Chapter Five – Identification and Evaluation of Alternatives

5 | Section 1 – Introduction

The purpose of this chapter is to identify analyze options that can be implemented to address facility requirements and infrastructure needs for Y63 during the planning period. **Table 4-32, *Project Priorities***, tabulates thirty-three projects identified to be undertaken in a phased approach over the course of the next twenty years to provide sufficient capacity to meet the impact of anticipated aviation demand on Y63's airfield, terminal area, general aviation facilities, support facilities, and airport access infrastructure.

This Chapter is organized to provide a broad overview of how the projects identified in Chapter Four, Facilities Requirements, meet the goals and objectives of the Airport Board, address airport FAA design standards, provide for Y63's safety/security needs, preserve existing infrastructure, and/or accommodate anticipated growth in aviation activity. Alternative plans are presented to address facility requirements associated with the expansion of general aviation and airport support facilities. Advantages and disadvantages of each option are presented based on operational, environmental, fiscal, and other considerations, and were compiled into a qualitative rank based on the ability to fulfill the facility needs. The alternatives that most effectively address the needed infrastructure improvements considering all factors were selected as the preferred alternatives.

5.1.1 Common Aspects of all Airside and Landside Alternatives

Of all the projects identified by the Facility Requirements chapter for implementation during the planning period, the following activities are common to all alternatives and are described below.

Update Airport Property Map/Exhibit A

FAA requires that all airport sponsors maintain a map depicting how various tracts of airport property were acquired. The airport sponsor is required to ensure that the map is current and reflective of all encumbrances and property transfers. The

Board's current airport property map does not comply with FAA standards and is being updated as part of this planning effort. As the Board acquires the property identified as part of this recommended plan, it will be necessary to update the property map on an ongoing basis.

Federal Environmental Reviews

Because Y63 is part of the National Plan of Integrated Airport Systems (NPIAS) and receives federal grant monies, an environmental review is required to be conducted prior to the start of construction projects. This review could take the form of a Categorical Exclusion, Environmental Assessment, or an Environmental Impact Statement. The level of such an assessment is contingent upon the scope and magnitude of work to be completed. Conducting such an assessment for each phase of work or project is required by the FAA regardless of the alternative selected for development.

Obstruction Mitigation

It is recommended that all existing obstructions to the Part 77 Approach surfaces to all Runways be cleared when practicable, and those that cannot should be mitigated by obstruction marking/lighting. Identifying obstructions and mitigating them is a high priority task.

Airport Zoning Update

The existing zoning ordinance is no longer applicable to the current airport development. The ordinance should be revised in Phase I and updated as often as needed to keep up with development at Y63.

Acquire Land

Where practicable, it is recommended that the City acquire fee simple interest in the portions of the RPZs and MnDOT Clear Zones that are currently controlled through avigation easement to prevent incompatible land uses. It is further recommended that the City acquire fee simple interest in properties that in the future will make up the RSA, RPZ, and Clear Zone areas of the Ultimate Runway 14/32.

Study Airport Water and Electrical Service Options

Y63 lacks sufficient water supply, due to its reliance on a well, to support the construction of larger hangars which require a sprinkling system per NFPA 409, *Standard on Aircraft Hangars*, thereby limiting the airport's development. Y63 does not have an emergency generator and has an electrical service line which has proven to be somewhat unreliable, leaving critical airport lighting and NAVAIDs vulnerable during a power outage.

Relocate/Update Fuel Facility

Aircraft using the fueling facility often block taxilanes on the apron, impacting free circulation, and the existing 100LL fuel tank is nearing the end of its useful life. It is recommended that Y63 replace the underground tank with an above-ground tank

and plan for the addition of a Jet A fuel tank in the future. The actual location of the equipment may vary by alternative, but the facilities themselves are the same.

Construction of Private Hangars

It is recommended that private hangars be constructed in each phase as demand warrants. While the apron and site work associated with each private hangar may vary by alternative, the buildings themselves are the same.

Construction of T-Hangars

It is recommended that a new T-hangar, sized to accommodate Group II aircraft, be constructed. It is also recommended at the 1976 T-hangar, which is at the end of its useful life, be replaced in the future with a new building, sized to accommodate Group I aircraft. The location for this building shall be shifted to bring the TOFA of Taxilane B in compliance with FAA standards.

Construction of Hangar-Access Taxilanes

It is recommended that taxilanes be provided for all new and existing hangars and that Taxilane Object Free Area widths be provided as needed to accommodate the intended aircraft (Group I or Group II) with their associated hangars. All circulation intended to provide access to Group II hangars shall have TLOFAs with dimensions commensurate with Group II standards.

Improve Airport Security and Access Control

It is recommended that Airport security be improved with the provision of additional full-cutoff wallpack lighting at sensitive areas, such as at hangar and personnel doors. It is further recommended that access to the apron be restricted to authorized personnel and the flying public by providing security fencing with gates between "public" areas of the airport and the apron. The actual location of the fence may vary by alternative, but the facilities themselves are the same.

Rehabilitate Arrival/Departure Building

This building, while expected to be adequate for the Airport's needs for years to come, is in need of upgrades and maintenance to ensure its viability for the next 20 years.

FBO Building Maintenance

The FBO building will require periodic maintenance and/or replacement of both minor and major components, such as doors, siding, roofing and painting to ensure that it remains in good condition.

Rehabilitate Existing Runway and Taxiway

Until they are reconstructed or replaced, Runway 14/32 and its taxiway must be maintained using routine maintenance practices.

Update Airport Beacon

It is recommended that the existing beacon be evaluated for compliance with AC 150/5345-12F and brought up to this standard.

Airport Wayfinding Study and Improvements

It is recommended that a wayfinding study and improvement project be completed.

Construct Partial Parallel Taxiway

It is recommended that a partial parallel taxiway be provided to improve airfield safety and pilot situational awareness in accordance with FAA guidance. The existing taxiway should be removed to eliminate the direct connection from the apron to the runway.

Upgrade Seaplane Base Dock, Ramp, Apron, and Fuel Truck Parking

It is recommended that the seaplane dock and ramp be replaced in compliance with FAA and MnDNR standards. An apron with two tie-down locations for seaplanes should be provided. It is also recommended that designated fuel truck parking with containment be provided to conform with environmental safety guidelines near the seaplane base.

Automobile Parking

Existing parking lots should be paved, and new lots developed, to meet MnDOT's standard for one parking space per based aircraft + 25%. This includes parking at the A/D building, FBO, and parking for the general public.

Wildlife Hazard Improvements

It is recommended that the City-owned brush dump site on Airport Road be removed to discourage mammals and other wildlife. It is also recommended that full-perimeter wildlife fencing be provided. The Wildlife Hazard Management Plan should be adopted and implemented for the reduction of on-site mammals and birds.

Provide Compass Rose

After the resurfacing or reconstruction of the apron, a compass rose may be added to provide assistance to pilots.

Maintenance Equipment and Equipment Storage Building

As maintenance equipment such as mowers and plows reach the end of their useful life, these items should be replaced. The provision of a storage building for this equipment will allow it to be stored on site.

Apron Improvements

The current apron is inadequate for current and future tie-down and circulation needs. It is recommended that current and new aprons areas be expanded to the south and west to accommodate increased demands for tie-downs and to improve circulation for Group I and II aircraft as well as helicopters. Apron and taxilane layout options will vary by alternative.

Provide Helipad

In order to accommodate growing demand for helicopter service at the FBO and to maintain a safe environment on the apron, it is recommended that a new helipad be provided in a location convenient to the FBO. While its location may vary by alternative, the space needed is the same.

Airport Road Improvement

The airport's access road, Airport Road, must be regularly maintained by the City as needed with crack seal and mill and overlay operations for sealing and smoothness.

Update Master Plan

As required by FAA, all NPIAS airports must complete Master Plan updates on a regularly scheduled basis.

Lighting Upgrades

When runway lighting is at the end of its useful life, upgrading the fixtures to a LED source is financially prudent. Ideally this would coincide with the lengthening of Runway 14/32 to its Ultimate length.

Avigation Easements

There are likely multiple properties adjacent to Y63 that have obstructions to the existing runway approach surfaces. An example of an obstruction in this case is the height of certain crops in areas directly adjacent to the runway, which may penetrate primary surfaces, approach surfaces, or transition surfaces. Some obstructions can be mitigated through control of crop height or the removal of trees. Often the best way to gain control of off-airport airspace to mitigate obstructions is through the acquisition of property, but this is not always possible or financially feasible. Since these properties are not needed for airport development or RPZ control, ***it is recommended that Y63 evaluate the most effective way to control incompatible uses, and that avigation easements be acquired over those properties that cannot be purchased in order to permit the removal or lighting of the obstructions***.

5 | Section 2 – Alternative Analysis 1 - Runway 14/32 Development

Figure 5-1: Existing Runway 14/32

5.2.1 Runway 14/32 Development Constraints and Considerations

Runway 14/32 is appropriately sized for smaller, A/B-I aircraft, but a growing demand for B-II facilities has been identified at Y63.

FAA funding of runway extensions, such as would be required for Y63's Critical Aircraft, generally requires at least *500 operations per year* of airplanes in the Critical Aircraft Category prior to project approval, as described in AC 150/5000-17, *Critical Aircraft and Regular Use Determination*. Y63 is unlikely to see that quantity of operations within the planning period, but it is prudent to plan for the appropriate runway length required by the Critical Aircraft, determined in Chapter 3, Aviation Forecasts.

The lengthening or rotating of the existing runway requires careful consideration due to the many constraints on the site, including County Roads, wetlands, wind coverage, and the acquisition of additional properties. Each of these may add to the cost of construction.

Mandatory safety areas, such as MnDOT Safety Zones, RPZs, and RSAs, and their specific requirements, have a significant impact on the viability of any runway alternative. Part 77 and TERPs surface must also be considered in final decision making.

The desired Visibility Minimum for Runway 14/32 is a determining factor when setting the safety area dimensions. Y63's current Visibility Minimum is "Not Lower than 1 Mile," resulting in the RSA, ROFA, and RPZs seen in Chapter 4, Table 4-10. For many pilots, a longer runway comes the expectation of lower visibility minimums, which necessitate a parallel taxiway, an increase in RPZ dimensions, and an increase in threshold siting standards (AC 150/5300-13A, Table 3-2). The Airport Board has expressed a desire to move forward with their current "Not Lower than 1 Mile" Visibility Minimum.

Runway Length	Length Zone A	Inner Width Zone A	Outer Width Zone A	Length Zone B	Inner Width Zone B	Outer Width Zone B
Ultimate Runway 14/32 Primary Surface: 500 wide x 4,700 long *(4,300' runway length + 200' beyond each end = 4,700')*						
Ultimate Runway 14/32 Zones A and B:						
14 – 4,000	2,866	500	1,300	1,433	1,300	1,700
32 – 4,000	2,866	500	1,300	1,433	1,300	1,700
Ultimate Runway 14/32 Zone C: 5,000 arcs from center of designated primary surface end						
Zone C Height Restriction: No object shall exceed 1356 MSL (Airport elevation 1206 + 150)						

Figure 5-2: MN Safety Zones A, B, and C; Note: All measurements are in feet.

5.2.2 Alternative 1A – Existing Condition

Alternative 1A is the unchanged existing condition of Runway 14/32, without lengthening or changing it in any way.

While the runway's current length is adequate for A/B-I aircraft, larger B-II craft, such as the Beechcraft King Air E90 Critical Aircraft, may require a longer runway. See Chapter 4, *Facility Requirements,* Figure 4-4, which indicates that the runway should be 4,250 feet.

The current runway is as long as it can be without the realignment of County Road 1 or County Road 25, or both, without the roads encroaching on the required RPZs and Clear Zones.

Meets Safety Criteria: The current runway meets FAA safety requirements for A/B Group I aircraft in terms of the RSA, ROFZ, and ROFA.

Meets Demand: The current runway meets the requirements for A/B Group I aircraft in width, geometry, and pavement strength.

Wind Coverage Impacts: The current runway alignment has excellent wind coverage of 95.17% at 10.5 knots and 97.92% at 13 knots.

Obstructions: There are a few trees at both ends of the runway and a small hill at the end of Runway 32 which penetrate the Departure surface and must be removed.

Constrains Future Landside Development: The current runway location does limit apron development in the southwest direction based on the required setbacks from the runway centerline.

Wetland Impacts or Shoreland OHWL Impacts: The current runway does not impact any delineated wetlands or the OHWL setback.

Easement Impacts: The current runway extends over a recorded drainage easement, but a culvert has been placed underneath the runway to allow the free flow of water. The encumbrance holder is a private property owner and the easement is not subordinate to the Airport. This easement may need to be relocated if the runway is extended in the future.

NAVAID/AWOS Impacts: The current runway falls within the AWOS Critical Area.

Compatible Uses Impacts: The runway's existing Safety Zones A and B have no incompatible uses at this time.

County Roads Impacts: The existing runway length and alignment requires no changes to the County Roads boarding the airport property.

Property Acquisition Required: The existing runway is entirely on current Airport property.

5.2.3 Alternative 1B – Lengthen to 4000' to the Southeast

Alternative 1B (See Figure 5-3) adds to the length of Runway 14/32 by extending it 600 feet to the southeast for a total 4000-foot length. Please note that the Ultimate runway length as determined in Chapter 4, referencing Figure 2-2 of AC 150/5325-4B, is 4,250'. In response to existing environmental constraints, including built and natural elements such as Island Lake which would be directly in line with the proposed extension, this alternative's runway length is limited to 4000' total.

Meets Safety Criteria: The current runway meets FAA safety requirements for A/B Group I and II aircraft in terms of the RSA, ROFZ, and ROFA. An extension of the runway would also meet those criteria.

Meets Demand: The extended runway would be designed to accommodate the Group II design aircraft in width, length, and pavement strength.

Wind Coverage Impacts: The current runway alignment has excellent wind coverage of 95.17% at 10.5 knots and 97.92% at 13 knots. An extension of the runway would maintain this alignment and wind coverage.

Obstructions: There are a few trees at both ends of Runway 14/32 and a small hill at the end of Runway 32 which penetrate the Departure surface and must be removed. When County Road 25 is realigned in order to avoid the new RPZ, care must be taken to ensure the road does not become an obstruction. There are a number of trees that will also need to be removed so that they do not penetrate the departure surface.

Constrains Future Landside Development: The current runway location does limit apron development in the southwest direction based on the required setbacks from the runway centerline.

Wetland Impacts or Shoreland OHWL Impacts: The proposed runway extension to the southeast will not impact any wetlands or OHWL setbacks.

Easement Impacts: The development of this alternative would mean a recorded access easement and an assumed ROW easement for County Road 25 would now be included in the new RPZ for Runway 32 and may require the relocation of the road (see below) and the access easement. This alternative would also impact the snowmobile trail and easement running along County Road 25. None of these easements are subordinate to the Airport.

NAVAID/AWOS Impacts: The extension of the runway to the southeast would not impact the AWOS. At the time of runway extension, runway lighting and PAPIs on the southern end of the runway would need to be relocated and/or updated. It is logical to replace runway and taxiway lighting at the time of runway extension.

Compatible Uses Impacts: The extension of the runway to the southeast will not result in incompatible uses in Safety Zones A and B, but will bring the runway and associated safety areas closer to Island Lake and the Grant County Waterfowl Production Area. A driveway would now be included in the RPZ and Clear Zone of Runway 32, and would need to be relocated. In Safety Zone B of Runway 14, a home site is present and may need to be acquired. The driveway to the home runs along the railroad tracks and falls within Safety Zones A and B.

County Roads Impacts: A runway extension to the southeast would require a realignment of County Road 25, a County State Aid Highway, to avoid the new RPZ area. On November 28, 2017, Bollig consulted with the County Engineer for Grant County, Tracy Von Bargen, regarding the multiple options for lengthening the runway. While curving CR 25 is not his preferred solution, as it would interrupt an otherwise long and straight road, if a curve were required in this location Mr. Von Bargen would like to see a 60-mph design curve. Road closures and cul-de-sacs are not favored by the County Engineer.

Property Acquisition Required: As depicted in Figure 5-4 and as listed in Table 5-5, adjacent parcels of land have been identified for fee simple acquisition in order to meet FAA standards for the control of the Ultimate Airport RPZs and Clear Zones, or as needed to facilitate the realignment of the County Road.

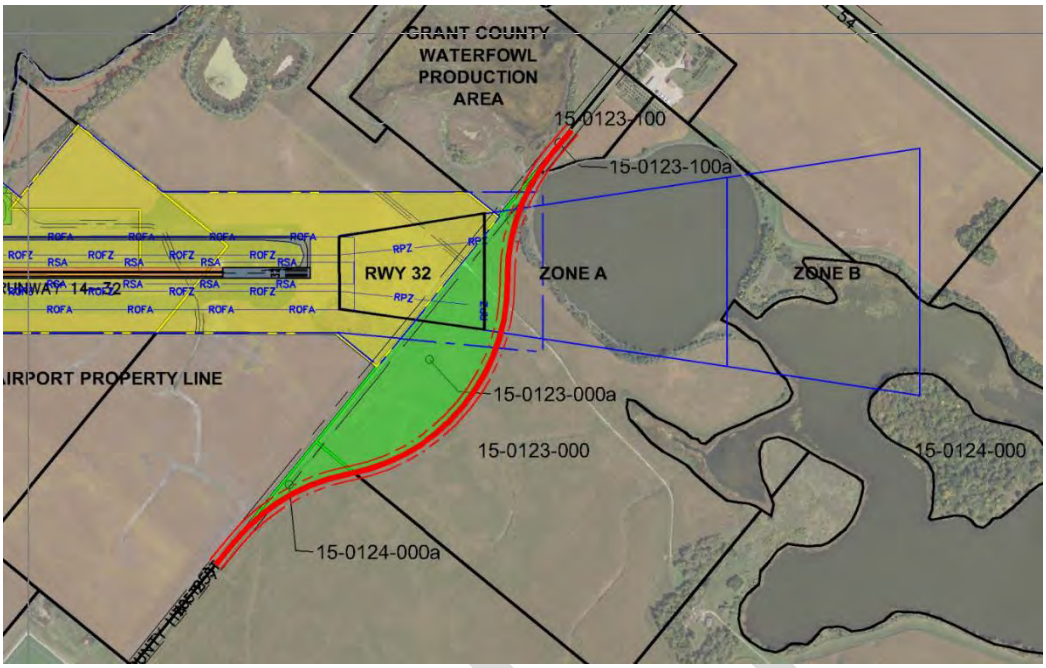

Figure 5-4: Proposed Land Acquisition

Parcel No.	Area (Acres)	Basis for Acquisition	Type of Interest	Owner	Grantor
15-0124-000a	3.82	Road Realignment	Fee Simple	Elbow Lake Airport	Coleman Family Trust
15-0123-000a	26.66	Road Realignment, RPZ, Clear Zone	Fee Simple	Elbow Lake Airport	Kimberly Colman
15-0123-100a	0.56	Road Realignment	Fee Simple	Elbow Lake Airport	Gerard Colman

Table 5-5: Proposed Land Acquisition Summary

Acquisition on fee simple ownership of these parcels (31.04 acres), as indicated on the figure above, will ensure the Airport Board remains compliant with FAA standards to "control", to the greatest extent possible, land areas constituting current and Ultimate PRZs at Y63. The purchase of land for road realignment will allow the existing County Road 25 to be moved outside of the Ultimate RPZ and Clear Zones.

5.2.4 Alternative 1C – Lengthen to 4000' to the Northwest

Alternative 1C (See Figure 5-6) adds to the length of Runway 13/32 by extending it 600 feet to the northwest for a total 4000-foot length. Please note that the Ultimate runway length as determined in Chapter 4, referencing Figure 2-2 of AC 150/5325-4B, is 4,250'. In response to existing built and natural environmental constraints, including the required re-routing of County Road 1, the Soo Rail Road line, and Elbow Lake to the northwest, this alternative's runway length is limited to 4000' total.

Meets Safety Criteria: The current runway meets FAA safety requirements for A/B Group I and II aircraft in terms of the RSA, ROFZ, and ROFA. An extension of the runway would also meet those criteria.

Meets Demand: The extended runway would be designed to accommodate the Group II design aircraft in width, length, and pavement strength.

Wind Coverage Impacts: The current runway alignment has excellent wind coverage of 95.17% at 10.5 knots and 97.92% at 13 knots. An extension of the runway would maintain this alignment and wind coverage.

Obstructions: There are a few trees at both ends of the runway and a small hill at the end of Runway 32 which penetrate the Departure surface and must be removed. When County Road 1 is realigned in order to avoid the new RPZ, care must be taken to ensure the road does not become an obstruction. There are a number of trees that will also need to be removed so that they do not penetrate the departure surface.

Constrains Future Landside Development: The current runway location does limit apron development in the southwest direction based on the required setbacks from the runway centerline.

Wetland Impacts or Shoreland OHWL Impacts: The proposed runway extension to the southeast will likely impact a delineated wetlands northwest of the current runway. It would not impact OHWL setbacks.

Easement Impacts: The development of this alternative would mean an assumed ROW easement for County Road 1 would now be included in the new RPZ for Runway 14 and may require the relocation of the road (see below). This alternative would also impact the snowmobile trail easement running along County Road 1. Neither of these easements are subordinate to the Airport.

NAVAID/AWOS Impacts: The extension of the runway to the southeast would mean that additional runway length would be included in the AWOS Critical Area. At the time of runway extension, runway lighting and PAPIs on the northern end of the runway would need to be relocated and/or updated. It is logical to replace runway and taxiway lighting at the time of runway extension.

Compatible Uses Impacts: The extension of the runway to the northwest will not result in incompatible uses in Safety Zones A and B, but will bring the runway and associated safety areas closer to both Trisko and Elbow Lakes In Safety Zone B of Runway 14, a home site is present and may need to be acquired. The driveway to the home runs along the railroad tracks and falls within Safety Zones A and B.

County Roads Impacts: A runway extension to the northwest would require a realignment of County Road 1, a County State Aid Highway, to avoid the new RPZ area. On November 28, 2017, Bollig consulted with the County Engineer for Grant County, Tracy Von Bargen, regarding the multiple options for lengthening the

runway. Curving County Road 1 is preferred over modifying County Road 25, as traffic is already slowing down in this location and a curve here would be less disruptive. It should be designed for a 40 or 55 mph speed. Road closures and cul-de-sacs are not favored by the County Engineer.

Complicating this alternative is the fact that realigning County Road 1 also requires modifications to the existing Soo Line double-track railroad crossing, shifting it to the west. The crossing will be due for reconstruction in about 10-15 years (20-year overall life), so we may be able to capture funding from that process. Grant County is currently budgeting $350,000 for replacement of railroad crossing arms for a single roadway crossing. The re-routing of this road would also impact the wetland just west of County Road 1 (Trisko Lake) and would require the realignment of County Road 1 on the north side of the railroad tracks, impacting Elbow Lake.

Property Acquisition: As depicted in Figure 5-7 and as listed in Table 5-8, adjacent parcels of land have been identified for fee simple acquisition to meet FAA standards for the control of the Ultimate Airport RPZs and Clear Zones, or as needed to facilitate the realignment of the County Road.

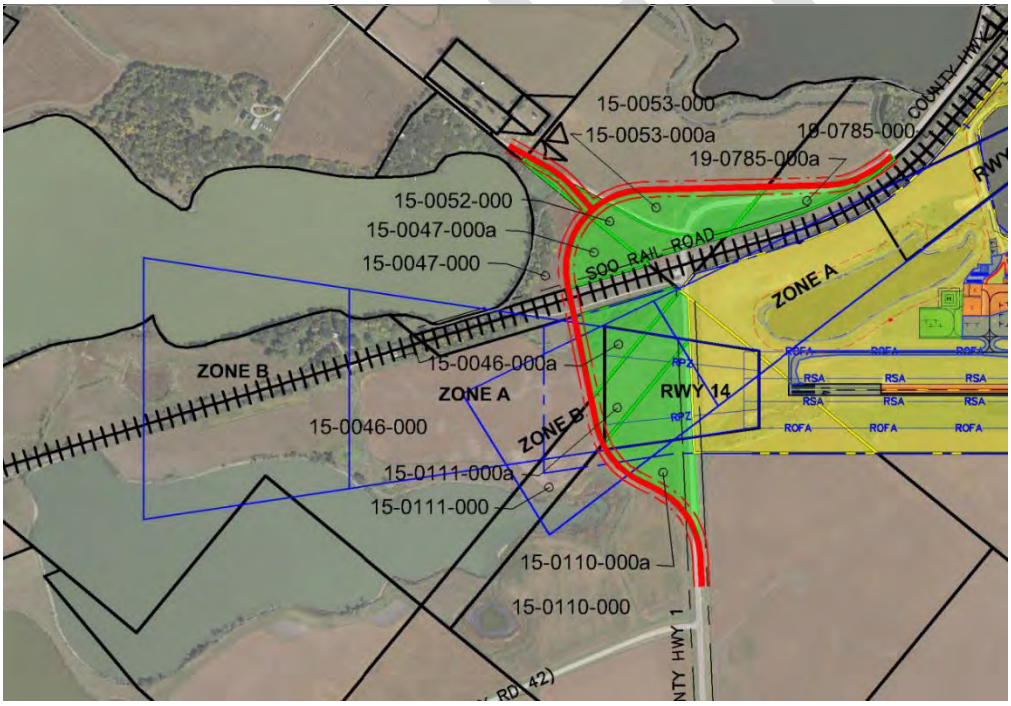

Figure 5-7: Proposed Land Acquisition

Parcel No.	Area (Acres)	Basis for Acquisition	Type of Interest	Owner	Grantor
15-0110-000a	10.54	Road Realignment, RPZ, Clear Zone	Fee Simple	Elbow Lake Airport	Larry Windom
15-0111-000a	5.67	Road Realignment, RPZ, Clear Zone	Fee Simple	Elbow Lake Airport	Allan Windom
15-0046-000a	5.50	Road Realignment, Clear Zone	Fee Simple	Elbow Lake Airport	Allan Windom
15-0047-000a	3.91	Road Realignment	Fee Simple	Elbow Lake Airport	Greiner Family Trust
15-0052-000	3.76	Road Realignment	Fee Simple	Elbow Lake Airport	John Kapphahn
15-0053-000a	6.71	Road Realignment	Fee Simple	Elbow Lake Airport	Sarah Sanford
19-0785-000a	4.11	Road Realignment	Fee Simple	Elbow Lake Airport	Benjamin Brutlag

Table 5-8: Proposed Land Acquisition Summary

Acquisition of fee simple ownership of these parcels (40.2 acres), will ensure the Airport Board remains compliant with FAA standards to "control", to the greatest extent possible, land areas constituting current and Ultimate PRZs at Y63. The purchase of land for road realignment will allow the existing County Road 1 to be moved outside of the Ultimate RPZ and Clear Zones.

5.2.4 Alternative 1D – Rotate and Lengthen to 4000'

Alternative 1D creates a new runway, rotated so that no County Roads fall within the proposed RPZs or Clear Zones. Please note that the Ultimate runway length as determined in Chapter 4, referencing Figure 2-2 of AC 150/5325-4B, is 4,250'. In response to existing built and natural environmental constraints, including the presence of the Grant County Waterfowl Production Area, this alternative's length is limited to 4000' total.

This alternative has the highest cost, requiring the purchase of many acres of property and the construction of an entirely new runway. A planning level estimate sets this cost at over $11 million. It also would be a compromise on wind coverage, similar to what is experienced at Sealane 11/29, which has a coverage of 86.28% at 10.5 knots and 92.91% at 13 knots. While the alignment could be set to avoid the surrounding County Roads, there are expected impacts to various wetland areas, a drainage easement, and the Grant County Waterfowl Production Area. The rotation of the runway would require the acquisition of portions of a number of properties. Two of those properties are part of the Grant County Waterfowl Production area and may not be easily available for purchase.

With all of the above factors taken into consideration, this alternative is not feasible and should be dismissed.

5.2.5 Alternative Analysis 1 Summary

Criteria	1A Existing Condition	1B Lengthen to SE	1C Lengthen to NW
Meets Safety Criteria	Yes	Yes	Yes
Meets Demand	No	Yes	Yes
Wind Coverage Impacts	No	No	No
Constrains Future Landside Development	Yes	Yes	Yes
Wetland Impacts	No	No	Yes
Shoreland OHWL Setback Impacts	No	No	No
Easement Impacts	No	No	No
NAVAID/AWOS Impacts	No	No	No
Compatible Uses Impacts	No	No	No
County Road Impacts	No	Yes	Yes
Property Acquisition Required (Acres)	None	32	41
Planning Level Cost Estimate	N/A	$2.8 million	$4.3 million

Table 5-9: Alternative Analysis 1 Comparison

5.2.6 Alternative Analysis 1 Recommended Alternative

Alternative 1B is recommended due to its significantly lower cost, its maintenance of the existing runway's excellent wind coverage, and its avoidance of impacts on delineated wetlands and recorded easements. Alternative 1C is more disruptive to County Road circulation and delineated wetlands, while Alternative 1D is dismissed due to the high cost of property acquisition and new runway construction.

5.2.7 Alternative Analysis 1 Preferred Alternative

The Elbow Lake Airport Board, at their meeting held on February 27, 2018, has selected Alternative 1B as the preferred alternative. Their decision was made with the input of the designated Airport Advisory Committee. This alternative was selected because it results in the least amount of environmental and infrastructure impacts while allowing the extension of Runway 14/32 to an Ultimate length of 4,000 feet when demand for an extension is justified.

Recorded Encumbrances
Protected Waters/Wetlands
ZONE B
ZONE A
MnDOT SAFETY ZONE B
MnDOT SAFETY ZONE A
MnDOT CLEAR ZONE
250' X 1200' X 490'
STATE HWY 55
RWY 29
DIVISION ST
RUNWAY 11–29
STATE HWY 54
MnDOT CLEAR ZONE
250' X 1200' X 490'
COUNTY HWY 1
AIRPORT RD
RWY 11
AWOS CRITICAL AREA
FAA RUNWAY PROTECTION ZONE
250' X 1000' X 450'
SOO RAIL ROAD
GRANT COUNTY
WATERFOWL
PRODUCTION
AREA
AIRPORT PROPERTY LINE
FAA RUNWAY PROTECTION ZONE
250' X 1000' X 450'
ZONE A
R=500'
ZONE B
ZONE B
ZONE A
RWY 14
RWY 32
150' RSA
RUNWAY 14–32
500' ROFA
ZONE A
ZONE B
AIRPORT PROPERTY LINE
MnDOT SAFETY ZONE B
EXISTING AWOS
MnDOT CLEAR ZONE
500' X 1000' X 800'
MnDOT SAFETY ZONE B
MnDOT SAFETY ZONE A
MnDOT CLEAR ZONE
500' X 1000' X 800'
REALIGNED COUNTY
ROAD 25 WITH 60 MPH
DESIGN CURVES
MnDOT SAFETY ZONE A
(COUNTY RD 42)
COUNTY HWY 1
0'
500'
1000'

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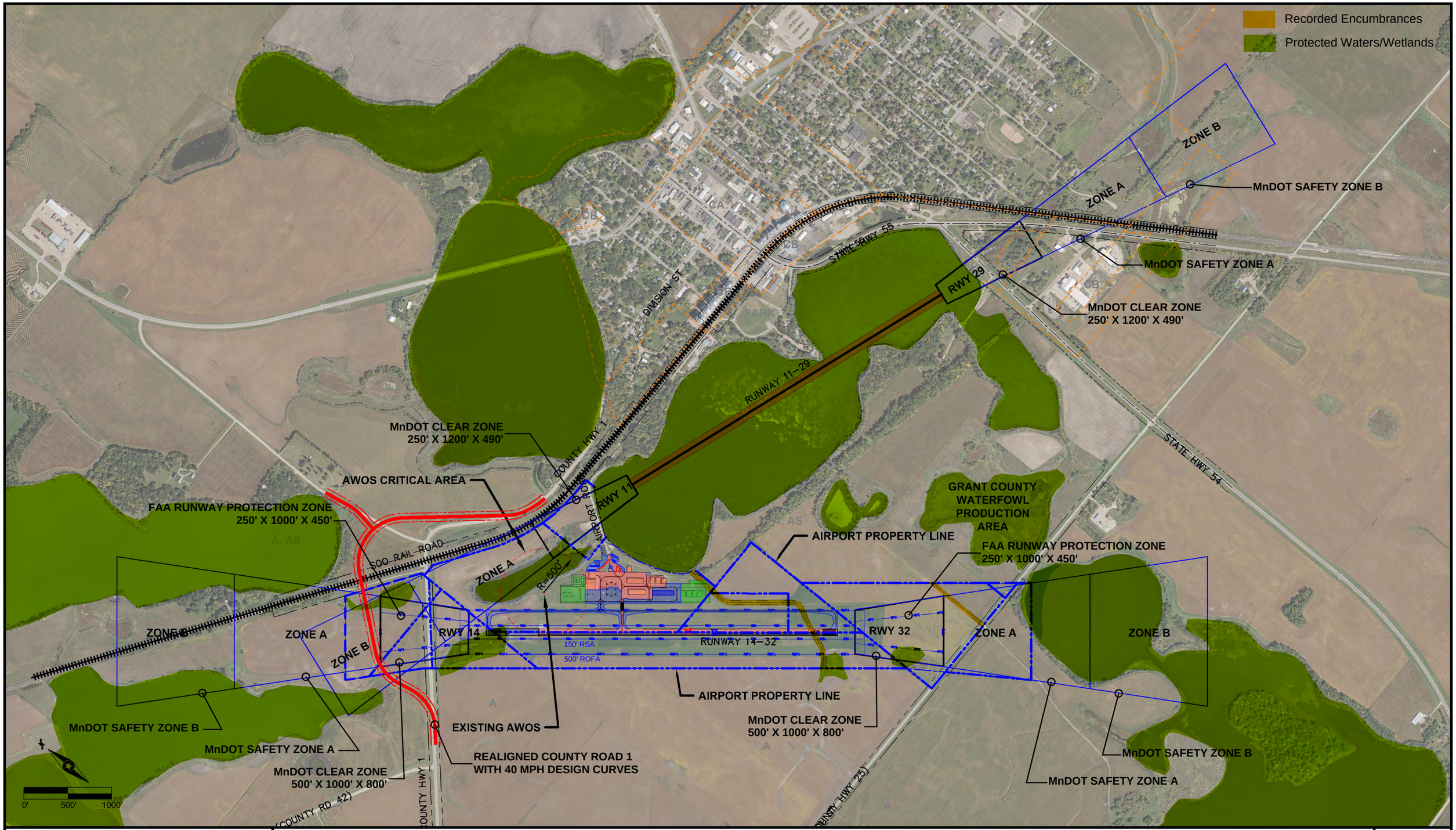
engineering & environmental

ELBOW LAKE MUNICIPAL AIRPORT

Alt. 1B - Lengthen to 4000' to the Southeast

Figure
5-3



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ELBOW LAKE MUNICIPAL AIRPORT'

Alt. 1C - Lengthen to 4000' to the Northwest

Figure
5-6

5 | Section 3 – Alternative Analysis 2 - Taxiway Development

Figure 5-10: Existing Taxiway

5.3.1 Taxiway Development Constraints and Considerations

MnDOT's State Aviation System Plan recommends at least 20,000 operations per year to fund a full parallel taxiway, which is the Ultimate recommendation, but Y63 is unlikely to see that quantity of operations within the planning period. In the interim, a partial parallel taxiway can provide most of the safety and operational benefits of a full parallel taxiway with a considerably lower cost. The full taxiway could then be constructed at the time of the future runway extension project.

A parallel taxiway placed on the existing decommissioned turf runway can reduce construction costs related to earthwork and grading. The exact location must be carefully analyzed to maintain the required distances from Runway 14/32 and any planned apron/taxilane development.

If a parallel taxiway were constructed on the site of the old turf runway, it is possible to meet TOFA and runway/taxiway and taxiway/taxilane separation requirements set forth in AC 150/5300-13A (See Chapter 4, Facilities Requirements). The placement of a parallel taxiway on the old turf runway makes sense financially, taking advantage of the pre-existing grading and compacted surface already in place, reducing construction cost and requiring the majority of the new earthwork at each end where it would connect to Runway 14/32.

AC 150/5300-13A, Section 405, states, *"A parallel taxiway eliminates using the runway for taxiing, thus increasing capacity and protecting the runway under low visibility conditions. In addition, a full length parallel taxiway is required for instrument approach procedures with visibility minimums below one mile and recommended for all other conditions."* The provision of a parallel taxiway would meet the FAA's recommendations in Section 405 and would also be an opportunity to reduce potential runway incursions by preventing direct access from the apron to the runway.

A parallel taxiway would increase safety of daily operations to and from the FBO and could potentially improve response time for Medivac operations and is recommended at the Ultimate taxiway.

5.3.2 Alternative 2A – Existing Condition

The existing taxiway does not meet FAA guidance for situational awareness – leading a pilot from the apron directly on to the center of the runway. Reconfiguration of the taxiway to provide one or two extra turns prior to reaching the runway, along with appropriate signage, will increase safety and reduce runway incursions. It is recommended that the taxiway be reconfigured.

5.3.3 Alternative 2B – Full Length Parallel Taxiway

Alternative 2B (See Figure 5-11) consists of the construction of a full-length parallel taxiway at the time of the extension of Runway 14/32, at 4000 feet long, with three holding positions to the runway. The existing taxiway with direct connection to the runway would be removed.

Meets Safety Criteria: The taxiway would be designed to meet the criteria set forth in AC 150/5300-13A, eliminating direct access from the apron to the runway and improving pilot situational awareness.

Meets Demand: The new taxiway would be designed to accommodate the Group II design aircraft in width, geometry, and pavement strength.

Constrains Future Landside Development: The development of a parallel taxiway, be means of its required TOFA does restrict landside development of apron and taxilane areas.

Wetland Impacts or Shoreland OHWL Impacts: The location of this alternative does not impact any delineated wetlands or the OHWL setback.

Easement Impacts: The development of this alternative would cross a recorded drainage easement, extending from a wetland area south of Runway 14/32 and running northward to Flekkefjord Lake. The design of the taxiway and any drainage structures would need to allow the continued free flow of water to the lake, either with a culvert, as was done at for the Runway, or through a relocation of the waterway and the associated easement

Part 77/TERPs Surfaces Impacts: The construction of a parallel runway does not impact Part 77 or TERPs Surfaces.

NAVAID/AWOS Impacts: Development of the taxiway would fall within the AWOS Critical Area.

Property Acquisition Required: The proposed taxiway is entirely on current Airport property.

5.3.4 Alternative 2C – Partial Parallel Taxiway

Alternative 2C (See Figure 5-12) consists of the construction of a partial-length parallel taxiway, at approximately 750 feet long, with two holding positions to Runway 14/32. The existing taxiway with direct connection to the runway would be removed.

Since it is unlikely that Y63 will meet the 20,000 operations benchmark within the planning period for the funding of a full taxiway, a partial parallel taxiway is recommended within the planning period. It would be considerably less costly, but meet most of the FAA's recommendations for improving situational awareness, and will provide two holding positions of aircraft waiting to enter the runway. This smaller project could be completed more quickly than a full parallel runway, providing its safety features within the short term. This project can be completed before the runway is lengthened to its Ultimate length.

Meets Safety Criteria: The taxiway would be designed to meet the criteria set forth in AC 150/5300-13A, eliminating direct access from the apron to the runway and improving pilot situational awareness.

Meets Demand: The new taxiway would be designed to accommodate the Group II design aircraft in width, geometry, and pavement strength.

Constrains Future Landside Development: The development of a parallel taxiway, be means of its required TOFA does restrict landside development of apron and taxilane areas.

Wetland Impacts or Shoreland OHWL Impacts: The location of this alternative does not impact any delineated wetlands or the OHWL setback.

Easement Impacts: The development of this alternative would not impact any recorded easements.

Part 77/TERPs Surfaces Impacts: The construction of a parallel runway does not impact Part 77 or TERPs Surfaces.

NAVAID/AWOS Impacts: Development of the taxiway would fall within the AWOS Critical Area.

Property Acquisition Required: The proposed taxiway is entirely on current Airport property.

5.3.5 Alternative Analysis 2 Summary

Criteria	2A Existing Condition	2B Full Length Taxiway	2C Partial Taxiway
Meets Safety Criteria	No	Yes	Yes
Meets Demand	No	Yes	Yes
Constrains Future Landside Development	No	Yes	Yes
Wetland Impacts	No	Yes	No
Shoreland OHWL Setback Impacts	No	No	No
Easement Impacts	No	Yes	No
Part 77/TERPs Surfaces Impacts	No	No	No
NAVAID/AWOS Impacts	No	Yes	Yes
Property Acquisition Required	None	None	None
Length	Unchanged	4000’	750’
Planning Level Cost Estimate	N/A	$1,069,000	$414,000

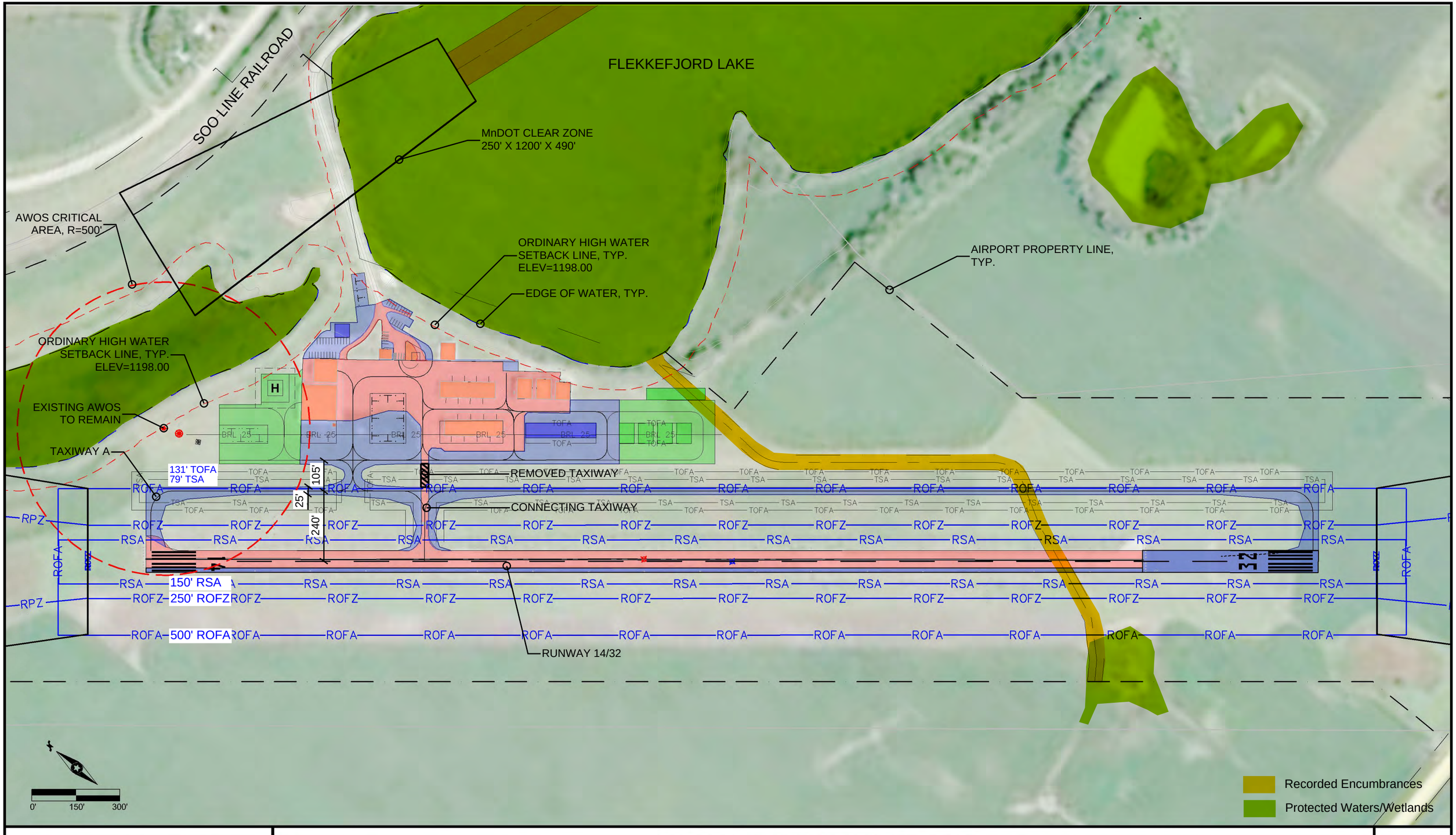
Table 5-13: Alternative Analysis 2 Comparison

5.3.6 Alternative Analysis 2 Recommended Alternative

Alternative 2C is recommended in the short term due to its immediate impact on runway safety and lower cost. Alternative 2B is recommended to be completed at the time of the Ultimate runway extension.

5.3.7 Alternative Analysis 2 Preferred Alternative

The Elbow Lake Airport Board, at their meeting held on February 27, 2018, has selected Alternative 2C as the preferred alternative. Their decision was made with the input of the designated Airport Advisory Committee. This alternative was selected because it can deliver safety improvements more quickly and for lower cost than the construction of a full parallel runway. The Board wishes to pursue a full parallel runway (Alternative 2B) at the time of the Runway 14/32 extension, 20+ years into the future.



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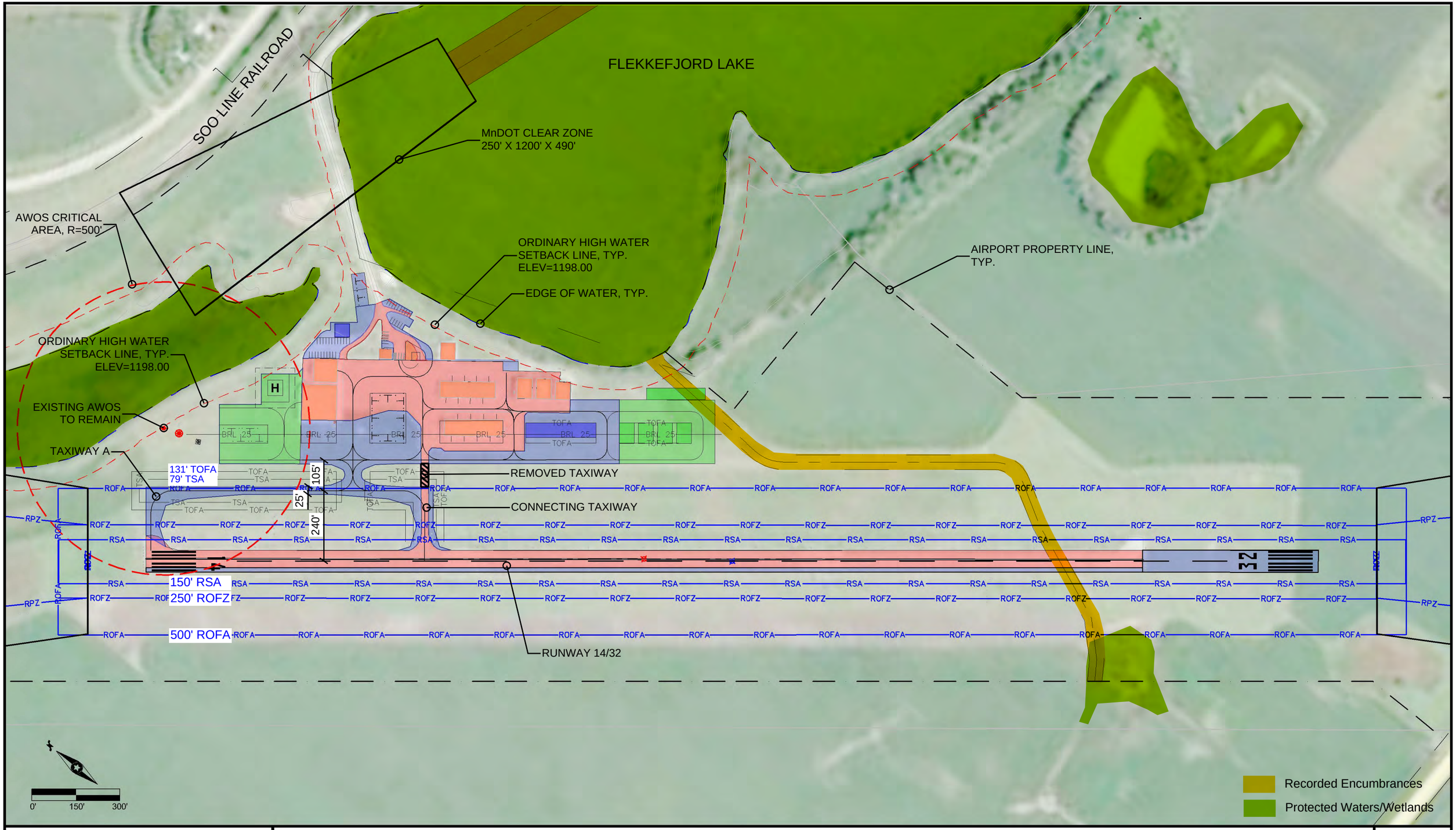
Alt. 2B - Full Parallel Taxiway

Figure 5-11



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Alt. 2C - Partial Parallel Taxiway

Figure
5-12

5 | Section 4 – Alternative Analysis 3 - Apron Improvements

Figure 5-14: Existing Apron

5.4.1 Apron Development Constraints and Considerations

It is recommended that tie downs meeting ADG B-II dimension requirements be provided along with the existing A-I configured tie downs. The new apron areas should be sized to accommodate up to Group II aircraft, including circulation, and adequate tie-downs be provided for based and transient aircraft demands. It is also recommended that hangar aprons be constructed to accommodate conventional hangar development based on the demand summarized Chapter 4, Facility Requirements.

As the number of itinerant operations grows in the planning period, the demand for tie-down positions on the apron also grows. As documented in Chapter 3*, Aviation Forecasts*, Figure 3-25, the total number of aircraft operations is expected to grow from 6,000 in 2016 to 6,375 in the short term, 6,750 in the immediate term, and 7,500 in the long term. This shows a clear need for additional tie-down locations in the future.

Other considerations when selecting an Apron Development alternative include the provision of taxilanes and tie-downs for Group II aircraft, the AWOS Critical Area, and the proposed apron's impact on wetlands and recorded easements. The Ordinary High Water Line setback set forth in the Elbow Lake Shoreland Ordinance regulates building structures, but does not apply to paved areas within the setback area.

Alternatives 3B and 3C, which include new apron development areas, have been shown with the minimum required dimension from taxiway to taxilane, maximizing

the apron area towards Runway 14/32. Interim development is shown in each alternative to permit apron development as demand and funding allows.

5.4.2 Alternative 3A – Existing Condition

The existing apron is inadequate to serve Y63's current and future needs. It has been shown to become easily crowded with just a few aircraft in tie-down positions, making circulation difficult and unsafe. Future growth in number and size of aircraft mean that addition tie-downs and adequate circulation is required, preferably sized for Group II aircraft.

As seen in Figure 5-15, existing Taxilanes A and B do not meet the minimum TLOFA standards for Group I aircraft, which is 79' clear. Any of these conditions which cannot be feasibly corrected should be addressed with a Modifications to Standards request per Order 5300.1F. Note that when the 2011 T-hangar is replaced at the end of its useful life, 30 or more years into the future, it could be shifted to the south to create a compliant Taxilane B between it and the existing (but presumably replaced) T-hangar to the north. Moving existing buildings would be the only way to bring these existing taxiways into compliance, therefore justifying a Modifications to Standards request.

When an aircraft is fueling at the fuel station, the clear area needed at Taxilane A is compromised. The location of the fuel station, including 100LL and Jet A fuel, can be shifted to improve circulation, though a Modification to Standards may still be necessary.

5.4.3 Alternative 3B – Expand Apron Toward Southeast

Alternative 3B (See Figure 5-16) includes apron development to the south and east of the existing apron. Development on this apron would include aircraft storage buildings and taxilanes.

Meets Demand: This apron expansion would provide access to future T-hangar and possibly other private hangars (as demand warrants) or an SRE building. The apron's taxilanes and future T-hangar would be sized for Group II aircraft.

Wetland Impacts or Shoreland OHWL Impacts: Any apron development must consider and avoid impacting nearby wetland areas, as well as the OHWL setback outlined in Elbow Lake's Shoreland Ordinance. Paving in the setback area is not regulated by the ordinance.

Easement Impacts: The development of this apron does not impact any recorded easements.

Part 77/TERPs Surfaces Impacts: Any building development on this apron would need to be carefully designed to avoid penetration of the Part 77 Transitional Surface with the structure while maintaining adequate TLOFAs around the buildings.

NAVAID/AWOS Impacts: Development on this apron is outside of the AWOS Critical area and is positioned away from other Airport NAVAIDs.

Property Acquisition Required: This apron is entirely on current Airport property.

5.4.4 Alternative 3C – Expand Apron Toward Northwest

Alternative 3C (See Figure 5-17) includes apron development to the south and east of the existing apron. Development on this apron would include aircraft tie-down locations and taxilanes for Group II aircraft. The number of Group I tiedowns would be reduced to improve circulation around the FBO and fuel facility.

This alternative would also provide a helicopter landing pad, separating it as much as possible from other GA aircraft in tiedown positions as much as possible to reduce buffeting of parked aircraft. Joe LaRue, Airport Manager and owner of the FBO Prairie Air, notes that helicopters coming to Y63 are not left outside for any significant length of time, instead using tugs to move them from wherever they land to the FBO for repair. With this in mind, helicopter tie-down positions are not seen as necessary.

Meets Demand: This apron expansion would provide access to future tiedowns and a helipad. The apron's taxilanes and tie-downs would be sized for Group II aircraft.

Wetland Impacts or Shoreland OHWL Impacts: Any apron development must consider and avoid impacting nearby wetland areas, as well as the OHWL setback outlined in Elbow Lake's Shoreland Ordinance. Paving in the setback area is not regulated by the ordinance.

Easement Impacts: The development of this apron does not impact any recorded easements.

Part 77/TERPs Surfaces Impacts: Any building development on this apron would need to be carefully designed to avoid penetration of the Part 77 Transitional Surface with the structure while maintaining adequate TLOFAs around the buildings.

NAVAID/AWOS Impacts: Development on this apron is partially within the AWOS Critical Area, which must be considered when locating structures, both in height and occlude angle of 10 degrees or less.

Property Acquisition Required: This apron is entirely on current Airport property.

5.4.5 Alternative Analysis 3 Summary

Criteria	3A Existing Condition	3B Expand Apron to SE	3C Expand Apron to NW
Group I Tie-downs	8	0	0
Group II Tie-downs	0	0	8
Helipad	0	0	1
Wetland Impacts	N/A	None	None
Shoreland OHWL Setback Impacts	N/A	None	None
Easement Impacts	N/A	None	None
Part 77/TERPs Surfaces Impacts	N/A	None	None
NAVAID/AWOS Impacts	N/A	None	None
Property Acquisition Required	N/A	None	None
Planning Level Cost Estimate	N/A	$685,000	$1,697,000

Table 5-18: Alternative Analysis 3 Comparison

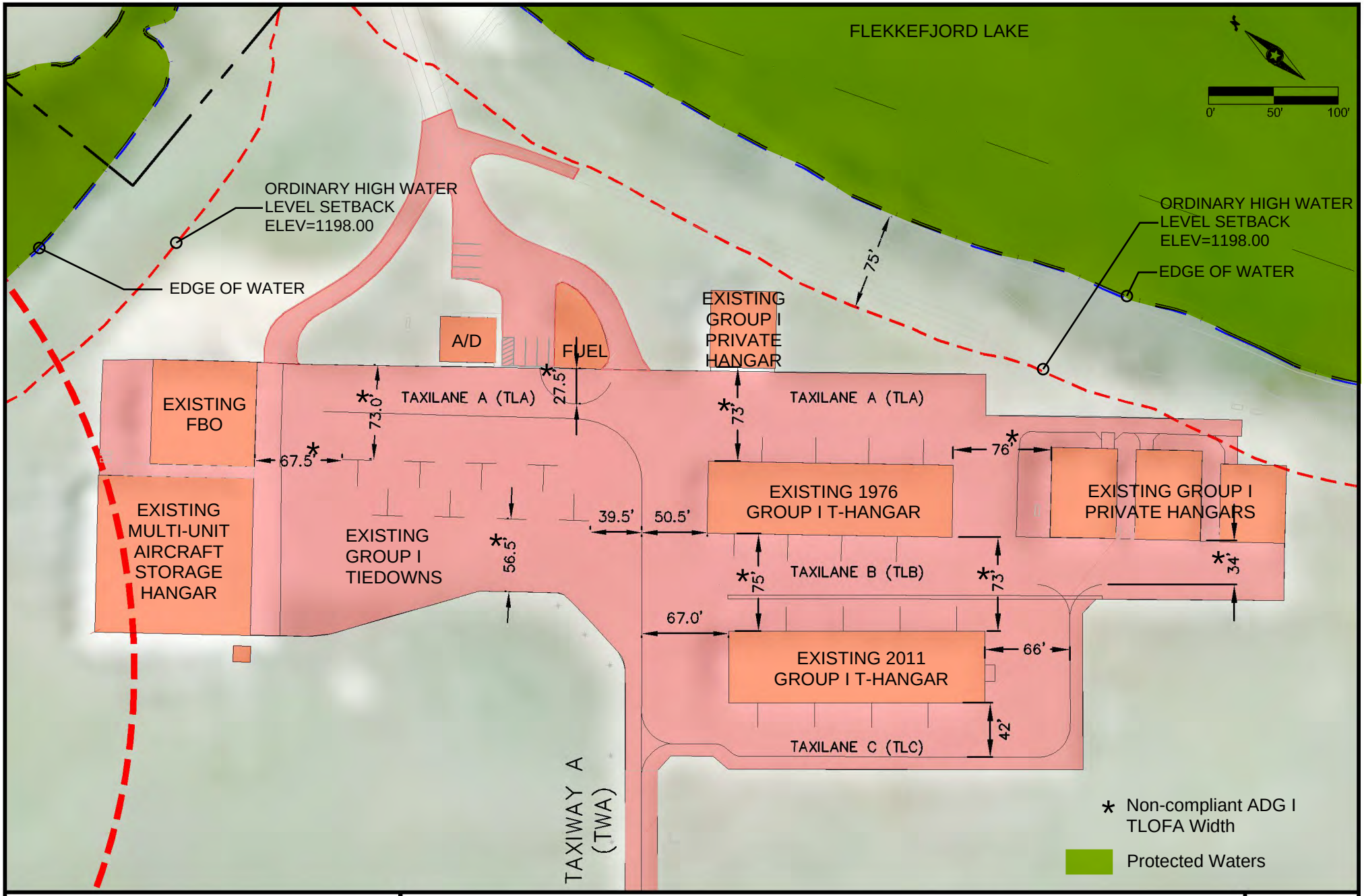
5.4.6 Alternative Analysis 3 Recommended Alternative

Alternative 3C, which includes an expansion to the northwest and a rehabilitation of the existing apron, is recommended in the short term, providing Group II tie downs and improvements to aircraft parking and circulation in the existing area. When the recommended Group II T-hangar is built in the future, Alternative 3B, an apron expansion to the southeast, should be constructed.

5.4.7 Alternative Analysis 3 Preferred Alternative

The Elbow Lake Airport Board, at their meeting held on February 27, 2018, has selected Alternative 3C as the preferred alternative. Their decision was made with the input of the designated Airport Advisory Committee. This alternative was selected because it will address the most pressing problems seen on the existing apron today – the too-narrow taxilanes and the poor arrangement of tie-down locations – leading to congestion on the apron, additional staff time moving and rearranging aircraft on the apron, and the increased likelihood of dangerous conditions during aircraft movement. In consideration of the growing helicopter repair activity at the FBO, this alternative provides a designated helipad to increase safety on the apron.

The Board wishes to pursue apron development to the southeast (Alternative 3B) in the future, at the time of construction of the future aircraft storage hangar described in Alternative 4.



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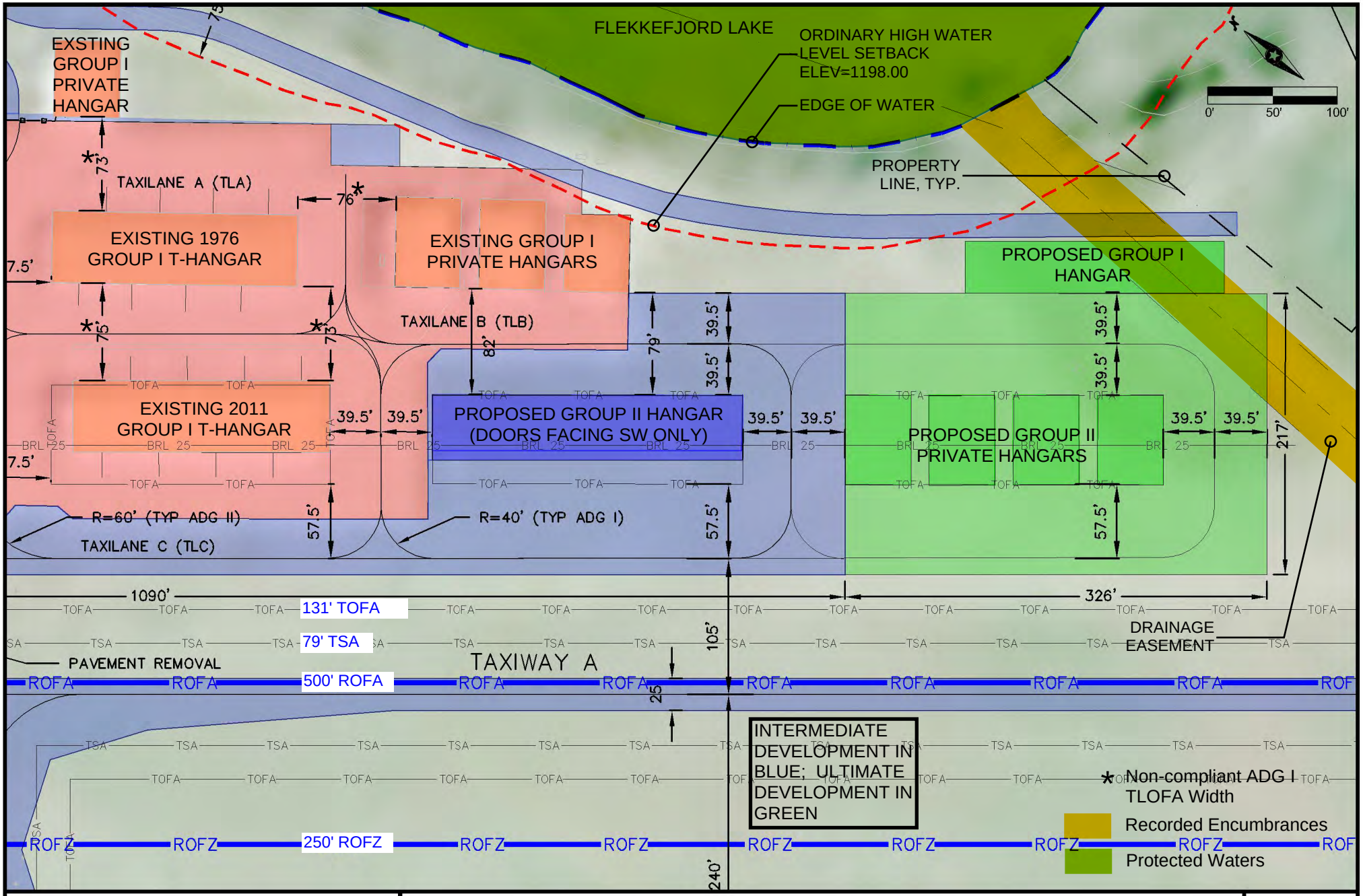
Alt 3A - Apron Existing Condition

Figure 5-15



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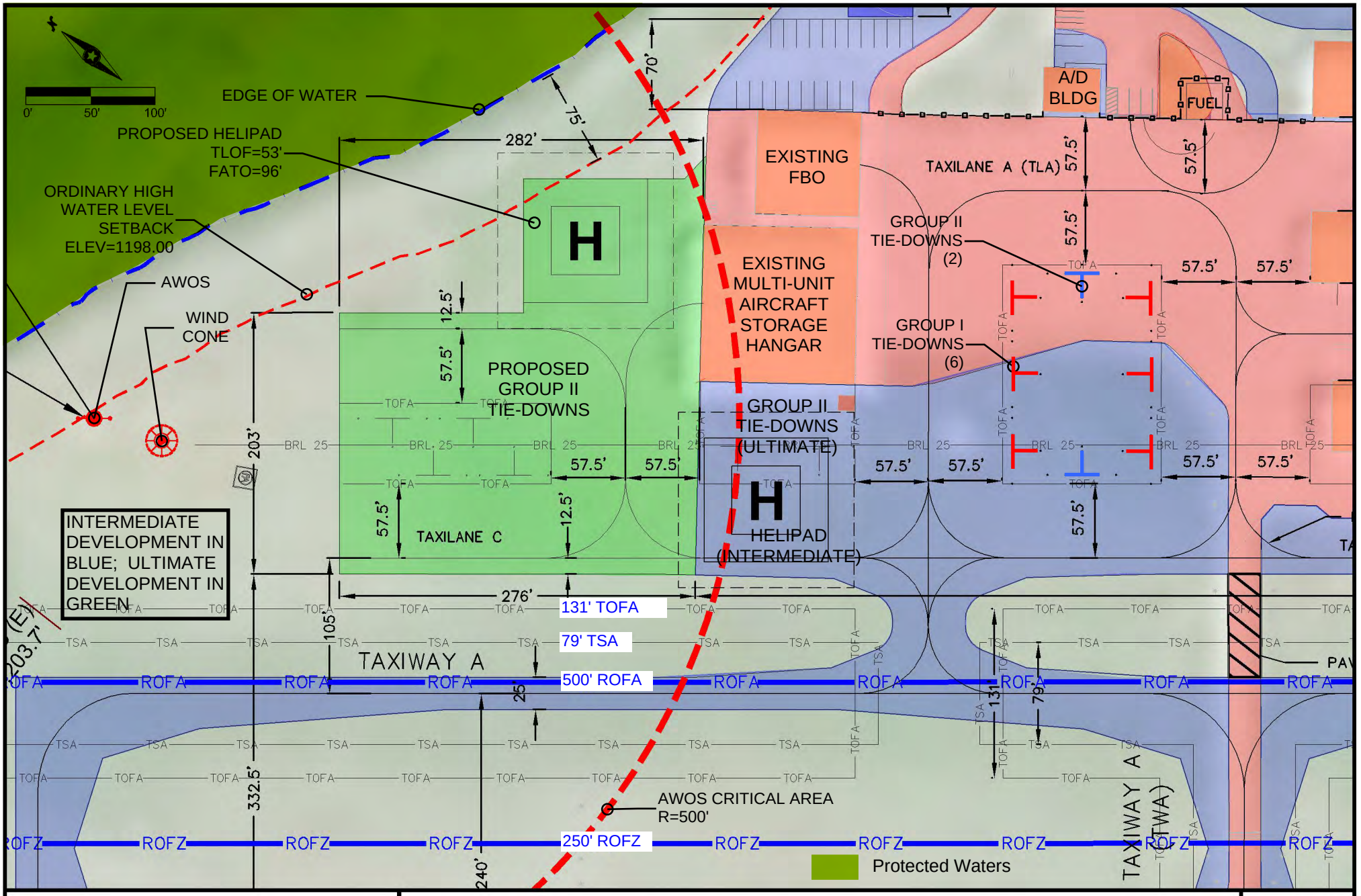
Alt 3B - Apron Development to Southeast

Figure 5-16



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Alt. 3C - Apron Development to Northwest

Figure 5-17

5 | Section 5 – Alternative Analysis 4 - Hangar and Taxilane Development

Figure 5-19: Existing T-Hangars

5.5.1 Hangar and Taxilane Development Constraints and Considerations

Y63's existing apron does not meet the TLOFA requirements for the Group II Demand Aircraft, and in some cases, does not meet the requirements for Group I aircraft. Areas meant to serve ADG I or ADG II aircraft must meet the minimum TLOFA clearances from that group. If this minimum cannot be reasonably accommodated, a Modifications to Standards request must be made with the FAA.

Chapter 3, *Aviation Forecasts*, demonstrates the need for additional hangar spaces. The next hangar constructed at Y63 should be sized to accommodate Group II aircraft as supported by the forecasted demand and by the numbers of these larger aircraft being stored over Winter 2017-2018, supplementing the Group I T-hangars storage already on site. All circulation leading to and around the Group II hangar should be configured to meet the TLOFA requirements for Group II aircraft.

The existing 1976 Group I T-hangar is near the end of its useful life. A replacement building, containing eight units, would need to accommodate Group I aircraft as it is expected there will be a demand for storage for these smaller craft for the foreseeable future. Note that the existing location does not currently have adequate TLOFA width (79') around the building for Group I aircraft. A *Modification to Standards* request per Order 5300.1F would be necessary, because there isn't the ability replace or relocate the building to meet FAA standards without the removal of a second building that is not at the end of its useful life.

The placement of new hangars should not impede aircraft circulation or future landside development. The AWOS Critical Area must be considered when locating structures, both in height and occlude angle of 10 degrees or less.

5.5.2 Alternative 4A – Add Hangar on SE Apron

Alternative 4A (See Figure 5-20) locates a Group II hangar on a proposed new apron east of the existing landside facilities. Note that the proposed location does not provide complete Group II TLOFA circulation (115' clear) around the entire building, due to the location of the existing private hangar structures to the north. This hangar would be single-sided, facing the southernmost taxilane with the required TLOFA for Group II aircraft. Taxilanes on the remaining three sides would be reserved for the use of Group I aircraft only.

Meets Demand: This hangar would meet the demand for storage of four Group II aircraft.

Constrains Future Landside Development: The location of this hangar does not constrain future landside development.

Wetland Impacts or Shoreland OHWL Impacts: The location of this alternative does not impact any delineated wetlands or the OHWL setback.

Easement Impacts: The development of this hangar does not impact any recorded easements.

Part 77/TERPs Surfaces Impacts: This hangar would need to be carefully designed to avoid penetration of the Part 77 Transitional Surface with the structure while maintaining adequate TLOFAs for each ADG around the building.

NAVAID/AWOS Impacts: This location is outside of the AWOS Critical area and is positioned away from other Airport NAVAIDs.

Property Acquisition Required: This location is on current Airport property.

5.5.3 Alternative 4B – Add Hangar on North Side of Ultimate Apron

Alternative 4B adds hangar storage for Group I aircraft as within an area designed for Group I circulation, with a TLOFA of 79' minimum.

Meets Demand: This hangar would meet the demand for storage of four Group I aircraft.

Constrains Future Landside Development: The location of this hangar does not constrain future landside development.

Wetland Impacts or Shoreland OHWL Impacts: The location of this alternative does not impact any delineated wetlands or the OHWL setback.

Easement Impacts: The development of this hangar may impact the recorded drainage easement to Flekkefjord Lake.

Part 77/TERPs Surfaces Impacts: This location is well away from the TERPs Surfaces of Runway 14/32 and 11/29 and their associated Building Restriction Lines established by the Part 77 Transitional Surface. Since FAA does not recognize TERPs surfaces for sealanes such as 11/29, the proposed location is not problematic.

NAVAID/AWOS Impacts: This location is outside of the AWOS Critical area and is positioned away from other Airport NAVAIDs.

Property Acquisition Required: This location is on current Airport property.

5.5.4 Alternative 4C – Add Hangar on North or West Sides of Existing Apron

In this alternative, hangars could be added to the north side of the existing apron or to the west of the FBO. Both locations are problematic, due to the OHWL setbacks required from the bodies of water surrounding the building area, however it may be possible to get a waiver from the City on regard to this setback. In addition, any

development near the AWOS is problematic due to the need to keep buildings away from the AWOS Critical Area, which is better to use for future tie downs or a helipad.

With all of the above factors taken into consideration, this alternative is not feasible and should be dismissed.

5.5.5 Alternative Analysis 4 Summary

Criteria	4A Hangar on New SE Intermediate Apron	4B Hangar to North of Ultimate Apron
Group I Aircraft	0	4
Group II Aircraft	4	0
Constrains Future Landside Development	No	No
Wetland Impacts	No	No
Shoreland OHWL Setback Impacts	No	No
Easement Impacts	No	Yes
Part 77/TERPs Surfaces Impacts	No	No
NAVAID/AWOS Impacts	No	No
Property Acquisition Required	None	None
Planning Level Cost Estimate	$760,000	$700,000

Table 5-21: Alternative Analysis 4 Comparison

5.5.5 Alternative Analysis 4 Recommended Alternative

Alternative 4A is recommended in the near-term to accommodate growing demand for based aircraft hangar space. This location could accommodate both Group I and Group II aircraft, as demand warrants, but would be recommended as a Group II structure to take advantage of the availability of the Group II TLOFA to the south, and to meet growing Group II storage demand. The location defined in Alternative 4B is so narrow that it will likely only accommodate a Group I sized hangar on the Ultimate SE apron.

5.5.6 Alternative Analysis 4 Preferred Alternative

The Elbow Lake Airport Board, at their meeting held on February 27, 2018, has selected Alternative 4A as the preferred alternative. Their decision was made with the input of the designated Airport Advisory Committee. This alternative was selected because it would most immediately fill the demand for Group II aircraft storage space. The hangar should be sized for Group II aircraft with Group II taxilane access from the south, while preserving Group I taxilane access for future hangars to the north.

The Board wishes to pursue a Group I hangar (Alternative 4B) in the future as part of the Ultimate development, as Group I aircraft storage demand warrants.

5 | Section 6 – Alternative Analysis 5 - Private Hangar Development

Figure 5-22: Existing Private Hangars

5.6.1 Private Hangar Development Constraints and Considerations

Additional Private Hangars would be developed only as demand for them warrants. There is currently no demand for additional private hangars, but this may change over the course of the planning period.

Any new construction of non-sewered buildings (meaning buildings not connected to a municipal sewer system) must not encroach the 75' setback from the Ordinary High Water Line, per the City Shoreland Management Ordinance. The AWOS Critical Area must also be considered when locating structures, both in height and occlude angle of 10 degrees or less. New hangars similar to the size of the existing private hangars must be able to meet the height restrictions as indicated in Building Restriction Lines to protect the Part 77 Transition Surface.

5.6.2 Alternative 5A – Location 1 – On New SE Apron

Alternative 5A (See Figure 5-20) locates the future private hangars in the center of a proposed new apron. This location is logical due to the ability to provide Group II taxilane access to each building that will meet FAA standards.

Constrains Future Landside Development: Positioning hangars in the center of the proposed new apron does not impede future development of landside facilities to the southeast.

Wetland Impacts or Shoreland OHWL Impacts: Positioning the hangars in the center of the proposed new apron does not impact any delineated wetlands or the OHWL setback.

Easement Impacts: The development of private hangars in this location does not impact any recorded easements.

Part 77/TERPs Surfaces Impacts: Buildings in this location, if pursued, would need to be carefully designed to avoid penetration of the Part 77 Transitional Surface with the hangars.

NAVAID/AWOS Impacts: This location is outside of the AWOS Critical area and is positioned away from other Airport NAVAIDs.

Property Acquisition Required: This location is on current Airport property.

5.6.3 Alternative 5B – Location 2 – North Side of Existing Apron

Alternative 5B (See Figure 5-20) locates the future private hangars on the north side of the existing apron. This location is more problematic due to building area constraints and restricted taxilane widths.

Constrains Future Landside Development: Positioning the hangars on the north side of the existing apron does not constrain future development.

Wetland Impacts or Shoreland OHWL Impacts: Positioning the hangars on the north side of the existing apron is problematic due to the presence of the Ordinary High Water Level setback line established by Elbow Lake's Shoreland Ordinance for Flekkefjord Lake. This leaves a strip of land so narrow as to preclude development of an adequately-sized private hangars. It may be possible to receive a waiver from the City regarding this setback.

Easement Impacts: The development of private hangars to the north of the apron does not impact any recorded easements.

Part 77/TERPs Surfaces Impacts: The northern location is well away from the TERPs Surfaces of Runway 14/32 and 11/29 and their associated Building Restriction Lines established by the Part 77 Transitional Surface.

NAVAID/AWOS Impacts: This location is outside the AWOS Critical area and is positioned away from other Airport NAVAIDs.

Property Acquisition Required: This location is on current Airport property.

5.6.4 Alternative Analysis 5 Summary

Criteria	5A Private Hangars at SE Apron	5B Private Hangars on North Side of Apron
Constrains Future Landside Development	No	No
Wetland Impacts	No	No
Shoreland OHWL Setback Impacts	No	Yes
Easement Impacts	No	No
Part 77/TERPs Surfaces Impacts	No	No
NAVAID/AWOS Impacts	No	No
Property Acquisition Required	None	None
Planning Level Cost Estimate	Paid by Owner of Hangar	Paid by Owner of Hangar

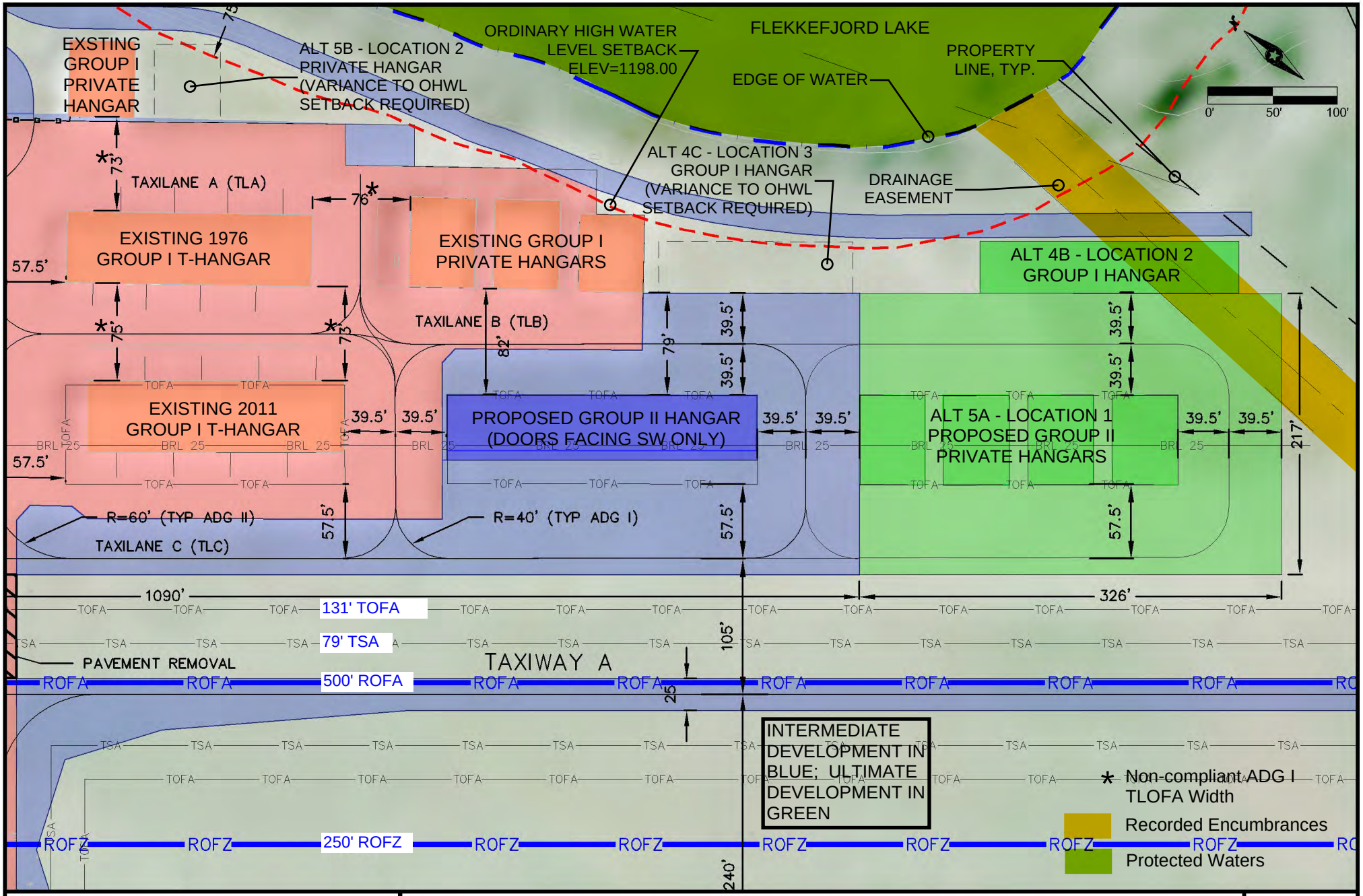
Table 5-23: Alternative Analysis 5 Comparison

5.6.5 Alternative Analysis 5 Recommended Alternative

Alternative 5A is recommended as the location for future private hangars because it does not negatively impact wetlands, the OHWL setback, easements, TERPS surfaces or airport NAVAIDs. It also preserves access to the southeast for future apron development.

5.6.6 Alternative Analysis 5 Preferred Alternative

The Elbow Lake Airport Board, at their meeting held on February 27, 2018, has selected Alternative 5A as the preferred alternative. Their decision was made with the input of the designated Airport Advisory Committee. This alternative was selected because the location proposed did not interfere with future apron and taxilane development to the southeast and had fewer environmental impacts. This alternative would be pursed after the completion of the proposed Group II hangar and apron described in Alternative 4A.The private hangars may be sized for Group I or II aircraft with Group II taxilane access from the south, while preserving Group I taxilane access for future hangars to the north.



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Alt. 4A - Location 1 - Add Hangar (Group II)
Alt. 4B - Location 2 - Add Hangar (Group I)
Alt.4C - Location 3 - Add Hangar (Group I)

Alt. 5A - Location 1 - Hangars at New SE Apron
Alt. 5B - Location 2 - Hangars at Exist. Apron

Figure 5-20

5 | Section 7 – Alternative Analysis 6 - Security Fence Location

Figure 5-24: Existing Apron Fencing

5.7.1 Security Fence Development Constraints and Considerations

The requirement for a security fence separating aircraft movement areas from the general public was most recently identified in a 5010 Inspection letter from Christopher Meyer on July 12, 2016. Minnesota public airport licensing rules require that fencing or barriers be constructed to prevent persons not engaged in flight activities from having access to a "position of danger" with relation to aircraft near building areas and on the flight line. While there is a small portion of existing fencing at the A/D building, additional fencing is required to prevent unauthorized persons from freely accessing the apron, taxiway, and runway. Signs should also be posted alerting the public of the aircraft operations area.

The security fencing requirement can best be met by considering a range of issues unique to Y63. While security fencing is desirable, another factor to be considered is that the general public has great interest in activity at Y63. Members of the Airport Board have related that people enjoy coming out to the airport to see the aircraft and the activity, and those people are public supporters of the airport and its value in Elbow Lake. Others enjoy walking, biking or jogging the length of Airport Road due to its natural setting and wildlife. Restricting access to these leisure activities may have the effect of subduing public support for the airport. The Board wishes to preserve a view to the apron if possible.

On the other hand, the Airport Manager reported that some members of the public may attempt to use the seaplane ramp and dock for fishing or lounging, which should be deterred if possible. A fence and signage could be positioned prior to the seaplane base to discourage access by unauthorized persons.

The fence length and number of gates will be the largest determinant of cost. It may be possible to incorporate the existing apron fence segment for a cost savings. No property acquisition would be required for either alternative.

5.7.2 Alternative 6A – Location 1 – Fence at Apron Edge

Alternative 6A (See Figure 5-25) locates the security fence at the apron's edge. This alternative requires two sliding gates: one which would be manual, next to the FBO, and another which would be automatic with a secure entry system, as requested by the Airport Manager.

Security Level: While a fence stretching from the FBO to the nearest private hangar would effectively cut off direct access to the apron by the public, it would not be difficult to go around either of the buildings to enter the apron from the east or the west.

Public Accessibility: This alternative would provide the greatest level of public accessibility, allowing non-flying members of the public to walk right up to the edge of the apron and observe the aircraft activity. It would not impede those who use Airport Road for recreation or exercise.

Wetland Impacts: This alternative does not impact any delineated wetlands.

Shoreland OWHL Setback Impacts: The setback enforced by the City's shoreland ordinance does not apply to fencing.

Planning Level Cost Estimate: This alternative has a greater cost due to its length and number of required gates.

5.7.3 Alternative 6B – Location 2 – Fence at Airport Road

Alternative 6B (See Figure 5-25) locates the security fence on Airport Road, between the current City Brush Dump and the Seaplane base. This alternative requires one automatic sliding gate with a secure entry system, as requested by the Airport Manager.

Security Level: This alternative's location creates greater security for all Airport facilities and improves public safety by making it harder for unauthorized persons to get around the ends of the fence, essentially stretching from Flekkefjord Lake to the wetland to the west. This location would protect the seaplane base from unauthorized use, which is a frequent problem.

Public Accessibility: This alternative, due to its distance from the apron, would discourage public engagement by inhibiting casual observation of airport activity. Recreational users of Airport Road would also have a reduced length of road available for use.

Wetland Impacts: This alternative may impact a delineated wetland if the fence is extended too far to the west.

Shoreland OWHL Setback Impacts: The setback enforced by the City's shoreland ordinance does not apply to fencing.

Planning Level Cost Estimate: This alternative is less costly due to its reduced fence length and single gate. A "turn around" or parking area on the public side of the gate should be included in the cost.

5.7.4 Alternative Analysis 6 Summary

Criteria	6A Security Fence at Apron	6B Security Fence at Airport Rd
Security Level	Low	High
Public Accessibility of Airport	High	Low
Wetland Impacts	None	Low
Shoreland OHWL Setback Impacts	No	No
Planning Level Cost Estimate	$84,000	$60,000

Table 5-26: Alternative Analysis 6 Comparison

5.7.5 Alternative Analysis 6 Recommended Alternative

Alternative 6B is recommended because it provides the highest level of security from Airport Road and is the lowest cost solution. However, City staff wish to preserve public access to view the activity at the airport as a marketing and public relations tool.

5.7.6 Alternative Analysis 6 Preferred Alternative

The Elbow Lake Airport Board, at their meeting held on February 27, 2018, has selected Alternative 6A as the preferred alternative. Their decision was made with the input of the designated Airport Advisory Committee. This alternative was selected because the Airport Board felt that public access to view the activity at the airport was extremely important and outweighed other security considerations, while still meeting the Minnesota Airport Licensing requirement to "prevent all persons not engaged in flight activities from having access to a position of danger with relation to aircraft in the vicinity of building areas and on the flight line."

Consideration should be given, during the design of the security fence system, to the Airport Board's desire to allow the public to see the activity on the Apron. In this alternative, the seaplane base dock is left "unprotected." It is recommended that clear and visible signage be installed at the dock prohibiting its use by the general public and directing them to other City lake-access areas instead.

5 | Section 8 – Alternative Analysis 7 - SRE Building Location

Figure 5-27: Snow on the Apron at Y63

5.8.1 SRE Building Development Constraints and Considerations

A Maintenance and Snow Removal Equipment Building, located on Airport property, would provide ready access to critical safety and maintenance equipment, and would fulfill FAA's requirements that all equipment funded by FAA must be kept on site for Airport use only.

The building should be located for easy access from the City during weather emergencies and be adjacent to critical apron, taxiway, and runway areas. Its location should not interfere with Part 77 or TERPs surfaces, and should not unnecessarily constrain future landside development. It should not interfere with the function of any NAVAIDs. The AWOS Critical Area must be considered when locating structures, both in height and occlude angle of 10 degrees or less. Location of any structure within the Critical Area must be coordinated with MnDOT.

The building must be large enough, approximately 45' x 50', to accommodate all FAA and State-funded equipment, such as mowers and snow plows.

5.8.2 Alternative 7A – Location 1 – SRE Near FBO

Alternative 7A (See Figure 5-25) locates the SRE Building near the Airport's FBO.

Access from City and Access to Paving: This location is most easily accessed from Elbow Lake during a snow event and is within 100 feet of apron paving.

Constrains Future Landside Development: This location occupies a relatively small strip of land between an existing access drive and the Ordinary High Water Level setback line established by Elbow Lake's Shoreland Ordinance. Other proposed structures for Y63, such as a T-hangar or private hangars, would not be well-suited in this location as it does not have immediate access to the apron.

Wetland Impacts or Shoreland OHWL Impacts: As this location is outside of the Ordinary High Water Level setback line, a structure in this location is acceptable per the ordinance, and is assumed not to interfere with Wetland or Shoreland environments.

Easement Impacts: This location does not impact any recorded easements.

Part 77/TERPs Surfaces Impacts: This location is well away from the TERPs Surfaces of Runway 14/32 and 11/29 and their associated Building Restriction Lines established by the Part 77 Transitional Surface. Since FAA does not recognize TERPs surfaces for sealanes such as 11/29, so the proposed location is not problematic.

NAVAID/AWOS Impacts: This location is outside of the AWOS Critical area and is positioned away from other Airport NAVAIDs.

Property Acquisition Required: This location is on current Airport property.

5.8.3 Alternative 7B – Location 2 – SRE at North of Existing Apron or SE End of New Apron

Alternative 7B (See Figure 5-25) locates the SRE Building on the north side of the existing apron or the east side of a proposed new apron.

Access from City and Access to Paving: This location is less easily accessed from Elbow Lake during a snow event and has immediate access to apron paving.

Constrains Future Landside Development: Positioning the building on the east side of the proposed new apron does potentially impede future development of landside facilities to the southeast. Positioning the building on the north side of the existing apron does not constrain future development.

Wetland Impacts or Shoreland OHWL Impacts: Positioning the building on the east side of the proposed new apron does not impact any delineated wetlands or the OHWL setback. Positioning the building on the north side of the existing apron is problematic due to the presence of the Ordinary High Water Level setback line established by Elbow Lake's Shoreland Ordinance for Flekkefjord Lake. This leaves a strip of land so narrow as to preclude development of an adequately-sized SRE building.

Easement Impacts: The development of an SRE building to the north or east does not impact any recorded easements.

Part 77/TERPs Surfaces Impacts: The northern location is well away from the TERPs Surfaces of Runway 14/32 and 11/29 and their associated Building Restriction Lines established by the Part 77 Transitional Surface. The eastern location, if pursued,

would need to be carefully designed to avoid penetration of the Part 77 Transitional Surface with the SRE structure.

NAVAID/AWOS Impacts: Both locations are outside of the AWOS Critical area and are positioned away from other Airport NAVAIDs.

Property Acquisition Required: Both locations are on current Airport property.

5.8.4 Alternative Analysis 7 Summary

Criteria	7A SRE Bldg. Near FBO	7B SRE Bldg. at SE Apron
Access from City	Good	Poor
Access to Airport Paving	Good	Good
Constrains Future Landside Development	No	Yes
Wetland Impacts	No	No
Shoreland OHWL Setback Impacts	No	Yes
Easement Impacts	No	No
Part 77/TERPs Surfaces Impacts	No	No
NAVAID/AWOS Impacts	No	No
Property Acquisition Required	None	None
Planning Level Cost Estimate	$190,000	$190,000

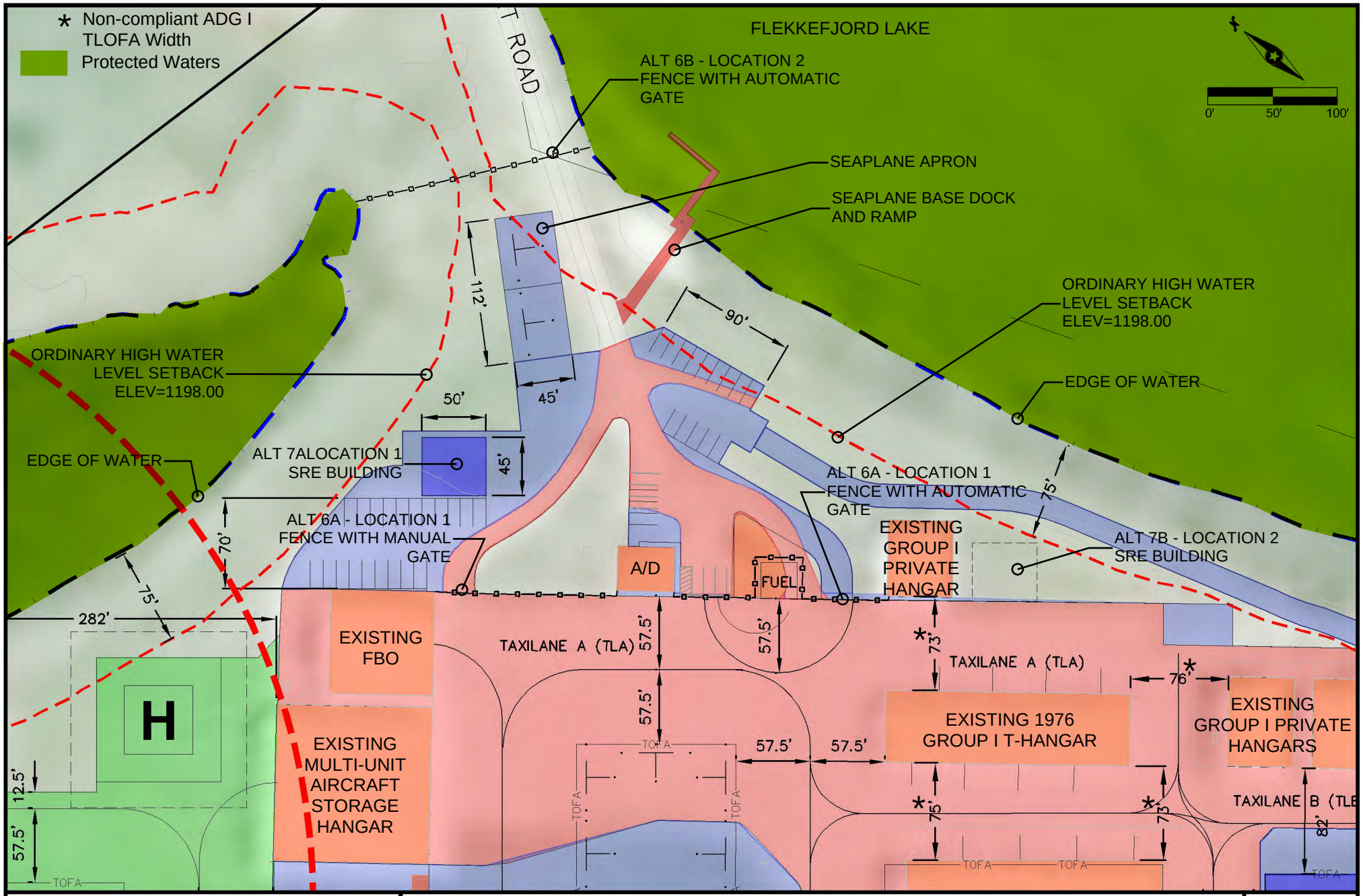
Table 5-28: Alternative Analysis 7 Comparison

5.8.5 Alternative Analysis 7 Recommended Alternative

Alternative 7A is recommended for the SRE building location because it is conveniently located for access from Elbow Lake as well as to critical airport paved surfaces. This location does not impact wetlands, Shoreland OHWL setbacks, or Part 77 or TERPs surfaces. It is preferable to the SE apron location because it does not constrain the development of additional hangars or apron area.

5.8.6 Alternative Analysis 7 Preferred Alternative

The Elbow Lake Airport Board, at their meeting held on February 27, 2018, has selected Alternative 7A as the preferred alternative. Their decision was made with the input of the designated Airport Advisory Committee. This alternative was selected because the Board felt its position made the most sense for easy access from Airport Road and to the apron and had no environmental impacts due to its location.



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Alt. 6A - Location 1 - Fence at Apron Edge
Alt. 6B - Location 2 - Fence at Airport Road
Alt. 7A - Location 1 - SRE Bldg near FBO
Alt. 7B - Location 2 - SRE Bldg at Apron

Figure
5-25

5 | Section 9 – Preferred Alternatives

The table below summarizes the decisions of the Airport Board in review of the proposed alternatives on February 27, 2018. The combination of these selected alternatives is the preferred plan for general aviation development at Elbow Lake Municipal Airport.

Criteria	Planning Level Cost Estimate	Development Phasing
Alternative 1 – Extend Runway to Southeast	$2.8 Million	20+ years
Alternative 2 – Partial Taxiway	$414,000	0-5 years
Alternative 3 – Apron to Northwest	$1,697,000	0-5 years
Alternative 4 – Group II Hangar	$760,000	5-10 years
Alternative 5 – Private Hangars	By Owner	As needed
Alternative 6 – Security Fence at Apron	$84,000	0-5 years
Alternative 7 – SRE Building Near FBO	$190,000	5-10 years

Table 5-29: Preferred Alternative Cost and Development Phasing