1 PURPOSE AND NEED

1.1 Roadway History: 1966 to Present

Knik-Goose Bay (KGB) Road was constructed on its current alignment in 1966. However, the corridor has functioned as an important transportation link for early miners, farmers, and homesteaders since the early 1900's (Yarborough et al, 2013). It serves as the primary surface transportation link for thousands of private, recreational, and commercial travelers every day. The original roadway had a gravel surface and a width that varied from 40 feet at its north end near the Parks Highway intersection to 34 feet at its south end, near Goose Bay Airport. KGB Road serves as the primary link for residents living between Wasilla and the Goose Bay Airport and points further south. Maintenance and minor improvement activities have been ongoing since its initial construction and include the following:

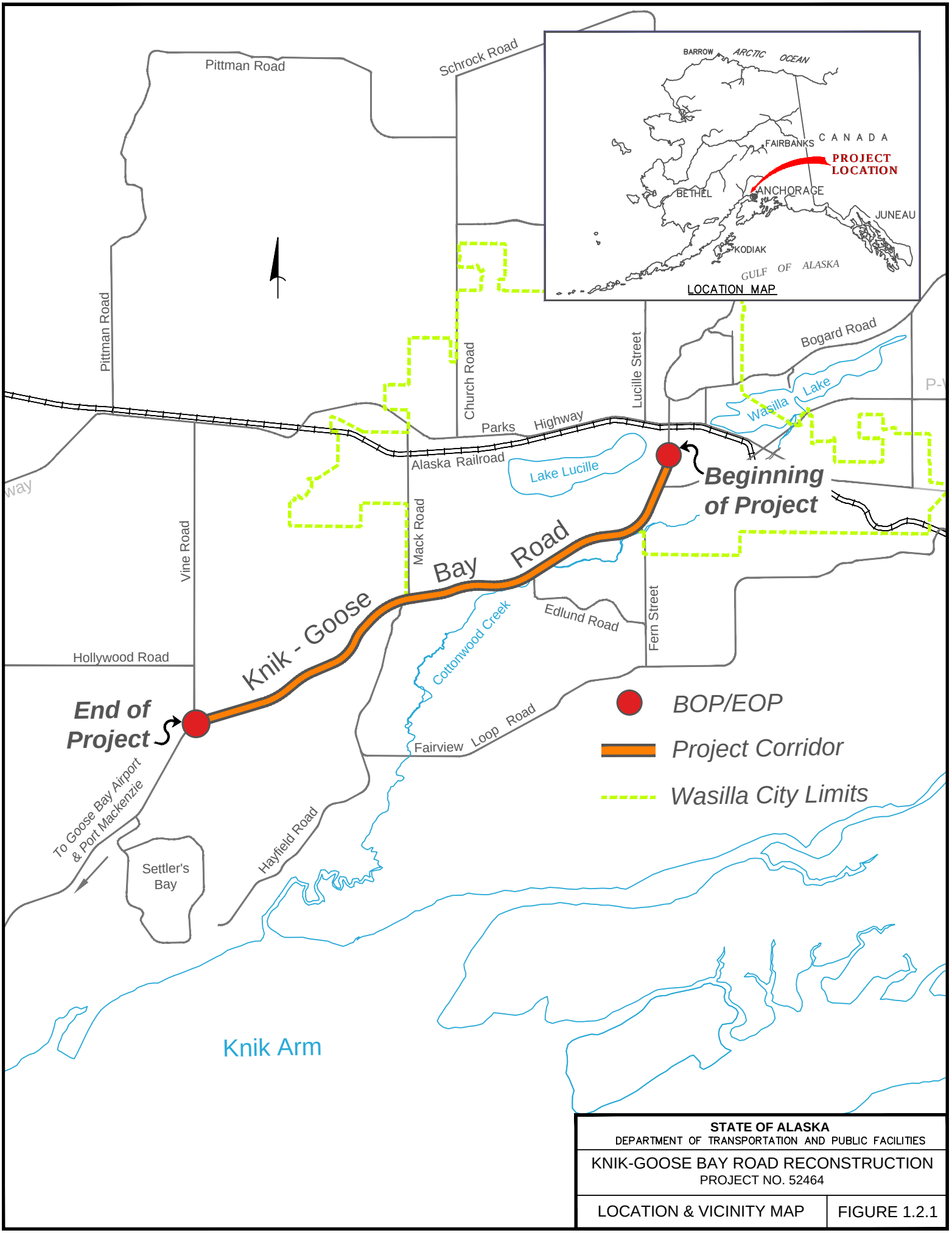
- 1970 – Converted from gravel to asphalt driving surface
- 2003 – Turn lane and traffic signal installed on KGB Road at Palmer-Wasilla Highway (PWH) intersection
- 2004 – Roadway rehabilitated and a 10-foot wide separated, multi-use pathway constructed between the Parks Highway and Settlers Bay Drive
- 2004 – Intersection lighting and auxiliary turn lanes installed at select intersections, signals installed at West Fairview Loop Road and Vine Road
- 2014 – Traffic signal installed at intersection with Fern Street
- 1980's to 2008
    - Left turn lanes at Fairview Loop Road
    - Intersection lighting at various intersections between the Parks highway and Vine Road
    - Milling of rumble strips

1.2 Existing Road Conditions

KGB Road is a rural two-lane road extending approximately 20 miles from the Parks Highway in Wasilla to the Goose Bay Airport in the Matanuska-Susitna Borough (MSB). This proposed project begins at Centaur Avenue [milepost (MP 0.3)] and ends at Vine Road (MP 6.8), for a total length of 6.5 miles (Figure 1.2.1). The Alaska Department of Transportation and Public Facilities (DOT&PF) functionally classifies KGB Road as a Principal Arterial.

Within the project limits KGB Road has two 12-foot wide travel lanes, paved shoulders varying from four to six feet in width, and gradual side slopes. It has numerous horizontal curves and a rolling vertical alignment that generally conforms to surrounding terrain. Stormwater drainage is supported by open ditches and culverts at natural drainage areas. There are no bridges or other major drainage structures within the limits of the proposed project corridor.

Two arterials, Palmer-Wasilla Highway (PWH) and Vine Road, and four collectors, Fern Street, Edlund Road, Mack Road, and Fairview Loop Road intersect KGB Road within the project area (Figure 1.2.2). All other intersecting roads are local roads. There are 27 roadways and 39 driveways that currently provide full, direct access onto KGB Road.



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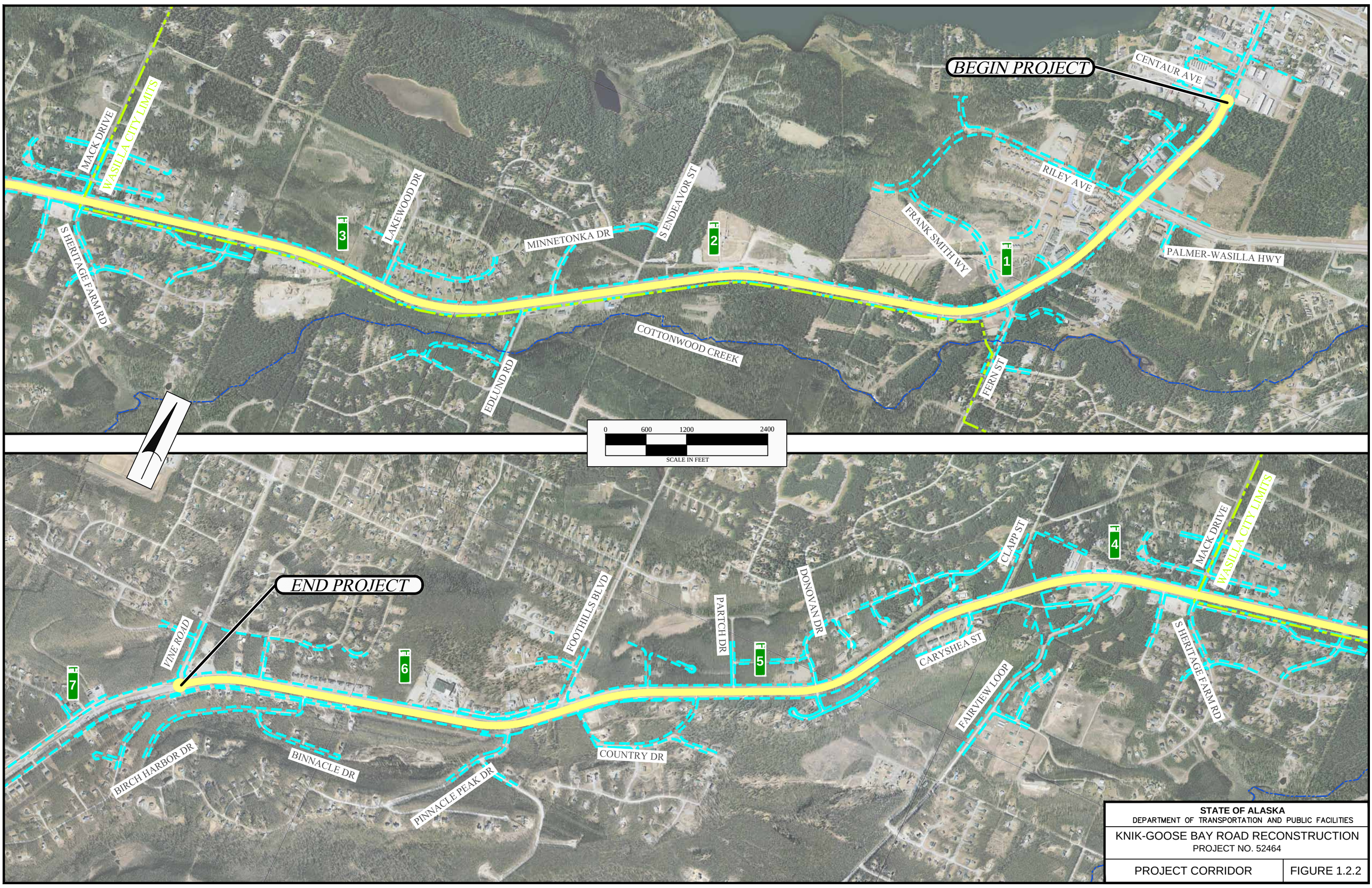
KNIK-GOOSE BAY ROAD RECONSTRUCTION
PROJECT NO. 52464

LOCATION & VICINITY MAP | FIGURE 1.2.1



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PROJECT CORRIDOR | FIGURE 1.2.2

The intersections of PWH, Fern Street, Fairview Loop Road, and Vine Road are signalized and have illumination. All remaining street approaches are stop-sign controlled. All intersections are illuminated along the corridor. The following eight intersections have auxiliary turn lanes:

- PWH Northbound (NB) and Southbound (SB), Right and Left
- Century Circle SB Right
- Fern Street NB Right and SB Left
- Endeavour Street SB Right
- Edlund Road SB Left
- Fairview Loop Road NB and SB Left
- Clapp Street SB Right
- Vine Road NB Left and SB Right

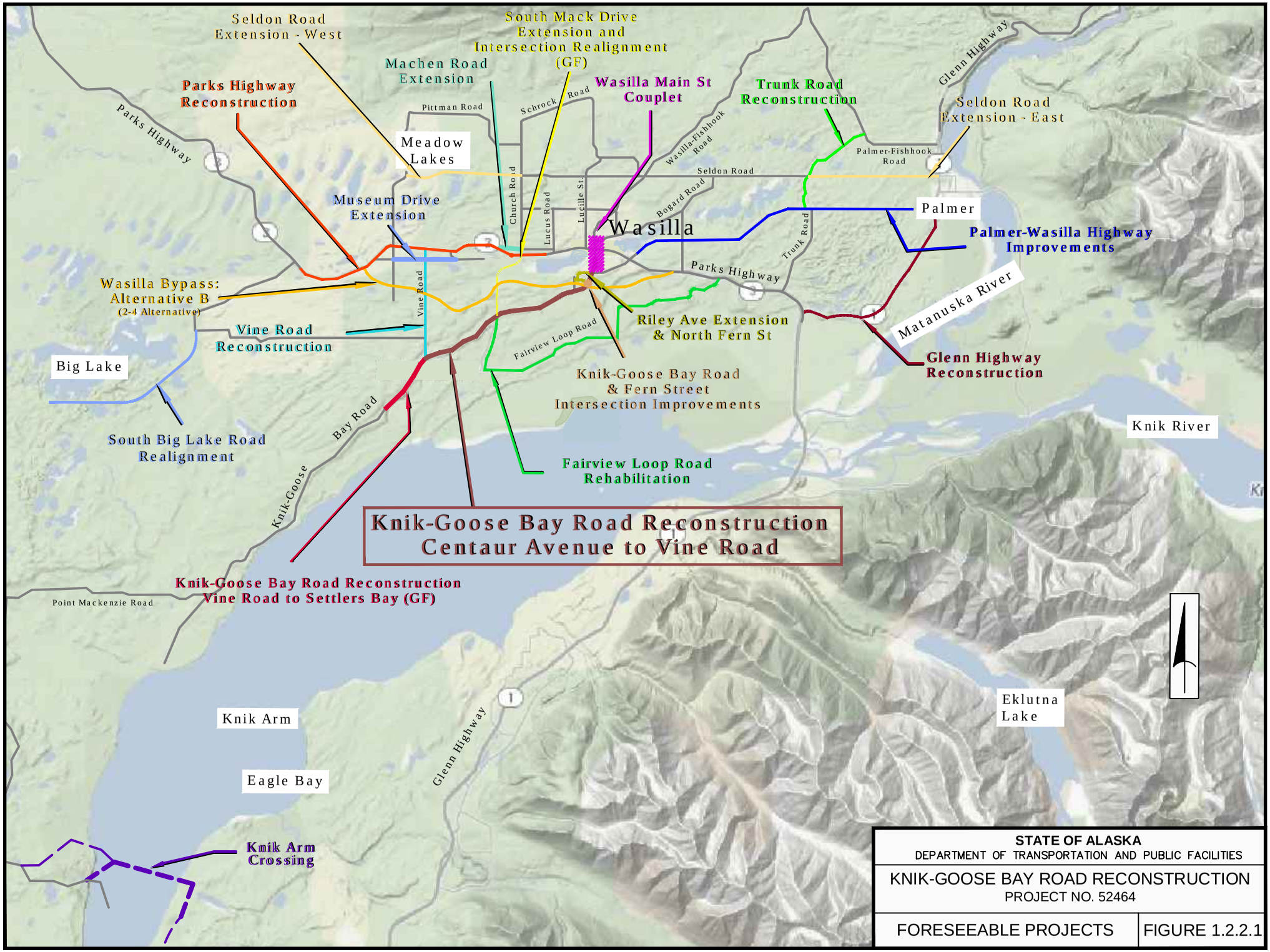
Approximately 65 percent of the land adjacent to KGB Road is developed with private residences, neighborhoods, or businesses. Commercial development is concentrated between Centaur Avenue and Fern Street at the north end of the project corridor. The remainder of land adjacent to the project corridor is largely undeveloped and consists of birch and spruce forests.

1.2.1 Existing Traffic Conditions

Average Daily Traffic (ADT) volumes on KGB Road increased by over 700 percent between 1977 and 2010. On the more heavily traveled segment of the road between the Parks Highway and Vine Road, ADT increased nearly 1000 percent during the same period. In 2010, the annual average daily traffic (AADT) volumes averaged nearly 8,000 vehicles per day (vpd) for the entire route and ranged from 18,400 vpd south of PWH to 8,200 vpd south of Vine Road. Between PWH and Fairview Loop, the high volume of vehicles using KGB Road exceeds the capacity of the two-lane highway.

1.2.2 Reasonably Foreseeable Projects

Within the greater vicinity of this proposed KGB Road project, there are approximately 20 transportation improvement projects that could develop in the reasonably foreseeable future (Figure 1.2.2.1). Project sponsors include the State of Alaska, MSB, and City of Wasilla (COW), and progress ranges from planning level to currently in construction. These area projects, together or alone, are not intended, nor are they expected to address the many challenges facing KGB Road. The projects will improve mobility for the traveling public throughout the greater Matanuska-Susitna Valley, but none of them will alleviate the pressing congestion and safety concerns on KGB Road. As part of the project analysis, DOT&PF used growth rates derived from the Parks Highway Alternate Corridor (PHAC) – Alternative 2 (November 2013). This land-use based traffic model incorporates these foreseeable projects into its calculated growth rates.



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FORESEEABLE PROJECTS | FIGURE 1.2.2.1

1.3 Purpose and Need for the Action

The purpose of this proposed project is *to improve mobility for people and freight* and *to enhance access management* along KGB Road between Centaur Avenue and Vine Road. The project would correct problems created by unconstrained access, *thereby improving safety* and reducing congestion for roadway users. The purpose of this proposed project is precipitated by three needs:

1. **Safety**
2. **Congestion Relief**
3. **Travel Efficiency**

In reference to a roadway, the term "mobility" is defined by the FHWA as "the ability [of traffic] to move or be moved from place to place". This ability is not mode-dependent but applies to vehicles, transit, pedestrians, and bicyclists. According to the FHWA, mobility can be measured in terms of "travel times, level of traffic congestion, and duration of congestion, all of which focus on how long it takes to get from place to place."

The term "access" refers to how vehicles get onto and off of a roadway. Access can be provided via ramps, intersections, frontage roads, or driveways. The type of access provided from a roadway to adjacent property depends on the primary function of the roadway. Access management aims to control traffic flow by determining the best methods and locations to get users on and off a roadway.

Need 1: Safety

The need for improving safety on KGB Road is established in the 2008 Traffic Safety Corridor (TSC) study conducted by DOT&PF, in cooperation with the Alaska State Troopers and the Alaska Highway Safety Office. The purpose of a TSC study is to identify roadway segments with above average incidences of high severity (fatal and major injury) crashes by analyzing data on types of collisions, collision locations, conditions when collisions occurred, and causes of collisions.

Traffic Safety Corridor designation is intended to be a short-term measure to address existing safety concerns until long-term solutions are in place. The per-mile injury rate indicates crash concentration while the per-vehicle mile crash rate is an indication of facility safety. If both thresholds are exceeded, there is a good chance safety countermeasures will substantially reduce crashes.

Strategies to alleviate fatal and major injury crashes were implemented shortly after TSC designation, including installing special signage, increasing enforcement and penalties for traffic violations, and employing education-based measures directed at driver behavior.

The KGB Road TSC study area extended from the Parks Highway to the Goose Bay Airport. The following data from 1977 to 2006 were analyzed: roadway functional class, historical crash data, traffic volumes, vehicle speeds, highway condition, and current traffic enforcement levels and practices. AADT and total number of crashes increased from 1977 to 2006; however, both fatal and major injury crash rates remained relatively stable. Minor injury and property-damage-

only crash rates increased. Since 2006, KGB Road ranks in the top two roads in Alaska for major injury and fatal crash rates.

The total accident rate for the entire length of KGB Road is 2.27 crashes per 100 million vehicle miles (MVM) traveled, well above the 1999-2006 statewide average of 1.45 crashes per 100 MVM for rural roadways. In June 2009, based on the TSC study results, and in accordance with the DOT&PF *Alaska Traffic Manual Supplement*, the 16.6 mile segment of KGB from PWH (KGB Road MP 0.7) to Point MacKenzie Road (KGB Road MP 17.3) was designated a TSC.

Traffic volumes and crash concentrations were higher in the first 6.5 miles between the Parks Highway and Vine Road than along the remainder of the TSC. This proposed reconstruction project includes this entire 6.5 mile segment. The TSC study showed that 75 percent of all major injury and fatal crashes occurred within the first 6.5 miles of KGB Road.

From 1977 to 2009, 27 of the 35 total fatal collisions (resulting in 38 fatalities) occurred on this 6.5 mile segment. The fatal accident rate for this segment was 5.4 fatal crashes per 100 MVM traveled, which is approximately 3.8 times the 2006 national fatal accident rate for similar facilities. Of particular note, over 42 percent of the fatal collisions on KGB Road were attributed to head-on crashes and were significantly overrepresented compared to the 2003 statewide average of 15.7 percent.

KGB Road's designation as a TSC was intended to be a short-term measure to address safety concerns until long-term measures are in place or until crash rates decrease to an acceptable level and are sustained. Although the most current data is not yet available, the TSC designation resulted in a 69% decrease in the fatal and major-injury crash rate between 2009 and 2011. This data set does not reflect a sustained lower crash rate, so KGB Road remains a TSC. Strategies implemented after TSC designation do not address the need to reduce congestion along the corridor nor do they implement permanent corrective measures. The overarching need to address these serious safety problems is highlighted by projected increases in traffic volumes over the next 20 years.

Need 2: Congestion Relief

Heavy traffic during peak travel periods causes congestion and delay on KGB Road between Centaur Avenue and Vine Road, particularly south of PWH. For purposes of traffic data collection and capacity analysis, the DOT&PF assumed an existing year of 2010, a construction year of 2019 and a design year of 2039. The project corridor was divided into six traffic segments for the purposes of analysis to more accurately discern segment volume-related needs. Segment break points were selected based on their traffic contributions to KGB Road or their relationship to other projects that will impact traffic volumes on KGB Road in the near or foreseeable future.

The segments are:

1. Centaur Avenue to PWH
2. PWH to Fern Street
3. Fern Street to Edlund Road
4. Edlund Road to Mack Road
5. Mack Road to Fairview Loop Road
6. Fairview Loop Road to Vine Road

In 2010, project corridor AADT for the six segments ranged from 5,500 to 18,200 vpd. It is the busiest two-lane road in the state and far exceeds its design capacity. For this reason, the proposed project must include additional travel lanes in each direction. The DOT&PF estimates segment traffic volumes will range from 23,600 to 52,500 by 2039 (Table 1.3.1). As recommended by the DOT&PF Central Region Planning Section, the forecast traffic volumes are based on growth rates derived from the Parks Highway Alternative Corridor's (PHAC) land-use based traffic model – Alternative 2. This land-use based traffic model indicates growth rates that range from 2.67% to 5.15%.

Table 1.3.1 - Annual Average Daily Traffic Count

KGB Road Segment	Current Year 2010 (vehicles/day)	Mid-Year 2029 (vehicles/day)	Design-Year 2039 (vehicles/day)
Centaur Avenue – Palmer-Wasilla Hwy	5,500	14,300	23,600
Palmer Wasilla Highway - Fern Street	18,200	30,100	39,100
Fern Street – Edlund Road	17,700	36,100	52,500
Edlund Road – Mack Road	14,100	29,600	43,800
Mack Road – Fairview Loop Road	14,600	29,900	43,500
Fairview Loop Road – Vine Road	13,000	30,900	48,600

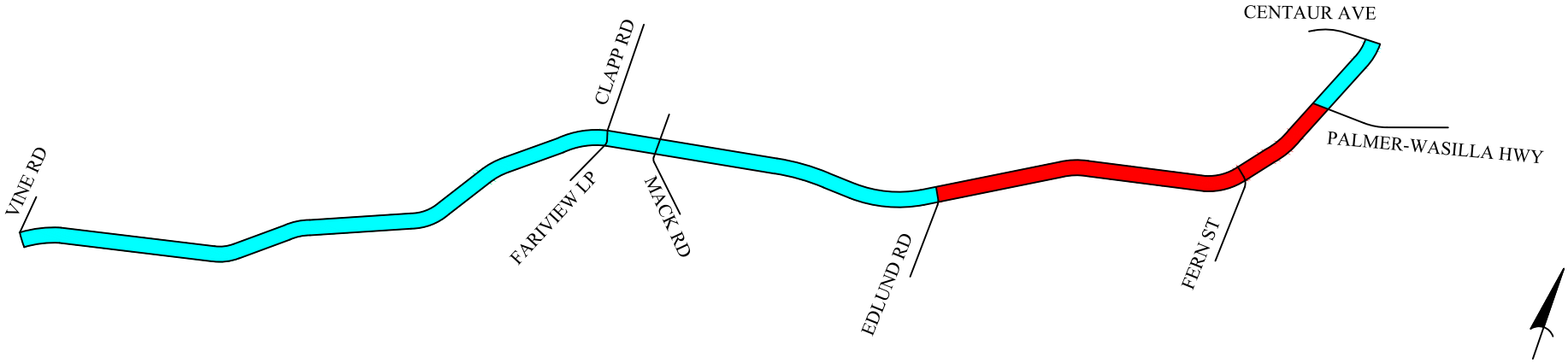
Congestion levels are evaluated using a measure expressed as "level of service" (LOS). LOS is represented by a letter "grade" ranging from A for excellent conditions (free-flowing traffic) to F for failure conditions (extremely congested, stop-and-go traffic). LOS B through E describes progressively worsening traffic conditions. When the capacity of a road is exceeded, congestion and delay result in a poor LOS.

Table 1.3.2 shows current and predicted segment LOS based on AADT for traffic movements along the proposed project corridor for the current, mid-, and design- years if the highway is not improved. Segment capacity analysis indicates KGB Road is currently operating at LOS F between PWH and Edlund Road and at LOS C for the remainder of the project corridor. Under the No-Build alternative, design year traffic flow for the entire project area is predicted to deteriorate to LOS F and the entire existing facility will be over capacity (Figure 1.3.1).

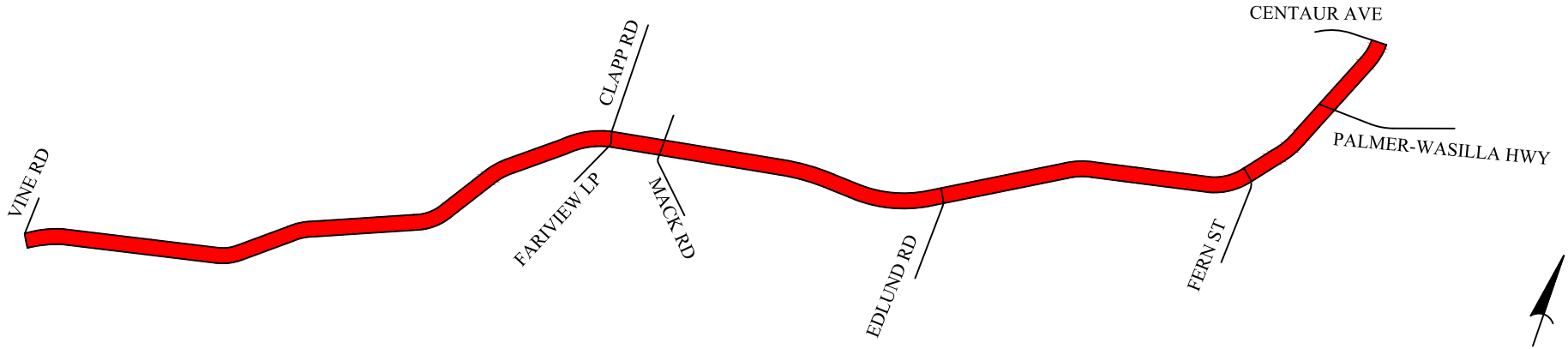
Table 1.3.2 - Roadway Level of Service without Improvements

KGB Road Segment	Current Year 2010	Mid-Year 2029	Design-Year 2039
Centaur Avenue – Palmer Wasilla Highway	C	C	**F**
Palmer Wasilla Highway - Fern Street	**F**	**F**	**F**
Fern Street – Edlund Road	**F**	**F**	**F**
Edlund Road – Mack Road	C	**F**	**F**
Mack Road – Fairview Loop Road	C	**F**	**F**
Fairview Loop Road – Vine Road	C	**F**	**F**

EXISTING YEAR 2010



DESIGN YEAR 2039



LEVEL OF SERVICE

A B C D E F

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SEGMENT LEVEL-OF-SERVICE | FIGURE 1.3.1

Need 3: Travel Efficiency

As a principal arterial, KGB Road's primary purpose is to move large volumes of traffic from one area to another while providing reasonable access. For the purpose of this proposed project, travel efficiency is defined as "the ability to accomplish a trip with a minimum expenditure of time and effort." The presence of commercial driveways, private driveways and at-grade local road intersections throughout the project corridor are inconsistent with good access management principles, and are proven to reduce overall travel efficiency. As congestion levels continue to rise, the ability to accomplish a trip with a minimum expenditure of time and resources is expected to continue to deteriorate.

1.4 Project Objectives

Objective 1 – Improve Safety

- Reduce high severity crash rates along the corridor, particularly head-on collisions
- Reduce overall crash rates along the corridor for all users

Objective 2 – Reduce Congestion

- Reduce current- and design- year congestion for users traveling on KGB Road from Centaur Avenue to Vine Road
- Reduce current- and design- year delay at intersections along KGB Road from Centaur Avenue to Vine Road

Objective 3 – Increase Travel Efficiency

- Decrease travel time for users commuting to the Parks and Glenn Highways, which lead to southcentral Alaska's major commerce and employment nodes
- Safely and efficiently balance the demands on mobility and access to adjacent land parcels and local streets