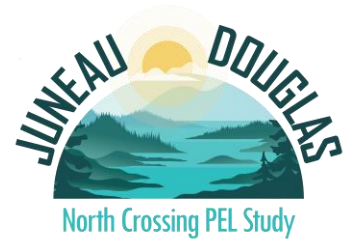




# APPENDIX 7:

Traffic and Safety Analysis Memoranda



# Traffic and Safety Analysis

To: Greg Lockwood, P.E., Project Manager, Alaska Department of Transportation and Public Facilities  
From: Steve Noble, DOWL  
Date: April 23, 2025  
Project: Juneau Douglas North Crossing PEL Study  
Project Numbers: SFHWY00299/0003259

## Introduction

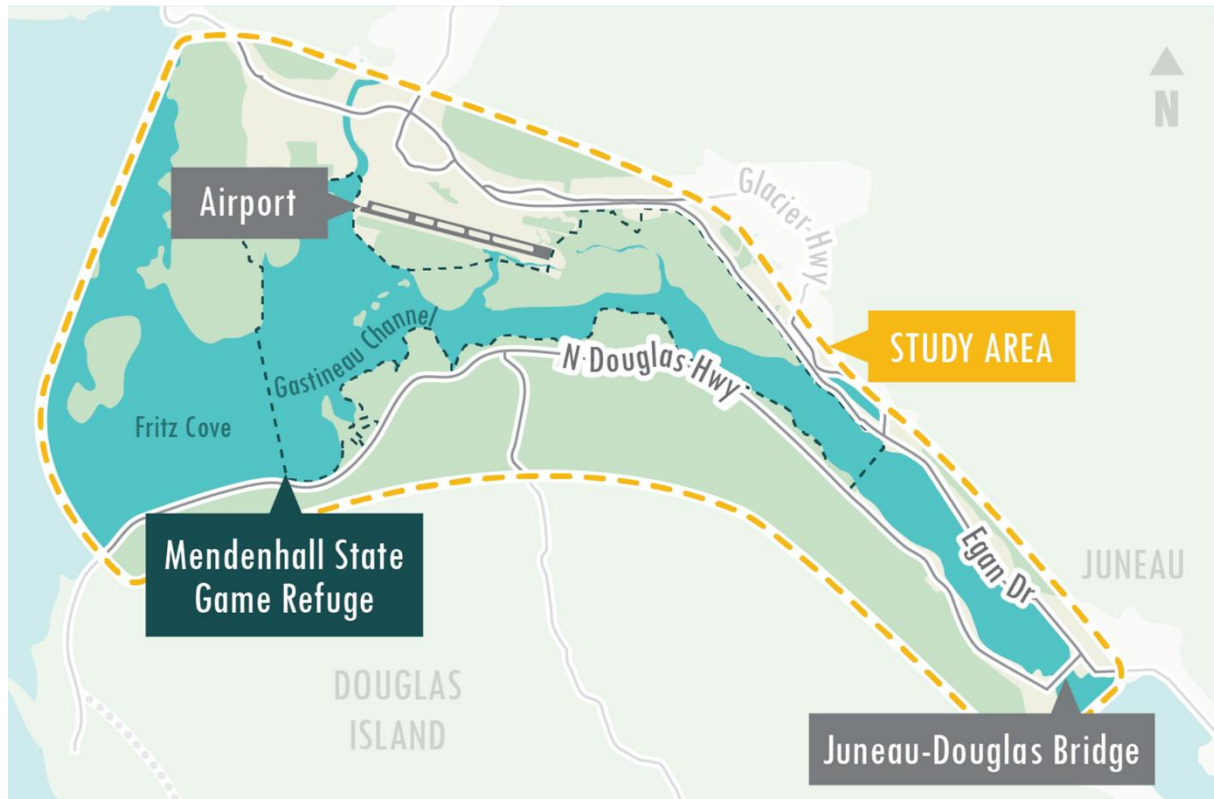
The City and Borough of Juneau has partnered with Alaska Department of Transportation and Public Facilities (DOT&PF) to study a possible transportation corridor to connect Juneau with the north end of Douglas Island. A connection has been studied since the 1980s but has not progressed beyond identification and recommendation of preliminary alternative alignments. The previous studies highlighted several reasons for a north crossing:

- Congestion during peak periods on the existing Douglas Island Bridge
- Concerns about safety and emergency response in the event of a bridge closure
- The potential for residential, commercial, industrial, and port development at west Douglas Island

DOT&PF has chosen to use the Planning and Environmental Linkages (PEL) process to identify and evaluate a purpose and need and recommend alternatives for connecting Juneau with Douglas Island. The PEL process will provide opportunities for public input and involvement. The analyses conducted may be incorporated into a future National Environmental Policy Act (NEPA) process.

The study area boundary, where the proposed crossing may be located, is shown in Figure 1. The study area encompasses the area where prior studies and community outreach identified potential alternative crossing locations.

This memorandum summarizes the five traffic and safety memorandums submitted as part of the Juneau Douglas Island PEL, which cover the existing network, existing conditions, safety, and future conditions.



Figure

1: Study Area

## Existing Network

The existing network analysis laid out a summary of the existing transportation facilities within the study area, provided samples of existing typical sections for high-volume roads, and reviewed applicable transportation plans.<sup>1</sup>

## Summary Statistics

Table 1 shows summary statistics for roads by functional class and ownership, bridges, sidewalks, transit stops, and transit routes within the study area. Arterials, collectors, and local roads each comprise one-third of the total 94 miles. DOT&PF owns two-thirds while City and Borough of Juneau (CBJ) owns the remaining third. There are sidewalks or separated paths of 16 percent of the roadways within the study area. Capital Transit services eight routes, of which three are running every day, and an additional four routes run Monday-Friday.

<sup>1</sup> Transportation Network Memo August 22, 2022

**Table 1: Summary Statistics for Transportation Network**

| Data Category                             | Category                                                        | Category Summation | % of Total  |
|-------------------------------------------|-----------------------------------------------------------------|--------------------|-------------|
| Roadway Functional Classification (miles) | Interstate                                                      | 0.00               | 0%          |
|                                           | Principal Arterial – Other                                      | 23.65              | 25%         |
|                                           | Minor Arterial                                                  | 9.23               | 10%         |
|                                           | Major Collector                                                 | 12.92              | 14%         |
|                                           | Minor Collector                                                 | 18.04              | 19%         |
|                                           | Local                                                           | 30.08              | 32%         |
|                                           | <b>Total</b>                                                    | <b>93.91</b>       | <b>100%</b> |
| Bridges (count)                           | <b>All Bridges</b>                                              | <b>41</b>          | <b>100%</b> |
| Sidewalks (miles)                         | Regularly Maintained                                            | 4.95               | 5%          |
|                                           | Periodically Maintained                                         | 2.70               | 3%          |
|                                           | Not Maintained                                                  | 1.70               | 2%          |
|                                           | <b>Total</b>                                                    | <b>9.35</b>        | <b>10%</b>  |
| Separated Paths                           | <b>Total</b>                                                    | <b>5.26</b>        | <b>6%</b>   |
| Shoulder Lanes                            | <b>Total</b>                                                    | <b>20.05</b>       | <b>21%</b>  |
| Transit Stops (count)                     | <b>All Stops</b>                                                | <b>64</b>          | <b>100%</b> |
| Transit Routes (count)                    | All day – 7 days a week                                         | 3                  | 38%         |
|                                           | Monday-Friday                                                   | 4                  | 50%         |
|                                           | Summer: 7 days a week<br>Fall, Winter, Spring:<br>Monday-Friday | 1                  | 12%         |
|                                           | <b>Total</b>                                                    | <b>8</b>           | <b>100%</b> |

## Typical Sections

Figure 2 shows the existing typical section for Douglas Bridge, the typical sections for other high-volume roads in the study area can be found in the Transportation Network Memo.

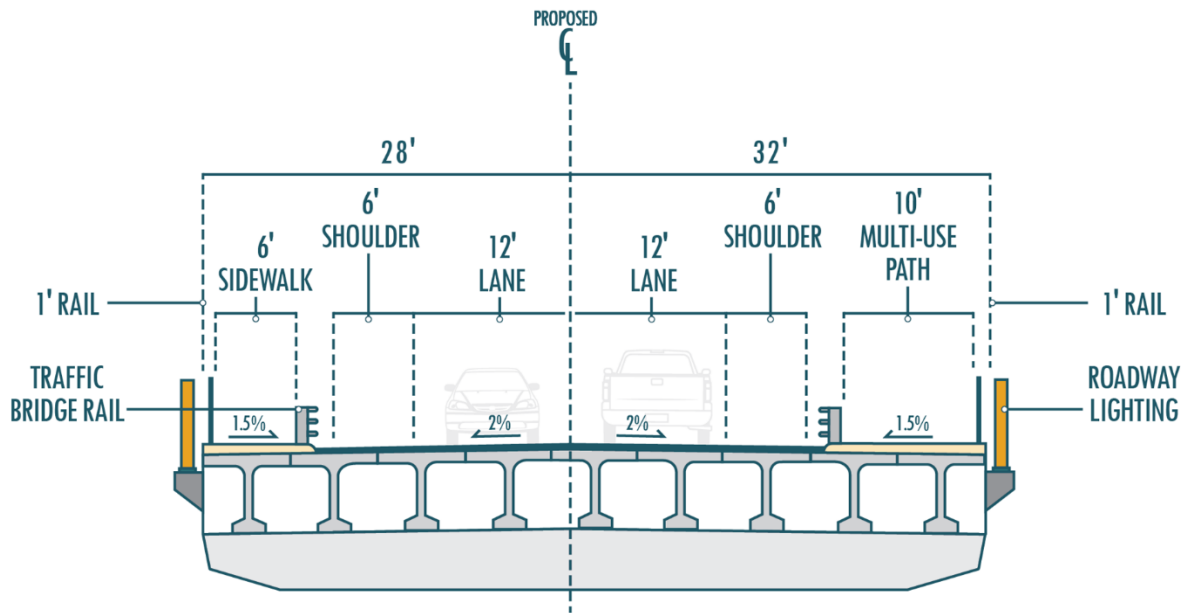
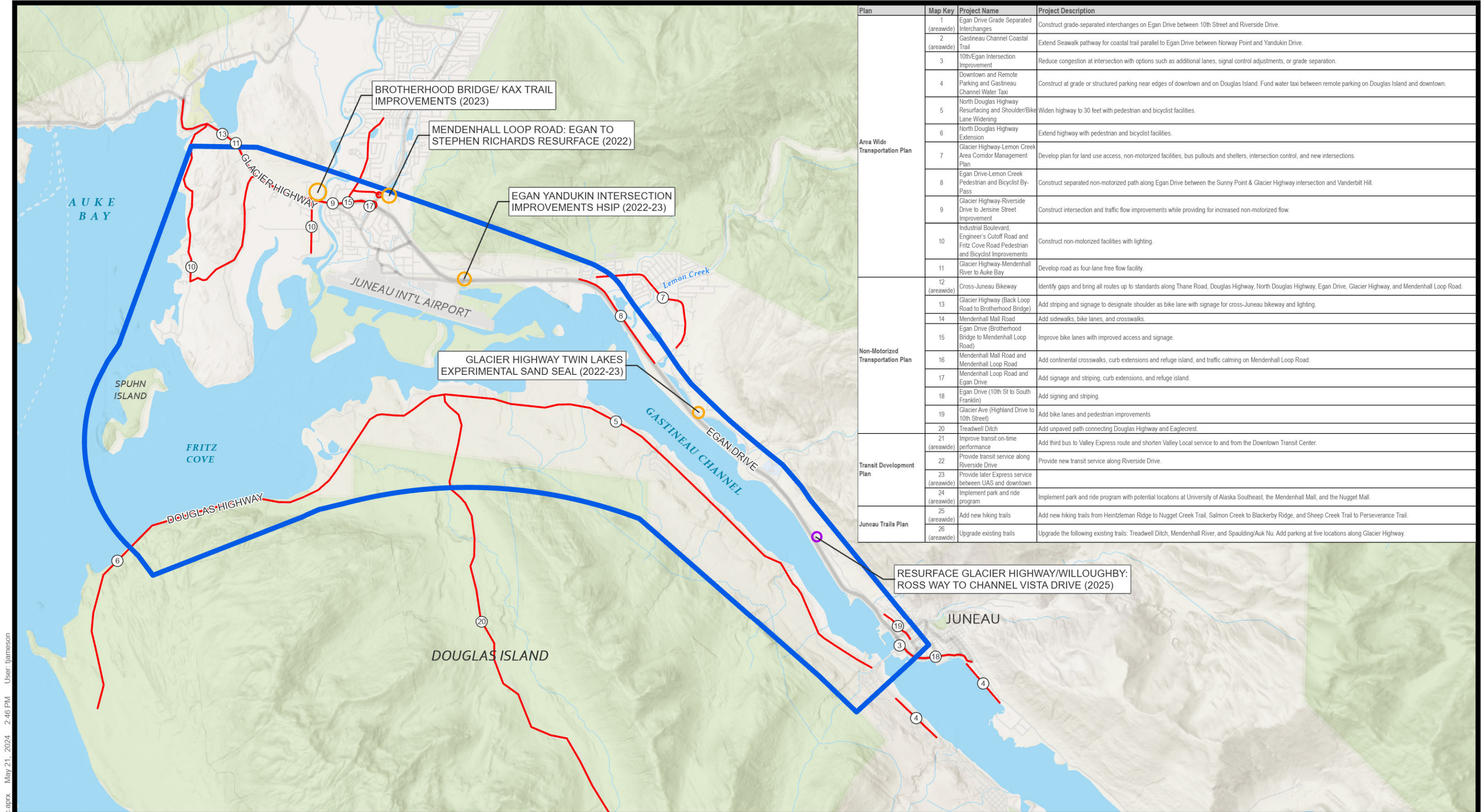


Figure 2: Typical Section – Douglas Bridge

## Transportation Plan Review

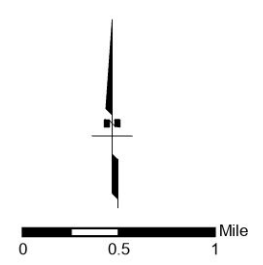
The transportation plans shown in Table 2 were reviewed and summarized in how they relate to the existing and future transportation network. Additionally, Figure 3 (attached) shows current and future DOT&PF construction projects.

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| Plan                              | Map Key       | Project Name                                                                                           | Project Description                                                                                                                                                 |
|-----------------------------------|---------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Area Wide Transportation Plan     | 1 (areawide)  | Egan Drive Grade Separated Interchanges                                                                | Construct grade-separated interchanges on Egan Drive between 10th Street and Riverside Drive.                                                                       |
|                                   | 2 (areawide)  | Gastineau Channel Coastal Trail                                                                        | Extend Seawalk pathway for coastal trail parallel to Egan Drive between Norway Point and Yandukin Drive.                                                            |
|                                   | 3             | 10th/Egan Intersection Improvement                                                                     | Reduce congestion at intersection with options such as additional lanes, signal control adjustments, or grade separation.                                           |
|                                   | 4             | Downtown and Remote Parking and Gastineau Channel Water Taxi                                           | Construct at grade or structured parking near edges of downtown and on Douglas Island. Fund water taxi between remote parking on Douglas Island and downtown.       |
|                                   | 5             | North Douglas Highway Resurfacing and Shoulder/Bike Lane Widening                                      | Widen highway to 30 feet with pedestrian and bicyclist facilities.                                                                                                  |
|                                   | 6             | North Douglas Highway Extension                                                                        | Extend highway with pedestrian and bicyclist facilities.                                                                                                            |
|                                   | 7             | Glacier Highway-Lemon Creek Area Corridor Management Plan                                              | Develop plan for land use access, non-motorized facilities, bus pullouts and shelters, intersection control, and new intersections.                                 |
|                                   | 8             | Egan Drive-Lemon Creek Pedestrian and Bicyclist By-Pass                                                | Construct separated non-motorized path along Egan Drive between the Sunny Point & Glacier Highway intersection and Vanderbilt Hill.                                 |
|                                   | 9             | Glacier Highway-Riverside Drive to Jensine Street Improvement                                          | Construct intersection and traffic flow improvements while providing for increased non-motorized flow.                                                              |
|                                   | 10            | Industrial Boulevard, Engineer's Cutoff Road and Fritz Cove Road Pedestrian and Bicyclist Improvements | Construct non-motorized facilities with lighting.                                                                                                                   |
|                                   | 11            | Glacier Highway-Mendenhall River to Auke Bay                                                           | Develop road as four-lane free flow facility.                                                                                                                       |
| Non-Motorized Transportation Plan | 12 (areawide) | Cross-Juneau Bikeway                                                                                   | Identify gaps and bring all routes up to standards along Thane Road, Douglas Highway, North Douglas Highway, Egan Drive, Glacier Highway, and Mendenhall Loop Road. |
|                                   | 13            | Glacier Highway (Back Loop Road to Brotherhood Bridge)                                                 | Add striping and signage to designate shoulder as bike lane with signage for cross-Juneau bikeway and lighting.                                                     |
|                                   | 14            | Mendenhall Mall Road                                                                                   | Add sidewalks, bike lanes, and crosswalks.                                                                                                                          |
|                                   | 15            | Egan Drive (Brotherhood Bridge to Mendenhall Loop Road)                                                | Improve bike lanes with improved access and signage.                                                                                                                |
|                                   | 16            | Mendenhall Mall Road and Mendenhall Loop Road                                                          | Add continental crosswalks, curb extensions and refuge island, and traffic calming on Mendenhall Loop Road.                                                         |
|                                   | 17            | Mendenhall Loop Road and Egan Drive                                                                    | Add signage and striping, curb extensions, and refuge island.                                                                                                       |
|                                   | 18            | Egan Drive (10th St to South Franklin)                                                                 | Add signing and striping.                                                                                                                                           |
|                                   | 19            | Glacier Ave (Highland Drive to 10th Street)                                                            | Add bike lanes and pedestrian improvements                                                                                                                          |
|                                   | 20            | Treadwell Ditch                                                                                        | Add unpaved path connecting Douglas Highway and Eaglecrest.                                                                                                         |
|                                   | 21 (areawide) | Improve transit on-time performance                                                                    | Add third bus to Valley Express route and shorten Valley Local service to and from the Downtown Transit Center.                                                     |
| Transit Development Plan          | 22            | Provide transit service along Riverside Drive                                                          | Provide new transit service along Riverside Drive.                                                                                                                  |
|                                   | 23 (areawide) | Provide later Express service between UAS and downtown                                                 |                                                                                                                                                                     |
|                                   | 24 (areawide) | Implement park and ride program                                                                        | Implement park and ride program with potential locations at University of Alaska Southeast, the Mendenhall Mall, and the Nugget Mall.                               |
| Juneau Trails Plan                | 25 (areawide) | Add new hiking trails                                                                                  | Add new hiking trails from Heintzleman Ridge to Nugget Creek Trail, Salmon Creek to Blackerby Ridge, and Sheep Creek Trail to Perseverance Trail.                   |
|                                   | 26 (areawide) | Upgrade existing trails                                                                                | Upgrade the following existing trails: Treadwell Ditch, Mendenhall River, and Spaulding/Auk Nu. Add parking at five locations along Glacier Highway.                |

- PROPOSED STUDY AREA
- COMPLETED PROJECT
- PLANNED PROJECT
- FUTURE PLANNED PROJECT



**KEY PROJECTS**

SEC 25 - 27, 34 - 36, T 40S, R 65E; SEC 30 - 34, T 40S, R 66E  
SEC 1 - 12, 15 - 17, T 41S, R 66E;  
SEC 4 - 10, 15 - 17, 21 - 23, 27 T 41S, R 67E

COPPER RIVER MERIDIAN, ALASKA



|                                                                                  |          |
|----------------------------------------------------------------------------------|----------|
| STATE OF ALASKA<br>DEPARTMENT OF TRANSPORTATION<br>AND PUBLIC FACILITIES         |          |
| DOT&PF PROJECT NO. SFHWY00299/0003259<br>JUNEAU DOUGLAS NORTH CROSSING PEL STUDY |          |
| CITY AND BOROUGH OF JUNEAU, ALASKA                                               |          |
| MAY 21, 2024                                                                     | FIGURE 3 |

Imagery Credits: World Hillshade: Esri, NASA, NGA, USGS, FEMA  
Community no labels: State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, NRCAN, Parks Canada

**Table 2: Transportation Plans Reviewed**

| Plan Name (Year)                                           | Agency                     | Link                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Juneau Area Wide Transportation Plan (2001)                | City and Borough of Juneau | <a href="https://juneau.org/index.php?gf-download=2020%2F01%2FPRINT-VERSION_Area-Wide-Transportation-Plan.FINAL.pdf&amp;form-id=22&amp;field-id=11&amp;hash=540b91e22ac9efa21b48601fb9e0efd0de86fe7310a3a648bd4be25d31e903bb">https://juneau.org/index.php?gf-download=2020%2F01%2FPRINT-VERSION_Area-Wide-Transportation-Plan.FINAL.pdf&amp;form-id=22&amp;field-id=11&amp;hash=540b91e22ac9efa21b48601fb9e0efd0de86fe7310a3a648bd4be25d31e903bb</a> |
| Juneau Non-Motorized Transportation Plan (2009)            | City and Borough of Juneau | <a href="https://juneau.org/index.php?gf-download=2017%2F04%2FJNMTPFinalwithMaps.pdf&amp;form-id=22&amp;field-id=11&amp;hash=59f9e767b73777f6b16ec52cc854893f6518657e7ca4e329a1c5fbbc3b09c431">https://juneau.org/index.php?gf-download=2017%2F04%2FJNMTPFinalwithMaps.pdf&amp;form-id=22&amp;field-id=11&amp;hash=59f9e767b73777f6b16ec52cc854893f6518657e7ca4e329a1c5fbbc3b09c431</a>                                                               |
| City and Borough of Juneau Transit Development Plan (2014) | City and Borough of Juneau | <a href="https://juneaucapitaltransit.org/wp-content/uploads/2016/04/JUNEAUTDP-Final-140213.pdf">https://juneaucapitaltransit.org/wp-content/uploads/2016/04/JUNEAUTDP-Final-140213.pdf</a>                                                                                                                                                                                                                                                           |

The City and Borough of Juneau Code of Ordinances<sup>2</sup> was also reviewed for material pertaining to the transportation network. Title 72 – Traffic contains regulations on rules of the road, vehicle inspection requirements, and parking, but does not contain guidelines referring to the design or procurement of the transportation network.

## Existing Conditions

Evaluation of the existing conditions included an analysis of the existing operations within the study area, and an analysis of the Origin-Destination data.

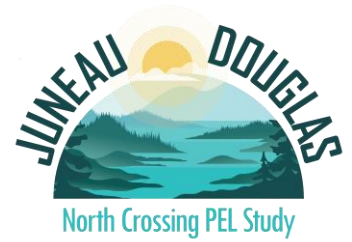
## Existing Operations

The existing operations analysis included a high-level analysis of the volume to capacity of the existing Juneau-Douglas Bridge under existing conditions.<sup>3</sup> The volume to capacity analysis considered the segment capacity of the bridge, as well as operations at the intersections on either end of the bridge (the roundabout on Douglas Highway and the signalized intersection of Egan Drive with 10th Street), as these intersections may limit capacity. While a second bridge across the north channel may be warranted for many reasons, this memo focused on determining if volumes under existing conditions suggest the need to construct a second channel crossing. The existing operations analysis concluded the following:

- Egan Drive with 10th Street: the intersection operates at or near capacity during both morning and evening peak hours.

<sup>2</sup> Code of Ordinances. City and Borough of Juneau. Accessed 2022. [https://library.municode.com/ak/juneau/codes/code\\_of\\_ordinances](https://library.municode.com/ak/juneau/codes/code_of_ordinances)

<sup>3</sup> Volume to Capacity of the Existing Juneau-Douglas Bridge, August 22, 2022



- Roundabout at Douglas Highway with Juneau-Douglas Bridge: the roundabout operates over capacity during the AM peak and near capacity during the PM peak.
- Juneau-Douglas Bridge: the bridge operates under capacity under average annual daily traffic (AADT) conditions.

## Existing Origin Destination Patterns

Existing Origin-Destination patterns were analyzed to forecast volumes for each alternative bridge location.<sup>4</sup>

The Origin-Destination dataset for this project was provided by INRIX (an analytics vendor supplying LBS data) through IDAX (a distributor of INRIX data) for the months of March, April, May, and June 2022. All of the trips in the dataset have at least one waypoint either on the Douglas Bridge, or on Egan Drive/Glacier Highway between the bridge and the Auke Bay roundabout.

After combining data to obtain statistically valid results into five basic subareas, Table 3 shows the percentage likelihoods and confidence intervals for the resulting origin-destination table. This table was used to develop the volume forecasts for each proposed bridge location.

Table 3 presents the average and likely range of the percentage of all trips between each origin and destination pair. By using the 90 percent confidence interval for the origin destination it can be seen that the largest volume of vehicles at 13.4 percent are traveling from Sunny Point/Lemon Creek/Twin Lakes to South Douglas.

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<sup>4</sup> Origin-Destination Data Memo, August 22, 2022

**Table 3: Origin Destination Percentage Likelihood and Confidence Interval**

|             |                                              | Destination Zone                                   |                                              |                        |                         |                          |
|-------------|----------------------------------------------|----------------------------------------------------|----------------------------------------------|------------------------|-------------------------|--------------------------|
|             |                                              | Point Lena /<br>Auke Bay /<br>Mendenhall<br>Valley | Sunny Point /<br>Lemon Creek /<br>Twin Lakes | Downtown<br>Juneau     | North Douglas<br>Island | South Douglas<br>Island  |
| Origin Zone | Point Lena / Auke Bay /<br>Mendenhall Valley |                                                    |                                              |                        | 3.3%<br>(1.3 to 5.3%)   | 13.2%<br>(11.4 to 15.1%) |
|             | Sunny Point / Lemon<br>Creek / Twin Lakes    |                                                    |                                              |                        | 4.5%<br>(2.6 to 6.5%)   | 13.4%<br>(11.5 to 15.2%) |
|             | Downtown Juneau                              |                                                    |                                              |                        | 3.8%<br>(1.9 to 5.8%)   | 8.8%<br>(6.9 to 10.6%)   |
|             | North Douglas Island                         | 3.7%<br>(1.8 to 5.7%)                              | 4.1%<br>(2.2 to 6.1%)                        | 4.1%<br>(2.2 to 6.1%)  | 3.9%<br>(2.0 to 5.9%)   |                          |
|             | South Douglas Island                         | 11.6%<br>(9.7 to 13.5%)                            | 10.5%<br>(8.6 to 12.4%)                      | 9.0%<br>(7.1 to 10.9%) |                         | 5.9%<br>(4.0 to 7.9%)    |

## Safety

The safety of the study area was analyzed to best guide determination of crossing termini locations based on safety.<sup>5</sup> The evaluation included fatal and serious injury crashes (F&SI) within the study area from 2010 to 2019.<sup>6</sup> Additional breakdown of the data included crashes by year, type, distribution, and location throughout the study area, and rates per hundred million vehicle miles traveled (100 MVMT) for segments and rates per hundred million entering vehicles (100 MEV) for intersections. These study area crash rates were compared to statewide average rates for F&SI crashes to identify locations which had existing safety concerns and may be impacted by increased traffic due to the crossing.

Statewide crash rates for F&SI crashes on segments were reported from the 2022 Alaska Highway Safety Improvement Program (HSIP) Handbook, crash rates at intersections were reported from the 2017 Alaska HSIP since statewide average crash rates for intersections are not reported in the 2022 Alaska HSIP.<sup>7,8</sup>

Tables 4 and 5 show the number of F&SI crashes and crash severity along segments of roadway and at intersections within the study area, respectively. Table 4 compares the location crash rate to the statewide average (crashes per 100 MVMT) based on crash severity. Table 5 compares the location crash rate to the statewide average and critical average rates (crashes per 100 MEV) based on intersection control type and number of approaches. The segments and intersections are sorted from the west end of the study area to the east end. As shown, none of the segments or intersections are above the statewide crash rate.

<sup>5</sup> Fatal and Serious Injury Crash Memo, August 22, 2022.

<sup>6</sup> Crash data for 2020 not included due to potential impact by the COVID-19 response.

<sup>7</sup> Alaska Highway Safety Improvement Program Handbook, Alaska DOT&PF, January 2017.

<sup>8</sup> Alaska Highway Safety Improvement Program Handbook, Alaska DOT&PF, August 2023.

**Table 4: Segment F&SI Crash Severity and Crash Rate, 2010 – 2019**

| Location                                                           | Crash Severity |       | AADT<br>(veh/day) | Segment Crash Rate |       | Statewide Crash Rate |       |
|--------------------------------------------------------------------|----------------|-------|-------------------|--------------------|-------|----------------------|-------|
|                                                                    | Serious Injury | Fatal |                   | Serious Injury     | Fatal | Serious Injury       | Fatal |
| Egan Drive<br>(Glacier Highway to Old Dairy Road)                  | 1              | 0     | 26,688            | 1.50               | —     | 6.90                 | 1.35  |
| Egan Drive<br>(Old Dairy Road to Sunny Drive)                      | 2              | 0     | 25,301            | 1.93               | —     |                      |       |
| Egan Drive<br>(Vanderbilt Hill Road to Glacier Highway)            | 2              | 0     | 21,561            | 1.88               | —     |                      |       |
| N. Douglas Highway<br>(Boonie Doon Drive to Juneau Douglas Bridge) | 1              | 0     | 3,790             | 2.43               | —     |                      |       |

**Table 5: Intersection F&SI Crash Severity and Crash Rate, 2010 - 2019**

| Location                               | Traffic Control Type | Crash Severity |       | AADT<br>(veh/day) | Intersection F&SI Crash Rate | Statewide Crash Rate |          |
|----------------------------------------|----------------------|----------------|-------|-------------------|------------------------------|----------------------|----------|
|                                        |                      | Serious Injury | Fatal |                   |                              | Base                 | Critical |
| Egan Drive / Mendenhall Loop Road      | Signal               | 1              | 0     | 20,989            | 0.01                         | 1.57                 | 1.83     |
| Mendenhall Loop Road / Atlin Drive     | Signal               | 1              | 0     | 19,789            | 0.02                         | 1.57                 | 1.83     |
| Egan Drive / Glacier Highway           | Signal               | 1              | 0     | 27,052            | 0.01                         | 1.02                 | 1.20     |
| Egan Drive / Old Dairy Road            | Signal               | 5              | 0     | 26,688            | 0.06                         | 1.57                 | 1.80     |
| Glacier Highway / Walmart Driveway     | Signal               | 1              | 0     | 7,034             | 0.04                         | 1.02                 | 1.39     |
| Egan Drive / Vanderbilt Hill Road      | Signal               | 2              | 0     | 21,111            | 0.03                         | 1.02                 | 1.23     |
| Egan Drive / Engineers Cutoff          | TWSC                 | 1              | 0     | 12,769            | 0.02                         | 0.52                 | 0.72     |
| Egan Drive / Jensine Street            | TWSC                 | 0              | 1     | 15,292            | 0.02                         | 0.52                 | 0.70     |
| Egan Drive / Wildmeadow Lane           | TWSC                 | 1              | 1     | 15,292            | 0.04                         | 0.52                 | 0.70     |
| Egan Drive / Vintage Boulevard         | TWSC                 | 1              | 0     | 15,620            | 0.02                         | 0.55                 | 0.73     |
| Glacier Highway / Mendenhall Loop Road | TWSC                 | 0              | 1     | 2,013             | 0.15                         | 0.52                 | 1.06     |
| Glacier Highway / Nugget Mall Driveway | TWSC                 | 1              | 0     | 7,441             | 0.04                         | 0.52                 | 0.78     |
| Crest Street / Airport Boulevard       | TWSC                 | 1              | 0     | 2,269             | 0.13                         | 0.55                 | 1.06     |
| Yandukin Drive / Old Dairy Road        | TWSC                 | 0              | 1     | 2,601             | 0.12                         | 0.55                 | 1.03     |
| Glacier Highway / Hospital Drive       | TWSC                 | 1              | 0     | 3,287             | 0.09                         | 0.52                 | 0.93     |
| Egan Drive / Highland Drive            | TWSC                 | 4              | 1     | 12,395            | 0.12                         | 0.52                 | 0.72     |
| Egan Drive / 12 <sup>th</sup> Street   | TWSC                 | 0              | 2     | 18,158            | 0.03                         | 0.55                 | 0.72     |

## Future Conditions

The future conditions analysis was based on traffic volume forecasts following a 0.25 percent annual growth rate.<sup>9</sup> Origin-Destination Data at the census block level was used to determine proportions of the forecasted traffic which could be assigned to alternative bridge locations.<sup>10</sup> This information was then used to estimate traffic volume on each alternative bridge location.<sup>11</sup>

For the existing bridge and for each of the bridge alternative locations, the travel time and distance between each pair of census blocks was determined using Google Maps travel time and distance estimates, supplemented with estimates of travel time using distance and estimated speed, as applicable.

The travel time using the alternative bridge location was compared to the travel time using the existing bridge. The proportion of the existing bridge traffic volume which experienced a 10 percent reduction of travel time or better was assigned to the alternative bridge. If the travel times for the alternative and the existing bridge were within 10 percent of each other, the proportion was split evenly between the two bridges. For the downtown alternative bridge location, it was assumed that traffic would split evenly on each bridge (assuming each bridge would serve one-way traffic). Any traffic that would use a bridge in any of the alternative locations would increase traffic volumes on Douglas Highway and reduce volumes on Egan Drive.

After initial estimates of traffic volumes for each bridge were completed, travel speeds on Douglas Highway were revised to reflect the increased volume. This resulted in longer travel times on Douglas Highway. Estimates of the proportion of traffic using each bridge were adjusted to reflect these new travel times.

Table 6 shows the resulting proportion of traffic forecasted for each bridge. The analysis indicates that five to 50 percent of the forecasted traffic would be diverted from the existing bridge to one of the proposed bridge alternatives. The table also shows the travel time savings for each set of bridges, calculated as the average travel time saved per user. While a bridge at the Mendenhall/North Airport location would result in the highest time savings for individual users (up to 15 minutes), the Sunny Point/Vanderbilt/Twin Lakes/Salmon Creek locations would result in the greatest overall travel time benefit.

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<sup>9</sup> Volume to Capacity of the Existing Juneau-Douglas Bridge, August 22, 2022

<sup>10</sup> Origin-Destination Data Memo, August 22, 2022

<sup>11</sup> Bridge Volume Forecast memo, August 22, 2022.

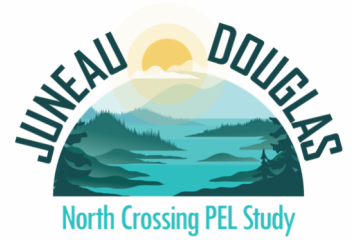
**Table 6: Proportion of Traffic Volumes Selecting each Bridge Alternative Location**

| Bridge                         | Mendenhall or North Airport  | Sunny Point Area or Vanderbilt | Twin Lakes or Salmon Creek   | Eagle Creek Bridge     | Downtown/ Juneau Douglas |
|--------------------------------|------------------------------|--------------------------------|------------------------------|------------------------|--------------------------|
| Proposed                       | 5 to 15%                     | 20 to 30%                      | 30 to 40%                    | 40 to 45%              | 50%                      |
| Existing                       | 85 to 95%                    | 70 to 80%                      | 60 to 70%                    | 55 to 60%              | 50%                      |
| Individual Travel Time Savings | Up to 15 minutes             | Up to 13 minutes               | Up to 10 minutes             | Up to 5 minutes        | Minimal                  |
| Average Time Saved             | 20 to 35 seconds per vehicle | 55 to 65 seconds per vehicle   | 60 to 65 seconds per vehicle | 40 seconds per vehicle | Minimal                  |

## Summary

The traffic and safety analysis for the Juneau Douglas North Crossing PEL Study established the following key takeaways:

- The existing conditions analysis concluded the following:
  - Egan Drive with 10th Street: the intersection operates at or near capacity during both morning and evening peak hours.
  - Roundabout at Douglas Highway with Juneau-Douglas Bridge: the roundabout operates over capacity during the AM peak and near capacity during the PM peak.
  - Juneau-Douglas Bridge: the bridge operates under capacity under average annual daily traffic (AADT) conditions.
  - The largest volume of vehicles at 13.4 percent are traveling from Sunny Point/Lemon Creek/Twin Lakes to South Douglas.
- Safety analysis concluded none of the study area roadway segments or intersections are above the statewide crash rate.
- Future conditions indicate five to 50 percent of the forecasted traffic would be diverted from the existing bridge to one of the proposed bridge alternatives. In addition, the Mendenhall/North Airport bridge alternative location would result in the highest time savings for individual users (up to 15 minutes) while the Sunny Point/Vanderbilt/Twin Lakes/Salmon Creek bridge alternative locations would result in the greatest overall travel time benefit.



# Technical Memorandum

## Transportation Network

To: Marie Heidemann, Project Manager, Alaska Department of Transportation and Public Facilities  
From: Kristen Hansen, Environmental Lead, DOWL  
Date: April 24, 2025  
Project: Juneau Douglas North Crossing PEL Study  
Project Numbers: SFHWY00299/0003259

## PEL Study Description

The City and Borough of Juneau has partnered with Alaska Department of Transportation and Public Facilities (DOT&PF) to study a possible transportation corridor to connect Juneau with the north end of Douglas Island. A connection has been studied since the 1980s but has not progressed beyond identification and recommendation of preliminary alternative alignments. The previous studies highlighted several reasons for a north crossing:

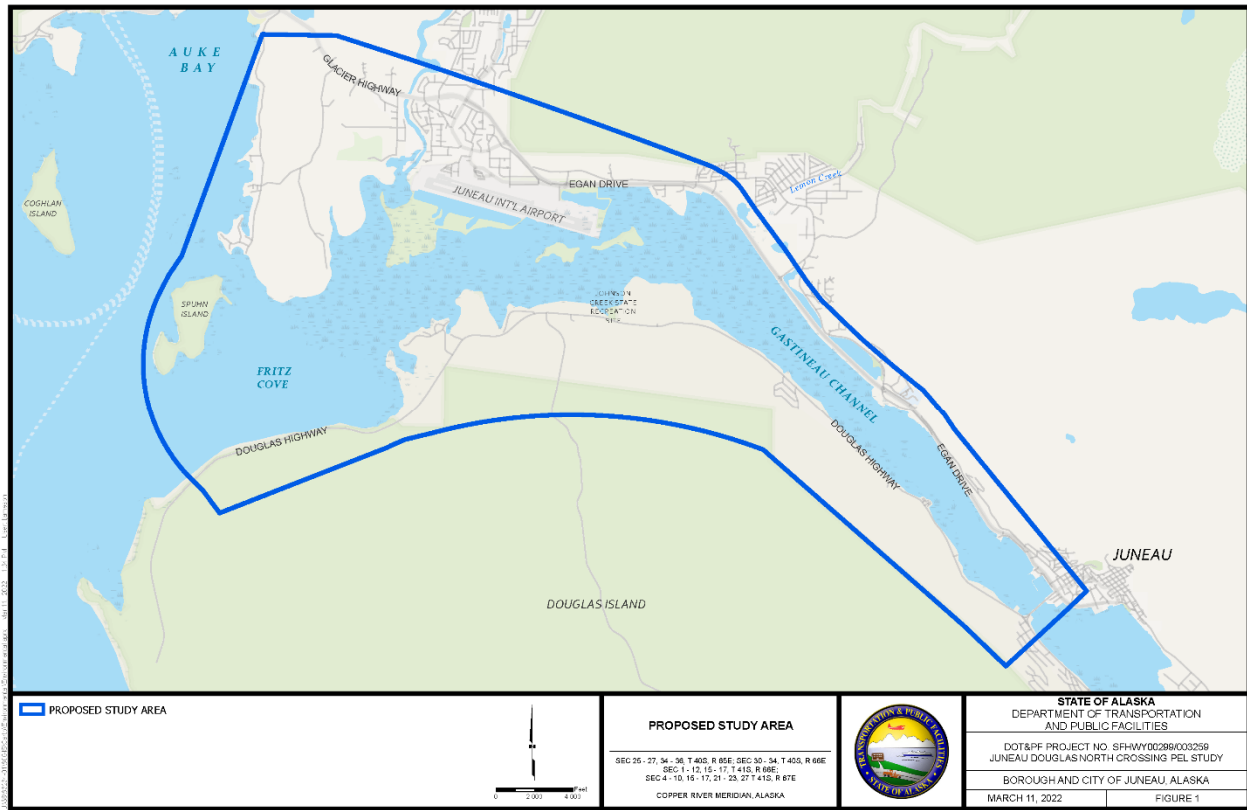
- Congestion during peak periods on the existing Douglas Island Bridge
- Concerns about safety and emergency response in the event of a bridge closure
- The potential for residential, commercial, industrial, and port development at west Douglas Island

DOT&PF has chosen to use the Planning and Environmental Linkages (PEL) process to identify and evaluate a purpose and need and recommend alternatives for connecting Juneau with Douglas Island. The PEL process will provide opportunities for public input and involvement. The analyses conducted may be incorporated into a future National Environmental Policy Act (NEPA) process.

The study area boundary, where the proposed crossing may be located, is shown in Figure 1. The study area encompasses the area where prior studies and community outreach identified potential alternative crossing locations.

## Purpose of the Technical Memorandum

This memorandum is an initial step in the development of the proposed alternatives for the Juneau Douglas North Crossing PEL Study (Project Numbers: SFHWY00299/0003259). It is intended to confirm statistics of transportation facilities and review applicable transportation plans in the study area.



**Figure 1: Study Area**

## Research Methods

Research methods included data gathering from the DOT&PF online GIS hub and DOT&PF staff, compiling data on non-motorized facilities, collecting transit route and stop locations from CBJ, and reviewing projects listed in applicable transportation plans.

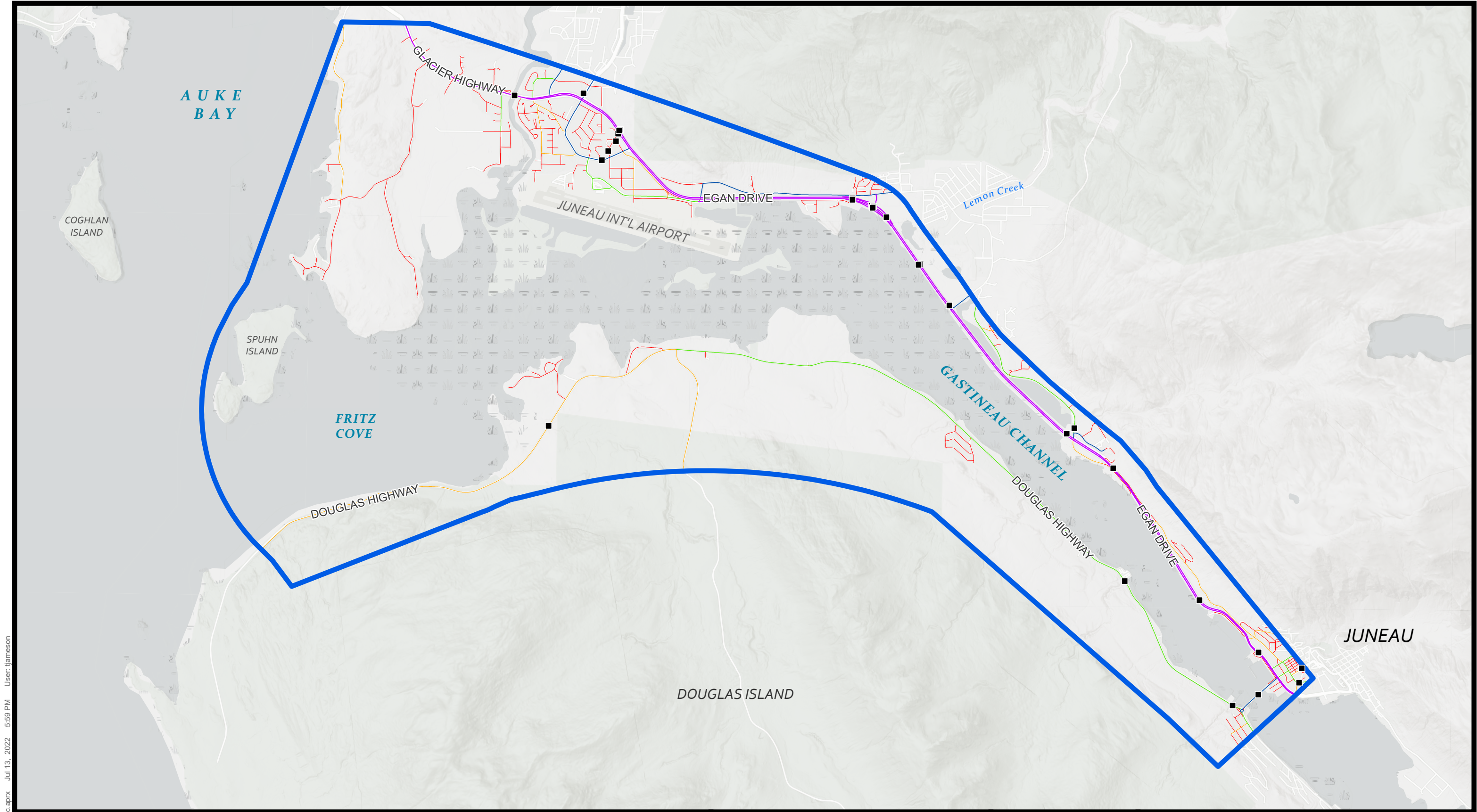
## Mapping Methods

The transportation network was mapped using data from sources discussed above and listed below. No field verification or assessment of locational reliability was performed. Data was downloaded from the sources listed above and the following figures, with the elements in each map listed below, were created:

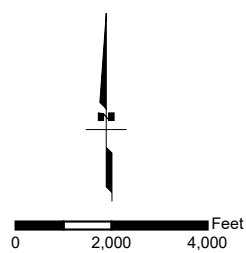
- Figure 2. Roadways by Functional Classification
  - Functional classification
  - Roadway ownership
  - DOT&PF bridge locations

- Figure 3. Non-Motorized Facilities
  - Sidewalks
  - Separated paths
  - Shoulder lanes
- Figure 4. Transit Routes and Stops
  - Transit stop locations
  - Transit routes and frequencies
- Figure 5. Key Projects
  - Locations of key planned projects included in applicable transportation plans
  - Locations of current and future DOT&PF construction projects
- Figure 6. AADT
  - Roadway traffic volumes

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- |                                                                                                         |                                                                                                                |                                                                                                   |
|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------|
|  PROPOSED STUDY AREA |  PRINCIPAL ARTERIAL (OTHER) |  DOT&PF BRIDGE |
|  MINOR ARTERIAL      |  MAJOR COLLECTOR            |                                                                                                   |
|  MINOR COLLECTOR     |  LOCAL                      |                                                                                                   |



### ROADWAYS BY FUNCTIONAL CLASSIFICATION

SEC 25 - 27, 34 - 36, T 40S, R 65E; SEC 30 - 34, T 40S, R 66E  
SEC 1 - 12, 15 - 17, T 41S, R 66E;  
SEC 4 - 10, 15 - 17, 21 - 23, 27 T 41S, R 67E

COPPER RIVER MERIDIAN, ALASKA



**STATE OF ALASKA**  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES

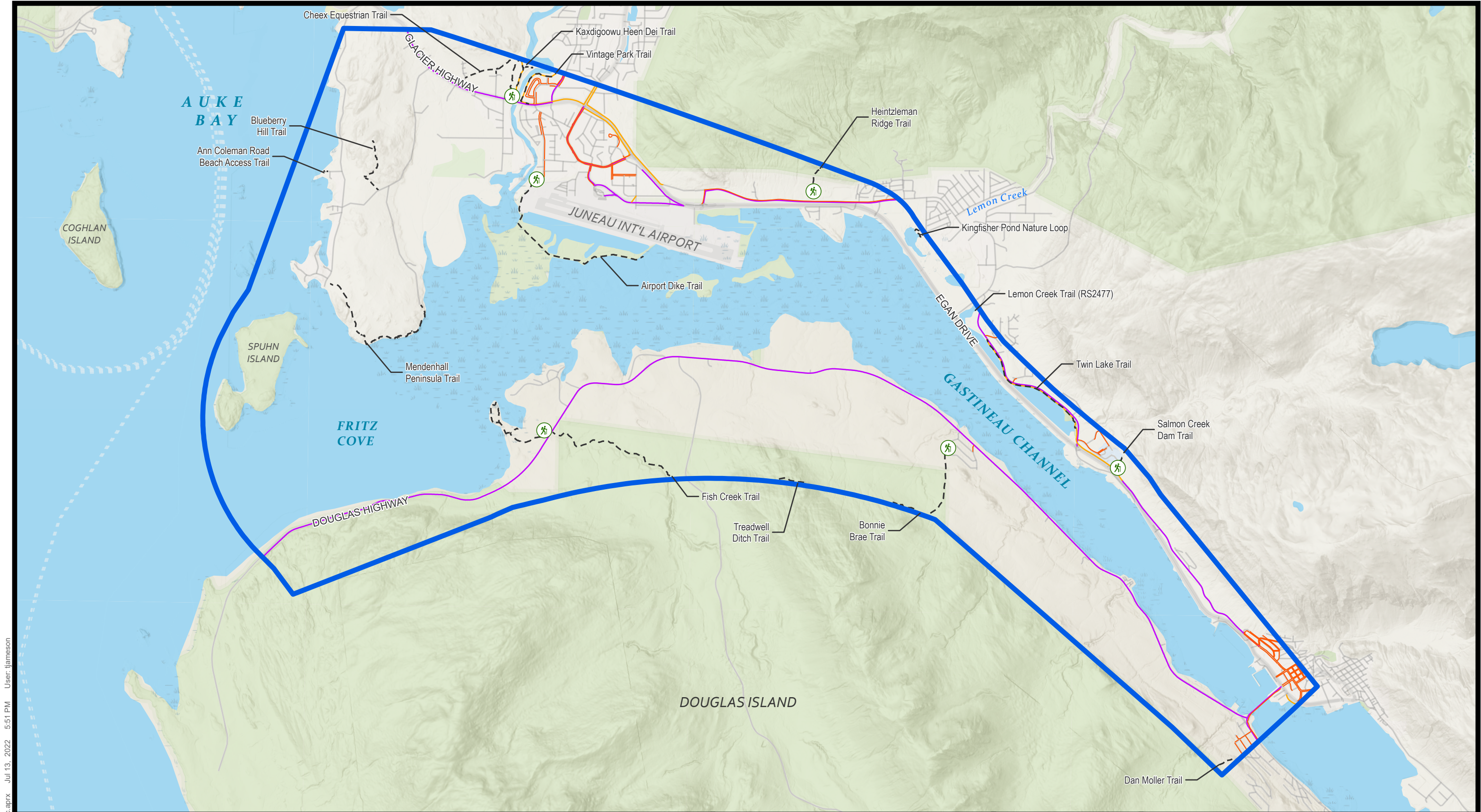
DOT&PF PROJECT NO. SFHWY00299/0003259  
JUNEAU DOUGLAS NORTH CROSSING PEL STUDY

CITY AND BOROUGH OF JUNEAU, ALASKA

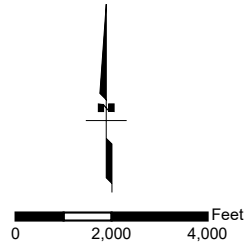
JULY 13, 2022

FIGURE 2

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- |                                                                                                         |                                                                                                    |                                                                                                     |
|---------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------|
|  PROPOSED STUDY AREA |  SIDEWALK       |  TRAILHEAD (CBJ) |
|                                                                                                         |  SEPARATED PATH |  TRAIL (CBJ)     |
|                                                                                                         |  SHOULDER LANE  |                                                                                                     |

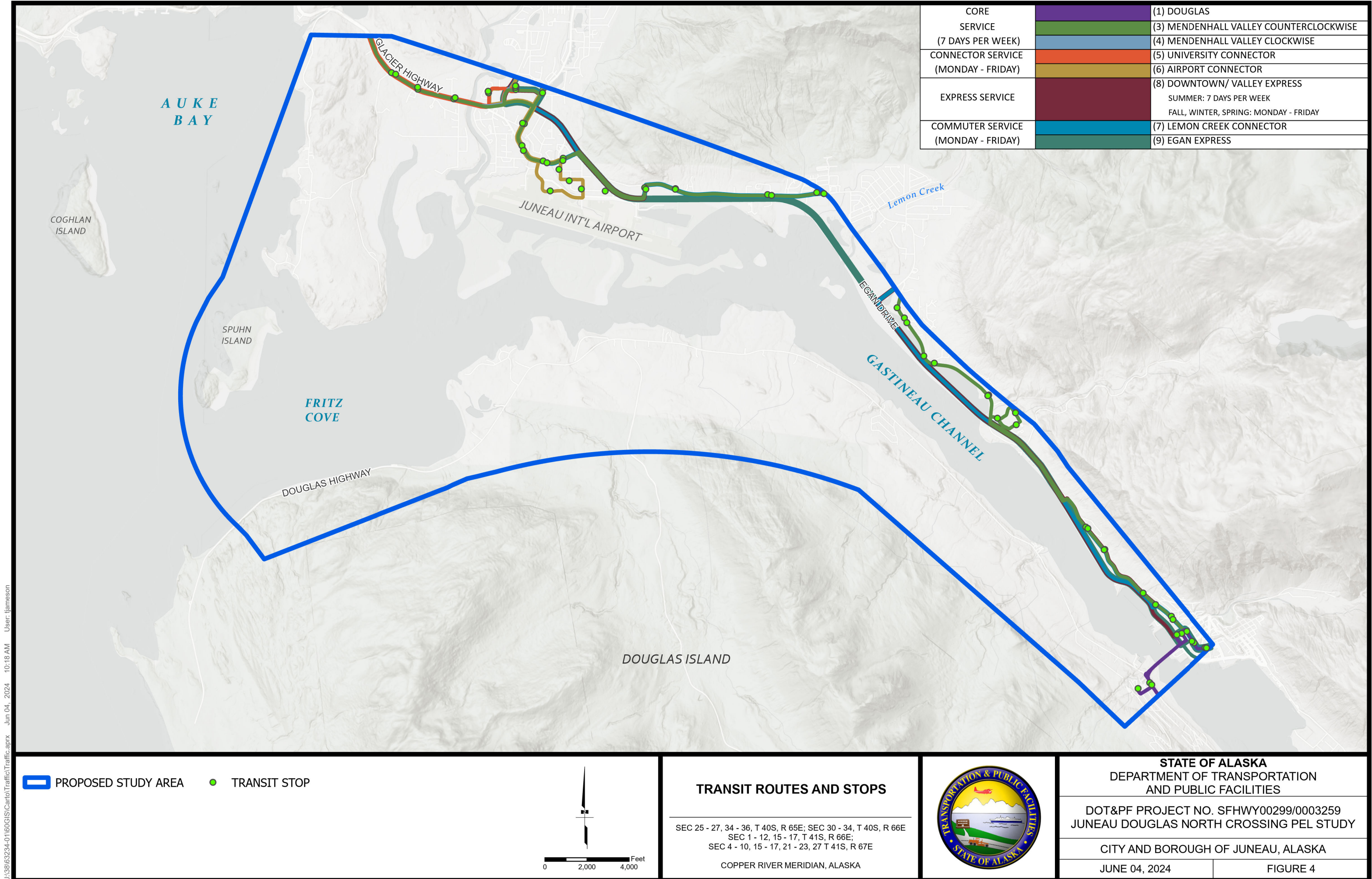


#### NON-MOTORIZED FACILITIES

SEC 25 - 27, 34 - 36, T 40S, R 65E; SEC 30 - 34, T 40S, R 66E  
SEC 1 - 12, 15 - 17, T 41S, R 66E;  
SEC 4 - 10, 15 - 17, 21 - 23, 27 T 41S, R 67E  
COPPER RIVER MERIDIAN, ALASKA

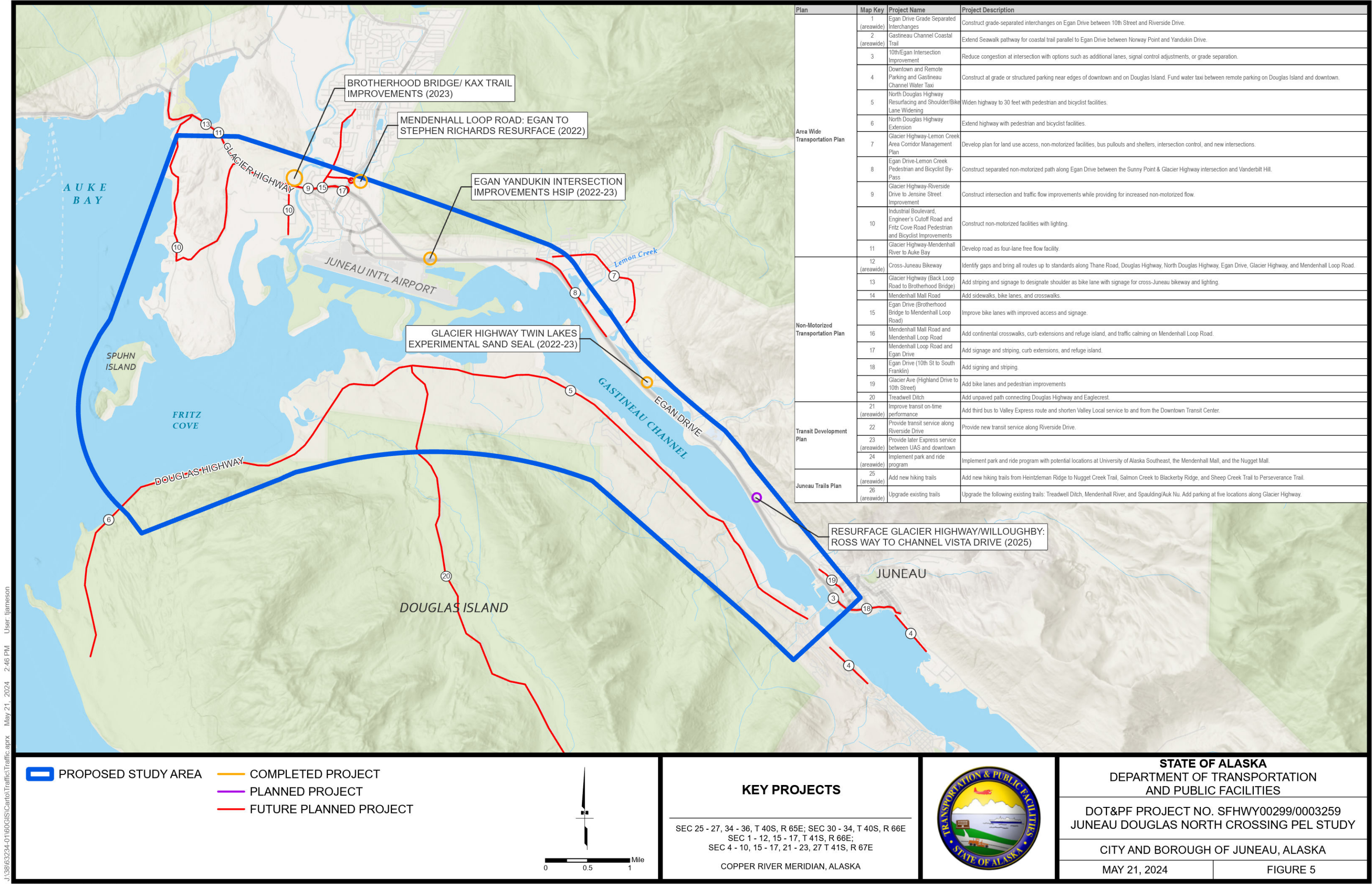


| STATE OF ALASKA<br>DEPARTMENT OF TRANSPORTATION<br>AND PUBLIC FACILITIES         |          |
|----------------------------------------------------------------------------------|----------|
| DOT&PF PROJECT NO. SFHWY00299/0003259<br>JUNEAU DOUGLAS NORTH CROSSING PEL STUDY |          |
| CITY AND BOROUGH OF JUNEAU, ALASKA                                               |          |
| JULY 13, 2022                                                                    | FIGURE 3 |



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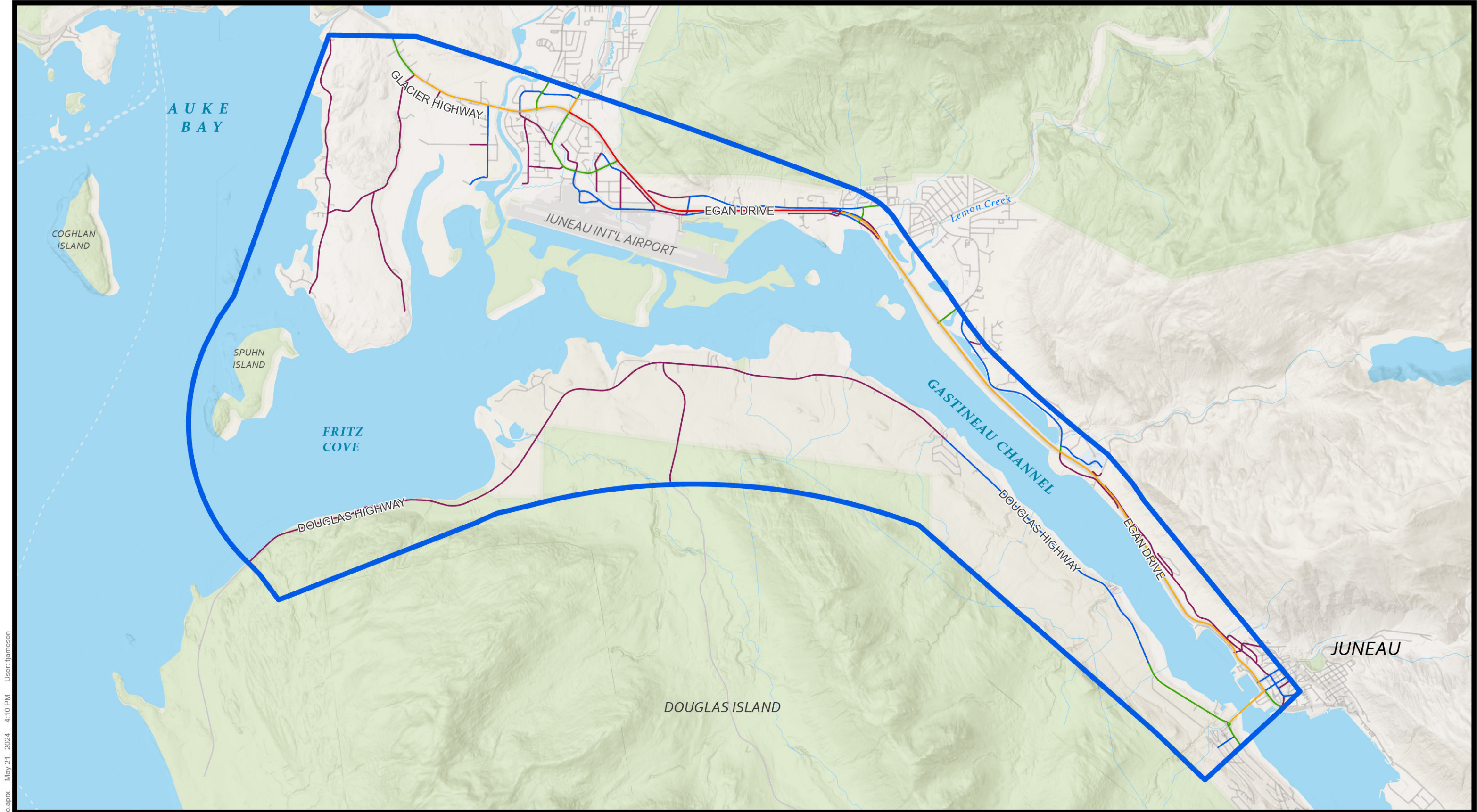
Imagery Credits: Light Gray Base: State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, NRCAN, Parks Canada  
World Hillshade: Esri, NASA, NGA, USGS, FEMA



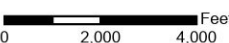
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Imagery Credits: World Hillshade: Esri, NASA, NGA, USGS, FEMA  
Community no labels: State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, NRCAN, Parks Canada

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|                                                                                                         |                                                  |                                |
|---------------------------------------------------------------------------------------------------------|--------------------------------------------------|--------------------------------|
|  PROPOSED STUDY AREA | <b>AVERAGE ANNUAL DAILY TRAFFIC COUNT (2021)</b> |                                |
|                                                                                                         | 100 - 1870<br>1871 - 5490<br>5491 - 11365        | 11366 - 19200<br>19201 - 29000 |

**AVERAGE ANNUAL DAILY TRAFFIC COUNT 2021**

SEC 25 - 27, 34 - 36, T 40S, R 65E; SEC 30 - 34, T 40S, R 66E  
SEC 1 - 12, 15 - 17, T 41S, R 66E;  
SEC 4 - 10, 15 - 17, 21 - 23, 27 T 41S, R 67E

COPPER RIVER MERIDIAN, ALASKA



**STATE OF ALASKA**  
DEPARTMENT OF TRANSPORTATION  
AND PUBLIC FACILITIES

DOT&PF PROJECT NO. SFHWY00299/0003259  
JUNEAU DOUGLAS NORTH CROSSING PEL STUDY

CITY AND BOROUGH OF JUNEAU, ALASKA

|              |          |
|--------------|----------|
| MAY 21, 2024 | FIGURE 6 |
|--------------|----------|

Imagery Credits: World Hillshade: Esri, NASA, NOAA, USGS, FEMA  
Community no labels: State of Alaska, Esri Canada, Esri, TomTom, Garmin, SafeGraph, METI/NASA, USGS, EPA, NPS, USDA, USFWS, NRCAN, Parks Canada

## Data Summary

Table 1 summarizes data sources referenced in this memorandum. Table 2 shows summary statistics for roads by functional class and ownership, bridges, sidewalks, transit stops, and transit routes within the study area. Arterials, collectors, and local roads each comprise one-third of the total 94 miles. DOT&PF owns two-thirds while City and Borough of Juneau (CBJ) owns the remaining third. There are sidewalks or separated paths of 16% of the roadways within the study area. Capital Transit services 8 routes, of which three are running every day, and an additional 4 routes run Monday-Friday.

**Table 1: Summary of Data Sources**

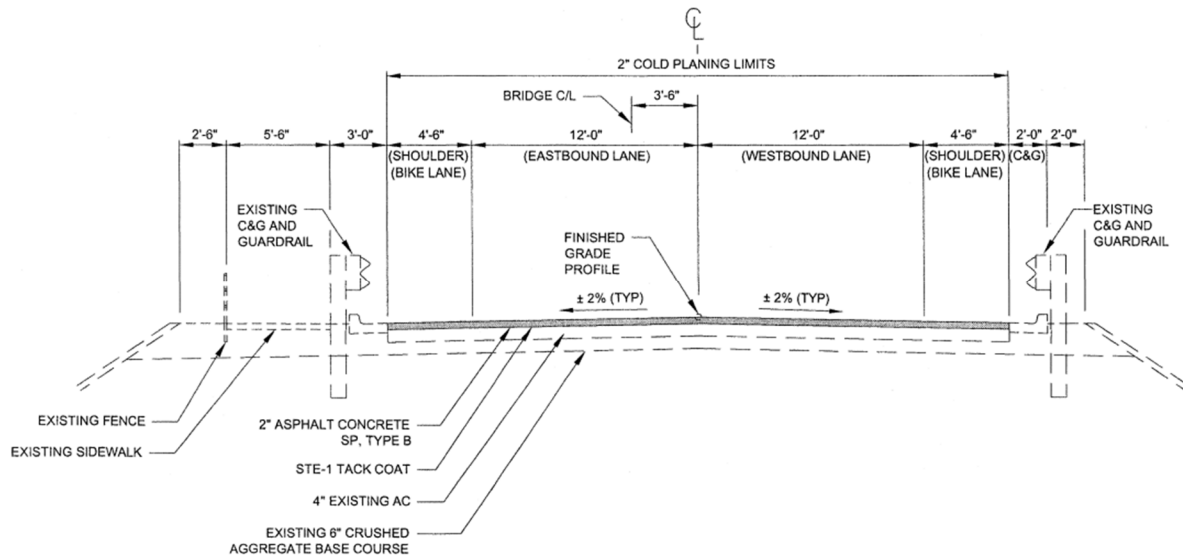
| Data Description          | Source                                                                                                               |
|---------------------------|----------------------------------------------------------------------------------------------------------------------|
| Functional Classification | DOT&PF ( <a href="https://akdot.maps.arcgis.com/home/index.html">https://akdot.maps.arcgis.com/home/index.html</a> ) |
| Bridges                   | CBJ (email correspondence)                                                                                           |
| Sidewalks                 | CBJ (email correspondence)                                                                                           |
| Separated Paths           | Juneau Non-Motorized Transportation Plan (2009)                                                                      |
| Shoulder Lanes            |                                                                                                                      |
| Transit Stops and Routes  | Capital Transit ( <a href="https://juneaucapitaltransit.org/">https://juneaucapitaltransit.org/</a> )                |

**Table 2: Summary Statistics for Transportation Network**

| Data Category                             | Category                                                        | Category Summation | % of Total  |
|-------------------------------------------|-----------------------------------------------------------------|--------------------|-------------|
| Roadway Functional Classification (miles) | Interstate                                                      | 0.00               | 0%          |
|                                           | Principal Arterial – Other                                      | 23.65              | 25%         |
|                                           | Minor Arterial                                                  | 9.23               | 10%         |
|                                           | Major Collector                                                 | 12.92              | 14%         |
|                                           | Minor Collector                                                 | 18.04              | 19%         |
|                                           | Local                                                           | 30.08              | 32%         |
|                                           | <b>Total</b>                                                    | <b>93.91</b>       | <b>100%</b> |
| Bridges (count)                           | <b>All Bridges</b>                                              | <b>41</b>          | <b>100%</b> |
| Sidewalks (miles)                         | Regularly Maintained                                            | 4.95               | 5%          |
|                                           | Periodically Maintained                                         | 2.70               | 3%          |
|                                           | Not Maintained                                                  | 1.70               | 2%          |
|                                           | <b>Total</b>                                                    | <b>9.35</b>        | <b>10%</b>  |
| Separated Paths                           | <b>Total</b>                                                    | <b>5.26</b>        | <b>6%</b>   |
| Shoulder Lanes                            | <b>Total</b>                                                    | <b>20.05</b>       | <b>21%</b>  |
| Transit Stops (count)                     | <b>All Stops</b>                                                | <b>64</b>          | <b>100%</b> |
| Transit Routes (count)                    | All day – 7 days a week                                         | 3                  | 38%         |
|                                           | Monday-Friday                                                   | 4                  | 50%         |
|                                           | Summer: 7 days a week<br>Fall, Winter, Spring:<br>Monday-Friday | 1                  | 12%         |
|                                           | <b>Total</b>                                                    | <b>8</b>           | <b>100%</b> |

Figure 2 (attached) shows the road network by functional classification and ownership, while Figure 6 shows the average annual daily traffic volumes on the study area roadways. In conjunction, these figures show that the primary direction of travel within the study area is north south along Egan Drive. Off of Egan Drive, Vehicles primarily access Glacier Highway and Mendenhall Loop Road to the north and the Juneau Douglas Bridge to the south.

Figures 7 to 10 show existing typical sections for high volume roads including Douglas Bridge<sup>1</sup>, Glacier Highway<sup>2</sup>, Egan Drive<sup>3</sup>, and North Douglas Highway<sup>4</sup>.



**Figure 7: Typical Section – Douglas Bridge**

<sup>1</sup> JNU-FFY09 Areawide Paving. Alaska Department of Transportation and Public Facilities. 2009. <https://dot.alaska.gov/sereg/asbuilts/Assets/JNU/68837.pdf>

<sup>2</sup> Juneau: Egan Drive & Glacier Hwy Resurfacing. Alaska Department of Transportation and Public Facilities. 2009. <https://dot.alaska.gov/sereg/asbuilts/Assets/JNU/68901.pdf>

<sup>3</sup> Juneau: Egan Drive & Glacier Hwy Resurfacing. Alaska Department of Transportation and Public Facilities. 2009. <https://dot.alaska.gov/sereg/asbuilts/Assets/JNU/68901.pdf>

<sup>4</sup> JNU-North Douglas Highway Pavement Rehabilitation. Alaska Department of Transportation and Public Facilities. 2010. <https://dot.alaska.gov/sereg/asbuilts/Assets/JNU/69633asbuilt.pdf>

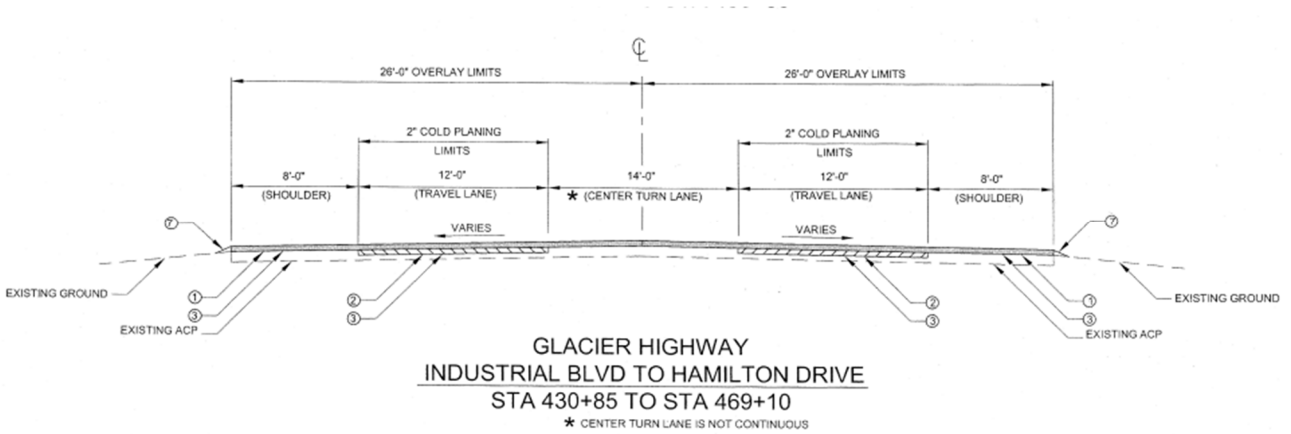


Figure 8: Typical Section – Glacier Highway from Industrial Boulevard to Hamilton Street

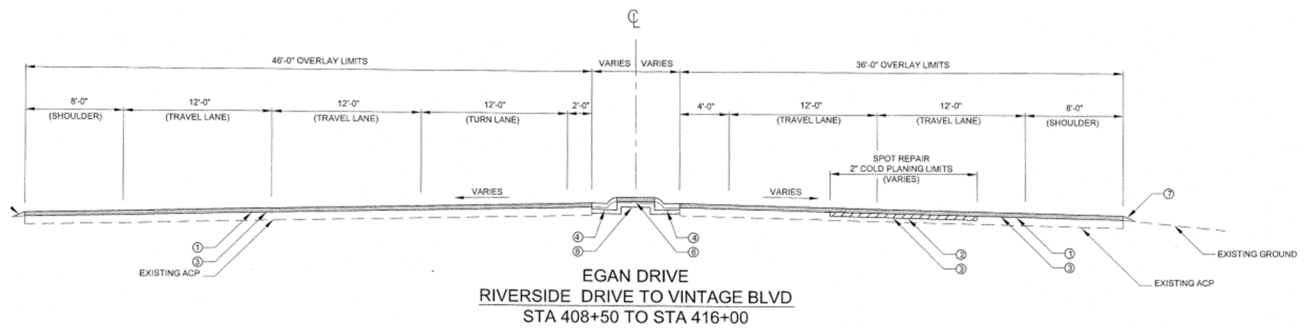


Figure 9: Typical Section – Egan Drive from Riverside Drive to Vintage Boulevard

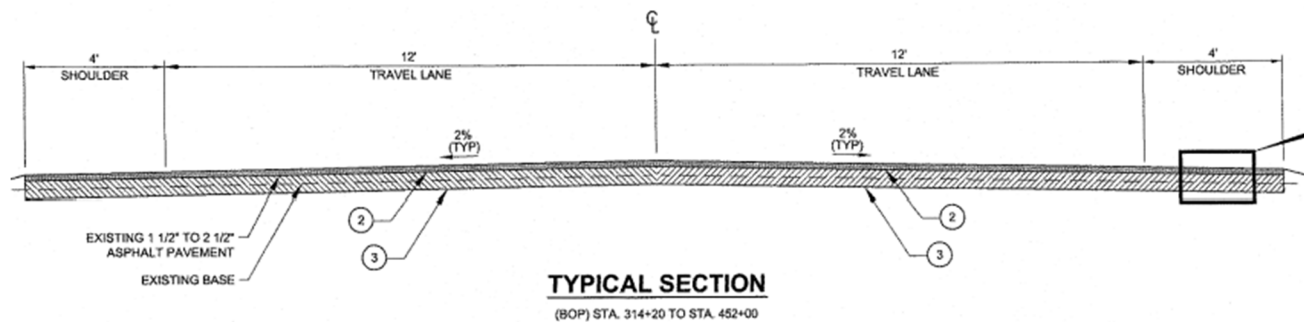


Figure 10: Typical Section – North Douglas Highway from West of Fish Creek Road to Peterson Creek Trail

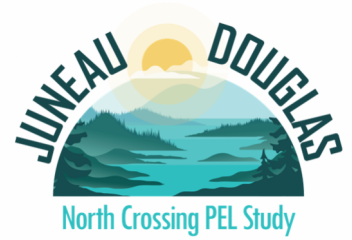


Figure 3 (attached) shows sidewalks, separated paths, and shoulder lanes, while Figure 4 (attached) shows transit stops and transit routes in the study area. Over 60 percent of all sidewalk mileage is near downtown Juneau south of Ross Way, while another 30 percent is between the Brotherhood Bridge and Old Dairy Road north and south of Egan Drive. Separated paths are present along Glacier Highway east of Vanderbilt Hill Road and along Egan Drive near Mendenhall Loop Road. Shoulder lanes extend along Glacier Highway and Douglas Highway. While there are shoulders along Egan Drive through Lemon Creek, the road is a controlled access facility and therefore bicycles are prohibited.

The transit routes primarily move passengers between the Downtown Transit Center and the Valley Transit Center. Of the three routes that operate daily, two routes (3, 4) travel between the Downtown Transit Center and the Valley Transit Center via Glacier Highway making stops in Twin Lakes and Lemon Creek end with a loop through Mendenhall Valley. The third route that operates daily connects the Downtown Transit Center to Douglas Island making stops in West Juneau and Douglas. Three of the other routes are connector routes that operate Monday through Friday and allow for other parts of Juneau to be connected via the transit system. Route 5 provides a connection between the University of Alaska Southeast and the Valley Transit Center, while route 6 connects the Valley Transit center to the airport. Route 7 follows a similar path as routes 3 and 4 between the transit centers but makes additional stops in Lemon Creek. Route 8 also connects the two transit centers and makes a loop in Mendall Loop, but makes fewer stops between the transit centers allowing for faster travel times. Lastly, Route 9 operates for limited hours Monday through Friday and provides an express route between the Valley Transit Center and the Downtown Transit Center.

## Transportation Plan Review

The transportation plans shown in Table 3 were reviewed and summarized in how they relate to the existing and future transportation network. Specifically, key projects and proposed changes are discussed in each plan. Table 4 and Figure 5 (attached) show key planned projects in the study area. Additionally, Figure 6 (attached) shows current and future DOT&PF construction projects.

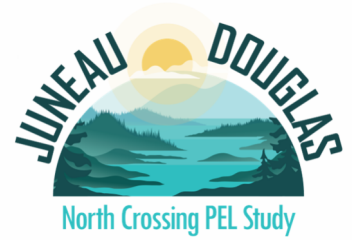
**Table 3: Transportation Plans Reviewed**

| Plan Name (Year)                                           | Agency                     | Link                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
|------------------------------------------------------------|----------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Juneau Area Wide Transportation Plan (2001)                | City and Borough of Juneau | <a href="https://juneau.org/index.php?gf-download=2020%2F01%2FPRINT-VERSION_Area-Wide-Transportation-Plan.FINAL.pdf&amp;form-id=22&amp;field-id=11&amp;hash=540b91e22ac9efa21b48601fb9e0efd0de86fe7310a3a648bd4be25d31e903bb">https://juneau.org/index.php?gf-download=2020%2F01%2FPRINT-VERSION_Area-Wide-Transportation-Plan.FINAL.pdf&amp;form-id=22&amp;field-id=11&amp;hash=540b91e22ac9efa21b48601fb9e0efd0de86fe7310a3a648bd4be25d31e903bb</a> |
| Juneau Non-Motorized Transportation Plan (2009)            | City and Borough of Juneau | <a href="https://juneau.org/index.php?gf-download=2017%2F04%2FJNMTPFinalwithMaps.pdf&amp;form-id=22&amp;field-id=11&amp;hash=59f9e767b73777f6b16ec52cc854893f6518657e7ca4e329a1c5fbcc3b09c431">https://juneau.org/index.php?gf-download=2017%2F04%2FJNMTPFinalwithMaps.pdf&amp;form-id=22&amp;field-id=11&amp;hash=59f9e767b73777f6b16ec52cc854893f6518657e7ca4e329a1c5fbcc3b09c431</a>                                                               |
| City and Borough of Juneau Transit Development Plan (2014) | City and Borough of Juneau | <a href="https://juneaucapitaltransit.org/wp-content/uploads/2016/04/JUNEAUTDP-Final-140213.pdf">https://juneaucapitaltransit.org/wp-content/uploads/2016/04/JUNEAUTDP-Final-140213.pdf</a>                                                                                                                                                                                                                                                           |

The **Juneau Area Wide Transportation Plan** is the guiding document for defining the framework for transportation projects over the 20-year horizon throughout the Juneau Borough. The plan identifies both transportation goals and an overall vision for the system. The primary goals relate to safety, improvements to existing and development of new facilities, multimodal connections, and limiting impacts on the environment. The plan specifically addresses a second crossing of the Gastineau Channel to directly link the Douglas Highway to the rest of the CBJ road network to improve access for various trip purposes, including recreation, shopping, commuting, goods movement, and travel to the airport and ferry terminal. It further notes the second crossing would also provide a second route for emergency vehicles and simplify traffic management for construction projects on the Douglas Bridge and connecting intersections. The construction of a second channel crossing is listed as an areawide transportation priority, with specific recommendations (ID 1.3) to fund an Environmental Impact Statement for the second crossing and to construct it (ID 14) in the near term. The plan notes the Assembly has taken several actions in support of the second crossing, including ranking it as a top transportation priority.

The **Juneau Non-Motorized Transportation Plan** guides the development of the walking and bicycling network in Juneau with recommended facility improvements and policies. The plan goals include designing streets to meet the needs of all users, increasing non-motorized activity, reducing crashes, improving connectivity, and improving maintenance.

The **City and Borough of Juneau Transit Development Plan** evaluates how well Capital Transit serves population, employment, and activity centers throughout the region and recommends improvements to increase the efficiency and effectiveness of transit services. The plan consists of a comprehensive operations analysis and development of service scenarios. Recommendations are made to meet five services goals, namely, to operate routes on schedule, match service levels with ridership demand, evaluate service to new



areas, ensure high-quality and convenient service, and make service and associated elements easy to understand.

Table 4 shows planned projects within the study area from the transportation plans reviewed. Large areawide projects include constructing grade-separated interchanges along Egan Drive, improving the cross-Juneau bikeway, expanding transit service to Riverside Drive, and implementing a park and ride program. Projects near the south end of the study area include adding non-motorized facilities on Glacier Avenue, resurfacing, and widening the North Douglas Highway, reducing congestion at the Egan Drive & 10th Street intersection. Projects in Lemon Creek include a pedestrian and bicyclist bypass along Egan Drive and a corridor management plan for Glacier Highway. In Mendenhall Valley, projects include developing Glacier Highway as a four-lane free-flow facility, adding non-motorized facilities along Industrial Boulevard, Engineer's Cutoff Road, and Fritz Cove, and adding non-motorized facilities along Mendenhall Mall Road. Finally, improvements on Douglas Island include extending North Douglas Highway to Outer Point and adding an unpaved path between North Douglas Highway and Eaglecrest Ski Area.

The City and Borough of Juneau Code of Ordinances<sup>5</sup> was also reviewed for material pertaining to the transportation network. Title 72 – Traffic contains regulations on rules of the road, vehicle inspection requirements, and parking, but does not contain guidelines referring to the design or procurement of the transportation network.

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<sup>5</sup> *Code of Ordinances*. City and Borough of Juneau. Accessed 2022. [https://library.municode.com/ak/juneau/codes/code\\_of\\_ordinances](https://library.municode.com/ak/juneau/codes/code_of_ordinances)

**Table 4: Key Planned Projects in the Study Area**

| Plan                          | Map Key      | Project Name                                                                                           | Project Description                                                                                                                                           |
|-------------------------------|--------------|--------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Area Wide Transportation Plan | 1 (areawide) | Egan Drive Grade Separated Interchanges                                                                | Construct grade-separated interchanges on Egan Drive between 10th Street and Riverside Drive.                                                                 |
|                               | 2 (areawide) | Gastineau Channel Coastal Trail                                                                        | Extend Seawalk pathway for coastal trail parallel to Egan Drive between Norway Point and Yandukin Drive.                                                      |
|                               | 3            | 10th/Egan Intersection Improvement                                                                     | Reduce congestion at intersection with options such as additional lanes, signal control adjustments, or grade separation.                                     |
|                               | 4            | Downtown and Remote Parking and Gastineau Channel Water Taxi                                           | Construct at grade or structured parking near edges of downtown and on Douglas Island. Fund water taxi between remote parking on Douglas Island and downtown. |
|                               | 5            | North Douglas Highway Resurfacing and Shoulder/Bike Lane Widening                                      | Widen highway to 30 feet with pedestrian and bicyclist facilities.                                                                                            |
|                               | 6            | North Douglas Highway Extension                                                                        | Extend highway with pedestrian and bicyclist facilities.                                                                                                      |
|                               | 7            | Glacier Highway-Lemon Creek Area Corridor Management Plan                                              | Develop plan for land use access, non-motorized facilities, bus pullouts and shelters, intersection control, and new intersections.                           |
|                               | 8            | Egan Drive-Lemon Creek Pedestrian and Bicyclist By-Pass                                                | Construct separated non-motorized path along Egan Drive between the Sunny Point & Glacier Highway intersection and Vanderbilt Hill.                           |
|                               | 9            | Glacier Highway-Riverside Drive to Jensine Street Improvement                                          | Construct intersection and traffic flow improvements while providing for increased non-motorized flow.                                                        |
|                               | 10           | Industrial Boulevard, Engineer's Cutoff Road and Fritz Cove Road Pedestrian and Bicyclist Improvements | Construct non-motorized facilities with lighting.                                                                                                             |
|                               | 11           | Glacier Highway-Mendenhall River to Auke Bay                                                           | Develop road as four-lane free flow facility.                                                                                                                 |

| Plan                              | Map Key       | Project Name                                            | Project Description                                                                                                                                                 |
|-----------------------------------|---------------|---------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Non-Motorized Transportation Plan | 12 (areawide) | Cross-Juneau Bikeway                                    | Identify gaps and bring all routes up to standards along Thane Road, Douglas Highway, North Douglas Highway, Egan Drive, Glacier Highway, and Mendenhall Loop Road. |
|                                   | 13            | Glacier Highway (Back Loop Road to Brotherhood Bridge)  | Add striping and signage to designate shoulder as bike lane with signage for cross-Juneau bikeway and lighting.                                                     |
|                                   | 14            | Mendenhall Mall Road                                    | Add sidewalks, bike lanes, and crosswalks.                                                                                                                          |
|                                   | 15            | Egan Drive (Brotherhood Bridge to Mendenhall Loop Road) | Improve bike lanes with improved access and signage.                                                                                                                |
|                                   | 16            | Mendenhall Mall Road and Mendenhall Loop Road           | Add continental crosswalks, curb extensions and refuge island, and traffic calming on Mendenhall Loop Road.                                                         |
|                                   | 17            | Mendenhall Loop Road and Egan Drive                     | Add signage and striping, curb extensions, and refuge island.                                                                                                       |
|                                   | 18            | Egan Drive (10th St to South Franklin)                  | Add signing and striping.                                                                                                                                           |
|                                   | 19            | Glacier Ave (Highland Drive to 10th Street)             | Add bike lanes and pedestrian improvements                                                                                                                          |
|                                   | 20            | Treadwell Ditch                                         | Add unpaved path connecting Douglas Highway and Eaglecrest.                                                                                                         |
| Transit Development Plan          | 21 (areawide) | Improve transit on-time performance                     | Add third bus to Valley Express route and shorten Valley Local service to and from the Downtown Transit Center.                                                     |
|                                   | 22            | Provide transit service along Riverside Drive           | Provide new transit service along Riverside Drive.                                                                                                                  |
|                                   | 23 (areawide) | Provide later Express service between UAS and downtown  |                                                                                                                                                                     |
|                                   | 24 (areawide) | Implement park and ride program                         | Implement park and ride program with potential locations at University of Alaska Southeast, the Mendenhall Mall, and the Nugget Mall.                               |

# Volume to Capacity of the Existing Juneau-Douglas Bridge

## Introduction

The Alaska Department of Transportation (DOT&PF) has retained Kinney Engineering, LLC (KE) as a subconsultant to DOWL for the *Juneau-Douglas North Channel Crossing Planning & Environmental Linkage (PEL) Study*, which will evaluate alternatives and determine recommended crossing location(s) for a second bridge crossing of the channel between Juneau and Douglas Island, north of the existing Juneau-Douglas Bridge.

The purpose of this memorandum is to perform a high-level analysis of the volume to capacity of the existing Juneau-Douglas Bridge under existing conditions and in the 2050 design year, under the assumption of a 0.25% annual growth rate. KE will perform a more detailed volume forecast after the population forecast being prepared for this project is complete. The volume to capacity analysis considers the segment capacity of the bridge, as well as operations at the intersections on either end of the bridge (the roundabout on Douglas Highway and the signalized intersection of Egan Drive with 10<sup>th</sup> Street), as these intersections may limit capacity. While a second bridge across the north channel may be warranted for many reasons, this memo focuses on determining if volumes under existing conditions and/or in the 2050 design year suggest the need to construct a second channel crossing.

Operational analyses of the intersections at either end of the bridge rely on *Highway Capacity Manual* methodologies, utilize Synchro and McTrans Highway Capacity Software (HCS), and present qualitative level of service (LOS) scores. Capacity considerations for the bridge itself use the planning level average annual daily volumes presented in the *2020 Quality Level of Service Handbook* prepared as a guide by the Florida Department of Transportation.

## Summary of Results

### Egan Drive with 10<sup>th</sup> Street:

- Under existing conditions, the intersection operates at LOS D during both morning and evening peak hours.
- By 2050, the intersection LOS will deteriorate to LOS E in the AM peak but will continue to operate at LOS D in the PM peak.

### Roundabout at Douglas Highway with Juneau-Douglas Bridge

- Under existing conditions, the roundabout operates at LOS E during the AM peak and LOS D or better during the PM peak.
- By 2050, the roundabout LOS will deteriorate to LOS F in the AM peak but will continue to operate at LOS D or better during the PM peak.

### Juneau-Douglas Bridge

- Under existing conditions, the bridge operates under capacity during peak hours.
- By 2050, the bridge will operate at or near capacity during peak hours.

Figure 1 summarizes operations expected during the 2050 AM peak, which is the time of day expected to experience the most delay and capacity issues.



Figure 1: 2050 AM Peak

Figure 2 summarizes operations expected during the 2050 PM peak, which is not expected to experience as much delay as the AM peak.



Figure 2: 2050 PM Peak

# Analysis

## Juneau-Douglas Bridge

Historic Average Annual Daily Traffic (AADT) data was collected from the DOT&PF's online *Alaska Traffic Data* site. 2022 and 2050 design year AADT's were projected using a 0.25% annual growth rate, as shown in Table 1.

*Table 1: AADT's on the Juneau-Douglas Bridge*

| Provided by DOT&PF |        |       |       |        |        |        |                    | Projected by KE |        |
|--------------------|--------|-------|-------|--------|--------|--------|--------------------|-----------------|--------|
| 2014               | 2015   | 2016  | 2017  | 2018   | 2019   | 2020   | 2014–2020 Average* | 2022            | 2050   |
| 11,524             | 11,695 | 8,562 | 8,471 | 14,016 | 15,556 | 12,800 | 13,198             | 13,297          | 14,260 |

## - Counts denoted as "user supplied" by DOT&PF

## - Counts estimated by DOT&PF, pandemic volumes

\* Average does not include "user supplied" counts or 2020 pandemic volumes

The Florida Department of Transportation 2020 *Quality/Level of Service (Q/LOS) Handbook* provides guidance for developing and reviewing roadway capacity and Q/LOS at a generalized planning level. Volume tables in the handbook provide generalized annual average daily volumes for roadways by facility type.

The functional classification of the Juneau-Douglas Bridge is minor arterial, the downtown end of the bridge is controlled by a signalized intersection, the bridge is located in a transitioning area, and the posted speed limit is 30 mph. Based on these criteria, applicable average daily volumes for a given LOS are shown in Table 2.

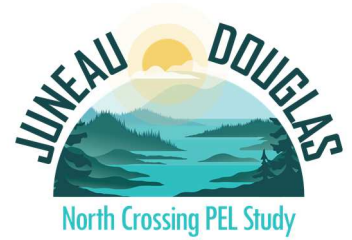
*Table 2: Generalize Annual Average Daily Volumes*

Source: Table 2 (Transitioning Areas and Areas Over 5,000 Not in Urbanized Areas) in the 2020 *Q/LOS Handbook*

| State Signalized Arterials Class II (35 mph or slower posted speed limit) |   |       |        |        |
|---------------------------------------------------------------------------|---|-------|--------|--------|
| LOS                                                                       | B | C     | D      | E      |
| Transitioning Areas, 2 Lanes, Undivided                                   | * | 6,500 | 13,300 | 14,200 |

\* Cannot be achieved using table input value defaults

The volumes presented in the *Q/LOS Handbook* tables are estimated to be the highest volumes at which a given LOS can be achieved at a planning level of analysis; volumes above those shown in the LOS E column are estimated to cause a given facility to operate over capacity. Table 2 shows that at a planning level of analysis, the Juneau-Douglas Bridge operates under capacity (LOS D) during peak hours under existing conditions. Assuming a 0.25% growth rate, the bridge will operate above capacity by 2050, likely resulting in standing queues and significant delays.



## Egan Drive with 10<sup>th</sup> Street

Operational analysis indicates that the signalized intersection at Egan Drive with 10<sup>th</sup> Street operates at LOS D during peak hours under existing conditions. In the 2050 design year, overall operations at the intersection are expected to deteriorate to LOS E in the AM peak but remain at LOS D in the PM peak.

In the 2050 AM peak, vehicles traveling from the Mendenhall Valley and turning left onto 10<sup>th</sup> Street will experience LOS F. The following movements will experience LOS E:

- Vehicles traveling from Mendenhall Valley and continuing on Egan Drive (expected 95<sup>th</sup> percentile queues will exceed 600 feet),
- Vehicles heading from Douglas Island and turning onto Egan Drive towards the Mendenhall Valley (expected 95<sup>th</sup> percentile queues will exceed 500 feet),
- Vehicles heading from Douglas Island and continuing onto 10<sup>th</sup> Street (expected 95<sup>th</sup> percentile queues will exceed 500 feet), and
- Vehicles heading from downtown via Egan Drive and turning left towards Douglas Island.

In the 2050 PM peak, no movements experience LOS F. However, the following movements will experience LOS E:

- Vehicles traveling from the Mendenhall Valley and turning left onto 10<sup>th</sup> Street,
- Vehicles traveling from 10<sup>th</sup> Street towards Douglas Island,
- Vehicles traveling from downtown via Egan Drive and turning left towards Douglas Island, and
- Vehicles traveling from downtown via Egan Drive and continuing towards Mendenhall Valley (expected 95<sup>th</sup> percentile queues will exceed 700 feet).

## Roundabout at Douglas Highway with Juneau-Douglas Bridge

Operational analysis indicates the roundabout at Douglas Highway with Juneau-Douglas Bridge operates well (LOS D or better) during the PM peak under existing conditions and in the 2050 design year.

Under existing conditions during the AM peak, significant delay (LOS F with queues over 500 feet) is experienced by vehicles entering the roundabout from West Juneau/Douglas and continuing onto North Douglas Highway or turning right onto the bridge (towards downtown). The through and right lane is shared and there is a high volume of vehicles wishing to turn right to cross the bridge (more than double the volume of any other movement entering the roundabout), causing some congestion. Additionally, vehicles entering the roundabout from North Douglas Highway and continuing onto the Juneau-Douglas Bridge have right-of-way in the roundabout over the vehicles entering from West Juneau/Douglas, exacerbating the congestion. By 2050 this delay is expected to cause the roundabout as a whole to operate at LOS F, and queues are expected to extend nearly 1,000 feet. (Note that during the PM peak a high number of vehicles turn left from the bridge towards West Juneau/Douglas; however, the bridge-leg of the roundabout has a dedicated left-turn and right-turn lane and there are fewer conflicting vehicles circulating within the roundabout, which ameliorates some of the congestion).

A Juneau resident has anecdotally reported that vehicles entering the roundabout experience about 5 minutes of delay during the AM peak and about 2 minutes of delay during the PM peak. While the operational analysis does not indicate that standing queues will build during the PM peak under either existing conditions or in the design year, SimTraffic microsimulation indicates that rolling queues are experienced under both volume cases.

# Origin-Destination Data Memo

## Introduction

The Alaska Department of Transportation (DOT&PF) has retained Kinney Engineering, LLC (KE) as a subconsultant to DOWL for the *Juneau-Douglas North Channel Crossing Planning & Environmental Linkage (PEL) Study*, which will evaluate alternatives and determine recommended crossing location(s) for a second bridge crossing of the Gastineau channel to and from Douglas Island, north of the existing Juneau-Douglas Bridge. This memo provides a general description of existing Origin-Destination data that was gathered to forecast volumes for each bridge location. Volume forecasts for each bridge will be included in a separate memo.

## Introduction to Location-Based Service (LBS) and Other “Big” Data

There are numerous software services that gather location data from users and use that information to provide location-specific information. Examples of these types of services include navigation software and location-based advertising. Software-as-a-service analytics companies buy this anonymized data and combine it with other purchased data sources (such as connected vehicles and roadway sensors) to provide information such as travel times, travel speeds, and travel paths. These types of services and data sources will be used for the Juneau origin-destination analysis for this project.

Research is underway to determine the accuracy and usefulness of this data for numerous applications. For example, the Eastern Transportation Coalition, a partnership between 17 eastern states and DC, has an initiative to prequalify analytics vendors to provide travel time and speed, origin-destination, freight, waypoint, volume, and conflation data to agencies. To date, three vendors (HERE, INRIX, and TomTom) have been pre-qualified for providing validated travel time and speed data. A current project will pre-qualify twelve vendors for all six datasets (see [TDM Fact Sheet](#) and [Data Validation Reports](#)).

Because LBS analytics is an emerging service, the landscape is changing rapidly (i.e. new data sources are frequently added and new tools for evaluating them are being developed) and not all possible uses of the data have been fully vetted. That being said, the information gathered by analytics companies provides significantly more travel path detail and is less time consuming to gather than information gathered using traditional methods (such as license plate surveys or household travel surveys). As such, the LBS data can be used for a range of planning purposes.

## Data Purchased for the Juneau-Douglas North Channel PEL

The Origin-Destination dataset for this project was provided by INRIX (an analytics vendor supplying LBS data) through IDAX (a distributor of INRIX data) for the months of March, April, May, and June 2022. INRIX gathered the data from 14 providers, including 3 providers monitoring fleet vehicles with embedded GPS, 4 providers monitoring consumer vehicles with embedded GPS, and 7 providers monitoring consumer mobile devices. The data includes trip start and end points, as well as waypoints (indicating the route taken). The frequency of the waypoint data varies from once every second to once every 12 minutes. All of the trips in the data set have at least one waypoint either on the Douglas Bridge, or on Egan Drive/Glacier Highway between the bridge and the Auke Bay roundabout.

A total of 83,973 trips were provided from March through June 2022; about 85% of the trips came from a single mobile device provider that was added to the INRIX dataset at the end of April 2022. As such, this memo focuses on the 76,168 trips that occurred between April 29, 2022 and June 28, 2022.

The INRIX dataset includes only the portion of the total trips traveling in the City and Borough of Juneau that can be tracked by the data providers. As such, this memorandum compares the INRIX volumes with traffic volumes collected at DOT&PF continuous count stations (CCSs) to estimate how much of the total traffic was captured by the INRIX data.

Figure 1 shows the census tract and block group boundaries for the study area, including Douglas Island, Downtown Juneau, Lemon Creek, Mendenhall Valley, and Auke Bay. Figure 2 shows the locations of four DOT&PF CCSs (Auke Bay, Sunny Point, Egan at Mile 3, and South Douglas Highway).

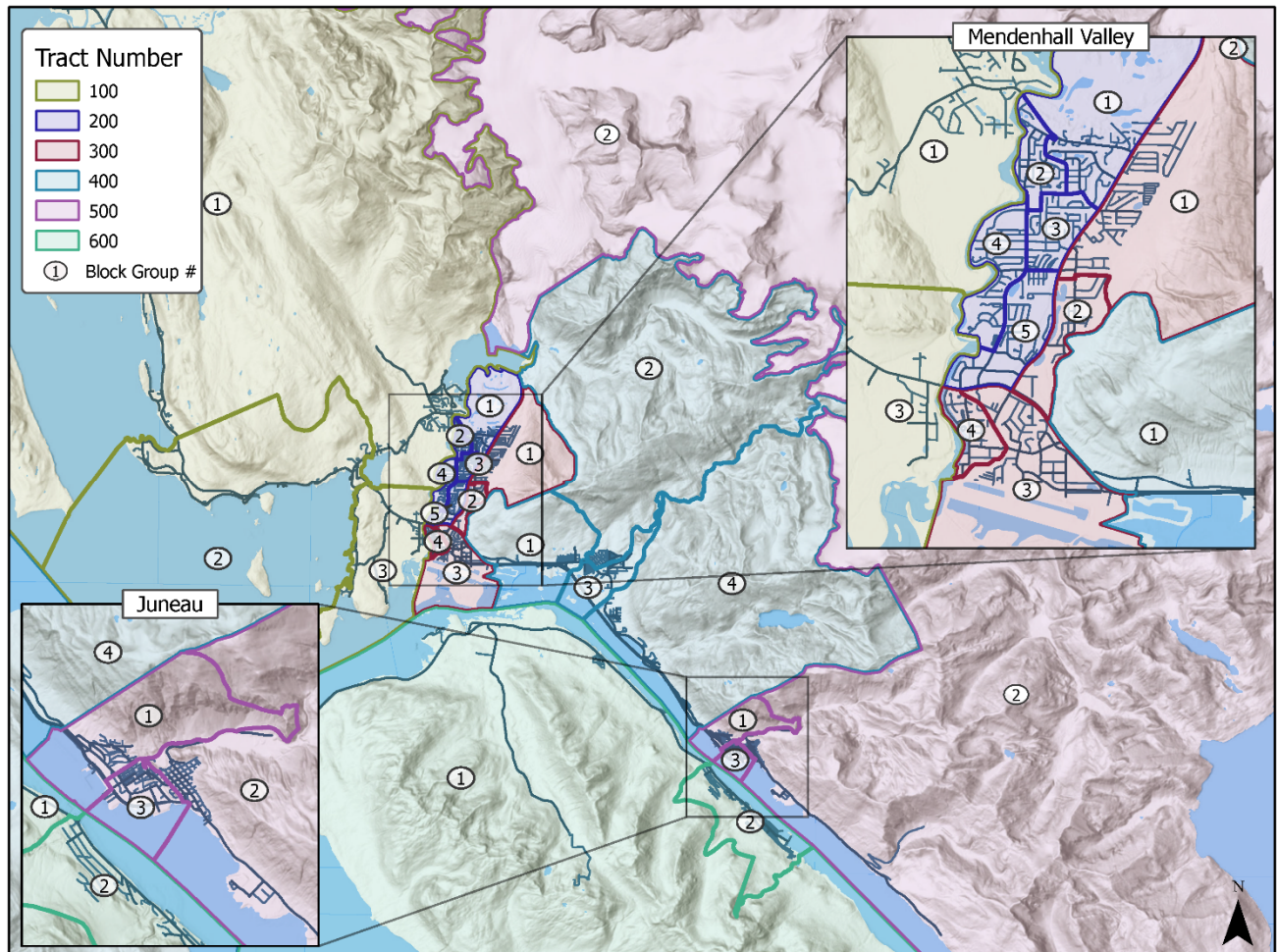


Figure 1: Census Tract and Block Groups in Study Area



Figure 2: DOT&PF Continuous Count Stations Used in the Analysis

# Analysis

## Seasonality

Because the majority of the trips collected from INRIX occurred in May and June, the data set represents spring/summer traffic patterns. The May data includes the period while school is in session, and the June data includes the beginning of the cruise ship season. Because the data was not collected in winter months, it does not include winter recreation trips to Eaglecrest Ski Area. Origin-destination patterns are somewhat different in summer and winter because the ski area is situated on the north side of Douglas Island while most other Douglas Island tourist/recreational destinations are south of the Juneau-Douglas bridge.

Winter trips to Eaglecrest Ski Area were estimated from information provided by Eaglecrest Ski Area, as well as from the 2012 Eaglecrest Ski Area Master Plan and their current website. Average daily trips in winter range from 500 to 800 trips per day, with as many as 1,600 trips on individual days when snow conditions are very good. This estimate corresponds with data collected by DOT&PF on Fish Creek Road at Fish Creek Bridge for one week in February 2006 and one week in March 2012. For both weeks, the average volume was 700 vehicles per day.

## Statistical Analysis of the INRIX Dataset for Origin-Destination Analysis

The INRIX dataset can be organized into an origin-destination table showing the number of trips in the dataset that start in each census block group (corresponding to the rows in the table) and end in each census block group (corresponding to the columns in each table). For the purposes of forecasting volumes on each of the proposed bridges, the data will be converted to percentages of trips. As such, the data becomes a percentage likelihood, with the likelihood that any trip within Juneau starting in one census block group and ending in another being estimated as the percentage of total INRIX trips that were observed traveling between those census block groups.

When performing statistical analysis of percentage likelihood, it is desirable for there to be at least 5 data points in each cell of the table. The standard error of the percentage in each cell can then be determined by the equation:

$$SE = \sqrt{\frac{P(1 - P)}{n}}$$

The 95<sup>th</sup> percentile confidence interval for the percentage likelihood can be calculated using the equation:

$$Confidence\ Interval = P \pm 1.96(SE)$$

The origin-destination table using all of the census tracts and block groups separately has many cells that contain less than 5 data points. As such, the areas were combined to obtain statistically valid results. To obtain statistically valid results for less aggregated data, additional data would be needed; however, the data could be aggregated in other ways to obtain equally valid data sets. Table 1 shows the percentage likelihoods and confidence intervals for the resulting origin-destination table. Figure 3 shows the location of the combined census tract and block group areas.

Table 1: Origin Destination Percentage Likelihood and Confidence Interval

|             |                                              | Destination Zone                                   |                                              |                        |                         |                          |
|-------------|----------------------------------------------|----------------------------------------------------|----------------------------------------------|------------------------|-------------------------|--------------------------|
|             |                                              | Point Lena /<br>Auke Bay /<br>Mendenhall<br>Valley | Sunny Point /<br>Lemon Creek /<br>Twin Lakes | Downtown<br>Juneau     | North Douglas<br>Island | South Douglas<br>Island  |
| Origin Zone | Point Lena / Auke Bay /<br>Mendenhall Valley |                                                    |                                              |                        | 3.3%<br>(1.3 to 5.3%)   | 13.2%<br>(11.4 to 15.1%) |
|             | Sunny Point / Lemon<br>Creek / Twin Lakes    |                                                    |                                              |                        | 4.5%<br>(2.6 to 6.5%)   | 13.4%<br>(11.5 to 15.2%) |
|             | Downtown Juneau                              |                                                    |                                              |                        | 3.8%<br>(1.9 to 5.8%)   | 8.8%<br>(6.9 to 10.6%)   |
|             | North Douglas Island                         | 3.7%<br>(1.8 to 5.7%)                              | 4.1%<br>(2.2 to 6.1%)                        | 4.1%<br>(2.2 to 6.1%)  | 3.9%<br>(2.0 to 5.9%)   |                          |
|             | South Douglas Island                         | 11.6%<br>(9.7 to 13.5%)                            | 10.5%<br>(8.6 to 12.4%)                      | 9.0%<br>(7.1 to 10.9%) |                         | 5.9%<br>(4.0 to 7.9%)    |

Incorporating the trip estimates for Eaglecrest Ski Area, in wintertime about 30% of the bridge traffic heads to North Douglas and 70% to South Douglas, while in the summertime, about 25% of the bridge traffic heads to North Douglas and 75% to South Douglas.

The percentage likelihood and confidence intervals from Table 1 will be used to develop the volume forecasts for each proposed bridge location. Whether or not a proposed bridge will be used will be determined by comparing travel time using the proposed bridge with travel time using the existing bridge. These percentages will inform the amount of the forecasted bridge volume that would switch to the proposed bridge if it were built, for each combination of origin and destinations.

Table 1 presents the average and likely range of the percentage of all trips between each origin and destination pair. By using the 90% confidence interval for the origin destination it can be seen that the largest volume of vehicles at 13.4% are traveling from Sunny Point/Lemon Creek/Twin Lakes to South Douglas.

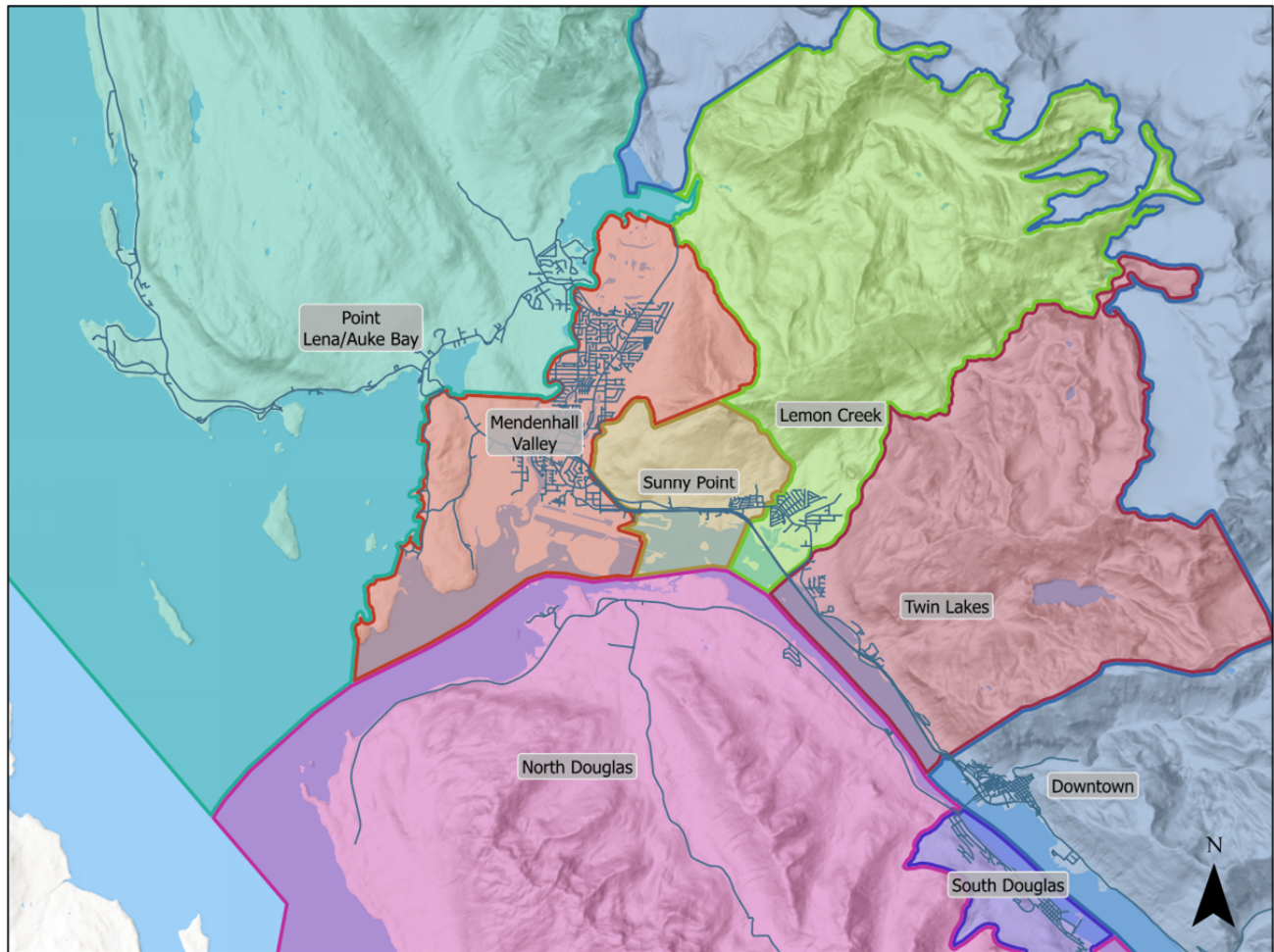


Figure 3: Combined Areas for Statistical Analysis

## Comparison of Origin-Destination Data to Volume Counts

DOT&PF collects traffic volumes at continuous count station (CCS) locations year-round and publishes that data online. As such, traffic volumes at these sites can be collected for the same period as the INRIX data set. The DOT&PF data includes all vehicles that pass a specific location but is limited in that counts are only available at select locations and trip origin and destination locations are unknown. The INRIX data includes trip origin and destination data but is pulled from limited sources and therefore does not include all trips. There are four CCSs in the area covered by the INRIX data. For each CCS, Table 2 provides an estimate of the volume of INRIX trips passing that point (based on the origin and destination census tracts and block groups) and compares it to the DOT&PF traffic volumes at that CCS location. The INRIX trip volumes range from 1.3% to 1.7% of the total DOT&PF volumes (average of 1.5%).

Table 2: DOT&PF Continuous Count Station Volumes compared to INRIX Data (April 29-June 28, 2022)

| <u>Location</u>                        | DOT&PF<br>Continuous Count<br>Station Volume | INRIX Data | INRIX as % of<br>DOT&PF Volume |
|----------------------------------------|----------------------------------------------|------------|--------------------------------|
| Auke Bay<br>(TMAS 000805)              | 167,115                                      | 2,570      | 1.5%                           |
| Sunny Point<br>(TMAS 000896)           | 1,616,584                                    | 21,097     | 1.3%                           |
| Egan Drive at mile 3<br>(TMAS 000806)  | 1,272,690                                    | 21,302     | 1.7%                           |
| South Douglas Highway<br>(TMAS 000918) | 459,485                                      | 6,671      | 1.5%                           |

## Exploration of Raw Origin-Destination Data

Table 3 shows the number of INRIX trips traveling from Douglas Island to mainland Juneau and from mainland Juneau to Douglas Island. A further breakdown of INRIX trips in Table 4 and Table 5 shows that most of this traffic (about 75%) is going to and from the southern side of Douglas Island (Tract 6 Block 2).

Table 3: INRIX trips between Douglas Island and Juneau Mainland (April 29-June 28, 2022)

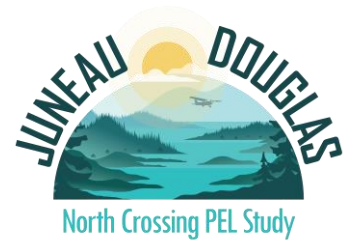
| INRIX Data                 |                    | <u>Destination</u> |                    |
|----------------------------|--------------------|--------------------|--------------------|
|                            |                    | Douglas<br>Island  | Juneau<br>Mainland |
| <u>Origin<br/>Location</u> | Douglas<br>Island  | -                  | 4,200              |
|                            | Juneau<br>Mainland | 4,577              | -                  |

Table 4: INRIX Trips with Douglas Island (Tract 6) Destinations (April 29-June 28, 2022)

| INRIX Data                 |                                    | <u>Destination</u>                          |                                       |
|----------------------------|------------------------------------|---------------------------------------------|---------------------------------------|
|                            |                                    | North Douglas<br>(Tract 6 Block<br>1 A,B,C) | South Douglas<br>(Tract 6 Block<br>2) |
| <u>Origin<br/>Location</u> | Juneau<br>Mainland<br>(Tracts 1-5) | 1,132                                       | 3,445                                 |

Table 5: INRIX Trips with Douglas Island (Tract 6) Origins (April 29-June 28, 2022)

| INRIX Data                 |                                    | <u>Destination</u>     |
|----------------------------|------------------------------------|------------------------|
|                            |                                    | Juneau<br>(Tracts 1-5) |
| <u>Origin<br/>Location</u> | North Douglas<br>(Tract 6 Block 1) | 1,171                  |
|                            | South Douglas<br>(Tract 6 Block 2) | 3,029                  |



# Technical Memorandum

## Fatal and Serious Injury Crashes

To: Greg Lockwood, P.E., Project Manager, Alaska Department of Transportation and Public Facilities  
From: Kristen Hansen, Environmental Lead, DOWL  
Date: April 2, 2025  
Project: Juneau Douglas North Crossing PEL Study  
Project Numbers: SFHWY00299/0003259

### PEL Study Description

The City and Borough of Juneau has partnered with Alaska Department of Transportation and Public Facilities (DOT&PF) to study a possible transportation corridor to connect Juneau with the north end of Douglas Island. A connection has been studied since the 1980s but has not progressed beyond identification and recommendation of preliminary alternative alignments. The previous studies highlighted several reasons for a north crossing:

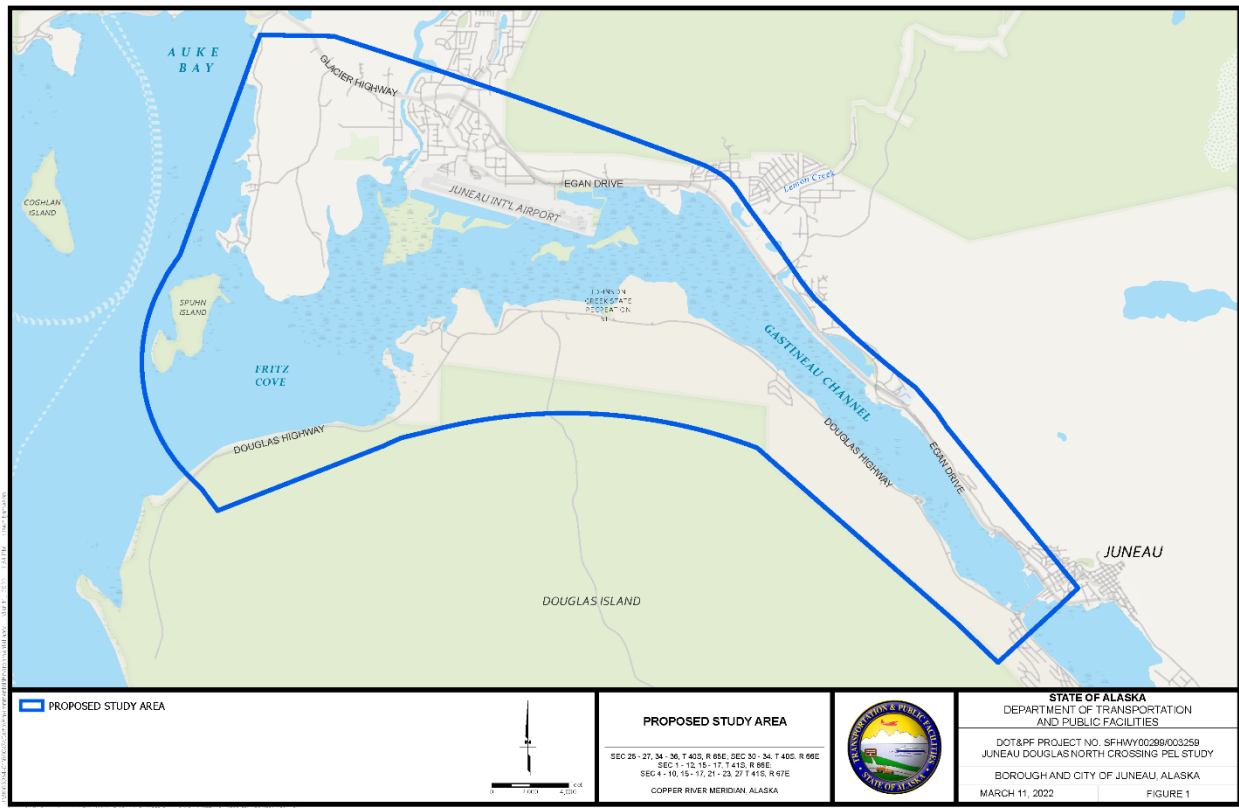
- Congestion during peak periods on the existing Douglas Island Bridge
- Concerns about safety and emergency response in the event of a bridge closure
- The potential for residential, commercial, industrial and port development at west Douglas Island

DOT&PF has chosen to use the Planning and Environmental Linkages (PEL) process to identify and evaluate a purpose and need and recommend alternatives for connecting Juneau with Douglas Island. The PEL process will provide opportunities for public input and involvement. The analyses conducted may be incorporated into a future National Environmental Policy Act (NEPA) process.

The study area boundary, or Probable Limits of the Alternatives (PLA), where the proposed crossing may be located, is shown in Figure 1. The study area encompasses the area where prior studies and community outreach identified potential alternative crossing locations.

### Purpose of the Technical Memorandum

This memorandum is an initial step in the development of the proposed alternatives for the Juneau Douglas North Crossing PEL Study (Project Numbers: SFHWY00299/0003259). It is intended to analyze crashes in the study area to best guide determination of crossing termini locations based on safety. This memorandum analyzes fatal and serious injury crashes within the study area from 2010 to 2019. Findings from this analysis will be considered in the alternatives development and screening process. The memorandum includes an assessment of fatal and serious injury (F&SI) crashes by year, type, distribution, and location throughout the study area, and rates per hundred million vehicle miles traveled (MVMT) for segments and intersections. These study area crash rates are compared to statewide average rates for F&SI crashes to identify locations which have existing safety concerns and may be impacted by increased traffic due to the crossing.



**Figure 1: Study Area Boundary**

## Summary of Data Sources

Data sources for the maps and analyses are shown below in Table 1, which include DOT&PF, the National Highway Traffic Safety Administration, and the Federal Highway Administration. Crash data are shown through the end of 2019 as 2020 data are not yet finalized by DOT&PF. Additionally, crashes and crash rates in 2020 were potentially impacted by the COVID-19 response; these impacts are assumed to not be sustained through the project design year. Statewide crash rates for F&SI crashes on segments are reported from the 2022 Alaska Highway Safety Improvement Program (HSIP) Handbook, as this is the most recent HSIP Handbook with reported rates.<sup>1</sup> Statewide base crash rates and critical crash rates at intersections are reported from the 2017 Alaska HSIP since statewide average crash rates for intersections are not reported in the 2022 Alaska HSIP.<sup>2</sup>

<sup>1</sup> Alaska Highway Safety Improvement Program Handbook, Alaska DOT&PF, August 2023.

<sup>2</sup> Alaska Highway Safety Improvement Program Handbook, Alaska DOT&PF, January 2017.

**Table 1: Data Sources**

| Data Description                              | Year                      | Source                                             | Source Link                                                                                                                                                                 |
|-----------------------------------------------|---------------------------|----------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Crash data                                    | 2010 to 2019              | DOT&PF                                             | Email correspondence with DOT&PF, Southcoast Region, March 31, 2022                                                                                                         |
| Project area annual average daily traffic     | 2012 to 2019 <sup>a</sup> | DOT&PF                                             | <a href="https://alaskatraficdata.drakewell.com/publicmultinodemap.asp">https://alaskatraficdata.drakewell.com/publicmultinodemap.asp</a>                                   |
| Statewide fatalities                          | 2012 to 2019              | National Highway Traffic Safety Administration     | <a href="https://www.nhtsa.gov/file-downloads?p=nhtsa/downloads/FARS/">https://www.nhtsa.gov/file-downloads?p=nhtsa/downloads/FARS/</a>                                     |
| Statewide vehicle miles traveled              | 2012 to 2019              | Federal Highway Administration                     | <a href="https://www.fhwa.dot.gov/policyinformation/statistics/">https://www.fhwa.dot.gov/policyinformation/statistics/</a>                                                 |
| Statewide average crash rates (segments)      | 2010 to 2022 <sup>b</sup> | Alaska Highway Safety Improvement Program Handbook | <a href="https://highways.dot.gov/sites/fhwa.dot.gov/files/2023-08/AK-HSIP-2022.pdf">https://highways.dot.gov/sites/fhwa.dot.gov/files/2023-08/AK-HSIP-2022.pdf</a>         |
| Statewide average crash rates (intersections) | 2017                      | Alaska Highway Safety Improvement Program Handbook | <a href="https://dot.alaska.gov/stwddes/dcstraffic/assets/pdf/hsip/hsip_hdbk_170101.pdf">https://dot.alaska.gov/stwddes/dcstraffic/assets/pdf/hsip/hsip_hdbk_170101.pdf</a> |

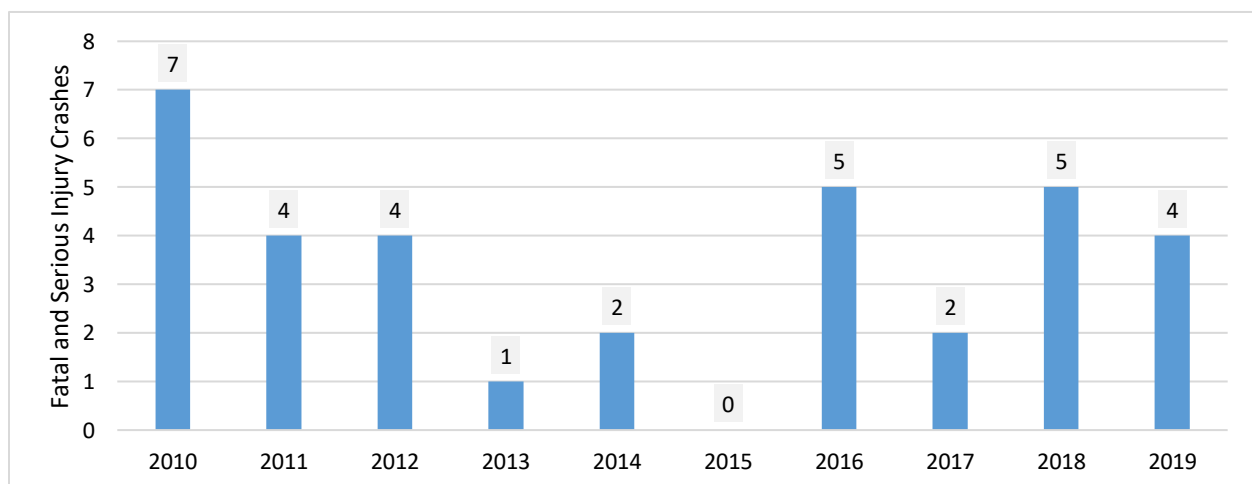
Notes:

<sup>a</sup> Project area annual average daily traffic (AADT) is the average of location AADT between 2012 and 2019.

<sup>b</sup> Statewide average crash rates used for fatal and serious injury crash analysis are the average of crash rates between 2010 and 2019 to be consistent with crash data analyzed.

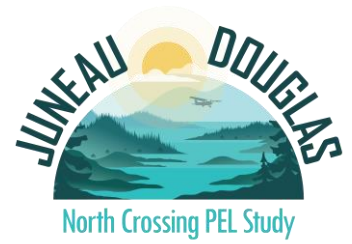
## Crash Characteristics

From 2010 to 2019, 7 fatal and 27 serious injury crashes occurred within the study area, or an average of 2.7 fatal and serious injury crashes per year (Figure 2).



**Figure 2: Fatal and Serious Injury Crashes by Year**

Tables 2 and 3 show the number of F&SI crashes and crash severity along segments of roadway and at intersections within the study area, respectively. Table 2 compares the location crash rate to the statewide



average (crashes per 100 MVMT) based on crash severity. Table 3 compares the location crash rate to the statewide average and critical average rates (crashes per 100 MEV) based on intersection control type and number of approaches. The segments and intersections are sorted from the west end of the study area to the east end. Locations with bold text in Tables 2 and 3 have a higher crash rate than the statewide average.

**Table 2: Segment F&SI Crash Severity and Crash Rate, 2010 – 2019**

| Location                                                           | Crash Severity |       | AADT (veh/day) | Segment Crash Rate |       | Statewide Crash Rate |       |
|--------------------------------------------------------------------|----------------|-------|----------------|--------------------|-------|----------------------|-------|
|                                                                    | Serious Injury | Fatal |                | Serious Injury     | Fatal | Serious Injury       | Fatal |
| Egan Drive<br>(Glacier Highway to Old Dairy Road)                  | 1              | 0     | 26,688         | 1.50               | —     | 6.90                 | 1.35  |
| Egan Drive<br>(Old Dairy Road to Sunny Drive)                      | 2              | 0     | 25,301         | 1.93               | —     |                      |       |
| Egan Drive<br>(Vanderbilt Hill Road to Glacier Highway)            | 2              | 0     | 21,561         | 1.88               | —     |                      |       |
| N. Douglas Highway<br>(Boonie Doon Drive to Juneau Douglas Bridge) | 1              | 0     | 3,790          | 2.43               | —     |                      |       |

**Table 3: Intersection F&SI Crash Severity and Crash Rate, 2010 - 2019**

| Location                               | Traffic Control Type | Crash Severity |       | AADT (veh/day) | Intersection F&SI Crash Rate | Statewide Crash Rate |          |
|----------------------------------------|----------------------|----------------|-------|----------------|------------------------------|----------------------|----------|
|                                        |                      | Serious Injury | Fatal |                |                              | Base                 | Critical |
| Egan Drive / Mendenhall Loop Road      | Signal               | 1              | 0     | 20,989         | 0.01                         | 1.57                 | 1.83     |
| Mendenhall Loop Road / Atlin Drive     | Signal               | 1              | 0     | 19,789         | 0.02                         | 1.57                 | 1.83     |
| Egan Drive / Glacier Highway           | Signal               | 1              | 0     | 27,052         | 0.01                         | 1.02                 | 1.20     |
| Egan Drive / Old Dairy Road            | Signal               | 5              | 0     | 26,688         | 0.06                         | 1.57                 | 1.80     |
| Glacier Highway / Walmart Driveway     | Signal               | 1              | 0     | 7,034          | 0.04                         | 1.02                 | 1.39     |
| Egan Drive / Vanderbilt Hill Road      | Signal               | 2              | 0     | 21,111         | 0.03                         | 1.02                 | 1.23     |
| Egan Drive / Engineers Cutoff          | TWSC                 | 1              | 0     | 12,769         | 0.02                         | 0.52                 | 0.72     |
| Egan Drive / Jensine Street            | TWSC                 | 0              | 1     | 15,292         | 0.02                         | 0.52                 | 0.70     |
| Egan Drive / Wildmeadow Lane           | TWSC                 | 1              | 1     | 15,292         | 0.04                         | 0.52                 | 0.70     |
| Egan Drive / Vintage Boulevard         | TWSC                 | 1              | 0     | 15,620         | 0.02                         | 0.55                 | 0.73     |
| Glacier Highway / Mendenhall Loop Road | TWSC                 | 0              | 1     | 2,013          | 0.15                         | 0.52                 | 1.06     |
| Glacier Highway / Nugget Mall Driveway | TWSC                 | 1              | 0     | 7,441          | 0.04                         | 0.52                 | 0.78     |
| Crest Street / Airport Boulevard       | TWSC                 | 1              | 0     | 2,269          | 0.13                         | 0.55                 | 1.06     |
| Yandukin Drive / Old Dairy Road        | TWSC                 | 0              | 1     | 2,601          | 0.12                         | 0.55                 | 1.03     |
| Glacier Highway / Hospital Drive       | TWSC                 | 1              | 0     | 3,287          | 0.09                         | 0.52                 | 0.93     |
| Egan Drive / Highland Drive            | TWSC                 | 4              | 1     | 12,395         | 0.12                         | 0.52                 | 0.72     |
| Egan Drive / 12 <sup>th</sup> Street   | TWSC                 | 0              | 2     | 18,158         | 0.03                         | 0.55                 | 0.72     |

Four-fifths of crashes occurred at intersections, with angle and single vehicle run-off-road crashes as the most frequent crash types. Single vehicle run-off-road was the most frequent crash type at locations other than signalized intersections. A total of nine pedestrian and bicyclist crashes occurred in total over the analysis period. Overall, crash rates are lower than the statewide average at all study area locations.

## Crash Modification Countermeasures

All the Douglas Island crossing alternatives will have a terminus in Juneau tying into the existing Egan Drive alignment. The current trends in safety could be impacted by the increase in traffic due to a new bridge connection for both motorized and non-motorized crashes. Given the currently proposed preliminary alternative termini locations, crash modification factors (CMFs) were examined as potential mitigation efforts to lessen the impact of adding a bridge connection on Egan Drive.<sup>3</sup> The focus of the CMFs examined was to address the geometric changes to the roadway, potential updates to intersection operations, and F&SI crashes involving non-motorized users. Table 4 shows the identified CMFs, the appropriate crash type and severity for which they apply, and the associated crash reduction factor.

**Table 4: Crash Modification Factor Considerations**

| Crash Modification Factor                                         | CMF ID | Crash Type |       |            | Crash Severity |                         |                      | Crash Reduction Factor |
|-------------------------------------------------------------------|--------|------------|-------|------------|----------------|-------------------------|----------------------|------------------------|
|                                                                   |        | All        | Angle | Pedestrian | All            | K, A, B, C <sup>a</sup> | A, B, C <sup>b</sup> |                        |
| Convert Intersection to Roundabout                                | 9156   | X          | —     | —          | X              | —                       | —                    | 72%                    |
| Convert Intersection to Roundabout                                | 9157   | X          | —     | —          | —              | —                       | X                    | 44%                    |
| Conversion of Stop-Controlled Intersection to Roundabout          | 4876   | X          | —     | —          | —              | —                       | X                    | 41.9%                  |
| Conversion of Stop-Controlled Intersection to Roundabout          | 4872   | X          | —     | —          | —              | —                       | X                    | 44.2%                  |
| Conversion of Intersection to Roundabout                          | 4868   | X          | —     | —          | —              | —                       | X                    | 41.7%                  |
| Install a Traffic Signal                                          | 319    | X          | —     | —          | —              | X                       | —                    | 23%                    |
| Install a Traffic Signal (Major Road Speed Limit at Least 40 mph) | 323    |            | X     | —          | X              | —                       | —                    | 67%                    |
| Install Bicycle Lanes                                             | 10743  | X          | —     | —          | X              | —                       | —                    | 35.1%                  |
| Install Sidewalk                                                  | 11246  |            | —     | X          | X              | —                       | —                    | 40.2%                  |
| Install Pedestrian Signals at Intersection                        | 8480   | X          | —     | —          | X              | —                       | —                    | Variable               |
| Set Posted Speed Limit 10 mph Below Engineering Recommendation    | 10251  | X          | —     | —          | X              | —                       | —                    | 16%                    |

Notes:

<sup>a</sup> Crash severity K is fatal, severity A is major injury, severity B is minor injury, severity C is possible injury.

The crash modification factors identified in Table 4 indicate a reduction in F&SI crashes at all alternative termini locations. However, further analysis will need to be conducted when an alternative is finalized to determine the change in expected crashes.

<sup>3</sup> CMF Clearinghouse, <https://www.cmfclearinghouse.org/results.php>, Accessed May 2024.

# Bridge Volume Forecast Memo

## Introduction

The Alaska Department of Transportation (DOT&PF) has retained Kinney Engineering, LLC (KE) as a subconsultant to DOWL for the *Juneau-Douglas North Channel Crossing Planning & Environmental Linkage (PEL) Study*, which will evaluate alternatives and determine recommended crossing location(s) for a second bridge crossing of the Gastineau channel to and from Douglas Island, north of the existing Juneau-Douglas Bridge. This memo provides volume forecasts for each bridge alternative location using data from two previous memos: the Origin-Destination Data memo and the Volume to Capacity of the Existing Juneau-Douglas Bridge memo.

Figure 1 shows the study areas from the Origin Destination memo and the bridge alternatives.

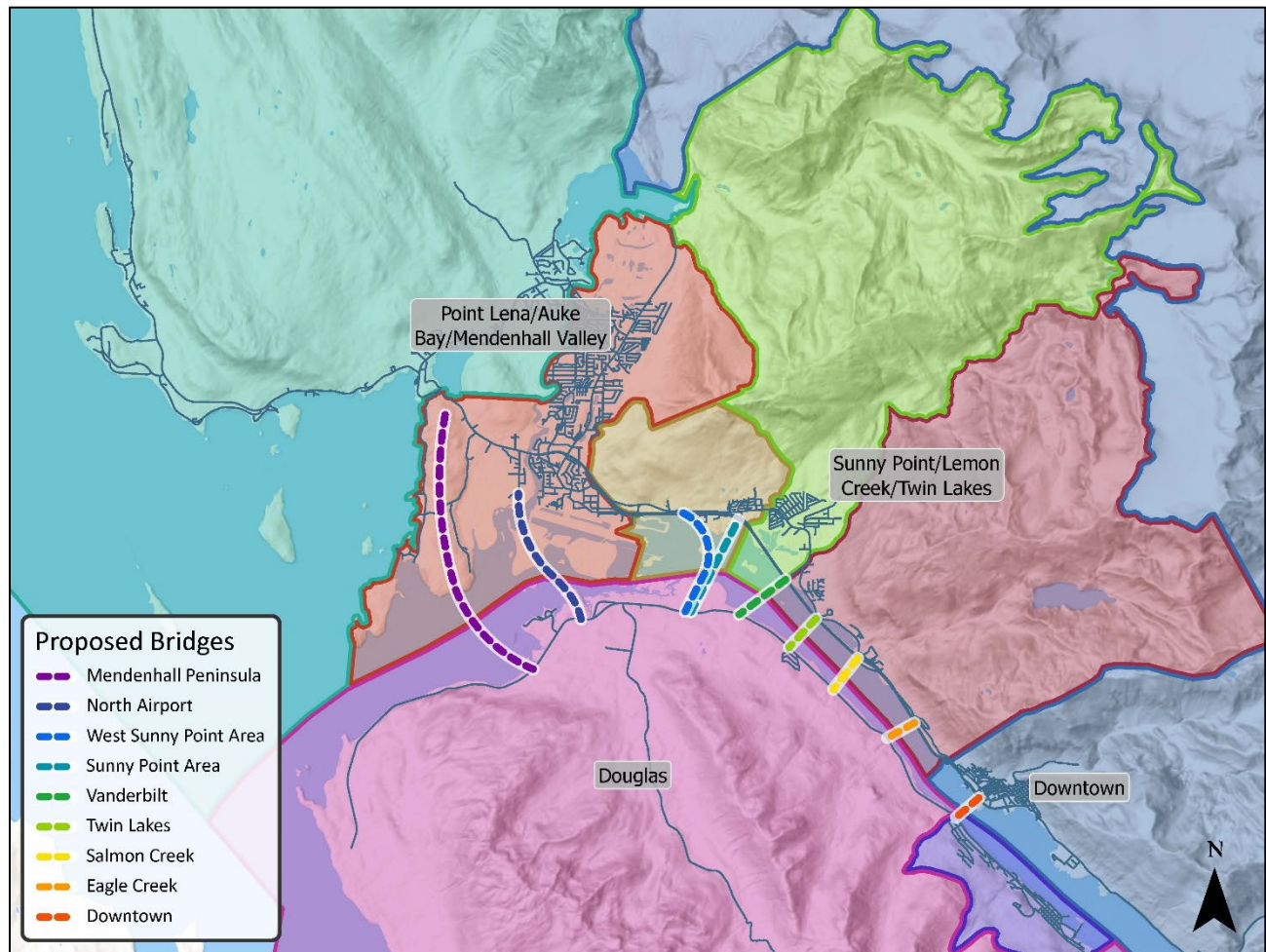


Figure 1: Study Areas and Bridge Alternative

# Analysis

## Travel Time & Travel Distance for Each Bridge Alternative Location

For the existing bridge and for each of the bridge alternative locations, the travel time and distance between each pair of census blocks was determined using Google Maps travel time and distance estimates, supplemented with estimates of travel time using distance and estimated speed, as applicable.

A table showing the calculated travel times and distances is presented in the Appendix.

## Forecast Bridge Volumes (Existing Bridge)

Volume forecasts for the existing bridge were developed previously in the Volume to Capacity of the Existing Juneau-Douglas Bridge memo and are presented in *Table 1*. Note that the forecasted volumes have been rounded to the nearest 100.

*Table 1: Forecast Bridge Volumes for Existing Juneau-Douglas Bridge*

| Year | 2022   | 2030   | 2040   | 2050   | 2060   |
|------|--------|--------|--------|--------|--------|
| AADT | 13,900 | 14,200 | 14,600 | 14,900 | 15,300 |

## Origin-Destination Proportions

The proportion of the total traffic using the existing bridge that travels between each Census Block Group and Douglas Island was estimated using location based services (LBS) data, as described previously in the Origin-Destination Data memo.

## Forecast Bridge Volumes (Bridge Alternative Locations)

For each of the bridge alternative locations, the travel time using the alternative bridge location was compared to the travel time using the existing bridge. For each origin-destination pair, the proportion of the existing bridge traffic volume corresponding to that pair was assigned to either the alternative bridge or the existing bridge, based on the bridge with the shortest travel time for that pair. If the travel times for the alternative and the existing bridge were within 10% of each other, the proportion was split evenly between the two bridges. For the downtown alternative bridge location, it was assumed that traffic would split evenly on each bridge (assuming each bridge would serve one-way traffic).

Any traffic that would use a bridge in any of the alternative locations would increase traffic volumes on Douglas Highway and reduce volumes on Egan Drive. Since Egan Drive is not operating near capacity, average speeds on Egan Drive are mostly impacted by the traffic signals and would not change with a decrease in volumes. However, increased volumes on Douglas Highway could have an impact on speeds. The Highway Capacity Manual Exhibit 15-2 provides an estimate for how vehicle speeds are impacted by directional volumes on two-lane highways. After initial estimates of traffic volumes for each bridge were completed, travel speeds on Douglas Highway were revised to reflect the increased volume. This resulted in longer travel times on Douglas Highway. Estimates of the proportion of traffic using each bridge were adjusted to reflect these new travel times.

Table 2 shows the resulting proportion of traffic that is forecast to be using each bridge based on this analysis. The analysis indicates that 5 to 50% of the traffic would be diverted from the existing bridge to one of the proposed bridge alternatives. The table also shows the travel time savings for each set of bridges, calculated as the average travel time saved per user. While a bridge at the Mendenhall/North Airport location would result in the highest time savings for

individual users (up to 15 minutes), the Sunny Point/Vanderbilt/Twin Lakes/Salmon Creek locations would result in the greatest overall travel time benefit.

Table 3 shows the range of volumes forecasted for each alternative bridge location.

*Table 2: Proportion of Traffic Volumes Selecting each Bridge Alternative Location*

| Bridge                         | Mendenhall or North Airport  | Sunny Point Area or Vanderbilt | Twin Lakes or Salmon Creek   | Eagle Creek Bridge     | Downtown/ Juneau Douglas |
|--------------------------------|------------------------------|--------------------------------|------------------------------|------------------------|--------------------------|
| Proposed                       | 5 to 15%                     | 20 to 30%                      | 30 to 40%                    | 40 to 45%              | 50%                      |
| Existing                       | 85 to 95%                    | 70 to 80%                      | 60 to 70%                    | 55 to 60%              | 50%                      |
| Individual Travel Time Savings | Up to 15 minutes             | Up to 13 minutes               | Up to 10 minutes             | Up to 5 minutes        | Minimal                  |
| Average Time Saved             | 20 to 35 seconds per vehicle | 55 to 65 seconds per vehicle   | 60 to 65 seconds per vehicle | 40 seconds per vehicle | Minimal                  |

*Table 3: Alternative Bridge Location Volume Forecast*

| Mendenhall or North Airport |                |                |                |                | Sunny Point Area or Vanderbilt |               |                |                |                |
|-----------------------------|----------------|----------------|----------------|----------------|--------------------------------|---------------|----------------|----------------|----------------|
| AADT 2022                   | AADT 2030      | AADT 2040      | AADT 2050      | AADT 2060      | AADT 2022                      | AADT 2030     | AADT 2040      | AADT 2050      | AADT 2060      |
| Proposed Bridge             |                |                |                |                | Proposed Bridge                |               |                |                |                |
| 700 to 2100                 | 700 to 2150    | 750 to 2200    | 750 to 2250    | 750 to 2300    | 2800 to 4150                   | 2850 to 4250  | 2900 to 4400   | 3000 to 4450   | 3050 to 4600   |
| Existing Bridge             |                |                |                |                | Existing Bridge                |               |                |                |                |
| 11800 to 13200              | 12050 to 13500 | 12400 to 13850 | 12650 to 14150 | 13000 to 14550 | 9750 to 11100                  | 9950 to 11350 | 10200 to 11700 | 10450 to 11900 | 10700 to 12250 |

Table 3: Alternative Bridge Location Volume Forecast (cont)

| Twin Lakes or Salmon Creek |              |               |               |               | Eagle Creek     |              |              |              |              |
|----------------------------|--------------|---------------|---------------|---------------|-----------------|--------------|--------------|--------------|--------------|
| AADT 2022                  | AADT 2030    | AADT 2040     | AADT 2050     | AADT 2060     | AADT 2022       | AADT 2030    | AADT 2040    | AADT 2050    | AADT 2060    |
| Proposed Bridge            |              |               |               |               | Proposed Bridge |              |              |              |              |
| 4150 to 5550               | 4250 to 5700 | 4400 to 5850  | 4450 to 5950  | 4600 to 6100  | 5550 to 6250    | 5700 to 6400 | 5850 to 6550 | 5950 to 6550 | 6100 to 6900 |
| Existing Bridge            |              |               |               |               | Existing Bridge |              |              |              |              |
| 8350 to 9750               | 8500 to 9950 | 8750 to 10200 | 8950 to 10450 | 9200 to 10700 | 7400 to 7850    | 7600 to 8050 | 7800 to 8250 | 7950 to 8450 | 8150 to 8650 |

| Downtown/Juneau Douglas |              |              |              |              |
|-------------------------|--------------|--------------|--------------|--------------|
| AADT 2022               | AADT 2030    | AADT 2040    | AADT 2050    | AADT 2060    |
| Proposed Bridge         |              |              |              |              |
| 6750 to 7150            | 6900 to 7300 | 7100 to 7500 | 7250 to 7650 | 7400 to 7900 |
| Existing Bridge         |              |              |              |              |
| 6750 to 7150            | 6900 to 7300 | 7100 to 7500 | 7250 to 7650 | 7400 to 7900 |

In winter, the Eaglecrest Ski Area is estimated to attract 500 to 800 trips per day to the North Douglas area. This could result in a shift of traffic of up to approximately 5% from the Downtown/Juneau Douglas Bridge to the proposed bridges.