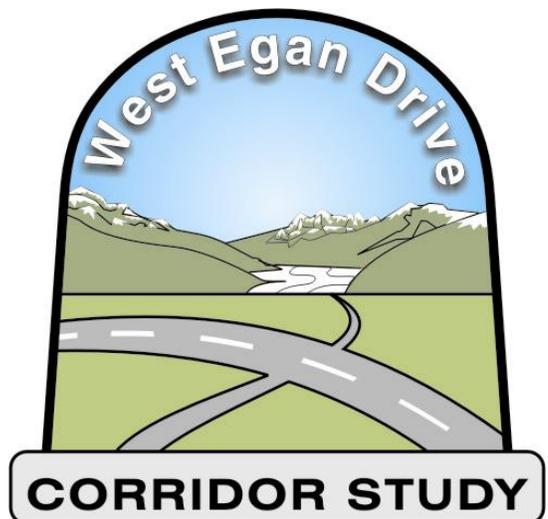


Section 6

Final Report Chapter 3 Appendix





Section 6: Final Report Chapter 3 Appendix

Technical Memo

Appendix A - Transit Level of Service Descriptions

Appendix B - Traffic Volume Tables

Appendix C - Accident Diagrams

Appendix D - Intersection Level of Service Criteria

Appendix E - Operational Analysis Worksheets

Appendix F - 95th Percentile Queues

Appendix G - Population and Employment Data

Appendix H - Origin-Destination Analysis

Section 6 Final Report Chapter 3 Appendix

Chapter 3 Technical Memorandum





KITTELSON & ASSOCIATES, INC.

TRANSPORTATION PLANNING/TRAFFIC ENGINEERING

610 SW ALDER, SUITE 700 • PORTLAND, OR 97205 • (503) 228-5230 • FAX (503) 273-8169

TECHNICAL MEMORANDUM #3

West Egan Drive Corridor Study Existing and Future No-Build Transportation Conditions

Date: May 9, 2002

Project #: 4978.3

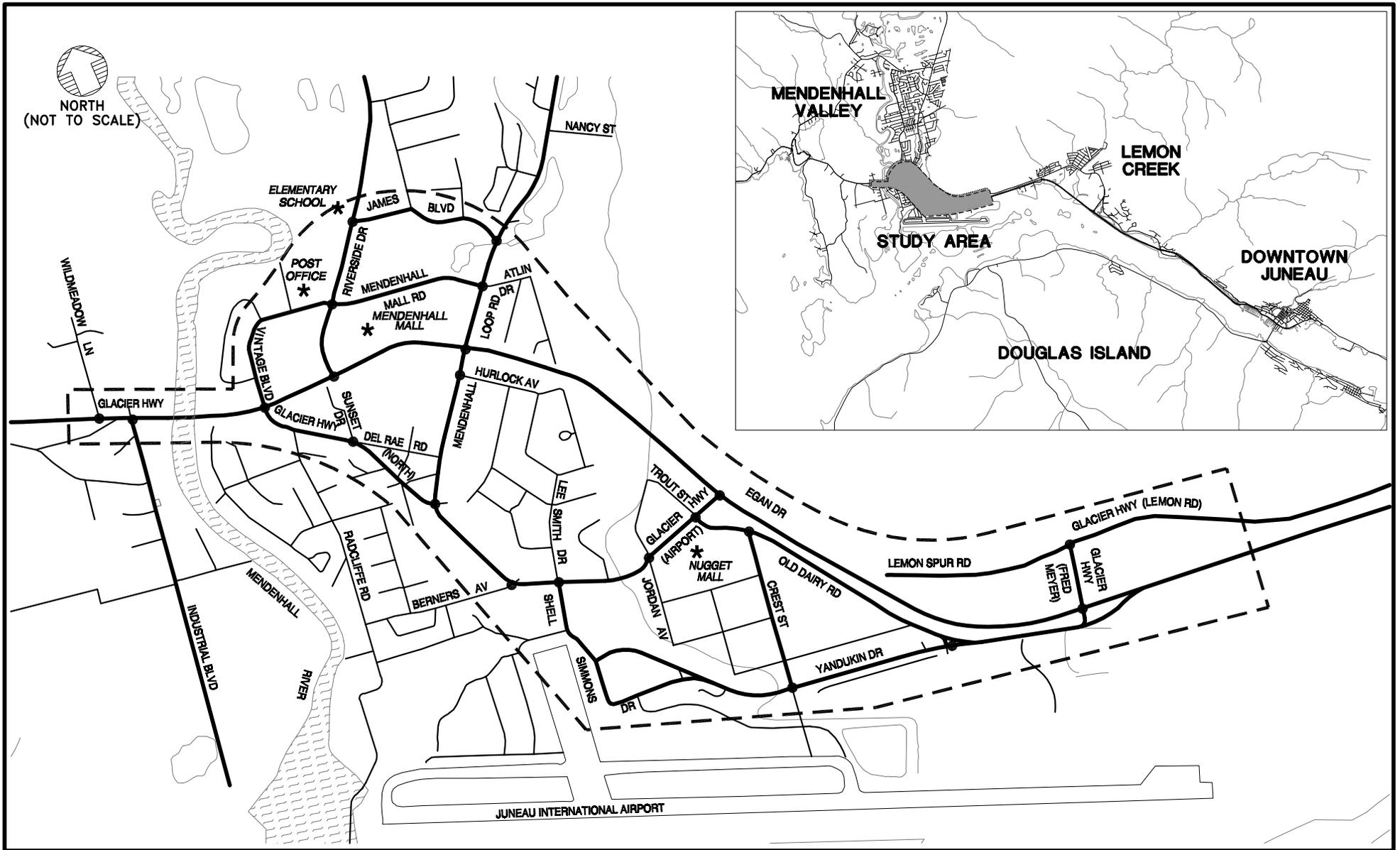
To: Alaska Department of Transportation & Public Facilities
From: Kittelson & Associates, Inc.

INTRODUCTION

The purpose of this technical memorandum is to summarize the characteristics and operations of the existing and future no-build transportation system in the West Egan Drive Corridor Study project area. The existing conditions analysis provides the project team with a baseline of comparison for evaluating future transportation system needs. For the “no-build” analysis, forecast peak hour traffic volumes were developed and then applied to calculate future traffic operations assuming minimal improvements to the existing transportation system (no-build analysis). The forecast peak hour traffic volumes will also be used as the design condition for future roadway alternatives analysis. The remainder of this technical memorandum documents the results of this analysis.

The study area for the project includes Egan Drive from Wildmeadow Lane east to Glacier Highway (Lemon Road) and is bounded by James Boulevard to the north and Yandukin Drive to the south. The major roadways included in the study are Egan Drive, Riverside Drive, Mendenhall Loop Road, Industrial Boulevard, Yandukin Drive and Glacier Highway. Other roadways included in the study are James Boulevard, Mendenhall Mall Road, Vintage Boulevard, Shell Simmons Drive, Old Dairy Road, and Crest Street. Figure 1 shows the study area boundaries and the study roadways and intersections.

Because Glacier Highway consists of a series of discontinuous sections for the purposes of this analysis, Glacier Highway has been distinguished parenthetically by section based on either the traditional name for the section (e.g., Glacier Highway (North)) or by a significant use in the area (e.g., Glacier Highway (Fred Meyer)). These designations are noted on Figure 1.



LEGEND

- STUDY AREA BOUNDARY
- STUDY INTERSECTIONS

STUDY AREA MAP

WEST EGAN DRIVE CORRIDOR
 JUNEAU, ALASKA
 MAY 2002

FIGURE
1



ORGANIZATION OF THIS DOCUMENT

This document is organized into the following sections:

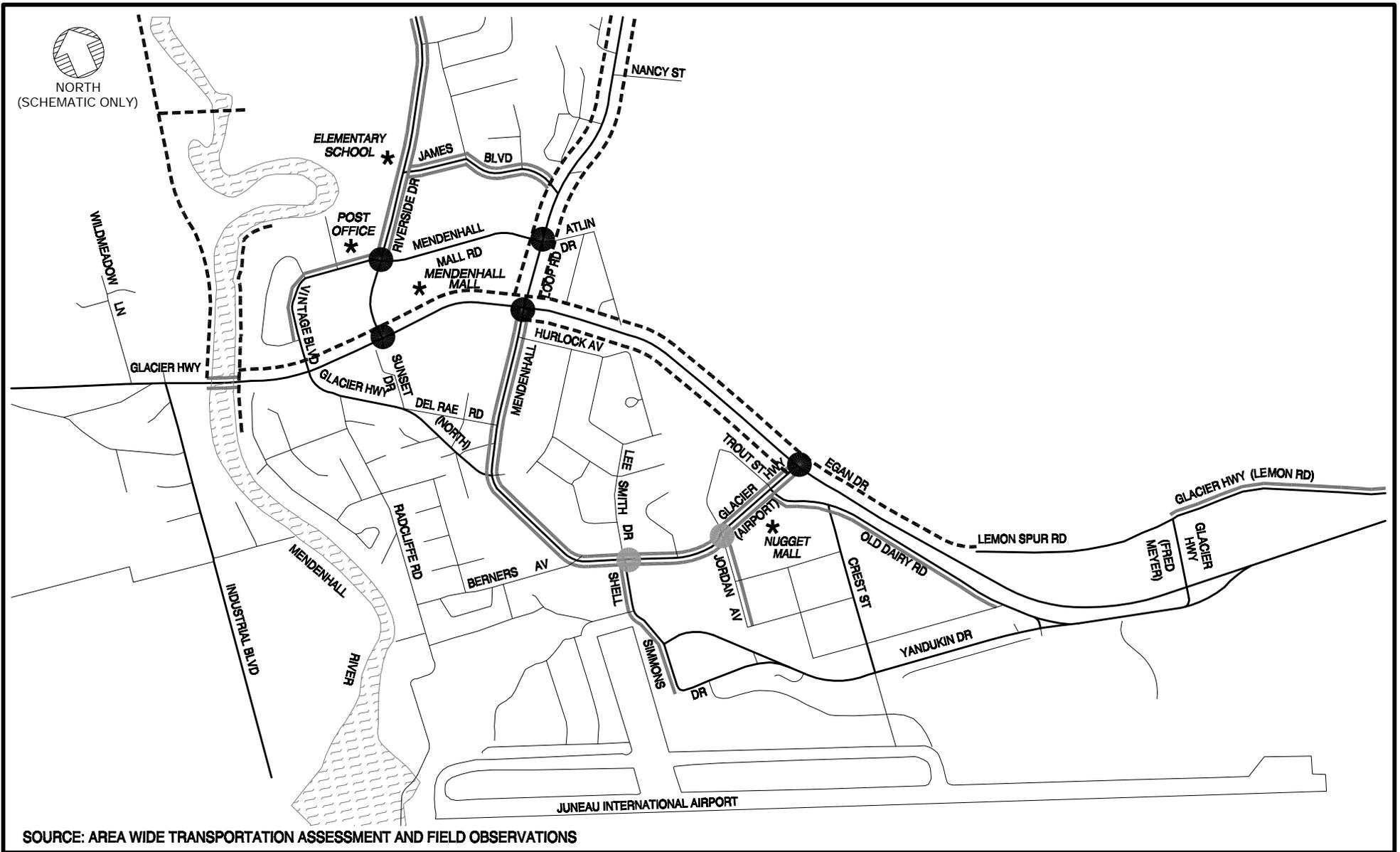
- **Pedestrian system:** This section presents the availability of sidewalks, pedestrian paths, and protected intersection crossings.
- **Bicycle system:** This section presents the availability of designated bicycle lanes and roadway shoulders.
- **Transit system:** This section presents the roadways served by transit routes, the service headways, and stop availability.
- **Roadway system:** This section presents the functional classification, jurisdiction, and posted speeds for all study roadways, as well as lane configurations, traffic control, accident history, and existing Level of Service for the study intersections.
- **Future no-build traffic operations analysis:** This section presents the forecast a.m. and p.m. peak hour year 2025 roadway link volumes, growth rates, resulting year 2025 a.m. and p.m. peak hour intersection turning movement volumes, and finally the results of the traffic operations analysis.

PEDESTRIAN SYSTEM

For each of the study roadways, Figure 2 shows the availability of sidewalks, pedestrian pathways, and crosswalks at signalized intersections. Deficiencies in the system were evaluated in the context of activity center locations and areas of moderate pedestrian crossings as noted during field data collection. As shown in Figure 2, much of the study area has sidewalks or pedestrian paths on one or both sides of the roadway.

Pedestrian facilities along Egan Drive include the following:

- **Pedestrian crossings:** Egan Drive is closed to non-motorized traffic except at its intersections. Signalized pedestrian crossings are provided at each of the three existing signalized intersections on Egan Drive. Since the section of the roadway in the study area is a high-speed facility through a commercial section of the Mendenhall Valley, it poses safety concerns for pedestrians trying to cross it. Field observations in February 2002 showed that moderate pedestrian traffic takes place at the unsignalized intersection of Egan Drive/Vintage Boulevard/Glacier Highway (North) and at the signalized intersection of Egan Drive/Riverside Drive. Crosswalks are provided across Egan Drive on the west leg of the Egan Drive/Riverside Drive intersection. The crosswalk then connects to a separated pedestrian/multi-use path along north side of Egan Drive that runs from Vintage Boulevard to Lemon Spur Road.
- **Egan Drive multi-use path:** A multi-use path is provided along the north side of Egan Drive between Vintage Boulevard and Lemon Spur Road. West of Vintage Boulevard this path splits to the north and south along the Mendenhall River. The south section is informal and passes under the Brotherhood Bridge continuing only a small distance along the east side of the river. The section of this pathway heading north does so along the west side of the Mendenhall River. There is also an informal pedestrian path along the



LEGEND

- MULTI-USE PATH
- SIDEWALK
- SIGNALIZED INTERSECTION WITH PEDESTRIAN CROSSINGS
- PLANNED SIGNALS WITH PEDESTRIAN CROSSINGS

NOTE: NON-STUDY ROADWAYS NOT INVENTORIED

NOTE: MULTI-USE PATH NORTH OF EGAN DRIVE ON THE EAST BANK OF THE MENDENHALL RIVER IS ON PRIVATE PROPERTY

PEDESTRIAN FACILITIES

WEST EGAN DRIVE CORRIDOR
 JUNEAU, ALASKA
 MAY 2002

FIGURE
2

east side of river north of Egan Drive. This path ends south of the ox-bow and is on private property. There is also a multi-use path on the south side of Egan Drive between Mendenhall Loop Road and the intersection of Egan Drive/Glacier Highway (McNugget)

- **Brotherhood Bridge:** A narrow sidewalk is provided on both sides of the bridge.

Based on field observation in February 2002, areas within the study area with the most pedestrian activity away from Egan Drive include Glacier Highway (Airport) from Nugget Mall to Mendenhall Loop Road and Riverside Drive at the Mendenhall Mall Road/Vintage Boulevard intersection. Pedestrian activity and travel patterns will be different in the summer time. The pedestrian facilities in the study area not on or in the immediate vicinity of Egan Drive are:

- **Mendenhall Loop Road multi-use path:** A multi-use path is present on both sides of Mendenhall Loop Road and provides good pedestrian connections between the residential areas to the north of the study area, Mendenhall Mall, and Egan Drive. The multi-use path along Mendenhall Loop Road is especially popular in the summer. A project is underway by ADOT&PF to raise the grade of the path and realign it at street crossings.
- **Glacier Highway (Airport) and Mendenhall Loop Road south of Egan Drive:** Sidewalks are provided on both side of Glacier Highway (Airport) and Mendenhall Loop Road south of Egan Drive to facilitate pedestrian traffic. The planned traffic signals on Glacier Highway (Airport) at Shell Simmons Drive and Jordan Avenue and the unsignalized crossing at the Glacier Highway (Airport)/Glacier Highway (North)/Mendenhall Loop Road intersection will help facilitate pedestrian crossings along Glacier Highway (Airport).
- **Mendenhall Mall Road area:** Signalized pedestrian crossings are provided at the intersections of Mendenhall Loop Road/Mendenhall Mall Road/Atlin Drive and Riverside Drive/Mendenhall Mall Road/Vintage Boulevard. No pedestrian facilities are provided on Mendenhall Mall Road; however, pedestrians can walk through the parking areas that bound both sides of the road.
- **Old Dairy Road:** Old Dairy Road presently has no pedestrian facilities; however, ADOT&PF is planning to construct a sidewalk along its south side in late 2002 or early 2003. The sidewalk will be assumed to exist as an element of this study's baseline conditions.

There are many transit stop locations with no signalized intersections in the nearby vicinity. Frequently, transit stops are located on both sides of high volume roadways with no provision for pedestrian crossings in the area. The transit stops on Egan Drive at Industrial Boulevard and on Glacier Highway at Fred Meyer are a few examples.

ADOT&PF staff members have also observed some pedestrians walking between the airport and Fred Meyer inadvertently walk along Yandukin Drive and try to cross Egan Drive at Yandukin Drive rather than using the pedestrian crossing at the intersection of Egan Drive/Glacier Highway (McNugget).

BICYCLE SYSTEM

The multi-use path described in the pedestrian section is also accessible to bicycle traffic. Bicyclists are able to ride on the north side of Egan Drive, along the Mendenhall Loop Road and the Mendenhall River. Lemon Spur Road, located at the east end of the multi-use path, is a low traffic volume facility, making it comfortable for bicyclists to use. From Lemon Spur Road, bicycle lanes are provided again on Glacier Highway (Lemon Road) towards Lemon Creek. Figure 3 shows the bicycle facilities in the study area.

In addition to the multi-use path, bike lanes are provided on Glacier Highway (Airport), Glacier Highway (North), Riverside Drive north of Mendenhall Mall Road, Mendenhall Loop Road from Glacier Highway (Airport) to Atlin Drive and on Glacier Highway west of Glacier Highway (North)/Vintage Boulevard intersection.

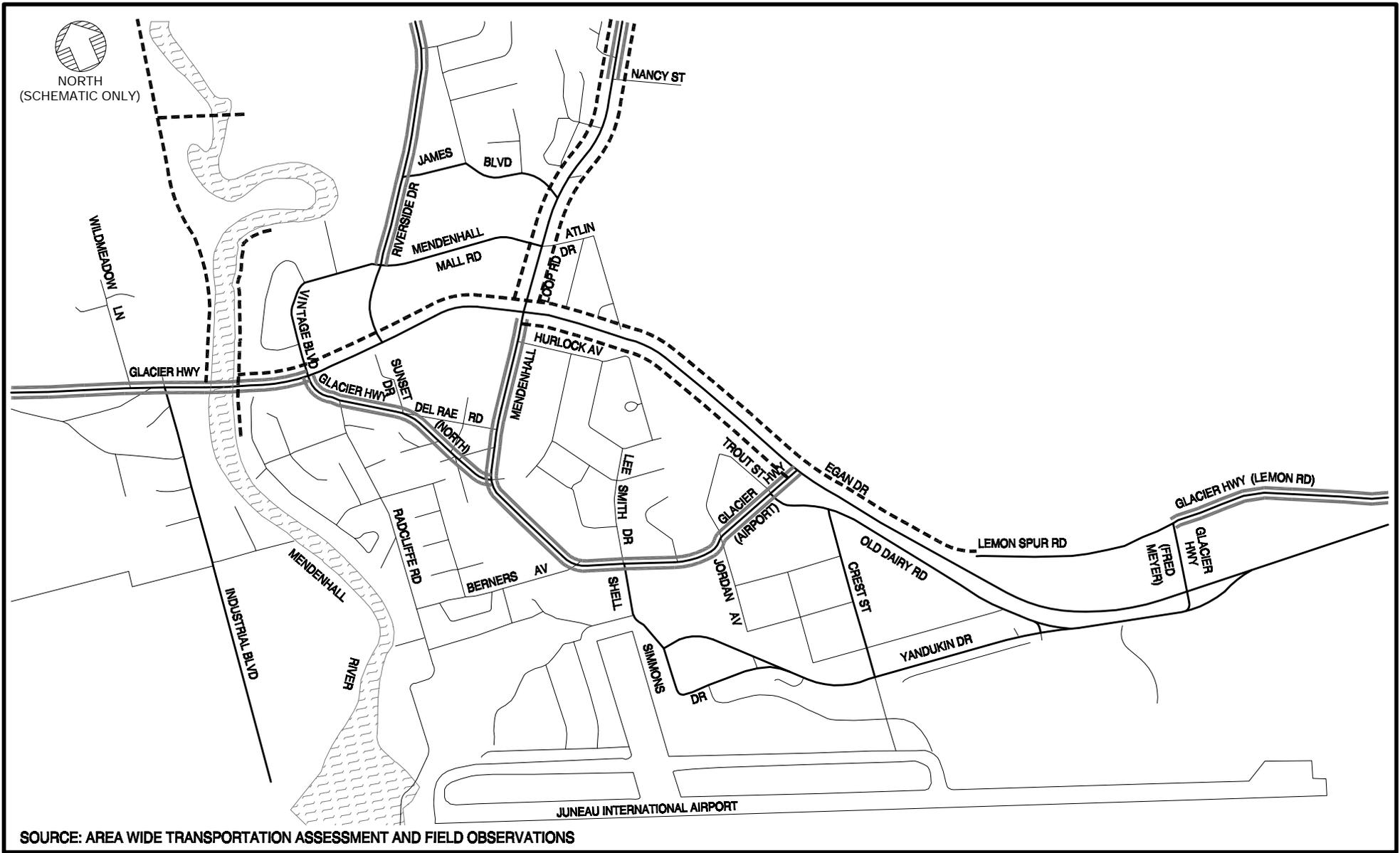
However, there are no bike lanes or shoulders on Mendenhall Loop Road from Atlin Drive to Nancy Street. As a result, bicyclists riding south on Mendenhall Loop Road find themselves cut off. There is, however, a transition from bicycles lanes to the multi-use path for bicyclist traveling north on Mendenhall Loop Road.

PUBLIC TRANSIT SYSTEM

Capital Transit provides public transportation service seven days a week in the West Egan Drive corridor on four fixed bus routes and the Care-a-Van complementary paratransit service. The fixed-route service alignments and their stops are shown for the study area in Figure 4.

Service Configuration

Within the Capital Transit system, transit routes run generally parallel to Egan Drive and Glacier Highway (Airport), with few transfer points and no feeder service or deviations off the main routes. The only transfer point in the study area is at Nugget Mall, shown in Figure 4 on Mallard Street, which has an unsheltered stop where riders can transfer between regular and express bus service. The main transit service running north and south through the study area is along Mendenhall Loop Road, which is served by the regular route. The following sections describe the service configuration in the West Egan Drive corridor in more detail.



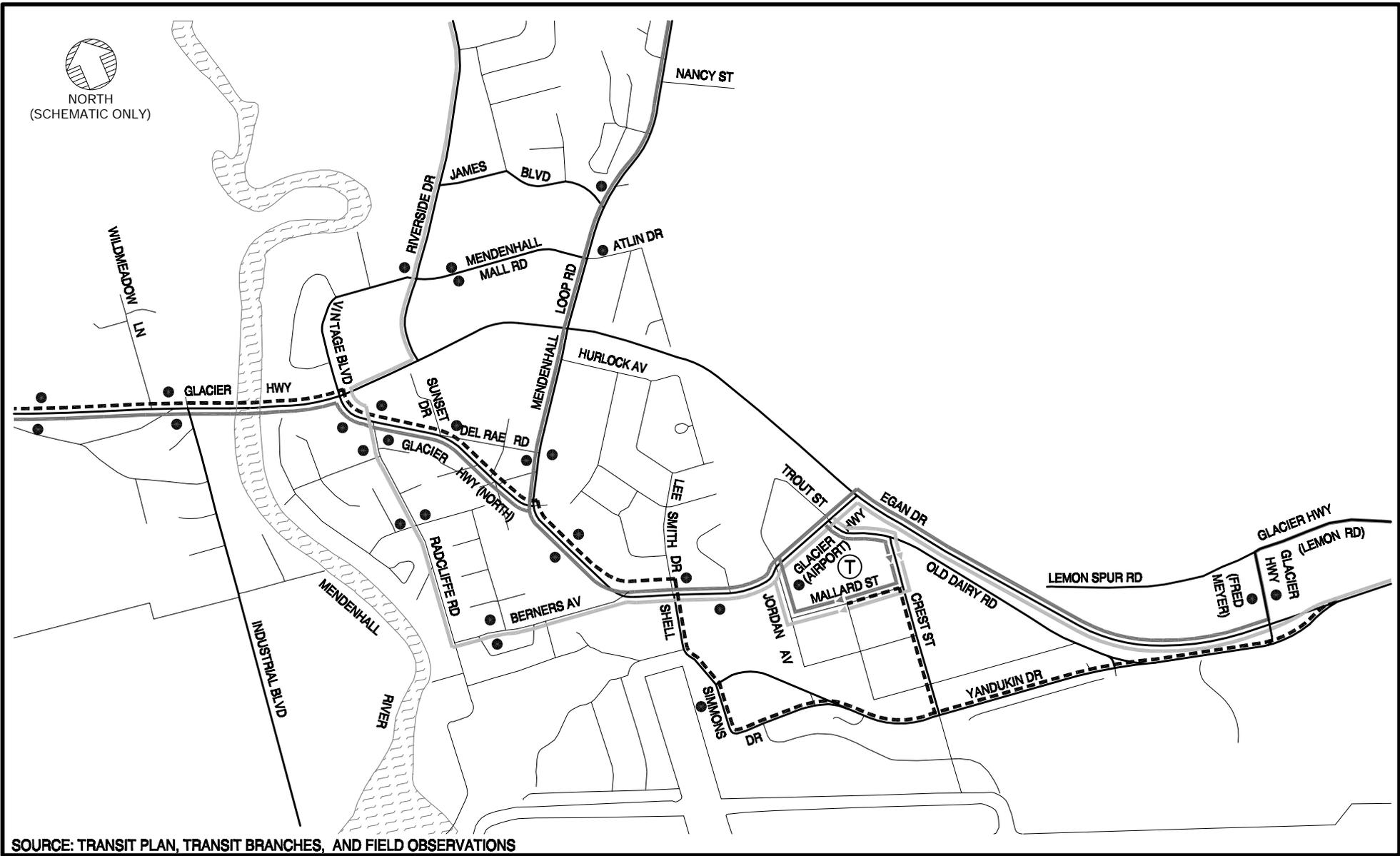
LEGEND	
	BICYCLE/SHOULDER LANES
	MULTI-USE PATH

NOTE: MULTI-USE PATH NORTH OF EGAN DRIVE ON THE EAST BANK OF THE MENDENHALL RIVER IS ON PRIVATE PROPERTY

BICYCLE FACILITIES

WEST EGAN DRIVE CORRIDOR
JUNEAU, ALASKA
MAY 2002

FIGURE	
3	



SOURCE: TRANSIT PLAN, TRANSIT BRANCHES, AND FIELD OBSERVATIONS

LEGEND

-  REGULAR ROUTE
-  COMMUTER ROUTE
-  EXPRESS ROUTE
-  BUS STOP
-  TRANSFER LOCATION

TRANSIT FACILITIES

WEST EGAN DRIVE CORRIDOR
 JUNEAU, ALASKA
 MAY 2002

FIGURE

4



Bus Stops

Figure 4 shows the locations of fixed-route bus stops in the West Egan Drive corridor. These locations were obtained from Capital Transit's 1996 *Transit Development Plan* (Reference 1). Outside of the project study area, riders can flag down buses at locations where bus stops are not posted and where bus operators deem it safe to stop; however, flag stops are no longer made within this study area. According to the 1996 *Transit Development Plan*, the bus stop with the highest level of weekday boarding in the study area is at Nugget Mall. There are no park-and-ride lots in the system.

Many of the marked stops along Glacier Highway (Airport Area) in the study area are sheltered, and the shelters contain benches for waiting passengers. Some of the shelters are fully enclosed and others are only partially enclosed. The shelters at Fred Meyer and at Industrial Boulevard, in particular, are fully enclosed.

Regular (Local) Transit Service

Regular transit service for Juneau, Lemon Creek, the Mendenhall Valley, and Auke Bay is provided on Routes 3 and 4, which share Glacier Highway (North) between downtown Juneau and Mendenhall Loop Road. West of the Glacier Highway (North)/Mendenhall Loop Road intersection, Routes 3 and 4 circulate in a loop formed from Mendenhall Loop Road and Glacier Highway (North). Route 3 travels counterclockwise on this loop; Route 4 travels clockwise.

Regular service is available in the study area beginning at 7:00 a.m. Monday through Saturday and 9:00 a.m. on Sunday. Service is hourly at about 7:00 a.m. and 8:00 a.m. Half-hour headways, a bus every thirty minutes in each direction, is offered between 8:30 a.m. (9:00 a.m. on Sunday) and 6:00 p.m. Service ends at about 6:00 p.m. on Sunday. Monday through Saturday hourly bus service continues until about 11:45 p.m.

Commuter Transit Service

Regular transit service in the West Egan Drive corridor is supplemented with weekday commuter runs in the morning and afternoon. The Mendenhall Valley Commuter leaves Auke Bay at 6:45 a.m. and provides boardings on the Mendenhall Loop Road to Mendenhall Boulevard. It then follows neighborhood streets leading to Riverside Drive, Radcliffe Road, and the Nugget Mall. The Mendenhall Valley Express leaves Auke Bay at 6:52 and provides boardings along the Mendenhall Loop Road to the Nugget Mall. At the Nugget Mall these commuter routes meet the local service for Lemon Creek and the Express bus for Juneau. Following transfers, these two buses proceed directly to downtown, arriving at 7:30 a.m. These commuter routes travel a shortened route through Lemon Creek and the Mendenhall Valley, reducing travel time for commuters.

Express Transit Service

Weekday express transit service is provided between downtown Juneau and Auke Bay, via Juneau International Airport and Nugget Mall, at one-hour headways. In the West Egan Drive corridor, express buses travel westbound between 7:45 a.m. and 5:45 p.m. and eastbound between 7:15 a.m. and 5:15 p.m.

Summary of Fixed-Route Bus Service

Table 1 below summarizes the level of weekday transit service offered on Capital Transit’s fixed-route buses in the West Egan Drive corridor. Level of Service is reported for the corridor, not for specific routes, because corridor-level assessment represents all available route and service choices. For example, corridor-level assessment recognizes that regular transit service is available when express transit service is not.

The Level of Service designations in Table 1 were taken from the *Transit Capacity and Quality of Service Manual* (Reference 2) and represent service quality from the passenger’s point of view. Appendix A contains a description of the Transit Level of Service criteria and the levels of service. Transit Level of Service is reported for frequency of transit service and for service span (i.e., the number of hours that transit service is available daily). Transit Level of Service A typically represents the highest quality of service. Service Frequency Level of Service C typically represents the maximum desirable wait time if a bus is missed. Hours of Service Level of Service C typically recognizes that service is provided throughout the day and in the early evening. Level of Service F typically represents no service, very limited service, or service that is unattractive to all riders.

TABLE 1 WEEKDAY FIXED-ROUTE BUS LEVEL OF SERVICE FROM THE WEST EGAN DRIVE CORRIDOR TO DOWNTOWN JUNEAU

Time of Day	Service Frequency Level of Service		Hours of Service Level of Service	
	MOE	LOS	Hours of Service Per Day	B
A.M. Peak	Bus Headways	D/E		
Midday	Bus Headways	D		
P.M. Peak	Bus Headways	D		

Notes: MOE = Measure of Effectiveness; LOS = Level of Service

Table 1 shows that Capital Transit provides a high level of service in the corridor in terms of service span and a moderate to low level of service in terms of frequency. Reflected in Service Frequency Level of Service are the cases in which regular, commuter, and express buses are scheduled to depart a given time point simultaneously. Service frequency to the West Egan Drive Corridor would be improved if the different routes departed downtown at different times.

Note that if one measures Level of Service by vehicles per hour, Capital Transit provides Level of Service C during the weekday morning peak, midday, and the afternoon peak (per discussions with Capital Transit). However, these routes are coordinated with other routes with timed transfers at either the Federal Building downtown or the Nugget Mall. Therefore, changing the arrival and departure times of these routes would improve Service Frequency Level of Service but may not better serve passengers.

Accessibility

Accessible transit service is available on Route 4 buses within the study area. These vehicles are equipped with wheelchair lifts.

Accessible transit service is also provided using the Care-a-Van complementary paratransit service, which provides trips throughout the Capital Transit service area and operates during the same hours that Capital Transit bus service is available. Care-a-Van is a free (with a “suggested donation” of \$1 for trips less than three miles and \$2 for longer trips) door to-door service operated by Southeast Senior Services and funded by Capital Transit and the Alaska Committee on Aging. To be eligible to use Care-a-Van, riders must be over 60 years old or have an Americans with Disabilities Act (ADA) card certifying a disability that prevents them from using the regular transit service. Care-a-Van requires 24 hours of notice to schedule a trip.

Ridership

Per discussions with Capital Transit, the system provided 933,142 annual passenger trips in 2001. This represents a 10 percent increase over the 845,480 annual passenger trips on its buses in 1999 (per Calendar Year 1999 data provided on website) and a 20 percent increase over the 779,721 annual passenger trips in 1995 (per the 1996 *Transit Development Plan*).

Capital Transit began half-hour service in May 2001. Average weekday ridership on the system peaked at nearly 3,500 in July and August of 2001. The average number of weekday trips in 1999 was 2,720.

Care-a-Van provided 27,223 trips in 1999. This is a 31 percent increase over the 20,745 trips reported in the 1996 *Transit Development Plan* for 1995.

ROADWAY SYSTEM

The study area includes four major roadways: Egan Drive, Glacier Highway, Riverside Drive, and Mendenhall Loop Road.

- Egan Drive is the main east-west roadway serving the City and Borough of Juneau and provides the only continuous route between downtown Juneau, the Mendenhall Valley, the Auke Bay (ferry terminal), and beyond;
- Glacier Highway is the old alignment of the highway connecting downtown Juneau to the surrounding community. With construction of Egan Drive, Glacier Highway was divided into various discontinuous sections, the sections providing access through the project study area are known as Glacier Highway (North), Glacier Highway (Airport), Glacier Highway (Fred Meyer) and Glacier Highway (Lemon Road);
- Riverside Drive is an urban collector street providing access from Egan Drive north into the western side of the Mendenhall Valley, and to Dimond Park; and
- Mendenhall Loop Road serves as the main north-south roadway providing access to the residential development on the east side of the Mendenhall Valley and the Mendenhall

Glacier. Mendenhall Loop Road also extends south of Egan Drive connecting to Glacier Highway (Airport). This is the main route connecting the residential and commercial development north and south of Egan Drive.

The major roadways in the study area are categorized by their functional classifications. The functional classifications for roads within the study area and the number of through lanes on each of the study roadways are shown in Figure 5. Roadway functional classifications distinguish between the degree of mobility and accessibility provided by a roadway. The primary purpose of principal and minor arterials is to provide mobility for through trips. Local streets provide accessibility to adjacent properties.

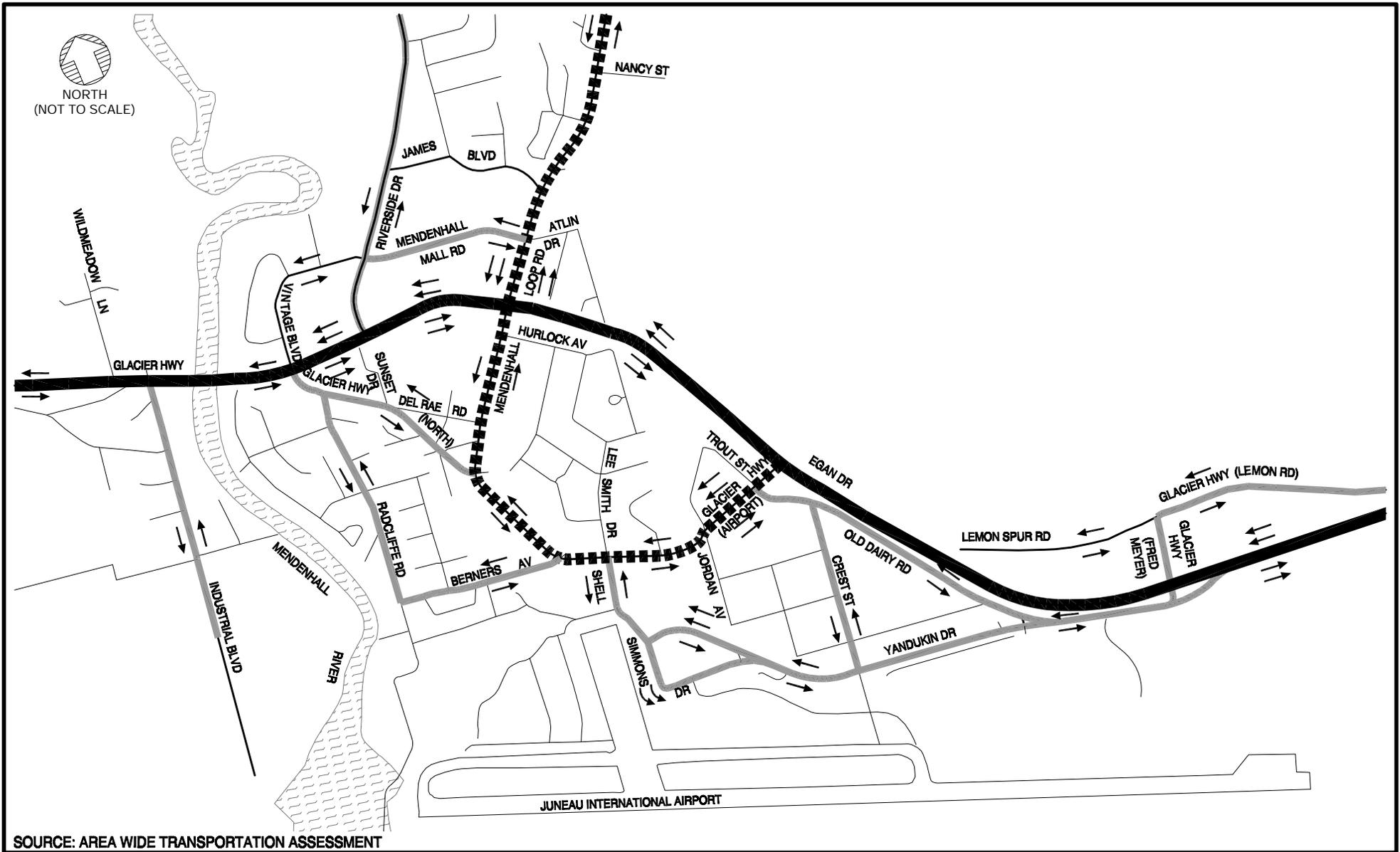
Figure 6 shows the jurisdiction oversight of the study roadways. As noted in the figure, most of the study roadways are under ADOT&PF and City and Borough of Juneau jurisdiction except for the Mendenhall Mall Road, which is under private ownership.

Table 2 shows the posted speed on the study roadways.

TABLE 2 POSTED SPEED ON STUDY ROADWAYS

Roadway	From	To	Posted Speed (mph)
Egan Drive	West Study Area Boundary	Mendenhall Loop Road	50
	Mendenhall Loop Road	East Study Area Boundary	55
Old Dairy Road	Glacier Highway (Airport)	Mid Point	35
	Mid Point	Yandukin Drive	40
Crest Street	Old Dairy Road	Yandukin Drive	30
Yandukin Drive	Egan Drive	Crest Street	40
	Crest Street	Shell Simmons Drive	30
Shell Simmons Drive	Yandukin Drive	Glacier Highway (Airport)	25 (NB)
	Glacier Highway (Airport)	Yandukin Drive	30 (SB)
	Yandukin Drive	Yandukin Drive	10 (Airport)
Glacier Highway (Airport)	Egan Drive	Mendenhall Loop Road	30
Glacier Highway (North)	Mendenhall Loop Road Ext	Egan Drive	35
Mendenhall Loop Road	Glacier Highway (North)	Egan Drive	35
	Egan Drive	North Study Area Boundary	40
James Boulevard	Mendenhall Loop Road	Riverside Drive	25
Mendenhall Mall Road	Mendenhall Loop Road	Riverside Drive	Not Posted
Riverside Drive	Egan Drive	North Study Area Boundary	35
Industrial Boulevard	Egan Drive	South Study Area Boundary	30

Note: NB = Northbound; SB = Southbound



LEGEND

-  PRINCIPAL ARTERIAL
-  MINOR ARTERIAL
-  URBAN COLLECTOR

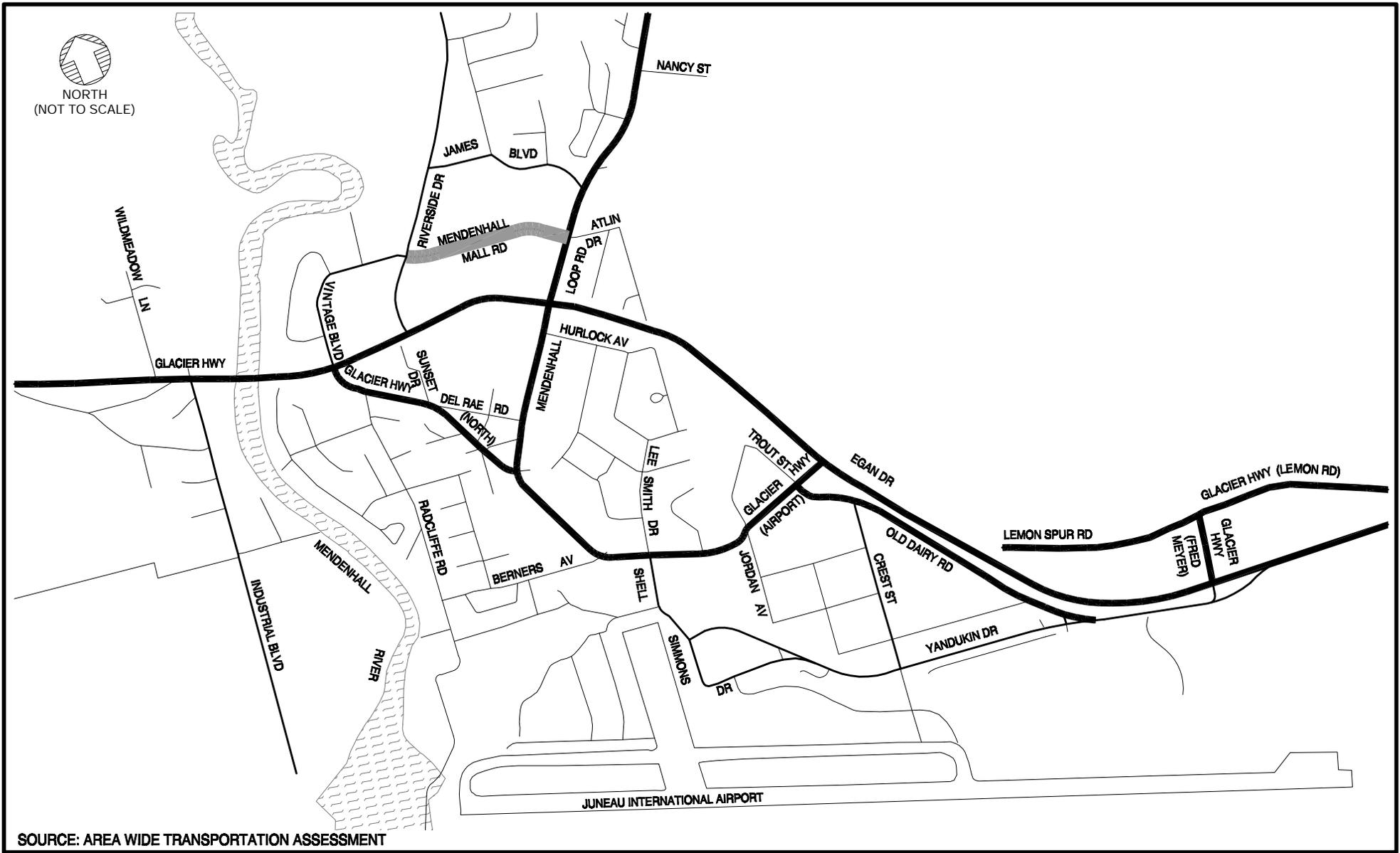
NOTE: MENDENHALL MALL ROAD IS PRIVATELY OWNED

ROADWAY FUNCTIONAL CLASSIFICATIONS AND THROUGH LANES

WEST EGAN DRIVE CORRIDOR
JUNEAU, ALASKA
MAY 2002

FIGURE
5





SOURCE: AREA WIDE TRANSPORTATION ASSESSMENT

LEGEND	
	ADOT
	CITY & BOROUGH OF JUNEAU
	PRIVATE

ROADWAY JURISDICTION

WEST EGAN DRIVE CORRIDOR
 JUNEAU, ALASKA
 MAY 2002

FIGURE

6



Geometric Conditions

The geometric conditions of the roads in the study area were analyzed according to five different categories: horizontal alignment, vertical profile, intersection sight distance, intersection spacing, and geometric layout of intersections. These categories were investigated during field observations to identify the areas of concern in the transportation system.

Horizontal Alignment

Horizontal alignments of the roadways within the study area were analyzed, i.e. unexpected sharp curves and negative super-elevations. None of the roads in the study area were identified as having horizontal alignment concerns based on field observations.

Vertical Profile

The existing vertical profiles of the roadways in the study area were evaluated according to their design speed for uncomfortable crest or sag vertical curves and stopping sight distances. Field observations did not reveal any roadways in the study area with vertical profile deficiencies.

Intersection Sight Distance

Intersection sight distance at unsignalized intersections is a safety parameter for evaluating a roadway. Sight distance is derived from the design speed and characteristics of the roadway. At the unsignalized Egan Drive/Yandukin Drive/Glacier Highway (Fred Meyer) intersection the sight triangle for eastbound left-turn movements from Egan Drive is obstructed by the westbound left-turn queue (turning from Egan Drive onto Yandukin Drive) when present. Intersection sight distance is also deficient at the Glacier Highway/Industrial Boulevard intersection for southbound vehicles turning left due to the crest vertical curve on the bridge.

Intersection Spacing

Tables 3, 4 and 5 show the existing intersection spacing along Egan Drive, Mendenhall Loop Road, and Glacier Highway (Airport).

TABLE 3 EXISTING INTERSECTION SPACING ALONG EGAN DRIVE

Cross Street	Intersection Control at Egan Drive	Spacing (ft)
Industrial Boulevard	Unsignalized	
		1,395
Glacier Highway (North)/Vintage Boulevard	Unsignalized	
		770
Riverside Drive	Signalized	
		1,430
Mendenhall Loop Road	Signalized	
		3,020
Glacier Highway (McNugget)	Signalized	
		4,035
Yandukin Drive/Glacier Highway (Fred Meyer)	Unsignalized	

TABLE 4 EXISTING INTERSECTION SPACING ALONG MENDENHALL LOOP ROAD NORTH OF EGAN DRIVE

Cross Street	Intersection Control at Mendenhall Loop Road	Spacing (ft)
Egan Drive	Signalized	
		705
Mendenhall Mall Road/Atlin Drive	Signalized	
		510
James Boulevard	Unsignalized	

TABLE 5 EXISTING INTERSECTION SPACING ALONG GLACIER HIGHWAY (AIRPORT) AND MENDENHALL LOOP ROAD SOUTH OF EGAN DRIVE

Cross Street	Intersection Control at Egan Drive	Spacing (ft)
Egan Drive (at Mendenhall Loop Road)	Signalized	
		235
Hurlock Avenue	Unsignalized (Right-In/Right-Out)	
		870
Del Rae Road	Unsignalized	
		465
Glacier Highway (North)	Unsignalized	
		1,110
Berners Avenue	Unsignalized	
		595
Shell Simmons Driver/Lee Smith Drive	Signalized (Planned)	
		460
Cascade Street	Unsignalized	
		490
Jordan Avenue	Signalized (Planned)	
		660
Old Dairy Road/Trout Street	Unsignalized	
		345
Egan Drive (at Glacier Highway/McNugget)	Signalized	

As shown in the above tables, the minimum intersection spacing along Egan Drive between signalized intersections is 1,430 feet and unsignalized intersections is 770 feet. On Mendenhall Loop Road north of Egan Drive, the minimum intersection spacing for signalized intersections is 705 feet and unsignalized intersection is 510 feet. On Glacier Highway (Airport) and Mendenhall Loop Road south of Egan Drive, the minimum spacing between signalized intersections is 950 feet and unsignalized intersection minimum spacing it is 235 feet.

ADOT&PF's Highway Pre-Construction Manual (Reference 3) recommends that signalized intersections be spaced such that progression of the traffic is possible. The manual guidance states that signalized intersections be evenly spaced along the arterial approximately 1,300 feet apart to promote progression of traffic in both directions. Note that in the study area, the peak hours have highly directional traffic flow that lends itself to being best served by progression for the dominant movement. In these situations, the optimal signal spacing for two-way progression becomes less significant.

Geometric Layout of Intersection

The operation and safety of intersections depends in part on its geometric layout. The majority of the intersections in the study area have well-designed geometric layouts, with the following exceptions:

- **Mendenhall Loop Road/Mendenhall Mall Road/Atlin Drive:** The east leg of the intersection is skewed and westbound through traffic does not line-up with its receiving lane on the west leg of the intersection. Instead, it directs the westbound through traffic to the opposing eastbound left-turning traffic. This can create conflict and should be addressed if any modifications are made to this intersection in future.
- **Industrial Boulevard/Glacier Highway:** Due to the transition from two-lane bridge to wide three-lane roadway west of Industrial Boulevard, the taper for the westbound left-turn lane onto Industrial Boulevard is substandard.
- **Egan Drive/Glacier Highway (North):** The superelevation of Egan Drive decreases the efficiency of turning movements to and from Glacier Highway (North)
- **Mendenhall Loop Road/Mendenhall Mall Road:** Field observations indicate limited available queue storage space for the northbound left-turn from Mendenhall Loop Road onto Mendenhall Mall Road.

Accident Analysis

ADOT&PF's 1999 Southeast Region Traffic and Safety Report (Reference 4) shows several of the intersections within the project study area showing up among the Region's top fifteen worst accident locations, summarized in Table 6. ADOT&PF ranks intersections by the incidence of accidents, the incidence and severity of accidents compared to the total volume of traffic entering the intersection, and based on the incidence of accidents (not accounting for accident severity) compared to the total volume of entering traffic. Based on these rankings, the following intersections appear as the highest accident locations in the study area:

- Egan Drive/Vintage Boulevard
- Egan Drive/Mendenhall Loop Road
- Egan Drive/Glacier Highway (McNugget)
- Mendenhall Loop Road/Mendenhall Mall Road/Atlin Drive
- Riverside Drive/Vintage Boulevard/Mendenhall Mall Road

TABLE 6 SAFETY RANKING OF SE REGION INTERSECTIONS (3 YEAR PERIOD)

Rank	Ranking by Total Number of Accidents	Ranking by Weighted Accident Rate	Rank by Unweighted Accident Rate
1	Egan Drive / Mendenhall Loop Road	Loop / Glacier Spur	Haines Hwy / 3 rd Ave (Haines)
2	Egan Drive / Glacier Highway (McNugget)	Lemon / K-Mart	Haines Hwy / Main Street (Haines)
3	Egan Drive / Vanderbilt	Douglas / N. Douglas	Egan / Vintage
4	S. Tongass / Jefferson St. (Ketchikan)	Egan / Vintage	Lemon / Sunny Point
5	Mendenhall Loop / Atlin Drive / Mendenhall Mall	Riverside / Vintage	S. Tongass / Jefferson St. (Ketchikan)
6	Egan Drive / Vintage	Lemon / Sunny Point	Egan / Mendenhall Loop
7	Egan Drive / Salmon Creek	Thane / Main	Mendenhall Loop / Mendenhall Blvd. / Valley
8	Egan Drive / Highland	Halibut Point Rd / Brady St. (Sitka)	Harbor / Maksoutoff (Sitka)
9	Lemon / Sunny Point	Egan / Vanderbilt	Egan / Vanderbilt
10	Riverside Drive / Vintage	S. Tongass / Carlanna Lake Road (Ketchikan)	Thane / Main
11	Egan Drive / Sunny Drive	B. Loop / Glacier Highway	Mendenhall Loop / Atlin Drive / Mendenhall Mall
12	Egan Drive / 10th	Egan / Glacier Highway (McNugget)	Riverside / Vintage
13	Egan Drive / 12th	Egan / Mendenhall Loop Road	Thane / Willoughby
14	Thane / Willoughby	S. Tongass / Madison St. (Ketchikan)	B. Loop / Glacier Highway
15	Thane / Main	S. Tongass / Main Street (Ketchikan)	Egan / Glacier Highway (McNugget)

Note: Intersections in **bold** are within study area. All intersections are in Juneau unless otherwise noted.

A separate analysis of data provided by ADOT&PF showed that between 1997 and 1999 there were reported accidents at fourteen of the twenty-one study intersections. The accident rate, defined as annual number of accidents occurring per million vehicles entering the intersection (MEV), was calculated for each of the fourteen intersections. Table 7 identifies each of the accident rate factors and the accident rate for each of the study intersections with available accident data.

Based on the data provided for this project, Egan Drive/Vintage Boulevard/Glacier Highway (North) intersection experienced the highest accident rate with 1.19 accidents per million entering vehicles (MEV). The Egan Drive/Mendenhall Loop Road and Vintage Boulevard/Riverside Drive intersections experienced the second highest accident rate with 0.93 accidents per MEV. Egan Drive/Mendenhall Loop Road intersection also has the highest annual average number of accidents with 12.7 accidents per year. Mendenhall Mall Road/Mendenhall

Loop Road intersection ranks fourth highest accident rate in the study area with 0.88 accidents per MEV, and Egan Drive/Glacier Highway (McNugget) intersection ranks fifth with 0.76 accidents per MEV.

TABLE 7 STUDY INTERSECTION ACCIDENT RATE (1997-1999)

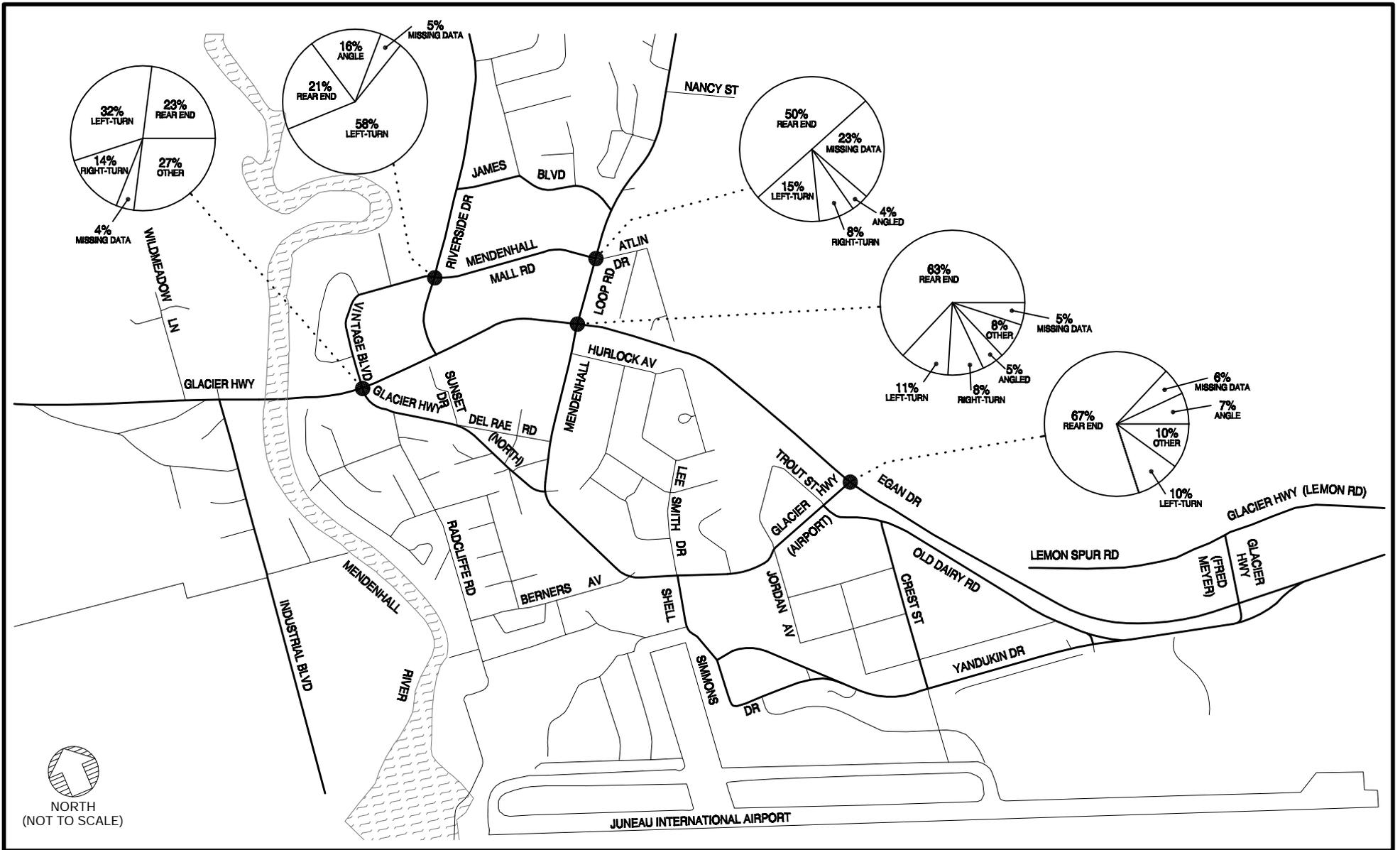
Intersections	Total # of Accidents	Accidents / year	MEV/ year	Accidents per MEV
Glacier Hwy / Industrial Blvd	8	2.6	5.20	0.50
Egan Dr / Vintage Blvd / Glacier Hwy (North)	22	7.3	6.09	1.19
Egan Dr / Riverside Drive	5	1.7	7.50	0.23
Egan Dr / Mendenhall Loop Rd	38	12.7	13.66	0.93
Egan Dr / Glacier Hwy (Mc Nugget)	30	10.0	13.12	0.76
Egan Dr / Yandukin Dr	11	3.7	11.55	0.32
Mendenhall Mall Rd / Riverside Dr/Vintage Blvd	19	6.3	6.8	0.93
James Blvd / Riverside Dr	6	2.0	3.78	0.53
James Blvd / Mendenhall Loop Rd	2	0.7	7.31	0.09
Mendenhall Mall Rd / Mendenhall Loop Rd	26	8.7	9.87	0.88
Glacier Hwy (Airport) / Jordan Ave	3	1.0	4.53	0.22
Glacier Hwy (Airport)/ Shell Simmons Dr	7	2.3	5.08	0.45
Glacier Hwy (Airport) Old Dairy Road / Trout St	7	2.3	4.28	0.54
Glacier Hwy (Lemon Rd) / Lemon Spur Rd / Glacier Hwy (Fred Meyer)	2	0.7	2.15	0.32

Notes: MEV= Million Entering Vehicles

Intersections shaded are the five intersections with the highest accident rates in the study area.

Table 8 identifies the type of accidents occurring at each of the intersections with available accident data and shows the number of injury accidents. Figure 7 shows accident types at the five intersections within the study area with the highest accident rates. As noted in Table 8 and shown on Figure 7, the majority of the accidents at the signalized intersections were rear-end accidents except at Riverside Drive/Mendenhall Mall Road; which has the highest number of left-turn accidents (predominately involving southbound left-turns). The top five intersections with the highest accident rate also had more than 50% of the injury accidents.

Among the unsignalized intersections, Egan Drive/Vintage Boulevard/Glacier Highway (North) and Egan Drive/Yandukin Drive had the highest incidence of accidents as well as the highest number of injury accidents. There were no fatalities reported in the study area over the time period analyzed. *Appendix B contains diagrams of the accident locations at each of the intersections with available accident data.*



NOTE: BASED ON REPORTED ACCIDENTS AT THE INTERSECTIONS WITH AVAILABLE DATA

ACCIDENT TYPES AT KEY INTERSECTIONS

WEST EGAN DRIVE CORRIDOR JUNEAU, ALASKA MAY 2002	FIGURE 7	
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TABLE 8 STUDY INTERSECTION ACCIDENT TYPES

Intersections	Total # of Accidents	Rear-End	Left-Turn	Right-Turn	Angled	Others	Missing Data	Injury
Glacier Hwy / Industrial Blvd	8	5	1		1		1	3
Egan Dr / Vintage Blvd / Glacier Hwy (North)	22	5	7	3		6 ⁽⁶⁾	1	10
Egan Dr / Riverside Dr	5	1	1			1	2	2
Egan Dr / Mendenhall Loop Rd	38	24 ⁽⁴⁾	4	3	2	3	2	20 ⁽⁵⁾
Egan Dr / Glacier Hwy (Mc Nugget)	30	20 ⁽⁷⁾	3		2	3	2	17 ⁽⁸⁾
Egan Dr / Yandukin Dr	11	2	4		1	4		5
Mendenhall Mall Rd / Riverside Dr/Vintage Blvd	19	4	11 ⁽³⁾		3		1	10
James Blvd / Riverside Dr	6	4	1			1		2
James Blvd / Mendenhall Loop Rd	2	1		1				2
Mendenhall Mall Rd / Atlin Dr / Mendenhall Loop Rd	26	13 ⁽¹⁾	4	2	1		6	14 ⁽²⁾
Glacier Hwy (Airport) / Jordan Ave	3		1		1		1	2
Glacier Hwy (Airport)/ Shell Simmons Dr	7		2		1		4	1
Glacier Hwy (Airport) / Old Dairy Road / Trout St	7	2	2	1			2	1
Glacier Hwy (Lemon Rd) / Glacier Hwy (Fred Meyer)	2		2					2

Intersections shaded are the five intersections with the highest accident rates in the study area.

- (1) Seven on southbound approach, four on northbound approach, and one each east and westbound on Mall/Atlin.
- (2) One injury involving pedestrian/bicycle.
- (3) Five while making southbound left and three while making northbound left.
- (4) 12 on the southbound approach, five on the northbound and westbound approaches and two on eastbound approach.
- (5) Includes two accidents involving pedestrian/bicycle.
- (6) Three north-south head-on accidents.
- (7) Eight on northbound approach, seven on southbound approach, three on eastbound and two on westbound.
- (8) One injury involving pedestrian/bicycle.

Peak Hour Traffic Operations

The existing lane configurations and traffic control devices (signalized and unsignalized intersections) shown in Figure 8 were determined through field review and ADOT&PF staff comments. In addition, ADOT&PF plans to complete improvements to Glacier Highway (Airport) in the summer of 2002. These improvements include installing traffic signals at the intersections of Glacier Highway (Airport)/Jordan Avenue and Glacier Highway (Airport)/Shell Simmons Drive; and prohibiting left turns from Trout Street and Old Dairy Road onto Glacier Highway (Airport) during the weekday p.m. peak hour. It was assumed that during the weekday p.m. peak hour, this diverted traffic uses Jordan Avenue to gain access for left turns onto Glacier Highway.

ADOT&PF provided weekday a.m. and p.m. peak hour intersection turning movement volumes for the study intersections. The volumes provided were from various years and various periods in the year. Existing (summer 2001) turning movement counts were developed from the recent intersection turning movement counts, seasonal adjustment factors, and historic growth factors.

The seasonal adjustment factors were based upon the 1999 fixed recorder data at the Riverside Drive recorder (#60500370 0) near Division Street and the fixed recorder data (#60333000 9) near Egan Drive at Glacier Avenue (Egan mile post 3). Traffic link data from the 1980, 1985, 1990, 1995, and 2000 Southeast Region Traffic and Safety Reports was used to determine the annual growth factors for each of the roadway links.

After the counts were seasonally adjusted to peak season levels (June), annual growth factors were applied to each of the intersections to bring all of the intersection volumes up to 2001 estimated traffic volumes. The estimated June 2001 traffic volumes were then adjusted to balance between intersections where appropriate. From this existing data and the analysis, the system a.m. and p.m. peak hours were determined to be 7:00 a.m. to 8:00 a.m. and 4:30 to 5:30 p.m., respectively. The estimated June 2001 weekday a.m. and p.m. peak hour traffic volumes used for traffic operations analysis are shown in Figures 9 and 10, respectively. *The original traffic volume counts and seasonal and annual growth adjustments are shown in Appendix C.*

To evaluate intersection operations at the study intersections, a peak hour level-of-service analysis was performed in accordance with the procedures described in the *2000 Highway Capacity Manual Update* (Reference 5) as implemented in Synchro 5.0. Level of service (LOS) is a concept developed to quantify the amount of delay that motorists experience when passing through an intersection. The LOS is calculated by applying a number of different nationally accepted equations that estimate intersection delay and capacity as a function of many different variables, including vehicular volumes and types, lane configurations, and traffic control. Levels of service range from “A” (best) to “F” (worst). *Appendix D contains a description of the intersection level-of-service criteria.*

As suggested in *A Policy on Geometric Design of Highways and Streets* (AASHTO, 2001), LOS C is desirable for urban arterial streets and LOS D is desirable for urban collectors and local streets. In addition, the *ADOT&PF Preconstruction Manual* identifies LOS C as a guideline for establishing overall widths of urban streets but does not give a specification for intersections. However, as a practical matter LOS C is often difficult to achieve at signalized intersections with longer cycle lengths. For this project, LOS D or better is generally considered to be acceptable for signalized intersections for consistency with previous studies in the area. In addition, LOS E or better is generally considered acceptable for the most critical movement at unsignalized intersections due to the difficulty in achieving LOS C or D where signalization is not warranted. However, all intersections with operations at LOS D or worse have been examined to develop a more detailed understanding of the operational characteristics.

Another measure of effectiveness used to evaluate intersections is the volume-to-capacity (v/c) ratio. The *Highway Capacity Manual* procedure provides an estimate of the intersection’s *capacity*, or the total volume of vehicles that may pass through the intersection during the one-hour analysis period, for each lane or group of lanes approaching the intersection. The volume-to-capacity ratio is the total volume of traffic approaching the intersection divided by the



SOURCE: FIELD OBSERVATION

LEGEND
● ESTIMATED VOLUMES

2001 EXISTING TRAFFIC VOLUMES WEEKDAY AM PEAK HOUR

WEST EGAN DRIVE CORRIDOR
JUNEAU, ALASKA
MAY 2002

FIGURE
9



SOURCE: FIELD OBSERVATION

LEGEND

- ESTIMATED VOLUMES

**2001 EXISTING TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR**

WEST EGAN DRIVE CORRIDOR
JUNEAU, ALASKA
MAY 2002

FIGURE
10

theoretical capacity of the intersection. Thus, a volume-to-capacity ratio of 1.0 represents an intersection operating at the limit of its capacity. For design purposes, a volume-to-capacity ratio of 0.90 is generally considered a desirable threshold.

The results of the analysis of weekday a.m. and p.m. peak hour traffic operations are shown in Table 9. *Appendix E contains the Level of Service worksheets for the analysis.*

In addition, in order to identify locations with potential queuing constraints, a 95th-percentile queuing analysis using Synchro 5.0 was performed at all signalized intersections and unsignalized intersections approaching capacity or having high delay. *Weekday peak hour 95th-percentile queue summary tables are contained in Appendix F.*

Weekday AM Peak Hour Traffic Operations

Three intersections on Egan Drive operate at relatively low levels of service during the existing weekday a.m. peak period:

- **Industrial Boulevard/Glacier Highway:** The southbound left-through-right turn is the critical movement at this intersection. There is ample capacity for this movement; however, the delay is relatively high (LOS E) due to infrequent gaps in Egan Drive traffic flow.

It should also be noted that many large vehicles travel to and from Industrial Boulevard. These vehicles have longer acceleration times than passenger cars and thus need larger gaps in traffic to enter Egan Drive. As a result, traffic on Egan Drive frequently is required to slow down to accommodate trucks that have just entered from Industrial Boulevard.

- **Egan Drive/Vintage Boulevard/Glacier Highway (North):** Motorists making a northbound left turn from Glacier Highway (North) onto Egan Drive experience a LOS D. There is ample capacity for this movement.
- **Egan Drive/Mendenhall Loop Road:** This intersection operates at LOS E with a volume-to-capacity ratio of 0.89. Field observations during the off-season (February 2002) indicated cycle failures at this intersection for several cycles during the a.m. peak hour, with queuing on the southbound Mendenhall Loop Road and eastbound Egan Drive approaches. The weekday a.m. peak hour analysis (of summer conditions) indicates that the average queue for southbound through and left-turn movements extends nearly to Mendenhall Mall Road.

TABLE 9 EXISTING AM AND PM PEAK HOUR INTERSECTION OPERATIONS

Intersection	LOS ¹	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't	LOS ¹	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't
	AM Peak Hour				PM Peak Hour			
Glacier Hwy / Wildmeadow Ln	B	0.01	14.7	SB LT/RT	C	0.02	22.9	SB LT/RT
Glacier Hwy / Industrial Blvd	E	0.08	42.4	SB LTR	F	0.46	>50	SB LTR
Egan Dr / Vintage Blvd / Glacier Hwy (North)	D	0.39	28.1	NB LT/RT	F	>1.0	>50	NB LT/RT
Egan Dr / Riverside Dr	C	0.39	22.8	--	C	0.70	24.8	--
Egan Dr / Mendenhall Loop Rd	E	0.89	57.9	--	E	0.99	59.9	--
Egan Dr / Glacier Hwy (McNugget)	B	0.74	16.2	--	C	0.9	26.8	--
Egan Dr / Yandukin Dr	C	0.23	19.1	WB LT	F	>1.0	>50	EB LT
Mendenhall Mall Rd / Vintage Blvd / Riverside Dr	C	0.50	25.7	--	C	0.56	31.4	--
James Blvd. / Riverside Dr	C	0.14	18.8	WB LT/RT	D	0.18	27.8	WB LT/RT
James Blvd / Mendenhall Loop Rd	C	0.31	20.2	EB LT/RT	C	0.18	15.8	EB LT/RT
Mendenhall Mall Rd / Mendenhall Loop Rd	B	0.61	17.4	--	C	0.76	27.7	--
Glacier Hwy (North) / Sunset Dr	A	0.01	9.2	SB LT/RT	B	0.01	10.1	SB LT/RT
Glacier Hwy (North)/Mendenhall Loop Rd Ext	C	0.05	18.8	WB LTR	F	0.34	>50	WB LTR
Glacier Hwy (Airport) / Berners Ave.	C	0.05	19.8	NB LT	F	0.14	>50	NB LT
Glacier Hwy (Airport)/ Shell Simmons Dr. Existing - TWSC Planned - signalized	C B	0.24 0.45	24.5 10.6	SB LT --	F B	>1.0 0.68	>50 16.2	NB LT --
Glacier Hwy (Airport) / Jordan Ave. Existing - TWSC Planned - signalized	C B	0.05 0.42	20.3 11.4	NB LT --	F B	>1.0 0.62 ²	>50 16.6	SB LT --
Glacier Hwy (Airport) / Old Dairy Rd./Trout St. Existing - full access Planned - restricted EW-LT during PM Pk.	F F	0.85 0.85	>50 >50	EB LT EB LT	F D	>1.0 0.62	>50 25.3	EB LT WB T/RT
Old Dairy Rd / Crest St	A	0.05	9.3	NB LT/RT	B	0.15	10.7	NB LT/RT
Yandukin Dr / Old Dairy Rd	B	0.12	10.4	SB LTR	B	0.19	12.2	SB LTR
Yandukin Dr / Crest Street	A	0.01	9.8	NB LTR	B	0.18	11.3	SB LTR
Glacier Hwy (Fred Meyer)/ Glacier Hwy (Lemon Rd)	B	0.02	10.8	EB TH/RT	D	0.52	26.8	EB TH/RT

¹ Averaged over all movements at signalized intersections; for critical movement only at unsignalized intersections)

² Includes left-turns rerouted from Trout Street and Old Dairy to Jordan Avenue.

NB = northbound, SB = southbound, EB = eastbound, WB = westbound

LT = left, TH = through, RT = right; LTR = left/through/right

LOS = Level of Service, V/C= volume-to-capacity ratio

TWSC = Two-way stop-controlled

Two signalized intersections were noted that operate well during the weekday a.m. peak hour (LOS C) but have considerable queuing:

- **Riverside Drive/Egan Drive:** The 95th-percentile queue for the southbound left turn movement from Riverside Drive onto Egan Drive occupies nearly all of the available storage area; and
- **Mendenhall Mall Road/Vintage Boulevard/Riverside Drive:** The 95th-percentile queue for the southbound through movement extends approximately half the distance to James Boulevard during the weekday a.m. peak period.

Off Egan Drive, the intersection of Glacier Highway (Airport)/Old Dairy intersection operates at LOS F during the weekday a.m. peak hour. The eastbound movements from Old Dairy Road exceed capacity. With completion of the traffic signal at the intersection of Jordan Avenue/Glacier Highway, motorists will have easier access to Glacier Highway via Jordan Avenue. There is a potential for motorists to cut through Nugget Mall instead of remaining on Jordan Avenue. The amount and impact of traffic making this maneuver should be monitored with opening of the Glacier Highway (Airport)/Jordan Avenue traffic signal.

Weekday PM Peak Hour Traffic Operations

Under existing conditions the weekday p.m. peak hour traffic conditions are as a whole more critical than existing a.m. peak hour traffic operating conditions. Four intersections are of concern on Egan Drive:

- **Egan Drive/Glacier Highway (North)/Vintage Boulevard:** Under existing p.m. peak hour conditions, the left-turn from Glacier Highway (North) onto Egan Drive at Vintage Boulevard is operating over capacity.
- **Egan Drive/Riverside Drive:** The eastbound left-turn movement from Egan Drive onto Riverside Drive is over capacity; the queue for this movement is important to consider in that it may extend beyond the left turn pocket and interrupt traffic flow on Egan Drive
- **Egan Drive/Mendenhall Loop Road** is operating at a Level of Service E with a volume-to-capacity ratio of 0.99. The westbound through movement is over capacity and the northbound and southbound Mendenhall Loop Road queues can extend past Hurlock Avenue and Mendenhall Mall Road respectively.
- **Egan Drive/Yandukin Drive:** Motorists traveling from eastbound Egan Drive (major street) onto Glacier Highway (minor street) experience a low level of service at this intersection. This left-turning movement is over-capacity during the existing p.m. peak hour. However, field observations in the off-season noted gaps in westbound traffic, caused by in part by platooning from a traffic signal in Lemon Creek and in part by the natural speed distribution of traffic on Egan Drive allow most of the eastbound left-turn queue in part to clear approximately every one to two minutes.

Off Egan Drive there are notable weekday p.m. peak hour traffic operating conditions as well:

- **Mendenhall Mall Road/Vintage Boulevard/Riverside Drive:** While this intersection operates at LOS C, the queue for the northbound left turn movement during the weekday p.m. peak hour can extend approximately half the distance to Egan Drive; and
- **Mendenhall Mall Road/Mendenhall Loop Road:** This intersection also operates at LOS C during the weekday p.m. peak hour; however, the 95th-percentile queue for the northbound through movement can extend back to Egan Drive. This could interrupt traffic flow from Egan Drive onto northbound Mendenhall Loop Road. In addition, the weaving movements along Mendenhall Loop Road between the free right turn from Egan Drive and the left turn onto Mendenhall Mall Road cause frequent congestion during the weekday p.m. peak hour, further exacerbating the queue.

FORECAST 2025 TRAFFIC VOLUMES

A set of annual growth rates and the resulting weekday a.m. and p.m. peak hour 2025 link volumes were prepared based on a review of historic traffic volume growth rates and from forecast population and employment data (*Appendix E*) provided by the City and Borough of Juneau. With ADOT&PF and CBJ approval, the resulting a.m. and p.m. peak hour link volumes (shown in Figures 11 and 12, respectively) were converted to the forecast intersection turning movement volumes shown in Figures 13 and 14, respectively. The intersection traffic operations analysis was performed assuming a peak hour factor of 1.0 to reflect average conditions over the peak hour.



LEGEND
 XX - YEAR 2001 VOLUMES
 [XX] - ANNUAL GROWTH RATE
 (XX) - YEAR 2025 VOLUMES

**FUTURE NO-BUILD CONDITIONS
 YEAR 2025 LINK VOLUMES
 WEEKDAY AM PEAK HOUR**

WEST EGAN DRIVE CORRIDOR JUNEAU, ALASKA MAY 2002	FIGURE 11	
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LEGEND
 XX - YEAR 2001 VOLUMES
 [XX] - ANNUAL GROWTH RATE
 (XX) - YEAR 2025 VOLUMES

**FUTURE NO-BUILD CONDITIONS
 YEAR 2025 LINK VOLUMES
 WEEKDAY PM PEAK HOUR**

WEST EGAN DRIVE CORRIDOR JUNEAU, ALASKA MAY 2002	FIGURE 12	
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FUTURE NO-BUILD CONDITIONS
YEAR 2025 TRAFFIC VOLUMES
WEEKDAY AM PEAK HOUR

WEST EGAN DRIVE CORRIDOR JUNEAU, ALASKA MAY 2002	FIGURE 13	
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FUTURE NO-BUILD CONDITIONS
YEAR 2025 TRAFFIC VOLUMES
WEEKDAY PM PEAK HOUR

WEST EGAN DRIVE CORRIDOR
JUNEAU, ALASKA
MAY 2002

FIGURE
14

FORECAST 2025 NO-BUILD TRAFFIC OPERATIONS ANALYSIS

The year 2025 no-build traffic operations analysis assumes no improvements that increase roadway or intersection capacity within the study area other than the currently planned and funded traffic signals at the intersections of Glacier Highway (Airport)/Shell Simmons Drive and Glacier Highway (Airport)/Jordan Avenue intersections. The results of the forecast 2025 weekday a.m. and p.m. peak hour traffic operations analysis are shown in Table 10.

Forecast Weekday AM Peak Hour Traffic Operations

The forecast weekday a.m. peak hour traffic operations on Egan Drive can be summarized as follows:

- **Glacier Highway/Industrial Boulevard:** This intersection will operate over capacity during the future weekday a.m. peak hour.
- **Egan Drive/Vintage Boulevard/Glacier Highway (North):** Motorists traveling through this intersection will experience relatively high delay (LOS F); however the intersection will operate under capacity.
- **Egan Drive/Mendenhall Loop Road:** During the future weekday a.m. peak hour, this intersection will operate over capacity and at LOS F. It is further anticipated that 95th-percentile southbound Mendenhall Loop Road queue may extend north to Mendenhall Mall Road.
- **Egan Drive/Yandukin Drive:** This intersection will operate at LOS F but under capacity.

Off Egan Drive, the intersections of James Boulevard/Mendenhall Loop Road and Glacier Highway (Airport)/Old Dairy Road/Trout Street are forecast to operate over capacity. Similar to existing conditions, motorists traveling through the Glacier Highway (Airport)/Old Dairy Road/Trout Street intersection will have the opportunity to avoid congestion at this location by using the Glacier Highway (Airport)/Jordan Avenue intersection instead.

In addition, the following intersections are forecast to have relatively high delay, yet still be operating under capacity:

- Glacier Highway (Airport)/Glacier Highway (North)/Mendenhall Loop Road,
- Glacier Highway (Airport)/Berners Avenue, and
- James Boulevard/Riverside Drive.

Forecast Weekday PM Peak Hour Traffic Operations

During the future weekday p.m. peak hour the following intersections (on and off Egan Drive) are forecast to be operating over capacity:

- Glacier Highway/Industrial Boulevard,
- Egan Drive/Vintage Boulevard/Glacier Highway (North),
- Egan Drive/Riverside Drive,
- Egan Drive/Mendenhall Loop Road,
- Egan Drive/Glacier Highway (McNugget),
- Egan Drive/Yandukin Drive,
- Glacier Highway (Airport)/Shell Simmons Drive,
- Mendenhall Mall Road/Vintage Boulevard/Riverside Drive,
- Glacier Highway (Airport)/Glacier Highway (North)/Mendenhall Loop Road,
- Glacier Highway (Fred Meyer)/Glacier Highway (Lemon Road), and
- Glacier Highway (Airport)/Old Dairy Road/Trout Street.

The following signalized intersections will operate under capacity but will operate with a LOS “D” or below.

- Mendenhall Mall Road/Mendenhall Loop Road,
- Glacier Highway/Wildmeadow Lane,
- James Boulevard/Riverside Drive, and
- Glacier Highway (Airport)/Berners Avenue.

TABLE 10 YEAR 2025 AM AND PM PEAK HOUR INTERSECTION OPERATIONS

Intersection	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't
	AM Peak Hour				PM Peak Hour			
Glacier Hwy / Wildmeadow Ln	C	0.01	18.2	SB LT/RT	D	0.05	30.6	SB LT/RT
Glacier Hwy / Industrial Blvd	F	>1.0	>50	NB LT	F	>1.0	>50	NB LT
Egan Dr / Vintage Blvd / Glacier Hwy (North)	F	0.85	>50	NB LT/RT	F	>1.0	>50	NB LT/RT
Egan Dr / Riverside Dr	C	0.49	21.9	--	E	>1.0	79.8	--
Egan Dr / Mendenhall Loop Rd	F	>1.0	>80	--	F	>1.0	>80	--
Egan Dr / Glacier Hwy (McNugget)	C	0.92	25.3	--	F	>1.0	>80	--
Egan Dr / Yandukin Dr	D	0.35	27.2	WB LT	F	>1.0	>50	EB LT
Mendenhall Mall Rd / Vintage Blvd / Riverside Dr	D	0.62	35.5	--	D	0.83	40.7	--
James Blvd. / Riverside Dr	D	0.22	25	WB LT/RT	F	0.56	>50	WB LT/RT
James Blvd / Mendenhall Loop Rd	F	>1.0	>50	EB LT/RT	C	0.29	24.3	EB LT/RT
Mendenhall Mall Rd / Mendenhall Loop Rd	B	0.72	15.3	--	D	0.93	36.4	--
Glacier Hwy (North) / Sunset Dr	B	0.01	10.2	SB LT/RT	B	0.02	11.6	SB LT/RT
Glacier Hwy (North)/Mendenhall Loop Rd Ext	E	0.12	42.6	WB LTR	F	>1.0	>50	WB LTR
Glacier Hwy (Airport) / Berners Ave.	D	0.14	33.4	NB LT	F	0.75	>50	NB LT
Glacier Hwy (Airport)/ Shell Simmons Dr. Planned - signalized	B	0.59	12.9	--	D	1.01	45.7	--
Glacier Hwy (Airport) / Jordan Ave. Planned - signalized	B	0.54	12.7	--	C	0.81	25.3	--
Glacier Hwy (Airport) / Old Dairy Rd./Trout St. Planned - restricted EW-LT during PM Pk.	F	>1.0	>50	EB LT	F	>1.0	>50	WB TH/RT
Old Dairy Rd / Crest St	A	0.07	9.5	NB LT/RT	B	0.29	13.3	NB LT/RT
Yandukin Dr / Old Dairy Rd	B	0.16	11.1	SB LTR	C	0.44	16.9	SB LTR
Yandukin Dr / Crest Street	B	0.02	10.2	NB LTR	B	0.29	14.3	SB LTR
Glacier Hwy (Fred Meyer)/ Glacier Hwy (Lemon Rd)	B	0.04	13.1	EB TH/RT	F	>1.0	>50	EB TH/RT

¹ Averaged over all movements at signalized intersections; for critical movement only at unsignalized intersections)

² Includes left-turns rerouted from Trout Street and Old Dairy to Jordan Avenue.

NB = northbound, SB = southbound, EB = eastbound, WB = westbound

LT = left, TH = through, RT = right; LTR = left/through/right

V/C= volume-to-capacity ratio

TWSC = Two-way stop-controlled

SUMMARY

The following is an overview of the key findings and conclusions of the analysis of existing and future no-build transportation conditions in the study area.

Pedestrian System

- Much of the study area has sidewalks or multi-use paths on one or both sides of the roadway. Signalized roadway crossings for pedestrians are provided at each of the five existing signalized intersections in the study area.
- Two planned traffic signals on Glacier Highway (Airport) at Shell Simmons Drive and Jordan Avenue will provide additional protected pedestrian crossings across Glacier Highway (Airport) when completed.
- Areas with the most pedestrian activity include Glacier Highway (Airport) from Nugget Mall to Mendenhall Loop Road and Riverside Drive at Mendenhall Mall Road/Vintage Boulevard, both of which have sidewalk facilities.
- The existing unsignalized intersections on Egan Drive at Vintage Boulevard/Glacier Highway (North) and Yandukin Drive act as a barrier to pedestrians due to the high speed of traffic on Egan Drive. Pedestrians have been observed attempting to cross at these locations despite the lack of signalized crosswalks. Pedestrians traveling between the airport and Fred Meyer have been observed trying to cross Egan Drive at the unsignalized Yandukin Drive intersection rather than at the signalized Glacier Highway (McNugget) intersection.
- There are many transit stop locations with stops on both sides of high volume roadways with no signalized intersections or facilities for pedestrians to cross the roadway in the nearby vicinity. The transit stops on Egan Drive at Industrial Boulevard and on Glacier Highway at Fred Meyer are a few examples.

Bicycle System

- The multi-use paths on both sides of Egan Drive and both sides of Mendenhall Loop Road provide primary bicycle access in and through the study area.
- Bike lanes are provided on Glacier Highway (Airport), Glacier Highway (North), Riverside Drive north of Mendenhall Mall Road, Mendenhall Loop Road from Glacier Highway (Airport) to Atlin Avenue and on Glacier Highway west of Glacier Highway (North)/Vintage Boulevard intersection.
- No bike lanes or shoulders are provided on Mendenhall Loop Road from Atlin Avenue to Nancy Street. As a result, bicyclists riding south on Mendenhall Loop Road find themselves cut off.

Public Transit System

- Capital Transit provides public transportation service seven days a week in the study area on four fixed bus routes and the Care-a-Van complementary paratransit service.

- According to the 1996 *Transit Development Plan*, the bus stop with the highest level of weekday boarding in the study area is at Nugget Mall. There are no park-and-ride lots in the system.
- Many of the marked stops along Glacier Highway (Airport) in the study area are sheltered, and the shelters contain benches for waiting passengers.
- Capital Transit provides a high level of service in the study area in terms of hours of service and a moderate to low level of service in terms of service frequency.
- Accessible transit service is provided via fixed-route buses with appropriate equipment, and Care-a-Van paratransit service.

Roadway System

- Most of the study roadways are under ADOT&PF and City and Borough of Juneau jurisdiction except for the Mendenhall Mall Road, which is under private ownership.
- At the unsignalized Egan Drive/Yandukin Drive/Glacier Highway (Fred Meyer) intersection the sight distance for eastbound left-turn movement from Egan Drive is obstructed by the westbound left-turn queue (turning from Egan Drive onto Yandukin Drive) when present.
- At the Mendenhall Loop Road/Mendenhall Mall Road/Atlin Drive intersection, the east leg is skewed and westbound through traffic does not line-up with its receiving lane in the west leg of the intersection.
- The highest incidence of reported accidents occurred at the intersections of Mendenhall Loop Road/Mendenhall Mall Road and Mendenhall Loop Road/Egan Drive. Most of these accidents were rear end accidents.
- More than 50% of the accidents in the study area involve injury with various degree of severity. No fatalities were reported.
- The ADOT&PF 1999 Traffic and Safety Report and the accident rate analysis showed that highest incidence and rate of accidents in the study area is occurring at the following intersections:
 - Egan Drive/Vintage Boulevard/Glacier Highway (North),
 - Egan Drive/Mendenhall Loop Road,
 - Egan Drive/Glacier Highway (McNugget),
 - Riverside Drive/Vintage Boulevard/Mendenhall Mall Road, and
 - Mendenhall Loop Road/Mendenhall Mall Road/Atlin Drive.

Existing Peak Hour Traffic Operations

- The system weekday a.m. and p.m. peak hour for the operational analysis was determined to be 7:00 a.m. to 8:00 a.m. and 4:30 p.m. to 5:30 p.m., respectively.
- The analysis of existing traffic operations was based on summer 2001 traffic volumes obtained from recent counts, seasonal adjustment factors, and historic traffic volume growth rates.

- The analysis of existing traffic operations shows that the critical intersections in the study area are:
 - **Egan Drive/Industrial Boulevard** – During the weekday p.m. peak hour this intersection operates at LOS F and near capacity. The southbound movements from the parking lot opposite Industrial Boulevard experience the highest level of delays and congestion.
 - **Egan Drive/Vintage Boulevard/Glacier Highway (North)** – During the weekday p.m. peak hour this intersection operates at LOS F and over capacity. Motorists traveling from Glacier Highway (North) onto Egan Drive experience the most congestion and delay.
 - **Egan Drive/Mendenhall Loop Road** – This intersection is operating at LOS E during both the weekday a.m. and p.m. peak hour. While it is operating under capacity during the weekday a.m. peak hour, during the weekday p.m. peak hour the intersection is operating at capacity. Southbound queuing during the weekday a.m. peak hour backs up through Mendenhall Mall Road. During the weekday p.m. peak hour the westbound through movement is over capacity and the northbound and southbound movements are at capacity. This results in extensive queuing on these approaches.
 - **Egan Drive/Yandukin Drive** – During the weekday p.m. peak hour this intersection operates at LOS F and over capacity. Motorists turning left from Egan Drive toward Fred Meyer experience the most delay and congestion.
 - **Glacier Highway (Airport)/Glacier Highway (North)/Mendenhall Loop Road** – Motorists traveling to Glacier Highway (North) from Glacier Highway (Airport) experience high levels of delay. However, the intersection is operating under capacity.
- Finally, the intersections of Glacier Highway (Airport) with Shell Simmons, Jordan Avenue, and Old Dairy Road all operate at LOS F and over capacity during the weekday p.m. peak hour. The traffic control changes planned for summer 2002 will improve the peak hour traffic operations to acceptable conditions for all three intersections during weekday p.m. peak hour. During the weekday a.m. peak hour, Glacier Highway (Airport)/Old Dairy Road/Trout Street may still experience long delays and operate at over capacity, although alternative signalized access will be available via Jordan Avenue.

Forecast Year 2025 Peak Hour Traffic Volumes

- Forecast weekday a.m. and p.m. peak hour link and intersection turning movement volumes were developed based on existing traffic volumes, historic growth traffic patterns, and forecast population and employment data provided by the City and Borough of Juneau.
- The most significant changes in land use that affect traffic in and through the study area are expected along Industrial Boulevard, the Peterson Hill area, the Nugget Mall, and Jordan Avenue area and the area in the vicinity of Fred Meyer.

Year 2025 Peak Hour Traffic Operations

- In the future, with continued growth in traffic volumes in the Mendenhall Valley area, the weekday p.m. peak period becomes the critical peak period. During the weekday p.m. peak hour all of the intersections on Egan Drive within the study corridor will operate over capacity:
 - Glacier Highway/Industrial Boulevard
 - Egan Drive/Vintage Boulevard/Glacier Highway (North)
 - Egan Drive/Riverside Drive
 - Egan Drive/Mendenhall Loop Road
 - Egan Drive/Glacier Highway (McNugget)
 - Egan Drive/Yandukin Drive.

During the weekday a.m. peak period, the intersections of Egan Drive/Riverside Drive and the Egan Drive/Glacier Highway (McNugget) will operate under capacity and at LOS C or better. All other intersections along Egan Drive within the study area (Glacier Highway/Industrial, Egan Drive/Vintage Boulevard/Glacier Highway (North), and Egan Drive/Yandukin Drive) will operate at LOS D and/or over capacity during the weekday a.m. peak hour.

- Off Egan Drive, during the weekday p.m. peak hour the following intersections will operate over capacity and/or at LOS D or worse:
 - Glacier Highway (Airport)/Glacier Highway (North)/Mendenhall Loop Road
 - Glacier Highway (Airport)/Shell Simmons Drive
 - Riverside Drive/Vintage Boulevard/Mendenhall Mall Road
 - Mendenhall Loop Road/Atlin Drive/Mendenhall Mall Road
 - Glacier Highway (Fred Meyer)/Glacier Highway (Lemon Road)
- The critical weekday a.m. peak hour intersections off Egan Drive differ from the weekday p.m. peak hour intersections. During the weekday a.m. peak hour the following intersections operate over capacity and/or at a relatively low level of service:
 - Mendenhall Loop Road/James Boulevard,
 - James Boulevard/Riverside Drive,
 - Glacier Highway/Old Dairy Road/Trout Street (optional signalized access to Glacier Highway from Jordan Avenue),
 - Glacier Highway/Mendenhall Loop Road, and
 - Glacier Highway/Berners Avenue.

These findings will contribute to the development of a purpose and need statement for the project and will form the basis for identifying solution concepts for the study area.

REFERENCES

1. Capital Transit, *Transit Development Plan*, 1996.
2. Transportation Research Board, *Transit Capacity and Quality of Service Manual*, 1st edition, 1999.
3. ADOT&PF, *Pre-Construction Manual*, 2001.
4. ADOT&PF Southeast Region, *1999 Southeast Region Traffic and Safety Report*, 1999.
5. Transportation Research Board, *Highway Capacity Manual*, 2000.