APPENDIX G

Level 1 Screening Results White Paper

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Juneau – Egan Drive and Yandukin Drive Intersection Improvements

IRIS Program No. SFHWY00079
Federal Project No. 0003208

Level 1 Screening Results White Paper

March 2021

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Table of Contents

Figures

Tables

Figures for Appendices

Tables for Appendices

Abbreviations

CBJ	City and Borough of Juneau
CLS	Closures
CMF	Crash Modification Factor
DOT&PF	Alaska Department of Transportation and Public Facilities
E-Y	Egan Drive at Yandukin Drive/Glacier-Lemon Road
ELE	Compatible Design Elements
FHWA	Federal Highway Administration
HSIP	Highway Safety Improvement Program
INT	Intersections
ITS	Intelligent Transportation System
OVP	Interchanges/Overpasses
PEL	Planning and Environmental Linkage
ROW	Right-of-way
SEO	Statewide Environmental Office
TDM	Traffic Demand Management
v/c	Volume-to-capacity Ratio

Executive Summary

The 15 build alternatives for the Egan Drive at Yandukin Drive/Glacier-Lemon Road (E-Y) Intersection Planning and Environmental Linkage (PEL) Study were developed and, in combination with compatible design elements, were analyzed using the Level 1 screening criteria for this study.

Table 1 summarizes the alternative combinations used to determine which alternatives would progress to Level 2. As most of the alternatives did not meet all of the baseline purpose and needs by themselves, compatible elements were added to help meet the baseline needs.

Five alternatives are recommended to be advanced to Level 2 screening:

- **INT-1, ELE-4, ELE-7:** Highway Safety Improvement Program (HSIP) Interim Action with Median Crossovers and a Grade Separated Pedestrian Crossing
- **INT-2, ELE-4:** Partial Access Signalized Intersection with Median Crossovers
- **INT-3, ELE-4:** Full Access Signalized Intersection with Median Crossovers
- **INT-6:** Two Signalized T-intersections
- **OVP-2, ELE-5:** Diamond Interchange with Two-way Frontage Road to Glacier-Nugget

Section 3, Screening Results, provides the reasons alternatives were advanced or dismissed. Note that vehicle safety (crash frequency and severity) metric scores were given a weighting of 2, while the rest of the metric scores were given a weighting of 1.

Table 1: Executive Summary Comparison of Level 1 Alternative Combinations

Alternative Number	Alternative Name	**Baseline Purpose and Need Metrics** – Do alternatives meet the project Purpose and Need?					**Other Considerations (Level 1 Qualitative Metrics)** – How do alternatives compare to the current intersection?								Score
		Purpose & Need >>	**Primary** *Alternative must score positive in one or more metrics to advance*			**Secondary**	**Other Considerations**								
			Safety			Alternate driving routes	Non-motorized accessibility	Economic growth			Environmental			Traffic operations	Cost	
		Metric >>	Crash frequency	Crash severity	Bicycles and pedestrians	Crash delay	Accessibility comfort	Land use plans	Business visibility	Business access	Wetland (Sec. 404) permit	Protected lands	Right-of-way (ROW) impact	Peak hour delay	Cost range	
Current Intersection Configuration																
No Build	Current Condition	Same conflicts	Same conflicts	No change	Same route	Same	Inconsistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Stays within the existing ROW	Same delay	Low	
Top Scoring Alternatives – Will Continue to Further Screening																
INT-1, ELE-4, ELE-7	HSIP Interim Action	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	Same delay	Medium	**9**
INT-2, ELE-4	Partial Access Signalized Intersection	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Stays within the existing ROW	More delay	Medium	**9**
INT-3, ELE-4	Full Access Signalized Intersection	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	More accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	More delay	Medium	**9**
INT-6	Two Signalized T-Intersections	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	More accessible	No jurisdictional wetlands impact	No use	Substantial ROW needed	More delay	Medium	**8**
OVP-2, ELE-5	Diamond Interchange	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Consistent with adopted land use plans	Less visible	More accessible	Individual permit	No use	Substantial ROW needed	Less delay	High	**8**

Table 1: Executive Summary Comparison of Level 1 Alternative Combinations, continued

Alternative Number	Alternative Name	**Baseline Purpose and Need Metrics** – Do alternatives meet the project Purpose and Need?						**Other Considerations (Level 1 Qualitative Metrics)** – How do alternatives compare to the current intersection?								Score
		Purpose & Need >>	**Primary** *Alternative must score positive in one or more metrics to advance*			**Secondary**		**Other Considerations**								
			Safety			Alternate driving routes	Non-motorized accessibility	Economic growth			Environmental			Traffic operations	Cost	
		Metric >>	Crash frequency	Crash severity	Bicycles and pedestrians	Crash delay	Accessibility comfort	Land use plans	Business visibility	Business access	Wetland (Sec. 404) permit	Protected lands	Right-of-way (ROW) impact	Peak hour delay	Cost range	
Lower Scoring Alternatives – No Further Screening																
CLS-1, ELE-5, ELE-7	SB Left Closure at E-Y and 2-Way Frontage Road to Nugget	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW needed	More delay	Medium	**6**
CLS-2, ELE-5, ELE-7	Median Closure at E-Y and 2-Way Frontage Road to Nugget	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW needed	More delay	Medium	**6**
CLS-3, ELE-5, ELE-7	Median Closure at E-Y, Interchange at Nugget	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Consistent with adopted land use plans	Less visible	Equally accessible	Individual permit	No use	Substantial ROW needed	Less delay	High	**7**
INT-4, ELE-4, ELE-7	Move Signalized Intersection from Nugget to E-Y	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Partially consistent with adopted land use plans	Equally visible	Less accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	More delay	Medium	**7**
INT-5, ELE-5	Roundabout Intersection	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Consistent with adopted land use plans	Equally visible	More accessible	Individual permit	No use	Substantial ROW needed	More delay	High	**7**
INT-7 (signal), ELE-4	Relocate Intersection to Southeast of Church with Signal	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Partially consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW needed	More delay	Medium	**5**
INT-8, ELE-4	Diverted Left Turn or Continuous Flow Intersection	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Partially consistent with adopted land use plans	Equally visible	More accessible	Individual permit	No use	Substantial ROW needed	More delay	High	**6**
INT-9	Diverging Diamond Intersection Pair	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Partially consistent with adopted land use plans	Equally visible	Less accessible	Individual permit	No use	Substantial ROW needed	More delay	High	**4**
OVP-1, ELE-4	Single Point Urban Interchange	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Partially consistent with adopted land use plans	Less visible	More accessible	Individual permit	No use	Substantial ROW needed	Less delay	High	**7**
OVP-3, ELE-5	Split Diamond Interchange Pair	Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable		Consistent with adopted land use plans	Less visible	More accessible	Individual permit	No use	Substantial ROW needed	Less delay	High	**8**

1 Introduction

Fifteen build alternatives and seven compatible elements were developed and analyzed using the identified Level 1 screening criteria for the E-Y Intersection PEL Study. The alternatives were grouped by compatible design elements (ELE) and alternative types: closures (CLS), intersections (INT), and interchanges/overpasses (OVP).

The alternatives development and evaluation process used for this PEL Study included:

- **Develop the project purpose and need.** Purpose and need was presented to the Community Focus Group and the Agency Working Group. Input was received from the community, agencies, and the Alaska Department of Transportation and Public Facilities (DOT&PF) Statewide Environmental Office (SEO) (which is serving in the role as lead federal agency), and the purpose and need statement was modified accordingly. The DOT&PF SEO has agreed to the purpose and need statement included in Appendix A of this document.
- **Develop a range of possible alternatives.**
- **Incorporate input requested and received.** Input was requested and received from the general public, Community Focus Group (November 5, 2019, and July 1, 2020), and Agency Working Group (November 5, 2019, and June 30, 2020). This input was incorporated into the range of alternatives.
- **Pre-screen the range of alternatives to eliminate those with fatal flaws.** Prescreening of alternatives is documented in a white paper dated July 27, 2020.
- **Develop Level 1 screening criteria.** Level 1 screening criteria was presented to the Community Focus Group on July 1, 2020 and the Agency Working Group on June 30, 2020.
- **Develop the fifteen build alternatives and seven compatible elements.** This information was presented to the Community Focus Group on July 1, 2020, and the Agency Working Group on June 30, 2020. Subsequent to this step, minor refinements were made in the alternatives. These refinements include adding compatible elements to some alternatives so they would better meet the project purpose and need. The refined alternatives were presented to the Community Focus Group on August 21, 2020, and to the Agency Working Group on August 22, 2020. These alternatives were also presented to the general public at an open house on October 16, 2020.
- **Conduct initial screening of these alternatives.** This information was also presented to the Community Focus Group on August 21, 2020, and the Agency Working Group on August 22, 2020.

This white paper documents the Level 1 screening criteria used (i.e., how they were developed, what they are, and background information for each), the description of the 15 build alternatives and the 7 compatible elements, and the screening results for the alternatives and compatible elements under the Level 1 screening criteria.

Table 2 presents the criteria used. The Level 1 screening ranked how well each alternative met the project's purpose and need compared to the No Build alternative by evaluating safety, alternate driving routes, and non-motorized accessibility. Other factors considered in the evaluation included additional project goals and impacts to the environment and socio-economic values. Based on this analysis,

5 alternatives with the appropriate compatible elements are proposed to be advanced to Level 2 screening, while 10 alternatives will not be carried forward.

The information in this white paper is intended to be used in a subsequent National Environmental Policy Act process. It provides critical planning analysis, consistent with 23 U.S. Code 168 (Integration of Planning and Environmental Review; for preliminary screening and elimination of alternatives) and 23 Code of Federal Regulations 450 (Planning Assistance and Standards).

Table 2: Level 1 Screening Criteria

Purpose	Need	Metric	Explanation of Metrics
Baseline Purpose and Need Metrics			
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Comparison of the crash potential between this alternative and the No Build alternative based on Alaska or national experience with similar treatments.
		Crash severity	Comparison of the crash severity between this alternative and the No Build alternative based on Alaska or national experience with similar treatments.
		Bicycles and pedestrians	Comparison of the number of conflicts between pedestrians and vehicles based on Alaska or national experience with similar treatments.
Secondary	Alternate driving routes	Crash delay	Description of whether the alternative provides an alternate route when there is a crash on Egan Drive. Alternatives that provide relief to congestion when there is a crash, but do not provide a new route, show "some improvement."
	Non-motorized accessibility	Accessibility comfort	Comparison of the difficulty and comfort level pedestrians and bicyclists experience in traveling from residences/businesses on one side of Egan Drive to those on the other side between this alternative and the No Build alternative.
Other Considerations (Level 1 Qualitative Metrics)			
	Economic growth	Land use plans	Description of how this alternative is consistent or not consistent with adopted City and Borough of Juneau land use plans.
		Business visibility	Description of how the alternative's design features will introduce elements (such as bridge abutments) that will affect the adjacent businesses' visibility to drivers.
		Business access	Description of any effects the alternative has on driveway access to adjacent businesses or travel distance to reach adjacent businesses.
	Environmental	Wetland (Sec. 404) permit	Assessment of whether the alternative will likely require a permit from U.S. Army Corps of Engineers and, if so, the type of permit. This is used as a surrogate for the amount of wetland or stream impacts anticipated.
		Protected lands	Assessment of whether the alternative may use Section 4(f) protected lands.
		Right-of-way (ROW) impact	Description of the amount of ROW acquisition the alternative will require (if any).
	Traffic operations	Peak hour delay	Comparison of the delay in the morning or evening peak period between this alternative and the No Build alternative.
	Cost	Cost range	Estimate of the construction cost for this alternative. High cost alternatives are similar to a grade-separated interchange, such as at Sunny Point. A project that only requires changes to pavement marking and signs is an example of a low-cost alternative.

2 Development of Level 1 Screening Criteria

The primary purpose of the Level 1 screening was to determine which of the alternatives best met the project purpose and need, but also had impacts to environmental, social, or economic resources that were acceptable or could be adequately mitigated. Table 2 documents the Level 1 screening criteria HDR and Kinney Engineering staff initially developed these screening criteria, and the Project Team, which includes approximately 12 multi-discipline members of the DOT&PF, including representatives of SEO, reviewed and modified these criteria as needed. These criteria were then presented to the Community Focus Group and Agency Working Group in June 2020. Comments received from those groups were incorporated into the criteria.

2.1 Screening Methodology

The screening methodology was developed to follow the basic structure of the purpose and need statement (Appendix A). There were baseline purpose and need elements and additional goals. The following subsections reflect that structure.

2.1.1 Safety

Crash frequency was ranked based on crash modification factors (CMFs) and engineering judgment. An alternative was considered to have fewer conflicts between vehicles if CMF values indicate a crash frequency was likely to drop, engineering experience suggests a CMF for a similar alternative could apply to an alternative, or engineering experience suggests an overall crash frequency would drop even though no CMF was found. CMFs were researched for similar types of treatments and used in this evaluation. These are found in Appendix B.

Crash severity was ranked in a similar manner to crash frequency using CMFs and engineering judgment. An alternative was considered to have fewer severe conflicts between vehicles if CMF values indicate a crash severity to drop, engineering experience suggests a CMF for a similar alternative could apply to an alternative, or engineering experience suggests overall crash severity would drop even though no CMF was found.

Bicycle and pedestrian safety was evaluated based on conflicts between pedestrians/bicycles and vehicles. Currently, a pedestrian crossing is not provided at Yandukin Drive for non-motorized users to cross Egan Drive. An alternative was considered to have fewer conflicts between pedestrian/bicycle modes and vehicles if a pedestrian crossing was provided.

2.1.2 Alternate Driving Routes

The Level 1 screening reviewed whether an alternative provided an alternate route for vehicles to bypass a crash. ELE-4 Median Crossover was developed to meet the need of an alternate route without the added impacts and costs of a new roadway (ELE-5 Frontage Road to Glacier-Nugget). Alternatives with ELE-4 were ranked as providing additional connectivity (an alternate route) during a crash.

Note that reducing crash frequency and crash severity will increase the reliability of the road as users will spend less time in traffic congestion caused by a crash if there are fewer crashes. However, an improvement was not indicated in this metric unless an alternative helped provide a way to bypass a crash while crash clean-up is occurring.

2.1.3 Non-motorized accessibility

Non-motorized accessibility was ranked based on how comfortable and difficult it would be for pedestrians and bicycles to cross Egan Drive. Currently, pedestrians and bicycles are prohibited from crossing at the E-Y intersection, and those doing so are crossing high-speed, unsignalized traffic. An alternative was considered to be less difficult or more comfortable if a signalized or grade-separated pedestrian crossing was provided.

2.1.4 Economic Growth

Land use plans were reviewed for action items relevant to this project. Four action items from adopted City and Borough of Juneau (CBJ) land use plans were identified:

1. Lemon Creek Area Plan action item: Advocate for improvements to the Fred Meyer and Egan Drive intersection (the E-Y intersection).
2. Lemon Creek Area Plan action item: Advocate for the extension of Glacier Highway to Egan Drive at the Glacier-Nugget intersection.
3. CBJ Comprehensive Plan Implementing Action 8.8-IA12: Provide sidewalk and bicycle paths or lanes.
4. CBJ Comprehensive Plan Implementing Action 8.8-IA13: Work with DOT&PF to provide a secondary route to Egan Drive where no alternative route currently exists. In particular, support the construction of an extension of Glacier Highway from its current dead-end north of Fred Meyer to the intersection of Glacier Highway and Egan Drive at McDonald's and the Nugget Mall.

An alternative was considered partially consistent if it provides for at least one of the action items and consistent if it meets all four action items. All alternatives were considered to be consistent with Action Item 1, to improve the E-Y intersection, and with Action Item 3, to provide sidewalk and bicycle paths or lanes.

Business visibility was ranked based on whether an alternative would obstruct the view of businesses currently visible along Egan Drive. *Business access* was ranked based on how access changes with the alternatives, such as adding or restricting movements.

2.1.5 Environmental

Level 1 analysis focused on impacts to resources that are protected by federal laws. Potential *wetland impacts* were based on a desktop analysis of probable wetland impacts (taken from aerial photography review of the project site) and what type of U.S. Army Corps of Engineers Section 404 permit would likely be needed. This provides an indication of the magnitude of the impact.

Protected lands was scored based on a review of likely Section 4(f) impacts. Section 4(f) of the Department of Transportation Act protects publicly owned parks or recreational lands, historic properties, and wildlife refuges. The Project Team reviewed the land uses in the study area and prepared a memorandum that documents those, with an analysis of the likelihood for a Section 4(f) use. There are Section 4(f) properties in the study area (trails and historic properties) but the current analysis shows the Level 1 alternatives are unlikely to result in a Section 4(f) use. This information has been reviewed by the DOT&PF SEO and accepted on December 3, 2020.

Right-of-way (ROW) impacts were reviewed qualitatively based on how much ROW acquisition an alternative would likely require, if any.

2.1.6 Traffic Operations

AM and PM peak hour volume-to-capacity (v/c) ratios were estimated for the 2040 design year using the Federal Highway Administration (FHWA) Capacity Analysis for Planning of Junctions Tool at the Glacier-Nugget and E-Y intersections. The maximum v/c ratio for each alternative was compared to the corresponding peak hour v/c ratio experienced with the No Build alternative to estimate if the alternative would increase, decrease, or have similar delay.

The v/c ratios calculated and the difference from the No Build condition is presented in Appendix C.

2.1.7 Cost

Costs were estimated qualitatively, ranging from low costs (installing signs and striping only) to high costs (comparable to interchanges, with higher cost elements such as bridges or walls).

2.2 Description of Level 1 Alternatives

The Level 1 alternatives were designed to meet the project purpose and need elements. In addition, it was assumed that pedestrian and bicycle facilities would be included in each design and would comply with the Americans with Disabilities Act. It was also assumed signals would only be installed where they are warranted.

In drawing diagrams for each alternative, comparisons to other existing facilities with similar context to the E-Y intersection were made to determine the footprint size. It was assumed business access would be similar to existing facilities and no additional modes of transit, such as a light rail, would be added. It was also assumed that bus stops would be relocated or rebuilt if existing bus stops would be impacted by an alternative.

DOT&PF Southcoast forecasts a 0.25 percent growth rate per year for the region. The PEL Study used these growth rate factors. Freight traffic volumes and bus trips were assumed to remain similar to existing. Travel demand for the 2040 design year specific to each alternative will be forecasted in the Level 2 screening step of the process.

3 Screening Results

This section presents the alternative combinations used to determine which alternatives would proceed to Level 2 screening. Cost was not used as a deciding factor in choosing which alternatives would advance.

The alternatives were screened and ranked against the Level 1 criteria. Although all alternatives met the vehicle safety needs, most of the alternatives alone did not meet all of the baseline purpose and need elements. Compatible elements were then included with each alternative to create combinations that met all of the baseline needs. If it were possible to add more than one compatible element to meet the same need, the element that met the needs with the least amount of impacts was included.

ELE-1: Traffic Demand Management (TDM), ELE-2: Intelligent Transportation Systems (ITS), and ELE-3: Flashing Intersection Ahead or Signal Ahead Signs were assumed to be included in all the alternatives, when compatible. However, they were not included in the screening because none of them changed the screening results. They all help meet the project purpose and need, but do not meet them on their own.

The following subsections present the Level 1 screening results for the alternatives, after elements were combined to meet baseline purpose and needs. Appendix D summarizes the results of all the different alternative combinations screened for Level 1. Appendix E describes the elements and how they were ranked individually.

3.1 No Build

The No Build alternative maintains the existing E-Y intersection configuration without any changes (Figure 1). The No Build alternative was screened to compare results with the build alternatives.

Table 3 presents the screening results for the No Build alternative.

<Click here to return to Table of Contents>

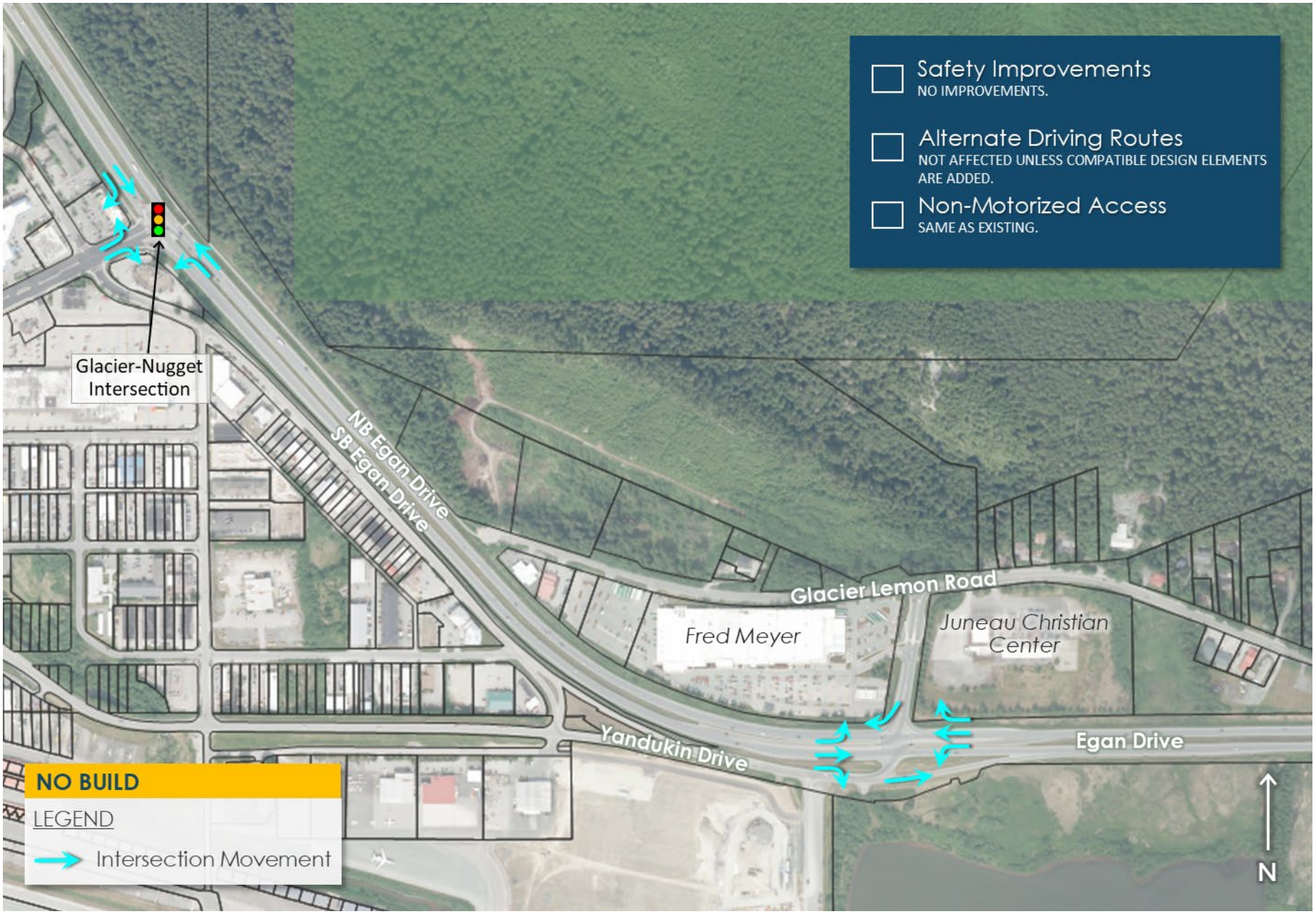

Figure 1: No Build Diagram

Table 3: No Build Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Same conflicts	There are no changes in crashes.
		Crash severity	Same conflicts	There are no changes to crash severity.
		Bicycles and pedestrians	No change	There are no changes to pedestrian and bicycle conflicts.
Secondary	Alternate driving routes	Crash delay	Same as now	No changes would be made at the intersection.
	Non-motorized accessibility	Accessibility comfort	Same	No changes would be made at the intersection.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Inconsistent with adopted land use plans	Does not implement CBJ Comprehensive Plan or Lemon Creek Area Plan recommendations.
		Business visibility	Equally visible	No changes would be made at the intersection.
		Business access	Equally accessible	No changes would be made at the intersection.
	Environmental	Wetlands (Sec. 404) permit	No jurisdictional wetlands impact	No change, no need for permit.
		Protected lands	No use	No use of Section 4(f) protected resources.
		Right-of-way (ROW) impact	Stays within the existing ROW	No changes would be made at the intersection.
	Traffic operations	Peak hour delay	Same delay	No changes to v/c ratio with the No Build alternative.
	Cost	Cost range	Low	No construction cost associated with the No Build alternative.

3.2 Top Scoring Alternatives (Recommended to be Advanced)

3.2.1 INT-1, ELE-4, ELE-7. HSIP Interim Action

This alternative, shown in Figure 2, would implement the recommended interim action measures proposed in the HSIP nomination for the E-Y intersection, which include:

- Reducing the speed limit on Egan Drive from 55 to 45 miles per hour during winter near the E-Y and Glacier-Nugget intersections
- Installing left-turn median striping with recessed pavement markers
- Installing an offset, northbound, right-turn lane with recessed pavement markers

Two compatible elements were added to the proposed interim action to meet all project baseline needs, which will make the alternative a more permanent solution. To meet the need for an alternate driving route during a crash, ELE-4 (Median Crossover) was added to the alternative. ELE-7 (Grade Separated Pedestrian Crossing) for the E-Y intersection was also added to meet bicycle/pedestrian safety and non-motorized accessibility comfort needs.

This alternative was developed as a low-cost measure to reduce crashes at the E-Y intersection. Adding the grade-separated pedestrian crossing to meet the baseline needs increases the impacts in terms of ROW and cost.

Table 4 presents the screening results for the combined INT-1, ELE-4, ELE-7 alternative.

This alternative was advanced because it ranked as one of the highest and meets baseline purpose and need with minimal ROW needed and no wetland impacts.

<Click here to return to Table of Contents>

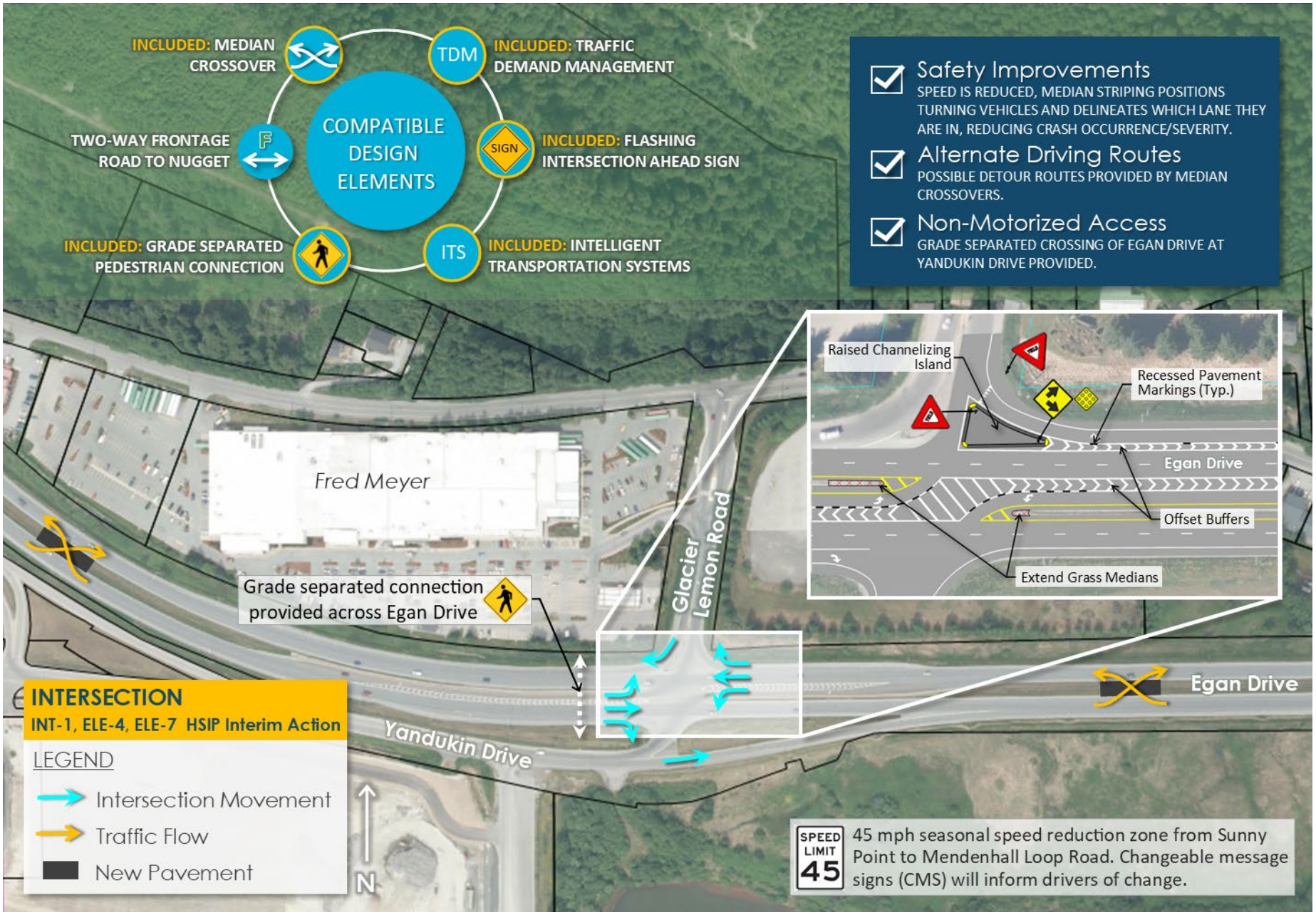

Figure 2: INT-1, ELE-4, ELE-7 Diagram

Table 4: INT-1 with ELE-4 and ELE-7 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for improving the channelized right-turn lane angle reduces crashes.
		Crash severity	Fewer severe conflicts	CMF for alternative applicable for severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Provides facility for pedestrians to cross Egan Drive. Removes pedestrian and bicycle conflict with vehicles.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Median crossover provides a new infrastructure used to reroute Egan Drive traffic when there is a crash.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Separates pedestrians from high-speed vehicles.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection. Inconsistent with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes. Inconsistent with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	Equally accessible	E-Y intersection would have the same movements allowed as the existing configuration.
	Environmental	Wetland (Sec. 404) permit	No jurisdictional wetlands impact	No change to footprint.
		Protected lands	No use	No change to highway footprint.
		Right-of-way (ROW) impact	Minimal ROW needed	Minor amounts of ROW required for pedestrian crossing
	Traffic operations	Peak hour delay	Same delay	Alternative v/c ratios at E-Y and Glacier-Nugget intersections are the same as existing v/c ratios.
	Cost	Cost range	Medium	Extends the grass medians, constructs a channelizing island, and installs new signs and pavement markings. Constructs a grade-separated pedestrian crossing and median crossovers.

3.2.2 INT-2, ELE-4. Partial Access Signalized Intersection

This alternative, shown in Figure 3, would signalize the E-Y intersection, only allowing vehicle movements currently allowed at the E-Y intersection (no left turns from the side streets would be allowed). A signalized crossing would be provided for pedestrians and bicyclists to cross Egan Drive at the E-Y intersection, similar to the signalized crossing at the Glacier-Nugget intersection. To meet the need for an alternate driving route during a crash, ELE-4 (Median Crossover) was added to the alternative.

Installing a signal to control the left turns from Egan Drive to the side streets at the E-Y intersection would reduce crashes at the E-Y intersection. While a signal will increase overall delay, only allowing the movements currently allowed at the intersection is expected to result in lower delay compared to installing a full access signal.

Table 5 presents the screening results for the combined INT-2, ELE-4 alternative.

This alternative was advanced because it ranked as one of the highest. It meets baseline purpose and needs while staying within the existing ROW and not impacting wetlands. While more delay is expected compared to the No Build alternative, it is expected that this alternative would have less delay compared to a full access signal (INT-3).

<Click here to return to Table of Contents>

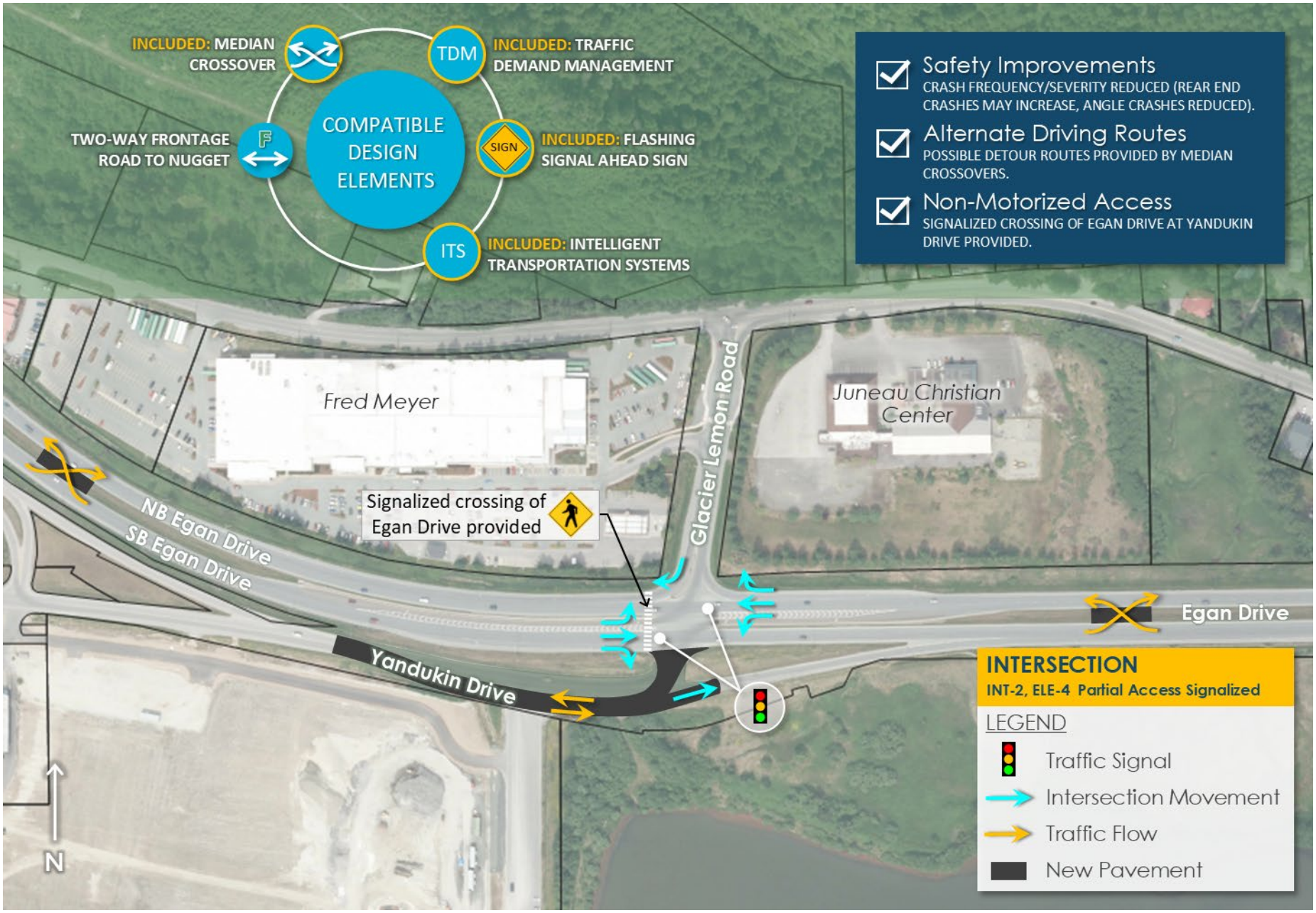

Figure 3: INT-2, ELE-4 Diagram

Table 5: INT-2 with ELE-4 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for installing a new traffic signal reduces angle crashes but increases rear-end crashes.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Signalized crossing at the E-Y intersection would give time for pedestrians to cross Egan Drive.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Median crossover provides a new infrastructure used to reroute Egan Drive traffic when there is a crash.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Signalized crossing will be provided at the E-Y intersection.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection. Inconsistent with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes. Inconsistent with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	Equally accessible	E-Y intersection would have the same movements allowed as the existing configuration.
	Environmental	Wetland (Sec. 404) permit	No jurisdictional wetlands impact	No mapped wetlands shown in this area.
		Protected lands	No use	No historic properties, no parklands, no recreational properties present in expanded footprint.
		Right-of-way (ROW) impact	Stays within the existing ROW	Final footprint may extend outside of DOT&PF ROW. May need additional land for Yandukin Drive realignment.
	Traffic operations	Peak hour delay	More delay	Alternative v/c ratio at E-Y intersection greater than existing v/c ratio.
	Cost	Cost range	Medium	Installs a signal, constructs median crossovers, and may need to realign Yandukin Drive.

3.2.3 INT-3, ELE-4. Full Access Signalized Intersection

This alternative, shown in Figure 4, would signalize the E-Y intersection and would reconstruct the approaches to allow all vehicle movements at the intersection. A signalized crossing would be provided for pedestrians and bicyclists to cross Egan Drive at the E-Y intersection, similar to the signalized crossing at the Glacier-Nugget intersection. To meet the need for an alternate driving route during a crash, ELE-4 (Median Crossover) was added to the alternative.

Installing a signal to control the left turns from Egan Drive to the side streets at the E-Y intersection would reduce crashes at the E-Y intersection. While this alternative would likely have more delay than INT-2: Partial Access Signalized Intersection, allowing full access provides additional business access.

Table 6 presents the screening results for the combined INT-3, ELE-4 alternative.

This alternative was advanced because it ranked as one of the highest. The alternative meets baseline purpose and needs, with minimal ROW takes needed and no wetlands impacted; however, it is expected to have more delay compared to the No Build alternative. The alternative provides more access to businesses on both sides of Egan Drive.

<Click here to return to Table of Contents>

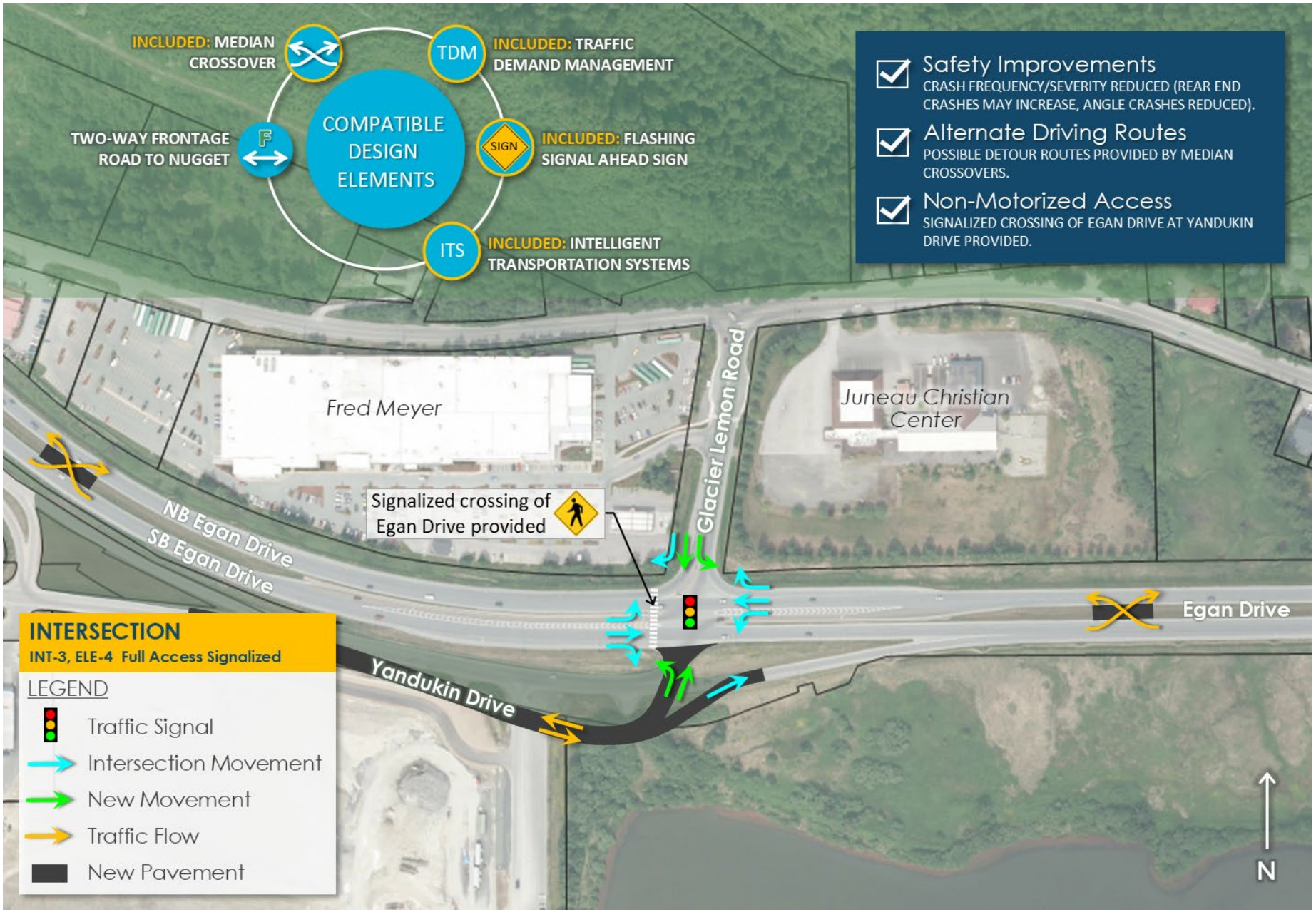

Figure 4: INT-3, ELE-4 Diagram

Table 6: INT-3 with ELE-4 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for installing a new traffic signal reduces angle crashes but increases rear-end crashes.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Signalized crossing at the E-Y intersection would give time for pedestrians to cross Egan Drive.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Median crossover provides a new infrastructure used to reroute Egan Drive traffic when there is a crash.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Signalized crossing will be provided at E-Y intersection.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection. Inconsistent with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 as it does not provide sidewalks and bicycle paths or lanes. Inconsistent with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	More accessible	E-Y intersection would have full movement access, allowing vehicles on one side of Egan Dr. to access residences and businesses on the other side and left turns from the side streets.
	Environmental	Wetland (Sec. 404) permit	No jurisdictional wetlands impact	No mapped wetlands shown in this area.
		Protected lands	No use	No historic properties, no parklands, no recreational properties present in expanded footprint.
		Right-of-way (ROW) impact	Minimal ROW needed	Final footprint may extend outside DOT&PF ROW. May need additional land for Yandukin Drive realignment.
	Traffic operations	Peak hour delay	More delay	Alternative v/c ratio at E-Y intersection greater than existing v/c ratio.
	Cost	Cost range	Medium	Realigns Yandukin Drive, installs a signal, and constructs median crossovers.

3.2.4 INT-6. Two Signalized T-Intersections

This alternative, shown in Figure 5, would separate the E-Y intersection into two signalized T-intersections, with the Yandukin Drive intersection southeast of the church. Separating the E-Y intersection into two intersections would provide detour routes when there is a crash. Since the alternative meets all of the baseline purpose and need elements, no compatible elements were added to the alternative.

Installing a signal to control the left turns from Egan Drive to the side streets at the two E-Y intersections would reduce crashes. Furthermore, moving the Yandukin Drive approach away from the horizontal curve between Yandukin Drive and Glacier-Nugget Highway would improve sight distance, further decreasing crashes. Similar to the other signalized alternatives, installing two signals is expected to increase delay for Egan Drive traffic. However, the Level 2 analysis will consider ways to reduce the delay impacts so that most drivers would only have to stop at one of the two new signals.

Table 7 presents the screening results for the INT-6 alternative.

This alternative was advanced because it was ranked among the second highest. The alternative improves access to businesses on either side of Egan Drive. An alternate route is provided during a crash without needing to manually set up temporary traffic control devices (considered an advantage over the median crossover treatment). No wetland impacts are expected; wetlands near the area have previously been permitted for fill. This alternative ranks slightly lower than the other signal alternatives because of the substantial ROW impacts due to moving the Yandukin Drive approach.

<Click here to return to Table of Contents>

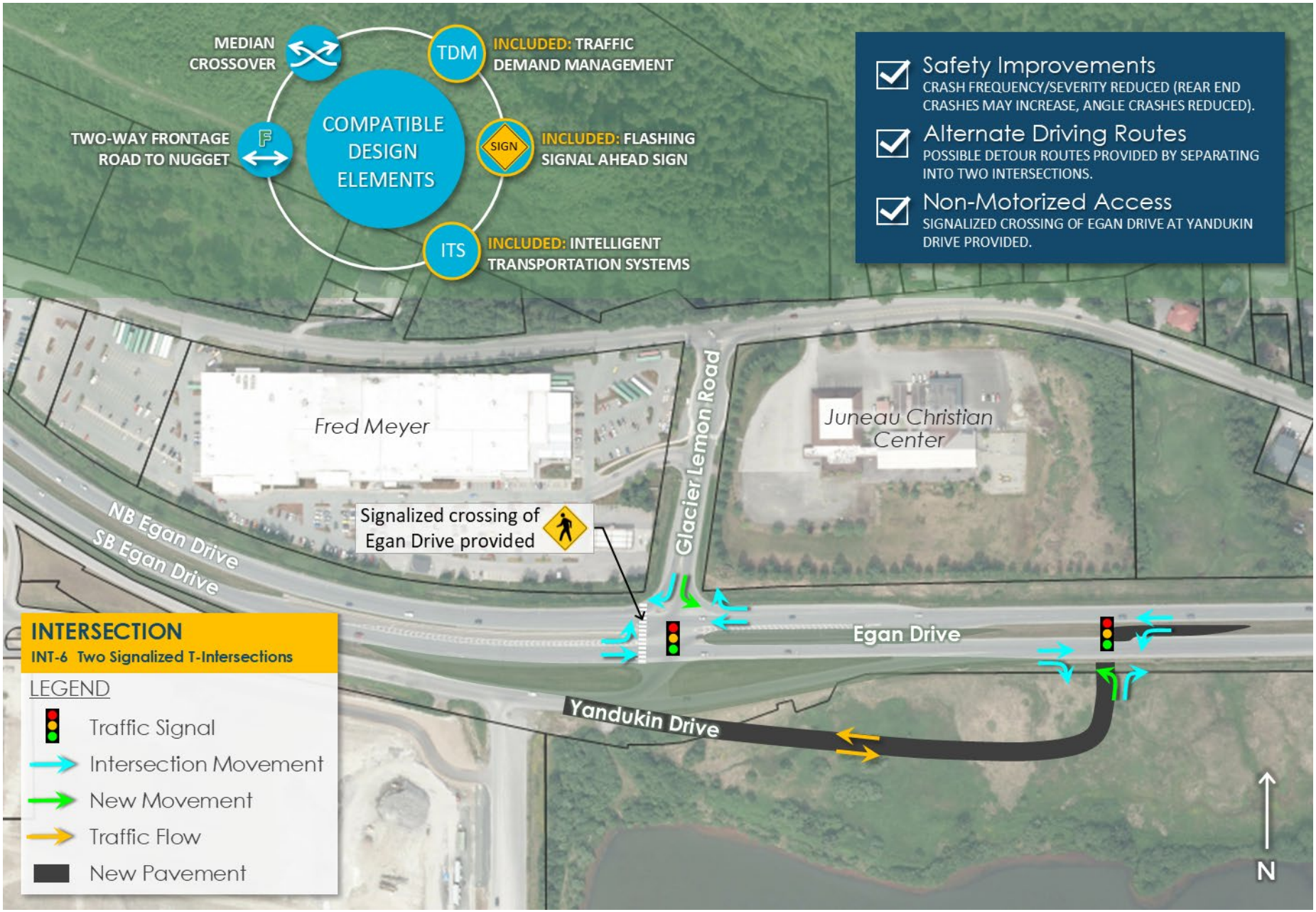

Figure 5: INT-6 Diagram

Table 7: INT-6 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for converting the E-Y intersection to two T-intersections reduces crashes.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Signalized crossing at the E-Y intersection would give time for pedestrians to cross Egan Drive.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Alternate route provided for northbound Egan Drive traffic towards Mendenhall Valley. Traffic would be able to access alternate routes at the two signals.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Signalized crossing will be provided at the E-Y intersection.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection. Inconsistent with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes. Inconsistent with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	More accessible	Left turn movements would be allowed from Yandukin Drive and Glacier-Lemon Road.
	Environmental	Wetland (Sec. 404) permit	No jurisdictional wetlands impact	Existing wetlands already permitted for fill for industrial project.
		Protected lands	No use	Does not include lands anticipated for conservation.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for Yandukin Drive realignment under development.
	Traffic operations	Peak hour delay	More delay	Alternative v/c ratio at E-Y intersection greater than existing v/c ratio.
	Cost	Cost range	Medium	Realigns Yandukin Drive farther southeast and installs two signals.

3.2.5 OVP-2, ELE-5. Diamond Interchange at the E-Y Intersection

This alternative, shown in Figure 6, would convert the E-Y intersection into a diamond interchange. Egan Drive through traffic would be raised up and over the Yandukin Drive intersection without stopping. Traffic entering and exiting Egan Drive would use ramps, and ramp and side street traffic would be controlled at the two ramp intersections. The interchange separates high-speed Egan Drive traffic from other movements. Pedestrians would also travel under Egan Drive. To meet the need for an alternate driving route during a crash, ELE-5 (Two-way Frontage Road) was added to the alternative.

The purpose of this alternative is to grade separate key movements at the E-Y intersection, reducing conflicts between high- and low-speed vehicles.

Table 8 presents the screening results for the combined OVP-2, ELE-5 alternative.

This alternative was advanced because it was ranked among the second highest. It has more flexibility and sustainability compared to OVP-1 (which ranked similarly) as it can be converted to a different configuration in the future while staying within a diamond interchange footprint.

<Click here to return to Table of Contents>

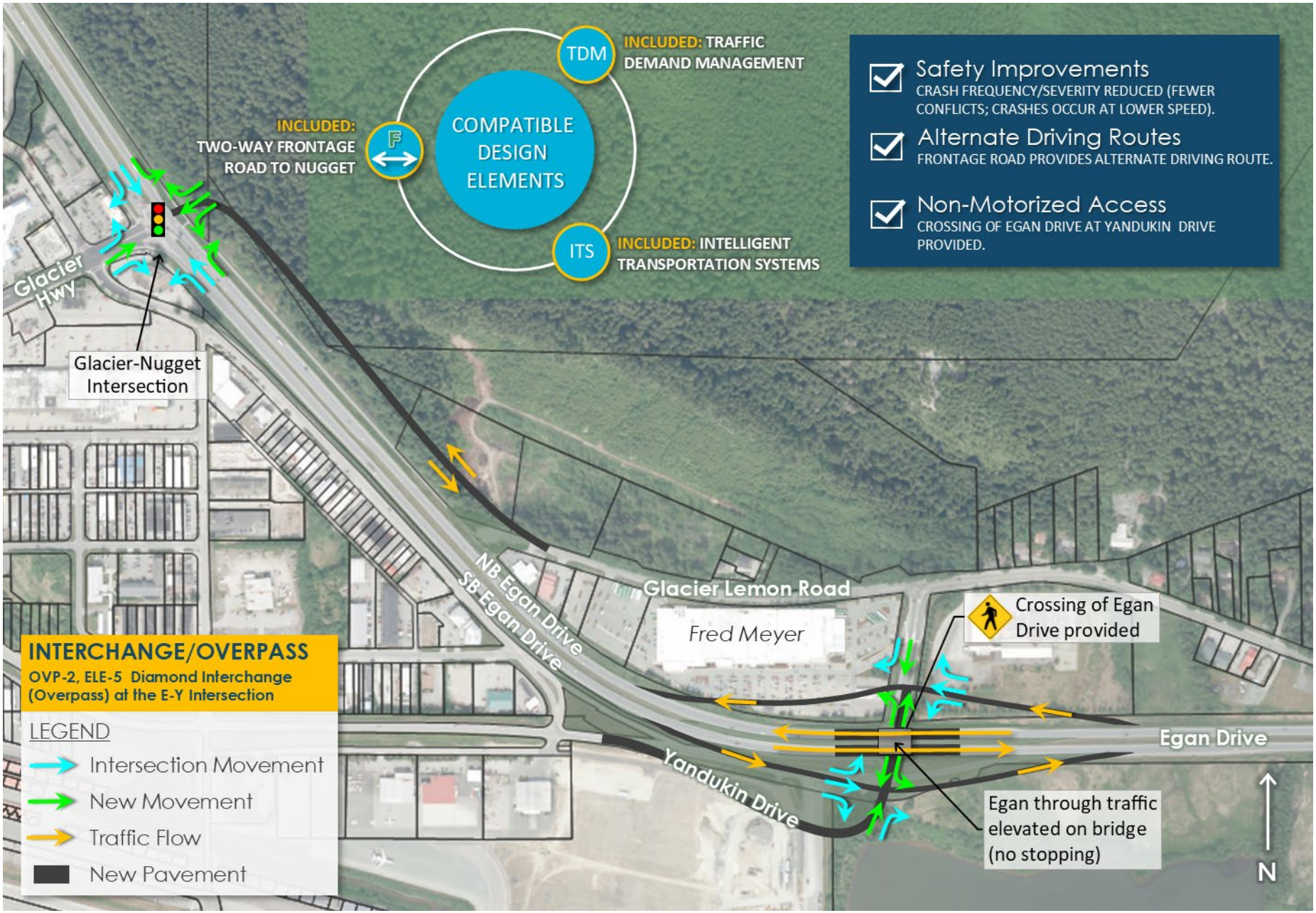

Figure 6: OVP-2, ELE-5 Diagram

Table 8: OVP-2 with ELE-5 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for converting at-grade intersection into a grade-separated interchange reduces crashes. An additional leg may increase crashes at Glacier-Nugget intersection; the increase is not expected to outweigh the decrease in crashes at E-Y intersection because movements would be signal controlled.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Crossing at the E-Y intersection would be provided for pedestrians and bicyclists to cross Egan Drive.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Two-way northbound frontage road from Glacier-Lemon Road to Glacier-Nugget intersection.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Pedestrians would cross fewer lanes than existing, reducing the distance needed to cross and how long pedestrians are exposed on the road. Vehicles would be traveling at lower speeds than Egan Drive traffic.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection and with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8-IA12 to provide sidewalks and bicycle paths/lanes and Action 8.8-IA13 to provide a secondary route to Egan Dr., where no alternative route exists.
		Business visibility	Less visible	Guardrail or concrete barriers along the elevated Egan Drive obstructs views to businesses. Elevated Egan Drive would obstruct views for side street traffic.
		Business access	More accessible	E-Y and Glacier-Nugget intersections would have full movement access.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Small sections of wetlands that remain along north side of Egan Drive may need to be filled.
		Protected lands	No use	No public parklands, historic properties, or recreation resources in area.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for Yandukin Drive realignment, on- and off-ramps, and elevated Egan Drive. Additional land needed for Glacier-Lemon Road extension to Glacier-Nugget intersection. May require Federal Highway Land transfer process (Title 23 Highway Easement Deed).
	Traffic operations	Peak hour delay	Less delay	Alternative v/c ratios at E-Y and Glacier-Nugget intersections less than existing v/c ratios.
	Cost	Cost range	High	Installs an elevated bridge structure with on- and off-ramps and realigns Yandukin Dr. Extends Glacier-Lemon Rd to Glacier-Nugget, which may require cutting into the hillside.

3.3 Lower Scoring Alternatives (Recommended to be Eliminated)

3.3.1 CLS-1, ELE-5, ELE-7. Southbound Left Closure at the E-Y Intersection and Two-way Frontage Road to Glacier-Nugget

This alternative, shown in Figure 7, would restrict southbound left vehicles from turning at the E-Y intersection. It would also extend the two-way frontage road (Glacier-Lemon Road) to the Glacier-Nugget intersection (ELE-5 is an inherent part of this alternative). Southbound left drivers would access Glacier-Lemon Road using the Glacier-Nugget intersection. All other movements currently allowed at the E-Y intersection would still be allowed. To meet the bicycle/pedestrian safety and non-motorized accessibility comfort needs, ELE-7 (Grade Separated Pedestrian Crossing) for the E-Y intersection was added to the alternative.

This alternative eliminates the conflict between southbound left-turn vehicles and Egan Drive through vehicles, reducing crashes. Vehicles are redirected to the Glacier-Nugget intersection, which may cause an increase in crashes at that location.

Table 9 presents the screening results for the combined CLS-1, ELE-5, ELE-7 alternative.

This alternative was dismissed because it scored lower than other alternatives. It impacts wetlands and requires substantial ROW (both public and private). More delay is expected on Egan Drive compared to the No Build alternative.

<Click here to return to Table of Contents>

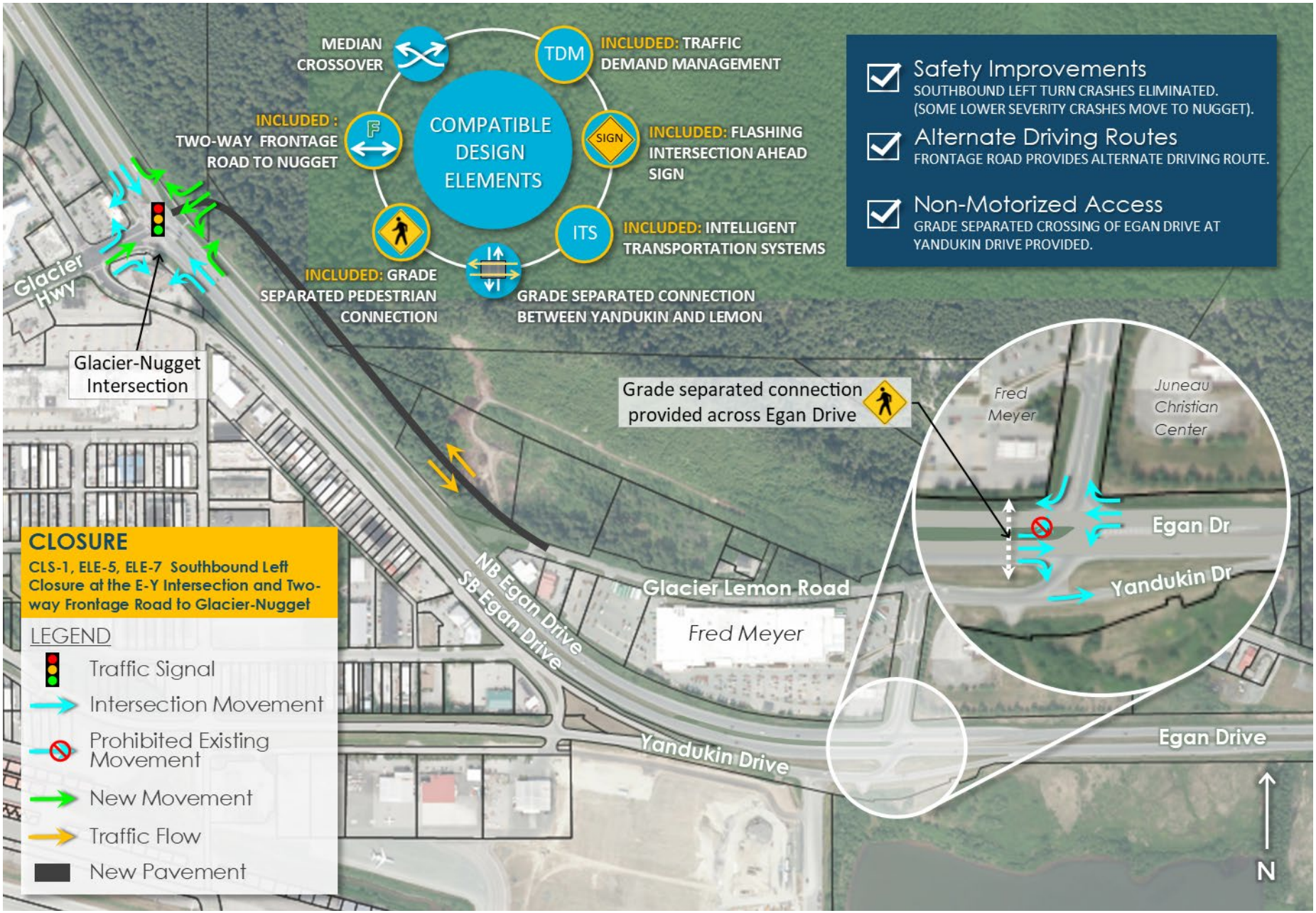

Figure 7: CLS-1, ELE-5, ELE-7 Diagram

Table 9: CLS-1 with ELE-5 and ELE-7 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for closing the median opening reduces southbound left crashes at E-Y intersection. Additional movements and volumes may increase crashes at Nugget; however, the increase in crashes is not expected to outweigh the crash reduction at E-Y intersection because the additional movements would be signal controlled.
		Crash severity	Fewer severe conflicts	CMF for alternative applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Provides facility for pedestrians to cross Egan Drive. Removes pedestrian and bicycle conflict with vehicles.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Two-way frontage road from Glacier-Lemon Road to Glacier-Nugget intersection.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Separates pedestrians from high speed vehicles
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection and with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes and with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	Equally accessible	Southbound left turns would not be allowed at E-Y intersection but would be able to turn at Glacier-Nugget intersection.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Known wetlands present. Individual permit needed.
		Protected lands	No use	Unlikely to encounter historic properties, parklands, or trail impacts constituting a use more than de minimis.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for Glacier-Lemon Road extension to Glacier-Nugget intersection. No relocations required. Conforms with existing area plan. May require Federal Highway Land transfer process (Title 23 Highway Easement Deed).
	Traffic Operations	Peak hour delay	More delay	Alternative v/c ratio at Glacier-Nugget intersection greater than existing v/c ratio.
	Cost	Cost range	Medium	Extends Glacier-Lemon Road to Glacier-Nugget intersection, which may require cutting into the hillside. Removes southbound left turn lane at E-Y intersection and constructs a grade-separated pedestrian crossing.

3.3.2 CLS-2, ELE-5, ELE-7. Median Closure at the E-Y Intersection and Two-way Frontage Road to Glacier-Nugget

This alternative, shown in Figure 8, would close the median at the E-Y intersection, eliminating all left-turn movements. It would also extend the two-way frontage road (Glacier-Lemon Road) to the Glacier-Nugget intersection (ELE-5 is an inherent part of the alternative). All other movements currently allowed at the E-Y intersection would still be allowed. Left turning drivers would turn at the Glacier-Nugget intersection or use the Sunny Point interchange. To meet the bicycle/pedestrian safety and non-motorized accessibility comfort needs, ELE-7 (Grade Separated Pedestrian Crossing) for the E-Y intersection was added to the alternative.

This alternative eliminates the conflict between left-turn vehicles and Egan Drive through vehicles, reducing crashes. Vehicles are redirected to the Glacier-Nugget intersection or the Sunny Point interchange, which may cause an increase in crashes at those locations.

Table 10 presents the screening results for the combined CLS-2, ELE-5, ELE-7 alternative.

This alternative was dismissed because it scored lower than other alternatives. It impacts wetlands and requires substantial ROW (both public and private). More delay is expected on Egan Drive compared to the No Build alternative.

<Click here to return to Table of Contents>

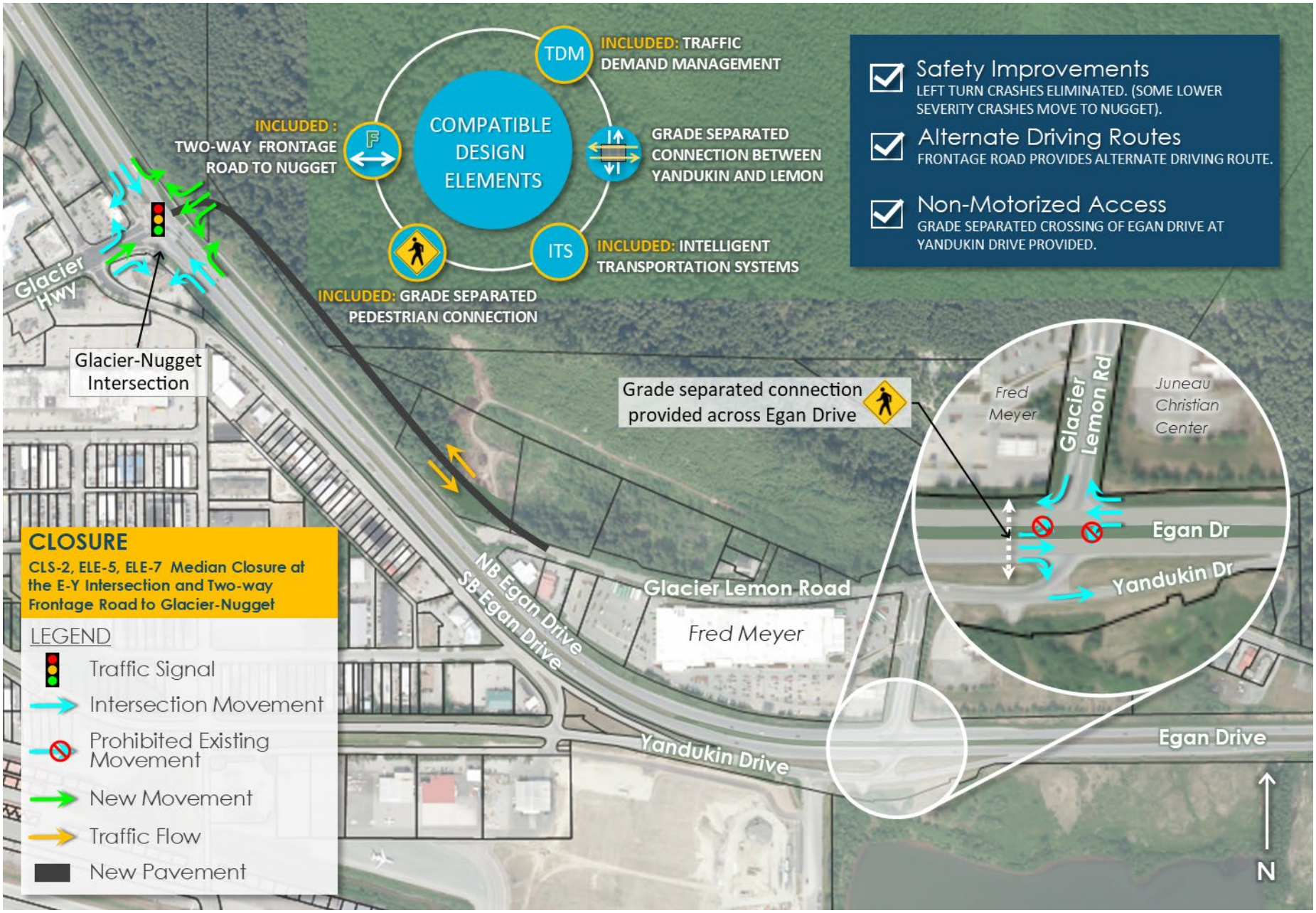

Figure 8: CLS-2, ELE-5, ELE-7 Diagram

Table 10: CLS-2 with ELE-5 and ELE-7 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for closing the median opening reduces crashes at E-Y intersection. Additional movements and volumes may increase crashes at Nugget; however, the increase in crashes is not expected to outweigh the crash reduction at E-Y intersection because the additional movements would be signal controlled.
		Crash severity	Fewer severe conflicts	CMF for alternative applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Provides facility for pedestrians to cross Egan. Removes pedestrian and bicycle conflict with vehicles.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Two-way frontage road from Glacier-Lemon Road to Glacier-Nugget intersection.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Separates pedestrians from high speed vehicles
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection and with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes and with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	Equally accessible	Left turn movements would not be allowed at E-Y intersection but vehicles would be able to turn at Glacier-Nugget intersection. Travel distance may increase for northbound left turning vehicles.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Known wetlands present. Individual permit needed.
		Protected lands	No use	Unlikely to encounter historic properties, parklands, or trail impacts constituting a use more than de minimis.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for Glacier-Lemon Road extension to Glacier-Nugget intersection. No relocations. May require Federal Highway Land transfer process (Title 23 Highway Easement Deed).
	Traffic operations	Peak hour delay	More delay	Alternative v/c ratio at Glacier-Nugget intersection greater than existing v/c ratio.
	Cost	Cost range	Medium	Extends Glacier-Lemon Rd. to the Glacier-Nugget intersection, which may require cutting into the hillside. Removes left-turn lanes at E-Y intersection and constructs a grade-separated pedestrian crossing.

3.3.3 CLS-3, ELE-5, ELE-7. Median Closure at the E-Y Intersection, Interchange at Glacier-Nugget

This alternative, shown in Figure 9, would close the median at the E-Y intersection and construct an interchange at the Glacier-Nugget intersection. It would also extend the two-way frontage road (Glacier-Lemon Road) to the new interchange (ELE-5 is an inherent part of this alternative). The median closure would eliminate all left-turn movements at the E-Y intersection and left-turning drivers would turn at the Glacier-Nugget interchange. All other movements allowed at the E-Y intersection would still be allowed. To meet the bicycle/pedestrian safety and non-motorized accessibility comfort needs, ELE-7 (Grade Separated Pedestrian Crossing) for the E-Y intersection was added to the alternative.

This alternative eliminates the conflict between left-turn vehicles at the E-Y intersection and Egan Drive through vehicles, reducing crashes. It may also reduce crashes at the Glacier-Nugget intersection as it will separate the through traffic on Egan Drive from all turning traffic at that location. The alternative also would reduce delay at the Glacier-Nugget intersection.

Table 11 presents the screening results for the combined CLS-3, ELE-5, ELE-7 alternative.

This alternative was dismissed because it scored lower than other alternatives. It impacts wetlands, needs substantial ROW, and businesses would likely experience reduced visibility.

<Click here to return to Table of Contents>

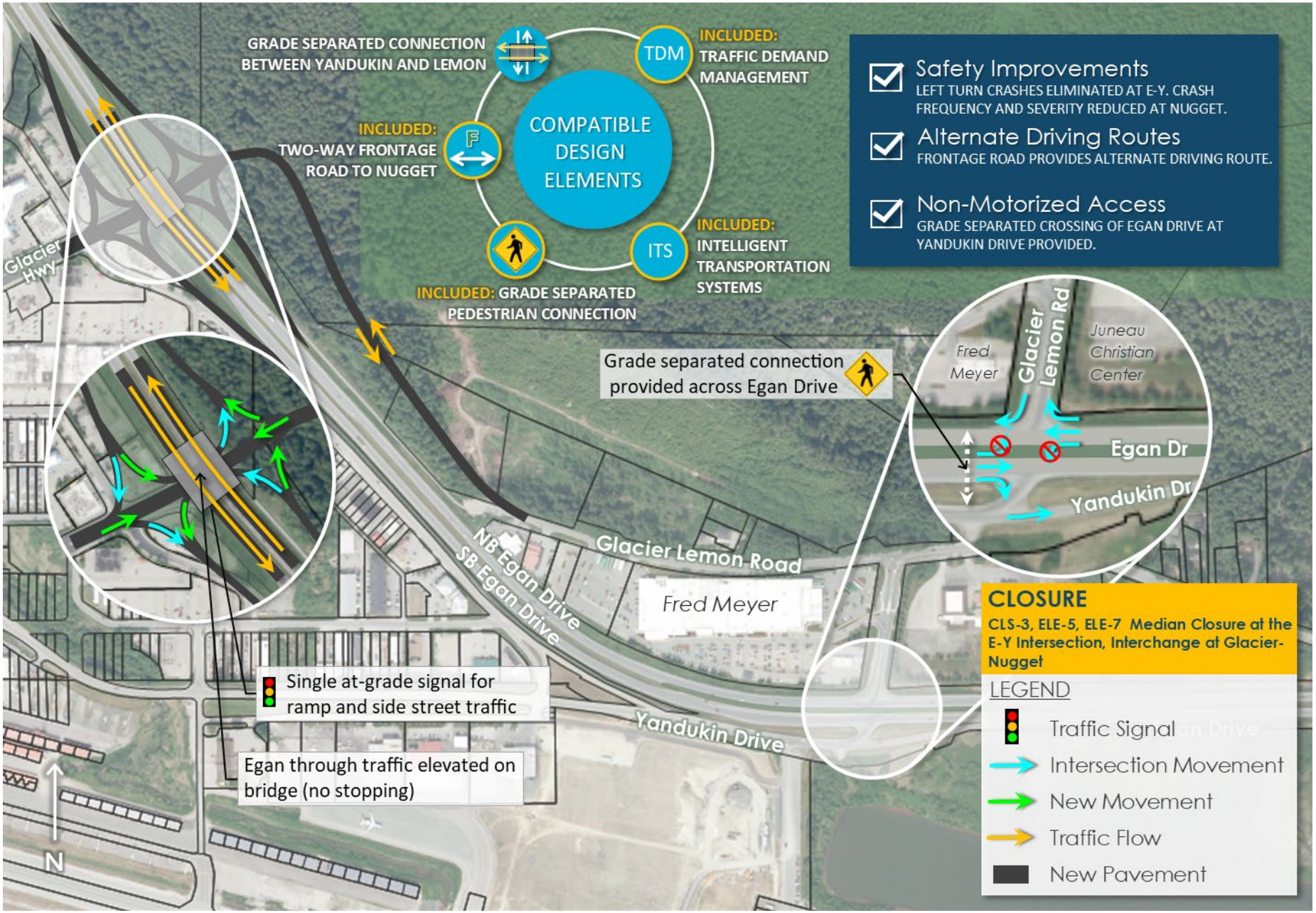

Figure 9: CLS-3, ELE-5, ELE-7 Diagram

Table 11: CLS-3 with ELE-5 and ELE-7 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for closing the median opening reduces crashes. CMF for converting at-grade intersection into a grade-separated interchange reduces crashes.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Provides facility for pedestrians to cross Egan Drive. Removes pedestrian and bicycle conflict with vehicles.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Two-way frontage road from Glacier-Lemon Road to Glacier-Nugget intersection.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Separates pedestrians from high-speed vehicles.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection and with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes and with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Less visible	Guardrail or concrete barriers along the elevated Egan Drive obstruct view to businesses near Glacier-Nugget intersection.
		Business access	Equally accessible	Left-turn movements would not be allowed at E-Y intersection, but vehicles would be able to turn at Glacier-Nugget intersection. Travel distance may increase northbound left-turning vehicles.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Known wetlands present. Individual permit needed.
		Protected lands	No use	Unlikely to encounter historic properties, parklands, or trail impacts constituting a use more than de minimis.
		Right-of-way (ROW) impact	Substantial ROW Needed	Additional land needed for Yandukin Drive realignment, Glacier-Lemon Road extension to Glacier-Nugget intersection, on- and off-ramps, space for elevated Egan Drive at Glacier-Nugget intersection. No relocations. May require Federal Highway Land transfer process (Title 23 Highway Easement Deed).
	Traffic operations	Peak hour delay	Less delay	Alternative v/c ratios at E-Y and Glacier-Nugget intersections less than existing v/c ratios.
	Cost	Cost range	High	Installs an elevated bridge structure with on- and off-ramps and removes the left turn lanes at E-Y intersection. Constructs a grade-separated pedestrian crossing.

3.3.4 INT-4, ELE-4, ELE-7. Move Signalized Intersection from Glacier-Nugget to the E-Y Intersection

This alternative, shown in Figure 10, would move the signal at the Glacier-Nugget intersection to the E-Y intersection. Movements at the Glacier-Nugget intersection would be restricted to Egan Drive through movements and right-in, right-out movements at the side streets, while all vehicle movements would be allowed at the E-Y intersection signal. This alternative would provide a signalized crossing for pedestrians and bicycles to cross at the E-Y intersection. To meet the need for an alternate driving route during a crash, ELE-4 (Median Crossover) was added to the alternative. ELE-7 (Grade Separated Pedestrian Crossing) for the Glacier-Nugget intersection was also added to meet bicycle/pedestrian safety and non-motorized accessibility comfort needs.

Moving the signal to the E-Y intersection would control the left turns from Egan Drive to the side streets at the E-Y intersection, which would reduce crashes at the E-Y intersection. At the Glacier-Nugget intersection, crashes would be reduced due to the elimination of any conflicting movements. Overall delay would remain about the same since the alternative removes one signal and adds another. While access at the E-Y intersection would improve (allowing all movements), the reduction in access at the Glacier-Nugget intersection could impact businesses there.

Table 12 presents the screening results for the combined INT-4, ELE-5, ELE-7 alternative.

This alternative was dismissed because it scored lower than other alternatives. The right-in, right-out only movement at the Glacier-Nugget intersection provides less access to residences and businesses along Glacier-Nugget Highway, negatively affecting ongoing economic conditions. Benefits of the alternative are comparable to a full signal at the E-Y intersection (INT-3), which does not remove the signal at the Glacier-Nugget intersection.

<Click here to return to Table of Contents>

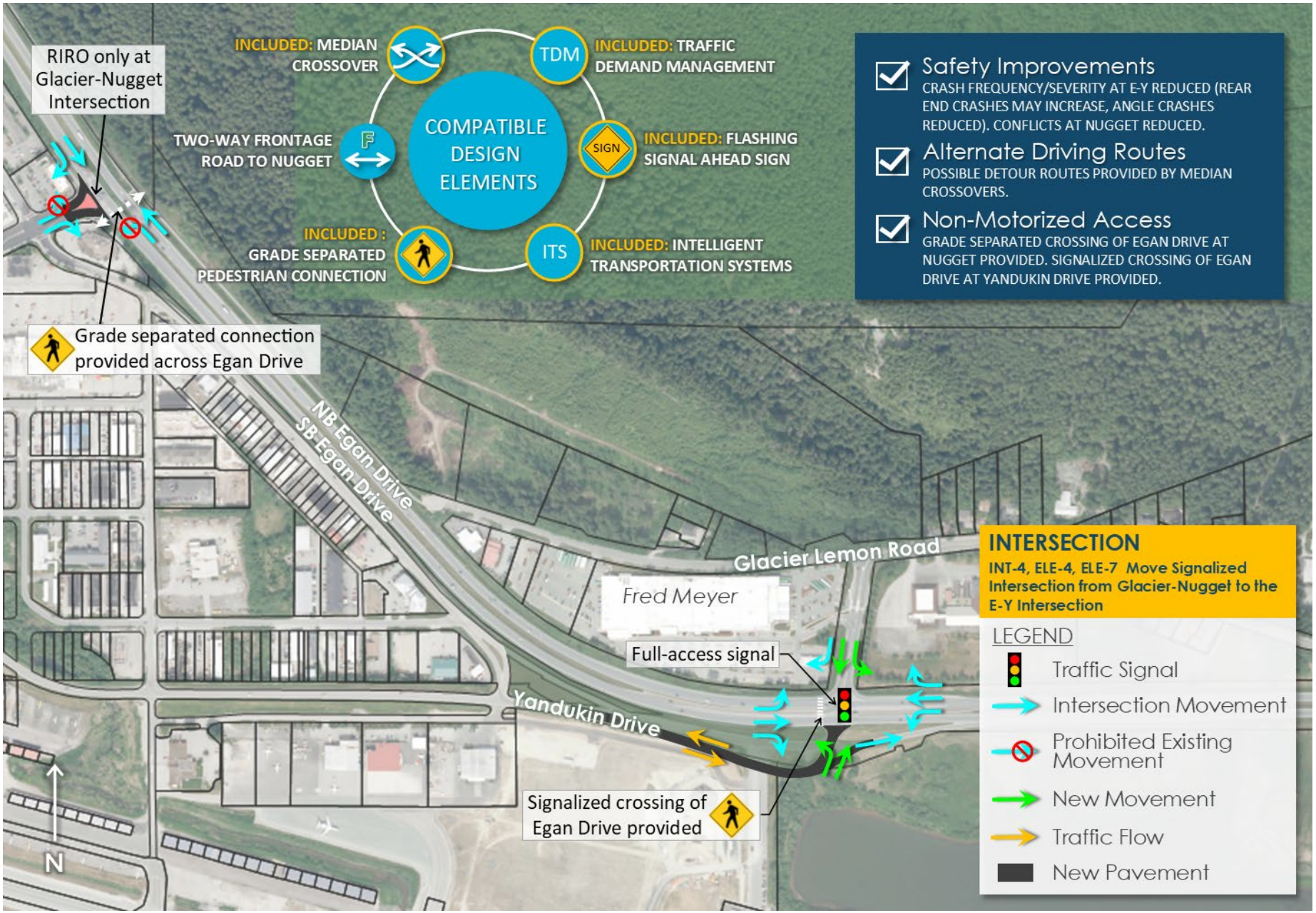

Figure 10: INT-4, ELE-4, ELE-7 Diagram

Table 12: INT-4 with ELE-4 and ELE-7 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for installing a traffic signal reduces angle crashes but increases rear-end crashes. CMF for closing the median opening reduces crashes at Glacier-Nugget intersection but may increase them at the E-Y intersection, but it is not expected to outweigh the reduction at the Glacier-Nugget intersection.
		Crash severity	Fewer severe conflicts	Both CMFs for alternative are applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Provides facility for pedestrians to cross Egan Drive. Removes pedestrian and bicycle conflict with vehicles.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Median crossover provides a new infrastructure used to reroute Egan Drive traffic when there is a crash.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Separates pedestrians from high speed vehicles
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection. Inconsistent with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Appears to preclude future connection. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes. Inconsistent with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	Less accessible	E-Y intersection would have full movement access. However, Glacier-Nugget Hwy. would be converted to right-in, right-out only, reducing accessibility to businesses near Glacier-Nugget intersection.
	Environmental	Wetland (Sec. 404) permit	No jurisdictional wetlands impact	Wetlands that may be present where the proposed footprint extends on the south side of Egan Drive are already permitted to be filled for industrial development.
		Protected lands	No use	No historic properties, parklands, or recreational properties present in expanded footprint.
		Right-of-way (ROW) impact	Minimal ROW needed	Additional land needed for Yandukin Drive realignment and pedestrian crossing.
	Traffic operations	Peak hour delay	More delay	Alternative v/c ratio at E-Y intersection greater than existing v/c ratio.
	Cost	Cost range	Medium	Realigns Yandukin Drive, removes signals at Glacier-Nugget intersection, and installs new signals at E-Y intersection. Constructs median crossovers and a grade-separated pedestrian crossing.

3.3.5 INT-5, ELE-5. Roundabout Intersection

This alternative, shown in Figure 11, would convert the E-Y intersection to a roundabout intersection. Speeds would be reduced as vehicles approach and enter the roundabout. The alternative would allow all movements at the intersection. Crossings with flashing lights or signalized crossings would be provided for pedestrians and bicycles to cross the E-Y intersection. To meet the need for an alternate driving route during a crash, ELE-5 (Two-way Frontage Road to Glacier-Nugget) was added to the alternative.

Installing a roundabout would slow traffic and eliminate all left-turn conflicts at the E-Y intersection, reducing crashes. Because all vehicles would have to slow down, and because approaching vehicles would have to yield to vehicles in the roundabout, this alternative would increase delay.

Table 13 presents the screening results for the combined INT-5, ELE-5 alternative.

This alternative was dismissed because it scored lower than other alternatives. It impacts wetlands and requires substantial ROW. More delay is expected on Egan Drive compared to the No Build alternative.

<Click here to return to Table of Contents>

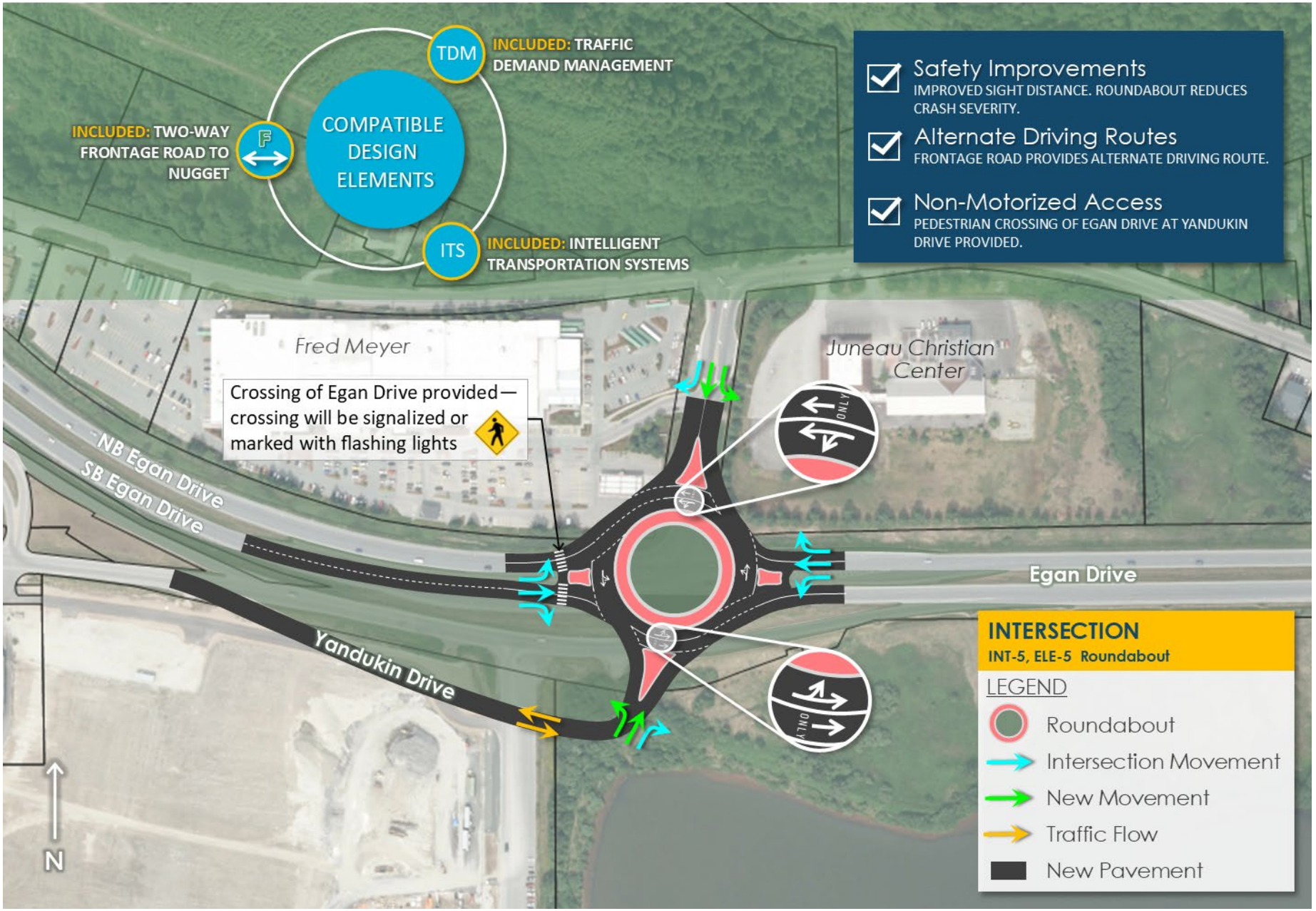

Figure 11: INT-5, ELE-5 Diagram

Table 13: INT-5 with ELE-5 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for converting intersection to a multi-lane roundabout reduces crashes. An additional leg may increase crashes at Glacier-Nugget intersection, the increase is not expected to outweigh the decrease in crashes at E-Y intersection because movements would be signal controlled.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Crossing would be provided on the north Egan Drive leg for pedestrians and bicyclists to cross.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Two-way frontage road from Glacier-Lemon Road to Glacier-Nugget intersection.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Signalized pedestrian crossing provided for the north Egan Drive leg.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection and with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes and with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	More accessible	E-Y and Glacier-Nugget intersections would have full movement access.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Temporary or minor fill may be required around intersection.
		Protected lands	No use	No public parklands, historic properties, or recreation resources in the area.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed from Fred Meyer and Juneau Christian Center for roundabout and Egan Dr. for Yandukin Dr. realignment. Likely requires relocation of gas station. Land needed for Glacier-Lemon Rd. extension to Glacier-Nugget intersection. May require Federal Highway Land transfer process (Title 23 Highway Easement Deed).
	Traffic operations	Peak hour delay	More delay	Alternative v/c ratio at E-Y intersection greater than existing v/c ratio.
	Cost	Cost range	High	Installs an elevated bridge structure with on- and off-ramps, realigns Yandukin Dr., and extends Glacier-Lemon Rd. to Glacier-Nugget intersection, which may require cutting into the hillside.

3.3.6 INT-7, ELE-4. Relocate Intersection to Southeast of Church

This alternative, shown in Figure 12, would relocate the E-Y intersection southeast to the other side of the church and would signalize it to meet bicycle/pedestrian safety and non-motorized accessibility comfort needs. Signalized crossings would be provided for pedestrians and bicycles to cross the E-Y intersection. To meet the need for an alternate driving route during a crash, ELE-4 (Median Crossover) was added to the alternative.

Installing a signal to control the left turns from Egan Drive to the side streets at the E-Y intersection would reduce crashes. Furthermore, moving the intersection away from the horizontal curve between Yandukin Drive and the Glacier-Nugget Highway would improve sight distance, further decreasing crashes. Similar to the other signalized alternatives, installing a signal is expected to increase delay for Egan Drive traffic.

Table 14 presents the screening results for the combined INT-7, ELE-4 alternative.

This alternative was dismissed because it scored lower than other alternatives. Substantial ROW takes are needed, with impacts to wetlands and more delay expected for Egan Drive traffic compared to the No Build alternative.

<Click here to return to Table of Contents>

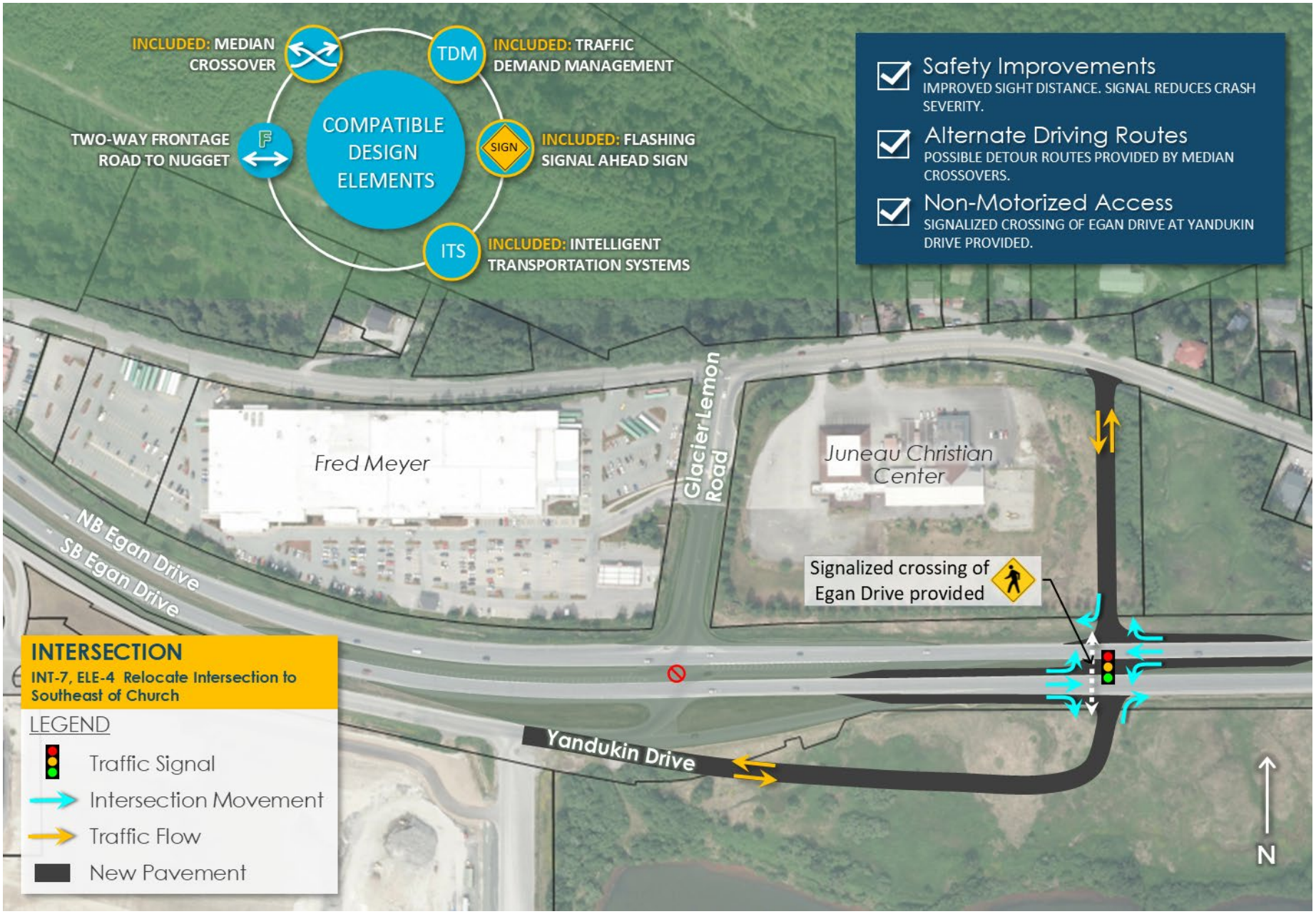

Figure 12: INT-7, ELE-4 Diagram

Table 14: INT-7 with ELE-4 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for improving sight distance at an intersection reduces crashes, and CMF for installing a new traffic signal reduces angle crashes but increases rear-end crashes.
		Crash severity	Fewer severe conflicts	CMF for improving sight distance applicable to severe multi-car angle crashes. CMF for signal is applicable to all severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Signalized crossing at E-Y intersection would give time for pedestrians to cross Egan Drive.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Median crossover provides a new infrastructure used to reroute Egan Drive traffic when there is a crash.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Signalized crossing will be provided at E-Y intersection.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection. Inconsistent with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Inconsistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes and Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	Equally accessible	The relocated intersection allows the same movements as the existing E-Y intersection. Travel distance would increase for Fred Meyer traffic to and from the Mendenhall Valley.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Would require fill in wetlands north of the existing Egan Dr. as it connects to Glacier Hwy. Wetlands on south side are already permitted to be filled for industrial development.
		Protected lands	No use	Unlikely to impact historic properties.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for Yandukin Drive realignment and new road to Glacier-Lemon Road.
	Traffic operations	Peak hour delay	More delay	Alternative v/c ratio at E-Y intersection greater than existing v/c ratio.
	Cost	Cost range	Medium	Closes the median at the existing E-Y intersection location, realigns Yandukin Dr. farther southeast, installs a new signal, and constructs a new road to Glacier-Lemon Rd. and median crossovers.

3.3.7 INT-8, ELE-4. Diverted Left Turn or Continuous Flow Intersection

This alternative, shown in Figure 13, would build an innovative, more efficient signal at the E-Y intersection. It includes two crossover signals on Egan Drive (approximately 1,000 feet to either side of the E-Y intersection) that would carry vehicles desiring to turn left at the E-Y intersection across opposing traffic, after which the left-turn traffic would travel to the E-Y signal. At the E-Y intersection, all traffic movements would be signalized, and (because left turns have already crossed over the oncoming through traffic) Egan Drive left-turn and oncoming through vehicles would be able to enter the intersection at the same time. To meet the need for an alternate driving route during a crash, ELE-4 (Median Crossover) was added to the alternative.

As with other signalized alternatives, installing a signal to control the left turns from Egan Drive would reduce crashes. This innovative alternative would be expected to have less delay than other signalized alternatives.

Table 15 presents the screening results for the combined INT-8, ELE-4 alternative.

This alternative was dismissed because it scored lower than other alternatives. While businesses would be more accessible, substantial ROW is needed, with impacts to wetlands and more delay expected for Egan Drive traffic compared to the No Build alternative.

<Click here to return to Table of Contents>

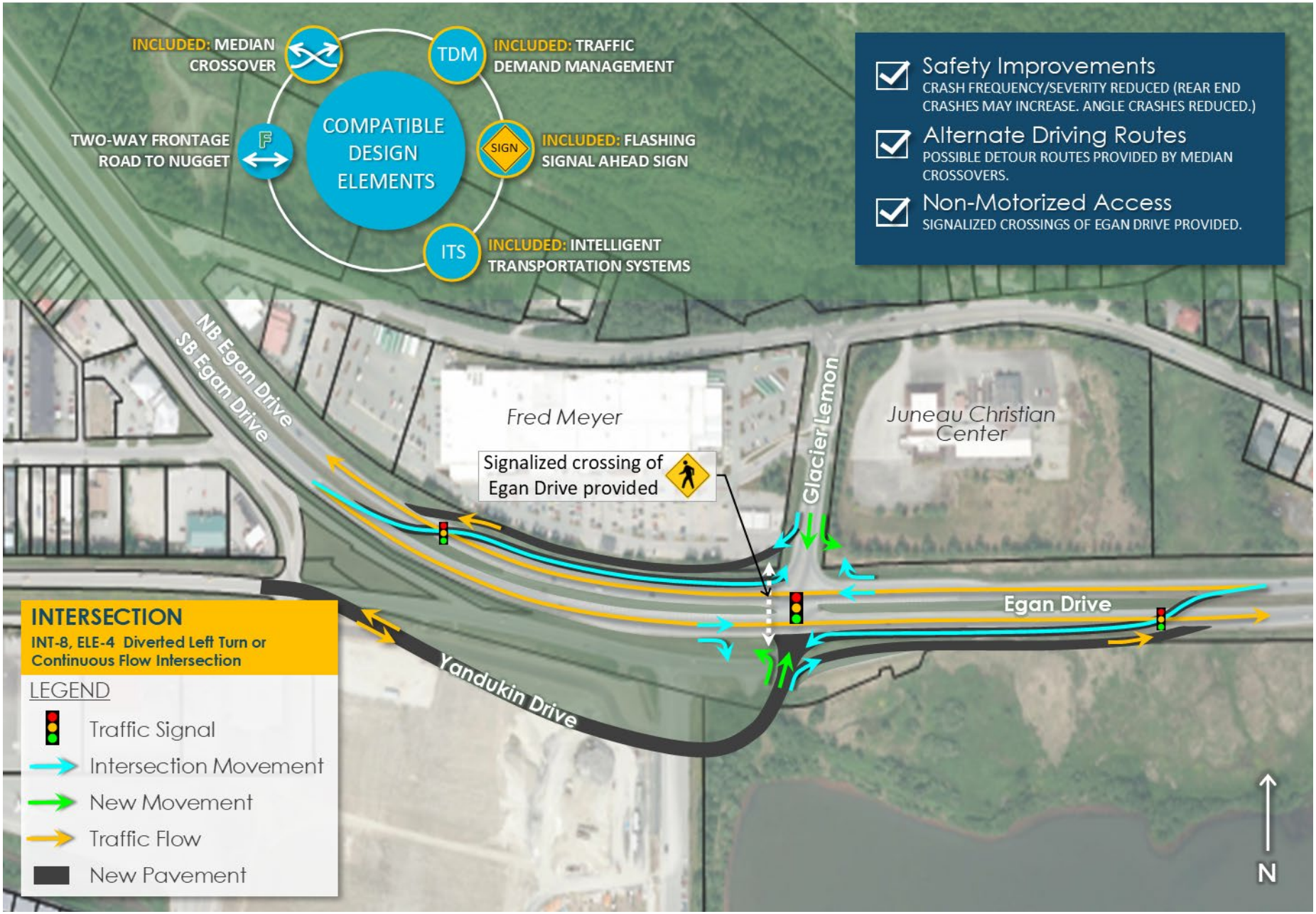

Figure 13: INT-8, ELE-4 Diagram

Table 15: INT-8 with ELE-4 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for installing a new traffic signal reduces angle crashes but increases rear-end crashes.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Signalized crossing at E-Y intersection would give time for pedestrians to cross Egan Drive.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Median crossover provides a new infrastructure used to reroute Egan Drive traffic when there is a crash.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Signalized crossing will be provided at E-Y intersection. Crossing distance would increase compared to existing.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection. Inconsistent with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Inconsistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes and with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Visibility to businesses is the same as existing.
		Business access	More accessible	Yandukin Drive connects to Glacier-Lemon Road, increasing access to businesses.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Would require fill in wetlands north of the existing Egan Drive. Wetlands on south side are already permitted to be filled for industrial development.
		Protected lands	No use	Unlikely to impact historic properties.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for Yandukin Drive realignment and for side street right-turn lanes to Egan Drive. Additional land also needed for crossover intersections, diverted left-turn lanes, medians/space between opposing lanes.
	Traffic operations	Peak hour delay	More delay	Alternative v/c ratio at E-Y intersection greater than existing v/c ratio.
	Cost	Cost range	High	Realigns Yandukin Drive, widens Egan Drive to install crossover intersections, constructs right turn acceleration lanes to Egan Drive, installs three signals, and median crossovers.

3.3.8 INT-9. Diverging Diamond Intersection Pair (Glacier-Nugget and E-Y Intersections)

This alternative, shown in Figure 14, would build two crossover signals at the Glacier-Nugget and E-Y intersections. In between the two signals, through traffic would travel on the left side of opposing through traffic. The crossovers would allow Egan Drive traffic to turn left onto Glacier-Nugget Highway or onto Yandukin Drive or Glacier-Lemon Road without conflicting with high-speed Egan Drive through traffic. Pedestrian crossings would be provided at the signals. No additional elements were needed for the alternative.

As with other signalized alternatives, installing a signal to control the Egan Drive would reduce crashes. This innovative alternative would be expected to have less delay than other signalized alternatives.

Table 16 presents the screening results for the INT-9 alternative.

This alternative was dismissed because it scored lower than other alternatives. It has the most negative impacts compared to the other alternatives. ROW and wetlands are impacted, vehicle delay is expected to increase, and businesses would be less accessible.

<Click here to return to Table of Contents>

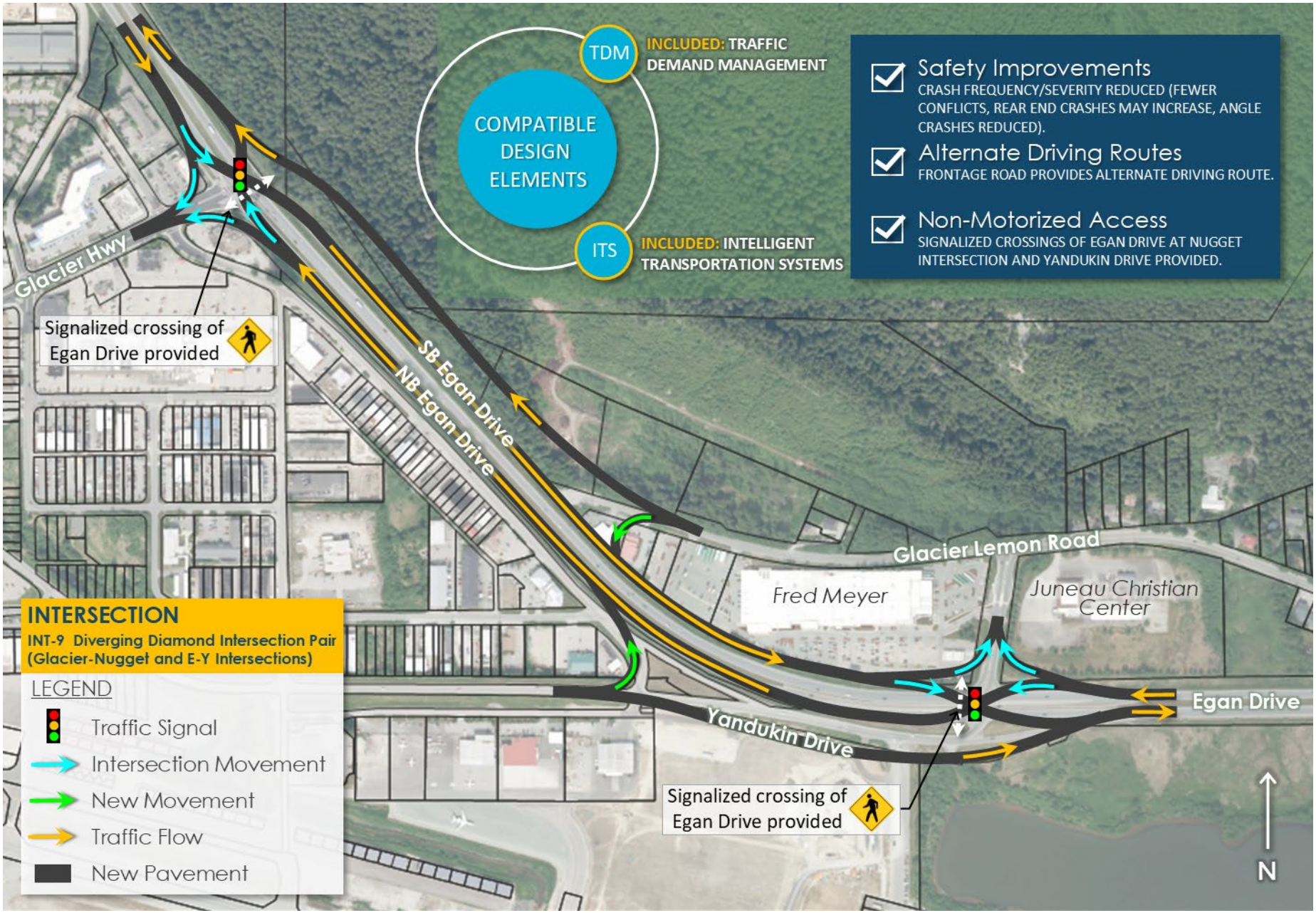

Figure 14: INT-9 Diagram

Table 16: INT-9 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for installing a new traffic signal reduces angle crashes but increases rear-end crashes.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Signalized crossing at the E-Y intersection would give time for pedestrians to cross Egan Drive.
Secondary	Alternate driving routes	Crash delay	Provides new route	Glacier-Lemon Road connection to the Glacier-Nugget Highway provides a route for northbound Egan Drive vehicles.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Signalized crossing will be provided at the E-Y intersection. Pedestrians would cross fewer lanes and on direction of traffic at a time, reducing the distance needed to cross and how long pedestrians would be exposed on the road.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection. Partially consistent with goal to advocate for the extension of Glacier Hwy. to Egan Dr. but only for northbound Egan Dr. traffic and does not connect to Glacier-Nugget intersection. Inconsistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes. Partially consistent with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Equally visible	Overall visibility to businesses would be similar to existing.
		Business access	Less accessible	Glacier-Nugget Hwy. and Glacier-Lemon Rd. would be one-way roads, limiting access. Vehicles would need to use the Mendenhall signal or Sunny Point interchange to get from one side of Egan Dr. to the other.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Would require fill in wetlands north of the existing E-Y intersection, and Glacier-Lemon Road extension to Glacier-Nugget intersection. Wetlands on south side are already permitted to be filled for industrial development.
		Protected lands	No use	Unlikely to encounter historic properties or parklands or trail impacts constituting a use more than de minimis.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for crossover intersections (clear for skew angle sight distance), crossed over lanes, medians/space between opposing lanes, Glacier-Lemon frontage road, and Yandukin Drive realignment. Requires business/property relocations.
	Traffic operations	Peak hour delay	More delay	Alternative v/c ratios at E-Y and Glacier-Nugget intersections greater than existing v/c ratios.
	Cost	Cost range	High	Reconstructs Egan Drive to allow for crossover, installs multiple on- and off-ramps, and realigns Yandukin Drive. Extends Glacier-Lemon Road to Glacier-Nugget intersection, which may cut into hillside.

3.3.9 OVP-1, ELE-4. Single Point Urban Interchange at the E-Y Intersection

This alternative, shown in Figure 15, would convert the E-Y intersection into a single point interchange. Egan Drive through traffic would be raised up and over the Yandukin intersection without stopping, while a single signal would control ramp and side street traffic. The interchange separates high-speed Egan Drive traffic from other movements. Signalized crossings would be provided for pedestrians to cross under Egan Drive. To meet the need for an alternate driving route during a crash, ELE-4 (Median Crossover) was added to the alternative.

The purpose of this alternative is to grade separate key movements at the E-Y intersection, reducing conflicts between high speed and low speed vehicles.

Table 17 presents the screening results for the combined OVP-1, ELE-4 alternative.

This alternative was dismissed because it scored lower than other alternatives. It is ranked slightly less than other interchange alternatives since it partially conforms to adopted land use plans. Compared to OVP-2 and OVP-3, the alternative has longer pedestrian crossings and is not as flexible or sustainable if changing conditions indicate the need for a new configuration for the interchange in the future.

<Click here to return to Table of Contents>

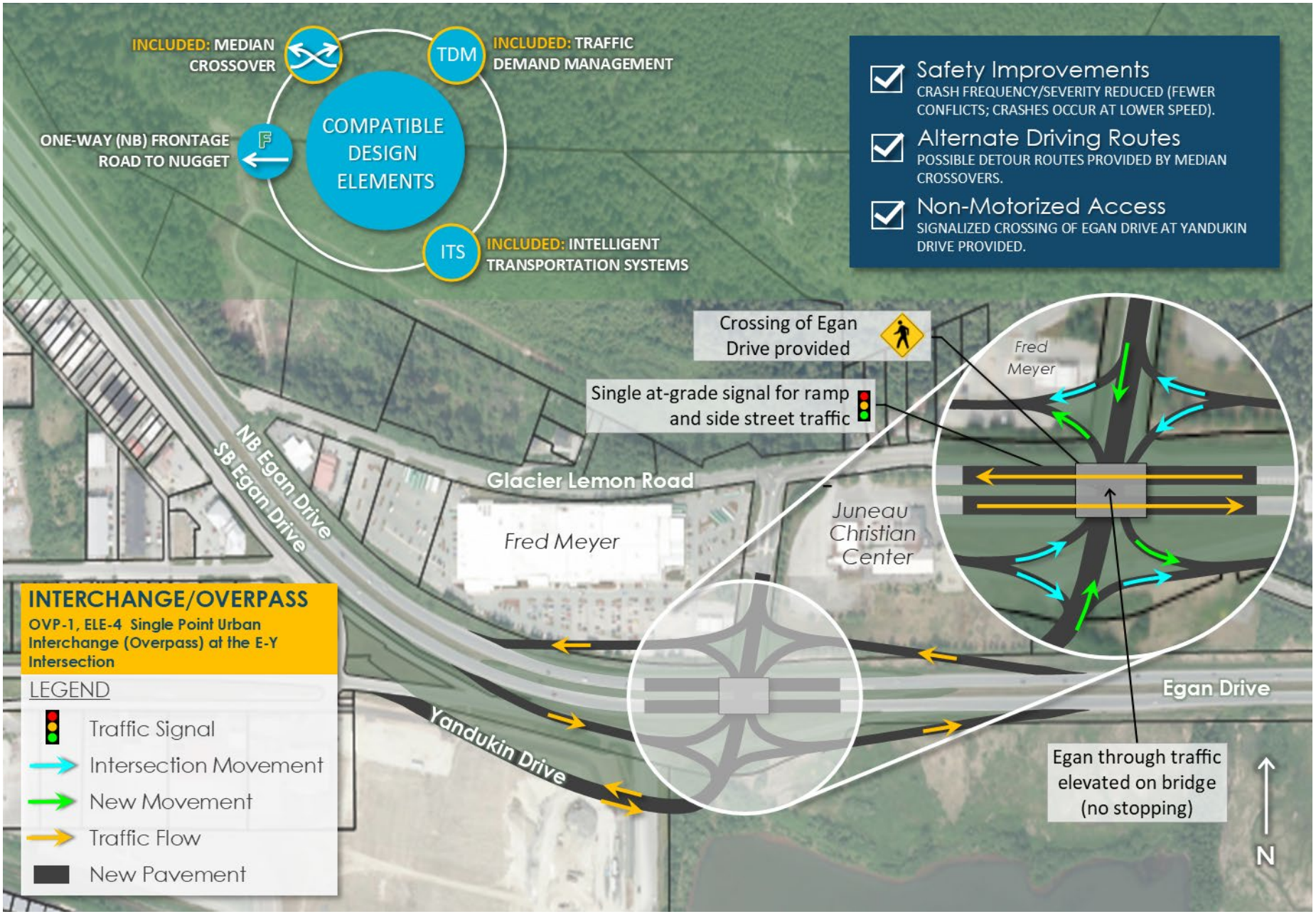

Figure 15: OVP-1, ELE-4 Diagram

Table 17: OVP-1 with ELE-4 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for converting at-grade intersection into a grade-separated interchange reduces crashes.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Crossing at E-Y intersection would be provided for pedestrians and bicyclists to cross Egan Drive.
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Median crossover provides a new infrastructure used to reroute Egan Drive traffic when there is a crash.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Signalized crossing will be provided at E-Y intersection. Pedestrians would cross fewer lanes, reducing the distance needed to cross and how long pedestrians are exposed on the road. Vehicles would be traveling at lower speeds than Egan Drive traffic.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection. Inconsistent with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Inconsistent with CBJ Comprehensive Plan Action 8.8-IA12 to provide sidewalks and bicycle paths or lanes and with Action 8.8-IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Less visible	Guardrail or concrete barriers along the elevated Egan Drive obstructs views to businesses. Elevated Egan Drive would obstruct views for side street traffic.
		Business access	More accessible	E-Y interchange connects Yandukin Drive to Glacier-Lemon Road.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Small sections of wetlands that remain along north side of Egan Dr. may need to be filled. Existing wetlands on south side of Egan Dr. are already permitted to be filled for industrial development.
		Protected lands	No use	No public parklands, historic properties, or recreation resources in area.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for Yandukin Drive realignment, on- and off-ramps, and space for elevated Egan Drive.
	Traffic operations	Peak hour delay	Less delay	Alternative v/c ratios at E-Y and Glacier-Nugget intersections less than existing v/c ratios.
	Cost	Cost range	High	Constructs an elevated bridge structure with on- and off-ramps, and realigns Yandukin Drive and median crossovers for vehicles to reroute.

3.3.10 OVP-3, ELE-5. Split Diamond Interchange Pair (Glacier-Nugget and E-Y Intersections)

This alternative, shown in Figure 16, would build half-diamond interchanges at the Glacier-Nugget and E-Y intersections. Egan Drive through traffic would be raised up and over both intersections without stopping, and signals would control ramp and side street traffic. The Glacier-Nugget interchange ramps would carry side street vehicles to and from the Mendenhall Valley, while the E-Y interchange ramps would carry side-street vehicles traveling to and from downtown. The alternative would also extend the frontage road (Glacier-Lemon Road) one way to the Glacier-Nugget intersection for northbound vehicles. Optionally, the frontage road could be built for two-way traffic. Dairy Road would serve as a frontage road on the opposite side of the highway.

The frontage road system (Glacier-Lemon Road and Old Dairy Road) would provide alternate routes along Egan Drive (ELE-5 is an inherent part of alternative). Pedestrians would cross under Egan Drive traffic.

The purpose of this alternative is to grade separate key movements at the E-Y intersection, reducing conflicts between high- and low-speed vehicles.

Table 18 presents the screening results for the combined OVP-3, ELE-5 alternative.

This alternative was dismissed, although it was ranked among the second highest, because the alternative has higher environmental impacts on built facilities and cost of elevated structures compared to OVP-2. It is also considered less sustainable than OVP-2 because ROW outside the built interchange footprint could be impacted if the intersection needs to be changed in the future.

<Click here to return to Table of Contents>

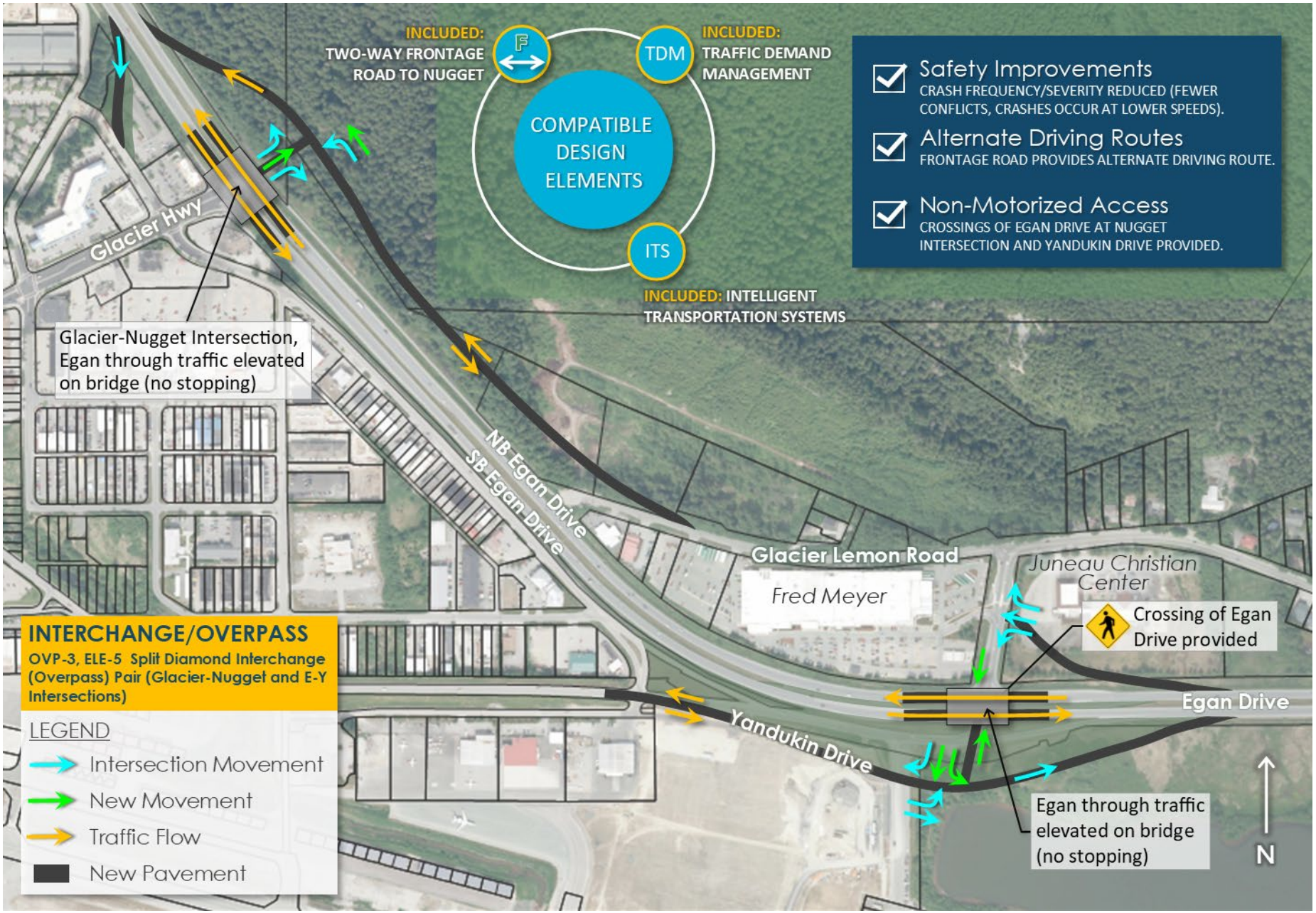

Figure 16: OVP-3, ELE-5 Diagram

Table 18: OVP-3 with ELE-5 Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency	Fewer conflicts	CMF for converting at-grade intersection into a grade-separated interchange reduces crashes.
		Crash severity	Fewer severe conflicts	CMF for alternative is applicable to severe conflicts.
		Bicycles and pedestrians	Decreases walking conflicts	Crossing at E-Y intersection would be provided for pedestrians and bicyclists to cross Egan Drive.
Secondary	Alternate driving routes	Crash delay	Provides new route	Two-way frontage road from Glacier-Lemon Road to Glacier-Nugget intersection.
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Pedestrians would cross fewer lanes than existing, reducing the distance needed to cross and how long pedestrians are exposed on the road. Vehicles would be traveling at lower speeds than Egan Drive traffic.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Consistent with adopted land use plans	Consistent with Lemon Creek Area Plan action item to advocate for improvements to E-Y intersection and with goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8 - IA12 to provide sidewalks and bicycle paths or lanes and with Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility	Less visible	Guardrail or concrete barriers along the elevated Egan Drive obstructs views to businesses. Elevated Egan Drive would obstruct views for side street traffic.
		Business access	More accessible	E-Y interchange connects Yandukin Drive to Glacier-Lemon Road, allowing vehicles on one side of Egan Drive to access residences and businesses on the other side.
	Environmental	Wetland (Sec. 404) permit	Individual permit	Wetlands impacts on expansion of Lemon Spur to Glacier Hwy, northeast of Lemon Spur/Egan Drive, and near the pond.
		Protected lands	No use	Unlikely to encounter historic properties, parklands, or trail impacts constituting a use more than de minimis.
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for Yandukin Drive realignment, Glacier-Lemon Road extension to Glacier-Nugget intersection, on- and off-ramps, space for elevated Egan Drive at Glacier-Nugget and E-Y intersections.
	Traffic operations	Peak hour delay	Less delay	Alternative v/c ratios at E-Y and Glacier-Nugget intersections less than existing v/c ratios.
	Cost	Cost range	High	Constructs two elevated bridge structures with multiple on- and off-ramps and realigns Yandukin Drive. The hillside may need to be cut for the Glacier-Lemon Road extension.

Appendix A Purpose and Need

The purpose of the Egan Drive and Yandukin Drive (E-Y) Intersection Planning and Environmental Linkages (PEL) Study is to identify ways to improve transportation safety for all users. The secondary purposes are to identify ways to improve mobility and route diversity in the transportation grid, improve access and mobility for pedestrians and bicyclists, and maintain traffic capacity and flow through the E-Y intersection and the surrounding area.

Transportation improvements will address the following needs:

Safety: The traveling public has expressed concerns regarding intersection safety. Crash frequency at this intersection is similar to the statewide average for similar intersections. Data show that out of a total of 86 crashes between 2005 and 2017, 7 involved major injuries. While there have been no fatalities at the intersection, nearly 48 percent of all crashes involved some sort of injury.

Alternate route in the event of crashes: Motorists traveling between the Mendenhall Valley and downtown are limited to using a single roadway, Egan Drive, for travel. Juneau businesses rely on the intersection as a vital component of the connection between downtown, Juneau International Airport, Mendenhall Valley, and points further out the road. When an accident occurs on Egan Drive, the lack of an alternate route directly affects travel time reliability, particularly during peak travel times. The lack of an alternate route results in area-wide congestion and traffic delays when collisions occur and increases overall perception of the crash rate and severity at the intersection.

Non-motorized access: The nearest controlled crossing of Egan Drive for pedestrians and bicyclists is 3/4 mile north from the E-Y intersection. Bicyclists and pedestrians unwilling to follow the lengthy, circuitous path often cross Egan Drive at Yandukin Drive, which is illegal and unsafe.

Potential improvements to the E-Y intersection should meet these additional community goals:

- Provide improvements that are consistent with approved land use plans and ordinances
- Consider designs that maintain or improve access to and visibility of businesses
- Transportation improvements should support opportunities for economic development and support planned future land uses
- Seek to minimize increases in vehicle delay, especially during the peak morning and evening commuting periods, to maintain the high mobility function of the corridor

Appendix B Crash Modification Factors

The safety screening measures were analyzed by determining if the alternative had historical evidence of reducing crashes. Crash Modification Factors (CMFs) are factors associated with a safety treatment to estimate the number of crashes at a location if the treatment is applied. CMFs are determined using a statistical analysis of sites with and without a treatment. Table B-1 presents CMFs that could be applicable to the build alternatives. CMFs less than 100 percent correspond to a reduction in crashes, while CMFs greater than 100 percent correspond to an increase in crashes.

Note that no CMF values were readily found for treatments adding a fourth leg (Closure [CLS] alternatives and ELE-4) to the Glacier-Nugget intersection. However, based on engineering experience, it is suggested that the potential increases in crash frequency and severity of adding a fourth leg would not outweigh the potential reduction in crashes at the E-Y intersection. The Glacier-Nugget intersection is signalized, which controls traffic and provides movements with their own time on Egan Drive.

Table B-1: CMFs for Alternatives

Alternative	Treatment	CMF (%)	Applicable Crash Type	Applicable Crash Severity	Source
CLS-1	Close Median Opening	10	Crashes involving vehicles making the movements to be closed	All	Highway Safety Improvement Program (HSIP) 2020 Handbook ID 305
CLS-2	Close Median Opening	10	Crashes involving vehicles making the movements to be closed	All	HSIP 2020 Handbook ID 305
CLS-3	Close Median Opening	10	Crashes involving vehicles making the movements to be closed	All	HSIP 2020 Handbook ID 305
	Convert At-grade Intersection into Grade-separated Interchange	58	All	All	CMF Clearinghouse ID 459
		43	All	Serious, minor, possible injury	CMF Clearinghouse ID 460
		64	All	Property damage only	CMF Clearinghouse ID 461
		84	All	All	CMF Clearinghouse ID 462
		73	All	All	CMF Clearinghouse ID 463
		72	All	Serious, minor, possible injury	CMF Clearinghouse ID 464
INT-1	Improve Angle of Channelized Right-turn Lane	41	Other	All	CMF Clearinghouse ID 8430
INT-2	New Traffic Signal	40	Angle crashes	All	HSIP 2020 Handbook ID 109
		125	Rear-end crashes	All	HSIP 2020 Handbook ID 109
INT-3	New Traffic Signal	40	Angle crashes	All	HSIP 2020 Handbook ID 109

Alternative	Treatment	CMF (%)	Applicable Crash Type	Applicable Crash Severity	Source
INT-3	New Traffic Signal	**125**	Rear-end crashes	All	HSIP 2020 Handbook ID 109
INT-4	New Traffic Signal	40	Angle crashes	All	HSIP 2020 Handbook ID 109
		125	Rear-end crashes	All	HSIP 2020 Handbook ID 109
INT-4	Close Median Opening	10	Crashes involving vehicles making the movements to be closed	All	HSIP 2020 Handbook ID 305
INT-5	Convert Unsignalized Intersection to Roundabout	56	All	Serious, minor, possible injury	CMF Clearinghouse ID 215
		80	All	Serious injury	CMF Clearinghouse ID 218
		54	All	Minor injury	CMF Clearinghouse ID 221
		87	All	Serious, minor, possible injury	CMF Clearinghouse ID 6397
	Conversion of Intersection into Multi-lane Roundabout	**106**	All	All	CMF Clearinghouse ID 4926
		37	All	Fatal, serious, minor, possible injury	CMF Clearinghouse ID 4927
INT-6	Convert Four-leg Intersection into Two Three-leg Intersections	135	All	Serious, minor, possible injury	CMF Clearinghouse ID 200
		75	All	Serious, minor, possible injury	CMF Clearinghouse ID 201
		67	All	Serious, minor, possible injury	CMF Clearinghouse ID 202
		115	All	Property damage only	CMF Clearinghouse ID 203
		100	All	Property damage only	CMF Clearinghouse ID 204
		90	All	Property damage only	CMF Clearinghouse ID 205
		43	All	Property damage only	CMF Clearinghouse ID 1628
	New Traffic Signal	40	Angle crashes	All	HSIP 2020 Handbook ID 109
		125	Rear-end crashes	All	HSIP 2020 Handbook ID 109
INT-7	Improve Sight Distance at Intersection	90	Multi-car angle crashes involving vehicles on the limited sight distance approach	All	HSIP 2020 Handbook ID 105
INT-8	New Traffic Signal	40	Angle crashes	All	HSIP 2020 Handbook ID 109
		125	Rear-end crashes	All	HSIP 2020 Handbook ID 109

Alternative	Treatment	CMF (%)	Applicable Crash Type	Applicable Crash Severity	Source
INT-9	New Traffic Signal	40	Angle crashes	All	HSIP 2020 Handbook ID 109
		125	Rear-end crashes	All	HSIP 2020 Handbook ID 109
OVP-1	Convert At-grade Intersection into Grade-separated Interchange	58	All	All	CMF Clearinghouse ID 459
		43	All	Serious, minor, possible injury	CMF Clearinghouse ID 460
		64	All	Property damage only	CMF Clearinghouse ID 461
		84	All	All	CMF Clearinghouse ID 462
		73	All	All	CMF Clearinghouse ID 463
		72	All	Serious, minor, possible injury	CMF Clearinghouse ID 464
OVP-2	Convert At-grade Intersection into Grade-separated Interchange	58	All	All	CMF Clearinghouse ID 459
		43	All	Serious, minor, possible injury	CMF Clearinghouse ID 460
		64	All	Property damage only	CMF Clearinghouse ID 461
		84	All	All	CMF Clearinghouse ID 462
		73	All	All	CMF Clearinghouse ID 463
		72	All	Serious, minor, possible injury	CMF Clearinghouse ID 464
OVP-3	Convert At-grade Intersection into Grade-separated Interchange	58	All	All	CMF Clearinghouse ID 459
		43	All	Serious, minor, possible injury	CMF Clearinghouse ID 460
		64	All	Property damage only	CMF Clearinghouse ID 461
		84	All	All	CMF Clearinghouse ID 462
		73	All	All	CMF Clearinghouse ID 463
		72	All	Serious, minor, possible injury	CMF Clearinghouse ID 464
ELE-3	Install a "Vehicles Entering When Flashing" (VEWF) System (Advance Post-mounted Signs on Major and Loops on Minor)	68	All	All	CMF Clearinghouse ID 4916

Appendix C V/C Ratio Comparisons

Volume-to-capacity (v/c) ratios were calculated using the Federal Highway Administration's (FHWA) Capacity Analysis for Planning of Junctions Tool. This sketch-planning tool evaluates the v/c ratios of various intersection and interchange designs using peak volumes. AM and PM peak v/c ratios were estimated at the Glacier-Nugget and Egan Drive at Yandukin Drive/Glacier-Lemon Road (E-Y) intersections for each alternative. The v/c ratios at each intersection were compared at each intersection, and the maximum value difference was used to rank the alternatives. An increase in v/c was considered to have more delay than the existing condition, while a decrease in v/c ratio was considered to be less delay.

Table C-1 presents the AM and PM peak v/c ratios for each alternative at the Glacier-Nugget and E-Y intersections.

Table C-1: Alternative V/C Ratio Comparisons

Alternative	E-Y Intersection				Glacier-Nugget Intersection			
	AM Peak		PM Peak		AM Peak		PM Peak	
	v/c ratio	Difference from No Build	v/c ratio	Difference from No Build	v/c ratio	Difference from No Build	v/c ratio	Difference from No Build
No Build	0.67		0.76		0.81		0.77	
CLS-1	0.67	0.00	0.45	-0.31	0.84	0.03	0.74	-0.03
CLS-2	0.58	-0.09	0.59	-0.17	0.89	0.08	0.91	0.14
CLS-3	0.58	-0.09	0.59	-0.17	0.49	-0.32	0.72	-0.05
INT-1	0.67	0.00	0.76	0.00	0.81	0.00	0.77	0.00
INT-2	0.68	0.01	0.77	0.01	0.81	0.00	0.77	0.00
INT-3	0.82	0.15	0.85	0.09	0.73	-0.08	0.66	-0.11
INT-4	1.00	0.33	1.04	0.28	0.54	-0.27	0.63	-0.14
INT-5	1.20	0.53	2.01	1.25	0.73	-0.08	0.66	-0.11
INT-6	0.82	0.15	0.87	0.11	0.73	-0.08	0.66	-0.11
INT-7	0.67	0.00	0.76	0.00	0.81	0.00	0.77	0.00
INT-8	0.70	0.03	0.72	-0.04	0.73	-0.08	0.66	-0.11
INT-9	0.78	0.11	0.85	0.09	0.72	-0.09	0.87	0.10
OVP-1	0.24	-0.43	0.36	-0.40	0.73	-0.08	0.66	-0.11
OVP-2	0.26	-0.41	0.45	-0.31	0.73	-0.08	0.66	-0.11
OVP-3	0.48	-0.19	0.71	-0.05	0.17	-0.64	0.65	-0.12
CLS-1 with ELE-6	0.67	0.00	0.45	-0.31	0.79	-0.02	0.74	-0.03
CLS-2 with ELE-6	0.58	-0.09	0.59	-0.17	0.84	0.03	0.83	0.06
CLS-3 with ELE-6	0.58	-0.09	0.59	-0.17	0.44	-0.37	0.64	-0.13

Appendix D Full Screening Results

Table D-1 present the results for all alternative combinations screened for Level 1.

Table D-1: Screening Results of All Alternative Combinations

Alternative Number	Alternative Name	**Baseline Purpose and Need Metrics** – Do alternatives meet the project Purpose and Need?						**Other Considerations (Level 1 Qualitative Metrics)** – How do alternatives compare to the current intersection?							
		Purpose & Need >>	**Primary** *Alternative must score positive in one or more metrics to advance*			**Secondary**		**Other Considerations**							
			Safety			Alternate driving routes	Non-motorized Accessibility	Economic growth			Environmental			Traffic operations	Cost
		Metric >>	Crash frequency	Crash severity	Bicycles and pedestrians	Crash delay	Accessibility comfort	Land use plans	Business visibility	Business access	Wetland (Sec. 404) permit	Protected lands	Right-of-way (ROW) impact	Peak hour delay	Cost range
No Build	Current Condition		Same conflicts	Same conflicts	No change	Same as now	Same	Inconsistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Stays within the existing ROW	Same delay	Low
CLS-1, ELE-5	SB Left Closure at E-Y and 2-Way Frontage Rd to Nugget		Fewer conflicts	Fewer severe conflicts	No change	Provides alternate route	Same	Consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW needed	More delay	Medium
CLS-1, ELE-5, ELE-7			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW needed	More delay	Medium
CLS-2, ELE-5	Median Closure at E-Y and 2-Way Frontage Rd to Nugget		Fewer conflicts	Fewer severe conflicts	No change	Provides alternate route	Same	Consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW Needed	More delay	Medium
CLS-2, ELE-5, ELE-7			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW needed	More delay	Medium
CLS-3, ELE-5	Median Closure at E-Y, Interchange at Nugget		Fewer conflicts	Fewer severe conflicts	No change	Provides alternate route	Same	Consistent with adopted land use plans	Less visible	Equally accessible	Individual permit	No use	Substantial ROW needed	Less delay	High
CLS-3, ELE-5, ELE-7			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Consistent with adopted land use plans	Less visible	Equally accessible	Individual permit	No use	Substantial ROW needed	Less delay	High
INT-1	HSIP Interim Action		Fewer conflicts	Fewer severe conflicts	No change	Same as now	Same	Partially consistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Stays within the existing ROW	Same delay	Low
INT-1, ELE-4			Fewer conflicts	Fewer severe conflicts	No change	Provides alternate route	Same	Partially consistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Stays within the existing ROW	Same delay	Medium
INT-1, ELE-7			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Same as now	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	Same delay	Medium
INT-1, ELE-4, ELE-7			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	Same delay	Medium
INT-2	Partial Access Signalized Intersection		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Same as now	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Stays within the existing ROW	More delay	Medium

Table D-1: Screening Results of All Alternative Combinations, continued

Alternative Number	Alternative Name	**Baseline Purpose and Need Metrics –** Do alternatives meet the project Purpose and Need?						**Other Considerations (Level 1 Qualitative Metrics) –** How do alternatives compare to the current intersection?							
		Purpose & Need >>	**Primary** *Alternative must score positive in one or more metrics to advance*			**Secondary**		**Other Considerations**							
			Safety			Alternate driving routes	Non-motorized Accessibility	Economic growth			Environmental			Traffic operations	Cost
		Metric >>	Crash frequency	Crash severity	Bicycles and pedestrians	Crash delay	Accessibility comfort	Land use plans	Business visibility	Business access	Wetland (Sec. 404) permit	Protected lands	Right-of-way (ROW) impact	Peak hour delay	Cost range
INT-2, ELE-4	Partial Access Signalized Intersection		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Equally accessible	No jurisdictional wetlands impact	No use	Stays within the existing ROW	More delay	Medium
INT-3	Full Access Signalized Intersection		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Same as now	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	More accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	More delay	Medium
INT-3, ELE-4			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	More accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	More delay	Medium
INT-4	Move Signalized Intersection from Nugget to E-Y		Fewer conflicts	Fewer severe conflicts	No change	Same as now	Same	Inconsistent with adopted land use plans	Equally visible	Less accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	More delay	Medium
INT-4, ELE-4			Fewer conflicts	Fewer severe conflicts	No change	Provides alternate route	Same	Inconsistent with adopted land use plans	Equally visible	Less accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	More delay	Medium
INT-4, ELE-7			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Same as now	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Less accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	More delay	Medium
INT-4, ELE-4, ELE-7			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Less accessible	No jurisdictional wetlands impact	No use	Minimal ROW needed	More delay	Medium
INT-5	Roundabout Intersection		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Same as now	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	More accessible	Individual permit	No use	Substantial ROW needed	More delay	Medium
INT-5, ELE-5			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Consistent with adopted land use plans	Equally visible	More accessible	Individual permit	No use	Substantial ROW needed	More delay	High
INT-6	Two Signalized T-Intersections		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	More accessible	No jurisdictional wetlands impact	No use	Substantial ROW needed	More delay	Medium
INT-7	Relocate Intersection to Southeast of Church		Fewer conflicts	Fewer severe conflicts	No change	Same as now	Same	Partially consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW needed	Same delay	Medium

Table D-1: Screening Results of All Alternative Combinations, continued

Alternative Number	Alternative Name	**Baseline Purpose and Need Metrics –** Do alternatives meet the project Purpose and Need?						**Other Considerations (Level 1 Qualitative Metrics) –** How do alternatives compare to the current intersection?							
		Purpose & Need >>	**Primary** *Alternative must score positive in one or more metrics to advance*			**Secondary**		**Other Considerations**							
			Safety			Alternate driving routes	Non-motorized Accessibility	Economic growth			Environmental			Traffic operations	Cost
		Metric >>	Crash frequency	Crash severity	Bicycles and pedestrians	Crash delay	Accessibility comfort	Land use plans	Business visibility	Business access	Wetland (Sec. 404) permit	Protected lands	Right-of-way (ROW) impact	Peak hour delay	Cost range
INT-7 (signal)	Relocate Intersection to Southeast of Church with Signal		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Same as now	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW needed	More delay	Medium
INT-7 (signal), ELE-4			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Equally accessible	Individual permit	No use	Substantial ROW needed	More delay	Medium
INT-8	Diverted Left Turn or Continuous Flow Intersection		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Same as now	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	More accessible	Individual permit	No use	Substantial ROW needed	More delay	High
INT-8, ELE-4			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	More accessible	Individual permit	No use	Substantial ROW needed	More delay	High
INT-9	Diverging Diamond Intersection Pair		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Equally visible	Less accessible	Individual permit	No use	Substantial ROW needed	More delay	High
OVP-1	Single Point Urban Interchange		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Some improvement	Less difficult or more comfortable	Partially consistent with adopted land use plans	Less visible	More accessible	Individual permit	No use	Substantial ROW needed	Less delay	High
OVP-1, ELE-4			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Partially consistent with adopted land use plans	Less visible	More accessible	Individual permit	No use	Substantial ROW needed	Less delay	High
OVP-2	Diamond Interchange		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Some improvement	Less difficult or more comfortable	Partially consistent with adopted land use plans	Less visible	More accessible	Individual permit	No use	Substantial ROW needed	Less delay	High
OVP-2, ELE-5			Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Consistent with adopted land use plans	Less visible	More accessible	Individual permit	No use	Substantial ROW needed	Less delay	High
OVP-3, ELE-5	Split Diamond Interchange Pair		Fewer conflicts	Fewer severe conflicts	Decreases walking conflicts	Provides alternate route	Less difficult or more comfortable	Consistent with adopted land use plans	Less visible	More accessible	Individual permit	No use	Substantial ROW needed	Less delay	High

Table D-1: Screening Results of All Alternative Combinations, continued

Alternative Number	Alternative Name	**Baseline Purpose and Need Metrics** – Do alternatives meet the project Purpose and Need?						**Other Considerations (Level 1 Qualitative Metrics)** – How do alternatives compare to the current intersection?							
		Purpose & Need >>	**Primary** *Alternative must score positive in one or more metrics to advance*			**Secondary**		**Other Considerations**							
			Safety			Alternate driving routes	Non-motorized Accessibility	Economic growth			Environmental			Traffic operations	Cost
		Metric >>	Crash frequency	Crash severity	Bicycles and pedestrians	Crash delay	Accessibility comfort	Land use plans	Business visibility	Business access	Wetland (Sec. 404) permit	Protected lands	Right-of-way (ROW) impact	Peak hour delay	Cost range
ELE-1	Traffic Demand Management														
ELE-2	Intelligent Transportation Systems														
ELE-3	Flashing Intersection Ahead or Signal Ahead Signs				Decreases walking conflicts		Less difficult or more comfortable								
ELE-4	Median Crossover					Provides alternate route									
ELE-5	One-way (Northbound) or Two-way Frontage Road to Glacier-Nugget					Provides alternate route		Partially consistent with adopted land use plans			Individual permit		Substantial ROW needed		High
ELE-6	Grade-separated Connection between Yandukin Drive and Glacier-Lemon Road								Less visible	More accessible	Individual permit		Minimal ROW needed	Same delay (CLS-1 only)	High
ELE-7	Grade-separated Pedestrian Crossing				Decreases walking conflicts		Less difficult or more comfortable						Minimal ROW needed		Medium

Appendix E Compatible Design Elements

The compatible design elements were screened against the criteria, and were only ranked if the design element could change the rank of a stand-alone alternative.

The following tables (Tables E-1 through E-5) and figures (Figures E-1 through E-3) present how ELE-3 through ELE-7 could change the level ranks to the alternatives. ELE-1 (Traffic Demand Management [TDM]) and ELE-2 (Intelligent Transportation System [ITS]) do not change the ranks for any of the alternatives; therefore, no tables are provided for the two elements.

To meet the bicycle/pedestrian safety and non-motorized accessibility metrics, two potential pedestrian crossing compatible elements were considered. The first compatible element option is an at-grade signalized pedestrian crossing, such as a Pedestrian Hybrid Beacon (PHB). Based on the guidelines in the Manual on Uniform Traffic Control Devices and the Alaska Traffic Manual, a pedestrian signal is not warranted because of the low volumes of pedestrians crossing Egan Drive at the E-Y intersection; therefore, this option was dismissed. The second compatible element option is a grade-separated pedestrian crossing in the form of a pedestrian bridge or a tunnel. The grade-separated crossing is depicted as compatible element ELE-7, and was added to alternatives when needed.

Note that at this level of screening, the ELE-7: Grade Separated Pedestrian Crossing element could either be a pedestrian bridge or a tunnel. Both options will be analyzed in Level 2 screening when more design information is available. For Level 1 screening, it was assumed that ELE-7 would require minimal right-of-way (ROW) needs and would not affect the overall cost ranking of the alternatives. These ranks may change during Level 2 screening with more design and location refinement.

Table E-1: ELE-3 Flashing Intersection Ahead Sign or Signal Ahead Sign Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to*	Safety	Crash frequency		
		Crash severity		
		Bicycles and pedestrians	Decreases walking conflicts	Provides facility for pedestrians to cross Egan Drive. Removes pedestrian and bicycle conflict with vehicles.
Secondary	Alternate driving routes	Crash delay		
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Separates pedestrians from high-speed vehicles.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans		
		Business visibility		
		Business access		
	Environmental	Wetland (Sec. 404) permit		
		Protected lands		
		Right-of-way impact		
	Traffic operations	Peak hour delay		
	Cost	Cost range		

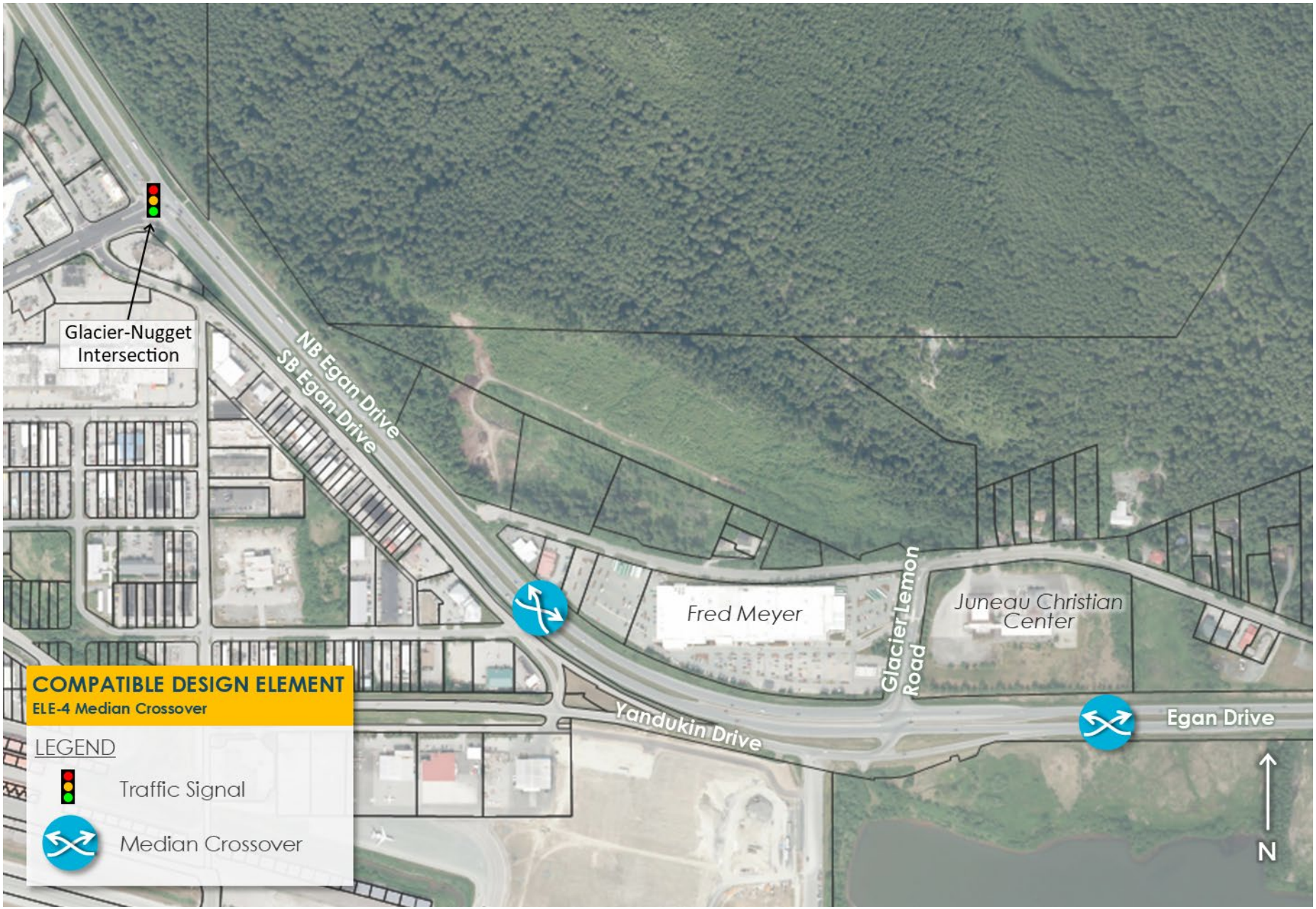

Figure E-1: ELE-4 Median Crossover Diagram

Table E-2: ELE-4 Median Crossover Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to*	Safety	Crash frequency		
		Crash severity		
		Bicycles and pedestrians		
Secondary	Alternate driving routes	Crash delay	Provides alternate route	New infrastructure provides Egan Drive traffic a new route when there is a crash.
	Non-motorized accessibility	Accessibility comfort		
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans		
		Business visibility		
		Business access		
	Environmental	Wetland (Sec. 404) permit		
		Protected lands		
		Right-of-way impact		
	Traffic operations	Peak hour delay		
	Cost	Cost range		

Figure E-2: ELE-5 One-way (Northbound) or Two-way Frontage Road to Glacier-Nugget Diagram

Table E-3: ELE-5 One-way or Two-way Frontage Road to Glacier-Nugget Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency		
		Crash severity		
		Bicycles and pedestrians		
Secondary	Alternate driving routes	Crash delay	Provides alternate route	Two-way frontage road from Glacier-Lemon Road to Glacier-Nugget intersection would provide an alternate route for Egan Drive traffic. A one-way frontage road would provide an alternate route for northbound Egan Drive traffic only.
	Non-motorized accessibility	Accessibility comfort		
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans	Partially consistent with adopted land use plans	Consistent with Lemon Creek Area Plan goal to advocate for the extension of Glacier Hwy. to Egan Dr. at Glacier-Nugget intersection. Consistent with CBJ Comprehensive Plan Action 8.8 IA13 to provide a secondary route to Egan Dr., where no alternative route currently exists.
		Business visibility		
		Business access		
	Environmental	Wetland (Sec. 404) permit	Individual permit	Known wetlands present. Individual permit needed.
		Protected lands		
		Right-of-way (ROW) impact	Substantial ROW needed	Additional land needed for Glacier-Lemon Road extension to Glacier-Nugget intersection. No relocations required. May require Federal Highway Land transfer process (Title 23 Highway Easement Deed).
	Traffic operations	Peak hour delay		
	Cost	Cost range	High	Constructs a new roadway to connect Glacier-Lemon Road to the Glacier-Nugget intersection, which may require cutting into the hillside and reconfiguring the Glacier-Nugget intersection.

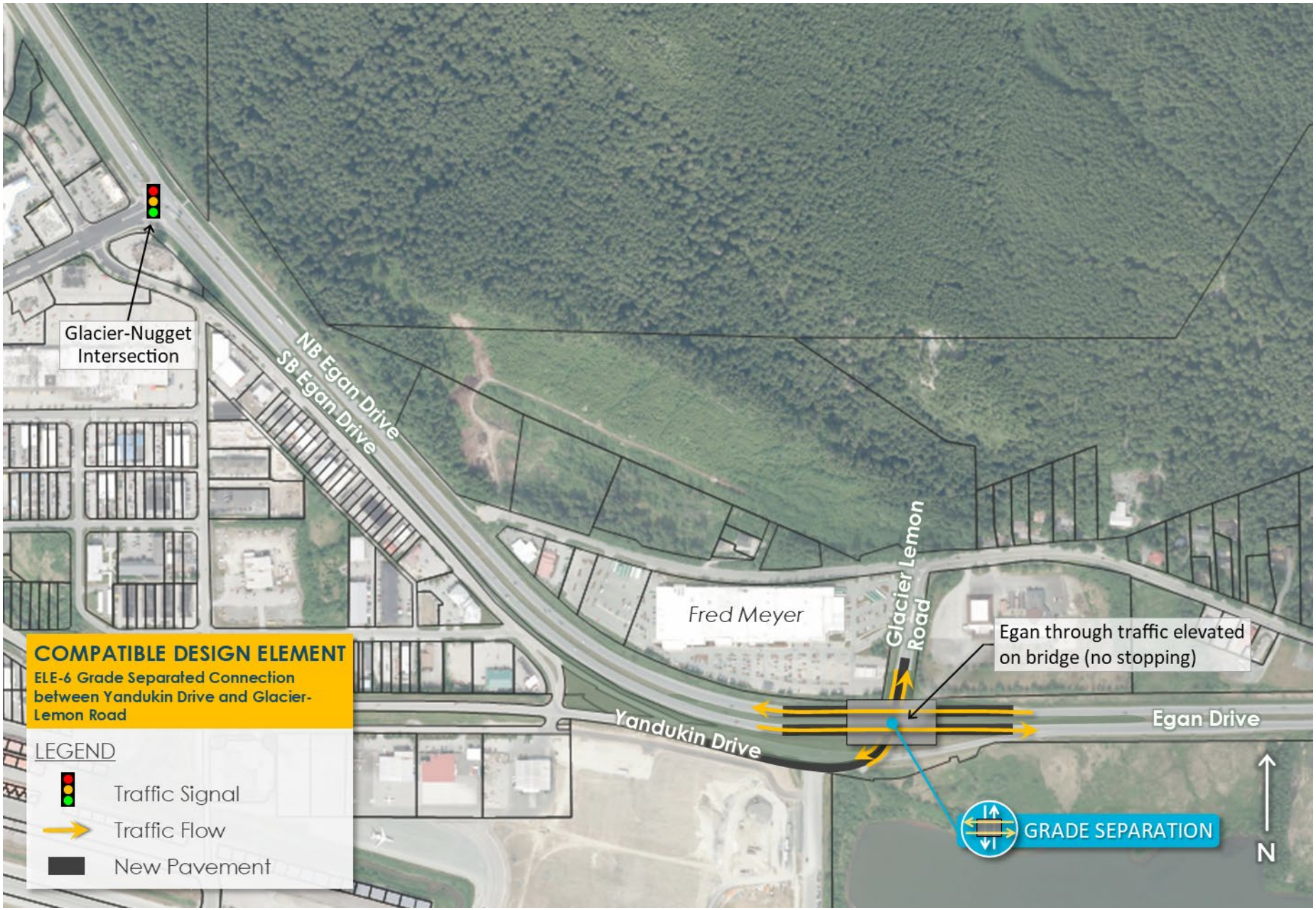

Figure E-3: ELE-6 Grade Separated Connection between Yandukin Drive and Glacier-Lemon Road Diagram

Table E-4: ELE-6 Grade Separated Connection Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to advance*	Safety	Crash frequency		
		Crash severity		
		Bicycles and pedestrians		
Secondary	Alternate driving routes	Crash delay		
	Non-motorized accessibility	Accessibility comfort		
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans		
		Business visibility	Less visible	Guardrail or concrete barriers would run along the elevated portion of Egan Drive, which would obstruct a portion of businesses near Egan Drive. The elevated roadway would also obstruct Fred Meyer and the Juneau Christian Center from Yandukin Drive vehicles.
		Business access	More accessible	The grade separation connects Yandukin Drive to Glacier-Lemon Road, allowing vehicles on one side of Egan Drive to access residences and businesses on the other side.
	Environmental	Wetland permit	Individual permit	Elevated roadway may require some fill in adjacent wetlands.
		Protected lands		
		Right-of-way (ROW) impact	Minimal ROW needed	Likely requires some property outside of ROW. May avoid adjacent development.
	Traffic operations	Peak hour delay	Same delay (CLS-1 only)	For CLS-1, the addition of the element results in the v/c ratio at E-Y intersection being the highest between the two intersections, which is about the same v/c ratio as existing. Ranking does not change for CLS-2 and CLS-3 with addition of element.
	Cost	Cost range	High	Constructs an elevated bridge structure, increasing cost.

Table E-5: ELE-7 Grade Separated Pedestrian Crossing Screening Results

Purpose	Need	Metric	Levels	Reasons of Level Ranking
Baseline Purpose and Need Metrics				
Primary – *Alternative must score positive in one or more metrics to*	Safety	Crash frequency		
		Crash severity		
		Bicycles and pedestrians	Decreases walking conflicts	Provides facility for pedestrians to cross Egan Drive. Removes pedestrian and bicycle conflict with vehicles.
Secondary	Alternate driving routes	Crash delay		
	Non-motorized accessibility	Accessibility comfort	Less difficult or more comfortable	Separates pedestrians from high-speed vehicles.
Other Considerations (Level 1 Qualitative Metrics)				
	Economic growth	Land use plans		
		Business visibility		Elevated structure may intermittently obstruct views of nearby businesses, but not substantially.
		Business access		
	Environmental	Wetland permit		
		Protected lands		
		Right-of-way (ROW) impact	Minimal ROW needed	Minor amounts of ROW assumed required for pedestrian crossing.
	Traffic operations	Peak hour delay		
	Cost	Cost range	Medium	Constructs a grade-separated pedestrian structure and pathways to lead pedestrians to bridge.

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