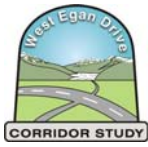


Section 9

Final Report Chapter 6 Appendix





Section 9: Final Report Chapter 6 Appendix

Appendix A - Traffic Operations Alternatives 1-4

Appendix B - Constructability, Construction Costs, Maintenance Costs, Right-of-Way Requirements, and Environmental Impacts Alternatives 1-4

Appendix C - Compatibility with the Built Environment Alternatives 1-4

Appendix D - Detailed Evaluations Alternatives 1-4 and No-Build

Appendix E - Traffic Operations Proposed Action

Appendix F - Compatibility with the Built Environment Proposed Action

Appendix G - Detailed Evaluation Proposed Action

Section 9 Final Report Chapter 6 Appendix

Appendix A: Traffic Operations Alternatives 1-4



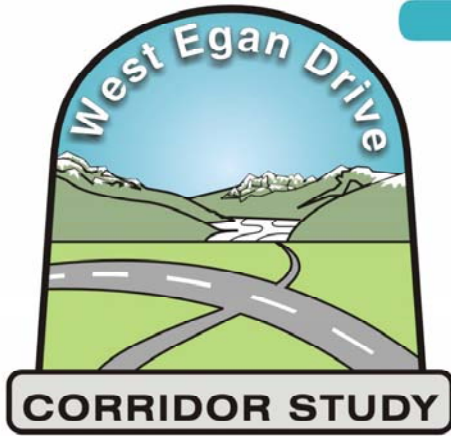
West Egan Drive Corridor Study

Appendix A: Working Paper #3 Update

Alternatives Analysis – Traffic Operations and Functional Layout

February 2003

Kittelson & Associates, Inc.
in association with CH2M Hill,
Cogan Owens Cogan, and Southeast Strategies



Introduction

Based on comments received from CAC Members during the November 2002 committee meeting, Alternatives 2 and 3 were modified as follows:

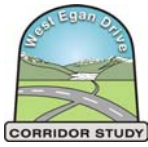
- Alternative 2 was modified to provide a westbound frontage road on the north side of Egan Drive from Glacier Highway (Airport) to Mendenhall Loop Road and from Mendenhall Loop Road to Riverside Drive.
- Alternative 3 was modified to provide a right-in-right-out access from Vintage Boulevard to the westbound Egan Drive on-ramp and the westbound Egan Drive frontage road section from Mendenhall Loop Road to Riverside Drive was removed.

This memo summarizes the results of the updated traffic operations analysis for Alternatives 2 and 3 and the previous results of the Alternatives 1 and 4 traffic operations analysis. This memo is intended as an update to the Working Paper 3 presented in November 2002, and will from this point forward serve as Appendix E to Memo #6.

WHAT'S IN THIS WORKING PAPER?

In the remainder of this memo, each alternative and its functional layout will be introduced. A functional layout is a scaled drawing of the proposed roadway system overlaid on the existing system. Among other things, the functional layout shows the horizontal alignment of the new system, the number of lanes on the roadway, the general extent of the right of way impacts, and a typical form of intersection control. Roundabouts could be feasible at several locations within the study area off Egan Drive but are not documented in this working paper, as they could be considered independently during the refinement studies performed subsequent to this reconnaissance study.

In addition to the description of the alternative and its functional layout, this memo also presents the results of the a.m. and p.m. peak hour traffic operations analyses. The traffic operations analyses were conducted to achieve Level of Service (LOS) D or better operations and volume to capacity ratios less than or equal to 0.90. Details of the analyses will be included as appendices.



Geometric considerations are also discussed for each alternative. These considerations relate to different design elements or physical features that are noteworthy.

Alternative Traffic Volumes

Forecasts of the volume of traffic expected on each alternative affect decisions on the appropriate size of the roadway. The year 2025 is the benchmark.

Origin-Destination Information

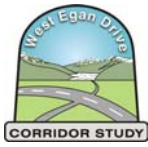
As each alternative would create new travel routes within the WEDCOR study area, it is important to estimate those routes that motorists are most likely to choose. To ascertain current travel patterns, the project team conducted an origin-destination (O-D) survey and analysis within the West Egan Drive Corridor.

First, key travel routes within the study area (e.g. southbound Mendenhall Loop Road to Glacier Highway (Fred Meyer), were identified. Next, for a two-hour period, partial license plate digits and letters of all vehicles traveling past the designated route origin during a two-hour period (e.g., making a southbound left turn on Mendenhall Loop Road) were recorded. During the same period, the license plate digits and letters of all vehicles traveling past the route destination (e.g., making a left hand turn from Egan Drive into Glacier Highway (Fred Meyer)) were recorded. The two sets of data were then compared to match license plates and thus, vehicles, traveling between the two locations. The number of matches revealed the desire for travel between the two locations (e.g., Mendenhall Valley and Fred Meyer). The results of this survey, quantifiable information about the most popular travel routes, are presented in Working Paper #2.

Forecast Traffic Volumes

The results of the O-D survey were combined with the forecasted a.m. and p.m. peak hour traffic volumes discussed in Memo 3 to assign a.m. and p.m. peak hour traffic to each of the four alternatives. For example, Alternative 1 includes a new connection north of Egan Drive between Mendenhall Loop and Lemon Spur. Motorists would be able to travel directly from Mendenhall Valley to Fred Meyer without using Egan Drive. The O-D survey helps estimate the volume of traffic that should be reassigned to this road.

The year 2025 no-build traffic volumes for the weekday a.m. and p.m. peak hours are shown in Figures 1 and 2. Forecast traffic volume figures for each design alternatives are in the Alternatives Analysis section of this working paper.



ALTERNATIVES ANALYSIS

For each alternative, the lane configurations and traffic control devices have been designed to provide LOS D or better operating conditions and an intersection volume-to-capacity ratio less than or equal to 0.90, except where noted. Though ADOT&PF design guidelines strive for LOS C conditions, LOS D is considered generally acceptable at signalized intersections. A tabular summary of forecasted a.m. and p.m. peak hour traffic operating conditions for each alternative is at the end of this working paper, followed by the traffic operations calculation work sheets in the appendix.

In the following section, each alternative and its functional layout and traffic volumes are described. This is followed by a discussion of the forecast traffic operating conditions for each. The latter includes a review of level of service and capacity conditions, vehicle queuing, and any applicable “weaving sections.” These are created when motorists traveling in adjacent travel lanes must change lanes and cross the paths of other vehicles to continue on their desired route. For example, in situations where an interchange on-ramp is followed immediately by an interchange off-ramp, motorists traveling from the on-ramp will have to merge into the mainline traffic stream while other motorists are merging into the same lane to gain access to the off-ramp. The distance between the ramps has an influence on traffic operations.

The evaluation also includes a study of 95th-percentile vehicle queue lengths at each of the study intersections. A 95th-percentile queue represents a standard design threshold that is used to ensure that turn lanes are sized properly and that intersections are spaced appropriately. In broad terms, all queues will be no longer than the 95th-percentile queue for 95 percent of the signal cycles during the peak hour.

ALTERNATIVE #1

This is characterized by full interchanges with frontage roads on Egan Drive from Vintage Boulevard to Mendenhall Loop Road, including an extension of Lemon Spur Road to Mendenhall Loop Road at James Boulevard (see Figure 3). The major system elements described below result in the weekday a.m. and p.m. peak hour traffic volumes shown in Figures 4 and 5.

System Description

Major System Changes

- The intersections of Vintage Boulevard/Egan Drive, Riverside Drive/Egan Drive, Mendenhall Loop Road/Egan Drive and Yandukin Drive/Egan Drive are converted to interchanges, with frontage roads connecting Vintage Boulevard to Mendenhall Loop Road on both the north and south side of Egan Drive.
- There is a direct connection from Lemon Spur Road to James Boulevard on the north side of Egan Drive.



- The existing intersection at Glacier Highway (Airport)/Egan Drive is closed; Glacier Highway (Airport) connects to the Lemon Spur Road extension.
- The intersection of Mendenhall Loop Road/Mendenhall Mall Road is converted to a right-in/right-out-only intersection. Left turns to and from Mendenhall Loop Road are prohibited; James Boulevard and a new connection from James Boulevard to Mendenhall Mall Road would become an optional route choice.
- Glacier Highway (North) no longer connects to Egan Drive.
- Access to Industrial Boulevard is relocated to the west to Jensine Street.
- Del Rae Road would be re-aligned to intersect with Glacier Highway (North) south of the current intersection.
- Access to/from Hurlock Avenue via Mendenhall Loop Road would be replaced by a new access opposite Del Rae Road.

Facility Needs

- Egan Drive is a four-lane, divided roadway throughout the corridor. Access is provided only through on-ramps and off-ramps except at the realigned Industrial Boulevard, which is signalized.
- Glacier Highway (Airport) from Old Dairy Road to the Mendenhall Loop Road interchange becomes a five-lane roadway.
- Right turns from Egan Drive to northbound Mendenhall Loop Road are no longer free flowing; they would be controlled by traffic signals.
- No traffic signal is required at the ramp terminal intersections of Egan Drive/Vintage Boulevard.
- The traffic signals currently at Mendenhall Loop Road/Mendenhall Mall Road and Egan Drive/Glacier Highway (Airport) would be removed. The new Glacier Highway (Airport) intersection with the Lemon Spur Road Extension is a stop-controlled intersection.

Traffic Operations

Some notable operational elements of Alternative 1 are identified below.

Capacity and Delay

- All but one of the signalized intersections have been designed to operate at Level of Service (LOS) C or better and a volume-to-capacity ratio of 0.90 or better during both the a.m. and p.m. peak hours. The exception is James Boulevard/Mendenhall Loop Road, which is expected to operate at an acceptable LOS D and volume-to-capacity ratio of 0.81 during the p.m. peak.



- At the Glacier Highway (Airport)/Berners Avenue intersection the delay experienced by the northbound left-turning vehicles during the a.m. and p.m. peak hours is greater than 50 seconds, resulting in LOS F. However, the northbound left-turn volume is light (less than 30 vehicles during either peak hour), and alternative routes to Glacier Highway are available.

Queuing

The design accommodates the forecasted vehicle queuing needs with the following notable exceptions:

- Egan Drive/Mendenhall Loop Road North Ramp Terminal
During the p.m. peak hour the northbound through movement and northbound left-turn queues will spill south through the south ramp terminal. The northbound through movements have a lane south of the south ramp terminal intersection to queue in; however, the northbound left turn does not. This queue is expected to occur on a green indication and therefore is not likely to have a lasting impact during the peak hour.

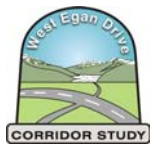
Weaving Sections

There are no weaving sections in Alternative 1.

Geometric Considerations

Some notable geometric elements of Alternative 1 are identified below.

- The existing horizontal alignment of Egan Drive in the vicinity of Mendenhall Loop Road intersection has an undesirable broken-back arrangement of curves. Providing a single 2,850-foot radius curve eliminates this geometric deficiency.
- The smallest horizontal curve introduced in the new Egan Drive horizontal alignment has a 2,000-foot radius. With the future erection of a median barrier between opposing traffic, the stopping sight distance for motorists traveling on the outside of the curve would comply with a design speed of approximately 55 miles per hour.
- The Riverside Drive extension impacts existing buildings (a residential house and church). The proposed alignment currently conforms to a design speed of approximately 35 miles per hour.
- The location of the eastbound off-ramp at the new Yandukin Drive interchange is located on the outside of a 2,000-foot radius curve. Exit speeds could be too high and the exact location of this ramp should be reviewed if this alternative is carried forward in the evaluation process.
- The proposed Egan Drive/Yandukin Drive interchange alignment results in an intersection angle of approximately 62 degrees. This satisfies the minimum design criterion for intersection angle. If this alternative is carried forward, there may be an opportunity to optimize the intersection angle and approach alignment during the next stage of the design process.



- The alignment of the southern leg of the new signalized Glacier Highway/Jensine Street intersection limits the visibility of the signal displays. Advance signals will be required to minimize confusion along this approach.
- The location of stop bars at intersections should be finalized during the next design stage to accommodate the turning swept paths of trucks.

ALTERNATIVE #2

The Alternative 2 roadway system is characterized by full interchanges on Egan Drive at Yandukin Drive, Mendenhall Loop Road, Riverside Drive, and Vintage Boulevard. A westbound frontage road extends from Glacier Highway (Airport) to Vintage Boulevard, and an eastbound frontage road extends from Vintage Boulevard to Mendenhall Loop Road. A partial interchange would be constructed at Glacier Highway (Airport) (see Figure 6). In this alternative Lemon Spur road extends as a two-way street to Glacier Highway (Airport). It is a westbound only frontage road from Glacier Highway (Airport) to Mendenhall Loop Road. Weekday a.m. and p.m. peak hour traffic volumes shown in Figures 7 and 8.

System Description

Major System Changes

- The intersections of Vintage Boulevard/Egan Drive, Riverside Drive/Egan Drive, and Mendenhall Loop Road/Egan Drive, are converted to interchanges. A westbound frontage road is provided between Glacier Highway (Airport) and Vintage Boulevard. An eastbound frontage road is provided between Vintage Boulevard and Mendenhall Loop Road.
- The Glacier Highway/Egan Drive (McNugget) intersection is converted to a partial interchange that provides access only to and from Downtown.
- The Yandukin Drive/Egan Drive intersection is relocated east and converted to a traditional diamond interchange.
- Riverside Drive is extended south from Egan Drive and aligned with Glacier Highway (North).
- Lemon Spur Road is extended to Glacier Highway (Airport), providing access from the south side of Egan Drive to Fred Meyer.
- Mendenhall Mall Road/Mendenhall Loop Road intersection remains a full access intersection.
- Glacier Highway (North) no longer connects to Egan Drive.
- Access to Industrial Boulevard is relocated to the west.
- Del Rae Road would be re-aligned to intersect with Glacier Highway (North) south of the current intersection.
- Access to/from Hurlock Avenue via Mendenhall Loop Road has been relocated to the south.



- Old Dairy Road would no longer be a through connection between Glacier Highway (North) and Yandukin Drive. Old Dairy would be re-aligned to intersect with Mallard Street.

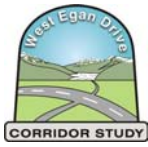
Facility Needs

- Egan Drive is a four-lane, divided roadway throughout the corridor. Access is only through on-ramps and off-ramps except at Industrial Boulevard, which is signalized.
- Glacier Highway (Airport), from the north ramp terminal intersection at the Egan Drive off-ramp to the Mendenhall Loop Road interchange, is a five-lane roadway.
- Riverside Drive is a four-lane roadway north of the interchange at Egan Drive (two through lanes northbound, one through lane southbound, plus center left turn lane).
- Right turns from Egan Drive to northbound Mendenhall Loop Road are no longer free flowing; they would be controlled by traffic signals.
- The north and south ramp terminal intersections at the Egan Drive/Vintage Boulevard are unsignalized.

Traffic Operations

Capacity and Delay

- All but one of the signalized intersections have been designed to operate at Level of Service (LOS) C or better and a volume-to-capacity ratio of 0.90 or better during both the a.m. and p.m. peak hours. The exception is Egan Drive North Ramps/Mendenhall Loop Road, which is expected to operate at LOS C and a volume-to-capacity ratio of 0.92 during the p.m. peak hour.
- As with Alternative 1, the intersection of Glacier Highway (Airport) and Berners Avenue is not signalized. This results in northbound motorists experiencing considerable delay when trying to turn left onto Glacier Highway during the a.m. and p.m. peak hours. This low volume movement has alternative signalized access to Glacier Highway. In addition, while delay may be high there is capacity available for motorists to complete the turning movement
- At the Glacier Highway (North)/Del Rae Road intersection the delay experienced by the westbound (side street) vehicles due to the relatively high volume of northbound and southbound through traffic results in LOS E during the p.m. peak hour. However, the westbound volumes are very low (less than 10 vehicles per movement during the peak hour) and do not warrant any additional lanes or traffic control.
- At the Egan Drive/Vintage Boulevard North Ramp intersection the delay experienced by the northbound through vehicles results in LOS E during the p.m. peak hour. This movement has alternative signalized access to the Mendenhall Valley. In addition, there is capacity available for motorists to perform this movement. Note that this movement is disallowed today.



Queuing

The design accommodates the forecasted vehicle queuing needs with the following notable exceptions:

- Egan Drive/Mendenhall Loop Road South Ramp Terminal - During the weekday p.m. peak hour the southbound left-turn queue would spill into the north ramp terminal but would be accommodated in the southbound through lanes at the north ramp intersection. This queue is expected to occur on a green indication and therefore is not likely to have a lasting impact during the peak hour.

Weaving Sections

In this alternative, there are weaving sections at the following locations:

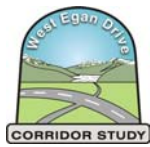
- On Egan Drive between the westbound Vintage Boulevard on-ramp merge and the westbound left turn at Industrial Boulevard;
- At the westbound Riverside Drive off-ramp merge with the westbound frontage road from Mendenhall Loop Road; and
- At the westbound Mendenhall Loop Road off-ramp merge with the westbound frontage road from Glacier Highway (Airport).

In addition, the ramp spacing between the Glacier Highway (Airport) and Yandukin Drive interchange marginally exceeds minimum spacing to avoid weaving conditions between the respective on and off-ramps. Therefore, weaving is not expected to be significant under the present design but could become an issue if ramp geometry changes with future revisions.

Geometric Considerations

Some notable geometric elements of Alternative 2 are identified below.

- The existing horizontal alignment of Egan Drive in the vicinity of Mendenhall Loop Road intersection has an undesirable broken-back arrangement of curves. Providing a single 2,850-foot radius curve eliminates this geometric deficiency.
- The smallest horizontal curve introduced in the new Egan Drive horizontal alignment is 2,000 feet. With the future erection of a median barrier between opposing traffic, the stopping sight distance for motorists traveling on the outside of the curve would comply with a design speed of approximately 55 miles per hour.
- The Riverside Drive extension impacts existing buildings (a residential house and church). The proposed alignment currently conforms to a design speed of approximately 35 miles per hour.



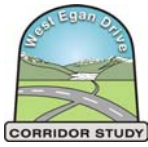
- The location of the eastbound off-ramp at the new Yandukin Drive interchange is located on the outside of a 2,000-foot radius curve. Exit speeds could be too high and the exact location of this ramp should be reviewed if this alternative is carried forward in the evaluation process.
- The location of the westbound off-ramp at the Riverside Drive interchange is located on the outside of a 2,850-foot radius curve. Exit speeds could be too high and the exact location of this ramp should be reviewed if this alternative is carried forward in the evaluation process.
- The spacing between Riverside Drive and Mendenhall Loop Road provides almost no weaving section on the westbound frontage road. Combined with the high exit speed anticipated at the westbound off-ramp, safety at this location may be a concern.
- The profile of the eastbound and westbound frontage roads between Riverside Drive and Mendenhall Loop Road will be dictated by the eastbound on-ramp and westbound off-ramp onto Riverside Drive, respectively. The spacing between the two crossroads provides little latitude to keep the profile of these frontage roads along the existing ground profile.
- The proposed Egan Drive/Yandukin Drive interchange alignment results in an intersection angle of approximately 62 degrees. This satisfies the minimum design criterion for intersection angle. If this alternative is carried forward, there may be an opportunity to optimize the intersection angle and approach alignment during the next stage of the design process.
- The location of stop bars at intersections would be finalized during the next design stage to accommodate the turning swept paths of trucks.

ALTERNATIVE #3

In Alternative 3 (see Figure 9), the current Vintage Boulevard access to Egan Drive is maintained as a right-in-right-out only access, and the intersections of Riverside Drive/Egan Drive and Yandukin Drive/Egan Drive are converted to full interchanges. The intersection of Mendenhall Loop Road/Egan Drive is converted to a partial interchange: access to westbound Egan Drive is not provided. There is a frontage road system eastbound between Riverside Drive and Mendenhall Loop Road, and westbound between Riverside Drive and Vintage Boulevard.

There is also a frontage road system between Glacier Highway (Airport) and Yandukin Drive that provides access for vehicles traveling through the Yandukin ramp terminal intersections to/from Glacier Highway (Airport). Access between Egan Drive (west of Glacier Highway (Airport)) and Glacier Highway (Airport) in both directions requires travel through the Yandukin interchange ramp terminal intersections.

The major system elements described below result in the weekday a.m. and p.m. peak hour traffic volumes shown in Figures 10 and 11.



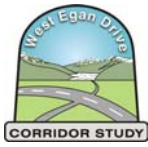
System Description

Major System Changes

- The intersections of Riverside Drive/Egan Drive and Mendenhall Loop Road/Egan Drive are connected eastbound via a frontage road on the south side of Egan Drive. The intersections of Riverside Drive/Egan Drive and Vintage Boulevard/Egan Drive are connected westbound via a frontage road on the north side of Egan Drive. Access at Vintage Boulevard is limited to right-in-right-out only to and from the westbound Egan Drive on-ramp. There is full access to and from east and westbound Egan Drive from Riverside Drive only. The interchange at Mendenhall Loop Road/Egan Drive provides full access with the exception of westbound on-ramp and eastbound off-ramp.
- The Yandukin Drive/Egan Drive intersection is realigned to the west of Fred Meyer and converted to a full interchange. This provides full access to and from Egan Drive and Yandukin Drive. Ramps connect Glacier Highway (Airport) to and from the Yandukin/Lemon Spur/Egan Drive interchange.
- Similar to Alternative 1, the intersection of Mendenhall Mall Road/Mendenhall Loop Road is a right-in/right-out intersection. Left turns to and from Mendenhall Loop Road are prohibited; James Boulevard and a new connection from James Boulevard to Mendenhall Mall Road could become an optional route choice for these movements.
- Glacier Highway (North) no longer connects to Egan Drive.
- Del Rae Road would be re-aligned to intersect with Glacier Highway (North) south of the current intersection.
- Access to/from Hurlock Avenue via Mendenhall Loop Road would be replaced by a new access opposite Del Rae Road.
- At the Glacier Highway (Airport)/Egan Drive intersection, access to and from eastbound Egan Drive would be made through the Yandukin Drive interchange and connecting frontage roads.
- Lemon Spur would be extended one-way westbound to connect with Glacier Highway (Airport) at the existing intersection of Egan Drive/Glacier Highway (Airport).

Facility Needs

- Egan Drive is a four-lane, divided roadway throughout the corridor. Access is provided only through on-and off-ramps, except at Industrial Boulevard, which is signalized.
- Glacier Highway (Airport) from the Old Dairy Road to the Mendenhall Loop Road interchange has five lanes.
- Riverside Drive has two northbound and southbound through lanes and a center turn lane extending approximately 350 feet south from the intersection of James Boulevard/Riverside Drive.
- Yandukin Drive has four lanes from the Lemon Spur intersection to south of the Egan Drive interchange.



- Right turns from Egan Drive to northbound Mendenhall Loop Road are no longer free flowing; they would be controlled by traffic signals.
- Currently, the intersections of Mendenhall Loop Road/Mendenhall Mall Road and Egan Drive/Glacier Highway (Airport) are signalized. Because of the change in these intersections traffic signals would no longer be required at this location.

Traffic Operations

Capacity and Delay

- All signalized intersections have been designed to operate at Level of Service (LOS) C or better with a volume-to-capacity ratio of 0.90 or better during both the a.m. and p.m. peak hours.
- At the Glacier Highway/Jensine Street intersection (providing secondary access to Industrial Boulevard), northbound vehicles going through or turning left will experience higher than desired delays. These vehicles have alternative signalized access at Industrial Boulevard. In addition, access at Jensine Street to Industrial Boulevard does not eliminate the need for a traffic signal at Industrial Boulevard.
- As with the other alternatives, the intersection of Glacier Highway (Airport) and Berners Avenue would not be signalized. This results in the northbound movements experiencing high delay when trying to turn left onto Glacier Highway during the a.m. and p.m. peak hours. This low volume movement has alternative access to Glacier Highway.
- At the Glacier Highway (North)/Del Rae Road intersection the delay experienced by the westbound (side street) vehicles due to the relatively high volume of northbound and southbound through traffic results in LOS F during the p.m. peak hour. However, the westbound volumes are very low (less than 10 vehicles per movement during the peak hour) and do not warrant any additional lanes or traffic control.

Queuing

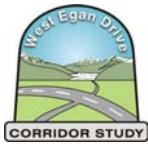
The design accommodates the forecasted vehicle queuing needs.

Weaving Sections

In this alternative, there is one potential weaving section on the eastbound frontage road between the Yandukin eastbound off-ramp and the south ramp terminal intersection at the Yandukin Drive/Egan Drive interchange. In addition, the interchange spacing between the eastbound Egan Drive on-ramp from Mendenhall Loop Road and off-ramp to Yandukin Drive marginally exceeds the minimum requirements to avoid a weaving section. Therefore, weaving is not expected to be significant under the present design but could become an issue if ramp geometry changes with future revisions.

Geometric Considerations

Some notable geometric elements of Alternative 3 are identified below.



- The existing horizontal alignment of Egan Drive in the vicinity of Mendenhall Loop Road intersection has an undesirable broken-back arrangement of curves. Providing a single 2,850-foot radius curve eliminates this geometric deficiency.
- The smallest horizontal curve introduced in the new Egan Drive horizontal alignment is 2,000 feet. With the future erection of a median barrier between opposing traffic, the stopping sight distance for motorists traveling on the outside of the curve would comply with a design speed of approximately 55 miles per hour.
- The Riverside Drive extension impacts existing buildings (a residential house and church). The proposed alignment currently conforms to a design speed of approximately 35 miles per hour.
- The location of the westbound off-ramp at the Riverside Drive interchange is located on the outside of a 2,850-foot radius curve. Exit speeds could be too high and the exact location of this ramp should be reviewed if this alternative is carried forward in the evaluation process. An alternative could be to combine the Mendenhall Loop Road and Riverside Drive westbound off-ramps.
- The profile of the eastbound frontage road between Riverside Drive and Mendenhall Loop Road will be dictated by the eastbound on-ramp from Riverside Drive. The spacing between the two crossroads provides little latitude to keep the profile of this frontage road along the existing ground profile.
- The design of the right-in/right-out access at Vintage Boulevard on the ramp from Riverside Drive onto westbound Egan Drive should be refined during the next design stage to ensure safe deceleration and acceleration of traffic on the ramp.
- The location of stop bars at intersections should be finalized during the next design stage to accommodate the turning swept paths of trucks.

ALTERNATIVE #4

Alternative 4 is characterized by travel lane additions to Egan Drive, new roadways and signals regulating multiple lanes of traffic at each intersection. Egan Drive remains at grade, and no interchanges would be constructed. Several intersections would include double left-turn lanes. New roadways would extend Lemon Spur Road to the Mendenhall Valley, and Riverside Drive south of Egan Drive (see Figure 12).

The major elements described below result in the weekday a.m. and p.m. peak hour traffic volumes shown in Figures 13 and 14.

System Description

Major System Changes

- Lemon Spur Road is extended to connect with James Boulevard at Mendenhall Loop Road.
- Riverside Drive continues south of Egan Drive to connect with Glacier Highway North.



- Glacier Highway (Airport)/Old Dairy Road/Trout Street becomes a right-in/right-out only intersection.
- The Glacier Highway (North)/Vintage Boulevard/Egan Drive intersection is converted to a right-in/right-out intersection for both side streets. Left turns to and from Egan Drive are prohibited.

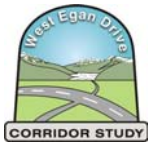
Facility Needs

- Egan Drive has three lanes in each direction, from Mendenhall Loop Road to Yandukin Drive.
- Westbound, west of Mendenhall Loop Road, as Riverside Drive is approached, Egan Drive transitions from three to two lanes. Between Riverside Drive and Industrial Boulevard, Egan Drive has two westbound lanes. Glacier Highway transitions to one westbound lane before Jensine Street.
- In the eastbound direction, Egan Drive transitions from one to two lanes between Jensine Street and Industrial Boulevard. Egan has two through lanes between Industrial Drive and east of Riverside Drive, where Egan transitions to three lanes through Yandukin Drive.
- Glacier Highway (Airport) has five lanes between the intersection of Mendenhall Loop Road/Egan Drive and Glacier Highway (Airport)/Egan Drive.
- Riverside Drive has five lanes between Egan Drive and James Boulevard.
- Right turns from Egan Drive to northbound Mendenhall Loop Road are no longer free flowing; they would be controlled by traffic signals.

Traffic Operations

Capacity and Delay

- Due to the large size of the signalized intersections on Egan Drive, long cycle lengths (120 to 150 seconds – considerably longer than the existing cycle length of 100 seconds) are needed to accommodate pedestrian movements across the intersection. These long cycle lengths result in additional delay to all users. Frequent pedestrian crossings across Egan Drive on the east side of the intersection will likely result in loss of signal coordination during the peak hours. This will reduce the ability to progress traffic away from these intersections, particularly at the intersections of Mendenhall Loop Road/Mendenhall Mall and Riverside Drive/Vintage Boulevard/Mendenhall Mall Road, resulting in additional delays, queues, and stops. Removal of the crosswalks is an option that may be appropriate for eliminating this effect on traffic operations; however, it would have a substantial negative effect on pedestrian circulation.
- All but four signalized intersections have been designed to operate at Level of Service (LOS) C or better and a volume-to-capacity ratio of 0.90 or better during both the a.m. and p.m. peak hours. The intersections of Egan Drive/Mendenhall Loop Road, James Boulevard/Mendenhall Loop Road, and Glacier Highway (Airport)/Jordan Avenue will operate at LOS D. The intersection of Egan Drive/Riverside Drive will operate at LOS E and a volume-to-capacity ratio of 0.74 during the p.m. peak hour. The poor level of



service is due primarily to the long cycle length. However, the acceptable volume-to-capacity ratio should provide ample capacity during the peak hour, and therefore additional improvements are not recommended.

- The intersection of Glacier Highway (Airport)/Berners Avenue is not signalized. Thus, drivers northbound turning left onto Glacier Highway are likely to experience delay during the a.m. and p.m. peak hours. Drivers have alternative signalized access to Glacier Highway.
- Secondary access to Industrial Boulevard from Glacier Highway via Jensine Street experiences unacceptable delay for the northbound through and left-turn movements. Access to Industrial Boulevard from Jensine Street does not eliminate the need for a traffic signal at Industrial. Similar to Alternative 3, one signalized access is sufficient to serve the Industrial Boulevard area; therefore, Jensine Street is not signalized in Alternative 4.
- The Lemon Spur extension to James Boulevard shifts approximately 400 vehicles per hour off Egan Drive during the p.m. peak hour, assuming that the remaining network is as proposed. If the Lemon Spur extension is not provided, the Egan Drive/Mendenhall Loop Road intersection degrades to LOS E and a volume-to-capacity ratio of 0.95 during the p.m. peak hour. This assumes that the remaining network is as proposed.
- The Riverside Drive extension to Glacier Highway (North) shifts approximately 500 vehicles per hour off Egan Drive and Mendenhall Loop Road during the p.m. peak hour, assuming that the remaining network is as proposed. If the Riverside Drive extension is not provided, the Egan Drive/Mendenhall Loop Road intersection degrades to LOS E and a volume-to-capacity ratio of 0.89 during the p.m. peak hour, even assuming the provision of a second northbound left turn lane.

Queuing

The design accommodates the forecasted vehicle queuing needs with the following notable exceptions:

- Egan Drive/Mendenhall Loop Road
During the a.m. peak hour the southbound left-turn lane queue extends through the Mendenhall Mall Road intersection.

Weaving Sections

- There are no weaving sections in Alternative 4. Signalizing the right turn movement from Egan Drive onto Mendenhall Loop Road eliminates the existing weaving on Mendenhall Loop Road between Egan Drive and Mendenhall Mall Road.

Geometric Considerations

Some notable geometric elements of Alternative 4 are identified below.



- The existing horizontal alignment of Egan Drive in the vicinity of Mendenhall Loop Road intersection has an undesirable broken-back arrangement of curves with a relative short tangent between the two curves in the same direction.
- The alignment of the southern leg of the signalized Egan Drive/Yandukin Drive intersection limits the visibility of the signal displays. Advance signals will be required to minimize confusion along this approach.
- The Riverside Drive extension impacts existing buildings (a residential house and church). The proposed alignment currently conforms to a design speed of approximately 35 miles per hour.
- The location of stop bars at intersections should be finalized during the next design stage to accommodate the turning swept paths of trucks.



LINK VOLUME COMPARISON

Table 1 presents a comparison of selected link volumes for each of the alternatives, derived from the traffic volume figures in this appendix. Link volumes are between intersections or interchanges and have been approximated where there are intermediate streets or driveways. Additional volumes can be derived from the traffic volume figures as needed.

TABLE 1: DESIGN YEAR LINK VOLUMES, A.M. PEAK HOUR

	Design Year A.M. Peak Hour Traffic Volumes (Bi-Directional)				
	No-build	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Egan Drive					
Industrial Blvd to Vintage Blvd	1620	1650	1650	1620	1630
Vintage Blvd to Riverside Dr	1265	540	540	470	1360
Riverside Dr to Mend. Loop Rd	1715	540	1160	470	1580
Mend. Loop to Glacier Hwy (Apt)	3010	2620	2510	2620	2820
Glacier Hwy (Apt) to Yandukin Dr	3185	2620	3150	2620	2950
Glacier Highway (North, Airport)					
Egan Dr to Sunset Dr/Riverside Dr	495	<100	<100	<100	250
Riverside Dr to Mend. Loop Rd	400	820	860	1040	650
Mend. Loop Rd to Shell Simmons	1230	2070	1550	1660	1470
Shell Simmons Dr to Jordan Ave	1200	1820	1500	1520	1440
Jordan Ave to Old Dairy Rd	1145	1820	1110	1050	1280
Old Dairy Rd to Egan Dr	1375	190	580	---	1100
Mendenhall Loop Road					
South of Egan Dr.	865	1190	970	820	840
Egan Dr to Mend. Mall Rd.	2310	1970	2190	2080	2230
Mend. Mall Rd. to James Blvd	2345	2070	2370	2130	2240
Riverside Drive					
South of Egan Dr	---	790	860	1040	600
Egan Dr to Vintage/Mend. Mall Rd	1110	1100	1080	1390	1080
Vintage/Mend. Mall Rd to James	1005	1100	920	1300	1040
James Boulevard					
East of Riverside Dr	80	120	110	90	120
West of Mend. Loop Rd	220	430	270	400	340
Lemon Spur Road/Glacier Hwy (Lemon Rd)					
Mend. Loop to Glacier Hwy (Apt)	---	290	---	---	210
Glacier Hwy (Airport) to Yandukin	40	180	150	---	210

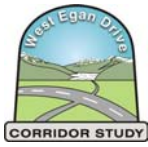
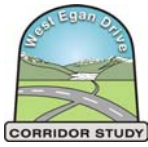


TABLE 2: DESIGN YEAR LINK VOLUMES, P.M. PEAK HOUR

	Design Year P.M. Peak Hour Traffic Volumes (Bi-Directional)				
	No-build	Alt. 1	Alt. 2	Alt. 3	Alt. 4
Egan Drive					
Industrial Blvd to Vintage Blvd	2695	2730	2720	2710	2710
Vintage Blvd to Riverside Dr	2585	650	650	440	2570
Riverside Dr to Mend. Loop Rd	2765	650	1930	440	2490
Mend. Loop to Glacier Hwy (Apt)	4455	3790	3540	3760	3900
Glacier Hwy (Apt) to Yandukin Dr	4835	3790	4650	3760	4260
Glacier Highway (North, Airport)					
Egan Dr to Sunset Dr/Riverside Dr	645	<100	<100	<100	220
Riverside Dr to Mend. Loop Rd	630	1450	1630	1880	1150
Mend. Loop Rd to Shell Simmons	2390	2860	2880	2860	2490
Shell Simmons Dr to Jordan Ave	2250	2500	2650	2480	2350
Jordan Ave to Old Dairy Rd	2000	1150	1590	1200	1570
Old Dairy Rd to Egan Dr	2370	390	1090	---	1590
Mendenhall Loop Road					
South of Egan Dr.	1540	1940	1440	1320	1550
Egan Dr to Mend. Mall Rd.	3260	2670	2950	2860	3050
Mend. Mall Rd. to James Blvd	3120	2470	2960	2780	2820
Riverside Drive					
South of Egan Dr	---	1450	1630	1900	1090
Egan Dr to Vintage/Mend. Mall Rd	1980	2100	2070	2300	1890
Vintage/Mend. Mall Rd to James	1680	1760	1670	2060	1590
James Boulevard					
East of Riverside Dr	120	410	240	250	320
West of Mend. Loop Rd	220	930	290	810	570
Lemon Spur Road/Glacier Hwy (Lemon Rd)					
Mend. Loop to Glacier Hwy (Apt)	---	650	---	---	900
Glacier Hwy (Airport) to Yandukin	515	440	430	---	900



Next Steps

At the next CAC meeting the results of this updated traffic operations analysis, and the refined evaluation will be discussed with the CAC. Based on CAC input, subsequent modifications, and revised analyses, ADOT&PF will select the alternative that represents the Department's Proposed Action. In addition, a phasing and implementation plan will be developed for the Department's Proposed Action. These will be discussed at a public event and final CAC to be held in spring 2003.



**FUTURE NO-BUILD TRAFFIC VOLUMES (YEAR 2025)
WEEKDAY AM PEAK HOUR**

West Egan Drive Corridor Study

Alaska Department of Transportation & Public Facilities



DATE
NOV 2002

FIGURE
1

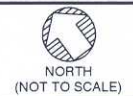
4978\DWGS\TASK-6\4978FIG1.DWG



**FUTURE NO-BUILD TRAFFIC VOLUMES (YEAR 2025)
WEEKDAY PM PEAK HOUR**

West Egan Drive Corridor Study

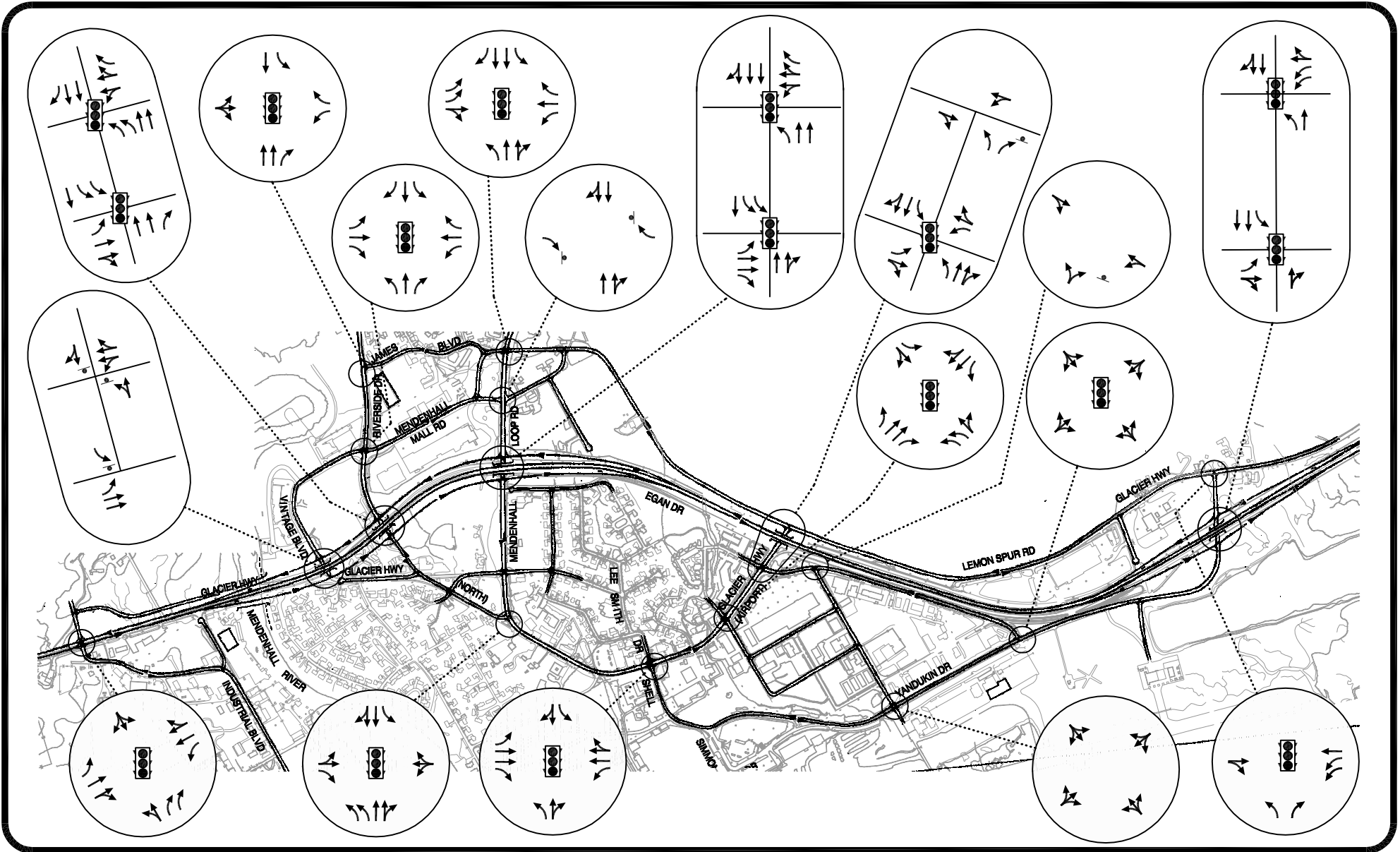
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DATE
NOV 2002

FIGURE
2

4978\DWGS\TASK-6\4978FIG2.DWG



MOST VIABLE ALTERNATIVES
ALTERNATIVE #1 - LANE CONFIGURATION AND TRAFFIC CONTROL DEVICES

West Egan Drive Corridor Study

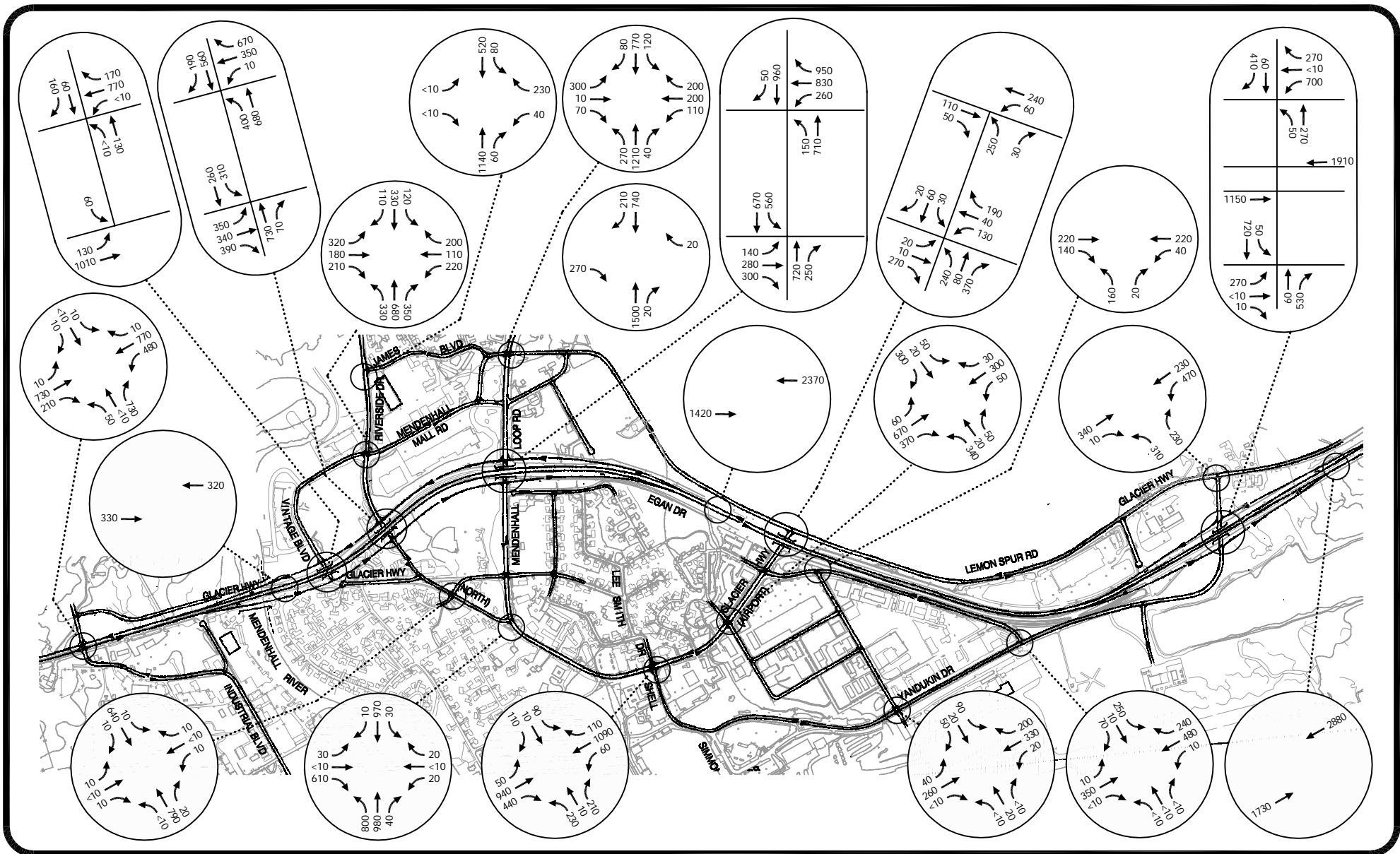
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FIGURE
3

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MOST VIABLE ALTERNATIVES ALTERNATIVE #1 - PM TRAFFIC VOLUMES

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FIGURE
5

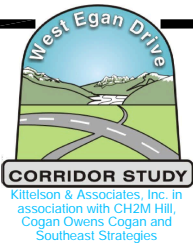
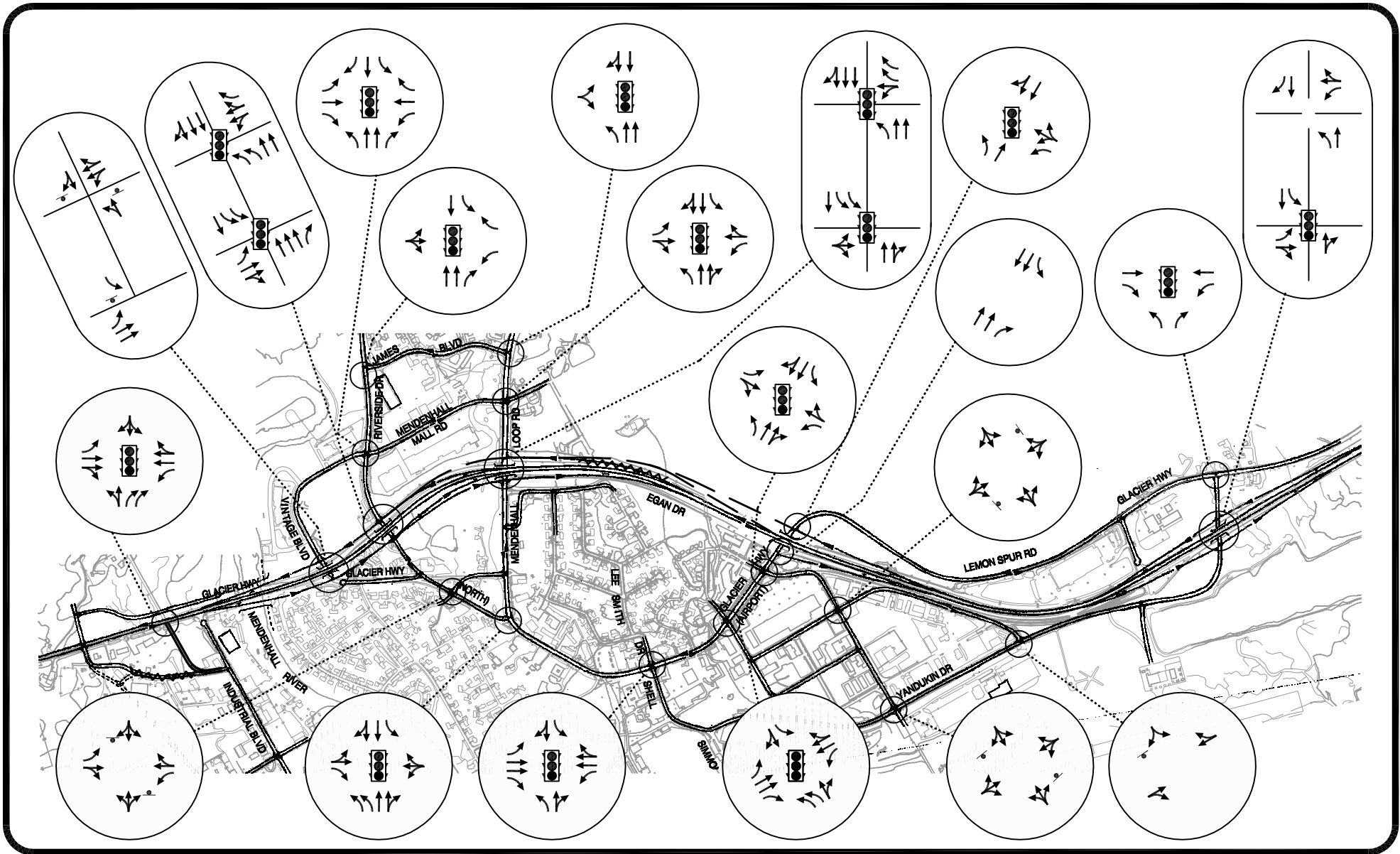
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TABLE 3: ALTERNATIVE 1 YEAR 2025 WEEKDAY OPERATIONS

Intersection (* = signalized)	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't
	AM Peak Hour				PM Peak Hour			
Glacier Hwy / Industrial Blvd*	B	0.61	16.0	-	B	0.75	18.7	-
Egan Dr / Vintage Blvd North Ramp	B	0.07	13.3	NB LT/TH	D	0.50	31.9	NB LT/TH
Egan Dr / Vintage Blvd South Ramp	B	0.03	10.8	SB LT	C	0.19	19.2	SB LT
Egan Dr / Riverside Dr North Ramp*	C	0.41	20.6	-	B	0.63	18.0	-
Egan Dr / Riverside Dr South Ramp*	C	0.43	20.8	-	C	0.64	30.2	-
Egan Dr / Mendenhall Loop Rd North Ramp*	B	0.56	19.6	-	C	0.89	29.9	-
Egan Dr / Mendenhall Loop Rd South Ramp*	B	0.72	14.7	-	C	0.78	27.2	-
Egan Dr / Yandukin Dr North Ramp*	B	0.21	13.7	-	B	0.44	13.9	-
Egan Dr / Yandukin Dr South Ramp*	A	0.54	8.8	-	A	0.63	9.0	-
Mendenhall Mall Rd / Vintage Blvd / Riverside Dr*	C	0.57	22.4	-	C	0.66	23.2	-
James Blvd. / Riverside Dr*	A	0.56	7.6	-	B	0.56	10.5	-
James Blvd / Mendenhall Loop Rd*	C	0.72	26.2	-	D	0.81	39.1	-
Mendenhall Mall Rd / Mendenhall Loop Rd	C	0.40	24.6	EB RT	C	0.50	18.3	EB RT
Glacier Hwy (North) / Del Rae Rd	C	0.04	16.0	EB LTR	D	0.10	31.6	EB LTR
Glacier Hwy (North)/Mendenhall Loop Rd Ext*	B	0.67	19.4	-	C	0.79	23.0	-
Glacier Hwy (Airport) / Berners Ave.	F	0.34	>50	NB LT	F	0.91	>50	NB LT
Glacier Hwy (Airport)/ Shell Simmons Dr.*	A	0.38	4.9	-	B	0.65	11.5	-
Glacier Hwy (Airport) / Jordan Ave.*	A	0.35	6.4	-	C	0.66	22.4	-
Glacier Hwy (Airport) / Old Dairy Rd./Trout St.*	B	0.56	16.7	-	C	0.42	21.2	-
Glacier Hwy (Airport) / Lemon Spur Rd	B	0.08	10.0	NB LT	C	0.49	18.6	NB LT
Old Dairy Rd / Crest St	B	0.10	10.4	NB LT/RT	C	0.37	16.9	NB LT/RT
Yandukin Dr / Old Dairy Rd*	B	0.46	13.9	-	C	0.81	20.9	-
Yandukin Dr / Crest Street	B	0.10	12.4	SB LTR	D	0.48	25.3	SB LTR
Glacier Hwy (Lemon Rd) / Lemon Spur Road*	B	0.39	17.8	-	C	0.64	20.4	-

¹ Averaged over all movements at signalized intersections; for critical movement only at unsignalized intersections
 NB = northbound, SB = southbound, EB = eastbound, WB = westbound
 LT = left, TH = through, RT = right; LTR = left/through/right
 LOS = Level of Service, V/C= volume-to-capacity ratio



MOST VIABLE ALTERNATIVES
ALTERNATIVE #2 - LANE CONFIGURATION AND TRAFFIC CONTROL DEVICES

West Egan Drive Corridor Study

Alaska Department of Transportation & Public Facilities



DATE
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FIGURE
6

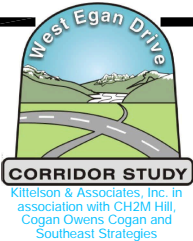
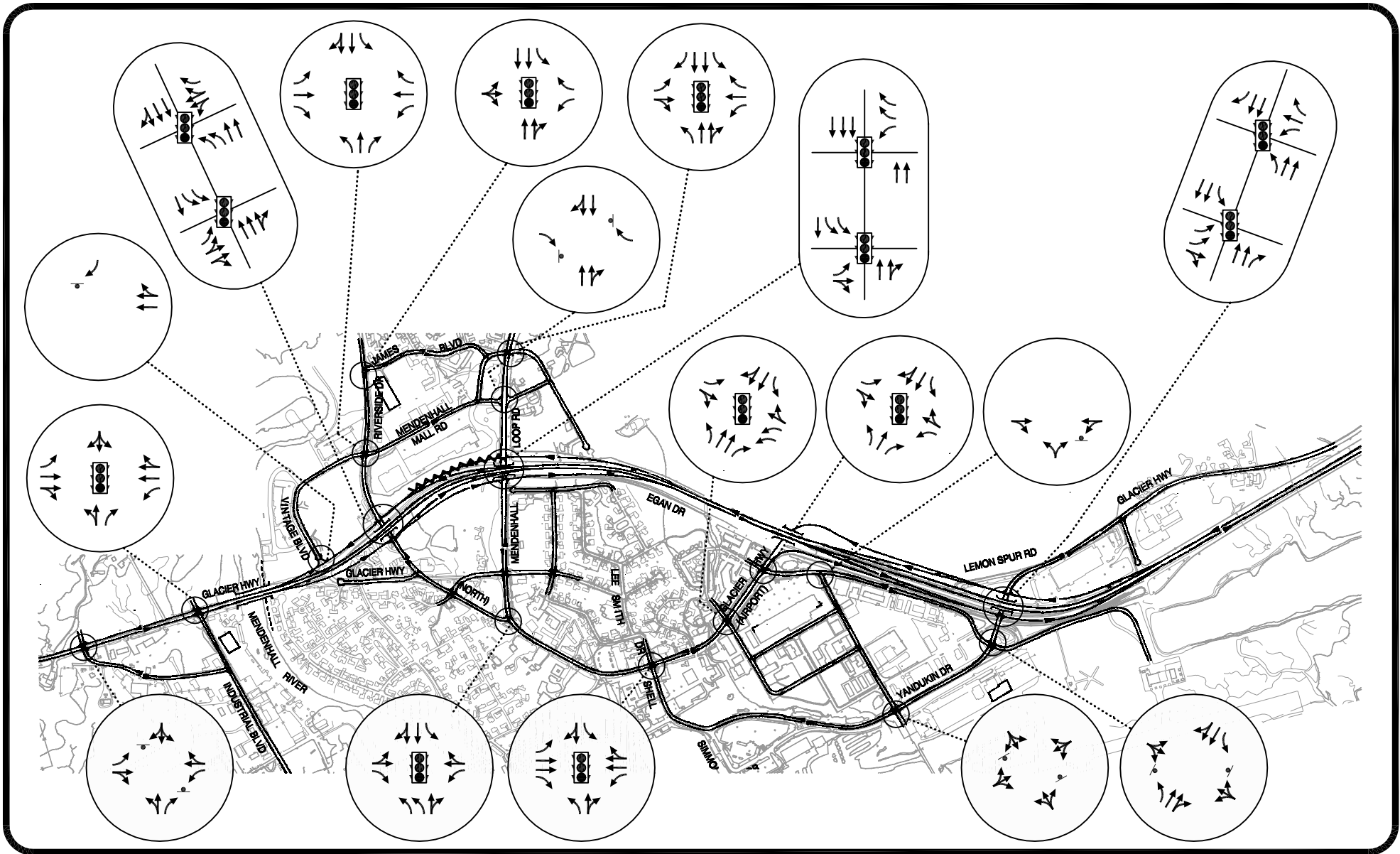
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TABLE 4: ALTERNATIVE 2 YEAR 2025 WEEKDAY OPERATIONS

Intersection (* = signalized)	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't
	AM Peak Hour				PM Peak Hour			
Glacier Hwy / Industrial Blvd*	C	0.59	24.7	-	C	0.76	22.4	-
Egan Dr / Vintage Blvd North Ramp	B	0.09	13.6	NB LT/TH	E	0.60	38.9	NB LT/TH
Egan Dr / Vintage Blvd South Ramp	B	0.03	11.0	SB LT	C	0.19	19.4	SB LT
Egan Dr / Riverside Dr North Ramp*	C	0.36	23.8	-	C	0.60	22.5	-
Egan Dr / Riverside Dr South Ramp*	B	0.42	19.0	-	C	0.62	25.2	-
Egan Dr / Mendenhall Loop Rd North Ramp*	B	0.59	16.9	-	C	0.92	29.8	-
Egan Dr / Mendenhall Loop Rd South Ramp*	B	0.69	13.0	-	C	0.73	28.7	-
Egan Dr / Glacier Highway (Airport) North Ramp*	B	0.19	13.6	-	B	0.73	17.8	-
Egan Dr / Glacier Highway (Airport) South Ramp	A	0.02	8.5	SB LT	A	0.03	10.0	SB LT
Egan Dr / Yandukin Dr North Ramp*	B	0.19	11.9	-	B	0.65	18.1	-
Egan Dr / Yandukin Dr South Ramp*	C	0.39	20.4	-	B	0.48	14.4	-
Mendenhall Mall Rd / Vintage Blvd / Riverside Dr*	C	0.53	23.4	-	C	0.62	26.3	-
James Blvd. / Riverside Dr*	A	0.46	6.0	-	A	0.48	6.4	-
James Blvd / Mendenhall Loop Rd*	A	0.75	9.2	-	A	0.67	3.5	-
Mendenhall Mall Rd / Mendenhall Loop Rd*	B	0.78	16.8	-	C	0.85	26.3	-
Glacier Hwy (North) / Del Rae Rd	C	0.05	16.9	EB LTR	E	0.14	42.7	WB LTR
Glacier Hwy (North)/Mendenhall Loop Rd Ext*	C	0.68	24.1	-	C	0.72	21.8	-
Glacier Hwy (Airport) / Berners Ave.	F	0.22	>50	NB LT	F	0.90	>50	NB LT
Glacier Hwy (Airport)/ Shell Simmons Dr.*	A	0.43	5.9	-	B	0.65	13.1	-
Glacier Hwy (Airport) / Jordan Ave.*	A	0.35	8.1	-	C	0.70	23.7	-
Glacier Hwy (Airport) / Old Dairy Rd./Trout St.*	B	0.53	11.2	-	B	0.61	15.5	-
Old Dairy Rd / Crest St	B	0.09	11.7	WB LTR	C	0.05	17.2	EB LTR
Yandukin Dr / Old Dairy Rd	B	0.17	11.3	SB LTR	C	0.54	21.6	SB LTR
Yandukin Dr / Crest Street	B	0.02	10.8	NB LTR	C	0.32	15.4	SB LTR
Glacier Hwy (Lemon Rd) / Lemon Spur Road*	C	0.32	28.3	-	C	0.75	29.0	-

¹ Averaged over all movements at signalized intersections; for critical movement only at unsignalized intersections
 NB = northbound, SB = southbound, EB = eastbound, WB = westbound
 LT = left, TH = through, RT = right; LTR = left/through/right
 LOS = Level of Service, V/C= volume-to-capacity ratio



MOST VIABLE ALTERNATIVES
ALTERNATIVE #3 - LANE CONFIGURATION AND TRAFFIC CONTROL DEVICES

West Egan Drive Corridor Study

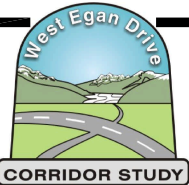
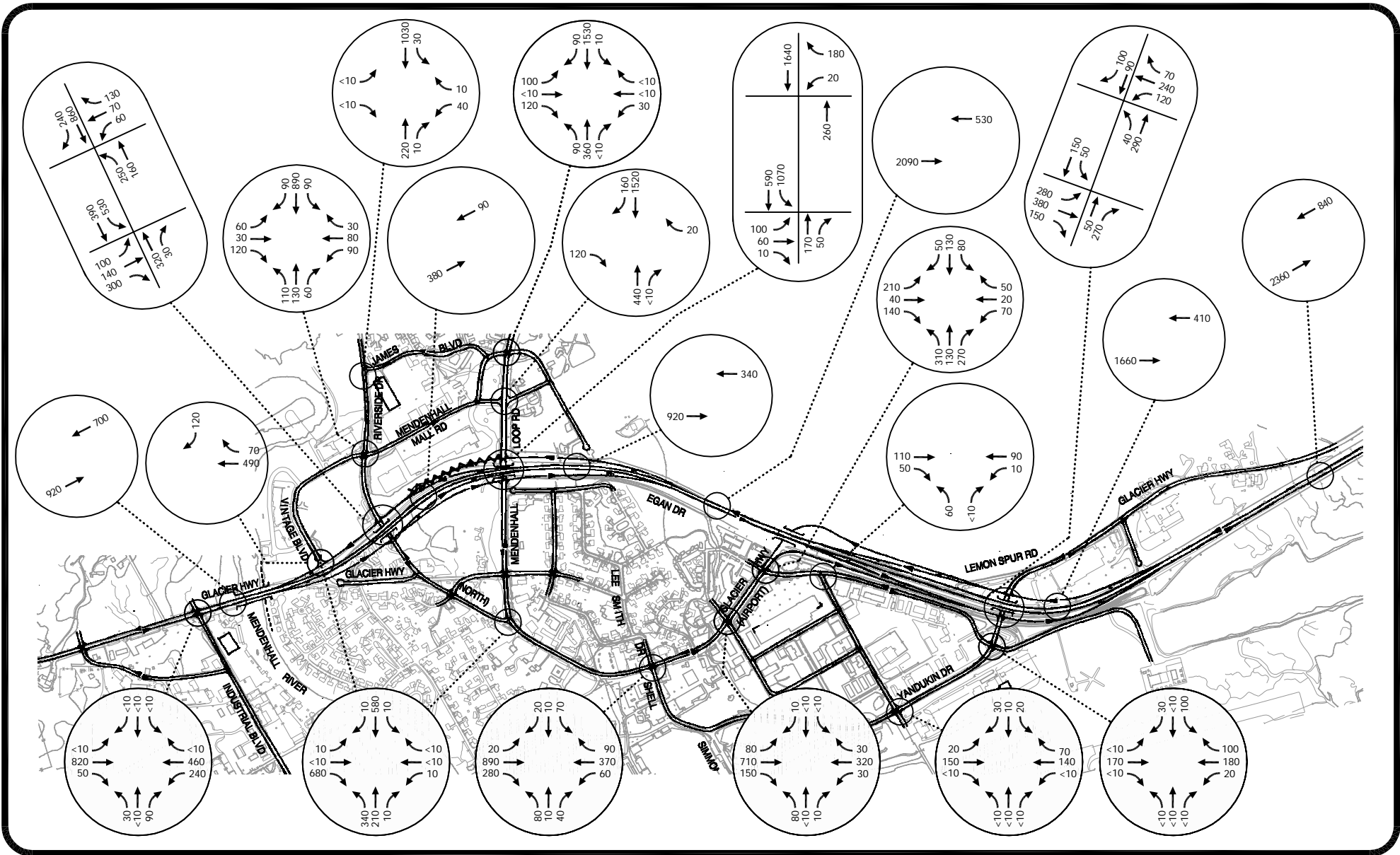
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FIGURE
 9

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MOST VIABLE ALTERNATIVES ALTERNATIVE #3 - AM TRAFFIC VOLUMES

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FIGURE
10

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TABLE 5: ALTERNATIVE 3 YEAR 2025 WEEKDAY OPERATIONS

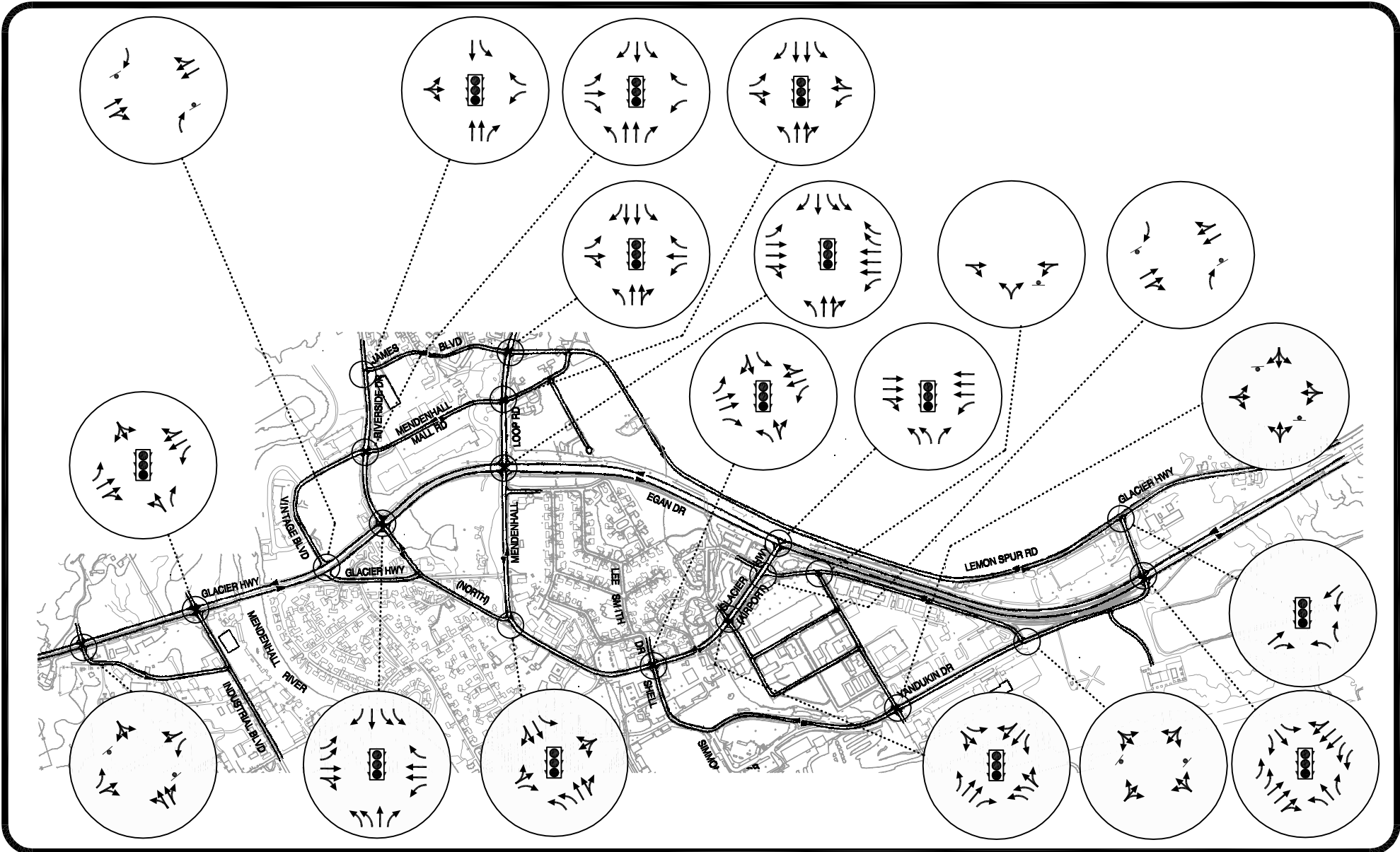
Intersection (* = signalized)	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't
	AM Peak Hour				PM Peak Hour			
Glacier Hwy / Jensine Street	F	0.32	>50	NB LT/TH	F	0.79	>50	NB LT/TH
Glacier Hwy / Industrial Blvd*	C	0.52	23.5	-	C	0.80	22.7	-
Egan Dr / Vintage Blvd North Ramp	B	0.19	11.5	SB RT	C	0.58	24.6	SB RT
Egan Dr / Riverside Dr North Ramp*	B	0.45	19.2	-	C	0.71	21.8	-
Egan Dr / Riverside Dr South Ramp*	B	0.48	19.0	-	C	0.74	28.8	-
Egan Dr / Mendenhall Loop Rd North Ramp*	A	0.46	6.1	-	B	0.69	18.2	-
Egan Dr / Mendenhall Loop Rd South Ramp*	B	0.57	18.2	-	C	0.63	25.2	-
Egan Dr / Yandukin Dr North Ramp*	B	0.26	13.8	-	C	0.83	20.0	-
Egan Dr / Yandukin Dr South Ramp*	B	0.58	16.6	-	B	0.56	15.8	-
Mendenhall Mall Rd / Vintage Blvd / Riverside Dr*	B	0.52	16.3	-	C	0.74	21.2	-
James Blvd. / Riverside Dr*	A	0.38	3.9	-	A	0.58	5.8	-
James Blvd / Mendenhall Loop Rd*	B	0.69	17.1	-	C	0.86	29.2	-
Mendenhall Mall Rd / Mendenhall Loop Rd	C	0.39	23.9	EB RT	C	0.44	17.5	EB RT
Glacier Hwy (North) / Del Rae Rd	C	0.06	19.7	EB LTR	F	0.20	>50	WB LTR
Glacier Hwy (North)/Mendenhall Loop Rd Ext*	C	0.71	22.5	-	B	0.75	19.5	-
Glacier Hwy (Airport) / Berners Ave.	F	0.30	>50	NB TH/RT	F	0.72	>50	NB LT
Glacier Hwy (Airport)/ Shell Simmons Dr.*	A	0.37	7.8	-	C	0.80	22.4	-
Glacier Hwy (Airport) / Jordan Ave.*	A	0.28	9.1	-	C	0.66	25.6	-
Glacier Hwy (Airport) / Old Dairy Rd./Trout St.*	B	0.51	17.9	-	B	0.47	18.7	-
Old Dairy Rd / Crest St	B	0.09	10.3	NB LT/RT	C	0.37	16.7	NB LT/RT
Yandukin Dr / Old Dairy Rd	B	0.08	10.5	SB LTR	D	0.62	28.7	SB LTR
Yandukin Dr / Crest Street	B	0.09	10.8	SB LTR	C	0.36	17.7	SB LTR

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

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

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

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



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MOST VIABLE ALTERNATIVES ALTERNATIVE #4 - LANE CONFIGURATION AND TRAFFIC CONTROL DEVICES

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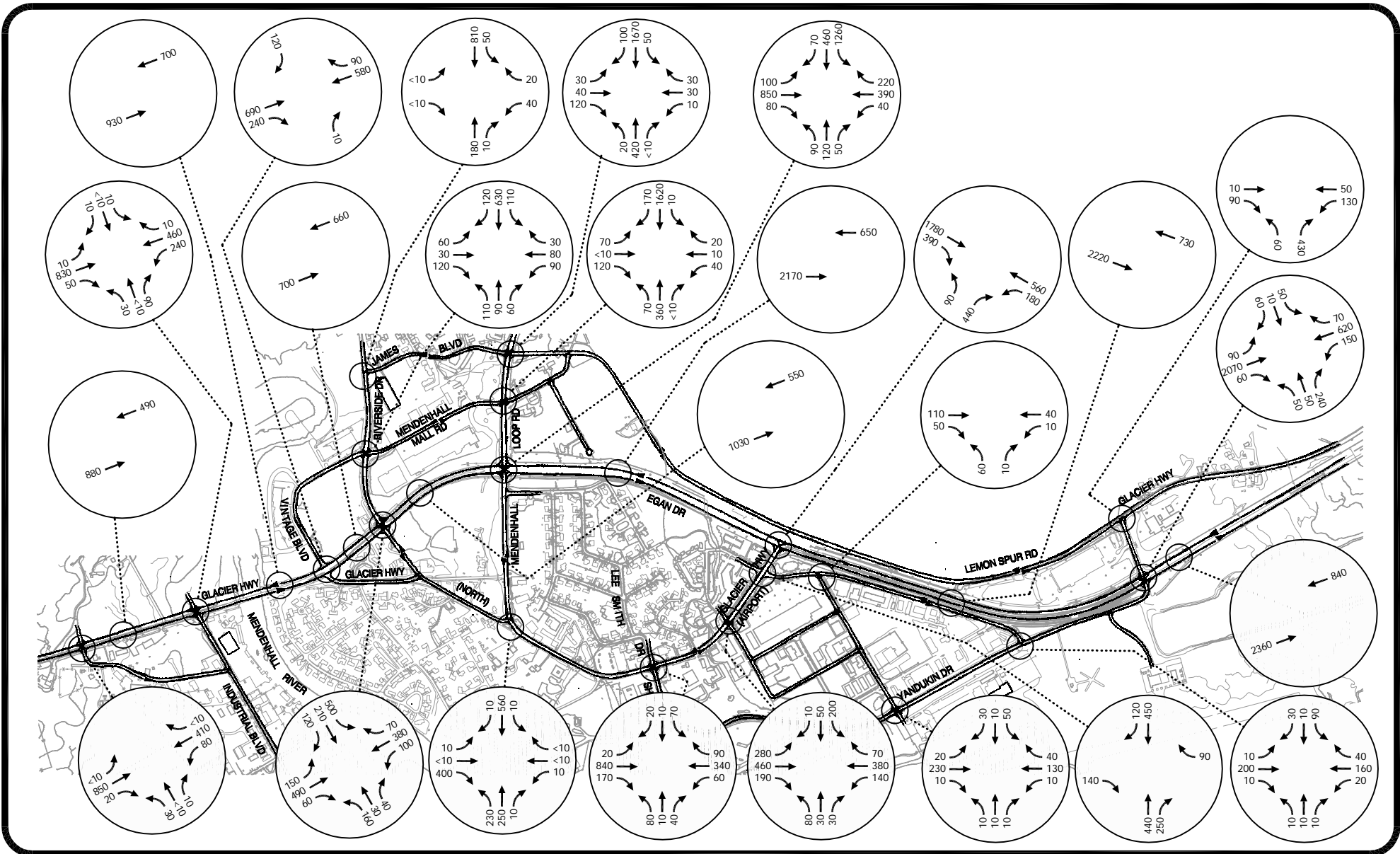
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FIGURE
12

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MOST VIABLE ALTERNATIVES ALTERNATIVE #4 - AM TRAFFIC VOLUMES

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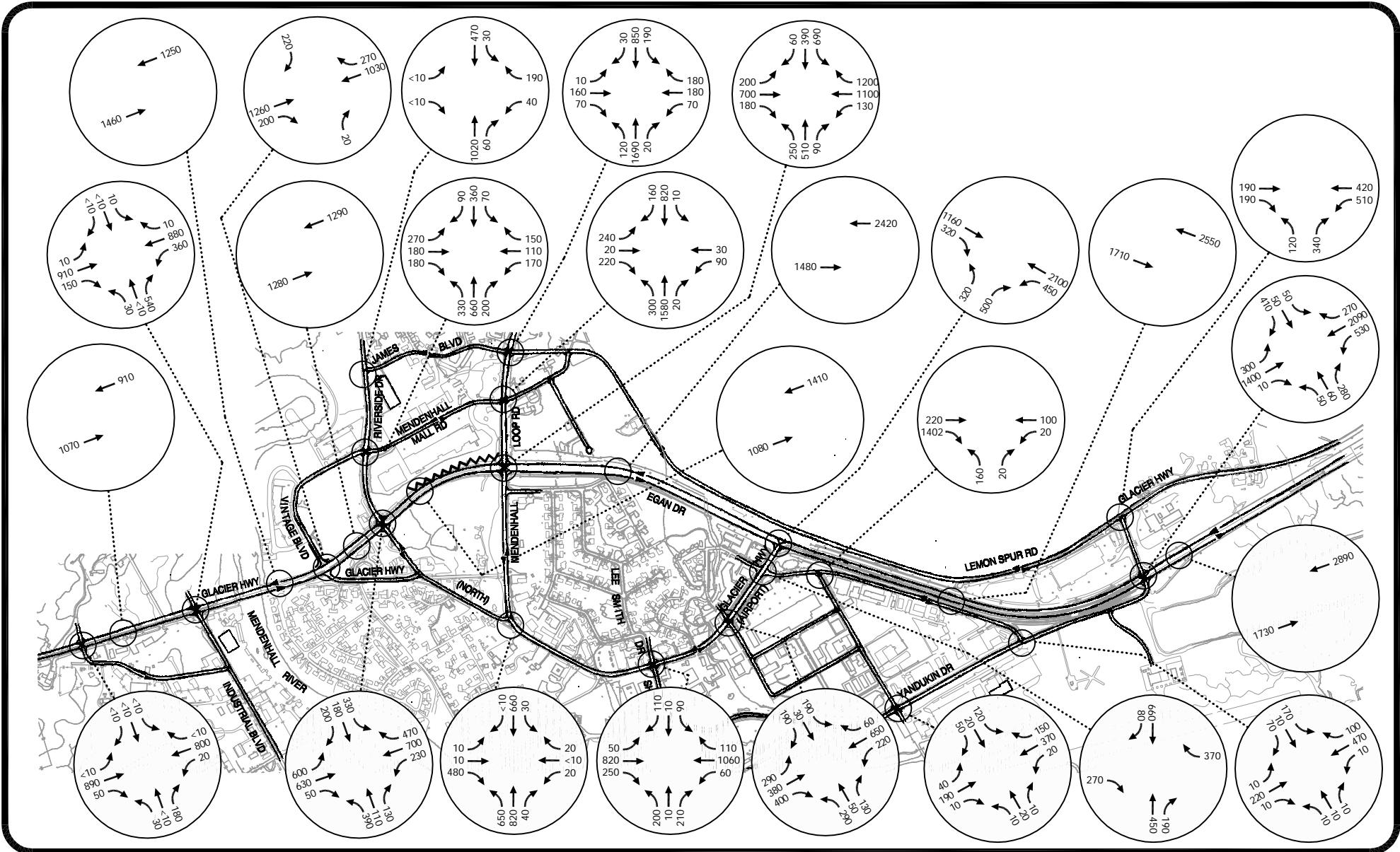
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FIGURE
13

4978IDWGSITASK-6A1T1-4_TRFU.DWG



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MOST VIABLE ALTERNATIVES ALTERNATIVE #4 - PM TRAFFIC VOLUMES

West Egan Drive Corridor Study

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FIGURE
14

4978DWGSITASK-6ALT1-4_TRFU.DWG



TABLE 6: ALTERNATIVE 4 YEAR 2025 WEEKDAY OPERATIONS

Intersection (* = signalized)	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't	LOS	V/C ¹	Control delay (sec/veh) ¹	Crit. Mov't
	AM Peak Hour				PM Peak Hour			
Glacier Hwy / Jensine Street	F	0.31	>50	NB LT/TH	F	0.75	>50	NB LT/TH
Glacier Hwy / Industrial Blvd*	C	0.49	22.2	-	C	0.75	29.8	-
Egan Dr / Vintage Blvd / Glacier Hwy North	B	0.18	11.7	SB RT	C	0.53	23.3	SB RT
Egan Dr / Riverside Dr*	D	0.51	38.8	-	E	0.74	62.3	-
Egan Dr / Mendenhall Loop Rd*	D	0.75	43.0	-	D	0.83	53.4	-
Egan Dr / Glacier Highway (Airport)*	C	0.85	25.4	-	B	0.80	19.5	-
Egan Dr / Yandukin Dr*	B	0.67	18.4	-	C	0.85	33.2	-
Mendenhall Mall Rd / Vintage Blvd / Riverside Dr*	C	0.67	21.9	-	C	0.67	20.6	-
James Blvd. / Riverside Dr*	A	0.56	5.5	-	A	0.50	8.8	-
James Blvd / Mendenhall Loop Rd*	B	0.72	12.2	-	D	0.89	35.2	-
Mendenhall Mall Rd / Mendenhall Loop Rd*	B	0.80	17.3	-	C	0.84	29.0	-
Glacier Hwy (North) / Riverside Extension (Sunset Dr)	B	0.25	12.1	EB LT/RT	C	0.34	17.0	EB LT/RT
Glacier Hwy (North)/Mendenhall Loop Rd Ext*	C	0.49	22.0	-	B	0.57	18.6	-
Glacier Hwy (Airport) / Berners Ave.	E	0.17	40.9	NB LT	F	0.41	>50	NB LT
Glacier Hwy (Airport)/ Shell Simmons Dr.*	A	0.35	6.0	-	B	0.61	11.0	-
Glacier Hwy (Airport) / Jordan Ave.*	C	0.52	22.1	-	D	0.70	37.5	-
Glacier Hwy (Airport) / Old Dairy Rd./Trout St.	B	0.20	11.3	EB RT	C	0.55	16.6	WB RT
Old Dairy Rd / Crest St	A	0.09	9.9	NB LT/RT	B	0.31	13.8	NB LT/RT
Yandukin Dr / Old Dairy Rd	B	0.23	13.4	SB LTR	D	0.69	34.6	SB LTR
Yandukin Dr / Crest Street	B	0.16	12.4	SB LTR	D	0.57	29.4	SB LTR
Glacier Hwy (Lemon Rd) / Lemon Spur Road*	B	0.42	19.5	-	C	0.64	23.7	-

¹ Averaged over all movements at signalized intersections; for critical movement only at unsignalized intersections
 NB = northbound, SB = southbound, EB = eastbound, WB = westbound
 LT = left, TH = through, RT = right; LTR = left/through/right
 LOS = Level of Service, V/C= volume-to-capacity ratio