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Alternatives Analysis Memo

To:	File
From:	Ryan Goentzel, PE
Subject:	Seward Hwy & Alyeska Hwy Intersection Improvements Alternatives Analysis Memo
Date:	September 26, 2022
Project #:	Z546190000 (DOT&PF) / 2860.01 (R&M)

Introduction

This memorandum documents the alternatives analysis process for the Seward Hwy and Alyeska Hwy Intersection Improvements project. This project was identified in the 1995 Girdwood Area Plan and made recommendations to improve the intersection because of the projected increase in traffic on the Seward Hwy and Alyeska Hwy. This traffic increase primarily results in additional travel delays and the potential for crashes. In 2001, the Girdwood Commercial Areas and Transportation Master Plan was adopted and made additional recommendations relevant to this intersection and the adjacent area. The nearby Seward Hwy MP 75-90 project had included reconstructing this intersection in the project. In 2018, the Girdwood Board of Supervisors (GBOS) passed a resolution that supported these improvements. In 2019, the DOT&PF initiated this project and hired R&M Consultants, Inc. to design and implement improvements at the intersection. Figure 1 shows the process that the project team followed to develop design alternatives for this project.

Purpose and Need

The purpose of the proposed project is to increase through-traffic highway capacity, improve intersection operation, and improve safety at the intersection of the Seward Hwy and Alyeska Hwy near the community of Girdwood, Alaska. The need for this project is based on the following:

- **Reduce intersection congestion** – This intersection experiences very poor level of service (LOS) during peak periods, which is measured as substantial delays, excessive queues, and risk-taking behaviors which affect operations and result in safety concerns.
- **Improve safety** – Angle crashes are the prevalent crash type with contributing factors including large vehicles parked along the shoulders blocking intersection sight lines. Nearby driveway and local road intersections are in close proximity to the main intersection, affecting operations and increasing conflicts between turning vehicles.
- **Allow future growth** – Projected increases in Seward Hwy traffic volumes may exceed the capacity of an undivided interstate during the design life. Accommodating future expansion without precluding adjacent developments is necessary.

In addition to these issues, the project team identified other issues that this project should resolve. These issues are shown in Appendix A.

Figure 1 – Alternatives Development Process

Traffic Analysis

As southcentral Alaska grows with permanent residents and out-of-state visitors, the Seward Hwy will experience an increase traffic which will add to the stress on the Seward and Alyeska intersection. Motorists traveling to and from the communities north and south of Girdwood are forced to travel through this intersection. This increase in traffic will lead to an increase in congestion, travel delays, and potential crashes.

As a subcontractor to R&M, Kinney Engineering, LLC, was hired to analyze the existing and future traffic volumes, movements, and behaviors in the project area. The analysis uses a 0.5% annual growth rate of traffic volumes from the construction year (2025) to the design year (2045) and 0.25% from the design year (2045) to 50 years beyond construction (2075). The populations of the Municipality of Anchorage (MOA), Mat-Su, and Kenai Peninsula Boroughs were factored into the travel demand for this project.

Analysis of the no-build alternative yielded an average annual Level of Service (LOS) for the design year of E for weekday PM peak and F for weekend peak for motorists travelling southbound on Alyeska turning left onto the Seward Hwy. In the summer, the Seward Hwy experiences an increase in traffic volume of roughly twice the annual average daily traffic (AADT), leading to a reduced LOS.

In 2007, the DOT&PF designated the Seward Hwy from MP 117 (Potter's Marsh) to 87 (3 miles east of the Alyeska Hwy intersection) as a Safety Corridor. Data has shown that this designation may have reduced crashes at the intersection despite nearby segments experiencing an increase both in number of crashes and severity. The study intersection has a crash rate below average for similar facilities. This may be a result of drivers slowing down as they approach the intersection because it is well-known,

visible, and they expect congestion. This slow-down of traffic adds friction on the highway in this area. With the projected increase in traffic, it is expected that a decrease in gaps for turning vehicles will occur thus leading to drivers taking chances and making risky decisions which results in head-on and angle crashes.

See the project's *Existing Conditions Report* under separate cover.

Preliminary Alternative Development

The project team developed design alternatives ranging from the no-build, to maintaining the existing configuration and adding a signal, all the way up to a four-lane divided highway with a grade-separated interchange. In total, there were eleven alternatives developed.

Appendix B contains these preliminary concept level design alternatives.

Alternative 1 – No-Build Alternative

The No-Build alternative maintains the existing configuration of the intersection.

Alternative 2 – Signalize Existing Intersection

This alternative maintains the existing configuration of the intersection but adds a traffic signal to control turning and through movements on the Seward and Alyeska highways.

Alternative 3 – Signalized Intersection (Improved)

This alternative is similar to Alt 2, but realigns Alyeska Hwy to the west, eliminates the mall approaches on Seward and Alyeska highways, channelizes the right turn movement for northbound Seward Hwy traffic to Alyeska Hwy, and extends Gold Avenue to Alyeska Hwy creating a signalized tee intersection.

Alternative 4 – Continuous Flow Intersection

This alternative is similar to Alt 3 but adds another traffic signal to control southbound Seward Hwy to Alyeska Hwy left turn and northbound Seward Hwy through movements. This additional signal allows for continuous flow traffic after southbound Seward Hwy left turn traffic crosses the northbound lane. This configuration is also known as a displaced left turn intersection.

Alternative 5 – Continuous Green Signal

This alternative is similar to Alt 3, but southbound Seward Hwy traffic is allowed to freely flow through the intersection by a continuous green signal. All other movements are controlled by the signal normally. Southbound left turn Alyeska Hwy to Seward Hwy traffic is provided an acceleration lane on Seward Hwy to allow for vehicles to accelerate and merge safely at highway speeds.

Alternative 6 – Divided Highway

This alternative realigns the Seward Hwy to the south, builds a new bridge over Glacier Creek, extends Alyeska Hwy to the realigned Seward Hwy, transforms the existing Seward Hwy into a one-way northbound frontage road, and adds traffic signals at the new Seward and Alyeska highway

intersection location and the existing intersection location. The configuration with Alyeska Hwy and Gold Avenue and the mall approaches are similar to Alt 3.

Alternative 7 – Trumpet Interchange

This alternative constructs a bridge overpass for Alyeska Hwy over the Seward Hwy to provide a grade-separated intersection. On and off ramps are provided for Girdwood traffic that allow for free-flow movements. Deceleration and acceleration lanes are provided on the Seward Hwy to allow for vehicles going to and coming from Alyeska Hwy to diverge and merge at appropriate speeds. It also constructs a roundabout the Alyeska Hwy and Gold Ave intersection. The driveways for the Girdwood Station Mall along the Seward Hwy and Alyeska Hwy are removed, but the Seward Hwy and Main St intersection remains. Access to the Mall would be located on Gold Ave and Main St.

Alternative 8 – Roundabout

This alternative constructs a large roundabout on the Seward Hwy, maintains the free right turn lane for southbound Alyeska Hwy to northbound Seward Hwy traffic, and provides deceleration and acceleration lanes. The local access modifications and roundabout intersection for Alyeska Hwy and Gold Ave from Alt 7 is also included in this alternative.

Alternative 9 – Tight Partial Diamond

This alternative constructs a bridge overpass for Alyeska Hwy over the Seward Hwy to provide a grade-separated intersection. On and off ramps that allow for deceleration and acceleration are provided for Girdwood traffic. This is similar to Alt 7, however, a traffic signal would be located on the southern side of the Seward Hwy to manage turning traffic. Retaining walls would also be constructed along the on and off ramps. The local access configuration is similar to Alt 7, except that a traffic signal would be located at the Alyeska Hwy and Gold Ave intersection instead of a roundabout.

Alternative 10 – Frontage Road

This alternative realigns the Seward Hwy to the south and converts the existing Seward Hwy roadbed into a two-way frontage road for the local traffic and turning movements around the Girdwood Station Mall. Access from the Seward Hwy would be two at-grade intersections by extending Alyeska Hwy and Main St. These extensions would carry one-way traffic with Alyeska carrying traffic into Girdwood from the Seward Hwy and Main St carrying traffic out of Girdwood and southbound on the Seward Hwy. The existing northbound free right-turn lane from Alyeska Hwy would move out to the new extension with Seward Hwy. The local access configuration is similar to Alt 9.

Alternative 11 – Diamond

This alternative represents a full-build scenario with the Seward Hwy being constructed over the Alyeska Hwy. The Seward Hwy would have two lanes for each direction and a new bridge over Glacier Creek. On and off ramps to allow for deceleration and acceleration and provide access to Alyeska Hwy would be constructed. The existing Seward Hwy roadbed would be converted into a frontage road for northbound traffic travelling to Girdwood. The southbound on-ramp from Alyeska would consist of a new bridge over Glacier Creek. The local access configuration is similar to Alt 9.

Preliminary Alternative Analysis

These alternatives were evaluated on several criteria based how the alternative impacted the criteria with scores of -1 (negative impact), 0 (moderate impact), and +1 (positive impact). The scoring criteria used for the evaluation were:

Meets Purpose and Need
Does the alternative satisfy the project's stated purpose and need?

Operations – Overall Turning Delay
How does the alternative affect the overall turning delay for vehicles turning in all directions?

Operations – Local Access
How does the alternative affect the local access for residents in old Girdwood and the Girdwood Station Mall traffic?

Safety – Conflict Point Reduction
How well does the alternative reduce the amount and potential severity of the conflict points for turning and though traffic?

Safety – Accommodates Non-Motorized Users
How well does the alternative accommodate non-motorized users?

Safety – Emergency Vehicle Access
How does alternative affect access for emergency vehicles travelling through the intersection?

Mobility – Truck Accommodation
How well does the alternative accommodate trucks travelling through the intersection and turning onto and off Alyeska Hwy?

Mobility – Seward Highway Through-Traffic Delay
How well does the intersection improve delay for through traffic on the Seward Hwy?

Mobility – Accommodates Future Divided Highway
How well does the alternative accommodate the Seward Hwy becoming a future four-lane divided highway?

Costs – ROW Cost
How much would potential ROW acquisitions cost?

Costs – Construction Cost
How much would the alternative cost for construction?

Costs – Maintenance Cost
How much would the alternative cost for maintenance?

Environmental Impacts – Viewshed
How does the alternative impact the viewshed from the Girdwood Station Mall and old Girdwood?

Environmental Impacts – Resources
How does the alternative impact environmental resources including wetlands, water of the U.S., cultural resources, aquatic and terrestrial habitat, contaminated sites, etc.? Environmental impacts were based on preliminary information. Environmental resources include wetland and waters of the U.S., cultural resources, aquatic and terrestrial habitat, contaminated sites, etc. Impact projections primarily based on extent of ground disturbance (i.e. project footprint).

Environmental Impacts – Consistency with Local Plans
Is the alternative consistent with local plans, including the Girdwood Area Plan (1995), Girdwood Commercial Areas and Transportation Master Plan (2001), and is it compatible with adjacent and planned land uses?

ROW Impacts – Number of Parcels
How many parcels are affected by the alternative?

ROW Impacts – Number of Relocations
How many relocations does the alternative require to be constructed?

Construction Impacts – Utility Relocations
What is overall impact to existing utilities and their relocations? This includes quantity (power, communications, etc.), complexity (interim service, additional infrastructure, major/minor relocation, etc.), and magnitude (large transmission versus small service lines).

Construction Impacts – Construction Phasing
How well does the alternative accommodate phasing for construction? Can it be constructed off alignment, does it need detours, extensive traffic control, etc.?

Construction Impacts – Construction Duration
How long would the alternative take to be constructed?

The scoring criteria were weighted based on its relative importance to the project and the purpose and need. This weighting ranged from 1 (low importance) to 5 (high importance). With the primary goals of maintaining high mobility and increasing safety on the Seward Hwy and at the intersection, the alternatives that featured grade-separations scored best.

Appendix C contains the alternatives evaluation matrix for the eleven preliminary concept level design alternatives.

Modified Alternatives Development

The eleven preliminary alternatives were presented to the public in the form of open houses, stakeholder meetings, municipal commission review, and project website posts. In addition, the alternatives went through agency reviews by DOT&PF and MOA. Through this process, there were some prominent issues that were identified:

1. How is the local access to the Old Girdwood neighborhood impacted by the project? There was concern expressed by Old Girdwood residents that the project would increase traffic on the local roads, specifically Gold Ave and Main St, which would be a detriment to the neighborhood context of Old Girdwood.
2. Could the project scope expand to replace the Alyeska Hwy bridge over the railroad?
3. Should the newly constructed Seward Hwy bridge over Glacier Creek be a boundary point for the project scope?
4. Could Alyeska Hwy be realigned to the west, thus moving the intersection away from the Girdwood Station Mall?

From the input received from the public and agencies, the issues listed above were resolved by the following:

1. Realign the Seward Hwy to the south to maintain or improve the current Old Girdwood local access and Girdwood Station Mall driveway configuration.
2. The Alyeska Hwy bridge over the railroad should be replaced given its age of nearly 60 years, maintenance cost versus the cost of constructing a new bridge, and its undersized for ideal use by the Alaska Railroad.
3. The cost and benefits of constructing a new bridge over Glacier Creek was weighed by the project team and DOT&PF and it was decided to be outside the scope of this project.
4. Realigning Alyeska Hwy to the west into the undeveloped wetlands allows for the local access and driveways for the Girdwood Station Mall be maintained. It was also necessary to provide the adequate acceleration length for vehicles travelling south on Alyeska Hwy turning south onto Seward Hwy to accelerate up to the proper merge speed. In addition, this realignment allows for the adequate deceleration length for vehicles travelling north on Seward Hwy turning north onto Alyeska Hwy to decelerate before reaching the Alyeska Hwy/Gold Ave intersection.

The top three preliminary build alternatives, Alt 7 – Trumpet Interchange, Alt 9 – Tight Partial Diamond, and Alt 11 – Diamond were decided to be carried forward for a more detailed design and evaluation process. This process included applying design standards, such as the AASHTO Green Book, Roadside Design Guide, DOT&PF Preconstruction Manual, etc. Design modifications applied to the three alternatives included realigning Seward Hwy and Alyeska Hwy, replacing the bridge over the railroad, and maintaining the current local access configuration. These modifications helped separate the arterial road functions of the Seward and Alyeska highways from the local road functions around the Mall.

Appendix D contains the modified concept level build alternatives. These were presented to the public and agencies to gather additional input on how to improve the designs and develop a recommended alternative.

Modified Alternatives Analysis

The three modified build alternatives went through additional evaluation using a number scoring and criteria weighting system with the goal of determining a recommended alternative to move forward with in the environmental and final design processes. The alternatives were again scored on the same criteria as before but ranged from -2 (negative impact) to +2 (positive impact) to allow for more separation in the total score.

Alt 11 was eliminated primarily due to its high cost and large environmental impacts. The high embankments and larger footprint also negatively affected this alternative relating to viewshed and wetland impacts.

Alt 9 was eliminated as it would require construction of a high embankment and retaining wall between the Seward Hwy and on/off ramps to function properly. Per public feedback, impacts to the viewshed from the Mall and Old Girdwood Neighborhood toward Turnagain Arm should be evaluated as a significant detriment to the design. The required embankment and retaining wall would have significant impact on viewshed. Despite its smaller footprint compared to Alt 7, it still impacted the wetlands south of the Seward Hwy.

Alt 7 proved to be the best solution that balanced the cost and environmental impacts while solving the issues identified, and best meeting the project's purpose and need. While Alts 9 and 11 improved the operations, safety, and mobility of the intersection and roadways, they proved to be too impactful in other areas.

Appendix E contains the evaluation matrix for the three modified build alternatives, plus the no-build.

Recommended Concept Level Alternative

The evaluation of the three modified build alternatives, plus the no-build, yielded Alt 7 – Trumpet Interchange as the top alternative to move forward with. This design went through additional reviews by the public, stakeholders, DOT&PF, and MOA. The major components and design process of the recommended concept level alternative is discussed below.

Alyeska Hwy Bridge

One of the major issues with the current intersection is the southbound Seward Hwy left turning vehicles onto Seward Hwy. At the current and future traffic volume levels, this configuration will increase safety concerns and travel delay along the two highways and at the intersection. To achieve the best possible improvements to safety and traffic flow, a grade separated intersection proved to be the only plausible solution.

Southbound Acceleration Lane

Given that a bridge was needed to grade separate the traffic movements, the location of the bridge was the next critical step in the design process. It was decided amongst the project team and DOT&PF that the Glacier Creek bridge would be a constraint to the project. That bridge was recently completed by the Seward Hwy MP 75-90 project and constructing a new bridge would be too costly to the project. Therefore, the design needed to work back from there. To allow for

vehicles to accelerate to 65 mph highway speed from the 20 mph on-ramp speed, an appropriate acceleration lane length dictated by the AASHTO Green Book needed to be provided.

Southbound On-ramp

With the southbound acceleration lane set, the clover leaf on-ramp could be designed. A horizontal curve with a 20-mph design speed, 4.2% superelevation, and 270 ft radius was chosen as it provided the best balance between driver comfort, truck turning accommodation, consideration for winter icing conditions, and impacts to wetlands. This on-ramp curve, together with the acceleration lane, located the new bridge about 670 ft west of the current intersection.

Northbound Off-ramp and Deceleration Lane

For northbound Seward Hwy traffic, adequate length is needed to allow vehicles to safely decelerate from 65 mph on the Seward Hwy to 25 mph on Alyeska Hwy. Constructing a dedicated lane allows these vehicles decelerate and turn without impacting or delaying northbound Seward Hwy through traffic. This directly improves safety and free flow traffic.

Over-height Vehicle Bypass

The new Alyeska Hwy overpass bridge will provide a vertical clearance of 17 ft over the Seward Hwy. To accommodate vehicles carrying loads higher than this, a bridge bypass for southbound traffic will be constructed.

Seward Hwy Realignment

In addition to the turning conflicts at the Alyeska Hwy intersection, there are a number of conflict points at the Mall driveway and Main St intersection on the Seward Hwy. These direct access points needed to be removed and consolidated elsewhere to improve safety and congestion along the Seward Hwy. Throughout the public involvement process, there was a desire expressed to maintain the neighborhood feel of Old Girdwood and driveway configuration of the Girdwood Station Mall property. To allow for this, the project team developed a solution that realigned the Seward Hwy to the south. Separating the Seward Hwy from the Mall driveways maintains internal mall circulation and 65 mph speeds on the Seward Hwy. This also eliminates congestion and delays on the Seward Hwy for northbound Seward Hwy traffic wanting to turn right into the Mall and on Main St. This realignment also allows for a future project to construct a four-lane divided Seward Hwy and new bridge over Glacier Creek.

Alyeska Hwy Merge Lanes

The next important design component is to provide enough distance for Seward Hwy southbound off-ramp and northbound off-ramp traffic turning onto Alyeska Hwy to merge into the correct lane to continue either to Girdwood, the Mall, or Old Girdwood. These merge lanes will be low speed and allow drivers enough time and space to merge left or right and travel toward their destination.

Alyeska Hwy Roundabout

The DOT&PF has adopted a “Roundabout First” policy, which states that designers must provide a written justification of any decision to install a traffic signal instead of a single-lane

roundabout. Roundabouts have been shown to improve congestion and safety over traffic signals and stop signs. The selection and design of roundabouts is heavily influenced by context. Through alternatives development and analysis process, it was apparent that a roundabout would be the best solution at this location. The final design will accommodate the variety of vehicles that travel through the intersection such as large semi-trucks, fuel trucks, tour buses, motorhomes, pick-up truck and trailer combinations, and passenger vehicles.

Alyeska Hwy Realignment

Two key components to roundabout design are visibility of the intersection and speed control of the approaching motorist. The recommended alternative design achieves this by straight lining the Alyeska Hwy alignment which provides as much sight distance as possible while also allowing enough distance for the final design to construct curvilinear approaches to control speed. Another benefit to this realignment is that the Alyeska Hwy bridge over the railroad could be replaced. From discussions with DOT&PF Bridge Section, it became apparent that this bridge needed to be replaced. Rising maintenance costs compared to a new bridge and its minimal clearance envelope for the railroad provided enough justification to construct a new bridge that meets current standards.

Old Girdwood and Girdwood Station Mall Access

With the realignments of the Seward Hwy and Alyeska Hwy, this allowed the Girdwood Station Mall to maintain its current driveway configuration. It also allowed for a direct access approach for Gold Ave and Old Girdwood residents to a public roadway. Currently residents must traverse Mall private property to access Alyeska Hwy. The conflict points for these driveways are reduced in number and potential crash severity because all movements will be at a much lower speed than the current configuration.

Toadstool Drive Access

Toadstool Dr provides access for the DOT&PF Girdwood Maintenance Station and Girdwood residents to the Seward Hwy. To improve safety along the Seward Hwy corridor, this approach needed to be consolidated and moved elsewhere. The logical solution for this was to connect the road to the new roundabout. This approach will remain operational for emergency and maintenance access but will be restricted to the public.

Some of the benefits this alternative provides are:

- All movement free flow, no stops
- Reduced conflict points and direct access to local roads/driveways from Seward Hwy removed, provides significant safety benefits
- Provides Old Girdwood Townsite neighborhood with legal access to Alyeska Hwy
- Roundabout provides traffic calming and opportunity to create gateway feel into Girdwood
- Pathway designed to current standards
- Reduce construction impacts due to off-alignment construction
- No change to internal mall circulation
- Seward Hwy designed for 65 mph
- Design accommodates future 4-lane divided highway

- Intersection lighting to improve visibility and safety

The recommended concept level alternative was presented to the public and reviewed by DOT&PF to gather input and approval for moving forward with this design. There was some negative feedback from the public mainly related to wetland and viewshed impacts, but overall, it was met with mostly positive comments and sentiment.

Appendix F shows the recommended concept level alternative.

Appendix A

Identified Issues

BIRD TO GIRD PATHWAY

ALASKA RAILROAD

TOADSTOOL DR

LEGEND

- SPEEDING
- PEDESTRIAN/VEHICLE CONFLICT
- MULTIPLE DRIVEWAYS CONFUSION/CONFLICTS
- USE OF ROW BY VENDORS
- LOCAL ROAD USED AS DETOUR FOR CUT-THROUGH TRAFFIC
- LACK OF OFF-STREET PARKING
- PRESERVE VIEWSHED
- FISHING ACCESS
- RECREATION/TRESPASSING

STUDY AREA

PROJECT LIMITS

WELCOME TO GIRDWOOD SIGN

ROW

LOCAL TRAFFIC ONLY

TO GIRDWOOD

SPEED LIMIT

ALYESKA HIGHWAY

MAIN ST

GOLD AVE

GLACIER CREEK

ACCESS THROUGH PRIVATE PROPERTY

TESORO STATION MALL

SEWARD HIGHWAY

TO ANCHORAGE

TO SEWARD

MILE 90

SCENIC AREA

SEWARD HWY MP 75-90 PROJECT LIMITS

GRAPHIC SCALE
100 0 100 200
(IN FEET)

AERIAL IMAGE DATES: 2015 & 2020

Seward Hwy & Alyeska Hwy Intersection Improvements

Identified Issues

December 10, 2020

Appendix B

Preliminary Concept Level Design Alternatives

NOTICE:
THIS DRAWING REPRESENTS A PRELIMINARY CONCEPT DEVELOPED BY THE DOT&PF AS OF 03/09/2021. IT DOES NOT REPRESENT DETAILED ENGINEERING OR ANALYSIS.


ALASKA RAILROAD
ALYESKA HIGHWAY
GOLD AVENUE
MAIN STREET
GLACIER CREEK
TOADSTOOL DRIVE
SEWARD HIGHWAY
SEWARD HIGHWAY
N
NOTICE:
THIS DRAWING REPRESENTS A PRELIMINARY CONCEPT DEVELOPED BY THE DOT&PF AS OF 03/09/2021. IT DOES NOT REPRESENT DETAILED ENGINEERING OR ANALYSIS.
• SIGNAL AT SEWARD HIGHWAY/ALYESKA HIGHWAY INTERSECTION
100'
0
100'


ALASKA RAILROAD
ALYESKA HWIGHWAY
GOLD AVENUE
SEE OPTIONAL DRIVEWAY CONSOLIDATION FIGURE FOR DRIVEWAY ACCESS DETAILS
MAIN STREET
GLACIER CREEK
TOADSTOOL DRIVE
SEWARD HIGHWAY
SEWARD HIGHWAY
N
NOTICE:
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• SIGNAL AT SEWARD HIGHWAY/ALYESKA HIGHWAY INTERSECTION
• SIGNAL AT ALYESKA HIGHWAY/GOLD AVENUE INTERSECTION
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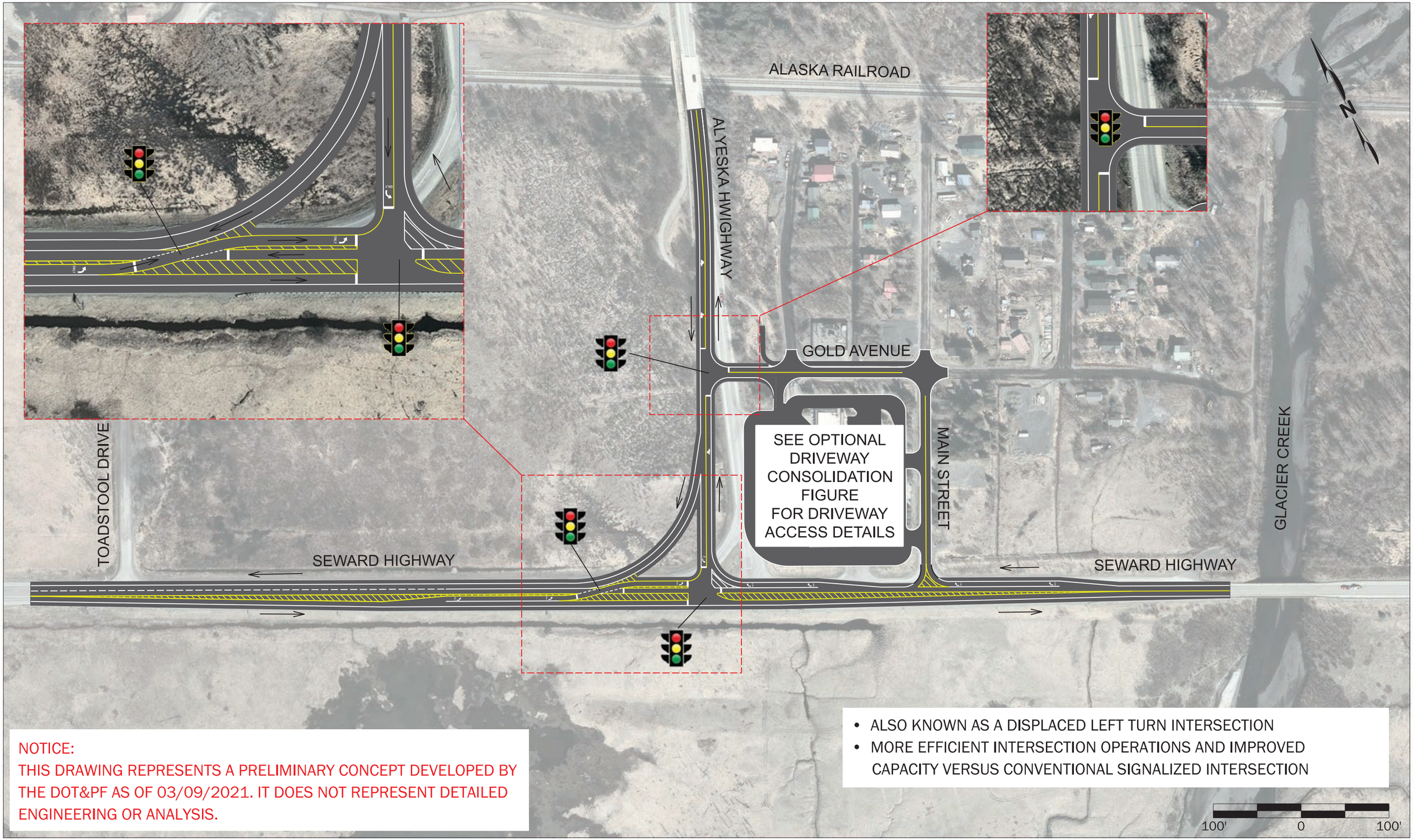

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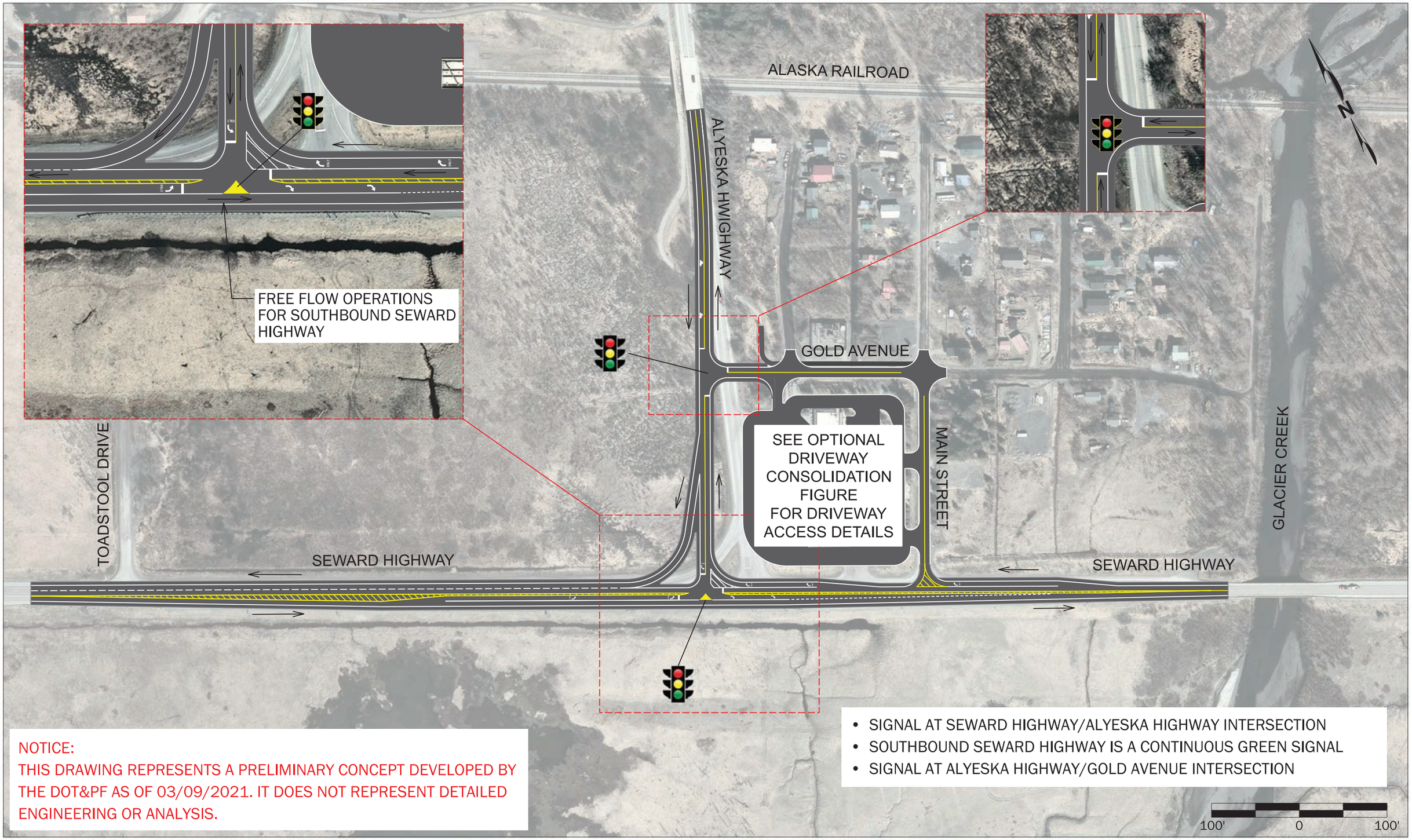
- ALSO KNOWN AS A DISPLACED LEFT TURN INTERSECTION
- MORE EFFICIENT INTERSECTION OPERATIONS AND IMPROVED CAPACITY VERSUS CONVENTIONAL SIGNALIZED INTERSECTION



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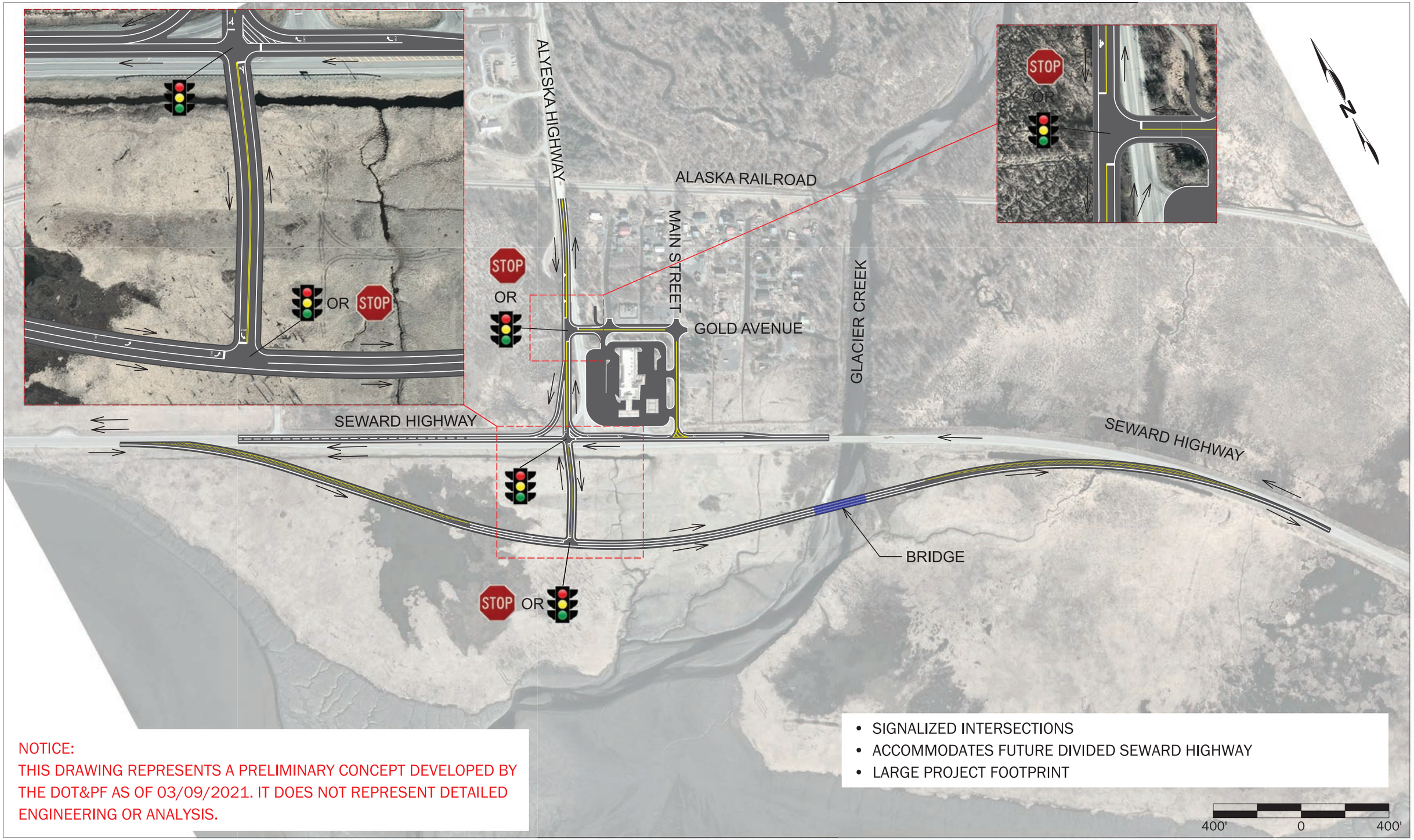
- SIGNAL AT SEWARD HIGHWAY/ALYESKA HIGHWAY INTERSECTION
- SOUTHBOUND SEWARD HIGHWAY IS A CONTINUOUS GREEN SIGNAL
- SIGNAL AT ALYESKA HIGHWAY/GOLD AVENUE INTERSECTION



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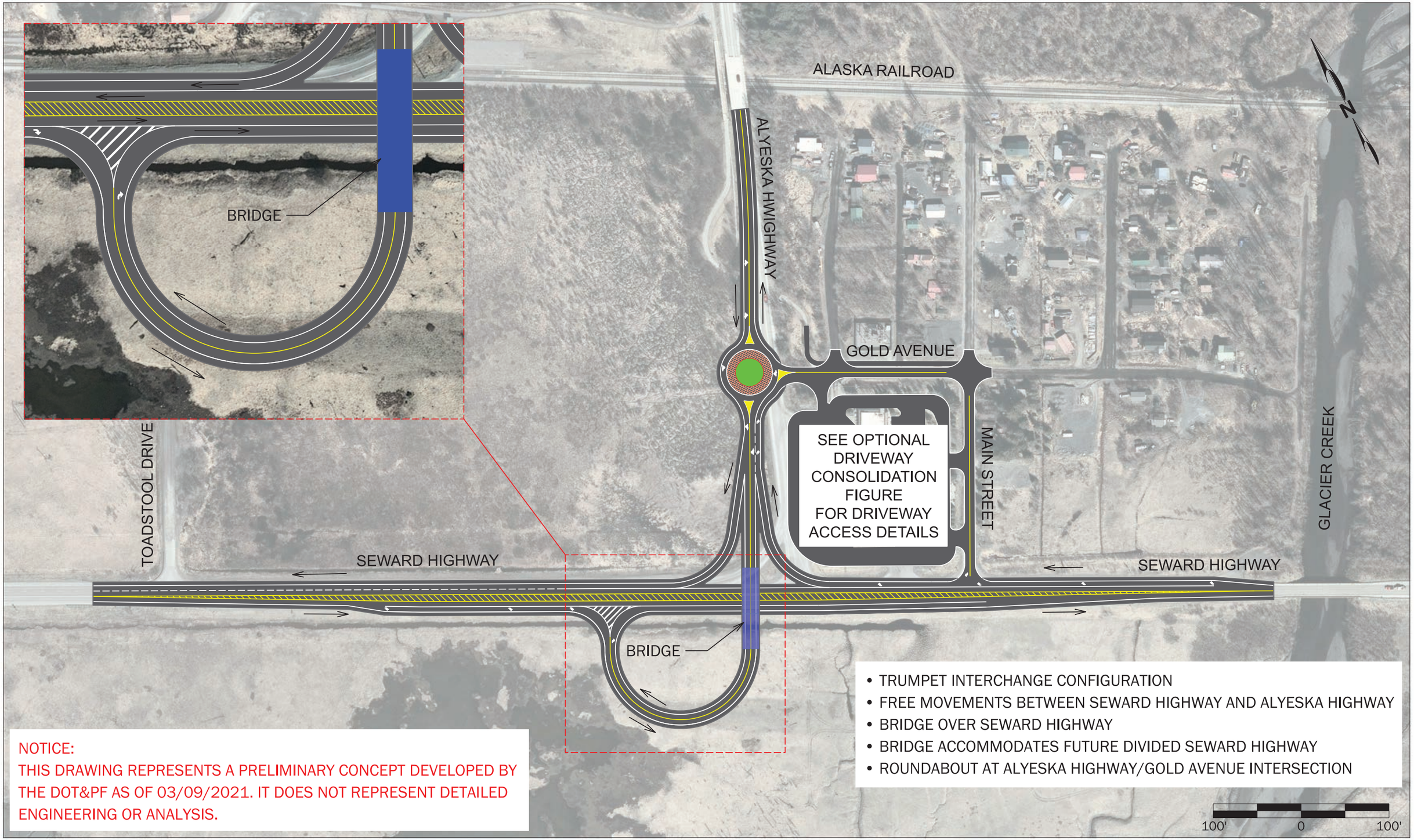
- SIGNALIZED INTERSECTIONS
- ACCOMMODATES FUTURE DIVIDED SEWARD HIGHWAY
- LARGE PROJECT FOOTPRINT



- TRUMPET INTERCHANGE CONFIGURATION
- FREE MOVEMENTS BETWEEN SEWARD HIGHWAY AND ALYESKA HIGHWAY
- BRIDGE OVER SEWARD HIGHWAY
- BRIDGE ACCOMMODATES FUTURE DIVIDED SEWARD HIGHWAY
- ROUNDABOUT AT ALYESKA HIGHWAY/GOLD AVENUE INTERSECTION

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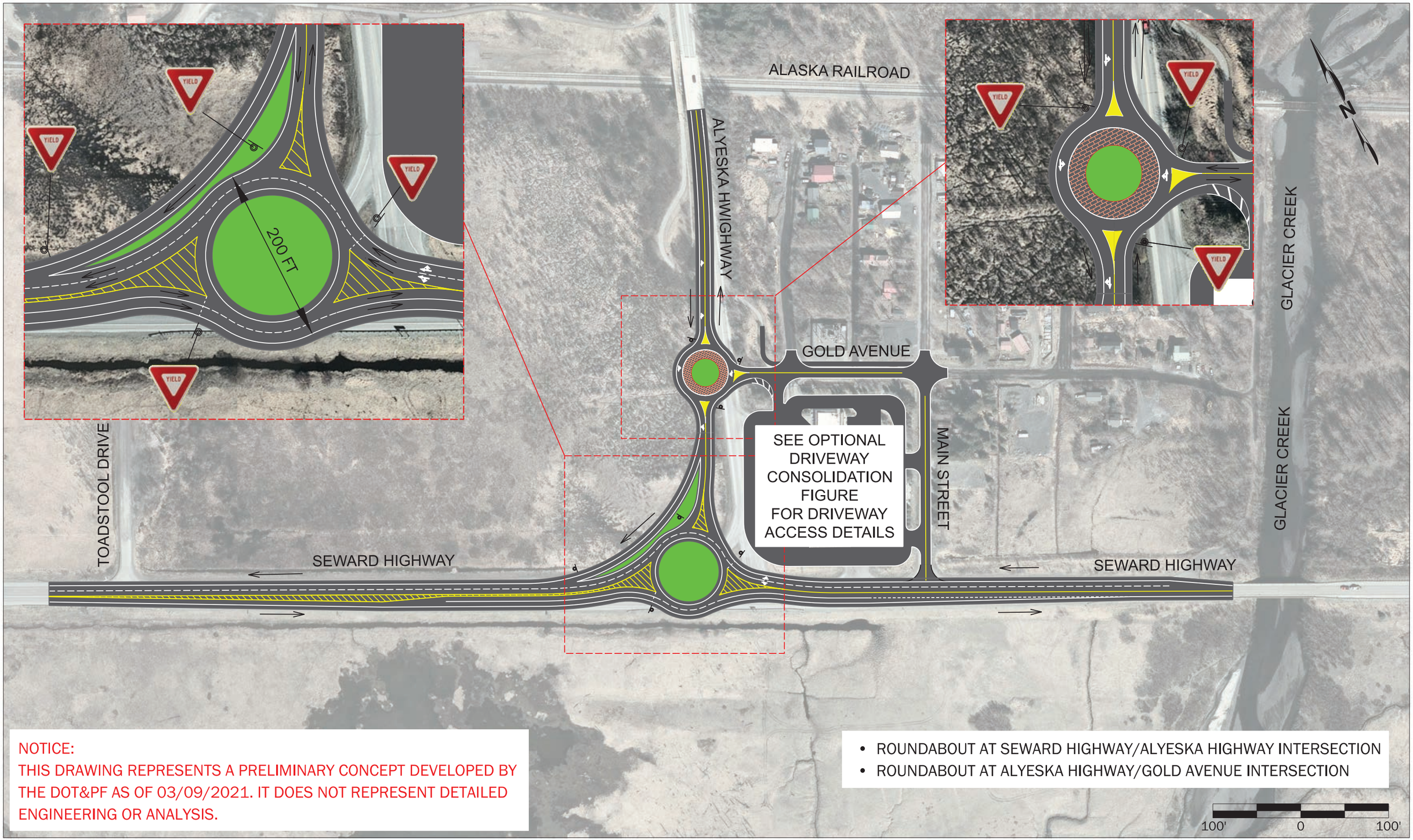
YIELD
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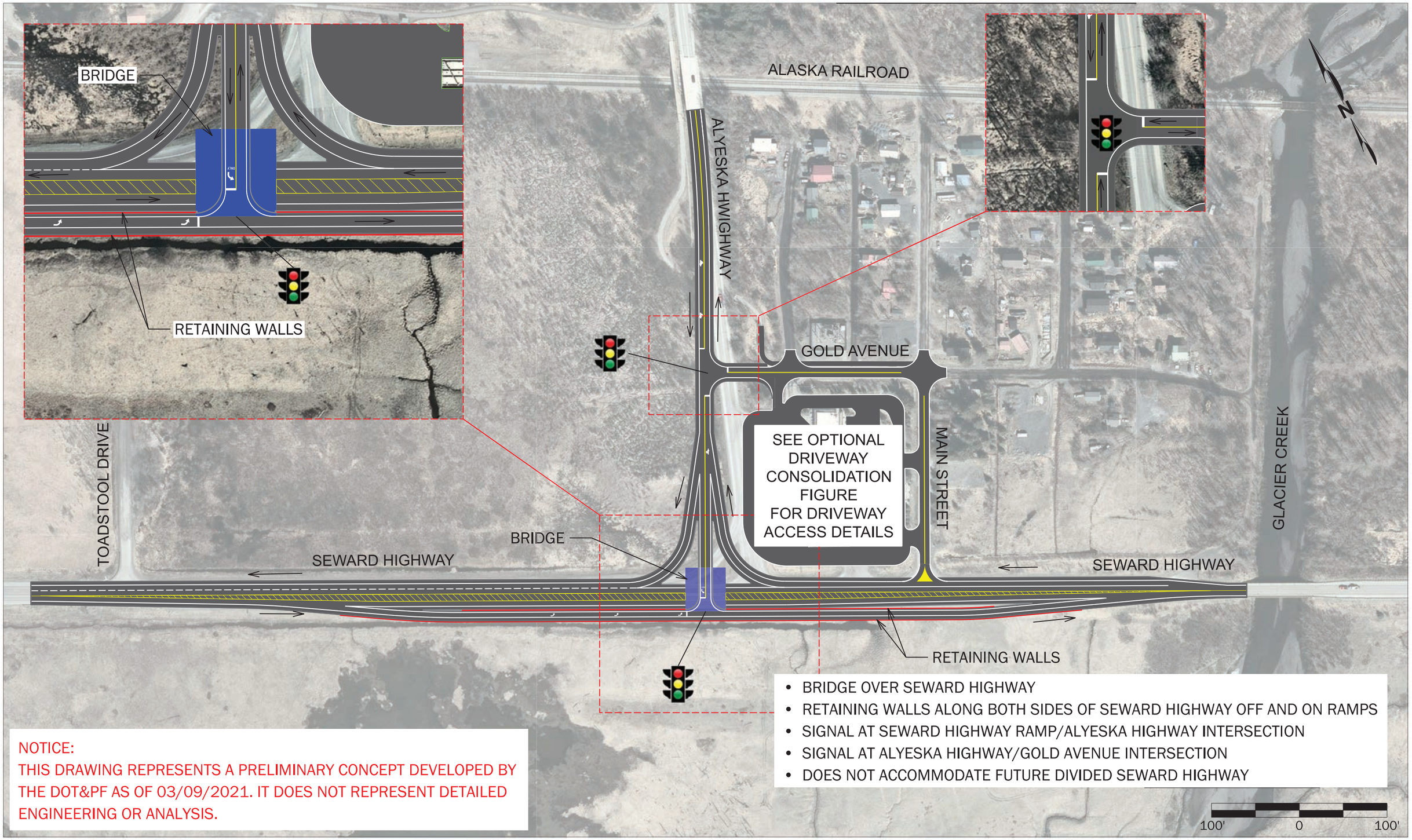
YIELD
ALASKA RAILROAD
ALYESKA HWIGHWAY
GOLD AVENUE
GLACIER CREEK
SEE OPTIONAL DRIVEWAY CONSOLIDATION FIGURE FOR DRIVEWAY ACCESS DETAILS
MAIN STREET
TOADSTOOL DRIVE
SEWARD HIGHWAY
SEWARD HIGHWAY
GLACIER CREEK
N
NOTICE:
THIS DRAWING REPRESENTS A PRELIMINARY CONCEPT DEVELOPED BY THE DOT&PF AS OF 03/09/2021. IT DOES NOT REPRESENT DETAILED ENGINEERING OR ANALYSIS.
• ROUNDABOUT AT SEWARD HIGHWAY/ALYESKA HIGHWAY INTERSECTION
• ROUNDABOUT AT ALYESKA HIGHWAY/GOLD AVENUE INTERSECTION
100'
0
100'



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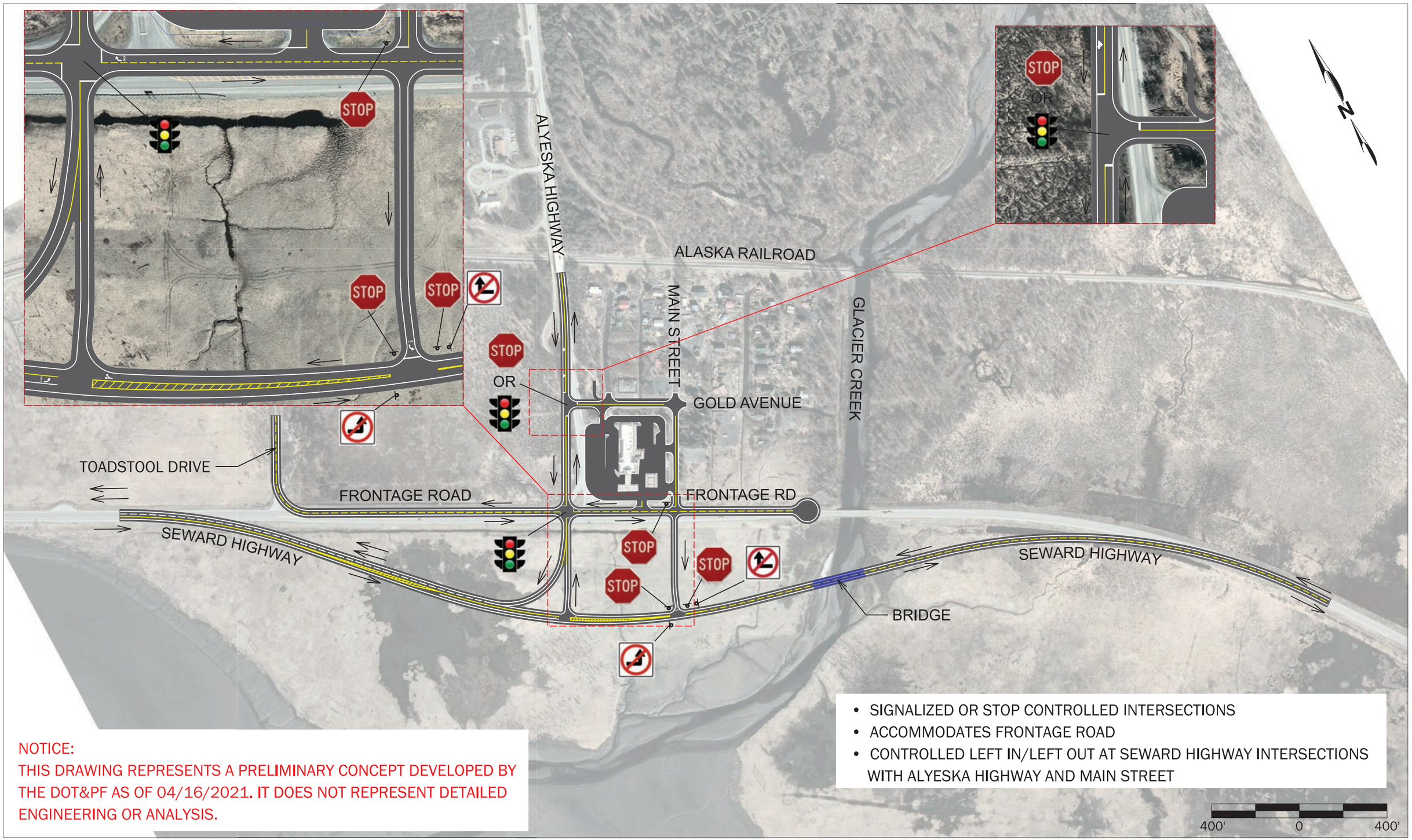
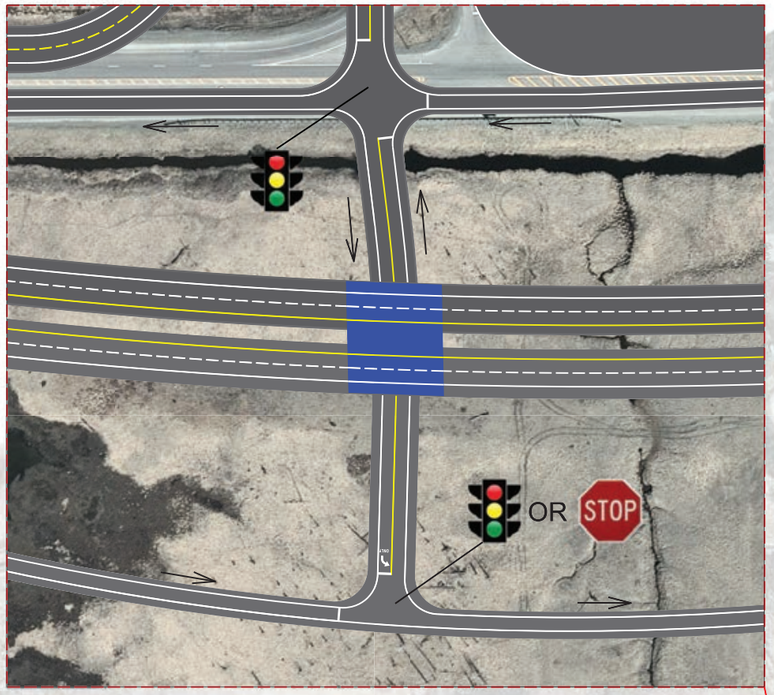
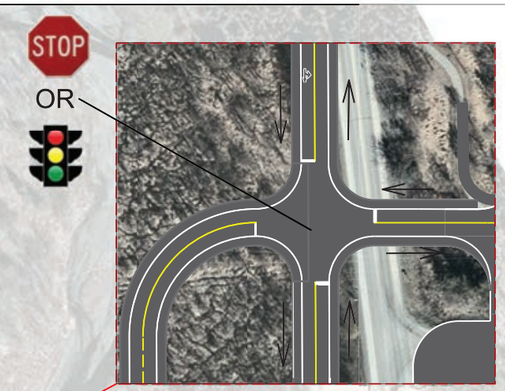
- BRIDGE OVER SEWARD HIGHWAY
- RETAINING WALLS ALONG BOTH SIDES OF SEWARD HIGHWAY OFF AND ON RAMPS
- SIGNAL AT SEWARD HIGHWAY RAMP/ALYESKA HIGHWAY INTERSECTION
- SIGNAL AT ALYESKA HIGHWAY/GOLD AVENUE INTERSECTION
- DOES NOT ACCOMMODATE FUTURE DIVIDED SEWARD HIGHWAY



NOTICE:
THIS DRAWING REPRESENTS A PRELIMINARY CONCEPT DEVELOPED BY THE DOT&PF AS OF 04/16/2021. IT DOES NOT REPRESENT DETAILED ENGINEERING OR ANALYSIS.

- SIGNALIZED OR STOP CONTROLLED INTERSECTIONS
- ACCOMMODATES FRONTAGE ROAD
- CONTROLLED LEFT IN/LEFT OUT AT SEWARD HIGHWAY INTERSECTIONS WITH ALYESKA HIGHWAY AND MAIN STREET





ALYESKA HIGHWAY

ALASKA RAILROAD

MAIN STREET

GLACIER CREEK

TOADSTOOL DRIVE

GOLD AVENUE

EXISTING BRIDGE

SEWARD HIGHWAY

ON-RAMP

BRIDGE

OFF-RAMP

OFF-RAMP

ON-RAMP

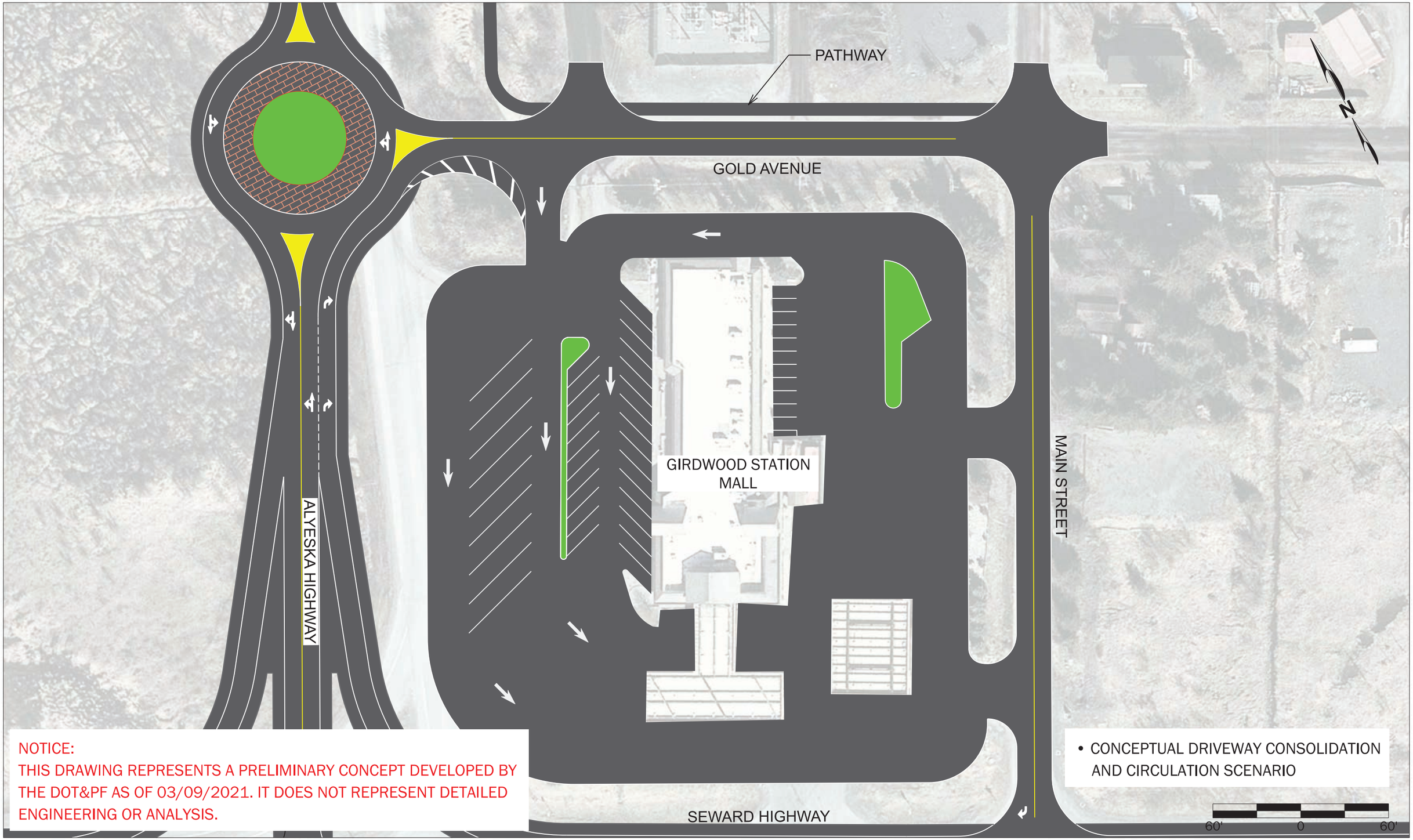
BRIDGES

STOP OR

NOTICE:
THIS DRAWING REPRESENTS A PRELIMINARY CONCEPT DEVELOPED BY THE DOT&PF AS OF 04/15/2021. IT DOES NOT REPRESENT DETAILED ENGINEERING OR ANALYSIS.

- SIGNALIZED OR STOP CONTROLLED INTERSECTIONS
- SEWARD HIGHWAY IS ELEVATED
- LARGEST APPARENT PROJECT FOOTPRINT

400' 0 400'


PATHWAY
GOLD AVENUE
N
GIRDWOOD STATION
MALL
MAIN STREET
ALYESKA HIGHWAY
SEWARD HIGHWAY
NOTICE:
THIS DRAWING REPRESENTS A PRELIMINARY CONCEPT DEVELOPED BY THE DOT&PF AS OF 03/09/2021. IT DOES NOT REPRESENT DETAILED ENGINEERING OR ANALYSIS.
• CONCEPTUAL DRIVEWAY CONSOLIDATION AND CIRCULATION SCENARIO
60'
0
60'

Appendix C

Alternatives Evaluation Matrix (Preliminary Designs)

Seward Hwy & Alyeska Hwy Intersection Improvements
Alternatives Evaluation Matrix (Preliminary Designs)

Assessment Category	Assessment Sub-Category	Criteria	Alt 1 No Build	Alt 2 Signalize Existing Intersection	Alt 3 Signalized Intersection (Improved)	Alt 4 Continuous Flow Intersection	Alt 5 Continuous Green Signal	Alt 6 Divided Highway	Alt 7 Trumpet Interchange	Alt 8 Roundabout	Alt 9 Tight Partial Diamond	Alt 10 Frontage Road	Alt 11 Diamond	Scoring Weight
Purpose and Need	Meets Purpose and Need		No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	5
	Operations	Overall Turning Delay	Significant Delay	Slightly improves	Slightly improves	Slightly improves	Slightly improves	Low to Moderate Delay	Minimal Delay	Low to Moderate Delay	Minimal Delay	Low to Moderate Delay	Minimal Delay	5
		Local Access	Maintains	Maintains	Maintains/Slightly improves	Maintains/Slightly improves	Maintains/Slightly improves	Slightly improves	Improved	Improved	Slightly improves	Improved	Improved	4
	Safety	Conflict Point Reduction	Same conflicts as existing	Same conflicts as existing	Fewer conflicts	Fewer conflicts	Fewer conflicts	Fewer conflicts	Very few conflicts	Fewer conflicts	Very few conflicts	Same conflicts as existing	Very few conflicts	5
		Accommodates Non-Motorized Users	No crossing provided	Signal controlled crossing	Signal controlled crossing	Signal controlled crossing	No crossing provided	No crossing provided	Separated crossing	Controlled crossing	Separated crossing	No crossing provided	Separated crossing	4
		Emergency Vehicle Access	As-is	More difficult	More difficult	More difficult	More difficult	More difficult	Improved	More difficult	Improved	More difficult	More difficult	4
	Mobility	Truck Accommodation	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	High	Low	High	Moderate	Moderate	4
		Seward Highway Through-Traffic Delay	Minimal	Moderate to High	Moderate to High	Moderate to High	Moderate to High	Low to Moderate Delay	Minimal	Low to Moderate Delay	Minimal	Low to Moderate Delay	Minimal	5
		Accommodates Future Divided Highway	Simple	Simple	Simple	Simple	Simple	Simple	Simple	Difficult	Simple	Simple	Simple	4
Costs		ROW Cost	n/a	n/a	Low	Low	Low	High	Moderate	Low	Low	High	High	2
		Construction Cost	n/a	Low	Low	Low	Low	High	High	Moderate	High	High	High	2
		Maintenance Cost	Low	Low	Moderate	Moderate	Moderate	Moderate	Low	Low	Moderate	High	High	3
Impacts	Environmental[1]	Viewshed	Maintains	Maintains	Maintains	Maintains	Maintains	Alters	Alters	Maintains	Limits	Alters	Limits	3
		Resources	No new impacts anticipated	Minimal to no new impacts anticipated	Minor impacts anticipated	Minor impacts anticipated	Minor impacts anticipated	Substantial impacts anticipated	Moderate impacts anticipated	Moderate impacts anticipated	Moderate impacts anticipated	Substantial impacts anticipated	Substantial impacts anticipated	3
		Consistency with Local Plans	No	Somewhat	Somewhat	Somewhat	Yes	Somewhat	Yes	Yes	Yes	Somewhat	Somewhat	3
	ROW	Number of Parcels	n/a	n/a	Low	Low	Low	High	Moderate	Low	Low	High	High	2
		Number of Relocations	n/a	n/a	None	None	None	None	None	None	None	None	None	2
	Construction	Utility Relocations	n/a	n/a	Low	Low	Low	Low	Low	Moderate	Moderate	Low	Moderate	1
		Construction Phasing	n/a	Simple	Simple	Simple	Simple	Moderate	Complex	Complex	Complex	Moderate	Moderate	1
		Construction Duration	n/a	Short	Short	Short	Short	Long	Long	Moderate	Long	Long	Long	1

Count	Green (+1)	12	11	10	10	11	4	13	8	12	5	8
	Yellow (0)	2	3	6	6	4	9	4	8	4	6	4
	Red (-1)	6	6	4	4	5	7	3	4	4	9	8

Raw Score	6	5	6	6	6	-3	10	4	8	-4	0
Weighted Score	3	-4	5	5	4	-6	45	11	38	-10	14

Appendix D

Modified Concept Level Design Alternatives

NOTICE:
THIS DRAWING REPRESENTS A PRELIMINARY CONCEPT DEVELOPED BY THE DOT&PF AS OF 02/17/2022. IT DOES NOT REPRESENT DETAILED ENGINEERING OR ANALYSIS.

- GRADE SEPARATED
- UTILIZES EXISTING FRONTAGE ROAD
- NO STOP SIGNS ON SEWARD OR ALYESKA HIGHWAY
- LARGE PROJECT FOOTPRINT

NOTICE:
THIS DRAWING REPRESENTS A PRELIMINARY CONCEPT DEVELOPED BY THE DOT&PF AS OF 02/17/2022. IT DOES NOT REPRESENT DETAILED ENGINEERING OR ANALYSIS.

- GRADE SEPARATED
- UTILIZES EXISTING FRONTAGE ROAD
- RETAINING WALLS
- SMALLEST PROJECT FOOTPRINT

NOTES:

1. SEWARD HWY REMAINS AT GRADE.
2. ALYESKA HWY ELEVATED OVER SEWARD HWY.
3. BRIDGE LENGTHS NEED TO BE CONFIRMED BY DOT&PF BRIDGE SECTION.

MONARCH MINE RD

TOADSTOOL DR

DOT&PF MAINTENANCE STATION

US FOREST SERVICE RANGER STATION

CALIFORNIA CREEK

NEW BRIDGE (150 FOOT SPAN)

BIRD TO GIRD TRAIL

TOADSTOOL DR

ALASKA RAILROAD

ALYESKA HWY

POSSIBLE TOADSTOOL CONNECTION

GLACIER CREEK

GOLD AVENUE

EXISTING ROW

MAIN ST

TIES INTO A 4 LANE UNDIVIDED SEWARD HIGHWAY AS DRAFTED. THE NATURE OF THIS TIE IN WILL BE DEPENDENT ON OTHER PROJECTS

EXISTING ROW

EXISTING BRIDGE

EXISTING ROW

EXISTING ROW

SEWARD HWY

EXISTING ROW

NEW BRIDGE (240 FOOT SPAN)

NEW BRIDGE (240 FOOT SPAN)

NEW BRIDGE (300 FOOT SPAN)

NEW BRIDGE (300 FOOT SPAN)

TURNAGAIN ARM

TIES INTO A 4 LANE DIVIDED SEWARD HIGHWAY AS DRAFTED. THE NATURE OF THIS TIE IN WILL BE DEPENDENT ON OTHER PROJECTS

GRAPHIC SCALE

−200 0 200 400

(IN FEET)

AERIAL IMAGE DATES: 2015

Seward Hwy & Alyeska Hwy Intersection Improvements

Alt 11 - Diamond Interchange April, 2022

DRAFT CONCEPT LEVEL DESIGN

Appendix E

Alternatives Evaluation Matrix (Modified Designs)

Seward Hwy & Alyeska Hwy Intersection Improvements
Alternatives Evaluation Matrix (Modified Designs)

Assessment Category	Assessment Sub-Category	Criteria	Alt 1 No Build	Alt 7 Trumpet Interchange	Alt 9 Tight Partial Diamond	Alt 11 Diamond	Scoring Weight
Purpose and Need	Meets Purpose and Need		-2	2	2	2	5
	Operations	Overall Turning Delay	-2	2	0	1	5
		Local Access	-2	1	1	1	4
	Safety	Conflict Point Reduction	-2	2	1	0	5
		Accommodates Non-Motorized Users	-2	1	2	2	4
		Emergency Vehicle Access	0	1	2	0	4
	Mobility	Truck Accommodation	1	0	1	2	4
		Seward Highway Through-Traffic Delay	2	2	2	2	5
		Accommodates Future Divided Highway	2	2	1	2	4
Costs		ROW Cost	2	0	0	-1	2
		Construction Cost	2	0	-1	-2	2
		Maintenance Cost	2	0	-1	-2	3
Impacts	Environmental[1]	Viewshed	2	0	-2	-1	3
		Resources	2	-1	0	-2	3
		Consistency with Local Plans	-2	1	1	1	3
	ROW	Number of Parcels	2	0	0	-1	2
		Number of Relocations	2	2	2	2	2
	Construction	Utility Relocations	2	0	0	0	1
		Construction Phasing	2	0	0	1	1
		Construction Duration	2	1	1	0	1

Count	Green (+2)	12	6	5	6
	Light Green (+1)	1	5	6	4
	Yellow (0)	1	8	6	4
	Orange (-1)	0	1	2	3
	Red (-2)	6	0	1	3

Raw Score	13	16	12	7
Weighted Score	10	65	50	38

Appendix F

Recommended Concept Level Alternative

NUMBER KEY:

1. NEW BRIDGE MEETS RAILROAD STANDARDS
2. OLD ROADWAY AND PATHWAY BRIDGES TO BE REMOVED
3. PEDESTRIAN TUNNEL
4. ROUNDABOUT PROVIDES TRAFFIC CALMING & REDUCES CONFLICT POINTS
5. DIRECT NEIGHBORHOOD ACCESS TO ALYESKA HWY
6. NO CUT-THROUGH TRAFFIC IN OLD GIRDWOOD FROM SEWARD HWY
7. NEW BRIDGE OVER SEWARD HWY
8. INTERSECTION CONFLICTS REMOVED. NO LEFT TURN ON TO OR OFF OF SEWARD HWY
9. MALL TRAFFIC SEPARATED FROM SEWARD HWY TRAFFIC
10. PROPOSED CONCRETE BARRIER WITH HEADLIGHT GLARE SCREEN

LEGEND:

- OVER-HEIGHT VEHICLE BYPASS
- PROPOSED BRIDGE
- REMOVAL OF ROADWAY
- PROPOSED ROADWAY
- PROPOSED PATHWAY

MONARCH MINE RD
TOADSTOOL DR
DOT&PF MAINTENANCE STATION
CHUGACH NATIONAL FOREST RANGER STATION
TO GIRDWOOD
CALIFORNIA CREEK
BIRD TO GIRD PATHWAY
ARRC ROW
ALASKA RAILROAD
EXISTING ALYESKA HIGHWAY
ROW
MAIN ST
GOLD AVE
GLACIER CREEK
PROPOSED TOADSTOOL DR CONNECTION
PROPOSED ALYESKA HWY REALIGNMENT
GIRDWOOD STATION MALL
TO ANCHORAGE
EXISTING SEWARD HIGHWAY
TO SEWARD
PROPOSED SEWARD HWY REALIGNMENT
TURNAGAIN ARM

GRAPHIC SCALE
−150 0 150 300
(IN FEET)
AERIAL IMAGE DATES: 2015 & 2020

Seward Hwy & Alyeska Hwy Intersection Improvements

Recommended Concept Level Alternative - Project Overview

June 2022