FAST PLANNING ROAD SERVICE AREA EXPANSION PLAN

FINAL REPORT

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NOVEMBER 2021

NFHWY00463/0002(454)

EXECUTIVE SUMMARY

The Fairbanks North Star Borough (FNSB) administers a Road Service Area (RSA) system that is unique among Second Class boroughs in Alaska. With 103 RSAs, hundreds of RSA commissioners, and mill rates that vary widely, the current RSA system has many challenges. FAST Planning, the Metropolitan Planning Organization (MPO) for the Fairbanks area, is seeking ways to facilitate RSA improvements and help fund local road improvements. This report summarizes the current issues and challenges with the RSA system, identifies and analyzes three potential alternatives, and presents a proposed incentive program for funding RSA road improvements. A proposed FNSB Road Standards Manual is also included with this report.

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INTRODUCTION

Orphan roads are those without a maintenance authority and, subsequently, do not receive regular maintenance or upkeep. Located throughout the Borough, orphan roads cause many problems, including:

- Access difficulty for emergency response, school bussing, and deliveries (e.g., heating fuel, potable water)
- Confusion among new residents that don't understand why their road isn't maintained
- Sub-standard road construction
- Difficulty bringing sub-standard orphan roads into Road Service Areas (RSAs)

Road Service Areas (RSAs) serve as the maintenance authority for many local roads in the Fairbanks North Star Borough (FNSB). While RSAs provide a mechanism for maintaining local roads, they aren't without issues, including:

- Differences in maintenance practices and standards between RSAs
- Unequal funding due to density, property values, and miles of road
- Challenges managing such a large system
- Inclusion of roads constructed under old regulations or received a variance

The RSA system in the FNSB is different than that of other Second Class Boroughs in Alaska. The Kenai Peninsula Borough (KPB) and the Matanuska-Susitna Borough (MSB) administer RSAs very differently.

Table 1 - Summary comparison of FNSB, Mat-Su Borough, and Kenai Peninsula Borough road service areas

Element	FNSB	MSB	KPB
No. RSAs	103	16	1
Miles of RSA roads	497	1,100	645
Minimum maintenance standards	No	No	Yes
Administration	400+ commissioners	48 commissioners	1 RSA director 6 RSA commissioners
Road condition monitoring	RSA commissioners	MSB superintendents	KPB inspectors
Orphan roads (miles)	260 (131 in MPA)	96	Unknown
Road construction @ time of subdivision plat?	Yes	No	No
Mechanism for adding orphan roads to RSAs	Annexation request Vote by RSA Vote by annexed area	Annexation request Vote by RSA Vote by annexed area	Maintenance Authority request Road Improvement Assessment District (RIAD)
Funding available to bring non-RSA roads up to standards	No	No	50/50 KPB match
Mill rates for road maintenance	0.294 – 14.010	1.50-4.60	1.40
Basis for RSA boundaries	Subdivision	Election Districts	N/A - single RSA
Avg. annual tax revenue for RSAs	$5M	$19.5M	$8.2M

HISTORY OF ROAD SERVICE AREAS (RSAS) IN THE FNSB

As a Second-Class Borough, The Fairbanks North Star Borough (FNSB) elected not to establish road powers. This means that roads developed for subdivisions outside the City of Fairbanks or the City of North Pole may not have a maintenance authority. These roads are considered 'orphan' roads.

In lieu of area-wide road powers, the FNSB uses Road Service Areas (RSAs) as a maintenance authority for many subdivisions across the borough. RSAs are created voluntarily by majority vote of area property owners to tax themselves for construction and road maintenance expenses, such as snow removal and grading. There are 103 RSAs in the FNSB. They range in size from 9 to 9,531 acres; in road length from 0.26 to 22.61 miles; and in number of parcels from 14 to 2,468. The entire RSA system includes 19,544 parcels, 497 miles of roads, $2.9 billion in taxable property value, and $4.8 million in taxable property value per mile of road[1]. Total annual revenue from RSA property taxes is approximately $5 million.

The FNSB began implementing RSAs in the late 1970s when the State of Alaska was paying for road maintenance if the borough would take on long-term maintenance. This pattern continued into the late 1980s even as State money decreased. In the early 1990s, the state no longer funded local road maintenance so RSAs began taxing themselves to pay for maintenance. The last new RSA in the FNSB was Drake Estates, created in 2000.

CURRENT STATE OF RSAS IN THE FNSB

There are 103 RSAs in the FNSB that encompass 597 miles of roads[2]. There are an additional 260 miles of orphan roads. Of these, 130.8 miles are within the FAST Metropolitan Planning Area (MPA) – see Figure 1 on the following page.

[1] By comparison, the City of Fairbanks has 11,197 parcels, 316 miles of roads, $2.8 billion in taxable property value, and $8.9 million in taxable property value per mile of road.

[2] There are 316 miles of roads in the City of Fairbanks and 47.5 miles of road in the City of North Pole

University of Alaska

City of Fairbanks

Fort Wainwright

Fairbanks International Airport

City of North Pole

Figure 1 - Orphan roads

Orphan roads

MPA Boundary

Road Service Areas

N

2

Miles

ISSUES AND CHALLENGES

Orphan roads and the nature of the FNSB RSA system have resulted in several issues.

Access issues – unmaintained roads can deteriorate to the point of impassability. School buses and emergency response vehicles cannot access subdivisions where roads are not plowed in winter or graded in summer. Private delivery services, such as those delivering potable water, heating fuel, or packages, cannot reach residences.

Figure 2 - Orphan roads are often unmaintained and in poor condition

Resident confusion – many residents new to the FNSB are unfamiliar with the RSA system and do not know if they live on an orphan road. Consequently, many new residents are surprised to find that their road is not plowed or that there is no routine maintenance. FNSB staff field many calls in the early winter and again in spring from residents wondering why their road isn't being plowed.

No maintenance standards – there are no borough-wide maintenance standards for RSA roads. This means that some RSAs have more frequent snow plowing and road grading than others.

Inconsistent road quality – A resident driving from their home in an RSA may go from an RSA, through a subdivision with orphan roads, and then back onto RSA, City, or state-maintained roads before reaching their destination. Along the way they may experience well-maintained roads and poorly maintained roads within a span of just a few miles.

Program management challenges – the high number of RSAs causes additional issues.

1. With over 400 RSA commissioner seats, it's difficult to find commissioners to fill all of them. There are currently over 150 empty seats. Commissioners are resident volunteers that manage their RSA's funds, select road contractors, and inspect road maintenance activities.
2. Managing 103 RSAs and coordinating with so many commissioners is a challenge for FNSB Rural Services staff.

Bringing orphan roads into RSAs – annexing a subdivision into an RSA requires a vote by the RSA residents. Often, residents within an RSA do not want to take on the costs associated with bringing orphan roads up to FNSB standards, as well as the additional burden of more roads to maintain, particularly if there is a significant difference in the quality of the roads between the RSA and the orphan roads. Likewise, there is no state or federal funding program for bringing orphan roads up to standard that would alleviate the financial burden on the RSA that is accepting the new roads without a signed maintenance agreement by a local government entity.

Equitable funding – housing density varies widely across the borough. Lower density RSAs must choose between higher taxation or less maintenance. Higher density RSAs can spread the cost of road maintenance across more residents. Likewise, higher value properties have the financial means to contribute more to road maintenance efforts.

Road – Rail crossings – at most railroad crossings, the road maintenance authority is responsible for maintaining the approach and signage. However, orphan road crossings must be maintained by the Alaska Railroad in order to maintain safe crossings. There are 10 orphan road railroad crossings, the majority of which are on the south side of Fairbanks in an industrial area.

CURRENT STATUTES, CODES, POLICIES, AND PLANS

There are multiple plans, codes, and policies that pertain to the transportation network within the FAST Planning Metropolitan Planning Area (MPA).

ALASKA STATUTE FOR SECOND CLASS BOROUGHS

Alaska's Constitution recognizes only two types of municipalities – cities and boroughs (Article X, Section 2). There are five types of boroughs: unified home-rule; non-unified home-rule; first-class; second-class; and third-class. The FNSB is a second-class borough. As a second-class borough, the FNSB may exercise its power to provide transportation systems if approved by voters. In lieu of exercising this power, the FNSB has opted to grant approval to property owners through road service areas. Alaska statute does not specify how a second-class borough must administer a service area.

FNSB MUNICIPAL CODE TITLE 17 - SUBDIVISIONS

FNSB code, Title 17, describes provisions for new subdivisions, including roads. Ordinance 2005-33 was the last significant revision to Title 17 regarding road design standards and construction. Ordinance 2019-01 updated road construction exemptions.

Section 17.56.060 outlines general requirements for road design and construction. Having road construction standards within municipal code is unusual; generally, a municipality will maintain separate road construction standards and reference them by code. Because Title 17 has been re-written several times, the requirements can be difficult to find by someone unfamiliar with Title 17.

Section 17.48 addresses considerations for sub-surface conditions and drainage needs. Section 17.56.140 addresses drainage.

Section 17.56.065 lays out exemptions to road construction and minimum road standards. Two exemptions to road standards worth noting are:

- When a subdivision is not in a road service area
- When a subdivision does not rely on roads maintained by a service area for access

These exemptions essentially allow new subdivisions to be created without minimum road construction standards, which helps perpetuate the development of orphan roads.

FNSB MUNICIPAL CODE TITLE 14 – ROAD SERVICE AREAS & COMMISSIONS

Title 14 identifies the procedures for forming a road service area; forming differential tax zones; and how to fill RSA commissioner seats. Section 14.08 details the procedure for annexing new roads into an RSA. Title 14 also lists all of the RSAs and their powers.

FNSB 2020 ECONOMIC RECOVERY PLAN

FNSB Economic Recovery Plan (2020) says 'revise Title 17 and Title 18 in Borough code to be easier to administer.' There is no additional detail on what this entails.

FAST PLANNING METROPOLITAN TRANSPORTATION PLAN (MTP), ENVISION 2045

The 2045 MTP identifies a mid-range goal to "expand existing RSAs or create new RSAs to address orphan roads, including funding to upgrade roads to current standards." This speaks to the MTP goal: *"Connecting and improving neighborhoods. Areas like Greater North Pole are growing quickly. Some have always lacked vital connections they need to make travel by all modes safe and efficient. Envision 2045 addresses transit,* ***inconsistent infrastructure quality****, and* ***poor neighborhood connectivity*** *to better meet the needs of pedestrians, cyclists, transit users, and drivers."* Text made bold for emphasis.

SALCHA-BADGER AREA PLAN

The Salcha-Badger Area Plan conducted a survey of residents to identify concerns with the road network. Two of the top four issues were related to local roads:

- Winter road maintenance
- Subdivision road conditions

This suggests that orphan roads and variable RSA maintenance contribute to residents' displeasure.

FNSB COMPREHENSIVE PLAN & FNSB COMPREHENSIVE ROAD PLAN

The FNSB Comprehensive Plan (2005) and the Comprehensive Road Plan (1991) are slated for update this year. While the Road Plan does not address RSAs, the FNSB Comprehensive Plan identifies a strategy for meeting goal #1 – to have a safe, efficient, multi-modal transportation system that anticipates community growth. Strategy #1 is to encourage location, design, and maintenance of roads based on their function and community needs. Specifically, Action E addresses RSAs:

- Resolve road service area issues that include:
    - Maintenance
    - Consolidation of road service areas
    - Inequities in road quality
    - Improve cost-saving measures
    - Enforcement of driveway permits
    - Enhance coordination of road maintenance among various agencies with the Borough
    - Pursue changing federal restrictions in highway funds to include maintenance

Additionally, the Comp Plan identifies Strategy 1, Action B: revise Title 17 to:

- Improve road standards
- Ensure access for emergency service vehicles to new developments
- Include the pedestrian element in the subdivision process
- Require public and private developers to provide adequate rights-of-way and road construction in conformance with Borough road standards

ALASKA POLICY ON RAILROAD/HIGHWAY CROSSINGS, 1988

When the State of Alaska acquired the Alaska Railroad, the Alaska Department of Transportation & Public Facilities and the Alaska Railroad Corporation convened a task force to identify the issues and solutions to railroad/highway crossings throughout the state. Regarding orphan roads, the task force identified that, *"...there are numerous crossings that are open to public travel but not under the jurisdiction of and maintained by a public authority. The railroad company and highway agency should make every effort to mutually resolve and agree on the appropriate classification (either public or private) or questionable crossings."*

The task force defined these orphan road crossings as PUB-4, "a crossing that is open to the public, but the road is not maintained by a public authority." The task force even pointed out that the FNSB has the highest incidence of these crossings.

The policy states that ARRC, DOT&PF, and local government should address the PUB-4 crossings by eliminating them when possible and installing appropriate signage (as identified in the Alaska Traffic Manual) when the crossings cannot be closed.

OTHER SECOND CLASS BOROUGHS

The FNSB RSA system is unique to the FNSB. Two other second-class boroughs (Kenai Peninsula Borough and Matanuska-Susitna Borough) have addressed road service areas differently. The following summarizes their approaches and outlines the challenges and opportunities associated with each.

KENAI PENINSULA BOROUGH

The Kenai Peninsula Borough (KPB) administers a single RSA that encompasses 645 miles of roads (98% gravel/2% paved) and is sub-divided into five regions. Roads within the RSA must meet KPB road construction standards. Five road inspectors monitor and evaluate road conditions to determine when grading or snow plowing needs to occur, as well as identify areas requiring repairs or reconstruction. They also ensure contractor work is satisfactory. This system helps maintain minimum road maintenance standards across the borough. The RSA director and a 7-member board are appointed by the Mayor and approved by the Assembly.

Much like the FNSB, the KPB took advantage of State funding for maintenance activities in the 1980s and State grants for capital construction through the early 2000s. When the State money ran out, borough property taxes were adjusted to ensure continued funding for local road maintenance. In FY2012, the KPB began an effort to grow the Road Service Area Special Fund to support capital projects and dust control. The current mill rate for road maintenance is 1.40. Real property, Personal property, and Oil property taxes generate approximately $8.2 million for the RSA fund.

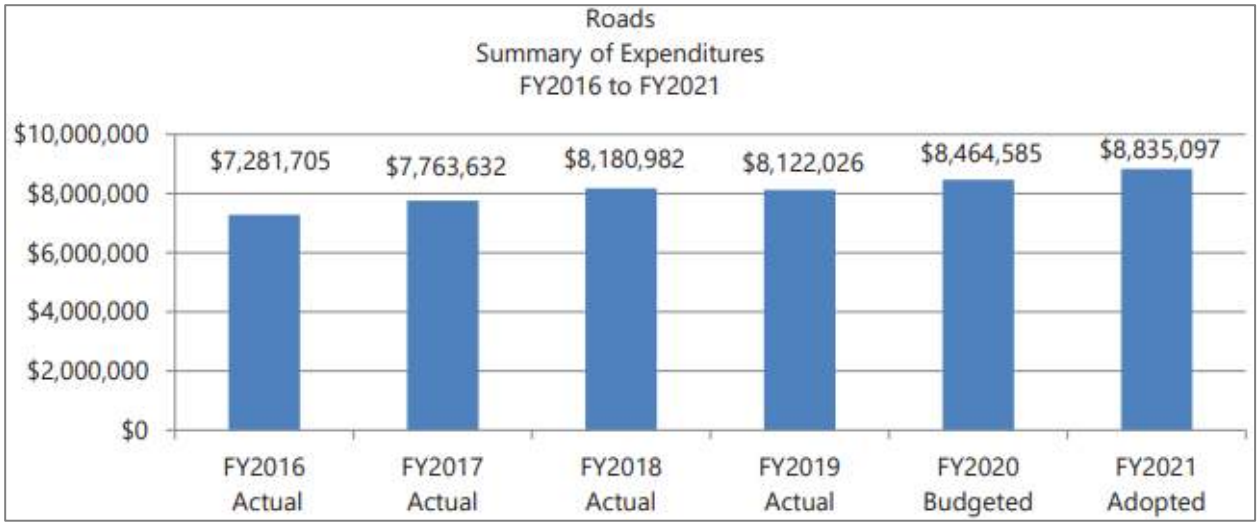


Figure 3 - KPB Road Expenditures, FY2016 - FY 2021

The RSA has four funds:

- RSA Fund
- Engineer's Estimate Fund
- Road Improvement Assessment District Fund
- RSA Capital Improvement Fund

Orphan roads can be added to the RSA through a Road Maintenance Application. Roads must meet KPB road construction standards and meet the criteria established in the KPB's Policy Statement 2009-01, *Acceptance of Roads for Maintenance*.

Residents may form a Road Improvement Assessment District (RIAD) to improve or construct subdivision roads. This is often a precursor to a Road Maintenance Application as it provides the mechanism for bringing orphan roads up to KPB construction standards. Residents must initiate a RIAD and obtain 60% of benefitted residents' approval. Generally, the borough will match 50% of construction costs.
The benefits of a single RSA include:

- Economies of scale
- Streamlined management
- Consistent application of standards
- Equitable funding

MATANUSKA-SUSITNA BOROUGH

The Matanuska-Susitna Borough (MSB) administers 16 RSAs. Each RSA has a 3-member volunteer board of supervisors which are appointed by the mayor and approved by the assembly. RSAs vary in size from 13.99 miles of road to 168.76 miles of road. Mill rates vary between RSAs with low rates around 1.50 mills and high rates near 4.60 mills. Total tax revenue for all RSAs is approximately $19.5 million.
MSB public works staff serve as superintendents in direct charge of all RSA road maintenance and construction. Each superintendent works closely with the RSA board to identify and prioritize work. Likewise, superintendents inspect road maintenance and construction activities to ensure they meet borough standards.

Bringing an orphan road into an RSA requires the changing of "community boundaries", which is initiated by a petition to the Borough Clerk signed by persons who, in aggregate, own at least 51% of the property in the "community" wishing to join. The Borough Manager prepares a feasibility recommendation and presents it to the Assembly, along with a draft Ordinance placing the question on the next regular election ballot. If the Assembly supports the Ordinance, the ballot question will be in two parts, one for the residents of the existing RSA and one for the residents in the "community" wishing to join. A 51% approval vote is required on both questions for the annexation.

In 2019, the MSB began allocating funds for RSA improvements such as bridge and railroad crossing maintenance; road paving projects; and the application of dust palliatives on gravel roads. The maximum funds allocated under this ordinance are $500,000.

ALTERNATIVES ANALYSIS

INTRODUCTION

The Fairbanks North Star Borough (FNSB) has 103 Road Service Areas (RSAs) which act as the road maintenance authority outside of the cities of Fairbank and North Pole in the FNSB. The operations of the RSA system and the number of RSAs is unique to the FNSB which allows RSA residents to tax themselves according to their desired level of road maintenance. The number of RSAs has created a greater need of FNSB management staff for RSA maintenance contracts and can create confusion as there are no consistent minimum maintenance standards for the entire borough.

Roads outside of an RSA are considered "orphaned" as there is no official road maintenance authority responsible for them. Orphaned roads can cause many problems including:

- **Access difficulty for emergency response, school bussing, and deliveries (e.g., heating fuel, potable water)**
- **Confusion among residents that do not understand why their road is not maintained**
- **Sub-standard road construction**
- **Difficulty and lack of funds for bringing sub-standard orphan roads up to standard and into RSAs.**

Additionally, some residents on orphaned roads may remain orphaned intentionally. Residents may opt to maintain their roads themselves through unofficial or undocumented contracts. This can lead to further confusion amongst residents if, for example, the resident who was maintaining the road moves out of the area. Anecdotal evidence suggests that some residents prefer to coordinate their own road maintenance due to real or perceived higher quality of maintenance and/or lower costs to residents than joining an RSA. The purpose of this analysis is to examine different alternatives for the RSA system that could provide more consistent road maintenance across the borough and bring orphan roads up to an acceptable standard to be maintained by an RSA. FAST Planning has federal funds available for upgrading roads to qualify for maintenance so that they may be annexed into an RSA and for road upgrades within RSA boundaries. The potential alternatives discussed in this memo are intended to expand more consistent road maintenance across the borough's road system; alleviate resident confusion regarding the system; make RSA mill rates more consistent across the borough; and simplify the RSA system overall to allow for greater ease of administration for FNSB Rural Services staff and its contractors.

HISTORY OF ROAD SERVICE AREAS IN THE FNSB

The FNSB was incorporated in 1964. The residents voted for the borough to be classified as a second-class borough, a status which does not automatically provide the borough with road service powers. Road service areas were created as the road maintenance authority within the boundary of the FNSB but outside of the cities of Fairbanks and North Pole. When the RSA system was originally created, road maintenance was state funded. In the 1980s, state funding began to decrease and the residents within RSAs responded by assessing their own tax mill rates to meet their desired levels of maintenance. Eventually, the RSA system became completely funded by RSA mill rate taxes.

The FNSB Planning Code 12.12.010 *streets and road maintenance* requires roads to be built to minimum design standards to be eligible for inclusion in an RSA, unless they otherwise request in writing to the RSA Commission and the request is approved. Historically, as developers subdivided land and developed a road network, the new roads were either annexed into a nearby RSA or more commonly would become their own new RSA. This system has led to a very large number of RSAs in the FNSB, currently at 103. In the early 2000s, state statutes were amended so that no new RSAs could be created if an area could be annexed into an RSA as new ones would further add to inconsistencies within the system and a greater administrative workload. As such, the last RSA was created in 2000.

There are currently exemptions codified within the FNSB code (specifically 17.56.065) that allow developers to build roads that do not meet the borough's minimum design standards. While these exemptions were greatly rolled back in 2019 through a Title 17 code amendment process, developers can still pursue a road construction exemption if the roads lie outside of an RSA or fire service area and do not depend on other RSA roads for access. Since roads must be built to minimum design standards to receive RSA maintenance, these exemptions have further exacerbated inconsistent road maintenance and orphaned road issues in the FNSB.

LEGAL FRAMEWORK

The legal framework affecting the RSA system for the FNSB primarily comes from the Alaska State Statutes, the Constitution of Alaska, and the Fairbanks North Star Borough Code.

Table 2 - Key laws and regulations governing RSA framework

Document Title	Owner	Key Takeaways
Alaska State Statute Section 29.35.490	State of Alaska	Establishes no road powers within the FNSB as second-class borough. As such, the borough may not exercise road powers without the majority of voters.
Alaska State Statute Section 29.35.450	State of Alaska	Establishes the authority of the FNSB and its ability to create service areas.
Alaska Constitution Article X	State of Alaska	Establishes the authority of the FNSB and its ability to create service areas.
Alaska Constitution Section 5 of Article X	State of Alaska	Reflects Section 29.35.450 of the Alaska State Statute that disallows the creation of a new RSA if the new service can be provided by a service area. Additionally, section 5 declares the authority to collect taxes to fund an RSA.
FNSB Planning Code Title 14	FNSB	Provides rules and regulations to create an RSA, what the RSA is responsible for, how it operates, and current RSA boundaries.
FNSB Planning Code Title 17	FNSB	Provides developers with the process and rules for constructing subdivision streets. The construction of roads is done through the platting process. Furthermore, Title 17 also provides the exemption rules for building roads that are not required to meet minimum design standards.
FNSB Planning Code Title 12	FNSB	Provides rules for maintenance and indicates roads built to design standards are eligible for road maintenance within an RSA.

CURRENT SYSTEM

There are 610 miles of road that are within the FNSB RSAs and receive regular maintenance. Each RSA must have at least three but not more than seven commissioners plus one additional alternate commissioner. The commissioners are responsible for ensuring their roads are maintained and monitor their roads for repairs. There are currently over 400 total commissioner seats and over 150 of those seats are vacant. It can be difficult to keep the seats filled as they are volunteer and RSAs with smaller resident densities have a harder time filling their seats. It is also difficult for an RSA to keep up with maintenance needs and operate without a commissioner as the commissioners are required to attend a minimum of two meetings per year, one in the first quarter and one in the third quarter. Although the FNSB borough staff manage the contracts for the maintenance providers, the FNSB relies heavily on the commissioners for RSA budget management, providing maintenance plans, recommending standards and specifications, and implementing policy and programs of capital assets. If the RSA commissioners do not meet the required number of times per year or the residents decide they no longer want to tax themselves, the FNSB has the authority through FNSB Planning Code 14.08.040 to alter RSA boundaries or dissolve RSAs without voter approval. The FNSB has only done this on four occasions. RSA residents decide amongst themselves how much they will be taxed for their road maintenance, which is their determined mill rate. The mill rates vary greatly, ranging from 0.294 – 14.010. Since the mill rate is determined by the RSA, maintenance from one RSA to another RSA may be different. Additionally, with orphaned roads, a traveler may go from a maintained road to an unmaintained road and back to a maintained road while driving through a neighborhood.

There are currently 260 miles of orphaned roads in the FNSB. These roads vary in length, resident density, geographic location, and surrounding property values, and may or may not already be built to standard. In FNSB code, developers are allowed an exemption from constructing roads to meet minimum design standards if certain criteria are met. In FNSB Code 17.56.065, a provision of the exemption indicates the road cannot rely on roads that are maintained by a service area as its only access. This exemption has led to the

development of "pockets" of orphaned roads that connect to state-maintained roads or other orphaned roads. Residents on an orphan road may be orphaned intentionally. Residents can opt to maintain the roads themselves, as they are not required to form an RSA. Residents may choose not to form an RSA for various reasons, such as deeming it too expensive or onerous due to low resident density or other factors, or a desire and ability to maintain their own roads to an acceptable standard.

Additionally, it can be difficult for an area to be annexed into an RSA. To be annexed into an RSA, the majority of voting residents within the RSA and within the selected annexation area must vote in favor. There are two separate issues regarding the voting process:

1. Residents may choose not to participate in the voting process, which leads to difficulties making the supporting majority vote.
2. RSAs are often hesitant to annex an orphan road because they will become responsible for upgrading the road to meet minimum design standards if it does not already.

SOLUTIONS BASED IN THE CURRENT SYSTEM

Using the current system, it is possible to annex orphan roads into an RSA. There are two primary challenges for areas wanting to be annexed into an RSA: 1) majority voter requirements and 2) funding to upgrade orphan roads to meet minimum design standards. To address the funding issue, FAST Planning has taken action to create a funding source specifically for road upgrades for orphan roads to qualify for road maintenance and to incentivize RSAs by potentially funding upgrades in the parent RSA. This program is still in the developmental phase. Due to FNSB staffing obligations, the annexation process can only be accommodated during a certain time of the year due to the elections cycle, and only once per year.

ALTERNATIVES

Alternatives were selected through a process that determined how best to address a series of complications and meet goals. The goals identified include: a more even distribution and consistent level of road maintenance across the FNSB; Mitigating access issues and confusion for residents, essential delivery services, and emergency responders; Easing borough staff contract management requirements to provide a more efficient use of staff and financial resources; and removing the reliance on so many volunteers to manage the system. Initially, the project team brainstormed potential alternatives to generate a list for further analysis. The team looked at other second-class boroughs and reviewed their RSA systems to identify features applicable to Fairbanks. This initial review resulted in four models:

- A new RSA to encompass all orphan roads (i.e., 104th RSA)
- A district model that consolidated the 103 RSAs into 6 RSAs
- Consolidation of all 103 RSAs into a single, borough-wide RSA
- Consolidation of the 103 RSAs into a smaller number of RSAs based on similarities such as topography, soil conditions, etc.

After additional analysis, three alternatives to the existing system were carried forward:

- A new RSA to encompass all orphan roads (i.e., 104th RSA)
- A district model that consolidated the 103 RSAs into 6 RSAs
- Consolidation of all 103 RSAs into a single, borough-wide RSA

EVALUATION METHODS

To evaluate the potential implications of each alternative on RSA mill rates, we used Geographic Information Systems (GIS) software to combine the property data with the financial (mill rate) data. Mill rates and expenditures per RSA were given to PDC by the Borough assessing department for the 2019 fiscal year. These figures were used to determine total property values for each RSA. GIS RSA data was provided by the FNSB, including RSA boundaries and road centerlines (miles of road). FNSB GIS tax parcel data was used to calculate the number of parcels in each RSA, which allowed for an estimate of parcels per mile of RSA road in each RSA.

The Single RSA alternative's 1.77 mill rate was developed by taking the total expenditures in 2019 and dividing them among all parcels in all RSAs. The allocation of the One RSA funds was estimated based on the parcels per mile in each RSA. RSAs are then allocated funds based on the average parcel density regardless of their overall tax contribution. A similar method was used for the Six RSA Districts alternative, whereas the funds were divided within each RSA district.

ALTERNATIVE 1 – SINGLE BOROUGH-WIDE RSA

With a single, borough-wide RSA, there would be a single mill rate of approximately 1.77 to meet the same overall funding as the current RSA system. As such, a consistent level of maintenance would be granted to the entire borough. This would alleviate the discrepancies in maintenance between RSAs. The FNSB staff needs would be transferred from primarily contract management responsibilities to field management as there would likely be a need for three to four field technicians, one RSA director, and several FNSB inspectors for road maintenance. The current system requires 400+ volunteer commissioners. The Single Borough-Wide RSA reduces the number of commissioners to 6 based on the RSA district boundaries.

Table 3 - Pros and cons of alternative 1

Pros	Cons
Singe RSA to manage	Residents will not be able to tax themselves a desired/variable amount
Single mill rate	More borough field staff needed
Lesser need for borough administrative management	Residents will have less control over their road maintenance
All areas will get the same level of maintenance	Most orphan roads need to be upgraded
Potential reduction in maintenance costs due to economy of scale	

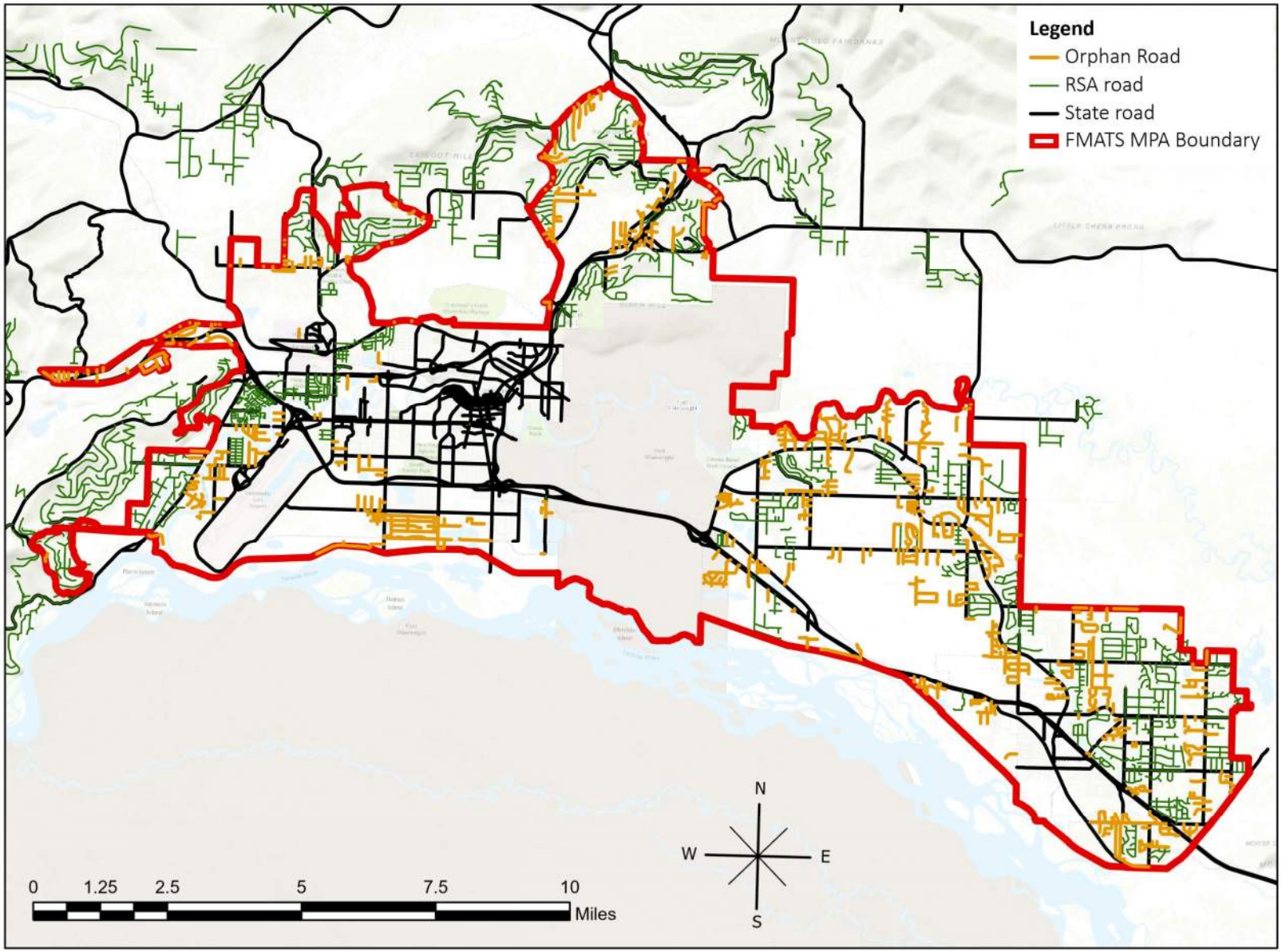


Figure 2 - Alternative 1

ALTERNATIVE 2 – DISTRICT STYLE MODEL

The district style alternative will follow the existing six FNSB road district boundaries. This will allow for some variation in mill rates but provides the same level of maintenance within the individual districts. The proposed mill rate for the districts ranges from 1.25-3.81 to reach approximately the same RSA funding levels as the current RSA structure. It is estimated that the number of commissioners needed would decrease to 18 and ease contract management responsibilities for borough staff but will likely require at least one more field service technician. Most of the orphan roads will be encompassed into the proposed RSA districts 2 and 6 with only a few miles of orphan road annexed into districts 3 and 4.

Table 4 - Pros and cons of alternative 2

Pros	Cons
Only six RSAs to manage	Residents have somewhat less local control than in the current system
Less variation in mill rates across the borough	Mill rate variation may still lead to differences in maintenance levels between districts
Lessen need for borough administrative management; fewer contracts to manage	Most orphan roads require upgrade
Residents still have some control over their mill rate	Orphan roads will impact districts unevenly
Residents still have some control regarding maintenance needs	
Fewer commissioner seats will be easier to fill	
Potential reduction in maintenance due to economies of scale	

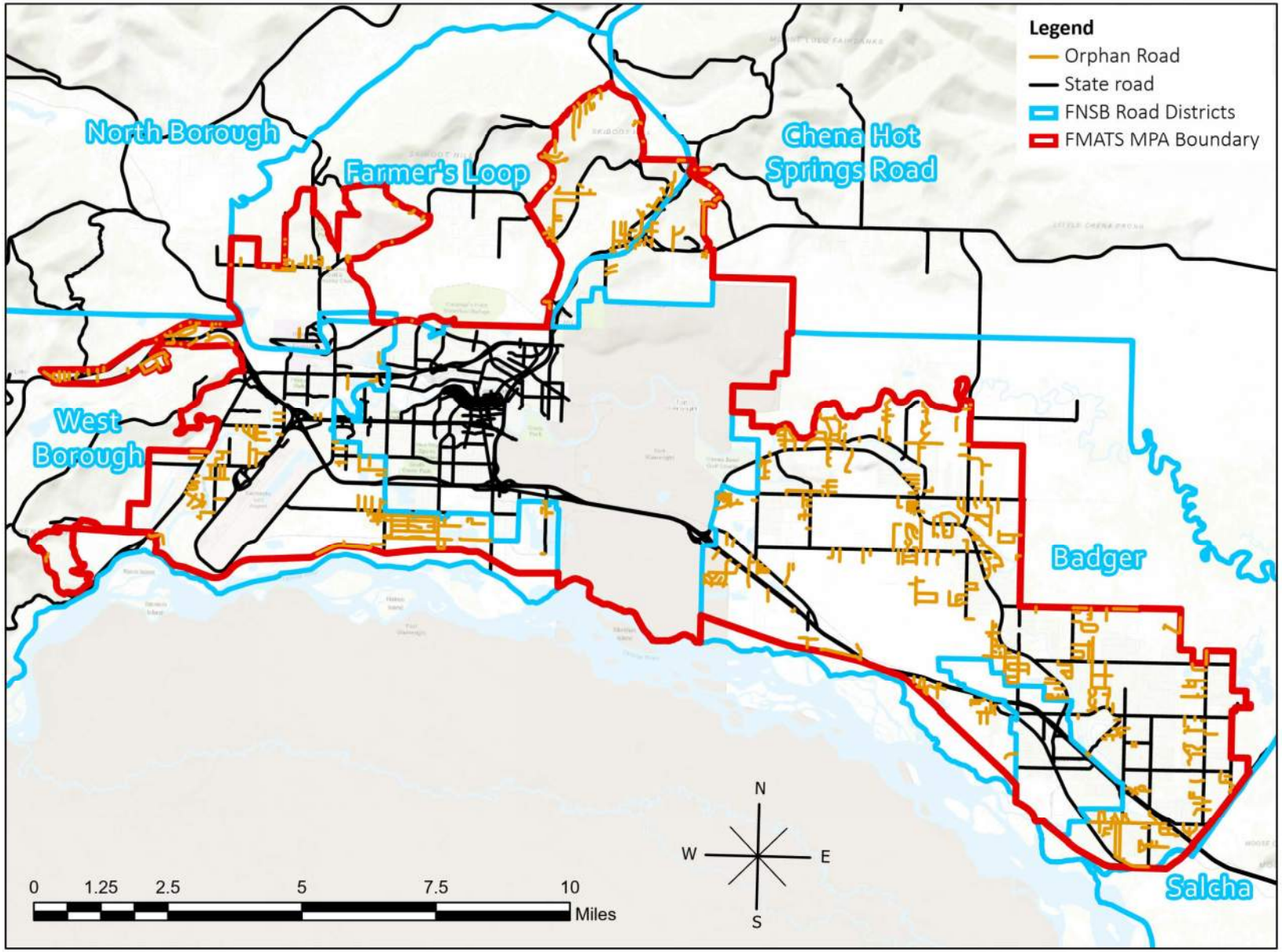


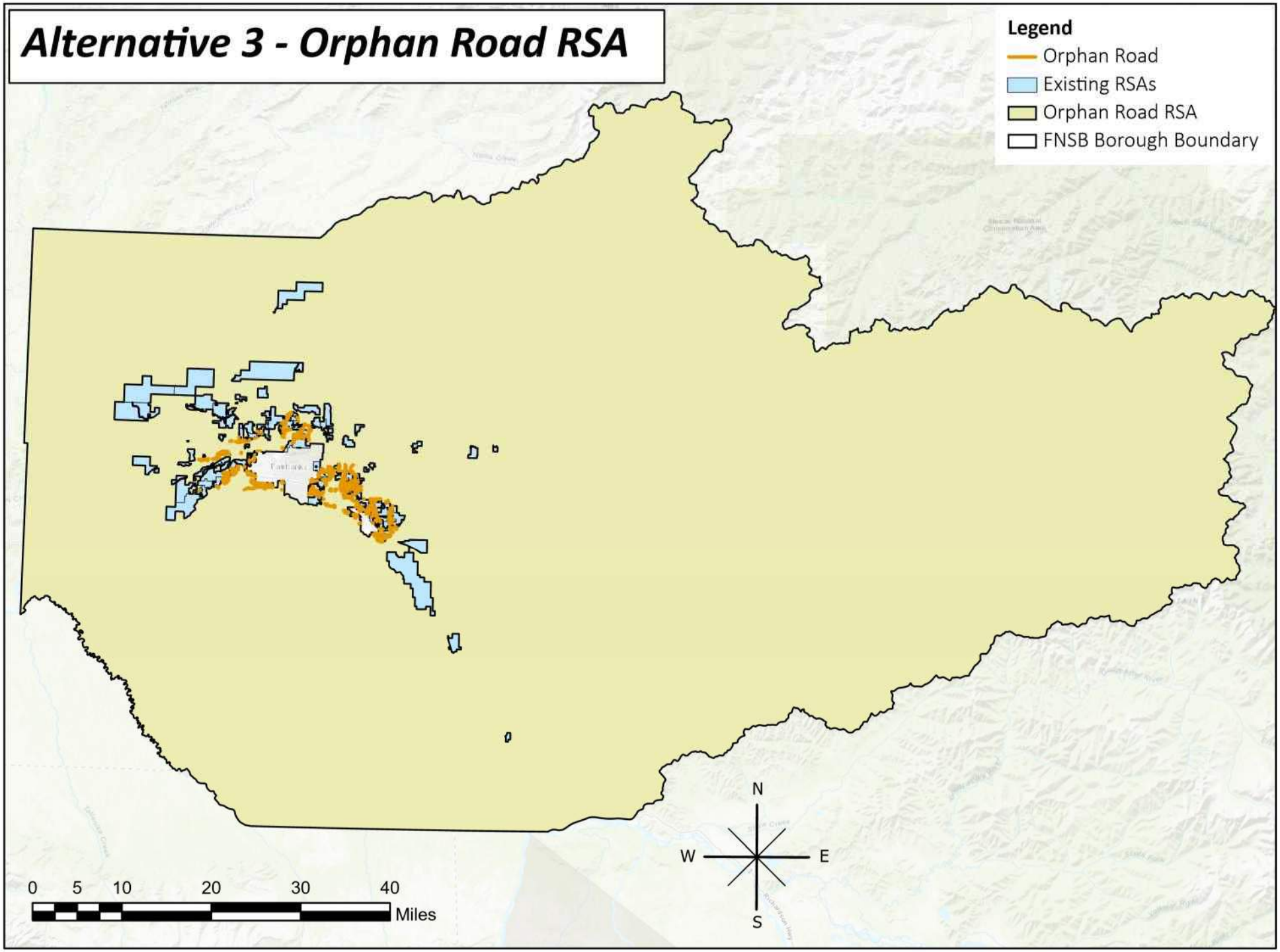
Figure 3 - Alternative 2

ALTERNATIVE 3 – SINGLE RSA FOR ORPHAN ROADS

The orphan road RSA will encompass all the orphan roads and leave the RSA system as it is. The orphan roads are spread out across the borough with most of them surrounding the city of North Pole and to the west of the city of Fairbanks, with few located north of the City of Fairbanks. It would be difficult to maintain these roads evenly as they vary greatly in distance from one another. There is also the concern that this may not be an option due to Section 29.35.490 of Alaska State Statute which prevents the creation of any new RSA if the area can be annexed into an RSA. Many of these roads will need to be upgraded to standards to be eligible for RSA maintenance. If the RSA can legally be created, the upgrades will likely not affect residents outside of the orphan road RSA in terms of financing or financial impacts.

Table 5 - Pros and cons of alternative 3

Pros	Cons
Orphan roads will have regular maintenance	Orphan road RSA may be difficult to manage due to geographic diversity
Only orphan roads, and no other RSAs, will be affected	Borough staff administrative needs will increase further
Orphan roads will be upgraded	Number of RSAs and Commissioners will increase
RSAs will maintain their mill rates	Not likely to be economical within the orphan RSA
RSAs will maintain their level of maintenance and local control	Unclear if this is a feasible option per state statute
The RSA system will not change overall	The RSA system will not change overall


Alternative 3 - Orphan Road RSA
Legend
Orphan Road
Existing RSAs
Orphan Road RSA
FNSB Borough Boundary
0 5 10 20 30 40
Miles
N
W
E
S

COMPARISON

Table 6 - Side by side comparison of alternatives

	Current RSA System	Alternative 1 – Single Borough RSA	Alternative 2 – RSA District Model	Alternative 3 – Orphan Road RSA
Pros	RSAs choose their mill rate RSAs choose their desired maintenance	Singe RSA to manage Single mill rate Lesser need for borough administrative management All areas will get the same level of maintenance Orphan roads will be upgraded	Only six RSAs to manage Less variation in mill rates across the borough Lessen need for borough administrative management Residents still have some control over their mill rate Residents still have some control regarding maintenance needs Fewer commissioner seats will be easier to fill Orphan roads will be upgraded	Orphan roads will have regular maintenance Only orphan roads, and no other RSAs, will be affected Orphan roads will be upgraded RSAs will maintain their mill rates RSAs will maintain their level of maintenance and local control The RSA system will not change overall
Cons	Limited options for non-RSA residents Relies heavily on volunteers Inconsistent maintenance Incentivizes developers to build below standard leaving upgrades to the residents Number of RSA commissioner seats vacant	Residents will not be able to tax themselves a desired/variable amount More borough field staff needed Residents will have less control over their road maintenance All orphan roads need to be upgraded	Residents have somewhat less local control than in the current system Mill rate variation may still lead to differences in maintenance levels between districts All Orphan roads require upgrade Orphan roads will impact districts unevenly	Orphan road RSA may be difficult to manage due to geographic diversity Borough staff administrative needs will increase further Number of RSAs and Commissioners will increase The RSA system will not change overall Unclear if this is a feasible option per state statute Not likely to be economical within the orphan RSA

IMPLEMENTATION PLAN

To accommodate either alternative 1 or 2, a phased implementation plan will be executed with a principled approach. The first will be a pilot program that will initially focus on one district. Upon successful execution of the pilot program on one district, the same consolidation will occur on the other districts. Once the pilot

program has been initiated in all districts; this would essentially be alternative 2. Alternative 2 would follow the same approach using the pilot program but would take the process a step further. Once the districts have consolidated all RSAs, the districts will consolidate to form a single RSA, alternative 1.

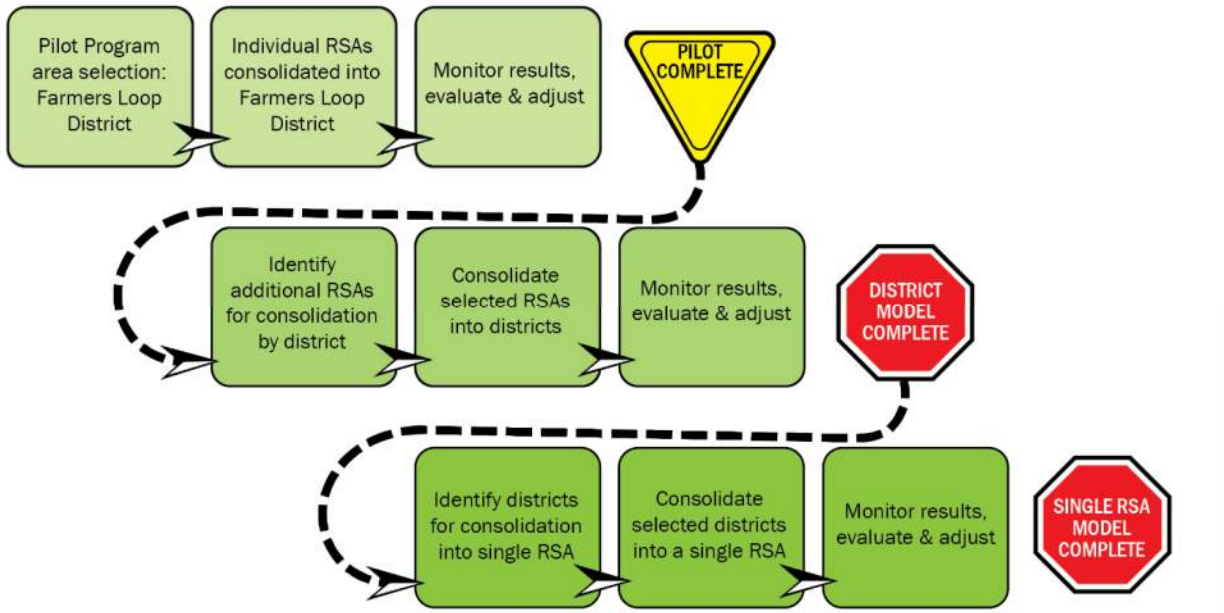


Figure 5 - Proposed implementation path of alternatives 1 or 2

PILOT PROGRAM

To initiate such an undertaking as reworking the current RSA structure, it would be recommended to first present a pilot program using one district. This program would provide an opportunity to work out the unforeseen problems in adjusting to a different program and do so with minimal cost risk.

SELECTION

Although the Farmer's Loop District may not be considered the smallest due to its number of roads, it was selected for the pilot program due it being the smallest in area and ease of consolidation.

CONSOLIDATION

Within the Farmer's Loop District, several elements of the RSAs will be consolidated such as balancing the mill rate for consistency, contractor and the level of maintenance will be selected across the entire district, and the commissioners will be selected for the district based on location.

MONITORING AND IRON OUT ISSUES

Upon completion of the selection and consolidation processes, a monitoring phase will begin. Monitoring will encompass a timeframe of no shorter than a single calendar year cycle to ensure that both summer maintenance and winter maintenance cycles are observed. If the issues are determined to be reasonably solvable and resolved, then the pilot program will be considered a success, the boundary will be become official and further RSA consolidations within other districts will be pursued.

CONCLUSION

There are several variables to consider in addressing the orphan roads in the FNSB. The current system works for some but not for all. Permissions are provided to residents within RSAs as they can tax themselves a desired amount and then receive the maintenance levels that they prefer. But it is difficult to fill volunteer commissioner seats and even more difficult to annex orphan roads into RSAs due to voter turn-out and hesitation to take responsibility to fund needed upgrades. With the development of the incentive program (see Incentive Program memo), annexing orphan roads may become easier, but the vacant commissioner seats could remain a problem. With each of the alternatives, there are pros and cons and it is important to address the variables that are most important. A single RSA makes sense in that all areas would be taxed at the same mill rate. The district model still allows for some variation in mill rates and appears to provide a compromise between resident desires and FNSB staff needs. The orphan RSA is likely the most problematic of the alternatives primarily because of the distance between the orphan roads and the uncertainly of whether it is a viable legal option. With all variables considered, this is not meant to be a cost saving measure but to alleviate the need for volunteers and the goal is to provide resident with more consistent maintenance and bring orphan road under a maintenance authority. Additionally, without the use the incentive program to provide funding to upgrade the orphan roads to design standards, there will be little progress in addressing the orphan road maintenance issues and they will likely continue to worsen as more development occurs.

APPENDIX A

ORPHAN ROAD UPGRADES INCENTIVE PROGRAM & APPLICATION (IPA)

APPENDIX A: ORPHAN ROAD UPGRADES INCENTIVE PROGRAM

A.1 Introduction

Without financial support or incentives to upgrade sub-standard roads, many subdivisions are reluctant to apply for annexation to an adjacent Road Service Area (RSA). RSAs are hesitant to accept new areas with substandard roads into their boundary as they would be responsible for the cost to upgrade the roads to qualify for maintenance. FAST Planning would like to develop an incentive program that will help bring orphan roads up to borough standards. Bringing orphan roads up to borough standards before annexation alleviates any financial concerns an RSA may have about annexing sub-standard roads. This incentive program will request funding from FAST Planning for the sole purpose of upgrading roads and allow subdivisions to simultaneously apply for annexation of the road(s) being upgraded into an RSA. FAST Planning will cover approximately 90.97% of the total project cost, which leaves 9.03% of the project cost to be covered by the benefitting parcels. If the proposed area is unable to provide the 9.03%, the FAST Planning Policy Board may be able to cover additional project cost. The Incentive Program and Annexation application will be known as "IPA".

Assumptions:

- FNSB annexation process remains the same
- FAST Planning application period is in the spring

IPA PROCESS

Anyone can initiate the application process, whether it be a property owner who resides on a substandard orphaned road or is affected by a substandard orphaned road, an RSA, Fairbanks North Star Borough (FNSB), FAST Planning, Alaska Department of Transportation & Public Facilities (DOT), or adjacent Cities. The initiator of the application will be known as the "sponsor" and will be required to coordinate the project with property owners.

APPLICATION

Applications for IPA will be submitted to the FNSB Rural Services Division (RSD). The application must include: the sponsor and co-sponsor's information; a map of the proposed district for upgrades indicating all benefiting parcels and including the parent RSA boundary and the proposed area to be annexed. If RSD determines the proposed area to be a good candidate for IPA, FAST Planning will initiate an Engineer's Estimate to determine a rough cost estimate for the proposed area upgrades. The Engineer's Estimate will also identify any potential mutual areas of benefit in need of upgrade within the service area that could also be completed through IPA. FAST Planning will cover the cost of the Engineer's Estimate through DOT's Advance Project Definitions Program. After the application is received and the Engineer's Estimate is completed, the RSD will prepare a petition packet for the sponsor that will include the Engineer's Estimate.

PETITION PROCESS

RSD will make the petition packet available to the sponsor by June 1st. The petition is required to be returned to RSD within approximately 30 days or by the deadline determined by RSD. The petition packet will include a

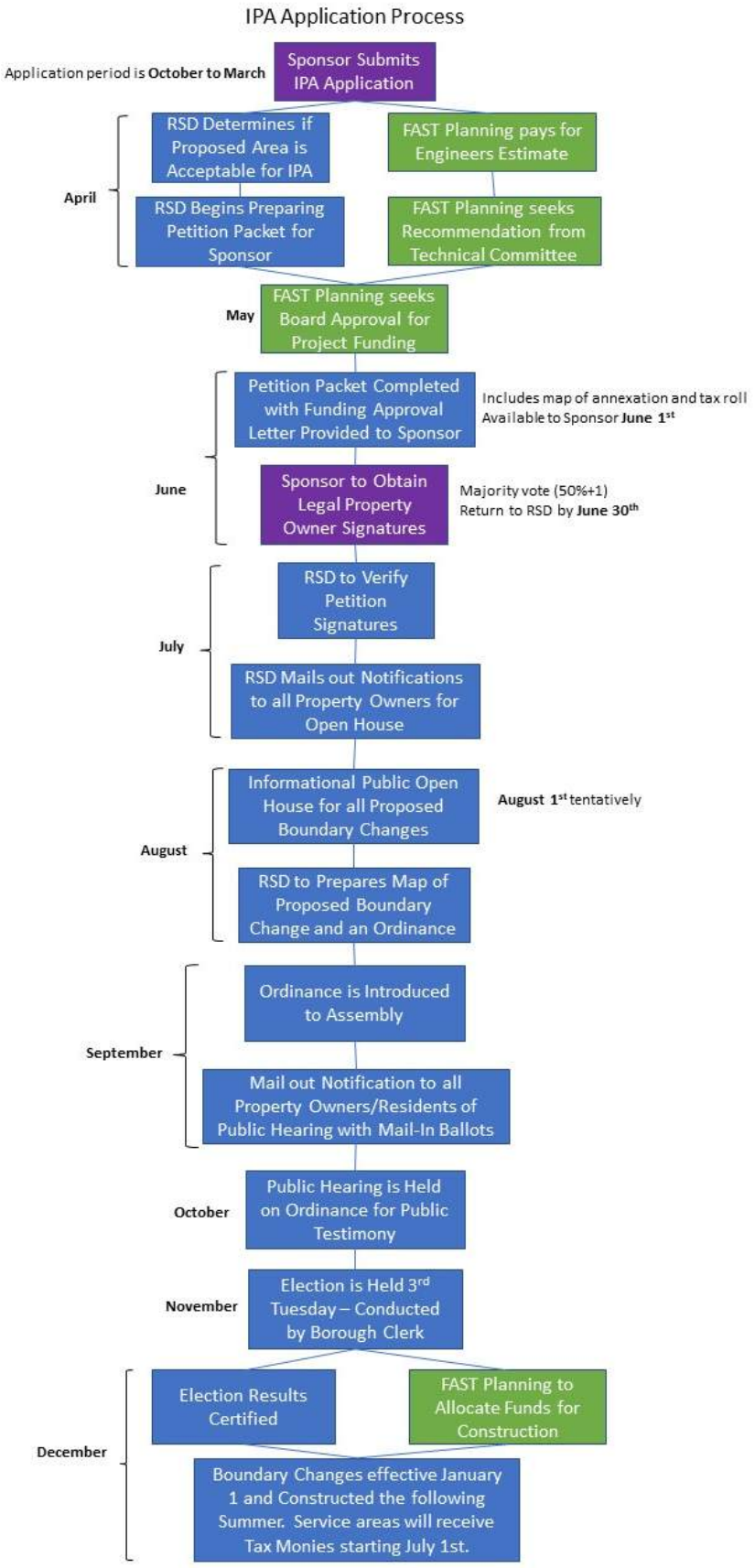
map of the area(s) to be annexed, the current tax roll of subject properties and owners, a 'change in resident density calculation' that includes changes for both the proposed annexed area and the parent service area, and the Engineer's Estimate. The signatures of all property owners who own more than 25% of the property are required, 50%+1 of all property owners are required, and only within the area to be annexed are required for the petition. Once the petition is returned, RSD will verify the signatures. If the sponsor fails to acquire the required signatures for the petition, IPA cannot continue and will have to be restarted.

NOTICE TO PROPERTY OWNERS AND OPEN HOUSE

There will be an informational Open House for all proposed areas to be annexed, this includes areas utilizing the IPA process. The Open House notice will go to all impacted residents and property owners within the proposed area and in the parent service area. Notices will also be advertised in the Fairbanks Daily News Miner.

The RSD will notify impacted residents and property owners by mail of the proposed road upgrade and the nearby selected RSA for annexation. The notice must include:

- The date and time of the public meeting
- A map showing the boundary of the proposed area for upgrade and annexation as well the boundary of the parent service area.
- A statement notifying residents that the project will be primarily funded by FAST Planning (90.97%) with a local match of 9.03% required contribution from property owners within the benefitting area to be annexed.
- The 'change in resident density calculation' completed by RSD to include both areas combined and estimated mill rate to help determine how maintenance funds for the RSA will change with annexation and inform the residents of the proposed area of potential pending tax changes.



- Indicate that the majority (50%+1) petition signature requirement has already been met by the property owners within the proposed area.
- Notice that funding will only be secured after a "yes" vote in the November election for both the proposed area and the parent service area.
- Statement that proposed area will receive long term, year-round maintenance.

Not required / may be provided in the Engineer's Estimate

- Identify any connection areas or areas of mutual benefit from the parent RSA to proposed area where road can be upgraded and/or improved.
- Identify any alternate access routes within proposed area to be annexed that may benefit the parent RSA.
- Identify areas within the parent RSA that are in the need of upgrade/repair.

ASSEMBLY MEETING AND PUBLIC TESTIMONY

After the informational open house, the RSD will create a map with the new service area boundary and create an ordinance to be reviewed by the Assembly for consideration. During the regularly scheduled Assembly meeting, public testimony will be allowed for or against the proposed service area ordinance. If the Assembly approves the ordinance an election will be held for both proposed area and the parent service area.
The notification for the Assembly meeting must be mailed to all affected residents, must follow the same requirements as the Open House notices, and must also include:

- Information on the public opportunity for testimony.
- Mail-in ballot with paid postage and instructions for in-person (drop-off) ballot casting.
- Statement that qualified voters include renters living in the affected area are also eligible to vote.
- Indicate that the determining results will be a majority of all who vote within the proposed area and the parent service area separately. A "yes" vote from both the parent RSA and the proposed area are required.

ELECTION

The election will be held on the 3rd Tuesday of November by the Borough Clerk once the Assembly approves the ordinance. Any qualified voter is eligible to vote. A qualified voter is someone who has lived in the proposed service area at least 30 days and has registered to vote at that address. Renters do qualify. The outcome will be determined by all who vote within the proposed area and the parent service area separately. To complete the annex and secure funding from FAST Planning, a majority "yes" for both areas is required. After the election, the results will be certified by the Assembly in December. The property owners will be notified of the election outcome by mail. The new RSA boundary will be effective January 1st of the following year. FAST Planning will allocate the funds based off the Engineer's Estimate to the project the following summer. The RSA will begin to receive the tax monies July 1st.

Fairbanks North Star Borough **Public Works Dept/Rural Services Division**
520 Fifth Avenue, 1st Floor, Suite D PO Box 71267 Fairbanks, Alaska 99707-1267 (907)459-1223 FAX 459-1499

APPLICATION FOR ROAD SERVICE AREA INCENTIVE PROGRAM ANNEXATION (IPA)

Sponsor's Name♦

Mailing Address

Residence Address

City, State Zip

Home Phone Work Phone

Email Address

Co-sponsor's Name

Mailing Address

Residence Address

City, State Zip

Home Phone Work Phone

Email Address

This application is for incentive program financing for road upgrades, which provides the following services:

Incentive Program Financing through FAST and Assume Road Maintenance and Construction Powers through the RSA Annexation Process.

Describe the area which pertains to this request. Include subdivision name, street names, or legal description of parcels:

☐ Include map of area to be annexed and total area

☐ Order Engineer's Report

♦ ***Note to Sponsor: This application will be processed as time permits.***

Rural Services Division

APPENDIX B

ROAD STANDARDS MANUAL

ROAD STANDARDS MANUAL

May 2021

DRAFT

Developed by

PDC ENGINEERS

PLAN • DESIGN • CONSTRUCT

A RESPEC COMPANY

Road Standards Manual

DRAFT

May 2021

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Chapter 1 - General Information

a. Purpose & Scope

These standards shall govern the construction of new roads as well as the rehabilitation of existing roads within the Fairbanks North Star Borough (FNSB). This does not include any roads, highways, or freeways owned and maintained by the State of Alaska Department of Transportation & Public Facilities (DOT&PF), the United States Department of Defense, or the cities of Fairbanks or North Pole.

b. Related Standard Specifications and Design Manuals

- American Association of State Highway and Transportation Officials (AASHTO) Geometric Design of Highways and Streets
- AASHTO Low Volume Road Design Guide
- AASHTO Guide to Bicycle Facilities
- Alaska Sign Design Guide
- Alaska DOT&PF Highway Preconstruction manual
- Alaska DOT&PF State Standard Specifications for Highway Construction (ASSHC)
- Federal Highways Administration (FHWA) Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)

c. Deviations

Nonadherence to these standards is only acceptable with written approval from the Borough Engineer. A request for a design deviation must include the following:

1) Design drawings, or a written description signed and sealed by a registered professional, clearly showing the impracticability of meeting these standards.
2) Design drawings, or a written description signed and sealed by a registered professional, clearly showing that the proposed alternative design maintains public safety, facility functionality, and long-term operations and maintenance requirements. Proposed alternative designs must accord with sound engineering principles.

Chapter 2 - Submittal Requirements

a. General

1) Permits

a) Storm Water Permit: Reference Title 17.12.020.C
b) Driveway Permit: Reference Title 17.52.010.A.3
c) Zoning Permit: Reference Title 18.104.080

See also Chapter 8: Environmental Guidelines and Permit Requirements.

b. Drawings and Technical Specifications

Project-specific drawings shall be submitted as part of the project approval process. The Alaska DOT&PF Standard Specifications for Highway Construction (ASSHC, current edition) shall be followed for construction materials, process, and procedure. Only desired modifications to the standard specifications shall be submitted for review. The drawings and specification modifications shall meet the following requirements.

1) Preliminary Plat Drawing Requirements

See Title 17.48.010 for Plat Drawing requirements. For new construction, a copy of the plat drawings shall be included with the construction drawings and technical specifications package.

2) Construction Drawing Requirements

Drawings shall be clear and legible.

Drawings shall be drawn to a scale that is appropriate to sufficiently show the work to be completed.

Drawings shall be plotted on a minimum sheet size of 11 inches by 17 inches, and all sheets in the drawing set shall be of the same size.

3) Technical Specification Requirements

Modifications to the technical specifications shall be organized under the format of the ASSHC, current edition.

Include only the portions of the ASSHC that are specifically applicable to the project.

Write out and identify by subsection all modifications to the ASSHC that are specifically applicable to the project.

All modifications to the ASSHC that are incorporated into the project technical specifications shall govern over any discrepancies in the ASSHC.

c. Review and Approval Process

Refer to FNSB Title 17.12 for information about the review and approval process.

d. Bonding and Warranty Period

See FNSB Title 17.56.060.G for bonding and warranty requirements.

See FNSB Title 17.44 for Assurances for Completion.

Chapter 3 - Road Design and Technical Criteria

a. Road Classifications

Roads meeting the definition of more than one classification should be evaluated using the design guidelines applicable to each functional class, and the higher of the applicable design guidelines should be applied.

1) **Pioneer Access Road**
   Pioneer Access Roads almost exclusively provide access to adjacent property and do not generally provide through continuity. As a result, they often are loop roads or end in cul-de-sacs. They provide access to a maximum of five individual subdivided properties that are five acres and larger.

2) **Alley**
   Alleys provide secondary access to areas proposed for dwellings, commercial or industrial uses, or subdivisions where service access, rear parking, or loading is desirable.

3) **Local Road 1**
   Similar to Pioneer Access Roads, Local Road 1 roads generally provide access to adjacent properties and do not usually provide through continuity. Local Road 1 roads are designed to provide direct access to 10 or fewer individual residential properties and have a maximum length of 1,320 feet. Local roads carry traffic from adjacent properties to Minor Collector roads.

4) **Local Road 2**
   Local Road 2 roads perform the same function as Local Road 1 roads within a subdivision, except that Local Road 2 roads provide access to between 11 and 40 lots and may provide through access. Local roads carry traffic from adjacent properties to Minor Collector roads.

5) **Minor Collector**
   The primary function of Minor Collector roads is to collect and distribute traffic from local roads and carry it to major collectors or the arterial road system. Minor Collectors generally do not offer direct residential access but may accommodate non-residential direct access. They may serve as potential through routes or spine roads within subdivisions and may also serve non-residential purposes. These roads can provide industrial or commercial access.

6) **Major Collector**
   Major Collector roads collect traffic from local roads and minor collectors and channel it to the arterial system. Major collectors do not offer direct residential access but may accommodate non-residential direct access. These roads can provide industrial or commercial access.

7) Frontage Road

The primary function of a frontage road is to separate properties from major arterials or freeways. Frontage roads improve safety by limiting direct access to major arterials and generally run adjacent and parallel to major arterials.

8) Arterial Road

Arterial roads are designed to move through traffic to and from major generators or out of a community. There is generally limited, consolidated direct access offered via occasional crossings or intersections. Primary access is via on- or off-ramps.

b. Design Speed

Design speed is a selected speed used to determine the various design features of the roadway. The design speed should be indicative of that which users of the roadway are expected to travel. It should take into account topography, adjacent land use, access to the roadway, and the functional classification of the roadway. Design speeds for roads within the Borough will range from 20 to 55 mph (see tables below).

c. Roadway Right-of-Way (ROW) Requirements

The ROW area is that which is designated for public access to the adjacent properties. The ROW must be wide enough to contain all road construction in addition to the finished road. The ROW width is primarily based on Road Classification. Refer to FNSB Title 17.56 for ROW requirements.

d. Roadway Width Requirements

Total roadway width is the sum of the traveled way width and the usable shoulder width on both sides of the roadway. Road shoulders must be surfaced with the same material as the traveled way. Roadway width is based on road classification.

Table 3-1: Roadway and ROW Width Requirements

Road Classification	Minimum ROW	Minimum Roadway Width (ft)
Pioneer Access Road	40	18
Alley	20	18
Local 1	40	22
Local 2	50	24
Minor Collector	60	24
Major Collector	80	32
Frontage Road(1)	40	28
Arterial Road	100	32

(1) Note: Frontage roads may be located within the dedicated ROW of a larger adjacent facility, in which case a dedicated frontage road ROW is not required.

e. Clear Zone

Clear zones may be defined as the width measured from the outer edge of the traveled way that is free of hazards such as power/light poles, trees, slopes steeper than 1-vertical:3-horizontal, and buildings. Clear zones should especially be considered in areas where the likelihood of vehicles exiting the roadway is higher, for example, around horizontal curves. Where clear zones can be provided at little to no additional cost, a clear zone width of 7 to 10 feet should be considered. If providing a minimum clear zone is deemed not cost-effective, the Borough Engineer should be consulted for review and approval of the proposed alternative design.

f. Vertical Alignment

The roadway vertical alignment consists of crest and sag vertical curves with tangent sections in between. Tangent section grades shall not exceed 10% without approval from the Borough Engineer. Minimum vertical curve criteria are based on road classification and design speed. (See Table 3-2.)

Table 3-2: Vertical Alignment and Curvature

Vertical Alignment			**Rate of Vertical Curvature, K(1)**	
Road Classification	**Design Speed (mph)**	**Stopping Sight Distance (ft)**	**Crest**	**Sag**
Pioneer Access Road	20	115	7	17
Alley				
Local 1				
Local 2	25	200	12	26
Minor Collector	30	250	19	37
Major Collector	45	425	61	79
Frontage Road	30	250	19	37
Arterial Road	(2)	(2)	(2)	(2)

(1) The rate of vertical curvature, K, is the length of curve (L) per percent algebraic difference in intersecting grades (A); i.e., K=L/A.

(2) To be determined during design based on traffic data and adjacent land use.

g. Horizontal Alignment

The roadway horizontal alignment consists of horizontal curves with tangent sections in between. Minimum center line curve radii are based on the road classification (see Table 3-3). Horizontal curves on collector roads and frontage roads shall be separated by a minimum 220-foot tangent length. Installation of switchback curves require the approval of the Borough engineer.

Table 3-3: Stopping Sight Distances and Minimum Radii for Horizontal Curves

Stopping Sight Distance and Minimum Radius for Horizontal Curve Design Maximum Superelevation Rate = 6%			**Minimum Radius (ft) for Paved Road**	**Minimum Radius (ft) for Unpaved Road**
Road Classification	**Design Speed (mph)**	**Stopping Sight Distance (ft)**		
Pioneer Access Road	20	80	80	135
Alley				
Local 1				
Local 2	25	115	145	210
Minor Collector	30	155	230	300
Major Collector	45	305	645	675
Frontage Road	30	155	230	300
Arterial Road	(1)	(1)	(1)	(1)

(1) To be determined during design based on traffic data and adjacent land use.

h. Sight Distance

Sight distance across the inside of horizontal curves is based on the horizontal alignment as well as the road design speed. See Table 3-3 for horizontal sight distance requirements. Sight distance for vertical curves is based on the vertical alignment and is also a function of design speed. Minimum vertical sight distances are based on an assumed eye height of 3.5 feet and an assumed object height of 2.0 feet. See Table 3-2 for vertical sight distance requirements.

Minimum intersection sight distances are shown in Table 3-4 and are based on an eye height of 3.5 feet and an object height of 3.5 feet. The distance shown is from the center of the observing (stopped) vehicle to the center of the observed (moving) vehicle measured along the path of the observed (moving) vehicle and correlated to the observed (moving) vehicle's speed. The minimum distances are based on road approach grades, between -3% and +3%. For grades steeper than +/-3%, see Table 3-5 for grade adjustment factors. For intersection grades steeper than those shown in Table 3-5, minimum sight distances must be approved by the Borough Engineer.

Table 3-4: Minimum Intersection Stopping Sight Distances

Design Speed (mph)	Stopping Sight Distance (ft)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645

Table 3-5: Grade Adjustment Factors for Sight Distance

Approach Grade (%)	Design Speed									
	20	**25**	**30**	**35**	**40**	**45**	**50**	**55**	**60**	**65**
-6	1.1	1.1	1.1	1.1	1.1	1.1	1.2	1.2	1.2	1.2
-5	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.2
-4	1.0	1.0	1.1	1.1	1.1	1.1	1.1	1.1	1.1	1.1
-3 to +3	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
+4	1.0	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9
+5	1.0	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
+6	1.0	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9

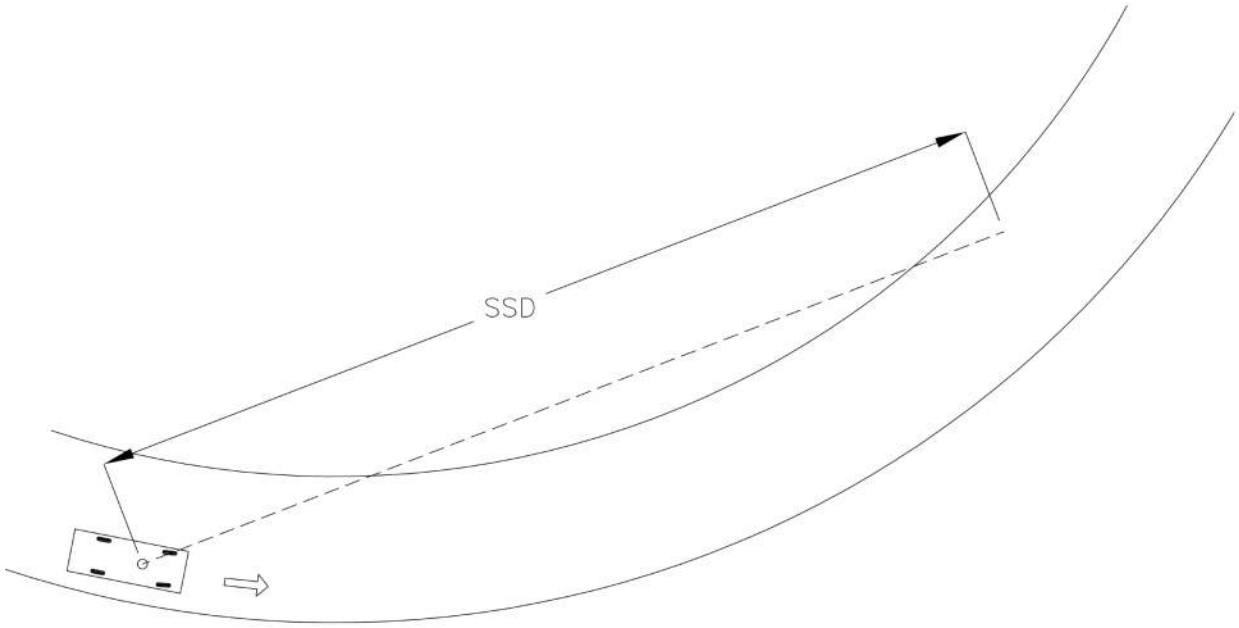

Figure 3-1: Horizontal Stopping Sight Distance

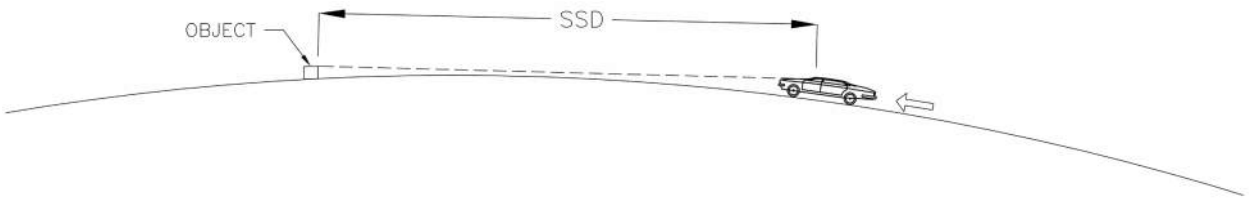

Figure 3-2: Vertical Stopping Sight Distance

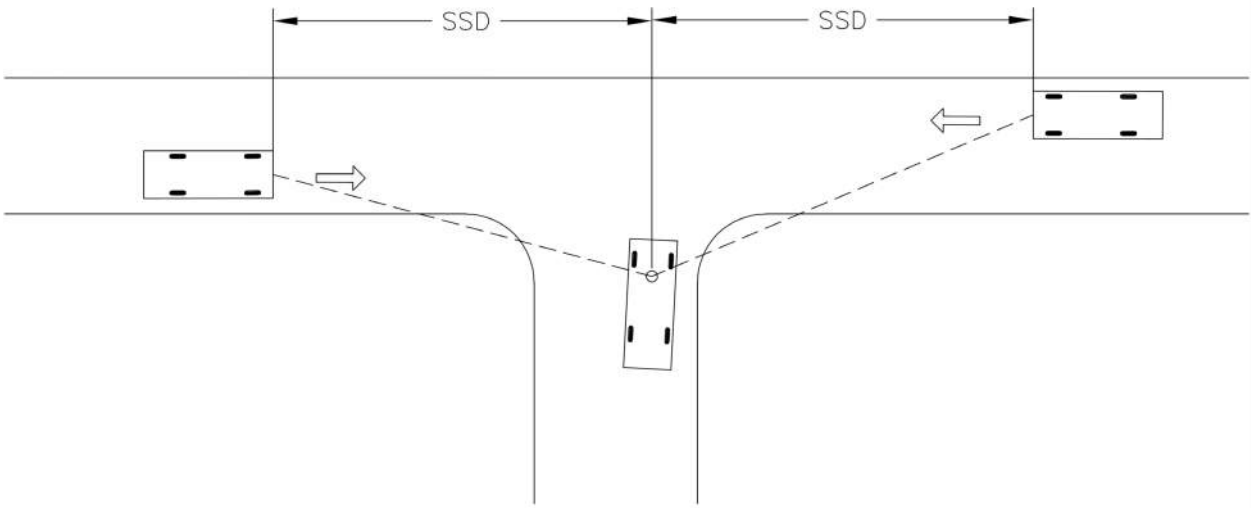

Figure 3-3: Intersection Stopping Sight Distance

i. Cross Slope / Roadway Crown

All unpaved roadways will have a 4% crown. All roadways surfaced with a chip seal or high float surfacing will receive a 3% crown. All roadways surfaced with Hot Mix Asphalt will receive a 2% crown. These requirements do not apply to intersections or superelevated horizontal curves. Road shoulders shall be sloped at the same rate as the traveled way unless otherwise approved by the Borough Engineer.

j. Superelevation on Horizontal Curves

Superelevation for horizontal curves is based on AASHTO Geometric Design of Highways and Streets.

Table 3-6: Curve Radii for Superelevation

Minimum Radii for Superelevation Rate		**Minimum Radius (ft), Rmin**																						
		Design Superelevation Rate, e(%)																						
Road Classification	**Design Speed (mph)**	NC*	RC**	2.2	2.4	2.6	2.8	3	3.2	3.4	3.6	3.8	4	4.2	4.4	4.6	4.8	5	5.2	5.4	5.6	5.8	6
Pioneer Access Road	**20**	1580	1120	991	884	791	709	635	566	498	422	358	309	270	238	212	189	169	152	136	121	106	80
Alley																							
Local 1																							
Local 2	**25**	2290	1630	1450	1300	1170	1050	944	850	761	673	583	511	452	402	360	324	292	264	237	212	186	145
Minor Collector	**30**	3130	2240	2000	1790	1610	1460	1320	1200	1080	972	864	766	684	615	555	502	456	413	373	335	296	230
Major Collector	**45**	6480	4680	4190	3770	3420	3110	2840	2600	2390	2190	2010	1840	1680	1540	1410	1300	1190	1090	995	903	806	645
Frontage Road	**30**	3130	2240	2000	1790	1610	1460	1320	1200	1080	972	864	766	684	615	555	502	456	413	373	335	296	230
Arterial Road	**55**	9410	6820	6110	5520	5020	4580	4200	3860	3560	3290	3040	2810	2590	2400	2210	2050	1890	1750	1610	1470	1320	1060

*NC-Normal Crown

**RC-Remove Adverse Crown or Reversed Crown

k. Embankment Requirements

New construction of road embankments shall meet the minimum thicknesses of Subbase and Base materials presented below and in Table 3-7. For reconstruction of existing roads, determine the thickness of existing Subbase and/or Base material and then add the remaining difference in order to meet the minimums provided in Table 3-7. Maximum material lift thickness during construction shall be 8 inches unless the Borough Engineer approves the use of a greater lift thickness prior to construction.

1) Subbase

Subbase shall be of the minimum thickness specified in Table 3-7 for the various road classifications. Subbase material shall consist of Selected Material Type A as defined in the ASSHC. Other types of subbase material may be used with prior approval from the Borough Engineer. The subbase material's maximum dry density shall be determined by the Modified Proctor Method.

2) Base

Base material shall be of the minimum thickness specified in Table 3-7 for the various road classifications. Base material shall consist of Aggregate Base Course, Grading D-1, as defined in the ASSHC. Other types of base material may be used with prior approval from the Borough Engineer. Base material shall be compacted to at least 90% of the material's maximum dry density as determined by the Modified Proctor Method.

Embankment sideslopes shall not be steeper than 1-vertical:2-horizontal unless otherwise approved by the Borough Engineer or as part of a sealed design prepared by a registered engineer. Embankment sideslopes of 1-vertical:4-horizontal are preferred.

For new construction in areas where permafrost is likely to exist, the subgrade shall be prepared as follows:

1) Clear all trees and brush out to 10 feet beyond the anticipated toe of the embankment.
2) Do not grub the surface; leave the existing vegetative mat in place.
3) Cover the full roadway embankment area (from toe to toe) with woven geotextile meeting the requirements of the ASSHC.

l. Surfacing Requirements

Surfacing material for new road construction shall match that of adjacent connecting roads and shall maintain similar type and character as nearby roads. Surfacing for reconstructed roads shall match the existing surface material. Surfacing material is to be approved and is subject to change by the Borough Engineer.

1) Surfacing Course

Surface Course material shall be of the minimum thickness specified in Table 3-7. Surface Course material shall consist of Aggregate Surface Course, Grading E-1 as defined in the ASSHC. Surface Course material shall be compacted to at least 90% of the material's maximum dry density as determined by the Modified Proctor Method. Other types of surface course material may be used with prior approval from the Borough Engineer.

2) High Float Chip Seal Surface

High Float Chip Seal for roadway surfacing shall be designed by a professional engineer or shall be designed and installed with direct oversight from the Borough Engineer or Borough Engineer's representative. Chip and asphalt binder specifications shall be submitted to the Borough Engineer for approval prior to beginning work.

3) Hot Mix Asphalt (HMA) Surface

Hot Mix Asphalt for roadway surfacing shall be designed by a professional engineer or shall be designed and installed with direct oversight from the Borough Engineer. Minimum HMA thickness shall be 2 inches, and maximum HMA lift thickness shall be 3 inches. HMA shall be compacted to at least 92% of the Maximum Specific Gravity as determined by Alaska Test Method 409. Asphalt mix design shall be submitted to the Borough Engineer for approval prior to beginning work.

Table 3-7: Embankment and Surfacing Minimum Material Depths

Road Classification	Subbase (inches)	Base (inches)	Surface Course (inches)
Pioneer Access Road	24	10	4
Alley	24	10	4
Local 1	24	10	4
Local 2	36	12	4
Minor Collector	36	12	6
Major Collector	36	12	6
Frontage Road	24	10	4
Arterial Road	48	14	N/A(1)

(1) Arterial Roads shall be paved with HMA Surface.

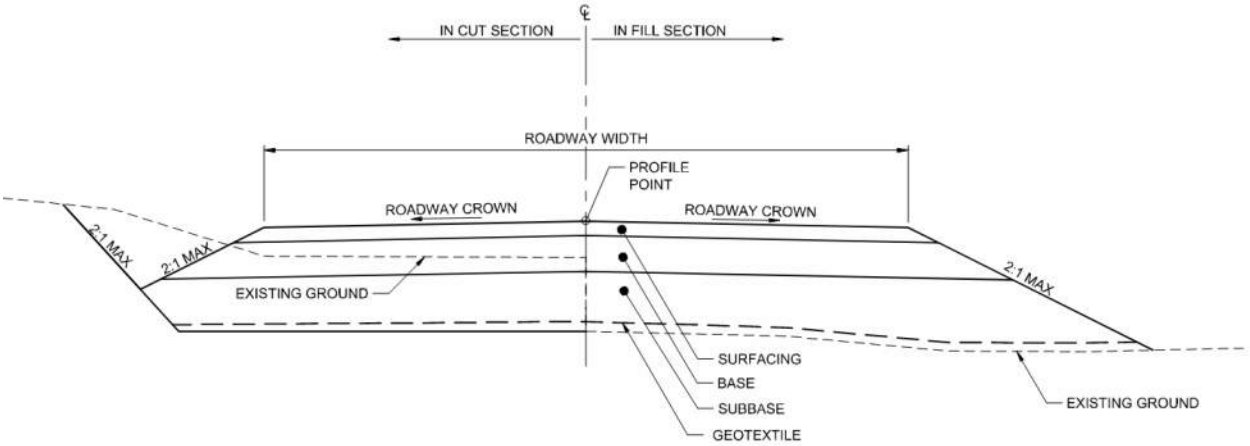

Figure 3-4: Typical Section

m. Intersections

Roads shall intersect at an angle as close to 90 degrees as feasible and no less than 60 degrees. All intersections shall have a minimum roadway return radius of 20 feet. No more than two roads shall intersect at any one point, and there must be a minimum of 200 feet between different centerline intersection points.

For a road intersecting with a collector or frontage roads, the intersecting roads shall have no horizontal curves within 100 feet of the intersection. For intersections with all other road classifications, the intersecting road shall have no horizontal curves within 50 feet of the intersection.

Within 100 feet of the roadway edge of the through road at an intersection, the intersecting road shall have a grade not to exceed 4%.

See Table 3-4 for minimum intersection stopping sight distances.

Refer to Section 3.h Sight Distance for sight distance requirements at intersections.

n. Cul-de-Sacs / Turnarounds

Roads that end without providing through access must provide a cul-de-sac at the end of the road.

Roads that end with cul-de-sacs or turnarounds must not exceed 900 feet in length as measured from the road intersection point to the cul-de-sac center point unless the following criteria are achieved:

1) For roads longer than 900 feet that end in cul-de-sacs, the minimum roadway width shall be 24 feet for the road's entire length.
2) In no case shall a road ending in a cul-de-sac exceed 1,320 feet in length.

Cul-de-sacs shall provide an 85-foot turning diameter contained within a ROW sufficient in size to contain all cul-de-sac construction.

Where installation of a cul-de-sac is not feasible, an appropriately sized turnaround may be installed with approval from the Borough Engineer. Turnarounds shall be of such dimensions that a vehicle with an 11-foot wheel base can turn completely around by backing only once. Alternate dimensions for both cul-de-sacs and turnarounds may be used with approval from the Borough Engineer. The surface of all cul-de-sacs or turnarounds must not exceed 4% grade in any direction.

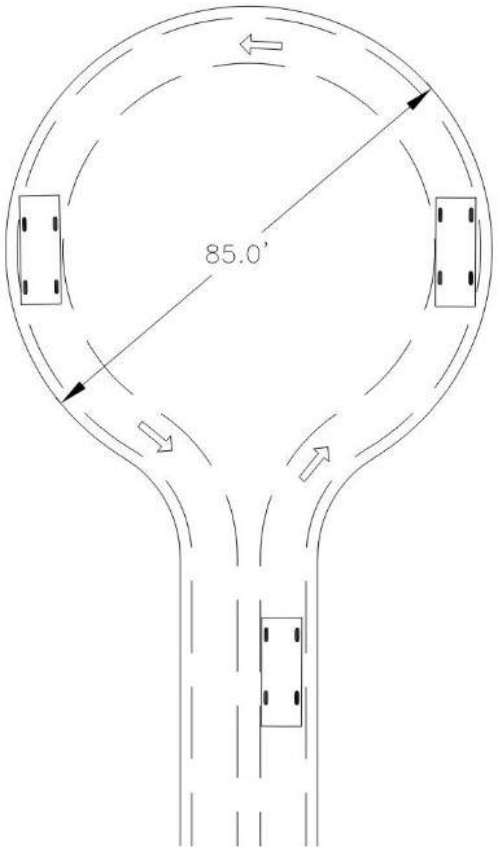

Figure 3-5: Cul-de-Sac

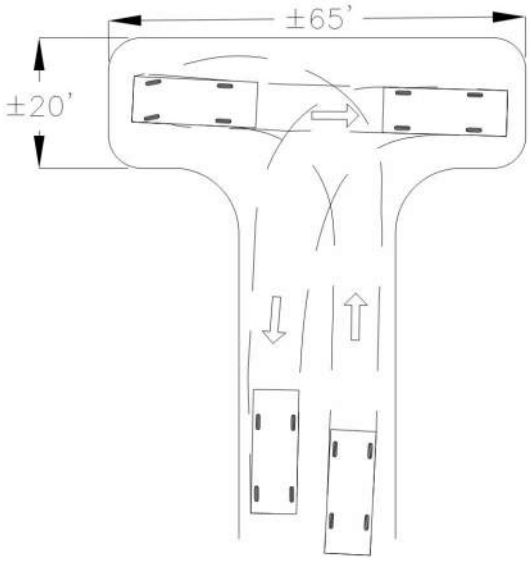

Figure 3-6: Turnaround 1

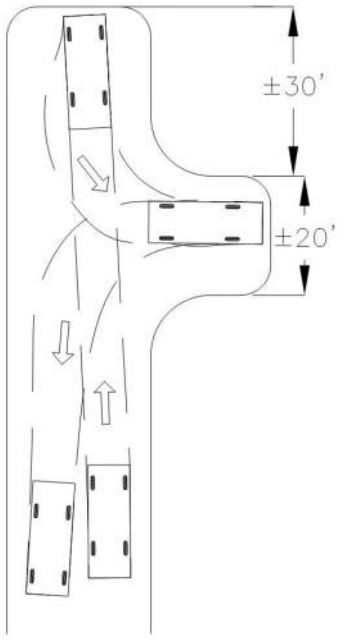

Figure 3-7: Turnaround 2

o. Roundabouts

Roundabout installations shall be designed using applicable federal design standards by a professional engineer with past roundabout design and traffic engineering experience.

p. Encroachments

Prior to plat approval, all ROW shall be clear of all encroachments from adjacent properties such as vehicles, structures, and residential utility poles.

q. Sidewalk

Sidewalks are only required in the following circumstances:

1) When reinstalling existing sidewalks during roadway reconstruction.
2) When installing adjacent to a new roadway in order to interconnect existing sidewalks outside the project extents.
3) When installing adjacent to a new roadway for consistency with the character of the connecting and nearby roadways.

Concrete sidewalks are to be constructed of Class B concrete as defined in the ASSHC. A concrete mix design shall be submitted to the Borough Engineer for review at least 15 days prior to concrete production. Concrete sidewalks are to be underlain by 10 inches minimum Bed Course material as defined in the ASSHC. Concrete sidewalks shall be a minimum of 6 inches thick at driveway curb cuts and a minimum of 4 inches thick between curb cuts. Sidewalks shall have a minimum width of 5 feet unless otherwise approved by the Borough Engineer. All curb ramps shall meet current ADA guidelines.

Sidewalk reinforcement shall consist of:

1) 4-inch – 6X6 – W1.4xW1.4 Welded Wire Mesh held up 2 inches from the bottom
2) 6-inch – 6X6 – W2.9xW2.9 Welded Wire Mesh held up 3 inches from the bottom

Sheets of welded wire mesh shall overlap by 9 inches minimum on the ends.

Install contraction joints (also known as crack control joints) at a spacing equal to the width of the sidewalk. Full-depth expansion joints shall be spaced a maximum of 50 feet apart along the centerline of the sidewalk and shall receive hot pour joint filler. Install full depth expansion joints at the interface between the sidewalk and the curb and gutter. Unless otherwise specified, all joints shall be perpendicular to the sidewalk and shall line up with joints in the curb and gutter.

r. Curb and Gutter

Curb and gutter are only required in the following circumstances:

1) When reinstalling as part of existing sidewalk reconstruction
2) When installing adjacent to a new sidewalk installation

Concrete curb and gutter shall be standard spill or catch curb and gutter shape and constructed of Class B concrete as defined in the ASSHC. A concrete mix design shall be submitted to the Borough Engineer for review at least 15 days prior to concrete production. Concrete curb and gutter are to be underlain by 10 inches minimum Bed Course material as defined in the ASSHC. Curb and gutter reinforcement shall consist of a minimum of two #4 steel reinforcing bars placed 4 inches over and 3 inches up from both sides.

Install expansion and contraction joints in the curb and gutter such that they align with the joints in the adjacent sidewalk. Maximum spacing between expansion joints is 50 feet, and all expansion joints shall be filled with hot-pour joint filler.

s. Bike Lanes / Shared Use Paths

Bike lanes or shared use paths are only required in the following circumstances:

1) When reinstalling existing bike lanes or shared use paths during roadway reconstruction
2) When installing adjacent to a new roadway in order to inter-connect existing bike lanes or shared use paths outside the project extents
3) When installing adjacent to a new roadway in order to be in keeping with the character of the connecting and nearby roadways

Bike lanes shall have a minimum top surface width of 4 feet.

Shared use paths shall have a minimum top surface width of 10 feet and a maximum paved width of 14 feet. Both sides of the usable top surface shall be bordered by a 1-foot-minimum unpaved shoulder having a maximum slope of 4:1. The top surface shall have a maximum cross-slope of 1.5%. Longitudinal path grades shall be less than or equal to the adjacent roadway grade.

Shared use paths shall have horizontal curves with minimum radii of 75 feet. The embankment material shall match that of the adjacent roadway embankment material both in type and thickness. The base material and surfacing material shall also match the adjacent roadway both in type and thickness unless determined otherwise by the Borough Engineer. On paths paved with HMA, a 1.5-inch thickness shall be allowed. If a shared use path is not adjacent to a roadway, the embankment material types and thicknesses shall be determined by a professional engineer with approval from the Borough Engineer.

t. Guardrail Design

Guardrail installations shall be designed by a professional engineer using FHWA standards. A cost-benefit analysis is recommended prior to design to determine if guardrail is warranted. Current Alaska DOT&PF-preferred guardrail materials and premanufactured models shall be utilized.

u. Mailbox Design

Mailboxes shall be constructed in accordance with the most recent version of the FNSB Rural Services Mailbox Installation, Mounting and Anchoring Detail, M1. Mailboxes shall be placed in accordance with the most recent version of the FNSB Rural Services Mailbox Location Drawing, M2.

v. Signage & Striping

All signs shall be designed and located according to the FNSB Road Service Area Sign Maintenance Details. All sign materials shall be in accordance with the ASSHC.

Sign types most commonly found on Borough roads are listed below:

1) Stop Signs – R1-1
2) Street Name Signs – D3-1
3) Speed Limit Signs – R2-1

Road striping shall only occur on roads surfaced with Hot Mix Asphalt or High Float/Chip Seal. Striping denoting the outer edges of the roadway lanes shall be 4 inches wide and solid white. Striping denoting the center line of the roadway shall be 4 inches wide and either solid or skip-pattern yellow. All striping plans are to be reviewed for approval by the Borough engineer prior to installation. Striping materials and execution shall be in accordance with the ASSHC.

Chapter 4 - Geotechnical Investigation Standards

a. Require a minimum amount of Geotechnical exploration.

b. Test pit or bore hole every 300 feet along road alignment.

c. Most important information:

1) Depth of organics
2) Frost Susceptability of Subgrade
3) Relative Density of Subgrade
4) Depth of Groundwater
5) Presence of Permafrost

Chapter 5 - Stormwater and Drainage Structures

a. Drainage Design Criteria

For all new road construction projects that will impact or change the drainage of adjacent land, a drainage plan shall be prepared, signed, and sealed by a professional engineer and shall, at a minimum, include:

- A description of the project area
- A description of the drainage basin being considered as part of the drainage design
- Methods and assumptions used in the drainage design
- Culvert locations and sizes
- Culvert outlet controls
- Drainage easements if applicable
- Ditch typical section showing ditch lining as applicable
- Soil stabilization structures

All project drainage structures shall be sufficient to carry surface water runoff from the spring melt. All drainage structures shall be sized to carry surface water runoff from the 10-year, 2-hour storm event. Drainage plans shall be submitted to the Borough Engineer for review and comment.

b. Ditch and Culvert Design

Ditches shall have a minimum depth of 2 feet measured from the edge of the road shoulder. Ditch foreslopes and backslopes shall not be steeper than 1-vertical : 2-horizontal unless otherwise approved by the Borough Engineer or as part of sealed design prepared by a registered engineer. Ditches shall have a minimum longitudinal grade of 1%. Ditches with a longitudinal grade exceeding 8% shall be approved by the Borough Engineer.

Roadway and driveway culverts shall be a minimum of 18 inches in diameter. Culverts of a continuous length greater than 100 feet shall be a minimum of 24 inches in diameter. All culverts shall be corrugated metal pipe meeting the requirements of the ASSHC or equal, sloped at a minimum 0.5% grade. A shallower culvert grade may be used with prior approval from the Borough Engineer. Culverts shall be installed with a minimum of 12 inches of cover under roadways and 8 inches of cover under driveways.

c. Temporary Erosion Control Measures

Project erosion control shall comply with the most current version of the ADEC Construction General Permit and shall comply with the requirements of the project Stormwater Pollution Prevention Plan (SWPPP) if applicable.

d. Permanent Post-Construction Stormwater Management

All permanent stormwater management features shall be reviewed and approved by the Borough Engineer prior to construction. The project must adhere to the requirements of the overseeing regulatory authority which is determined by project location. Storm drain curb and field inlet design to be prepared and sealed by a professional engineer.

e. Bridges and Major Drainage Structures

All bridges, pipe arches, retaining walls, or other major drainage structures shall be designed and sealed by a professional engineer. All culverts 36 inches in diameter or larger shall be designed and sealed by a professional engineer. Crossings of channels or water bodies containing anadromous fish species shall be designed and sealed by a professional engineer with sufficient fish passage design experience.

Chapter 6 - Access Control and Driveways

a. Access Control Standards

The following are recommended access control best practices and are not required elements of roadway design.

It is recommended that one driveway be provided per property. Driveways should ideally not be placed within separate turning roadways, auxiliary speed change lanes, exclusive turning lanes, or on/off-ramps. Driveways should be a minimum of 60 feet from the nearest edge of the traveled way of an intersection.

Driveways should be separated by a minimum distance of 35 feet on local roads, alleys, and pioneer access roads. They should be separated by a minimum distance of 50 feet on collector and frontage roads and by 75 feet on arterials.

Driveways shall have an access grade of 15% or less. All driveways shall be constructed with a +/- 2% landing with a minimum length of 10 feet. If the driveway is expected to be used by commercial trucks or large equipment, then it shall have a minimum landing length of 20 feet.

Driveways adjacent to curbed roadways should be designed by a professional engineer or should receive approval from the Borough Engineer prior to installation.

Refer to Section 3-h Sight Distance for sight distance recommendations at driveway intersections. Refer to Section 3-a Road Classifications for access control requirements on certain types of roadways.

b. Driveways – Technical Criteria

The following are recommended driveway design best practices and are not required elements of roadway design. Driveway construction and maintenance is the responsibility of the landowner.

Driveways should be constructed in accordance with the details included in the most current version of the FNSB Construction Permit Application for Driveways and should be graded such that surface drainage does not run from the driveway out into the adjacent roadway.

Driveways should have an access grade of 15% or less. All driveways should be constructed with a +/-2% landing with a minimum length of 10 feet. If the driveway is expected to be used by commercial trucks or large equipment, then it should ideally have a minimum landing length of 20 feet.

Chapter 7 - Utility Installations and Easements

a. Utility Location and Installation Requirements

Utilities may be installed within roadway ROW limits. See Title 17.56.030.

The items below are recommended utility design best practices and are not required elements of roadway design.

Overhead utilities that cross over the roadway should be a minimum of 20 feet above the finished surface of the road for existing roadways. For new construction, the finished surface should be a minimum of 20.5 feet below any overhead utilities to allow for future resurfacing of the roadway.

Chapter 8 - Environmental Guidelines and Permit Requirements

The following permits and regulations may be applicable to road development projects based on location and the scope of work.

a. U.S. Fish and Wildlife Service (USFWS) – Information for Planning and Consultation (IPaC)

IPaC should be consulted to confirm compliance in the following categories:

1) Endangered Species
2) Migratory Birds
3) Facilities
4) Wetlands

b. FNSB Floodplain Permit

c. Alaska Department of Environmental Conservation (ADEC) Alaska Pollutant Discharge Elimination System (APDES) Stormwater Permit

d. ADEC Construction General Permit

e. ADEC Excavation Dewatering General Permit

f. ADEC Wastewater Discharge

g. ADEC Contaminated Sites Review

h. Alaska Department of Natural Resources (ADNR) Water Rights

i. ADNR Alaska Heritage Resources Survey

j. U.S. Army Corps of Engineers

Consult for wetland delineation and compliance.

k. Alaska Railroad Permit

l. Alaska Department of Fish & Game (ADF&G)

1) Fish Habitat Permit
2) General Permit

m. Alyeska Pipeline Service Company Permits

Chapter 9 - Construction Inspection and Acceptance

a. Material Testing

Unless otherwise determined by the Borough Engineer, all materials shall be tested and or otherwise approved as described below.

1) Independent Testing Laboratory

Employment of an independent testing laboratory is required for testing and verification of aggregate materials and their installation. The testing laboratory must be qualified, licensed to operate in the State of Alaska, and must be approved by the Borough Engineer. The laboratory shall provide qualified personnel at the project site to perform sampling and testing. The laboratory personnel shall ascertain compliance of materials, mixes, and how they are installed.

2) Minimum Tests Required

a. Material Gradation Tests
Perform material gradation tests on all material used for construction of the roadway, ditches, driveways, and structures. Gradation tests shall be performed by a registered professional engineer on samples of each material, one taken from the source stockpile and one taken from the project site during construction in order to ensure compliance with these standards.

b. Optimum Moisture and Density Tests
Optimum moisture and maximum dry density shall be performed upon completion of the subbase and the base, and and the following method shall be used: Modified Proctor Method (AASHTO T180, Method D).

c. In-Place Density Tests
Unless otherwise stated in the project contract documents, Subbase, Base, and Surface Course material shall be compacted to at least 90% of the respective material's maximum dry density as determined by the Modified Proctor Method.

b. Survey Monument Preservation

If construction activity is expected to disturb or destroy an existing survey monument or accessories to an existing survey monument, then the following must be performed by a professional land surveyor or a qualified person under the direct supervision of a professional land surveyor prior to construction activity commencing:

1) Locate and reference the monument or the accessories to the monument.
2) File a corner record showing the location of the references to the monument or to the accessories to the monument as required.

Within 30 days of completion of construction activity the following activities shall be performed by a professional land surveyor or a qualified person under the direct supervision of a professional land surveyor:

1) Restore or replace the monument or the accessories to the monument.
2) File a new corner record as required.