	1147	0	0	No	No	Yes	Yes	Yes	No	No	No	No
12 - 13	1063	109	1172	0	0	No	No	Yes	Yes	Yes	No	No	No	No
13 - 14	1078	117	1195	0	0	No	Yes	Yes	Yes	Yes	No	No	No	No
14 - 15	1094	126	1220	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No
15 - 16	1109	134	1243	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No
16 - 17	1079	130	1209	0	0	No	Yes	Yes	Yes	Yes	No	Yes	No	No
17 - 18	0	0	0	0	0	No	No	No	No	No	No	No	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	9916	972	10888	0	0	0	4	8	9	7	0	3	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	✓
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	✓
56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	✓
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	✓
Warrant 3: Peak Hour	✓
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	✓
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 56% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	✓
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

HCS Warrants Report

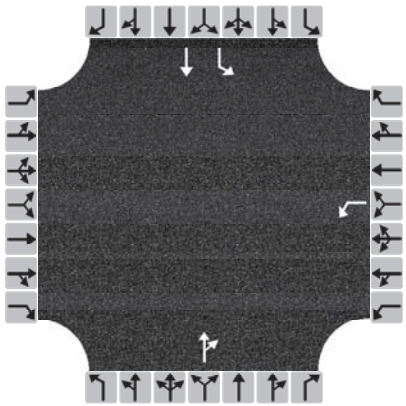
Project Information

Analyst	Kinney	Date	10/29/2023
Agency	KELLC	Analysis Year	2-06
Jurisdiction		Time Period Analyzed	Weekday, Summer
Project Description	FAA Road Ocean Homer Spit Warrants WBLT Only		

General

Major Street Direction	North-South	Population < 10,000	Yes
Starting Time Interval	7	Coordinated Signal System	No
Median Type	Undivided	Crashes (crashes/year)	0
Major Street Speed (mi/h)	35	Adequate Trials of Crash Exp. Alt.	No
Nearest Signal (ft)	5000		

Geometry and Traffic



Approach	Eastbound			Westbound			Northbound			Southbound		
Movement	L	T	R	L	T	R	L	T	R	L	T	R
Number of Lanes, N	0	0	0	1	0	0	0	1	0	1	1	0
Lane Usage				L				TR		L	T	
Vehicle Volumes Averages (veh/h)	0	0	0	29	0	0	0	389	28	51	357	0
Pedestrian Averages (peds/h)	0			0			0			0		
Gap Averages (gaps/h)	0			0			0			0		
Delay (s/veh)	0.0			0.0			0.0			0.0		
Delay (veh-hrs)	0.0			0.0			0.0			0.0		

School Crossing and Roadway Network

Number of Students in Highest Hour	0	Two or More Major Routes	No
Number of Adequate Gaps in Period	0	Weekend Counts	No
Number of Minutes in Period	0	5-year Growth Factor (%)	1

Railroad Crossing

Grade Crossing Approach	None	Rail Traffic (trains/day)	4
Highest Volume Hour with Trains	Unknown	High Occupancy Buses (%)	0
Distance to Stop Line (ft)	-	Tractor-Trailer Trucks (%)	10

Volume Summary

Hour	Major Volume	Minor Volume	Total Volume	Peds/h	Gaps/h	1A (70%)	1A (56%)	1B (70%)	1B (56%)	2 (70%)	3A (70%)	3B (56%)	4A (70%)	4B (56%)
07 - 08	751	15	766	0	0	No	No	No	No	No	No	No	No	No
08 - 09	823	20	843	0	0	No	No	No	No	No	No	No	No	No
09 - 10	898	24	922	0	0	No	No	No	No	No	No	No	No	No
10 - 11	974	29	1003	0	0	No	No	No	No	No	No	No	No	No
11 - 12	1047	33	1080	0	0	No	No	No	No	No	No	No	No	No
12 - 13	1063	38	1101	0	0	No	No	No	No	No	No	No	No	No
13 - 14	1078	43	1121	0	0	No	No	No	Yes	No	No	No	No	No
14 - 15	1094	48	1142	0	0	No	No	No	Yes	No	No	No	No	No
15 - 16	1109	53	1162	0	0	No	No	Yes	Yes	No	No	No	No	No
16 - 17	1079	50	1129	0	0	No	No	No	Yes	No	No	No	No	No
17 - 18	0	0	0	0	0	No	No	No	No	No	No	No	No	No
18 - 19	0	0	0	0	0	No	No	No	No	No	No	No	No	No
Total	9916	353	10269	0	0	0	0	1	4	0	0	0	0	0

Warrants

Warrant 1: Eight-Hour Vehicular Volume	
A. Minimum Vehicular Volumes (Both major approaches --and-- higher minor approach) --or--	
B. Interruption of Continuous Traffic (Both major approaches --and-- higher minor approach) --or--	
56% Vehicular --and-- Interruption Volumes (Both major approaches --and-- higher minor approach)	
Warrant 2: Four-Hour Vehicular Volume	
Four-Hour Vehicular Volume (Both major approaches --and-- higher minor approach)	
Warrant 3: Peak Hour	
A. Peak-Hour Conditions (Minor delay -- and-- minor volume --and-- total volume) --or--	
B. Peak-Hour Vehicular Volumes (Both major approaches --and-- higher minor approach)	
Warrant 4: Pedestrian Volume	
A. Four Hour Volumes --or--	
B. One-Hour Volumes	
Warrant 5: School Crossing	
Gaps Same Period --and--	
Student Volumes	
Nearest Traffic Control Signal (optional)	✓
Warrant 6: Coordinated Signal System	
Degree of Platooning (Predominant direction or both directions)	
Warrant 7: Crash Experience	
A. Adequate trials of alternatives, observance and enforcement failed --and--	
B. Reported crashes susceptible to correction by signal (12-month period) --and--	
C. 56% Volumes for Warrants 1A, 1B, --or-- 4 are satisfied	
Warrant 8: Roadway Network	
A. Weekday Volume (Peak hour total --and-- projected warrants 1, 2, or 3) --or--	
B. Weekend Volume (Five hours total)	
Warrant 9: Grade Crossing	
A. Grade Crossing within 140 ft --and--	
B. Peak-Hour Vehicular Volumes	

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Attachment I: Draft Report Review Comments

Follows this page.

Report REVIEW

PROJECT NAME: Lighthouse Development Traffic Impact Analysis Report
PROJECT NUMBER: N/A

	DATE: November 14, 2023 **REVIEWER: DOT&PF, COH** **SECTION: NA** **PHONE: NA**	**Confirmation of action taken on comment by:** **Randy Kinney, Kinney Engineering, LLC**

In Sheet No. column, use a 1 for General comments, X for estimate comments, Y - pg # for Specifications, and Z - pg # for DSR, and the alpha numeric pg # of Plan sheets (use an A if no Alpha is used on the plan sheets)
In the Section column below please use your assigned Functional group identifier: Right-of-Way = RW; Traffic Design = TD; Traffic Safety = TS; Highway Design = HD; Materials = M; Bridge Design = B; Survey = SC; Internal Review = QC; Construction = C; Utilities = U; Specifications = S; Review Engineer = RE; Maintenance = M&O; Environmental = ENV; Hydrology = HY.

Item No.	Sheet No. / Page No. DRAFT REPORT PAGE Numbers	Section/ Reviewer	Comment	Response	Meeting Note
1)	Page 13, Section 4.1 Point Number 1,	TS-LeCroy	If a restaurant or bar were being considered, consider mentioning that here. Trip generation numbers for LU 310 cover this, so no additional trips anticipated.	We added other hotel attributes that were in the original August development plan and left out of the current plan. We also added this sentence to 7.1.3 summary paragraph "The proposed hotel will include lodging, restaurant, bar, and convention facilities described in LU 310."	
2)	Page 15, Section 4.4, Paragraph 2	TS-LeCroy	Concur with assumption. Consider internal pedestrian connectivity between hotel and condos.	We add the need for pedestrian connectivity on site because of the public attractions in the hotel including bars and restaurant. Also adding to recommendations.	
3)	Page 18, Section 4.5.2, Paragraph 3	TS-LeCroy	Later in the document, it describes that the south driveway will be realigned with Kachemak Bay Dr.	This section only describes the site plan as it was presented for TIA analysis. The realignment is in recommendations, but noted here as well with this revision.	
4)	Page 24, Section 5.3.2, Paragraph 2	TS-LeCroy	Expected to increase the number of non-motorized crossings of Homer Spit Rd to access the multiuse pathway along the east side of the spit, increasing conflict occurrences between VRU's and motorists.	Adding the observation of additional conflicts between Vulnerable Road Users and vehicles.	
5)	Page 24, Section 5.3.4,	TS-LeCroy	Preservation projects do not provide capacity improvements. Some safety and pedestrian improvements are possible, but not guaranteed under the preservation project scope	We removed the term "capacity" from this sentence describing the project.	

	DATE: November 14, 2023 **REVIEWER: DOT&PF, COH** **SECTION: NA** **PHONE: NA**	**Confirmation of action taken on comment by:** **Randy Kinney, Kinney Engineering, LLC**

6)	Page 31, Section 6.5.3, Paragraph 1	TS-LeCroy	Good recommendation.	The subject of the comment, realign the south access driveway with Kachemak, will be restated in the recommendations as follows. "*The site plan shows the South Access Driveway is offset to the north of the Kachemak Drive approach. Revise the site plan to realign the South Access Driveway directly across from the Kachemak Drive approach to function as a four-leg intersection. Install stop sign control for the South Access Driveway.*"	
7)	Page 38, Section 7.1.4, Paragraph 2	TS-LeCroy	Agree.	No Action.	
8)	Page 44, Section 8.1.2, Paragraph 1	TS-LeCroy	13 AAC 02.155(a) requires drivers to yield to pedestrians in a crosswalk. Pedestrian crossing conspicuity should help improvement driver yield compliance.	Adding this to the end of this paragraph.	
9)	Page 57, Section 8.3.4 , Paragraph 2	TS-LeCroy	Likely out of that project's scope. Could contact that project's manager to determine further. Addition of a turn lanes would impact the ped crossing distance for the existing crosswalk and require reconstruction of the crossing - unlikely.	Deleted reference to the Pavement Preservation Project.	
10)	Page 66, Section 11.1.3, Paragraph 1	TS-LeCroy	This would likely depend on the non-motorized trip origins and destinations on FAA Rd. Could this statement be expanded to support this change in mode assumption. 6.3 Table 2 shows low existing crossing demand here, but not peak season.	We added discussion on how this benefits the origins and destinations to north of Ocean Drive and how the new public-oriented facilities bar and restaurant at the hotel could draw folks from the neighborhoods. Also, the crossing point is the logical one since the intersection is configured as a tee, and this provide a wider pavement center area that can be used for refuges.	

Report REVIEW

PROJECT NAME: Lighthouse Development Traffic Impact Analysis Report
PROJECT NUMBER: N/A

	DATE: November 14, 2023 **REVIEWER: DOT&PF, COH** **SECTION: NA** **PHONE: NA**	**Confirmation of action taken on comment by:** **Randy Kinney, Kinney Engineering, LLC**

11)	Page 75, Section 11.3, Point 5	TS-LeCroy	I'm supportive of a RRFB installation at this location due to the expected increase in demand and its location within a speed transition zone. Draft interim addenda has been provided that makes revisions to (incomplete, but intended as ATM)	We will add this to the recommendations. We are not including references or subject matter in the draft interim addenda as indicated in the transmittal email.	
12)	Page 75, Section 11.3, Point 6	TS-LeCroy	More than one lane required for ingress and egress. 23 ft (7m) width requirement for commercial driveways in the 1998 1190 Driveway Standards.	This was intended; we provide revised language to make this clear.	
13)	Page 7, Section 1.0 Fourth Paragraph	COH-Foster	"Pedestrian" to "Pedestrians"	Revised	
14)	Page 7, Section 1.0 2nd Bullet	COH-Foster	"to be compatible" to "for compatibility"	Revised	
15)	Page 7, Section 1.0 2nd Bullet	COH-Foster	Substitute: "Construct a connection between the Lighthouse Village Development to Bay Avenue using the B Street right-of-way to allow walking and biking trips to use the lower volume, low speed Bay Avenue, for non-motorist trip segments."	Revised	
16)	Page 10, Section 2.2 1st Paragraph	COH-Foster	Add "is" after "Report in first line of paragraph	Revised	
17)	Page 13, Section 4.1 2nd paragraph, 2nd sentence	COH-Foster	Substitute: "The vacation of B Street right-of-way is not addressed in this TIA, and is assumed to go forward as part of the development."	Revised	
18)	Page 14, Section 4.2 1st paragraph, 2nd sentence	COH-Foster	Substitute: "Parcel ID 17921015 is currently zoned Rural Residential and proposed by the applicant to be rezoned to General Commercial 1, aligning with the other two project parcels."	Revised	
19)	Page 19, Section 5.1 Last Paragraph	COH-Foster	Add: "This TIA is also based on the premise that Parcel ID 17921015 is rezoned to General Commercial 1 from Rural Residential, aligning with the other two project parcels."	Revised	

	DATE: November 14, 2023 **REVIEWER: DOT&PF, COH** **SECTION: NA** **PHONE: NA**	**Confirmation of action taken on comment by:** **Randy Kinney, Kinney Engineering, LLC**

20)	Page 41, Section 7.1.7 End of section	COH-Foster	Deleted last sentence. Add: "The Homer City Planner determined a TIA is required per Homer City Code 21.71.020 Application for Conditional Use Permit: 8. Any additional information the City Planner may require to determine whether the application satisfies the criteria for issuance of a permit."	Revised (final language altered)	
21)	Page 67, Section 11.1.3 Second Bullet	COH-Foster	Substitute: "Construct a connection between the Lighthouse Village Development to Bay Avenue using the B Street right-of-way to allow walking and biking trips to use the lower volume, low speed Bay Avenue, for non-motorist trip segments."	Revised	
22)	Page 75, Section 11.3 Second Bullet	COH-Foster	Substitute: "Construct a connection between the Lighthouse Village Development to Bay Avenue using the B Street right-of-way to allow walking and biking trips to use the lower volume, low speed Bay Avenue, for non-motorist trip segments."	Revised	
23)					

<u>Kinney Engineering Revisions</u>

A) In addition to the comments above, Kinney Engineering completed crash analysis and revised:

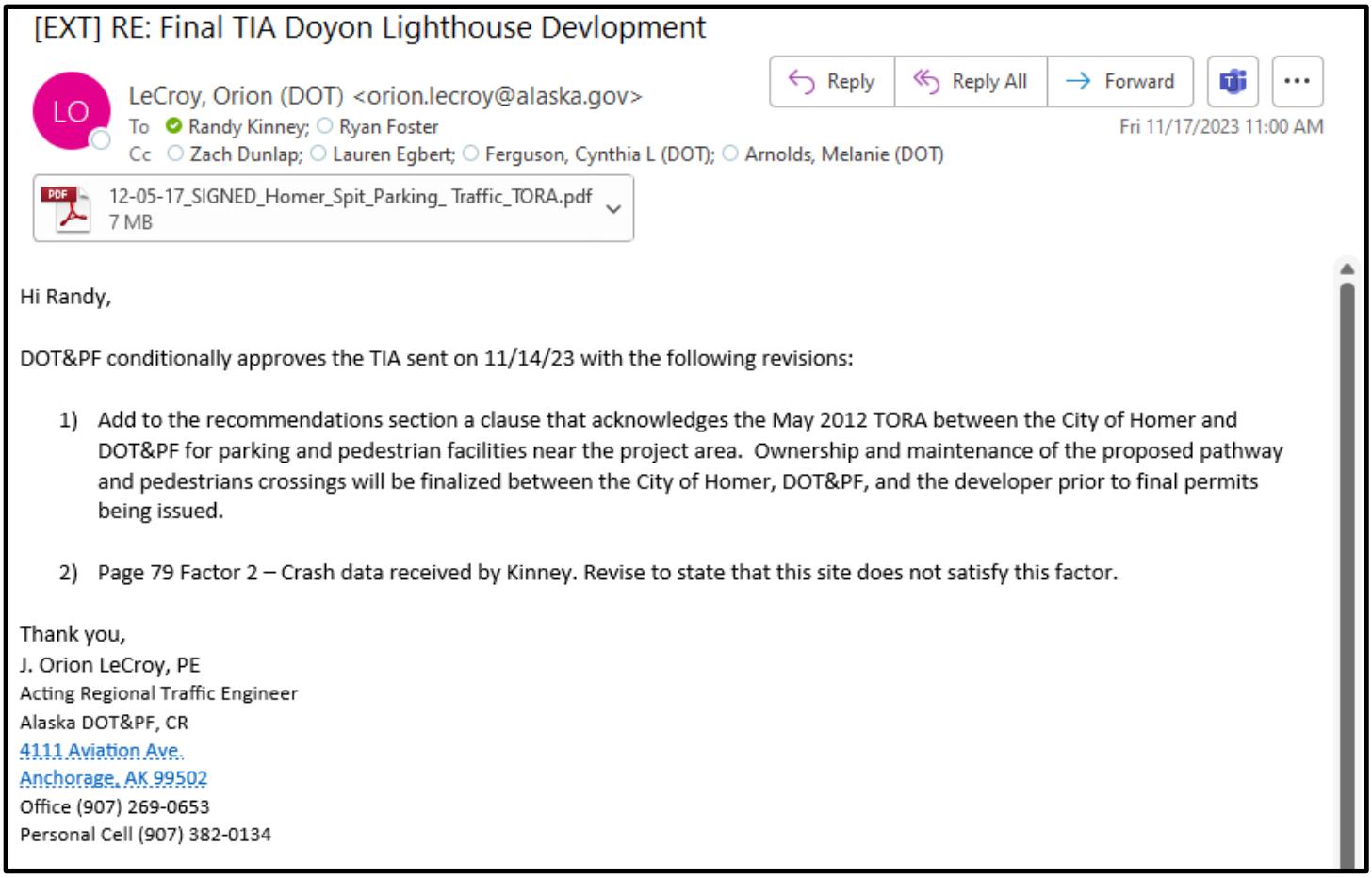
- Section 6.6
- Section 8.2.4
- Section 8.3.4

B) We had an internal review (by Scott Thomas) resulting in minor revisions that do not change the outcome or recommendations.

C) Scott did raise the question of driveway spacing. As a result, Kinney Engineering added a new section 4.6 Driveway Spacing (required new headings in Section 4). We find that the separation as proposed in the site plan is insufficient to meet PCM Table 1190-3 requirements. As a result shifting the north driveway to the north is required as well as realigning the south access with Kachemak Drive.

Attachment J: Department of Transportation and Public Facilities Conditional Acceptance

November 17, 2023 email LeCroy to Kinney (email thread below acceptance message is not shown).



[EXT] RE: Final TIA Doyon Lighthouse Devlopment

LO

LeCroy, Orion (DOT) <orion.lecroy@alaska.gov>

To Randy Kinney; Ryan Foster

Cc Zach Dunlap; Lauren Egbert; Ferguson, Cynthia L (DOT); Arnolds, Melanie (DOT)

Reply | Reply All | Forward

Fri 11/17/2023 11:00 AM

12-05-17_SIGNED_Homer_Spit_Parking_ Traffic_TORA.pdf
7 MB

Hi Randy,

DOT&PF conditionally approves the TIA sent on 11/14/23 with the following revisions:

1) Add to the recommendations section a clause that acknowledges the May 2012 TORA between the City of Homer and DOT&PF for parking and pedestrian facilities near the project area. Ownership and maintenance of the proposed pathway and pedestrians crossings will be finalized between the City of Homer, DOT&PF, and the developer prior to final permits being issued.

2) Page 79 Factor 2 – Crash data received by Kinney. Revise to state that this site does not satisfy this factor.

Thank you,
J. Orion LeCroy, PE
Acting Regional Traffic Engineer
Alaska DOT&PF, CR
4111 Aviation Ave.
Anchorage, AK 99502
Office (907) 269-0653
Personal Cell (907) 382-0134

Note: These requested revisions are included in this final report (November 18, 2023).